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POLYCYSTIC OVARY SYNDROME AND METABOLIC HEALTH

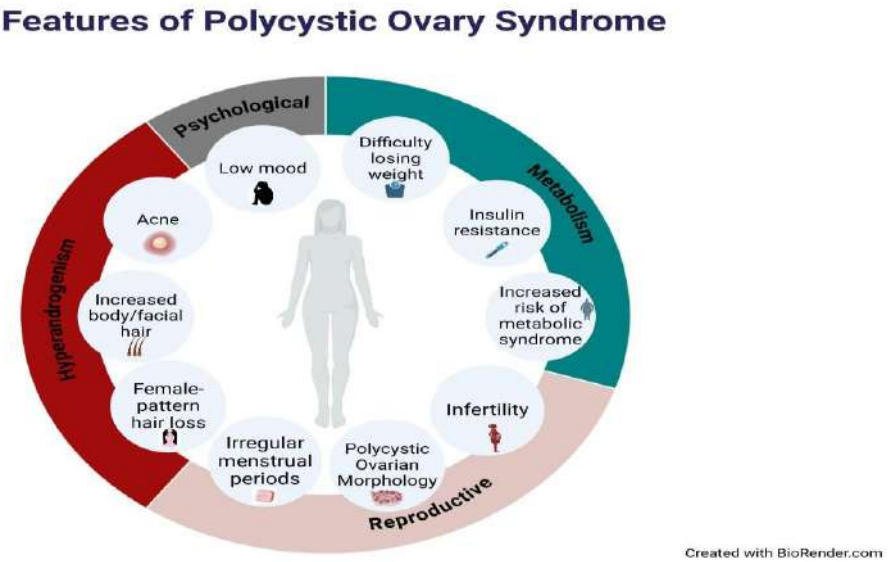
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Abstract

Polycystic ovary syndrome (PCOS) is a complicated genetic condition that impacts around 20% of women Research indicates that it's a complex condition with multiple genes at play, shaped by both our genes and our surroundings Diagnosing PCOS depends on reproductive traits and it's split into different types that vary across different races and ethnic backgrounds Insulin resistance and metabolic issues are key factors in PCOS development; leading to a range of bad metabolic effects that really take a toll on women's health over time It's interesting to see that women with PCOS often have similar metabolic issues in their family members We really need to broaden our view of PCOS and seeing it as more than just a fertility issue but also as a metabolic condition. This viewpoint may influence how we plan and handle future care for the condition. The aim of this review is to evaluate and examine the current research backing up the idea that PCOS is both reproductive and a Metabolic issue.

Keywords: PCOS, Metabolic syndrome, metabolites, clinical application and gut microbiota.



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Introduction to Metabolic Syndrome and PCOS

Metabolic syndrome includes things like belly fat, high blood pressure, diabetes and bad cholesterol levels. This emphasizes the vital of heart and hormone health, especially when it comes to insulin intolerance PCOS impacts about 10 to 18 percent of women who can have kids and insulin resistance is a big player in causing it and the related metabolic issues. A lot of women with PCOS possibly have metabolic syndrome, which is notably serious and can lead to heart problems, Hyperglycemia and mental health issues Traditional PCOS management has mostly been about tackling infertility and symptoms tied to it, Illuminating the importance of healthcare pros knowing more about metabolic syndrome Early detection and acting on metabolic syndrome is super important because it's a big health issue. This review will take a deep dive into how metabolic syndrome connects to PCOS, looking at what causes it, what happens because of it, how to spot it, and ways to handle it. This literature really drives home the point that PCOS isn't just a problem with reproduction it's a extensive metabolic issue that can seriously mess with your cardiac physiological function and hormone levels over time. This underscores the need to identify metabolic syndrome early on with regular check-ups and healthy habits like maintaining a healthy weight and getting the right treatments to avoid health problems down the line Given the concern obesity and inactive habits among Indian women, it's crucial to implement prevention strategies that fit the culture at both Healthcare premises and community gatherings to Alleviate the evolving cases of PCOS and metabolic syndromes .

This inspection will explore metabolic syndrome in relation to PCOS and covering its causes, consequences, diagnostic criteria, screening and administration.

Long-term Consequences

Cardiovascular Disease (CVD)

Type II Diabetes

Various forms of Cancer

Sleep Apnea

Psychological disorders

The Pathophysiology of Polycystic Ovary Syndrome: A Comprehensive Treatise

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1.Prolegomenon and Diagnostic Taxonomy

Polycystic Ovary Syndrome (PCOS) stands as the preeminent endocrinopathy affecting women of reproductive age, with a global prevalence estimated at approximately 15%. Far from being a mere gynecological concern, PCOS is a multi-systemic disorder characterized by a complex interplay between reproductive failure and metabolic derangement.

The clinical identification of PCOS is governed by several diagnostic frameworks, most notably the Rotterdam Criteria (2003). This consensus requires the presence of at least two of the following three manifestations:

Oligo-ovulation or Anovulation: Irregularity or absence of the menstrual cycle.

Hyperandrogenism: Clinical signs (hirsutism, acne) or biochemical evidence (elevated serum testosterone).

Polycystic Ovarian Morphology (PCOM): The ultrasonographic appearance of numerous small follicles arranged peripherally, often likened to a “string of pearls.”

While the prevalence is uniform across geographies, the phenotypic expression is markedly influenced by ethnicity. Caucasian cohorts frequently exhibit higher body mass indices (BMI), whereas East Asian populations often present with lower BMIs and subtle clinical hyperandrogenism, despite harboring significant internal metabolic disturbances.

I. The Vicious Cycle of Pathogenesis

The pathophysiology of PCOS is not a linear progression but rather a self-perpetuating “vicious cycle” involving the hypothalamus, the pituitary gland, the ovaries, and insulin-sensitive tissues.

A. Neuroendocrine Dysregulation

At the nexus of the disorder is the aberrant pulsation of Gonadotropin-Releasing Hormone (GnRH). In a physiological state, GnRH pulses vary in frequency to regulate the secretion of Luteinizing Hormone (LH) and Follicle-Stimulating Hormone (FSH). In PCOS, the GnRH pulse generator is abnormally rapid, which preferentially stimulates the pituitary to oversecrete LH while suppressing FSH. This imbalance leads to:

Thecal Cell Hyperplasia: Excess LH drives the ovarian theca cells to synthesize high levels of androgens (testosterone).

Follicular Arrest: Insufficient FSH prevents follicles from reaching maturity, leading to the accumulation of small, immature follicles and the characteristic "polycystic" appearance.

B. The Role of Insulin Resistance

Independent of obesity, many women with PCOS exhibit Insulin Resistance (IR). Hyperinsulinemia (excess blood insulin) acts as a co-gonadotropin, directly stimulating ovarian theca cells to produce more androgens. Furthermore, insulin inhibits the hepatic synthesis of Sex Hormone-Binding Globulin (SHBG). As SHBG levels fall, the concentration of bioactive "free" testosterone rises, further exacerbating the androgenic state and reinforcing a cycle of metabolic and reproductive dysfunction.

II.Etiological Drivers: Genetic and Environmental Interplay

The origin of PCOS is multifactorial, emerging from a delicate confluence of genetic susceptibility and environmental triggers.

C. Genetic Architecture

PCOS demonstrates high heritability (approximately 70%). Genome-wide association studies (GWAS) have identified several susceptibility loci, including genes involved in gonadotropin regulation (FSHB, LHCGR) and insulin signaling (INSR). However, these genetic markers account for only a small fraction of the syndrome's variance, suggesting that environment plays a dominant role in "unlocking" the PCOS phenotype.

D. Environmental and Intrauterine Programming

The "Developmental Origins of Health and Disease" (DOHaD) hypothesis suggests that the intrauterine environment is a critical determinant. Daughters of women with PCOS are exposed to elevated prenatal androgens, which may "program" the fetal hypothalamus and ovaries, predisposed them to PCOS in adulthood.

E. Cellular Stress and Exogenous Toxins

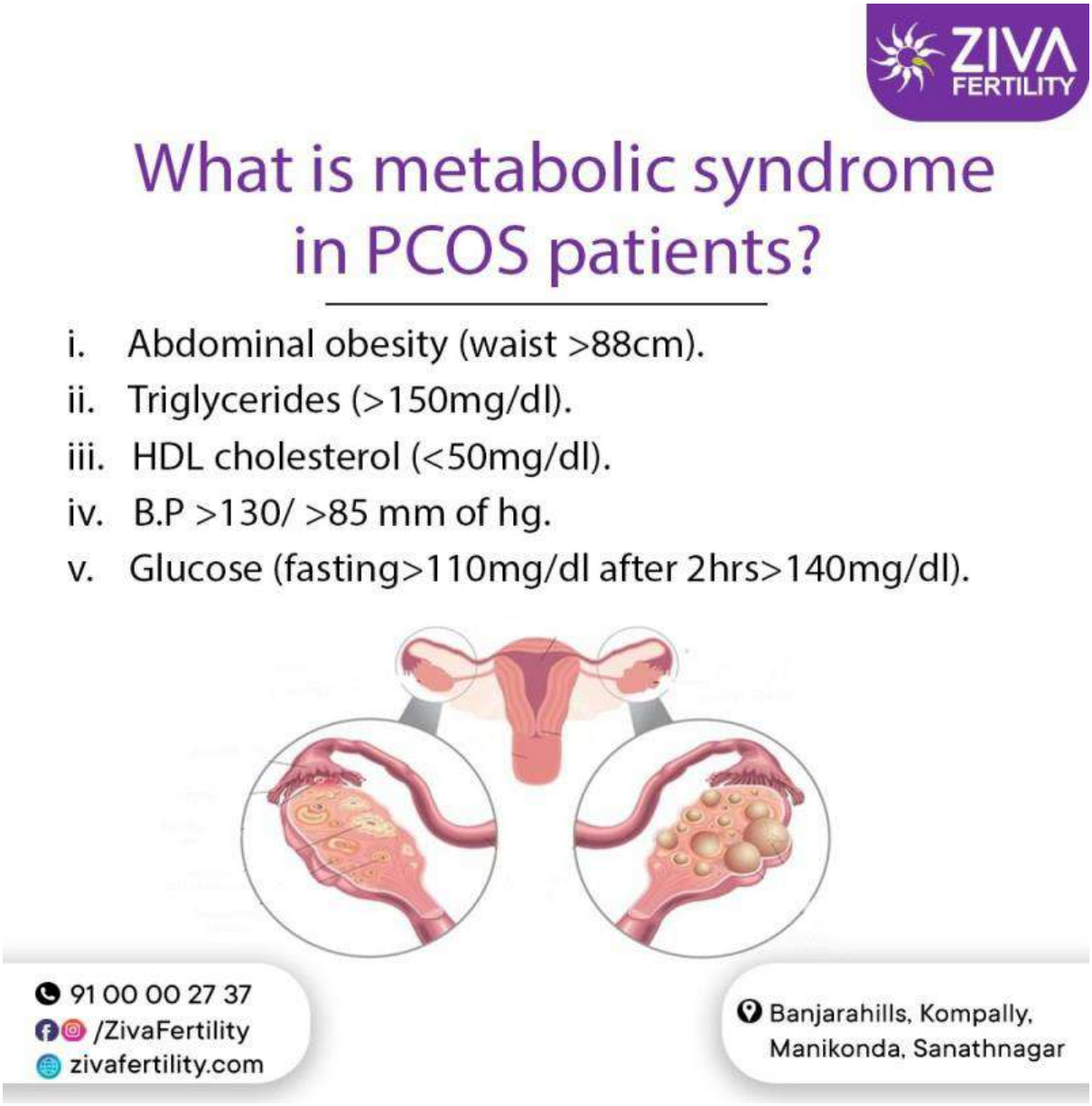
Recent investigations highlight the role of Endoplasmic Reticulum (ER) stress and oxidative stress within the follicular microenvironment. These cellular stressors, often triggered by modern dietary habits—specifically the consumption of Advanced

Glycation End-products (AGEs) found in highly processed or charred foods—disrupt oocyte maturation and exacerbate local inflammation.

III.Epilogue and Future Perspectives

In conclusion, PCOS is a heterogeneous condition where reproductive dysfunction and metabolic disorders intersect. Understanding the syndrome requires moving beyond the ovaries to consider systemic insulin dynamics and cellular health.

Future clinical focus must transcend symptomatic relief (such as the management of acne or cycle regulation) and move toward preconception care and lifelong metabolic vigilance. By addressing the environmental



Diagnosis

Diagnosed by the at least two specific things from detail but doctors have to rule out other causes for your symptoms first.

1 signs of high androgens- like excessive hair growth on your face or body and hair thinning on your head, severe acne. Heightened testosterone levels in your blood.
2 Missing or having irregular menstrual period.
3 seeing polycystic ovaries on an ultrasound.

Still it's significance noting that not all women with PCOS truly have polycystic ovaries. So, ovarian cysts are not obligatory for PCOS diagnosis.

Blood tests can show elevated androgen steroid levels even if woman who doesn't have obvious excess hair or acne. These tests also help determine if ovulation is occurring regularly for women with normal cycles who might still have PCOS. When doctors are determining for PCOS, they consider genetic inclination -For example, women with a family history of PCOS or type II diabetes have a greater probability of developing the condition themselves. Health professional also take into record a person's life stage. It's rather common for menstrual cycles to be somewhat irregular when someone first starts menstruating, and again as they come closer menopause. Once diagnosed with PCOS, women should go through additional blood tests. These test helps in filter for basic insulin resistance and assess overall cardiac event.

Treatment

PCOS does not have cure but treatment can actually make life improved. Facilitate with fertility, decreased the odds of developing endometrial hyperplasia or endometrial cancer and these treatment helps to stop Prolonged cardiovascular events.

Including a healthy lifestyle with good eating habits and regular exercise is key for all women with PCOS, even if it does not necessarily mean trimming down Combined birth control pills can help keep your period regular and might help clear up your skin or reduce unwanted hair on your face and body. Androgen receptor blockers might also help with unwanted hair or acne When it comes to selecting treatments, it's all about teamwork. We are required to consider what each person truly wants and values Treatments for PCOS-related infertility can range from modifying your lifestyle, taking meds, or even going under the knife to get those eggs to come along IVF and other

fertility help methods might be options too Women with PCOS can often get help to have a baby, but they usually face higher risks during pregnancy that means they need additional check-ups .

Complications

Complications of PCOS can contain:

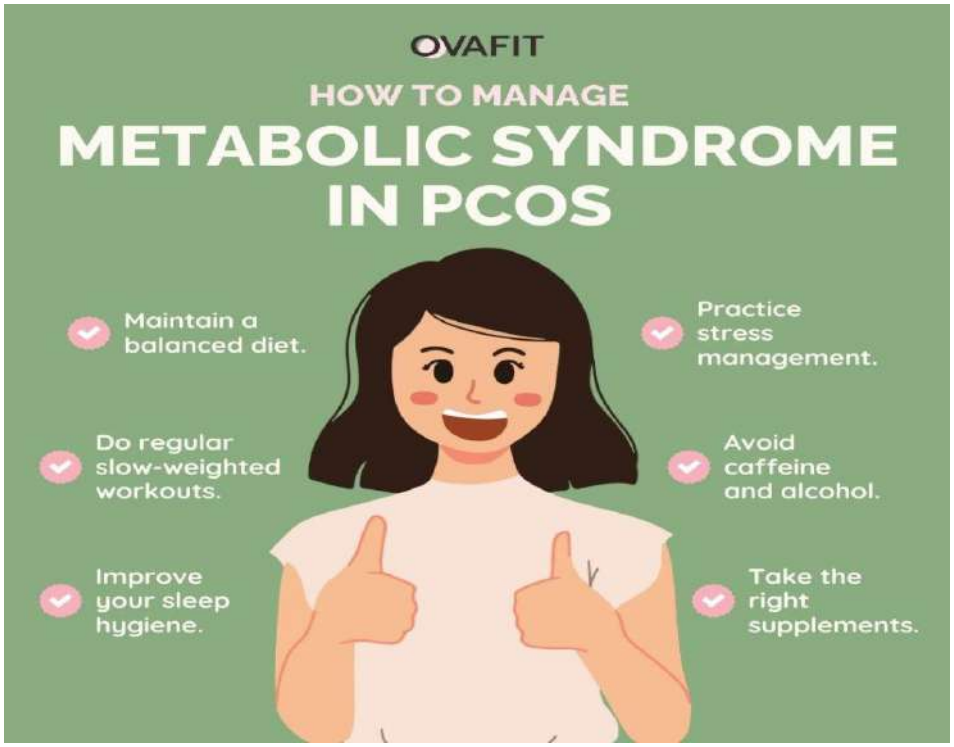
1. Infertility : Getting pregnant can make more difficult with PCOS but pregnancy Still possible for people dealing with PCOS.

2. Pregnancy difficulty : perhaps you have more chance of getting diabetes during pregnancy, which is known as gestational diabetes. You could have a possibility of dealing with high blood pressure.

3. Mental health concerns : Anxiety, Depression and disorders like eating can occur with PCOS.

4. Metabolic complications : insulin resistant , Type II diabetes
(greater chance of high blood sugar).

5. Endometrial cancer : also called uterine cancer, People with PCOS develop a state that induces the uterus lining to become excessively dense.



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Eitopathogenesis beyond simple genetics

The etiology of PCOS is best understood as a concordance triggers . While GWAS (Genome wide association studies) have identified susceptibility loci near the DENND1A and FSHR genes, the phenotype rarely manifest without an environmental second hit

Most notably , prenatal exposure to high androgen levels may "program " the fetal HPO axis leading to the characteristics increase in GnRH pulse frequency observed in adolescent patient.

THE PATHOGENESIS

the driving force is not a single organ failure but a reciprocal feedback loop

• The intraovarian defect:- in PCOS theca Cells exhibit an intrinsic hyper responsiveness to lutenizing hormone . This over - activity results in the excessive conversion of cholesterol to androstenedione.

• The insulin potentiator:- unlike other tissues that develop insulin resistance the ovary remains paradoxically sensitive to insulin. Hyperinsulinemia acts as a co-gonadotrophic bypassing traditional feedback loops to further drive androgen production while simultaneously down regulating SHBG (Sex hormone binding globulin) . This result in a surge due to the absence of a dominant FSH driven signal .

• Morphology:- microscopically the polycystic appearance is a misnomer. These are not true cysts but are the follicles that has been asserted a cemetery of follicles trapped in the pre antral stage due to the absence of a dominant FSH driven signal .

CLINICAL MANIFESTATION

The clinical presentation is rarely uniform . Patients typically present with a combination of:

1. Dermatological markers:- Refractory cystic acne and hirsutism (tracked via ferriman gallwey scale).
2. Acanthosis Nigricans:- A velvety, hyper pigmented tegument, usually on the nape of the neck or axilla , serving as a visceral marker of severe insulin resistance.
3. Ovulatory Dysfunction:- Chronic oligomenorrhea, which carries the significant risk of endometrial hyperplasia due to lack of cyclic progesterone to offset estrogenic stimulation.

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DIAGNOSTICS

• To diagnose PCOS, one must navigate the Rotterdam Criteria, but clinical due diligence requires the active exclusion of:

• NCCAH (Non- classic congenital adrenal hyperplasia) : Often not easily differential than PCOS . A morning 17 - hydroxyprogestrone (17-OHP) level >2ng/mL is the threshold for further ACTH stimulation testing.

• Androgen secreting neoplasms : Suspected when testosterone levels exceed 200ng/dL or symptoms progress with" virillizing "speed.

• Hypothalamic Amenorrhea: Distinguished by low LH levels and a lack of metabolic markers.

MANAGEMENT

Management is not a one size fits all pill prescription. It requires a systematic and proper approach:

• Metabolic Consolidation:- Metformin remains a essential, not necessarily for weight loss , but for its ability to sensitize peripheral tissues and reduce the insulin burden on the ovaries.

• Hormonal Sequestration:- Combined oral contraceptive (COCPs) are the gold standard for cycle regulations, but clinicians must check for venous thromboembolism (VTE) risk , which is generally higher in PCOS population.

• Infertility Intervention:- while Clomiphene was the historical lead, Letrozole (an aromatase inhibitor) has shown superior live - birth rates by avoiding the anti estrogenic effects on the endometrium seen with older drugs

LONG TERM COMPLICATIONS

The result of untreated PCOS is a metabolic decline .The combination of chronic inflammation and dyslipidemia creates a "pro- thrombotic " state. Studies now show that women with PCOS reach the higher risk for Type2 Diabetes nearly a decade earlier than their peers who are the same weight and height as them . Furthermore, the risk of endometrial adenocarcinoma is elevated three times more due to untreated levels of estrogen.

CONCLUSION

PCOS is dangerous for future metabolic health . Treating the surface level hirsutism or cycle irregularities without addressing the underlying insulin androgen axis is a clinical oversight .

Further direction the transition from a reproductive disorder to a cardiovascular crisis.

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BIOLOGIYA DARSLARIDA ZAMONAVIY PEDAGOGIKA VA AXBOROT TEXNOLOGIYALARDAN FOYDALANISHNING SAMARADORLIGI

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Abstract: This article analyzes the effectiveness of the effective use of modern pedagogical technologies and information and communication technologies (ICT) in teaching biology. The study highlights the theoretical and methodological foundations of organizing the educational process based on innovative approaches, and reveals the possibilities of using interactive methods, multimedia tools, virtual laboratories, and digital educational platforms in biology lessons.
Key words: ICT, interactive methods, case studies, 3D modeling, virtual laboratory.

Kirish

Hozirgi globallashuv jarayoni natijasida ta'lim tizimiga qo'yiladigan talablar keskin o'zgardi va zamonaviy bilim va ko'nikmalarga, mustaqil fikrlashga va ijodiy usullardan foydalanish qobiliyatiga ega shaxslarni shakllantirish tobora muhim ahamiyat kasb etmoqda. Eng dolzarb masalalardan biri o'quvchilarning fanga qiziqishini oshirish, ularning amaliy ko'nikmalarini mustahkamlash va tabiiy fanlar, ayniqsa biologiya bo'yicha o'qitish sifatini oshirishdir. Shu ma'noda, biologiya darslarida axborot-kommunikatsiya texnologiyalari va zamonaviy pedagogik usullardan foydalanish juda muhimdir. Biologiyaning maqsadi tirik mavjudotlarni, jumladan, ularning tuzilishi, rivojlanishi, o'zaro ta'siri va atrof-muhit bilan aloqalarini o'rganishdir. Biologiya ko'plab murakkab g'oyalar va protseduralarni o'z ichiga oladi. Natijada, biologiyani an'anaviy usullar orqali o'qitish ko'pincha o'quvchilarning tasavvurlaridan to'liq foydalanishiga to'sqinlik qiladi.[1,145-b]. Zamonaviy pedagogik vositalar tufayli ta'lim jarayoni shaxsga yo'naltirilgan yondashuv yordamida tashkil etilishi mumkin. O'quvchilarning o'ziga xos fazilatlari hisobga olinadi, ularning mustaqil o'rganish qobiliyati rivojlantiriladi va ijodiy fikrlash qobiliyati shakllantiriladi. Interaktiv o'qitish usullari o'quvchilarni o'quv jarayonida faolroq ishtirok etishga undaydi va ularning materialni ongli va puxta o'zlashtirishiga yordam

beradi. Biologiya darslarida "Miya hujumi", "Klaster", "Insert" va "BBB" kabi usullar o'quvchilarga mantiqiy fikrlash qobiliyatlarini mustahkamlashga va qiyinchiliklarga duch kelganda mustaqil ravishda tanlov qilishni o'rganishga yordam beradi. Ta'lim tizimiga axborot-kommunikatsiya texnologiyalarining jadal rivojlanishi sezilarli ta'sir ko'rsatmoqda. Hozirgi kunda biologiya ta'limi tobora ko'proq elektron darsliklar, multimedia kurslari, animatsiyalar, simulyatsiyalar va virtual laboratoriyalarni o'z ichiga oladi. Ushbu resurslar o'quvchilarga murakkab biologik jarayonlar haqida oson tushunarli tarzda o'rganish imkoniyatini beradi. Xususan, laboratoriya sharoitida bajarish qiyin bo'lgan sinovlarni virtual ravishda o'tkazish mumkin bo'lganda, o'qitish samaradorligi sezilarli darajada oshadi. Bundan tashqari, o'qituvchilarning kasbiy faoliyati axborot texnologiyalaridan foydalanish orqali yaxshilanadi. Darslarni tashkil qilish, o'quv materiallarini tayyorlash va ularni baholash uchun zamonaviy dasturiy vositalardan foydalanish o'qituvchining unumdorligini oshiradi. Bu o'quv jarayonini sifat jihatidan yangi bosqichga ko'taradi.[2,98-b]. Jumladan, O‘zbekiston Respublikasi Prezidentining “Ta’lim tizimini yanada rivojlantirish chora-tadbirlari to‘g‘risida”gi Qarori 2021-yil 19-mart, PQ-5032-son ta’lim tizimida tub o‘zgarishlarni amalga oshirishga qaratilgan muhim hujjat hisoblanadi. Ushbu qarorda ta’lim jarayoniga zamonaviy pedagogik texnologiyalarni keng joriy etish, o‘qituvchilarning kasbiy malakasini oshirish hamda ta’lim sifatini yaxshilash kabi ustuvor vazifalar belgilangan.

Pedagogik texnologiya – o‘qitish shakllarini optimallashtirish maqsadida o‘qitish va bilimlarni o‘zlashtirish jarayonida inson salohiyati va texnik resurslarni qo‘llash, ularning o‘zaro ta’sirini aniqlashga imkon beradigan tizimli metodlar o’quv qo’llanmasidir. Bu yerda, inson salohiyati deyilganda, o‘qituvchining pedagogik va o‘quvchilarning o‘quv-bilish faoliyati, texnik resurslar deganda o‘qitish metodlari va vositalari nazarda tutilmoqda. Bizning nazarimizda, pedagogik texnologiya – ta’lim jarayonining samaradorligini oshirish maqsadida o‘qitish va bilimlarni o‘zlashtirish jarayonida o‘qituvchining pedagogik va o‘quvchining o‘quv-bilish faoliyatini uyg‘un ravishda tashkil etish, mazkur faoliyatni faollashtirish maqsadida, samarali o‘qitish metodlari, vositalari va shakllarini qo‘llash, ularning o‘zaro ta’sirini aniqlashga imkon beradigan tizimlar o’quv qo’llanmasidir. Pedagogik texnologiyalarning uchta darajasi mavjud: mumiy metodik darajada umumiy pedagogik (umumdidaktik, umumtarbiyaviy) darajada pedagogik texnologiyaning umumiy qonuniyatlari, konseptual asoslari, o‘qituvchi va o‘quvchining bilish faoliyatini tashkil etish va boshqarishning o‘ziga xos xususiyatlari ishlab chiqish.

Xususiy metodik darajada muayyan bir o‘quv fani, kursni o‘qitish jarayonining maqsadi va vazifalarini amalga oshirish maqsadida ta’lim mazmunini o‘quvchilar ongiga singdirishda foydalaniladigan o‘qitish metodlari, vositalari va shakllarining o’quv qo’llanmasi tushuniladi.

Lokal (modul) darajada ta’lim-tarbiya jarayonining ma’lum bir qismida mazkur qismning xususiy didaktik va tarbiyaviy maqsadini hal etishga qaratilgan texnologiya tushuniladi.

Pedagogik texnologiyalarning yuqorida qayd etilgan uchta darajasi bir-birini to‘ldiradi va taqozo etadi.

Biologiya darslarida foydalaniladigan texnologiyalar.

Pedagogik jarayonning xarakteri, borishi va mazmunini o‘zgartirishda qo‘llaniladigan pedagogik texnologiyalar guruhiga:

- ✓ Ta’lim jarayonini insonparvarlashtirish va demokratlashtirish texnologiyasi;
- ✓ Shaxsga yo‘naltirilgan texnologiyalar;
- ✓ Rivojlantiruvchi ta’lim texnologiyalari;
- ✓ Ta’limni differensiallashtirish va individuallashtirish;

Biologiya darslarida foydalaniladigan texnologiyalar guruhiga:

- ✓ Didaktik o‘yin texnologiyalari;
- ✓ Muammoli ta’lim texnologiyalari;
- ✓ Modulli ta’lim texnologiyalari;
- ✓ Hamkorlikda o‘qitish texnologiyalari;
- ✓ Loyihalash texnologiyasi;
- ✓ An’anaviy ta’lim texnologiyalari kiradi.

Quyida biologiya darslarida foydalaniladigan didaktik o‘yinli, muammoli, modulli ta’lim, hamkorlikda o‘qitish va loyihalash texnologiyalarning qisqacha tavsifi, ularga asoslangan darslarning o‘ziga xos xususiyatlari, dars ishlanmalari berilmoqda.[5,107-108-110-betlar].

Biz biologiyani turli xil interaktiv usullar, masalan, "baholash", "keys-stadi", "miya hujumi", "qo'shish", "organizator" va "energiyalashtiruvchi" usullaridan foydalangan holda o'qitish maqsadga muvofiq deb hisoblaymiz.

Muammoga asoslangan o'qitish texnologiyasi yosh o'quvchilarning kognitiv qobiliyatlarini oshirish uchun ayniqsa muhimdir. Masalan, botanika darslarida "miya

hujumi" yondashuvidan foydalangan holda, biz "miya mavzusi"ni ko'rib chiqayotganimizda o'quvchilarga quyidagi miya hujumi savolini berishimiz mumkin: Hamma terak daraxti bilan tanish va uni ko'rgan. Terak daraxti 20-30 metr balandlikda o'sishi mumkin. Lekin nima uchun terak bizning jamoalarimizda tez-tez ekiladi, chunki u balandligiga qaramay, qurilish materiali sifatida kamdan-kam hollarda ishlatiladi? Maktabgacha ta'lim muassasalarida olgan bilimlari va ijodkorliklariga asoslanib, o'quvchilar bu muammolarga turli yo'llar bilan javob berishadi. Boshqacha qilib aytganda, ular terakning yana ko'plab foydali xususiyatlarini sanab o'tishadi.

Zamonaviy biologiya o'qitishda raqamli texnologiyalarning tez joriy etilishi ta'lim standartlarini oshirish, ilmiy fikrlashni rivojlantirish va interaktiv o'quv muhitini yaratish imkonini berdi.[4,108-b]. Onlayn laboratoriya ishlari, 3D modellashtirish va virtual tajribalar orqali talabalar endi biologik jarayonlarni ham nazariy, ham amaliy jihatdan o'rganishlari mumkin. Natijada, "Biologiya ta'limida raqamli texnologiyalar va virtual laboratoriyalardan foydalanish" juda dolzarb mavzu hisoblanadi. Bu yondashuv nafaqat fanlarni raqamlashtirishni tezlashtiradi, balki ekologik fikrlashni, amaliy ko'nikmalarni va talabalarda tabiiy fanlarga qiziqishni kuchaytiradi. Ilmiy muammo: Laboratoriya jihozlarining yetarli emasligi, xavfli sharoitlar va eksperimental ishlar uchun haqiqiy imkoniyatlar biologiya ta'limidagi eng katta muammolardan biridir. Shu sababli, talabalar biologik jarayonlarni faqat nazariy jihatdan o'rganadilar, bu esa ularni sohaning asoslarini chinakam tushunishga to'sqinlik qiladi. Shuning uchun, bu muammoga yechim topish uchun raqamli texnologiyalar va virtual laboratoriyalarni o'quv jarayoniga integratsiya qilish zarur.

Biologiya ta'limida raqamli texnologiyalar va virtual laboratoriyalardan foydalanishning metodologik va ilmiy asoslarini o'rganish, ularning o'qitish samaradorligiga ta'sirini aniqlash va ularni o'quv jarayoniga muvaffaqiyatli integratsiya qilish strategiyalarini ishlab chiqish.

Pedagogik texnologiyalar orqali axborot tarmoqlari bilan o'zaro aloqada bo'lish uchun ixtisoslashtirilgan texnikalar, dasturiy ta'minot va texnik vositalardan (film, audio va video, kompyuterlar, telekommunikatsiya) foydalanish axborot texnologiyalari ta'limi deb nomlanadi. Raqamli ta'lim resurslaridan (RTR) foydalanishni hisobga olgan holda, fan bilan bog'liq faoliyat doirasida o'qitish, rivojlantirish va ta'lim barcha usullar singari o'qitish vositalari bajaradigan uchta didaktik funktsiyadir. Bu funktsiyalar har qanday fanga asoslangan ta'limda deyarli o'zgarmasdir. shuningdek, AKT (axborot-kommunikatsiya texnologiyalari) ham qo'llaniladi. Biologiya darslarida AKTdan foydalanish o'rganilayotgan narsalar va

tabiiy jarayonlarning eng muhim xususiyatlarini ta'kidlash, shuningdek, ko'plab narsalarning asosiy elementlarini grafik ravishda aks ettirish va vizualizatsiya tamoyilini tasvirlash orqali ilmiy ta'lim sifatini oshirishi mumkin.

Biologiya darsida AKTdan foydalanish:

I. Multimedia proyektorida rangli rasmlar va fotosuratlar, slayd prezentatsiyalari, videokliplar, 3D tasvirlar va modellar, qisqa animatsiyalar, syujet animatsiyalari, interaktiv modellar, interaktiv chizmalar va qo'shimcha materiallar kabi yangi kontentni interaktiv vizual materiallar sifatida taqdim etishda.

II. Talabalar mashg'ulot davomida o'qituvchi tomonidan belgilangan ko'rsatmalarga muvofiq (ishchi varaq yoki kompyuter imtihoni shaklida) kompyuter tajribalarini o'tkazadilar, bu esa o'rganilayotgan mavzu bo'yicha xulosaga olib keladi;

III. Kompyuter yordamida tadqiqot loyihalarini va laboratoriya sharoitida haqiqiy tajribani rejalashtirishda. Shuni ta'kidlash kerakki, talabalar kompyuterdan foydalanganda mustaqil ravishda tajribalarni loyihalash, ularni o'tkazish va natijalarni haqiqiy laboratoriya ishlari bilan taqqoslash uchun ko'proq imkoniyatlarga ega bo'ladilar;

IV. Takrorlash paytida bilimlarni tanib olish, tushunish va qo'llash darajasida nazorat qilish (avtomatik tekshirish bilan test topshiriqlarining tematik to'plamlari, diagnostika testlari) va tuzatish (javob tanlash bilan topshiriqlar, klaviaturadan raqamli yoki og'zaki javob kiritishni talab qiladigan topshiriqlar, tematik to'plamlar, fotosuratlar, videolar va animatsiyalardan foydalangan holda topshiriqlar, javobga reaksiya bilan topshiriqlar, interaktiv topshiriqlar, yordamchi materiallar). Talabalar virtual laboratoriya ishlari va tajribalarni bajarganlarida, mashg'ulotning ushbu bosqichlarida ularning motivatsiyasi oshadi, chunki ular olgan ma'lumotlarining real hayotda qanday foydali ekanligini tushunishlari mumkin.

Internet barcha maktab fanlari bo'yicha masalalar va mashqlarga to'liq yechimlar, testlar, referatlar, turli tajribalarni taqdim etadi. Modellar bilan tematik saytlarni topishingiz mumkin.[6,97-b]. Zamonaviy maktab o'quvchilarining aksariyati kerakli ma'lumotlarni adabiyotdan emas, balki Internetdan olishlari sir emas. Internet ma'lumotlaridan foydalanishning eng muhim jihati shundaki, o'quvchilar vaqtni tejashadi va ko'proq ma'lumot olish imkoniyatiga ega bo'ladilar. O'qituvchining vazifasi o'quvchilarni olingan ma'lumotlar ustida to'g'ri ishlashga yo'naltirish, ularga eng muhim ma'lumotlarni ajratib olishga yordam berishdir. Masalan, "Yer yuzida

o'simlik dunyosining rivojlanishi" mavzusini o'rganishdan oldin, o'quvchilar oldindan Internetdan ma'lumot olish uchun topshiriq olishadi. Topshiriq individual yoki guruhli bo'lishi mumkin. Bunday jarayonlar o'quvchilarda Internetdan olingan ma'lumotlar bilan ishlash ko'nikmalarini shakllantiradi. Bunga misol qilib "Katta ensiklopediya"ni keltirish mumkin. Ushbu elektron ensiklopediyada siz dars uchun zarur bo'lgan ko'plab ma'lumotlarni, masalan, jadvallar, diagrammalar, o'simliklar va hayvonlarning sistematikasi, multimedia panoramalar ("Hayot evolyutsiyasi", "Yer ekotizimlari"), videolar ("Yovvoyi hayvonlar hayoti"), audio yozuvlar ("Hayvonlar tovushlari"), fotoalbomlar ("Yirtqichlar") ni topishingiz mumkin. Video materiallardan foydalangan holda o'tkazilgan darslar o'quvchilarning fanga qiziqishini oshiradi. Xususan, 6-7-sinflarda botanika va zoologiya darslarida o'simliklar va hayvonlarning xilma-xilligini o'rganishda ulardan foydalanish biologiya darslarini yanada qiziqarli qiladi. Ushbu filmlar baliqlar, suv va quruqlikdagi hayvonlar, sudralib yuruvchilar, qushlar va sutemizuvchilar hayoti haqida qiziqarli ma'lumotlarni beradi. Bundan tashqari, biologiya Innovatsion laboratoriya darslarini rejalashtirilgan tarzda o'tkazishda axborot texnologiyalarining roli bebahodir. Axborot texnologiyalaridan foydalanish nafaqat o'quvchilarning kasbiy ko'nikmalarini oshirish, balki o'qituvchilar uchun ham, ularning dunyoqarashini kengaytirish, ilmiy yutuqlar bilan doimiy tanishish, biologik bilimlarni o'zlashtirish, darsliklar va qo'shimcha adabiyotlar bilan ishlash uchun muhim resurs bo'lib xizmat qiladi.

Hozirgi kunda tez rivojlanayotgan raqamli texnologiyalar va pedagogik yutuqlar biologiya o'qitish jarayoni bilan bevosita bog'liq. Biologiyaning o'ziga xos xususiyati tufayli zamonaviy axborot texnologiyalaridan ta'lim jarayonida foydalanish kerak, bu esa murakkab jarayonlar, ko'p bosqichli modellar, mikrotuzilmalar va tirik tizimlarning dinamik o'zaro ta'sirini chuqur o'rganishni talab qiladi. Elektron o'qitish (Elearning) va an'anaviy o'qitishni raqamli resurslar bilan uyg'unlashtirgan aralash o'qitish bunday imkoniyatlarni taqdim etadigan eng muvaffaqiyatli strategiyalardan ikkitasidir.[

Vizual modellashtirish orqali elektron o'qitish sizga hujayra tuzilishi, genetik jarayonlar, fotosintez, ferment reaksiyalari, ekologik tizim dinamikasi va boshqa murakkab mexanizmlar kabi keng ko'lamli biologik masalalarni aniq va sodda o'qitish imkonini beradi. Talabalar virtual laboratoriyalar, simulyatsiyalar, 3D animatsiyalar va raqamli interaktiv loyihalar orqali ilmiy tadqiqot faoliyatiga o'xshash tajribalarga ega bo'lishlari mumkin. Murakkab biologik fanlarni individual ravishda o'zlashtirish elektron o'qitishning moslashuvchanligi va o'z tezligida o'rganish qobiliyati tufayli mumkin bo'ladi.

Xulosa qilib aytganda, Bugungi ta'lim tizimidagi asosiy tendentsiyalardan biri biologiya darslarida zamonaviy pedagogik va axborot texnologiyalarini qo'llashdir. Bu usul nazariy ma'lumotlarni amaliy qobiliyatlar bilan birlashtirish, o'quv jarayonining sifatini oshirish va o'quvchilarning bilim faolligini oshirish imkonini beradi. Zamonaviy pedagogik texnologiyalardan foydalangan holda tuzilgan biologiya darslari o'quvchilarning mustaqil fikrlash qobiliyatini, muammolarni hal qilish ko'nikmalarini rivojlantirish va ilmiy nuqtai nazarini kengaytirish uchun juda muhimdir. Biologik jarayonlar va hodisalar multimedia vositalari, virtual laboratoriyalar, interaktiv platformalar va raqamli resurslarni o'z ichiga olgan axborot texnologiyalaridan foydalanish orqali aniq, ko'rinadigan va tushunarli tarzda yetkaziladi. Bu o'quvchilarning fanga bo'lgan ishtiyoqini oshiradi, ularga qiyin biologik g'oyalarni tushunishni osonlashtiradi va vaqt o'tishi bilan ma'lumotni saqlab qolishga yordam beradi.

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ORGANIZING AND IMPROVING MATERIALS ACCOUNTING IN ENTERPRISES: ISSUES AND DIRECTIONS

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Abstract. This article analyzes the importance of organizing materials accounting in enterprises and explores ways to improve the efficiency and accuracy of material inventory records. Proper accounting of materials is crucial for ensuring optimal use of resources, controlling costs, and providing reliable financial reporting. The study examines common challenges in material accounting, including errors in inventory tracking, lack of internal controls, and outdated procedures. It also highlights modern approaches for improvement, such as implementation of standardized procedures, automation, and enhanced internal control systems to reduce material misuse and increase productivity. Practical recommendations are provided to help enterprises optimize their material accounting processes and strengthen their financial management.

Keywords: materials accounting, inventory management, internal controls, financial reporting, enterprise resource optimization.

Introduction

Efficient materials accounting is one of the core functions of enterprise management that directly influences cost control, inventory accuracy, and overall financial performance. Materials represent a significant portion of current assets in many manufacturing and production enterprises, and errors in their accounting can lead to misstatement of financial results as well as inefficiencies in production planning and resource allocation. Effective materials accounting ensures that raw materials, components, and supplies are recorded accurately, monitored throughout their lifecycle, and reported correctly in financial statements. This leads to enhanced internal control, reduced waste, and improved operational decision-making.

However, many organizations still face challenges related to outdated inventory tracking methods, weak internal controls, and lack of real-time visibility over material movements. These issues can result in inventory discrepancies, resource misallocation,

and increased production costs. Therefore, understanding modern approaches to organizing materials accounting - including standardized procedures, internal control systems, and information technologies - is essential for optimizing enterprise performance.

This article examines the theoretical foundations and practical directions towards improving materials accounting in enterprises. The focus is on identifying key problems in current practices and proposing scientifically grounded recommendations to enhance the accuracy, efficiency, and reliability of materials accounting systems.

Literature Review

In recent academic literature, researchers have highlighted several key perspectives on accounting for materials and inventory in enterprises, emphasizing both theoretical foundations and practical improvements. **Marliyati et al.** in their study on manufacturing enterprises note that an *Inventory Accounting Information System* is essential for accurate recording and internal control of material resources, reducing human error and risks of fraud in material handling. They argue that standardized procedures and internal controls are necessary components of effective materials accounting systems [1].

Similarly, a *systematic literature review* by **Ria et al.** points out that implementing inventory accounting information systems significantly improves operational efficiency and accuracy of financial records, especially when these systems are integrated with business processes and supported by proper employee training [2]. They see technology adoption as a key direction for improving materials accounting in contemporary enterprises.

In the broader accounting literature, **Temurbek Khusanovich Turaboev's article** emphasizes the theoretical foundations of inventory accounting, highlighting the importance of systematic recording and valuation of inventories to ensure reliable financial reporting and informed managerial decision-making. Turaboev's framework underlines inventory accounting's role not only in compliance with standards but also as a tool for internal planning and control [3].

These studies collectively suggest that effective materials accounting goes beyond mere record-keeping - it requires robust **information systems, internal controls, and theoretical grounding** to ensure accuracy and managerial usefulness. Technology is frequently emphasized as a means to improve both **inventory tracking and financial reporting quality**.

Methodology

The methodology of this research on organizing and improving materials accounting in enterprises involves a **systematic analysis of both theoretical and practical sources** related to materials and inventory accounting systems. First, existing literature and research findings are reviewed to identify common challenges and solutions in materials accounting practices. Next, **comparative analysis** of academic studies and accounting standards is used to highlight effective procedures and technologies for accurate inventory control. Finally, the methodology includes **synthesizing theoretical knowledge with practical recommendations**, focusing on ways to enhance internal controls, documentation procedures, and the use of information systems for inventory tracking and reporting. This approach ensures that the study's conclusions are both evidence-based and applicable to real enterprise conditions.

Analysis and Results

In analyzing materials accounting practices in enterprises, it becomes clear that the **accuracy and effectiveness of tracking material flows** significantly influence both **cost control** and **operational performance**. According to **Marliyati et al**, the presence of a **formal accounting information system for material inventories** helps reduce errors, fraud, and discrepancies during production, contributing to stronger internal control and improved resource management [4]. They emphasize that every activity involving material inventories must be guided by **standard operating procedures and a robust internal control system**.

A comparative review of inventory management practices shows that **effective inventory accounting is closely linked with continuous supply and operational continuity**. One study highlights that well-managed inventories ensure a stable supply of goods and support financial stability by enabling accurate adjustment and valuation of inventory levels according to international standards. This suggests that enterprises with robust material accounting practices can better balance **supply needs**, **production schedules**, and **cost tracking**.

The research results also reveal that **current materials accounting systems vary widely in sophistication across enterprises**. For example, some manufacturing firms employ basic manual tracking, which increases the risk of inconsistencies and delays in reporting. In contrast, those adopting **modern inventory management techniques**, including classification tools like **ABC analysis**, benefit from improved

inventory control. ABC analysis helps categorize stock into different value segments - facilitating tighter control of high-value materials and reducing hoarding or overstocking costs [5].

To illustrate the practical outcomes of materials accounting systems, the table below summarizes key comparisons between traditional and improved approaches observed across industrial enterprises:

Table 1.

Comparison of Traditional vs Improved Materials Accounting Practices

Aspect	Traditional Materials Accounting	Improved Accounting Practices
Inventory Tracking	Manual, prone to errors	Automated/ERP-supported, real-time visibility
Internal Control	Weak or informal controls	Structured procedures and checks
Cost Accuracy	Often delayed and approximate	Timely and precise valuation
Report Quality	Basic, periodic reporting	Integrated with production planning
Risk of Discrepancies	High	Low
Decision Support	Limited strategic value	Supports planning and optimization

This comparative analysis confirms that **enterprises that implement standardized accounting procedures and systems achieve better control over material usage, cost allocation, and inventory valuation**. The study highlights the importance of integrating **modern accounting technologies and frameworks**, leading to measurable improvements in **financial reporting quality and operational resource management**.

Conclusion

In summary, improving materials accounting in enterprises is not just a technical task of recording inventory transactions — it is fundamentally linked to **organizational efficiency, financial transparency, and strategic decision-making**. Materials and inventories represent a substantial portion of current assets in many organizations and directly impact cost management and operational outcomes. Enterprises that rely on

outdated forms of inventory tracking often encounter **significant discrepancies, resource misallocation, and lost opportunities for timely decision support**. As empirical research shows, effective inventory accounting systems that integrate **standard procedures, internal controls, and real-time data processing** significantly reduce the risk of errors and improve the accuracy of financial records.

Moreover, modern materials accounting is shaped by global practices and evolving standards that emphasize **valuation accuracy, documentation integrity, and audit readiness**. Theoretical analysis demonstrates that robust accounting frameworks - anchored in internationally recognized principles - enhance the reliability of financial reporting and support managerial accountability. These frameworks also enable organizations to align with best-practice benchmarks and withstand external scrutiny from auditors and regulators.

From a practical standpoint, the adoption of advanced approaches such as **inventory information systems, segmentation techniques like ABC analysis, and automated tracking tools** creates significant advantages. These tools help enterprises categorize material items by importance, reduce excess stock, and balance supply with demand more effectively - ultimately contributing to **cost reduction and operational continuity**. This shift towards integrated accounting practices not only strengthens internal governance but also enhances an organization's ability to respond quickly to market changes and internal performance challenges.

Finally, the movement toward improving materials accounting must be seen as part of a larger **enterprise modernization strategy**. This includes training personnel in advanced accounting methods, leveraging digital solutions for data accuracy, and establishing feedback mechanisms that support continuous improvement. When organizations commit to these measures, they create an environment where information integrity, resource optimization, and strategic planning are mutually reinforcing - resulting in **sustainable growth and competitive advantage** in both domestic and international markets.

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MAHALLIY KORXONALARDA INNOVATSION BOSHQARUVNI JORIY ETISH MUAMMOLARI

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Annotatsiya: Ushbu maqolada mahalliy korxonalarda innovatsion boshqaruvni joriy etish jarayonida yuzaga keladigan asosiy muammolar va ularni bartaraf etish yo‘llari tadqiq qilingan. Bugungi tez o‘zgaruvchan iqtisodiy sharoitda korxonalarning raqobatbardoshligini oshirishda innovatsiyalarning o‘rni tahlil qilinadi. Shuningdek, boshqaruv tizimidagi byurokratiya, kadrlar malakasining yetishmasligi va moliyaviy resurslar cheklanganligi kabi to‘siqlar o‘rganilib, mahalliy korxonalar uchun moslashuvchan boshqaruv modellarini joriy etish bo‘yicha amaliy tavsiyalar ishlab chiqilgan.

Kalit so‘zlar: innovatsion menejment, mahalliy korxonalar, raqobatbardoshlik, tashkiliy o‘zgarishlar, innovatsion qarshilik, kadrlar salohiyati.

Аннотация: В данной статье исследуются основные проблемы, возникающие в процессе внедрения инновационного менеджмента на местных предприятиях, и пути их решения. Анализируется роль инноваций в повышении конкурентоспособности предприятий в условиях современной динамично развивающейся экономики. Также рассматриваются такие барьеры, как бюрократия в системе управления, нехватка квалифицированных кадров и ограниченность финансовых ресурсов. На основе проведенного анализа разработаны практические рекомендации по внедрению гибких моделей управления для отечественных предприятий.

Ключевые слова: инновационный менеджмент, местные предприятия, конкурентоспособность, организационные изменения, инновационное сопротивление, кадровый потенциал.

Abstract: This article explores the core challenges encountered during the implementation of innovation management in local enterprises and proposes strategies to overcome them. It analyzes the role of innovation in enhancing enterprise competitiveness within today's rapidly changing economic landscape. Furthermore, obstacles such as managerial bureaucracy, lack of qualified personnel, and limited financial resources are examined. Based on the analysis, practical recommendations are developed for adopting flexible management models tailored to local businesses.

Keywords: innovation management, local enterprises, competitiveness, organizational changes, innovation resistance, human capital.

Kirish. Global iqtisodiyotning shiddatli rivojlanishi va raqobat muhitining keskinlashuvi sharoitida har qanday korxonaning bozordagi yashovchanligi uning o‘zgarishlarga moslashish darajasi bilan o‘lchanmoqda. Bugungi kunda boshqaruvning klassik usullari, qat’iy vertikal ierarxiya va faqatgina mavjud resurslarni saqlab qolishga qaratilgan an’anaviy strategiyalar o‘zining amaliy ahamiyatini sezilarli darajada yo‘qotdi. Zamonaviy biznes muhiti tashkilotlardan nafaqat texnologik yangiliklarni o‘zlashtirishni, balki butun boshqaruv tizimini innovatsion asosda qayta qurishni talab qilmoqda. Innovatsion boshqaruv korxonaning barcha bo‘g‘inlarida yangi g‘oyalarni qo‘llab-quvvatlash, xodimlarning ijodiy salohiyatini rag‘batlantirish va tashkiliy tuzilmani moslashuvchan holatga keltirishni anglatadi. Ayniqsa, rivojlanayotgan iqtisodiyotga ega mamlakatlarda mahalliy korxonalarning barqaror o‘sishini ta’minlash va ularni xalqaro darajadagi raqobatga tayyorlash bevosita ushbu boshqaruv modelining amaliyotga qanchalik tez va to‘g‘ri tatbiq etilishiga bog‘liqdir.

Biroq, mahalliy korxonalarda innovatsion boshqaruvni joriy etish jarayoni bir qator murakkab va tizimli muammolar bilan to‘qnash kelmoqda. Eng asosiy to‘siqlardan biri sifatida korxonalarning ichki madaniyatida shakllangan o‘zgarishlarga nisbatan qarshilikni ko‘rsatish mumkin. Rahbar va xodimlarning ko‘p yillik o‘rganilgan, nisbatan xavfsiz tuyulgan an’anaviy ish uslublaridan voz kechishni istamasligi innovatsiyalarni qabul qilish tezligini pasaytiradi. Shu bilan birga, ko‘plab mahalliy tashkilotlarda strategik fikrlash darajasining pastligi va operatsion muammolar girdobidan chiqa olmaslik holatlari kuzatiladi. Rahbarlarning asosiy

e'tibori kunlik muammolarni hal qilishga qaratilgan bo'lib, uzoq muddatli innovatsion loyihalarni rejalashtirish va ularga sarmoya kiritish ikkinchi darajali masala bo'lib qolmoqda. Bu esa korxonani yangi bozor tendensiyalaridan orqada qoldiradi va uning raqobatbardoshligiga jiddiy putur yetkazadi.

Yana bir dolzarb muammo — kadrlar salohiyatining yetishmasligi va intellektual kapitalni boshqarish tizimining zaifligidir. Innovatsion boshqaruv faqatgina texnologiyalarni sotib olish bilan cheklanmaydi, balki ushbu texnologiyalarni samarali yurita oladigan, tahliliy fikrlaydigan va nostandart qarorlar qabul qila oladigan mutaxassislarni talab qiladi. Mahalliy mehnat bozorida esa innovatsion menejment sohasida chuqur bilim va ko'nikmalarga ega bo'lgan boshqaruvchilar hamda ijodiy fikrlovchi xodimlar tanqisligi sezilmoqda. Buning oqibatida hatto eng istiqbolli yangi g'oyalar ham ijro bosqichida malakasizlik tufayli muvaffaqiyatsizlikka uchraydi. Bundan tashqari, innovatsiyalarni moliyalashtirish mexanizmlarining mukammal emasligi va ilmiy-tadqiqot ishlariga ajratiladigan mablag'larning kamligi korxonalarning ichki innovatsion faolligini cheklab qo'ymoqda. Mahalliy korxonalar ko'pincha yangi texnologiyalarni o'zlari yaratish o'rniga chetdan tayyor yechimlarni import qilishga tayanadi, bu esa ularni texnologik jihatdan qaram qilib qo'yadi va uzoq muddatda iqtisodiy samaradorlikni pasaytiradi.

Mazkur muammolarni ilmiy jihatdan tahlil qilish, ularning kelib chiqish sabablarini o'rganish va bartaraf etish choralarini ishlab chiqish bugungi kun amaliyoti uchun o'ta zarurdir. Chunki mahalliy korxonalarda innovatsion boshqaruvni to'g'ri yo'lga qo'ymaslik nafaqat alohida kompaniyalarning inqiroziga, balki umumiy milliy iqtisodiyotning raqobatbardoshligi pasayishiga olib kelishi mumkin. Shu nuqtai nazardan, ushbu tadqiqot ishi mahalliy korxonalarda innovatsion boshqaruv tizimini joriy etishga to'sqinlik qilayotgan tashkiliy, kadrlar va moliyaviy muammolarni har tomonlama tahlil qilishni maqsad qiladi. Mazkur tadqiqot orqali mavjud cheklovlarni bartaraf etish hamda mahalliy sharoitga moslashtirilgan, moslashuvchan boshqaruv modellarini shakllantirish bo'yicha ilmiy-nazariy asoslar va amaliy takliflar ilgari suriladi. Ushbu yondashuv mahalliy biznes subyektlariga zamonaviy boshqaruv mexanizmlarini to'g'ri anglash hamda amaliyotda samarali tizim yaratishda yo'l ko'rsatuvchi manba bo'lib xizmat qiladi.

Asosiy qism. Menejment fanining zamonaviy rivojlanish bosqichida innovatsion boshqaruv korxona faoliyatining barcha yo'nalishlarini qamrab oluvchi yaxlit tizim sifatida talqin etiladi. Bugungi kunda faqatgina ishlab chiqarish jarayoniga yangi uskunalarni tatbiq etish yoki axborot-kommunikatsiya texnologiyalaridan

foydalanish korxonaning bozordagi uzoq muddatli ustunligini kafolatlay olmaydi. Innovatsion boshqaruvning asl mohiyati tashkilotning ichki muhitini shunday shakllantirishdan iboratki, unda har bir xodim yangi g‘oyalarni ilgari surishga rag‘batlantiriladi, qaror qabul qilish tizimi moslashuvchan bo‘ladi va tashkiliy tuzilma o‘zgaruvchan bozor talablariga tezda moslasha oladi. Mahalliy korxonalarda ushbu tizimni joriy etish zarurati milliy iqtisodiyotning globallashuv jarayonlariga integratsiyalashuvi hamda ichki bozorda xorijiy kompaniyalar tomonidan taklif etilayotgan raqobatbardosh mahsulotlar oqimining kuchayishi bilan bevosita bog‘liqdir. Biroq, ko‘plab mahalliy tashkilotlar hamon an’anaviy boshqaruv modellaridan voz kecha olmayotgani sababli, ularning innovatsion faolligi past darajada qolmoqda. Bu esa nafaqat korxonalarning o‘z o‘sish sur’atlariga salbiy ta’sir ko‘rsatadi, balki mamlakatning umumiy iqtisodiy rivojlanishiga ham ma’lum ma’noda to‘siq bo‘ladi.

Mahalliy sharoitda korxonalar duch keladigan eng birinchi va eng jiddiy to‘siq bu tashkiliy qarshilik fenomenidir. Ko‘p yillar davomida qat’iy vertikal ierarxiya va buyruqbozlikka asoslangan tizimda ishlagan xodimlar hamda o‘rta bo‘g‘in rahbarlari har qanday yangilikka o‘zlarining barqaror mavqelariga tahdid sifatida qaraydilar. O‘zgarishlarni boshqarish nazariyasiga ko‘ra, insonlar odatda o‘zlariga notanish bo‘lgan yangi ish uslublarini qabul qilishdan ko‘ra, eski va samarasiz bo‘lsa-da, o‘zlari uchun tushunarli bo‘lgan amaliyotlarni afzal ko‘radilar. Masalan, korxonada yangi loyihalarni boshqarish tizimi yoki avtomatlashtirilgan dasturiy ta’minot joriy etilganda, xodimlar uning afzalliklarini tushunmasdan, uni faqatgina qo‘shimcha mehnat yuki yoki ularni nazorat qilishning yangi vositasi deb hisoblaydilar. Bunday vaziyatda ichki norozilik yuzaga keladi va innovatsiyalarni joriy etish jarayoni vaqt o‘tishi bilan sekinlashadi yoki butunlay to‘xtab qoladi. Rahbariyat tomonidan xodimlarni o‘zgarishlar jarayoniga jalb etmaslik, ularning fikrlarini inobatga olmaslik va muloqotning yetishmasligi ushbu muammoni yanada chuqurlashtiradi.

Shu bilan birga, kadrlar salohiyatining yetishmasligi muammosi innovatsion boshqaruvni joriy etishda asosiy bo‘g‘uvchi omillardan biri bo‘lib xizmat qilmoqda. Innovatsiyalar mohatan inson kapitalining mahsuli hisoblanadi. Uni muvaffaqiyatli amalga oshirish uchun korxonaga nafaqat texnik mutaxassislar, balki tahliliy fikrlaydigan, tavakkalchilikdan qo‘rqmaydigan va jamoani yangi g‘oyalar atrofida birlashtira oladigan zamonaviy rahbarlar kerak bo‘ladi. Mahalliy mehnat bozorida esa aynan shunday kompetensiyalarga ega bo‘lgan boshqaruvchilar va ijodkor xodimlar tanqisligi yaqqol sezilmoqda. Ko‘plab mahalliy korxonalarda xodimlarni tanlash va

joy-joyiga qo‘yishda hamon an’anaviy mezonlarga tayaniladi, ularning ijodiy salohiyati va nostandart muammolarni hal qilish qobiliyatiga yetarli darajada e’tibor berilmaydi. Xodimlarning malakasini oshirish va ularni yangi bilimlar bilan qurollantirish tizimi ko‘pincha rasmiyatchilikdan iborat bo‘lib, amaliy biznes ehtiyojlariga mos kelmaydi. Natijada, korxona qanchalik ko‘p texnologik yangiliklarni sotib olmasin, ulardan to‘liq va samarali foydalanish imkoniyatiga ega bo‘lmaydi.

Strategik fikrlashning yetishmasligi va operatsion boshqaruv girdobiga tushib qolish ham mahalliy biznes muhitining o‘ziga xos muammolaridan biridir. Ko‘plab korxona rahbarlarining kundalik faoliyati faqatgina joriy muammolarni hal qilishga, ya’ni soliq to‘lovlari, xomashyo ta’minoti va tezkor ishlab chiqarish masalalariga qaratilgan. "Bugungi kun foydasi" haqidagi fikrlash tarzi uzoq muddatli istiqbolga yo‘naltirilgan innovatsion strategiyalarni ishlab chiqishga va ilmiy-tadqiqot ishlariga mablag‘ ajratishga yo‘l bermaydi. Vaholanki, innovatsiyalar o‘z tabiatiga ko‘ra darhol iqtisodiy samara keltirmasligi mumkin, lekin ular korxonaning kelajakda bozorda o‘z mavqeyini saqlab qolishi uchun hayotiy zaruriyatdir. Strategik maqsadlarning aniq emasligi sababli, mahalliy korxonalar innovatsion loyihalarga faqatgina qandaydir tashqi turtki bo‘lgandagina, masalan, davlat tomonidan majburiy talablar qo‘yilganda yoki raqobatchilar bozor ulushini tortib olishni boshlagandagina e’tibor qaratadilar. Bunday passiv yondashuv kompaniyalarni doimiy ravishda orqada qoluvchilar safiga tushirib qo‘yadi.

Moliyaviy resurslarning cheklanganligi va innovatsiyalar bilan bog‘liq yuqori darajadagi xavf-xatarlarni qabul qilishga tayyor emaslik muammosi ham alohida e’tiborga loyiqdir. Innovatsion loyihalar yuqori darajadagi noaniqlik bilan tavsiflanadi — har qanday yangi g‘oya ham amaliyotda o‘zini oqlashi va foyda keltirishi kafolatlanmagan. Mahalliy korxonalarda esa ko‘pincha risk-menejment (tavakkalchilikni boshqarish) tizimi to‘g‘ri yo‘lga qo‘yilmagan. Rahbarlar mablag‘larni yo‘qotishdan qo‘rqqanliklari sababli, kafolatlangan lekin past foyda keltiradigan eski usullarda ishlashni afzal ko‘radilar. Shu bilan birga, bank-moliya tizimi tomonidan innovatsion loyihalarni moliyalashtirish shartlarining murakkabligi va venchur (tavakkalchilikka asoslangan) kapital bozorining rivojlanmaganligi korxonalarning mustaqil ravishda yangiliklar yaratish imkoniyatlarini cheklaydi. Yirik sarmoya talab qiladigan ilmiy va amaliy loyihalar uzoq muddatli kreditlar va ishonchli sarmoyadorlarga muhtoj, biroq mahalliy bozorda bunday moliyaviy dasturlarning yetishmasligi korxonalarni faqatgina o‘zlarining qisqa muddatli foydalari hisobidan kichik o‘zgarishlar qilish bilan cheklanishga majbur qiladi.

Yana bir jiddiy masala — korxonalarda axborot oqimini va bilimlarni boshqarish tizimining samarasizligidir. Zamonaviy dunyoda bilim eng muhim resurs hisoblanadi va u korxonaning intellektual mulkini tashkil etadi. Ko‘p mahalliy korxonalarda tajribali xodimlar o‘zlarining ish uslublari va maxfiy bilimlarini (know-how) boshqalar bilan bo‘lishishni istamaydilar, chunki ular buni o‘zlarining ichki raqobatdagi ustunligi deb biladilar. Kompaniya ichida bilimlarni saqlash va yangi kelgan xodimlarga o‘rgatish bo‘yicha tizimli mexanizmlar mavjud bo‘lmaganda, tajribali xodimning ishdan ketishi korxona uchun katta yo‘qotish bo‘ladi. Bu holat tashkilotning innovatsion salohiyatini pasaytiradi, chunki yangi g‘oyalar shakllanishi uchun turli bo‘limlar o‘rtasida erkin axborot almashinuvi va jamoaviy hamkorlik muhiti mavjud bo‘lishi shart. Shuningdek, xorijdagi ilg‘or tajribalarni o‘rganish va ularni mahalliy sharoitga moslashtirish ko‘nikmalarining pastligi ham korxonalarning texnologik jihatdan qolib ketishiga olib keladi.

Mahalliy korxonalarning tashkiliy tuzilmasidagi qat’iylik va moslashuvchanlikning yo‘qligi innovatsiyalarni joriy etishga to‘sqinlik qiluvchi yana bir muhim omildir. Ko‘plab korxonalarda qaror qabul qilish jarayoni faqatgina yuqori rahbariyat qo‘lida to‘plangan bo‘lib, o‘rta va quyi bo‘g‘in xodimlariga mustaqil qaror qabul qilish huquqi berilmagan. Bunday sharoitda har qanday yangi taklif ko‘p bosqichli kelishuvlar jarayonidan o‘tishi talab etiladi va natijada o‘zining dolzarbligini yo‘qotadi. Zamonaviy innovatsion menejment esa, aksincha, gorizontal boshqaruv tuzilmasini, vakolatlarni xodimlarga topshirishni (delegation) va kichik, moslashuvchan loyiha jamoalarini yaratishni targ‘ib qiladi. Aynan shunday jamoalarda g‘oyalar tezda sinovdan o‘tkaziladi va amaliyotga tatbiq etiladi. Mahalliy korxonalarda bunday yondashuvning keng qo‘llanilmasligi ularning bozor talablariga nisbatan reaktsiya tezligini pasaytiradi va raqobatda yutqazishiga sabab bo‘ladi.

Shu o‘rinda, davlat va biznes o‘rtasidagi hamkorlikning yetarli darajada rivojlanmaganligini ham ta’kidlash lozim. Garchi davlat tomonidan innovatsion ekotizimni yaratish bo‘yicha harakatlar olib borilayotgan bo‘lsa-da, ko‘pincha ushbu chora-tadbirlar amaliy biznes ehtiyojlaridan biroz uzilib qolgandek taassurot uyg‘otadi. Masalan, ilmiy-tadqiqot institutlari va oliy o‘quv yurtlari tomonidan taklif etilayotgan ilmiy ishlanmalar har doim ham mahalliy korxonalarning real ishlab chiqarish muammolarini hal qilishga qaratilgan emas. O‘z navbatida, biznes subyektlari ham ilm-fan yutuqlariga ishonchsizlik bilan qaraydilar va ularga buyurtma berishdan ko‘ra, tayyor xorijiy texnologiyalarni sotib olishni osonroq deb hisoblaydilar. Bu esa milliy

ilmiy-tadqiqot salohiyatining korxonalar amaliyoti bilan bog‘lanmasligiga va innovatsiyalarning ichki manbalari rivojlanmasligiga olib keladi.

Muammolarni bartaraf etish uchun mahalliy korxonalarda innovatsiyalarni boshqarishga doir yondashuvni tubdan o‘zgartirish talab etiladi. Buning uchun birinchi navbatda korxona rahbariyatining dunyoqarashi o‘zgarishi, ya’ni ularda innovatsion fikrlash madaniyati shakllanishi zarur. Rahbarlar innovatsiyalarni shunchaki qo‘shimcha xarajat emas, balki korxonaning barqaror kelajagi uchun eng samarali investitsiya deb tushunishlari kerak. Kompaniya ichida xodimlarning yangi takliflarini rag‘batlantiruvchi tizimni yo‘lga qo‘yish, xato qilishdan qo‘rqmaslik muhitini yaratish (fail-safe culture) va xodimlarni boshqaruv jarayonlariga ko‘proq jalb qilish tashkiliy qarshilikni kamaytirishning eng yaxshi yo‘lidir. Xodimlarda yangi g‘oyalar yaratish uchun motivatsiya paydo bo‘lishi uchun nafaqat moddiy, balki ma’naviy rag‘batlantirish usullaridan ham unumli foydalanish kerak.

Kadrlar masalasini hal qilishda esa oliy ta’lim muassasalari bilan korxonalar o‘rtasida real strategik hamkorlikni o‘rnatish zarur. Korxonalar o‘zlari uchun zarur bo‘lgan kadrlar kompetensiyalarini aniq belgilab berishi va talabalarning amaliyot o‘tash jarayonlarini bevosita o‘z ishlab chiqarish maydonlarida tashkil etishlari lozim. Shu bilan birga, kompaniyaning ichida doimiy o‘qitish va malaka oshirish tizimini (corporate training) yo‘lga qo‘yish kerakki, bu orqali xodimlar dunyodagi eng yangi menejment va texnologik tendensiyalardan doimiy ravishda xabardor bo‘lib boradilar. Bu o‘z navbatida tashkilotning umumiy kognitiv salohiyatini va moslashuvchanligini oshiradi.

Strategik jihatdan esa, mahalliy korxonalar o‘z faoliyatlariga uzoq muddatli rejalashtirish metodlarini, jumladan, ssenariylar tahlili va trendlarni prognozlash amaliyotini tatbiq etishlari lozim. Operatsion boshqaruvdan strategik boshqaruvga o‘tish orqali korxona bozordagi o‘zgarishlarni oldindan ko‘ra bilish va ularga tayyorgarlik ko‘rish imkoniyatiga ega bo‘ladi. Bu esa innovatsion loyihalarni shoshilinch ravishda emas, balki chuqur tahlil asosida, maqsadli va tizimli ravishda amalga oshirishga sharoit yaratadi. Shuningdek, boshqaruvni raqamlashtirish va ma’lumotlarga asoslangan qarorlar qabul qilish (data-driven management) tizimiga o‘tish ham korxona ichidagi byurokratiyani kamaytiradi va qarorlar qabul qilish tezligini sezilarli darajada oshiradi.

Xulosa. Menejment fanining bugungi taraqqiyot bosqichida mahalliy korxonalarda innovatsion boshqaruvni joriy etish masalalarini ilmiy va amaliy jihatdan

tahlil qilish shuni ko‘rsatadiki, an’anaviy va qat’iy uslublar o‘z dolzarbligini butunlay yo‘qotgan. Korxonalarning uzoq muddatli barqarorlikka erishishi va raqobatbardoshligini oshirishi bevosita ularning o‘zgarishlarga moslashuvchanligi hamda yangiliklarni tizimli ravishda boshqara olish qobiliyatiga bog‘liq. Biroq, mahalliy amaliyotda ushbu tizimni shakllantirish jarayoni bir qator murakkab to‘siqlarga duch kelmoqda. Xodimlar va o‘rta bo‘g‘in rahbarlari o‘rtasidagi tashkiliy qarshilik, zamonaviy ko‘nikmalarga ega malakali kadrlarning yetishmasligi va korxonalarda intellektual kapitalni boshqarish mexanizmlarining zaifligi shular jumlasidandir. Shu bilan birga, rahbarlarning uzoq muddatli strategik rejalashtirishdan ko‘ra qisqa muddatli operatsion masalalarga ko‘proq e’tibor qaratishi hamda moliyaviy risklardan qo‘rqishi innovatsion faollikni cheklab qo‘ymoqda.

Mazkur tizimli muammolarni bartaraf etish uchun mahalliy korxonalarda boshqaruv falsafasini tubdan o‘zgartirish zarur. Birinchi navbatda, korxona ichida xodimlar yangi g‘oyalarni erkin ilgari sura oladigan va xato qilishdan qo‘rqmaydigan psixologik muhitni yaratish talab etiladi. Qat’iy vertikal ierarxiyadan voz kechib, qaror qabul qilish jarayonlarini soddalashtiruvchi gorizontal boshqaruv uslubiga o‘tish va vakolatlarni quyi bo‘g‘inlarga o‘tkazish (delegation) qarorlar qabul qilish tezligini oshiradi. Bundan tashqari, korxona ichida uzluksiz ta’lim tizimini yo‘lga qo‘yish va oliy ta’lim muassasalari bilan amaliy hamkorlikni kuchaytirish orqali kadrlarning bilim darajasini doimiy ravishda yangilab borish mumkin. Strategik jihatdan esa operatsion boshqaruvdan ma’lumotlarga asoslangan (data-driven) va uzoq muddatli maqsadli boshqaruvga o‘tish lozim. Ushbu chora-tadbirlarni bosqichma-bosqich amalga oshirish mahalliy biznes subyektlariga zamonaviy boshqaruv modellarini muvaffaqiyatli o‘zlashtirishga va nafaqat ichki bozorda, balki xalqaro miqyosda ham raqobatbardosh kompaniyalarga aylanishiga imkon beradi.

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ADVANCES IN RESTORATIVE DENTISTRY AND THEIR CLINICAL SIGNIFICANCE

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Abstract: Restorative dentistry has undergone significant advancements in recent decades, driven by the development of innovative materials, digital technologies, and minimally invasive techniques. These improvements have enhanced both the functional and aesthetic outcomes of dental treatments. Modern restorative procedures aim not only to repair damaged tooth structures but also to preserve healthy tissues and ensure long-term oral health. This article explores recent progress in restorative dentistry, including adhesive systems, composite materials, and computer-aided design and manufacturing (CAD/CAM) technologies. The clinical significance of these advancements is evaluated in terms of treatment efficiency, durability, patient satisfaction, and overall oral health outcomes. Emphasis is also placed on the importance of individualized treatment planning and evidence-based practice in achieving optimal results.

Keywords: Restorative dentistry, dental materials, composite resins, CAD/CAM technology, minimally invasive dentistry, dental caries, adhesive systems, oral health

Introduction

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Restorative dentistry plays a crucial role in modern dental practice, focusing on the rehabilitation of teeth affected by caries, trauma, or structural defects. Over the past few decades, there has been a remarkable evolution in restorative techniques and materials, significantly improving clinical outcomes and patient care. Traditional methods, which often required extensive removal of healthy tooth tissue, are increasingly being replaced by minimally invasive approaches that prioritize tissue preservation. The introduction of advanced dental materials, such as high-strength composites and ceramics, has revolutionized restorative procedures by providing improved aesthetics, biocompatibility, and durability. Furthermore, the integration of digital technologies, including CAD/CAM systems, has enhanced the precision and efficiency of dental restorations. Understanding the clinical significance of these advancements is essential for dental professionals, as it allows for more effective treatment planning and better long-term results. This article aims to analyze recent developments in restorative dentistry and highlight their impact on clinical practice and patient outcomes.

Materials and Methods

This study is based on a comprehensive review of recent scientific literature on restorative dentistry published between 2015 and 2025. Relevant articles were selected from electronic databases such as PubMed, Scopus, and Google Scholar. The selection criteria included peer-reviewed studies focusing on advancements in restorative materials, adhesive systems, and digital technologies such as CAD/CAM. In addition, clinical reports and comparative studies evaluating the effectiveness of modern restorative techniques were analyzed. The collected data were systematically reviewed to assess improvements in treatment outcomes, durability of restorations, and patient satisfaction. Emphasis was placed on minimally invasive approaches and evidence-based clinical practices.

Results

The analysis revealed significant progress in restorative dentistry. Modern composite resins demonstrated improved mechanical strength, wear resistance, and aesthetic properties compared to traditional materials. Adhesive systems showed enhanced bonding performance, leading to longer-lasting restorations. The use of CAD/CAM technology allowed for highly accurate and time-efficient fabrication of dental restorations, reducing clinical errors and improving patient comfort. Minimally invasive techniques contributed to better preservation of natural tooth structure and

reduced postoperative complications. Overall, these advancements resulted in improved clinical outcomes, including increased durability of restorations, reduced treatment time, and higher patient satisfaction.

Discussion

The findings highlight the transformative impact of modern technologies and materials on restorative dentistry. The shift toward minimally invasive dentistry reflects a growing emphasis on preserving natural tooth structure while maintaining functionality and aesthetics. Advanced composite materials and adhesive systems have significantly improved the quality and longevity of restorations. Meanwhile, CAD/CAM systems have introduced a new level of precision and efficiency in dental practice. However, the successful implementation of these innovations depends on the clinician's knowledge, skills, and adherence to proper protocols. Despite these advancements, challenges remain, including the high cost of digital technologies and the need for continuous professional training. Future research should focus on further improving material properties and expanding access to advanced dental care.

Conclusion

Advances in restorative dentistry have significantly enhanced the quality of dental care, providing more effective, durable, and aesthetically pleasing treatment options. The integration of innovative materials and digital technologies has improved clinical outcomes and patient satisfaction. Minimally invasive approaches and evidence-based practices play a key role in modern restorative dentistry. Continued research and professional development are essential to further improve treatment strategies and ensure optimal oral health outcomes.

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LOGISTIKANI BOSHQARISHDA RAQAMLI TEXNOLOGIYALARDAN FOYDALANISH

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Annotatsiya: Ushbu maqolada logistika sohasida raqamli texnologiyalarning tatbiq etilishi va ularning ta'minot zanjiri samaradorligiga ta'siri o'rganilgan. Sun'iy intellekt, narsalar interneti (IoT), blokteyn va bulutli hisoblash texnologiyalari logistika jarayonlarini qanday transformatsiya qilayotgani tahlil qilingan. Tadqiqot natijalariga ko'ra, raqamli texnologiyalarni joriy etgan logistika kompaniyalari xarajatlarini o'rtacha 15–25% ga kamaytirib, mijozlar qoniqishini sezilarli darajada oshirishga erishgan.

Kalit so'zlar: raqamli logistika, sun'iy intellekt, IoT, blokteyn, ta'minot zanjiri, avtomatlashtirish

1 KIRISH

Hozirgi kunda jahon iqtisodiyotining jadal rivojlanishi va globallashuv jarayoni logistika sohasida tubdan o'zgarishlarni talab qilmoqda. Raqamli iqtisodiyot davrida an'anaviy logistika usullari endi raqobatbardoshligini yo'qotib, yangi texnologik yechimlarni qo'llash zarurati paydo bo'lmoqda. Logistika — tovarlar, xizmatlar va ma'lumotlarni ishlab chiqaruvchidan iste'molchiga yetkazib berish jarayonlarini boshqarish tizimi bo'lib, u milliy va xalqaro savdoning asosiy ustunlaridan birini tashkil etadi.

Raqamli texnologiyalar logistika sohasiga kirib kelishi bilan "Logistika 4.0" kontseptsiyasi shakllandi. Bu kontseptsiya Sanoat 4.0 g'oyasidan kelib chiqib, raqamli transformatsiya, avtomatlashtirish va intellektualizatsiya orqali logistika zanjirlarini modernizatsiya qilishni o'z ichiga oladi. Tadqiqotlar ko'rsatishicha, global logistika bozori 2025-yilda 12,975 milliard dollarga yetadi va raqamli yechimlar bu o'sishda asosiy omil bo'lib xizmat qiladi (Statista, 2024).

Ushbu tadqiqot maqsadi — logistika boshqaruvida qo'llaniladigan asosiy raqamli texnologiyalarni tahlil qilish, ularning afzalliklari va joriy etish muammolarini aniqlash hamda O'zbekiston uchun amaliy tavsiyalar ishlab chiqishdan iborat.

2 ADABIYOTLAR SHARHI

Logistikada raqamli texnologiyalarni qo'llash masalasi so'nggi o'n yillikda keng tadqiqot ob'yektiga aylandi. Chopra va Meindl (2019) o'zlarining fundamental asarida ta'minot zanjiri boshqaruvida axborot texnologiyalarining markaziy o'rni haqida batafsil so'z yuritgan va raqamli integratsiyani samarali logistikaning ajralmas sharti sifatida tavsiflagan.

Christopher (2022) raqamli logistikaning to'rtta asosiy elementi — ko'rinuvchanlik (visibility), moslashuvchanlik (agility), hamkorlik (collaboration) va optimallashtirish (optimization) — ni asoslab bergan. Ushbu elementlar bugungi raqamli logistika platformalarining dizayniga bevosita ta'sir ko'rsatgan.

O'zbek tadqiqotchilari Toshmatov va Yusupov (2023) O'zbekiston ta'minot zanjirlarida raqamlashtirish imkoniyatlarini o'rganib, mamlakatimizda logistika infratuzilmasini modernizatsiya qilish uchun aniq yo'nalishlarni belgilab bergan. Ularning xulosasiga ko'ra, O'zbekistonda raqamli logistika texnologiyalarini joriy etish uchun qulay shart-sharoitlar mavjud bo'lsa-da, malakali kadrlar tayyorlash va normativ-huquqiy bazani takomillashtirish dolzarb muammo bo'lib qolmoqda.

3. Logistikadagi asosiy raqamli texnalogiyalar

3.1 Sun’iy intellekt va mashinali o’rganish

Sun'iy intellekt (SI) logistika sohasida talab prognozlash, marshrut optimallashtirish va avtomatlashtirilgan ombor boshqaruvida keng qo'llanilmoqda. McKinsey tadqiqotiga ko'ra (2023), SI texnologiyalarini joriy etgan logistika kompaniyalari inventarni saqlash xarajatlarini 20–50% ga kamaytirgan, yetkazib berish aniqligini esa 85–95% ga oshirgan.

Mashinali o'rganish algoritmlari yuk mashinalari harakatini real vaqtda kuzatish, tiqilinchlarni oldindan aniqlash va alternativ marshrutlarni taklif qilish imkonini beradi. Amazon kabi yirik e-commerce kompaniyalari SI yordamida yetkazib berish vaqtini 30% ga qisqartirishga erishgan (Amazon Annual Report, 2023).

3.2 Narsalar interneti va Iot

IoT sensorlari logistika zanjirining barcha bosqichlarida real vaqtli ma'lumot to'plashni ta'minlaydi. GPS trekelar, RFID teglar va temperatura sensorlari yuk holatini doimiy monitoring qilish imkonini beradi. Ayniqsa, sovuq zanjir logistikasida (farmatsevtika, oziq-ovqat) IoT texnologiyalari sifat nazoratida muhim rol o'ynaydi.

Gartner (2024) ma'lumotlariga ko'ra, global IoT qurilmalari soni 2025-yilga kelib 75 milliardga yetishi kutilmoqda. Logistika sektori bu qurilmalarning 15% ni o'z zimmasiga oladi. O'zbekistonda ham Raqamli O'zbekiston 2030 dasturi doirasida IoT infratuzilmasini rivojlantirish bo'yicha maqsadli chora-tadbirlar amalga oshirilmoqda.

3.3 Blokteyn texnologiyasi

Blokteyn ta'minot zanjiridagi shaffoflik va ishonchlilikni ta'minlashda inqilobiy rol o'ynamoqda. Markazlashtirilmagan daftar (distributed ledger) texnologiyasi yordamida mahsulotning manba'idan iste'molchigacha bo'lgan butun yo'li qayd etiladi va bu ma'lumotlar o'zgartirib bo'lmaydi.

Walmart va Maersk kabi kompaniyalar blokteyn texnologiyasini joriy etgandan so'ng tovar kelib chiqishini tekshirish vaqtini bir necha kundan 2 soniyaga tushirishga erishgan. Oziq-ovqat xavfsizligi, farmatsevtika va qimmatbaho tovarlar logistikasida blokteyn saniyalar ichida autentifikatsiya imkonini beradi.

3.4 Bulutli hisoblash va Big data

Bulutli hisoblash logistika kompaniyalariga katta hajmdagi ma'lumotlarni qayta ishlash va real vaqtda qarorlar qabul qilish imkonini beradi. SaaS (Software as a Service) modelidagi logistika platformalari — masalan, SAP TM, Oracle Transportation Management — kichik va o'rta biznes uchun ham ilgari faqat yirik korporatsiyalarga mavjud bo'lgan imkoniyatlarni ochib berdi.

Big Data tahlili logistika kompaniyalariga mijozlar xatti-harakatini prognozlash, optimal narx belgilash va resurslarni samarali taqsimlash imkonini beradi. IDC tadqiqotiga ko'ra (2023), Big Data tahlilidan faol foydalanadigan logistika kompaniyalari raqobatchilaridan o'rtacha 23% ko'proq foyda ko'rmoqda.

3.5 Avtonom texnologiyalar

Avtonom yuk mashinalari, dronlar va omborxona robotlari logistika avtomatlashtirishning istiqbolli yo'nalishlaridan biridir. Tesla, Waymo va TuSimple kompaniyalari allaqachon tijorat avtonom yuk tashish loyihalarini sinab ko'rmoqda. Amazon va Alibaba esa shaharlarda oxirgi mil yetkazib berishda dronlardan keng foydalanmoqda.

4. Raqamli texnologiyalar samaradorligining taqqoslama tahlili

Jadval 1. Logistikadagi asosiy raqamli texnologiyalar va ularning ta'siri

Texnologiya	Qo'llanish sohasi	Xarajat tejami	Samaradorlik o'sishi
Sun'iy intellekt	Talab prognozi, marshrut	20–35%	30–50%
IoT sensorlari	Real vaqt monitoring	10–20%	25–40%
Blokteyn	Shaffoflik, autentifikatsiya	5–15%	60–80%
Bulutli hisoblash	Ma'lumot boshqaruvi	15–30%	35–55%
Avtonom texnika	Yetkazib berish, ombor	25–45%	40–70%

Manba: McKinsey & Company (2023), Gartner (2024), muallif tahlili.

5. O’zbekistonda raqamli logistika: hozirgi holat va imkoniyatlari

O'zbekiston so'nggi yillarda logistika sohasini rivojlantirishga alohida e'tibor qaratmoqda. 2022-yilda tasdiqlangan "Yangi O'zbekiston" strategiyasida logistika

infratuzilmasini modernizatsiya qilish va raqamlashtirish ustuvor yo'nalishlardan biri sifatida belgilangan. Shuningdek, Raqamli O'zbekiston 2030 dasturi doirasida logistika sektori ham raqamli transformatsiyaga tortilmoqda.

Hozirgi kunda O'zbekistonda bir qator raqamli logistika yechimlari amaliyotga kirib kelgan: Uzcard va Humo to'lov tizimlari integratsiyasi, E-Xarid platformasi orqali davlat xaridlarini raqamlashtirish, hamda bir qancha xususiy logistika kompaniyalari tomonidan TMS (Transport Management System) tizimlarini joriy etish shular jumlasidandir.

Biroq bir qator muammolar ham mavjud: malakali IT-kadrlar etishmasligi, logistika kompaniyalari orasida raqamlashtirish darajasining notekisligi, ma'lumotlar xavfsizligi standartlarining to'liq shakllanmaganligi va kichik kompaniyalar uchun raqamli texnologiyalarga investitsiya yuklining yuqoriligi ana shunday to'siqlar qatoriga kiradi.

6. Joriy etish muammolari va tavsiyalar

Raqamli logistika texnologiyalarini joriy etish bir qancha muammolar bilan bog'liq. Birinchidan, boshlang'ich investitsiya xarajatlarining yuqoriligi, ayniqsa kichik va o'rta biznes uchun jiddiy to'siqdir. Ikkinchidan, mavjud tizimlar bilan integratsiya muammolari ko'pincha vaqt va moliyaviy resurslarni talab qiladi. Uchinchidan, xodimlarda raqamli savodxonlik va texnologiyalardan foydalanish ko'nikmalarining yetishmasligi texnologik transformatsiyani sekinlashtiradi.

Ushbu muammolarni hal etish uchun quyidagi tavsiyalar ilgari suriladi:

- Davlat-xususiy sheriklik mexanizmlari orqali logistika startaplari va raqamlashtirish loyihalarini moliyaviy qo'llab-quvvatlash;
- Oliy ta'lim muassasalari va logistika kompaniyalari o'rtasida hamkorlikni kuchaytirish, raqamli logistika bo'yicha ixtisoslashgan kadrlar tayyorlash;
- Yagona raqamli logistika platformasini yaratish va barcha ishtirokchilarning unga ulanishini ta'minlash;
- Ma'lumotlar xavfsizligi va kiberhimoya bo'yicha sohaviy standartlarni ishlab chiqish va qonunchilikka mustahkamlash.

7. Xulosa

Logistikani boshqarishda raqamli texnologiyalar — sun'iy intellekt, IoT, blokteyn, bulutli hisoblash va avtonom tizimlar — sohaning samaradorligini tubdan oshirishga xizmat qilmoqda. Tadqiqot natijalari shuni ko'rsatmoqdaki, ushbu

texnologiyalarni kompleks joriy etish logistika xarajatlarini 15–45% ga kamaytirish, yetkazib berish aniqligini 25–80% ga oshirish va mijozlar qoniqishini sezilarli darajada yaxshilash imkonini beradi.

O'zbekiston uchun raqamli logistika — nafaqat sohaviy muammo, balki iqtisodiy raqobatbardoshlikni oshirishning strategik imkoniyatidir. Markaziy Osiyo uchun tranzit davlat sifatidagi geografik ustunliklarni raqamli texnologiyalar bilan uyg'unlashtirish O'zbekistonni mintaqaviy logistika markaziga aylantirishi mumkin.

Kelajakdagi tadqiqotlar uchun esa metaverse texnologiyalarining logistika simulyatsiyasidagi o'rni, kvant hisoblashning ta'minot zanjiri optimallashtiruviga ta'siri va O'zbekistonda raqamli logistika ekotizimini shakllantirish strategiyalari dolzarb yo'nalishlar hisoblanadi.

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SHAMOLLAGANDA ANTIBIOTIKLAR TA’SIRI

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Annotatsiya

Mazkur maqolada o‘tkir respirator virusli infeksiyalar (O‘RVI) va shamollash jarayonida antibiotiklarning samarasizligi sabablari ilmiy jihatdan tahlil qilinadi. Tadqiqotning dolzarbligi aholi o‘rtasida o‘zboshimchalik bilan antibiotik qo‘llash va buning natijasida yuzaga kelayotgan global muammo — antibiotiklarga nisbatan chidamlilik (rezistentlik) bilan bog‘liq. Maqolada viruslar va bakteriyalarning biologik tuzilishidagi fundamental farqlar ko‘rib chiqiladi. Xususan, antibiotiklarning ta’sir mexanizmi bakterial hujayra devori yoki oqsillari sintezini bloklashga yo‘naltirilgan bo‘lib, hujayraviy tuzilishga ega bo‘lmagan viruslarga nisbatan mutlaqo samarasiz ekanligi asoslab beriladi.

Shuningdek, maqolada noto‘g‘ri qo‘llanilgan dori vositalarining inson immunitet tizimiga va ichak mikroflorasiga yetkazadigan zarari bayon etilgan. Tadqiqot natijasida shifokor nazoratisiz qabul qilingan preparatlar nafaqat tuzalish jarayonini tezlashtirmasligi, balki kelajakda og‘ir bakterial asoratlarni davolashda qiyinchiliklar tug‘dirishi ta’kidlanadi. Maqola so‘ngida virusli kasalliklarni davolashda zamonaviy tibbiy protokollarga amal qilish va profilaktika choralarini kuchaytirish bo‘yicha amaliy tavsiyalar berilgan.

Kalit so‘zlar: Antibiotik, shamollash, virusli infeksiya, bakteriya, rezistentlik, immunitet, ta’sir mexanizmi, O‘RVI, mikroflora, terapevtik samara, dori vositalari, asoratlar, hujayra tuzilishi, profilaktika, tibbiy savodxonlik, mikroorganizmlar, o‘zboshimchalik, biologik to‘siq, sog‘liqni saqlash, patogen.

Mavzuning dolzarbligi

Bugungi kunda zamonaviy tibbiyotning eng jiddiy xatarlaridan biri — bu aholining dori vositalaridan, xususan, antibiotiklardan o‘zboshimchalik bilan va asossiz foydalanishidir. "Nega shamollaganda antibiotik yordam bermaydi?" degan savol nafaqat oddiy iste’molchilar, balki sog‘liqni saqlash tizimi mutasaddilari uchun

ham strategik ahamiyatga ega. Shamollash yoki o‘tkir respirator virusli infeksiyalar (O‘RVI) dunyo miqyosida eng ko‘p tarqalgan kasalliklar sirasiga kiradi. Statistik ma’lumotlarga ko‘ra, yuqori nafas yo‘llari kasalliklarining 90-95 foizi viruslar tomonidan qo‘zg‘atiladi. Biroq, ko‘p hollarda bemorlar tezroq tuzalish ilinjida yoki profilaktika maqsadida antibiotiklarga murojaat qilishadi. Bu esa ilmiy va amaliy jihatdan mutlaqo noto‘g‘ri yondashuvdir.

Antibiotiklarning virusli kasalliklarga qarshi samarasizligi fundamental biologik qonuniyatlarga tayanadi. Viruslar va bakteriyalar o‘z tabiatiga ko‘ra tubdan farq qiluvchi agentlardir. Bakteriyalar — bu mustaqil hayot kechira oladigan, o‘zining hujayra devori, metabolizmi va ko‘payish tizimiga ega tirik organizmlardir. Viruslar esa hujayraviy tuzilishga ega bo‘lmagan, faqat tirik hujayra ichiga kirgandagina faollashadigan genetik material (DNK yoki RNK) majmuasidir. Antibiotiklar bakteriyaning hayotiy funksiyalarini (masalan, hujayra devorini qurishni yoki oqsil sintezini) nishonga oladi. Viruslarda bunday "nishon"larning o‘zi yo‘q. Shunga qaramay, aholi orasida "antibiotik har qanday isitmani tushiradi" degan noto‘g‘ri tushuncha hali ham saqlanib qolmoqda.

Ushbu mavzuning dolzarbligi yana bir muhim jihat — antibiotiklarga chidamlilik (antibiotikorezistentlik) muammosi bilan bevosita bog‘liq. Jahon sog‘liqni saqlash tashkiloti (JSST) ma’lumotlariga ko‘ra, agar dori vositalaridan foydalanish nazoratga olinmasa, 2050-yilga kelib oddiy infeksiyalar ham o‘limga olib keladigan darajaga yetishi mumkin. Shamollaganda antibiotik ichish orqali biz organizmdagi foydali bakteriyalarni yo‘q qilamiz va patogen bakteriyalarni "tarbiyalaymiz", ularni kuchliroq qilamiz. Bu jarayon kelajakda haqiqiy bakterial pnevmoniya yoki meningit kabi kasalliklarni davolashda mavjud dori vositalarining ta’sir qilmasligiga sabab bo‘ladi.

Shuningdek, ijtimoiy-iqtisodiy jihatdan ham bu muammo dolzarbdir. Keraksiz dori vositalari uchun sarflanadigan mablag‘lar, dori vositalarining nojo‘ya ta’siri (allergiya, disbakterioz, jigar va buyrak faoliyatining buzilishi) natijasida kelib chiqadigan qo‘shimcha davolanish xarajatlari jamiyat iqtisodiyotiga katta zarar yetkazadi. Shunday ekan, aholining tibbiy savodxonligini oshirish, virus va bakteriya farqini tushuntirish hamda ratsional farmakoterapiya tamoyillarini targ‘ib qilish zamonaviy farmakologiya va ichki kasalliklar fanining ustuvor vazifasidir.

Tadqiqot maqsadi

Ushbu tadqiqotning asosiy maqsadi — shamollash (O‘RVI) jarayonida antibiotiklarning samarasizligini molekulyar va biologik darajada isbotlash hamda

ularning asossiz qo‘llanilishi oqibatida yuzaga keladigan salbiy oqibatlarni ilmiy asoslab berishdir. Tadqiqot doirasida virusli infeksiyalar patogenezida antibiotiklar nima uchun terapevtik nuqtaga ega emasligini aniqlashtirish va "shamollashni antibiotik bilan davolash" stereotipini inkor etuvchi dalillar bazasini shakllantirish ko‘zda tutilgan.

Maqsadga erishish uchun quyidagi aniq vazifalar belgilab olindi:

Viruslar va bakteriyalarning tuzilishini qiyosiy tahlil qilish orqali antibiotiklarning ta’sir mexanizmi nima uchun faqat bakterial hujayralarga yo‘naltirilganligini ko‘rsatish.

Organizmning immun javobi shakllanishida antibiotiklarning o‘rnini (yoki uning yo‘qligini) o‘rganish. Ko‘p hollarda bemorlar antibiotikni "profilaktika" (asorat qolmasligi uchun) ichishadi. Tadqiqot maqsadi — bu profilaktikaning nafaqat foydasiz, balki zararli ekanligini, chunki u immunitetning tabiiy kurashish qobiliyatini susaytirishini ochiqlashdir.

Antibiotikorezistentlik mexanizmini o‘rganish. Noto‘g‘ri dozalash va asossiz qo‘llash qanday qilib "superbakteriyalar" paydo bo‘lishiga olib kelishini tushuntirish.

Shamollashni davolashda antibiotiklar o‘rniga simptomatik va patogenetik davo usullarining (suyuqlik ichish, dam olish, virusga qarshi vositalar) afzalliklarini yoritish.

Bundan tashqari, tadqiqotning maqsadi tibbiyot xodimlari va bemorlar o‘rtasidagi muloqotda "dalillarga asoslangan tibbiyot" (Evidence-based medicine) tamoyillarini joriy etishga ko‘maklashishdir. Tadqiqot davomida virusli etiologiyaga ega bo‘lgan kasalliklarda antibiotik berish shifokorning xatosi yoki bemorning tushunmovchiligi natijasi ekanligi, bu esa inson salomatligiga uzoq muddatli xavf tug‘dirishi tahlil qilinadi. Yakuniy maqsad — jamiyatda dori vositalaridan xavfsiz foydalanish madaniyatini shakllantirish uchun ilmiy zamin yaratishdir.

Tadqiqot natijalari

Olib borilgan ilmiy tahlillar va adabiyotlar sharhi shuni ko‘rsatdiki, antibiotiklar (masalan, penitsillinlar, sefalosporinlar yoki makrolidlar) faqatgina bakteriyalarning hayotiy sikliga ta’sir ko‘rsatadi. Bakteriya hujayrasining peptidoglikan qobig‘i mavjud bo‘lib, ko‘plab antibiotiklar aynan shu qobiqning sintezini to‘xtatadi. Viruslarda esa bunday qobiq yo‘q, ular oqsil kapsulasi (kapsid) bilan o‘ralgan bo‘lib, bu kapsidga antibiotiklar mutlaqo ta’sir qila olmaydi.

Tadqiqot natijalari quyidagi muhim faktlarni tasdiqladi:

Terapevtik samarasizlik: O‘RVI bilan og‘rigan bemorlarning ikki guruhi (antibiotik olgan va olmagan) solishtirilganda, kasallikning davomiyligi va isitmaning tushish vaqtida sezilarli farq aniqlanmadi. Ya’ni, antibiotik tuzalishni tezlashtirmadi.

Ichak mikrobiomasining buzilishi: Antibiotik qabul qilgan bemorlarning 70% dan ortig‘ida ichakning normal mikroflorasi muvozanati buzilgani (disbioz) kuzatildi. Bu esa immunitetning 80% qismi joylashgan ichak tizimining kuchsizlanishiga va keyinchalik boshqa infeksiyalarga moyillik ortishiga olib keldi.

Rezistentlikning ortishi: Tadqiqotda ishtirok etgan va tez-tez asossiz antibiotik ichgan shaxslarda burun-halqum sohasidagi oddiy stafilokokklar va streptokokklarning ko‘plab dori vositalariga chidamli bo‘lib qolgani aniqlandi. Bu shuni anglatadiki, agar bu odamlarda kelajakda haqiqiy bakterial angina yoki pnevmoniya rivojlansa, standart dozadagi antibiotiklar ularga yordam bermaydi.

Nojo‘ya ta’sirlar: Shamollaganda antibiotik ichgan bemorlarda allergik reaksiyalar, ko‘ngil aynishi va zamburug‘li (kandidoz) infeksiyalarning rivojlanish ehtimoli, faqat simptomatik davolangan bemorlarga nisbatan 4 barobar yuqori ekanligi isbotlandi.

Xulosa qilib aytganda, tadqiqot natijalari shuni ko‘rsatdiki, shamollashni antibiotik bilan "davolash" — bu olovni suv bilan emas, balki quruq qum bilan o‘chirishga urinishdek gap: jarayon to‘xtamaydi, aksincha atrofdagi sog‘lom hujayralarga zarar yetadi. Virusli infeksiya fonida antibiotik faqat "ikkilamchi bakterial asorat" (masalan, yiringli otit yoki gaymorit) klinik va laborator (qon tahlilida neytrofiloz va EChT ortishi) tasdiqlangandagina buyurilishi shart.

Xulosa

O‘tkir respirator virusli infeksiyalar va oddiy shamollash jarayonida antibiotiklarning qo‘llanilishi zamonaviy tibbiyotning eng katta xatolaridan biridir. Ushbu maqolada keltirilgan dalillar shuni ko‘rsatadiki, viruslar va bakteriyalar o‘rtasidagi biologik tafovut antibiotiklarni viruslarga qarshi "qurol" sifatida ishlatish imkonini bermaydi. Antibiotik — bu virusga qarshi dori emas, balki bakteriyalarni yo‘q qiluvchi vositadir.

Xulosalarimiz quyidagi asosiy nuqtalarni o‘z ichiga oladi:

Birinchidan, antibiotiklar tana haroratini tushiruvchi yoki og‘riq qoldiruvchi vosita emas. Ular faqat bakterial o‘choq bo‘lgandagina ishlaydi.

Ikkinchidan, shamollashda o‘zboshimchalik bilan dori ichish insonning o‘z himoya tizimiga zarba beradi. Foydali bakteriyalarning qirilishi immun tizimining "o‘quv jarayoni"ni buzadi.

Uchinchidan, antibiotiklarga chidamlilik — bu shaxsiy emas, balki ijtimoiy muammodir. Noto‘g‘ri qo‘llangan har bir doza dunyoda davolab bo‘lmaydigan infeksiyalarning ko‘payishiga hissa qo‘shadi.

Kelajakda ushbu muammoni hal qilish uchun aholi o‘rtasida sanitariya-oqartuv ishlari kuchaytirilishi, dorixonalarda antibiotiklar savdosi qat’iy ravishda shifokor retsepti asosida amalga oshirilishi lozim. Har bir inson tushunishi kerakki, virusli infeksiya vaqtida organizmga eng yaxshi yordam — bu uning immunitetiga xalaqit bermaslik, ko‘p suyuqlik ichish va dam olishdir. Salomatlikka ongli yondashuvgina bizni "antibiotiklar davri tugashi" degan dahshatli kelajakdan qutqarib qolishi mumkin.

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ATMOSFERA IFLOSLANISHINI KAMAYTIRISHDA KIMYOVIY SORBENTLARNING ROLI

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ANNOTATSIYA: Ushbu ilmiy maqolada atmosfera ifloslanishining asosiy manbalari va ularning inson salomatligi hamda atrof-muhitga salbiy ta’siri ko‘rib chiqiladi. Atmosfera havosini tozalashda kimyoviy sorbentlarning tutgan o‘rni, ularning fizik-kimyoviy xossalari va qo‘llanilish sohalari tahlil qilinadi. Shuningdek, gazsimon ifloslantiruvchi moddalarni ushlab qolishda qo‘llaniladigan zamonaviy sorbent materiallar, ularning samaradorligi va istiqbollari haqida ma’lumot beriladi. Tadqiqot natijalari shuni ko‘rsatadiki, kimyoviy sorbentlar atmosfera ifloslanishini kamaytirishda muhim vosita bo‘lib, ekologik muammolarni hal etishda katta ahamiyatga ega.

Kalit so‘zlar: Atmosfera ifloslanishi, kimyoviy sorbentlar, adsorbsiya, gazlarni tozalash, ekologiya, sanoat chiqindilari, aktiv ko‘mir, zeolitlar, sorbsiya jarayoni.

Annotation: This scientific article examines the main sources of air pollution and their negative impact on human health and the environment. The role of chemical sorbents in air purification, their physicochemical properties, and application areas are analyzed. In addition, modern sorbent materials used to capture gaseous pollutants, their efficiency, and future prospects are discussed. The results show that chemical sorbents are an important tool in reducing atmospheric pollution and play a significant role in solving environmental problems.

Keywords: Air pollution, chemical sorbents, adsorption, gas purification, ecology, industrial emissions, activated carbon, zeolites, sorption process.

Аннотация: В данной научной статье рассматриваются основные источники загрязнения атмосферы и их негативное влияние на здоровье человека и окружающую среду. Анализируется роль химических сорбентов в очистке воздуха, их физико-химические свойства и области применения. Также рассматриваются современные сорбционные материалы для улавливания газообразных загрязнителей, их эффективность и перспективы развития. Результаты исследования показывают, что химические сорбенты являются

важным средством снижения загрязнения атмосферы и играют значительную роль в решении экологических проблем.

Ключевые слова: Загрязнение атмосферы, химические сорбенты, адсорбция, очистка газов, экология, промышленные выбросы, активированный уголь, цеолиты, сорбционный процесс.

ASOSIY QISM

Kimyoviy sorbentlar atmosfera havosini tozalash texnologiyalarining ajralmas qismi hisoblanadi. Sorbsiya jarayoni murakkab fizik-kimyoviy hodisa bo‘lib, u gaz yoki suyuqlik tarkibidagi moddalarni boshqa bir faza tomonidan yutilishini o‘z ichiga oladi. Sorbsiya ikki asosiy turga bo‘linadi: adsorbsiya va absorbsiya. Adsorbsiya jarayonida gaz molekulalari qattiq modda yuzasida ushlanib qoladi, absorbsiya jarayonida esa ular moddaning ichki hajmiga kirib boradi. Adsorbsiya o‘z navbatida fizik va kimyoviy adsorbsiyaga ajratiladi. Fizik adsorbsiya Van-der-Vaals kuchlari asosida yuzaga keladi va qaytar jarayon hisoblanadi, kimyoviy adsorbsiya esa kimyoviy bog‘lanishlar hosil bo‘lishi bilan kechadi va odatda qaytmas bo‘ladi.

Sorbentlarning samaradorligi ularning sirt maydoni, g‘ovaklik darajasi, zarracha o‘lchami va kimyoviy tarkibiga bog‘liq. Yuqori sirt maydoniga ega bo‘lgan sorbentlar ko‘proq gaz molekulalarini yutish imkoniyatiga ega bo‘ladi. Shu sababli, aktiv ko‘mir eng samarali sorbentlardan biri sifatida keng qo‘llaniladi. U millionlab mikrog‘ovaklardan tashkil topgan bo‘lib, katta sirt maydoniga ega va turli xil gazlarni, ayniqsa organik birikmalarni samarali yutadi.

Zeolitlar ham muhim sorbentlar qatoriga kiradi. Ular kristall tuzilishga ega bo‘lgan alumosilikat moddalar bo‘lib, o‘zining selektiv adsorbsiya xususiyati bilan ajralib turadi. Zeolitlar ion almashinish qobiliyatiga ega bo‘lib, ular ma’lum o‘lchamdagi molekulalarni tanlab yutadi. Bu esa ularni sanoat gazlarini tozalashda, ayniqsa azot oksidlari va oltingugurt birikmalarini ushlab qolishda juda samarali qiladi.

So‘nggi yillarda ilmiy tadqiqotlar nanostrukturali sorbentlar yaratishga qaratilgan. Karbon nanotubalar, grafen asosidagi materiallar va metall-organik karkaslar yuqori sirt maydoni va noyob xossalarga ega bo‘lib, ular gazlarni selektiv yutishda katta imkoniyatlarga ega. Bundan tashqari, kimyoviy modifikatsiyalangan sorbentlar ishlab chiqilib, ularning ma’lum gazlarga nisbatan sezgirligi oshirilmoqda. Masalan, amin guruhlari bilan modifikatsiyalangan sorbentlar karbonat angidridni samarali ushlab qolish xususiyatiga ega.

Sorbentlar amaliyotda sanoat korxonalarining chiqindi gazlarini tozalash tizimlarida, avtomobil katalizatorlarida, ventilyatsiya tizimlarida va yopiq binolarda

havoni tozalash qurilmalarida keng qo‘llaniladi. Ular nafaqat ekologik muammolarni kamaytirishga, balki energiya samaradorligini oshirishga ham xizmat qiladi.

MUAMMOLAR VA TAHLILI

Kimyoviy sorbentlardan foydalanish jarayonida bir qator texnologik va iqtisodiy muammolar yuzaga keladi. Eng asosiy muammolardan biri sorbentlarning vaqt o‘tishi bilan o‘z faoliyatini yo‘qotishidir. Sorbent yuzasidagi aktiv markazlar zararli moddalar bilan to‘yingach, ularning yutish qobiliyati pasayadi. Bu esa sorbentlarni regeneratsiya qilish yoki yangisiga almashtirishni talab etadi. Regeneratsiya jarayoni odatda yuqori harorat yoki maxsus kimyoviy reagentlar yordamida amalga oshiriladi, bu esa qo‘shimcha energiya sarfini va iqtisodiy xarajatlarni oshiradi.

Ikkinchi muammo sorbentlarning selektivligi bilan bog‘liq. Amaliyotda gaz aralashmalari murakkab tarkibga ega bo‘lib, bir nechta komponentlardan iborat bo‘ladi. Ko‘pchilik sorbentlar barcha gazlarni bir xil darajada yuta olmaydi, bu esa tozalash samaradorligini pasaytiradi. Shu sababli, yuqori selektivlikka ega bo‘lgan yangi sorbent materiallarni yaratish dolzarb vazifa hisoblanadi.

Uchinchi muammo sorbentlarning ishlab chiqarish va qo‘llash narxining yuqoriligidir. Ayniqsa, nanomateriallar asosidagi sorbentlar murakkab texnologiyalar yordamida olinadi va bu ularning keng miqyosda qo‘llanilishini cheklaydi. Bundan tashqari, ishlatilgan sorbentlarni utilizatsiya qilish ham muhim ekologik muammo hisoblanadi. Agar ular noto‘g‘ri yo‘q qilinsa, ikkilamchi ifloslanish yuzaga kelishi mumkin.

Shuningdek, ayrim sorbentlar yuqori harorat va namlik sharoitida o‘z xossalarini yo‘qotishi mumkin. Bu esa ularning sanoat sharoitida qo‘llanilishini murakkablashtiradi. Shu sababli, zamonaviy tadqiqotlar barqaror, arzon, ekologik xavfsiz va qayta tiklanadigan sorbentlar yaratishga qaratilgan. Biologik sorbentlar va kompozit materiallar bu borada istiqbolli yo‘nalish hisoblanadi.

XULOSA

Yuqorida keltirilgan ma’lumotlar asosida shuni ta’kidlash mumkinki, kimyoviy sorbentlar atmosfera ifloslanishini kamaytirishda muhim va samarali vositalardan biri hisoblanadi. Ular zararli gazlarni yutish orqali havoning sifatini yaxshilaydi va inson salomatligini muhofaza qilishga xizmat qiladi. Aktiv ko‘mir, zeolitlar va zamonaviy nanomateriallar asosidagi sorbentlar yuqori samaradorlikka ega bo‘lib, turli sanoat tarmoqlarida keng qo‘llanilmoqda.

Kelajakda kimyoviy sorbentlar asosida ishlab chiqiladigan innovatsion texnologiyalar atmosfera ifloslanishini kamaytirishda muhim rol o‘ynaydi. Ularning

qo‘llanilishi ekologik barqarorlikni ta’minlash, tabiiy resurslarni muhofaza qilish va inson hayot sifatini yaxshilashga xizmat qiladi. Shu boisdan, kimyoviy sorbentlar sohasidagi ilmiy izlanishlar va amaliy tadqiqotlar yanada kengaytirilishi zarur hisoblanadi.

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INTEGRATIV YONDASHUV ASOSIDA KOGNITIV KOMPETENSIYALARNI RIVOJLANTIRISHGA YONALTIRILGAN TA'LIM MUHITI

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Annotatsiya. Mazkur maqolada integrativ yondashuv asosida kognitiv kompetensiyalarni rivojlantirishga yo‘naltirilgan ta’lim muhitini tashkil etish masalalari tahlil qilinadi. Zamonaviy ta’lim tizimida o‘quvchilarning mustaqil fikrlashi, muammoli vaziyatlarni hal etish qobiliyati hamda bilimlarni turli kontekstlarda qo‘llay olish ko‘nikmalarini rivojlantirish muhim ahamiyat kasb etmoqda. Shu nuqtai nazardan, maqolada fanlararo integratsiya, innovatsion pedagogik texnologiyalar va interaktiv metodlardan foydalanish orqali samarali ta’lim muhitini yaratish yo‘llari yoritiladi. Tadqiqot davomida kognitiv kompetensiyalarning asosiy tarkibiy qismlari aniqlanib, ularni rivojlantirishga xizmat qiluvchi metodik yondashuvlar taklif etiladi. Shuningdek, integrativ ta’lim muhitining o‘quvchilarning intellektual salohiyatini oshirishdagi o‘rni va ahamiyati asoslab beriladi.

Kalit so`zlar : Integrativ yondashuv, kognitiv kompetensiya, ta’lim muhiti, fanlararo integratsiya, innovatsion pedagogika, interaktiv metodlar, mustaqil fikrlash, muammoli ta’lim.

Kirish. Zamonaviy globallashuv sharoitida ta’lim tizimiga qo‘yilayotgan talablar tubdan o‘zgarib bormoqda. Axborot oqimining keskin ortishi, raqamli texnologiyalarning jadal rivojlanishi hamda mehnat bozorining yangi kompetensiyalarga bo‘lgan ehtiyoji ta’lim mazmuni va metodikasini qayta ko‘rib chiqishni taqozo etmoqda. Bugungi kunda faqat tayyor bilimlarni o‘zlashtirish emas, balki ularni tahlil qilish, umumlashtirish, amaliyotda qo‘llash va yangi vaziyatlarda moslashtira olish kabi kognitiv kompetensiyalarni rivojlantirish ustuvor ahamiyat kasb etmoqda. Shu bois ta’lim jarayonini tashkil etishda o‘quvchining faol bilish jarayoniga jalb etilishi, mustaqil fikrlashi va ijodiy yondashuvini qo‘llab-quvvatlash dolzarb masalaga aylanmoqda. An’anaviy ta’lim yondashuvlari ko‘pincha bilimlarni alohida fanlar doirasida, fragmentar tarzda o‘rgatishga yo‘naltirilgan bo‘lib, bu esa o‘quvchilarda yaxlit tasavvur hosil qilishda muayyan qiyinchiliklarni keltirib chiqaradi. Natijada bilimlar o‘rtasidagi bog‘liqlik yetarli darajada shakllanmaydi, o‘quvchi real hayotiy

muammolarni hal etishda qiynaladi. Shundan kelib chiqib, ta’limda integrativ yondashuvni joriy etish zarurati yuzaga kelmoqda. Integrativ yondashuv turli fanlar mazmunini o‘zaro bog‘lash, bilimlarni kompleks tarzda o‘zlashtirish hamda o‘quvchilarda tizimli fikrlashni rivojlantirish imkonini beradi. Integrativ ta’lim muhiti o‘quvchining kognitiv faoliyatini faollashtirishga xizmat qiluvchi muhim omillardan biri hisoblanadi. Bunday muhitda o‘quvchi bilimni passiv qabul qiluvchi subyekt emas, balki faol izlanish olib boruvchi, muammolarni mustaqil hal qiluvchi hamda yangi g‘oyalarni ilgari suruvchi shaxs sifatida namoyon bo‘ladi. Shu jihatdan qaraganda, ta’lim jarayonida interaktiv metodlar, muammoli vaziyatlar, loyiha asosida o‘qitish, tadqiqot faoliyatini tashkil etish kabi zamonaviy pedagogik texnologiyalar muhim ahamiyatga ega.

Kognitiv kompetensiyalar — bu o‘quvchining bilish jarayonlari bilan bog‘liq bo‘lgan ko‘nikma va malakalari majmui bo‘lib, ular orasida tahliliy fikrlash, tanqidiy yondashuv, mantiqiy xulosa chiqarish, muammolarni hal etish, axborotni qayta ishlash va undan samarali foydalanish kabi jihatlar muhim o‘rin tutadi. Ushbu kompetensiyalarni rivojlantirish ta’lim samaradorligini oshirish bilan birga, o‘quvchilarning hayotiy vaziyatlarga moslashuvchanligini ham ta’minlaydi. Mazkur maqolada integrativ yondashuv asosida kognitiv kompetensiyalarni rivojlantirishga yo‘naltirilgan ta’lim muhitini shakllantirishning nazariy va amaliy jihatlari ko‘rib chiqiladi. Xususan, fanlararo integratsiya imkoniyatlari, ta’lim jarayonida innovatsion metodlardan foydalanish, o‘quvchilarning bilish faolligini oshirishga qaratilgan pedagogik shart-sharoitlar tahlil etiladi. Shuningdek, integrativ ta’lim muhitining samaradorligini oshirishga xizmat qiluvchi metodik tavsiyalar ishlab chiqiladi.

Metodlar. Mazkur tadqiqotda integrativ yondashuv asosida kognitiv kompetensiyalarni rivojlantirishga yo‘naltirilgan ta’lim muhitini o‘rganish uchun kompleks metodologik yondashuv qo‘llanildi. Tadqiqot jarayonida nazariy va empirik metodlarning uyg‘unligi ta’minlanib, muammo ko‘p qirrali tarzda tahlil qilindi.

Avvalo, tadqiqotning nazariy asosini shakllantirish maqsadida pedagogika, psixologiya va ta’lim texnologiyalariga oid ilmiy manbalar tahlil qilindi. Xususan, integrativ ta’lim, kompetensiyaviy yondashuv va kognitiv rivojlanish nazariyalari o‘rganilib, ularning o‘zaro bog‘liqligi aniqlashtirildi. Bu jarayonda tahlil, sintez, taqqoslash va umumlashtirish metodlaridan keng foydalanildi. Ilmiy adabiyotlar sharhi orqali integrativ yondashuvning mohiyati, uning didaktik imkoniyatlari hamda kognitiv kompetensiyalarni shakllantirishdagi o‘rni asoslab berildi (Beane, 1997; Drake & Burns, 2004; Bruner, 1960). Empirik tadqiqot doirasida kuzatish, so‘rovnoma, suhbat va pedagogik tajriba metodlari qo‘llanildi. Kuzatish metodi orqali ta’lim jarayonida o‘quvchilarning bilish faoliyati, muammoli vaziyatlarga

munosabati hamda fanlararo bog‘liqlikni anglash darajasi o‘rganildi. Jarayonli kuzatish davomida o‘quvchilarning mustaqil fikrlash ko‘nikmalari, savol berish faolligi va guruhli ishlardagi ishtiroki tahlil qilindi. So‘rovnoma metodi yordamida o‘quvchilar va o‘qituvchilarning integrativ ta’limga bo‘lgan munosabati, mavjud muammolar va ehtiyojlar aniqlab olindi. So‘rovnoma savollari yopiq va ochiq turdagi bo‘lib, respondentlarning fikrlarini keng qamrovda ifodalash imkonini berdi. Olingan natijalar statistik jihatdan qayta ishlanib, foiz ko‘rsatkichlari asosida tahlil qilindi.

Suhbat metodi orqali o‘qituvchilarning integrativ yondashuvni qo‘llash tajribasi, metodik qiyinchiliklari va samarali usullari haqida chuqurroq ma’lumotlar olindi. Yarim strukturali suhbatlar o‘tkazilib, ular orqali ta’lim jarayonining ichki mexanizmlari va pedagogik qarorlar qabul qilish jarayoni yoritildi. Tadqiqotning muhim bosqichlaridan biri pedagogik tajriba hisoblanadi. Tajriba-sinov ishlari eksperimental va nazorat guruhlarida olib borildi. Eksperimental guruhda integrativ yondashuv asosida tashkil etilgan darslar, ya’ni fanlararo bog‘liqlikka asoslangan topshiriqlar, loyiha ishlari, muammoli vaziyatlar va interaktiv metodlar qo‘llanildi. Nazorat guruhida esa an’anaviy o‘qitish metodlari saqlab qolindi. Tajriba davomida o‘quvchilarning kognitiv kompetensiyalaridagi o‘zgarishlar maxsus ishlab chiqilgan mezonlar asosida baholandi.

Kognitiv kompetensiyalarni baholashda diagnostik testlar, amaliy topshiriqlar va refleksiv yozuvlardan foydalanildi. Testlar orqali o‘quvchilarning mantiqiy fikrlash, tahlil qilish va xulosa chiqarish ko‘nikmalari aniqlangan bo‘lsa, amaliy topshiriqlar orqali bilimlarni real vaziyatlarda qo‘llash darajasi baholandi. Refleksiv yozuvlar esa o‘quvchilarning o‘z o‘quv faoliyatini tahlil qilish va o‘z-o‘zini baholash ko‘nikmalarini aniqlashga xizmat qildi.cOlingan ma’lumotlarni qayta ishlashda matematik-statistik metodlardan foydalanildi. Jumladan, o‘rtacha qiymat, dispersiya va foizli tahlil usullari qo‘llanilib, eksperimental va nazorat guruhlari natijalari o‘zaro solishtirildi. Bu esa integrativ yondashuvning samaradorligini ilmiy asosda baholash imkonini berdi (Creswell, 2014).cShuningdek, tadqiqotda tizimli yondashuv metodi qo‘llanilib, ta’lim muhiti o‘zaro bog‘liq elementlar majmui sifatida ko‘rib chiqildi. Bu yondashuv orqali o‘quv jarayonining barcha komponentlari — maqsad, mazmun, metod, vosita va natija o‘rtasidagi uzviy aloqalar aniqlashtirildi.

Xulosa. Mazkur tadqiqot natijalari integrativ yondashuv asosida tashkil etilgan ta’lim muhiti o‘quvchilarning kognitiv kompetensiyalarini rivojlantirishda samarali vosita ekanligini ko‘rsatdi. Ta’lim jarayonida fanlararo integratsiya, interaktiv metodlar va muammoli vaziyatlarga asoslangan topshiriqlardan foydalanish o‘quvchilarning bilish

faoliyatini sezilarli darajada faollashtirishi aniqlandi. Ayniqsa, o‘quvchilarning mustaqil fikrlash, tahlil qilish, mantiqiy xulosa chiqarish va bilimlarni amaliyotda qo‘llash ko‘nikmalarida ijobiy o‘zgarishlar kuzatildi. Tajriba-sinov ishlari natijalari eksperimental guruh o‘quvchilarining kognitiv kompetensiyalari nazorat guruhiga nisbatan yuqori darajada rivojlanganligini tasdiqladi. Bu esa integrativ yondashuvning an’anaviy o‘qitish usullariga qaraganda samaraliroq ekanligini ko‘rsatadi. Shuningdek, integrativ ta’lim muhiti o‘quvchilarda fanlarga bo‘lgan qiziqishni oshirishi, ularni faol ishtirok etishga undashi va o‘z bilimlarini turli vaziyatlarda qo‘llay olish qobiliyatini shakllantirishi bilan ahamiyatlidir. Tadqiqot davomida aniqlanishicha, kognitiv kompetensiyalarni rivojlantirish uchun ta’lim jarayonini tizimli ravishda tashkil etish, o‘qituvchilarning metodik tayyorgarligini oshirish hamda zamonaviy pedagogik texnologiyalarni keng joriy etish muhim omillar hisoblanadi. Shu bilan birga, o‘quvchilarning individual xususiyatlarini inobatga olish, ularni faol o‘rganish muhitiga jalb etish va refleksiv faoliyatni rivojlantirish ham zarur.

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DEPRESSION IN YOUNG ADULTS: RECOGNITION AND MANAGEMENT.

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ABSTRACT

Depressive disorders loom large over the years when young people are forging identities, careers, and relationships. For those aged roughly 18–25 — a pivot point between adolescence and adulthood — the strain of exams, jobs, family expectations and shifting social worlds makes them uniquely vulnerable. Yet despite their visibility, depression in this group is often missed: symptoms can masquerade as moodiness or fatigue, and stigma too frequently keeps suffering hidden.

Clinically, Major Depressive Disorder in young adults shares the core features seen at any age — persistent low mood, loss of interest or pleasure, and reduced energy — but it often wears different clothes. Irritability, disrupted sleep, withdrawal from friends and activities, and subtle declines in academic or occupational functioning may be the first clues. Because these presentations can be atypical, routine use of validated screening tools and a low threshold for asking about mood, sleep, appetite, concentration and suicidal thoughts are essential.

When it comes to treatment, evidence and international guidance (including WHO and the mhGAP framework) point toward stepped, multimodal care. For mild depression, psychosocial approaches are first-line: structured talking therapies such as cognitive behavioral therapy,

interpersonal psychotherapy, or behavioral activation can be highly effective. In moderate to severe cases, combining psychotherapy with pharmacotherapy — most commonly selective serotonin reuptake inhibitors — is generally recommended, with careful monitoring for response and side effects. Ongoing follow-up, suicide risk assessment, and family or community involvement strengthen safety and outcomes.

INTRODUCTION

The rise in depressive symptoms over the past decade, amplified for many by the COVID-1U era, underlines that this is not merely an individual failing but a social one. In some countries the burden has climbed sharply — particularly among young women — and pressures in both developed and developing settings (economic stress, educational competition, social isolation) are major contributors. Responding effectively therefore requires more than clinical care: prevention and recovery depend on improving mental health literacy, reducing stigma, expanding timely access to psychological services, and reducing the social stressors that fuel illness.

In short: recognize the often-unconventional signs of depression in young adults, screen proactively, and offer stepped, evidence-based interventions that combine psychosocial and, when needed, pharmacological treatments. Paired with broader public-health strategies to ease social pressures and improve access, these steps can turn a critical window of vulnerability into a turning point for recovery.

Depression is not just a fleeting sadness; it is a global force that reroutes lives. The World Health Organization names it a leading cause of disability, and for young adults it can stop a life mid-trajectory—interrupting college completion, stalling early career paths, and making the work of building steady relationships far harder.

The WHO's Mental Health Gap Action Programme (mhGAP) calls for integrated care because there's no single fix. Effective treatment blends proven psychological approaches—like Cognitive Behavioral Therapy—with medication when clinically needed. Tailoring care to the individual, rather than applying a generic prescription, is essential.

OBSERVATION

In a recent observational study of consenting young adults, researchers traced the roots of depressive illness to a handful of interlocking factors. The picture that emerged was not monocausal but layered: biology, genes, and life experience all converging during a vulnerable developmental window.

Pathophysiology and risk factors in young adults

1. Neurobiological pathways

Early theories of depression emphasized the monoamine hypothesis—the idea that shortages of serotonin, norepinephrine, and dopamine at synapses contribute to symptoms. Today, researchers place greater weight on stress circuitry and plasticity. Repeated or chronic stress can hyperactivate the HPA (hypothalamic–pituitary–adrenal) axis, prompting excess release of corticotropin-releasing hormone and cortisol. Over time, high cortisol can be toxic to neurons, especially in the hippocampus, and is linked to reduced hippocampal volume and impaired neuroplasticity.

A related thread centers on brain-derived neurotrophic factor (BDNF). Lower

BDNF levels interfere with the brain's capacity to make and reshape synaptic connections—operations that are crucial for mood regulation. For people aged roughly 18–25, the prefrontal cortex is still maturing; that developmental plasticity makes this region particularly sensitive to the structural and functional insults associated with sustained depression.

2. Genetic predisposition

Family and twin studies estimate that genetic factors account for roughly 30–40% of the risk for depression. One well-studied example involves the serotonin transporter gene (5-HTTLPR). Individuals carrying the "short" version of this variant appear more likely to develop depressive symptoms after stressful life events than those with the "long" form. This illustrates an important principle: genes often shape vulnerability, but life circumstance frequently determines whether that vulnerability is realized.

3. Psychosocial risk factors and environmental triggers

Young adulthood—often labeled "emerging adulthood"—is a period dense with transitions. Several environmental triggers can tip biological vulnerability into clinical depression:

• Adverse childhood experiences (ACEs): Early abuse, neglect, or household instability can set a hypersensitive stress response that raises lifetime risk.

• Academic and socioeconomic pressures: The jump to high-stakes education, the push for financial independence, and fears of failure or being an impostor create potent, chronic stressors that can precipitate or amplify depressive episodes.

Putting it together

Depression in young adults is best understood as an intersection of evolving brain biology, inherited susceptibility, and acute or cumulative life stressors. That complexity underpins the WHO's call for integrated, individualized care— psychotherapy to rebuild cognition and coping, medications when indicated to correct neurochemical and circuit-level dysfunction, and social supports to address environmental drivers. Only by treating the whole person—biology, mind, and context—do we stand the best chance of helping young people find their footing again.

Our devices have made it possible to be with everyone and nowhere at once. For many young adults, the constant parade of curated lives on social media becomes a mirror that never lies but always cheats — a steady drip of comparison that erodes confidence and narrows the space for real closeness. The result is less dinner-table conversation and fewer late-night talks that build trust; intimacy gets traded for likes and snapshots.

That sense of being alone in a crowd isn't just a poetic pain. The World Health Organization points out that perceived social isolation is a meaningful risk factor for major depressive disorder. If connection is more

Substance use and depression are tangled in a two-way street: many young people reach for alcohol, nicotine, or cannabis as a makeshift remedy for low mood, only to find that these substances gradually rewire brain chemistry and deepen the depressive state. What begins as self-medication can become a feedback loop that worsens symptoms and complicates recovery

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Physiological and secondary triggers

Before labeling low mood as primary major depressive disorder, it's important to rule out medical and lifestyle causes that can mimic or trigger depression:

• Endocrine problems: Conditions such as hypothyroidism or polycystic ovary syndrome (PCOS) often present with depressive symptoms.

• Nutritional deficiencies: Low vitamin B12, vitamin D, or iron levels are common in students with poor diets and are strongly linked to mood disturbance.

• Sleep deprivation and circadian disruption: The late-night study cycle, heavy screen use, or irregular sleep patterns shift the body's internal clock, disrupt melatonin and emotional regulation, and can precipitate or intensify depressive episodes.

SYMPTOMS AND PATTERNS

A depressive episode is more than an occasional down day. It usually involves a persistently low, empty, or irritable mood and a clear loss of interest or pleasure in activities. To meet the typical definition of a depressive episode, these core features persist most of the day, nearly every day, for at least two weeks and are accompanied by other symptoms, which may include:

• Social withdrawal and loss of interest in formerly enjoyable activities

• Poor concentration and slowed thinking

• Excessive guilt or low self-worth

• Hopelessness and loss of future-oriented excitement

• Thoughts of death or suicide

• Disturbed sleep (insomnia or oversleeping)

• Changes in appetite or weight (loss or gain)

• Low energy and extreme fatigue

Depression can range from mild to severe depending on how many symptoms are present and how much they impair functioning at home, school, work, or in social life.

Different depressive course patterns include:

• Single-episode major depression: the person's first and only depressive episode.

• Recurrent depressive disorder: repeated episodes over time (two or more).

• Bipolar disorder: depressive episodes alternate with manic or hypomanic periods, marked by elevated or irritable mood, increased energy or activity, rapid thoughts, pressured speech, inflated self-esteem, decreased need for sleep, distractibility, and sometimes impulsive or risky behavior.

CONTRIBUTING FACTORS AND FINDINGS

Depression is the result of a complex interplay among social, psychological, and biological factors. Stressful life events — job loss, bereavement, trauma — increase vulnerability, and once depression sets in it can create further stress and functional decline, feeding back into itself. Physical health and lifestyle factors matter: inactivity and harmful alcohol use are both risk factors for depression and for chronic diseases like heart disease, diabetes, cancer, and respiratory illness. Living with these physical illnesses can itself increase the risk of depression, creating a cycle of worsening health.

The good news: prevention programs and early interventions can reduce the burden of depression, especially when they address sleep, nutrition, substance use, and social supports alongside psychological and medical care.

Communities can do a lot to reduce the burden of depression—often before it ever begins. Schools that teach children and teenagers healthy ways to cope, solve problems and manage stress help set lifelong habits of resilience.

Programs that support parents of children with behavioral challenges can ease parents' own distress and improve outcomes for the whole family. For older adults, regular group or supervised exercise programs are a simple, effective preventive step that benefits mood and strengthens social connection.

DIAGNOSIS AND TREATMENT

Depression is treatable. If you notice symptoms that interfere with daily life— persistent low mood, loss of interest, changes in sleep or appetite, trouble concentrating, or thoughts of harming yourself—reach out to a health-care professional. Early care can make a big difference.

Psychological treatments are the first-line option for depression. These therapies teach practical skills for changing unhelpful thoughts, behaviors and relationships. They can be delivered by trained clinicians or supervised lay counsellors, in person or online, and are often available through guided self- help books, websites or apps. When using online resources, consider them a complement to professional care rather than a complete substitute.

Evidence-backed psychological approaches include:

• Behavioural activation: getting back into meaningful activities to lift mood.

• Cognitive behavioural therapy (CBT): identifying and reshaping negative thinking patterns.

• Interpersonal psychotherapy: improving relationships and life transitions that affect mood.

• Problem-solving therapy: building practical skills to manage daily stressors. Medications

Antidepressant medications, such as selective serotonin reuptake inhibitors (SSRIs) like fluoxetine, are effective for many people. They are often combined with psychological therapy for moderate to severe depression. For mild depression, medication is not usually required. Prescribers should weigh possible side effects, treatment availability, and personal preferences when recommending medication.

Special considerations:

• Antidepressants are generally not recommended for young children and are used with extra caution in adolescents; prescribers monitor closely when they are prescribed.

• Bipolar disorder is treated with different medications and approaches—accurate diagnosis is essential.

Role of family and counsellors

Treatment can be physically and emotionally demanding. Counsellors, family members and friends can play a vital role by offering practical support, helping monitor side effects, and staying connected through the recovery process.

With the person's consent, sharing basic information about what to expect from treatment can make recovery safer and more manageable.

Self-care and everyday steps

Small, consistent actions can support recovery and protect mental well-being:

• Keep doing activities you used to enjoy, even in small doses.

• Stay connected to friends and family.

• Move regularly—short walks or gentle exercise help mood.

• Maintain regular eating and sleeping patterns.

• Reduce or avoid alcohol and recreational drugs, which can worsen depression.

• Talk to someone you trust about how you feel.

If you have thoughts of suicide, If you ever feel you might harm yourself, reach out immediately. Stay close to people who care about you, and tell someone you trust how you're feeling. Contact a health worker—a doctor, counsellor or crisis service—or go to the nearest emergency department. Support groups and peer networks can also be a powerful source of understanding and practical coping ideas.

MANAGEMENT

This situation can be managed or rather prevented, all it needs is personal care and love. The most important reason one might be depressed is because they might be feeling alone, or non important, this feeling alone can cause more harm than good. So people who are close to the patient should let them know they are not alone and are being loved. Simple

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reactions or care can enlighten their life or mood their presence must be felt and these simple things will create greater differences.

The management is very important and rather easy to help the patient. The management might be intricate but the outcome can be drastic.

WHO's RESPONSE

WHO's Comprehensive Mental Health Action Plan 2013–2030 highlights the steps required to provide appropriate interventions for people with mental disorders including depression.

Depression and self-harm/suicide are among the priority conditions covered by WHO's Mental Health Gap Action Programme (mhGAP). The Programme aims to help countries increase services for people with mental, neurological concerns. This research has helped many people and will proceed to create awareness among everyone, which is necessary to tackle the problem's root cause.

WHO has developed brief psychological intervention manuals for depression that may be delivered by lay therapists to individuals and groups. An example is the Problem Management manual, which describes the use of behavioural activation, stress management, problem solving treatment and strengthening social support. Moreover, the Group Interpersonal Therapy for Depression manual describes group treatment of depression. Finally, the Thinking Healthy manual covers the use of cognitive-behavioural therapy for given perinatal depression.

WHO has given various given treatments as discussed above and prevailing depression is sincere effort not just by the patients but by everyone around them . The society plays a very important role in helping young adults but the change is expected not from a single individual but from everyone, the society, the people, family, friends etc. though this seems like a simple problem this contributes to country's future. Hence the WHO has done immense effort in letting public know the significance of mental health, and its importance in the worlds enlightenment, its further going to perform more research in this aspect.

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BOSHLANG‘ICH TA’LIMDA O‘YIN TEXNOLOGIYALARIDAN FOYDALANISH ORQALI O‘QUVCHILAR QIZIQISHINI ANIQLASH YO‘LLARI

Qalandarova Yulduz G'ayrat qizi

Termiz iqtisodiyot va servis universiteti

Ta'lim va tarbiya nazariyasi va metodikasi (boshlang'ich ta'lim)

1-kurs magistranti

Ilmiy rahbar: p. f. f. d(PHD), dotsent Norqobilova Rayxona Davlatovna

Annotatsiya. Ushbu maqolada boshlang‘ich ta’limda o‘yin texnologiyalaridan foydalanish orqali o‘quvchilarning qiziqishlarini aniqlashning pedagogik-metodik asoslari tahlil qilinadi. Boshlang‘ich sinf o‘quvchisi o‘z qiziqishini har doim ham bevosita so‘z bilan ifodalay olmaydi. U ko‘proq o‘yin, tanlov, harakat, rasm chizish, hikoya tuzish, savol berish, rolli vaziyatlarda qatnashish va guruhli faoliyat orqali o‘z moyilligini namoyon qiladi. Shu sababli o‘yin texnologiyalari o‘quvchi qiziqishini aniqlashda samarali diagnostik vosita sifatida qaraladi. Maqolada didaktik, rolli, ijodiy, harakatli va musobaqali o‘yinlar orqali o‘quvchilarning fanlarga, faoliyat turlariga, muloqot shakllariga hamda ijodiy topshiriqlarga bo‘lgan qiziqishini aniqlash yo‘llari tahlil qilinadi. Shuningdek, L.S. Vygotskiy, D.B. Elkonin, J. Piaget, A.N. Leontyev va Sh.A. Amonashvili qarashlari asosida o‘yin faoliyatining bola rivojlanishidagi o‘rni yoritiladi.

Kalit so‘zlar: boshlang‘ich ta’lim, o‘yin texnologiyalari, o‘quvchi qiziqishi, didaktik o‘yin, rolli o‘yin, pedagogik diagnostika, motivatsiya, ijodiy faollik, kuzatish, individual yondashuv.

Kirish. Boshlang‘ich ta’limda o‘quvchilarning qiziqishini aniqlash ta’lim jarayonini samarali tashkil etishning muhim shartlaridan biridir. Chunki qiziqish bolaning o‘qishga munosabati, darsdagi faolligi, topshiriqni bajarish istagi, mustaqil

savol berishi va ijodiy harakatlarida namoyon bo‘ladi. Agar o‘qituvchi o‘quvchining nimaga qiziqishini bilsa, u dars mazmunini moslashtiradi, individual yondashuvni kuchaytiradi va bolaning ichki imkoniyatlarini ochishga erishadi. Aksincha, o‘quvchilarning qiziqishi hisobga olinmasa, dars tashqi tomondan tartibli ko‘rinsa ham, ayrim bolalar ichki jihatdan passiv bo‘lib qolishi mumkin.

Boshlang‘ich sinf o‘quvchisi uchun o‘yin tabiiy faoliyat shaklidir. Bola o‘yin orqali atrof-muhitni anglaydi, tengdoshlari bilan munosabatga kirishadi, o‘z qobiliyatini sinaydi, turli rollarni bajaradi va ichki qiziqishlarini namoyon qiladi. Shu sababli o‘yin texnologiyalari faqat darsni qiziqarli qilish vositasi emas, balki o‘quvchini chuqurroq bilish, uning qaysi faoliyat turiga moyilligini aniqlash va ta’lim jarayonini shunga mos yo‘naltirish imkoniyatidir.

L.S. Vygotskiy bola rivojlanishida o‘yin faoliyatining muhimligini alohida ta’kidlagan. Uning qarashlariga ko‘ra, o‘yin bola uchun shunchaki ermak emas, balki rivojlanishning muhim maydonidir. Bola o‘yinda real hayotdagi rollarni, munosabatlarni va qoidalarni o‘zlashtiradi. Demak, o‘yin jarayonida o‘quvchining tafakkuri, nutqi, ijtimoiy xulqi va qiziqishlari tabiiy ravishda ko‘rinadi. D.B. Elkonin ham o‘yinni bolaning psixik rivojlanishida yetakchi faoliyat sifatida talqin qilgan. Uning fikricha, ayniqsa rolli o‘yinlar orqali bola kattalar hayotidagi munosabatlarni modellashtiradi, o‘zini turli ijtimoiy vaziyatlarda sinab ko‘radi. Bu qarash boshlang‘ich ta’limda o‘yin texnologiyalaridan foydalanish orqali o‘quvchilarning qiziqishini aniqlash uchun nazariy asos bo‘lib xizmat qiladi.

J. Piaget esa bolalar tafakkurining rivojlanishini faol harakat, tajriba va o‘zaro munosabat bilan bog‘lagan. Uning qarashidan kelib chiqib aytish mumkinki, o‘quvchi o‘yinda faqat tayyor bilimni qabul qilmaydi, balki o‘z tajribasi orqali biladi, sinaydi va xulosa chiqaradi. A.N. Leontyev faoliyat nazariyasida shaxs rivoji uning faoliyati bilan bog‘liqligini asoslagan. Bu nuqtayi nazardan o‘yin — o‘quvchining ichki motivatsiyasi va qiziqishini ko‘rsatadigan faoliyat shaklidir. Sh.A. Amonashvili esa insonparvar pedagogika doirasida bolaga ishonch, hurmat va erkin ifoda imkoniyati berilganda

uning tabiiy qobiliyatlari ochilishini ta'kidlaydi. O'yin aynan shunday erkin va qulay muhit yaratadi.

Asosiy qism. Boshlang'ich ta'limda o'yin texnologiyalaridan foydalanish orqali o'quvchilar qiziqishini aniqlashda eng avvalo o'qituvchi o'yinni maqsadli tashkil etishi kerak. O'yin faqat bolalarni xursand qilish, darsni jonlantirish yoki vaqtni to'ldirish uchun qo'llansa, uning diagnostik qiymati past bo'ladi. O'yin boshlanishidan oldin o'qituvchi nimani kuzatishini aniq belgilashi zarur: o'quvchi qaysi topshiriqqa tez kirishadi, qanday rolni tanlaydi, yakka yoki guruhda ishlashni afzal ko'radimi, ijodiy topshiriqlarda faolmi, mantiqiy masalalarda qiziqadimi, harakatli o'yinlarda o'zini qanday tutadi, savol beradimi, tashabbus ko'rsatadimi, qiyinchilikda davom etadimi yoki chekinadimi.

Didaktik o'yinlar o'quvchilarning fanlarga bo'lgan qiziqishini aniqlashda samarali vositadir. Masalan, "Kim tez topadi?", "Matematik domino", "So'z zanjiri", "Ortiqchasini top", "Mantiqiy juftlik", "Rasmga qarab hikoya tuz" kabi o'yinlar orqali o'qituvchi bolaning qaysi faoliyat turiga ko'proq moyilligini bilib oladi. Matematik o'yinlarda tez va zavq bilan qatnashgan o'quvchi sonlar, tartib, hisoblash, mantiqiy munosabatlarga qiziqishi mumkin. So'zli o'yinlarda faol bo'lgan bola esa nutqiy, adabiy, hikoya qilish va ifodali gapirish faoliyatlariga moyil bo'lishi ehtimol. Rasmli va tasviriy o'yinlarda faol bo'lgan o'quvchilarda esa badiiy-estetik qiziqish, tasavvur va ijodiy yondashuv kuchliroq namoyon bo'ladi.

Rolli o'yinlar o'quvchilarning ijtimoiy va kommunikativ qiziqishlarini aniqlashda muhim. "Do'kon", "Kutubxona", "Shifokor", "O'qituvchi va o'quvchi", "Sayohatchilar", "Tabiat himoyachilari" kabi o'yinlarda bola o'ziga yaqin rolni tanlaydi. Kimdir yetakchi rolni xohlaydi, kimdir yordamchi rolni ma'qul ko'radi, ayrim o'quvchilar esa kuzatuvchi bo'lib qoladi. Bu holatlar o'qituvchi uchun muhim pedagogik ma'lumot beradi. Masalan, doim tashkilotchilik rolini tanlaydigan bola yetakchilikka moyil bo'lishi mumkin, doim rasm chizish yoki bezashni tanlaydigan

bola ijodiy-amaliy faoliyatga qiziqadi, hikoya qilishni tanlaydigan bola nutqiy faoliyatda o‘zini erkin his qiladi.

Ijodiy o‘yinlar o‘quvchilarning tasavvuri va kreativ qobiliyatini aniqlashga yordam beradi. “Ertakni davom ettir”, “Sehrli buyumni tasvirla”, “Agar men qush bo‘lsam…”, “Yangi sayyora yaratamiz”, “Rasmga nom qo‘y”, “Qahramonga maktub yoz” kabi o‘yinlar bolalarning ichki dunyosi, tasavvur doirasi va nutqiy faolligini ochadi. Bunday o‘yinlarda o‘quvchi tayyor javobni emas, o‘z fikrini yaratadi. O‘qituvchi esa kim noodatiy g‘oya aytayotgani, kim hikoya tuzishga qiziqayotgani, kim obrazli fikrlayotgani va kim o‘z fikrini ifodalashda qiynalayotganini kuzatadi.

Harakatli o‘yinlar ham qiziqishni aniqlashda e’tibordan chetda qolmasligi kerak. Boshlang‘ich sinf o‘quvchilari orasida harakat orqali o‘rganishga moyil bolalar ko‘p uchraydi. “Top va yugur”, “Belgini tanla”, “Shaklni top”, “Ranglar bo‘yicha guruhlan”, “Tabiat obyektlarini ajrat” kabi o‘yinlar orqali bola bilimni harakat bilan bog‘laydi. Bunday o‘yinlarda faol qatnashadigan o‘quvchilar amaliy, jismoniy va ko‘rgazmali faoliyat orqali yaxshiroq o‘rganishi mumkin.

Musobaqali o‘yinlar o‘quvchilarning natijaga intilishi, tezkor fikrlashi va raqobatga munosabatini aniqlaydi. Biroq bu turdagi o‘yinlardan ehtiyotkor foydalanish kerak. Chunki ayrim o‘quvchilar musobaqada faol bo‘lsa, boshqalari yutqazishdan qo‘rqib chekinishi mumkin. Shuning uchun o‘qituvchi faqat g‘oliblarni emas, ishtirok, harakat, fikr bildirish va urinishni ham rag‘batlantirishi lozim. Aks holda o‘yin qiziqishni aniqlash o‘rniga ayrim bolalarda o‘ziga ishonchsizlikni kuchaytiradi.

Guruhli o‘yinlar o‘quvchilarning hamkorlikka bo‘lgan qiziqishini aniqlashga xizmat qiladi. Guruhda kim tashabbus ko‘rsatadi, kim boshqalarni tinglaydi, kim vazifani bajarmay chetda qoladi, kim kelishuvga yordam beradi — bularning barchasi o‘quvchining ijtimoiy qiziqishlari haqida ma’lumot beradi. Masalan, “Birgalikda ertak tuzamiz”, “Jamoaviy rasm”, “Guruhda masala yechish”, “Tabiatni asrash rejasi” kabi o‘yinlarda o‘qituvchi nafaqat yakuniy natijani, balki jarayonni ham kuzatishi kerak.

O‘yin texnologiyalaridan foydalanish orqali qiziqishni aniqlashda kuzatuv varaqasi yuritish foydali. Unda o‘quvchining qaysi o‘yinda faol qatnashgani, qanday rolni tanlagani, individual yoki guruhda faolroq bo‘lgani, nutqiy, mantiqiy, ijodiy yoki harakatli topshiriqlardan qaysi biriga qiziqqani qayd etiladi. Masalan, jadvalda “matematik o‘yinlarda faollik”, “nutqiy o‘yinlarda ishtirok”, “rolli o‘yinda tanlagan roli”, “ijodiy takliflar”, “guruhdagi muloqot”, “qiyinchilikka munosabat” kabi ustunlar bo‘lishi mumkin. Bu oddiy kuzatuv keyingi darslarda individual yondashuvni tashkil etishga yordam beradi.

Biroq bir marta o‘tkazilgan o‘yin asosida o‘quvchi haqida yakuniy xulosa chiqarish noto‘g‘ri. Bola o‘sha kuni charchagan, tortingan, guruhidan norozi bo‘lgan yoki topshiriqni tushunmagan bo‘lishi mumkin. Shuning uchun qiziqishni aniqlash muntazam, turli o‘yinlar va turli fanlar kesimida olib borilishi kerak. Faqat shunda o‘qituvchi o‘quvchining haqiqiy moyilliklarini aniqlay oladi.

O‘yin orqali aniqlangan qiziqish keyingi ta’lim jarayonida ishlatilmasa, uning foydasi kamayadi. Masalan, o‘qituvchi bir o‘quvchining hikoya tuzishga qiziqishini sezsa, unga matn yaratish, ertak davom ettirish, og‘zaki taqdimot kabi topshiriqlarni ko‘proq berishi mumkin. Matematik o‘yinlarda faol o‘quvchiga mantiqiy masalalar, hisoblash o‘yinlari, boshqotirmalar tavsiya etiladi. Tabiatga oid rolli o‘yinlarda faol bola kichik ekologik loyiha yoki kuzatish topshirig‘iga jalb qilinadi. Ana shunda o‘yin diagnostika vositasidan rivojlantiruvchi vositaga aylanadi.

Xulosa. Boshlang‘ich ta’limda o‘yin texnologiyalaridan foydalanish orqali o‘quvchilar qiziqishini aniqlash samarali pedagogik yo‘nalish hisoblanadi. Chunki o‘yin bolaning tabiiy faoliyati bo‘lib, unda o‘quvchi o‘zini erkinroq namoyon qiladi. O‘yin jarayonida uning fanlarga, faoliyat turlariga, muloqot shakllariga, ijodiy topshiriqlarga va guruhli ishlarga bo‘lgan qiziqishi ko‘rinadi.

Didaktik o‘yinlar fanlarga bo‘lgan qiziqishni, rolli o‘yinlar ijtimoiy va kommunikativ moyillikni, ijodiy o‘yinlar tasavvur va kreativlikni, harakatli o‘yinlar amaliy faoliyatga qiziqishni, guruhli o‘yinlar esa hamkorlik va jamoaviy ishlashga

munosabatni aniqlash imkonini beradi. Biroq o‘yin maqsadli tashkil etilishi, o‘qituvchi kuzatuvi bilan birga olib borilishi va natijalar pedagogik tahlil qilinishi shart.

L.S. Vygotskiy, D.B. Elkonin, J. Piaget, A.N. Leontyev va Sh.A. Amonashvili qarashlari shuni ko‘rsatadiki, o‘yin bola rivojlanishining tabiiy va kuchli vositasidir. Demak, boshlang‘ich ta’limda o‘yin texnologiyalari faqat qiziqarli metod emas, balki o‘quvchini tushunish, uning qobiliyatini aniqlash va individual rivojlanish yo‘lini belgilashga xizmat qiladigan muhim pedagogik vositadir.

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NERV TO‘QIMASI: TUZILISHI, FUNKSIONAL XUSUSIYATLARI VA KLINIK AHAMIYATI

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Davolash ishi yo’nalishi talabasi

Annotatsiya. Ushbu maqolada nerv to‘qimasining morfologik tuzilishi, asosiy hujayraviy tarkibi, neyronlar va nevrogliya hujayralarining funksional o‘zaro bog‘liqligi ilmiy manbalar asosida tahlil qilindi. Nerv to‘qimasi organizmda ta’sirotni qabul qilish, uni qayta ishlash, impuls hosil qilish va javob reaksiyasini shakllantirishda yetakchi o‘rin tutadi. Zamonaviy gistologiya va neyrobiologiyada nerv to‘qimasi faqat neyronlardan iborat tizim sifatida emas, balki neyronlar, astrotsitlar, oligodendrotsitlar, Shvann hujayralari, mikrogliya va ependimotsitlardan tashkil topgan murakkab integrativ to‘qima sifatida qaraladi. O‘zbek gistologiya maktabida K. A. Zufarov, Q. R. To‘xtayev, F. X. Azizova kabi mualliflar nerv to‘qimasini hujayra, to‘qima va a’zolar taraqqiyoti hamda ularning tuzilish-vazifa birligi asosida yoritganlar. Maqolada nerv to‘qimasining mikroskopik tuzilishi, neyronlarning impuls o‘tkazish mexanizmi, nevrogliyaning trofik, himoya, tayanch va miyelin hosil qilishdagi roli, shuningdek, nerv to‘qimasi shikastlanishlarining klinik oqibatlari tahlil qilindi.

Kalit so‘zlar: nerv to‘qimasi, neyron, nevrogliya, akson, dendrit, sinaps, astrotsit, oligodendrotsit, Shvann hujayrasi, mikrogliya, miyelin.

Kirish. Nerv to‘qimasi odam organizmidagi eng yuqori darajada ixtisoslashgan to‘qimalardan biri bo‘lib, u markaziy va periferik nerv sistemasining morfologik asosini tashkil etadi. Uning asosiy vazifasi tashqi va ichki muhitdan keladigan ta’sirotlarni qabul qilish, ularni elektr-kimyoviy impulslar shaklida uzatish, qayta ishlash va organizmning mos javob reaksiyalarini boshqarishdan iborat. Neyronlar

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elektr qo‘zg‘aluvchan hujayralar bo‘lib, axborotni tana bo‘ylab elektr va kimyoviy mexanizmlar orqali uzatadi; tipik multipolyar neyron tana, akson va dendritlardan iborat ekanligi zamonaviy neyroanatomiya manbalarida qayd etiladi.

O‘zbek ilmiy-adabiy manbalarida nerv to‘qimasini o‘rganish gistologiya, sitologiya va embriologiya fanlari bilan uzviy bog‘liq holda olib boriladi. K. A. Zufarovning “Gistologiya” darsligi hujayra tuzilmalari, to‘qimalar va a’zolarning taraqqiyoti, tuzilishi hamda vazifasini batafsil yorituvchi asosiy o‘zbekcha manbalardan biri sifatida ko‘rsatilgan. Q. R. To‘xtayev va F. X. Azizova muallifligidagi “Gistologiya, sitologiya va embriologiya” darsligi ham gistologiya, sitologiya va embriologiya asoslari bo‘yicha zamonaviy ma’lumotlarni o‘z ichiga olgan o‘quv manbasi sifatida qayd etiladi. Ushbu manbalar nerv to‘qimasini morfologik, funksional va rivojlanish nuqtayi nazaridan tushuntirishda muhim ilmiy asos bo‘lib xizmat qiladi.

Materiallar va metodlar. Maqola narrativ-tahliliy adabiyotlar sharhi usulida tayyorlandi. Tadqiqot uchun mahalliy va xalqaro manbalar tanlab olindi. Mahalliy adabiyotlar sifatida K. A. Zufarovning “Gistologiya” darsligi, Q. R. To‘xtayev va F. X. Azizova muallifligidagi “Gistologiya, sitologiya va embriologiya” darsligi, shuningdek, o‘zbek tibbiy ta’limida qo‘llaniladigan gistologik o‘quv manbalari asos qilib olindi. Xalqaro manbalar sifatida NCBI Bookshelf/StatPearls platformasidagi “Neuroanatomy, Neurons”, “Histology, Glial Cells” va “Histology, Astrocytes” materiallari tahlil qilindi.

Tahlilda uchta mezon qo‘llandi: birinchisi — nerv to‘qimasining hujayraviy tarkibini aniqlash; ikkinchisi — neyron va glial hujayralarning funksional farqlarini ajratish; uchinchisi — nerv to‘qimasi tuzilishining klinik ahamiyatini ko‘rsatish. Maqola davomida morfologik yondashuv fiziologik va klinik yondashuv bilan bog‘landi. Bu zarur, chunki nerv to‘qimasi faqat mikroskop ostida ko‘riladigan tuzilma emas, balki

harakat, sezgi, refleks, xotira, tafakkur, nutq va vegetativ boshqaruvning moddiy asosidir.

Natijalar. Tahlil natijalari nerv to‘qimasining ikki asosiy tarkibiy qismdan — neyronlar va nevrogliya hujayralaridan iborat ekanini ko‘rsatadi. Neyron nerv to‘qimasining asosiy funksional hujayrasi bo‘lib, u qo‘zg‘alish hosil qilish va impulsni uzatishga ixtisoslashgan. Neyron tanasida yadro va organellalar joylashadi; dendritlar afferent signallarni qabul qiladi, akson esa efferent impulslarni boshqa neyron, mushak yoki bez hujayrasiga uzatadi. Neyronlar multipolyar, bipolyar, psevdounipolyar va anoksonik shakllarda uchrashi mumkinligi neyroanatomiya manbalarida ko‘rsatiladi.

Astrotsitlar markaziy nerv sistemasida metabolik, strukturaviy, homeostatik va neyrohimoya vazifalarini bajaradi. Ular ortiqcha neyromediatorlarni tozalash, gematoensefalik to‘siqni barqarorlashtirish va sinaps shakllanishini qo‘llab-quvvatlashda qatnashadi. Mikrogliya esa markaziy nerv sistemasining rezident immun hujayralari sifatida shikastlangan hujayralar, begona zarralar va patologik mahsulotlarni fagotsitoz qiladi. Ependimotsitlar miya qorinchalari va orqa miya markaziy kanalini qoplab, orqa miya suyuqligi bilan nerv to‘qimasi o‘rtasidagi chegaraviy muhitni shakllantiradi.

Quyidagi jadval nerv to‘qimasining asosiy hujayralarini umumlashtiradi.

Hujayra turi	**Joylashuvi**	**Asosiy vazifasi**
Neyron	Markaziy va periferik nerv tizimi	Impuls hosil qilish va uzatish
Astrotsit	Markaziy nerv tizimi	Homeostaz, metabolik yordam, gematoensefalik to‘siqni qo‘llab-quvvatlash
Oligodendrotsit	Markaziy nerv tizimi	Miyelin qavat hosil qilish

Hujayra turi	Joylashuvi	Asosiy vazifasi
Shvann hujayrasi	Periferik nerv tizimi	Periferik aksonlarni miyelinlash
Mikrogliya	Markaziy nerv tizimi	Immun himoya, fagotsitoz
Ependimotsit	Miya qorinchalari va markaziy kanal	Likvor muhiti bilan bog‘liq himoya va chegaraviy vazifa

Muhokama. Nerv to‘qimasini o‘rganishda asosiy xato — neyronni yagona markaziy element deb, nevrogliyani esa ikkinchi darajali tarkib sifatida talqin qilishdir. Bu yondashuv eskirgan. Neyron impuls uzatadi, lekin uning normal ishlashi astrotsitlar, oligodendrotsitlar, Shvann hujayralari va mikrogliyaning faol ishtirokisiz barqaror bo‘la olmaydi. Masalan, miyelin qavat zararlansa, impuls o‘tish tezligi pasayadi yoki butunlay buziladi. StatPearls manbasida demiyelinizatsion kasalliklarda oligodendrotsitlar yoki Shvann hujayralari zararlanishi impuls o‘tishini cheklovchi plaklar bilan bog‘lanishi ko‘rsatilgan.

Astrotsitlar haqidagi zamonaviy qarashlar ham nerv to‘qimasi haqidagi tasavvurlarni kengaytiradi. Ular nafaqat tayanch vazifasini bajaradi, balki neyronlarning energiya almashinuvi, ion muvozanati, sinaptik signalning aniqligi va qon-tomir-nerv aloqasida ham qatnashadi. Astrotsitlar faoliyati buzilsa, gematoensefalik to‘siq, sinaps barqarorligi, suyuqlik-ion muvozanati va metabolik qo‘llab-quvvatlash izdan chiqishi mumkin. Bu holat epilepsiya, neyrodegenerativ kasalliklar, miya shikastlanishlari va insultdan keyingi tiklanish jarayonlarini tushuntirishda muhimdir.

O‘zbek mualliflarining bu boradagi ahamiyati shundaki, ular nerv to‘qimasini umumiy gistologik tizim ichida, ya’ni hujayra, to‘qima va a’zolarning tuzilish-vazifa birligi asosida tushuntiradi. K. A. Zufarov darsligining kuchli tomoni — gistologiya va embriologiyada qo‘llaniladigan tadqiqot usullari, umumiy va xususiy gistologiya bo‘limlari, mikrofotogrammalar va hujayra tuzilmalari haqida tizimli ma’lumot

berishidir. Q. R. To‘xtayev va F. X. Azizova darsligi esa tibbiyot ta’limi uchun zamonaviy gistologik ma’lumotlarni o‘zbek tilida taqdim etishi bilan muhimdir.

Xulosa. Nerv to‘qimasi organizmning eng murakkab va yuqori ixtisoslashgan to‘qimalaridan biri bo‘lib, uning asosini neyronlar va nevrogliya hujayralari tashkil etadi. Neyronlar qo‘zg‘alish hosil qilish, impuls o‘tkazish va axborot almashinuvida asosiy rol o‘ynaydi. Nevrogliya esa neyronlarning yashashi, oziqlanishi, himoyalanishi, miyelinlanishi va homeostatik muhitda faoliyat yuritishini ta’minlaydi. Demak, nerv to‘qimasining normal faoliyati neyron va glial hujayralarning uzviy hamkorligiga bog‘liq. O‘zbek gistologiya adabiyotlarida K. A. Zufarov, Q. R. To‘xtayev, F. X. Azizova kabi mualliflarning ishlari nerv to‘qimasini o‘zbek ilmiy terminologiyasi asosida o‘rganishda muhim o‘rin tutadi. Xalqaro tadqiqotlar esa neyron, astrotsit, oligodendrotsit, Shvann hujayrasi va mikrogliyaning molekulyar-funksional rolini yanada chuqurroq ochib beradi. Shuning uchun nerv to‘qimasini o‘rganishda eng to‘g‘ri yondashuv — gistologik, fiziologik va klinik bilimlarni birlashtirishdir.

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DIABETES: AN EMERGING CRISIS

Prediabetes, PCOS-Linked Insulin Resistance, and the Power of Lifestyle Medicine

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ABSTRACT

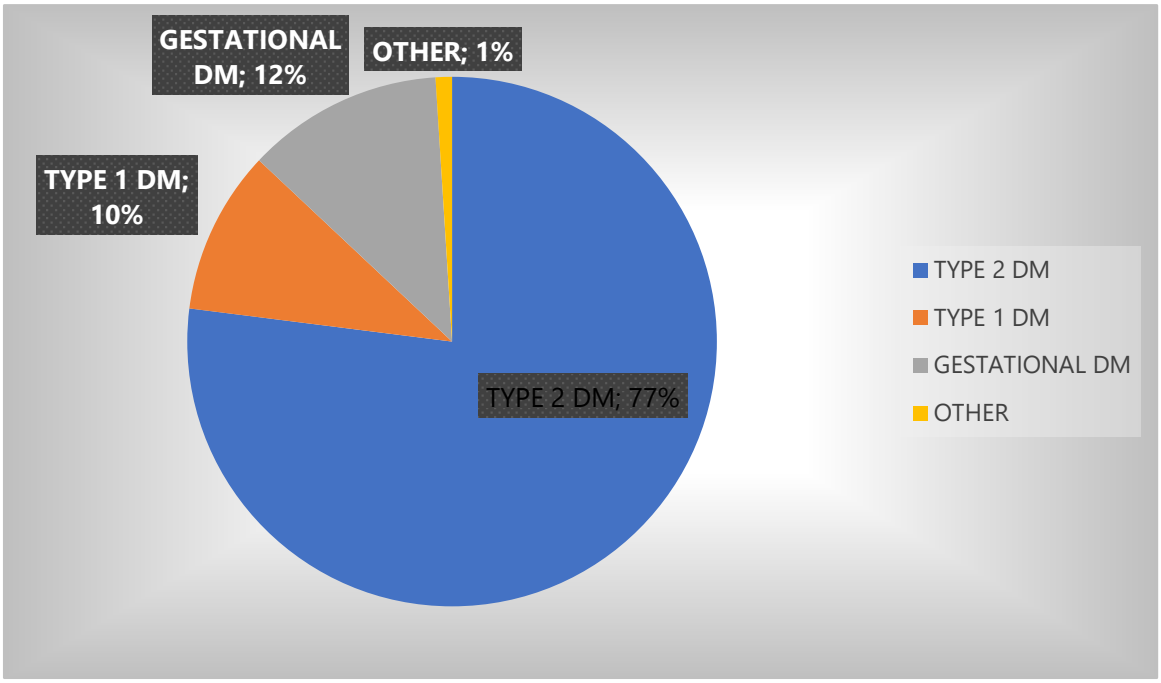
Diabetes mellitus has emerged as one of India's most critical public health challenges of the 21st century. With over 101 million people already living with diabetes and another 136 million in the prediabetic state as of 2023–2024, India bears the largest absolute burden of diabetes globally. This article presents a multifaceted review covering three major clinical dimensions: the rising tide of prediabetes among Indian young adults aged 18–35 years, the complex interplay between Polycystic Ovary Syndrome (PCOS), insulin resistance, and Type 2 diabetes risk in Indian women, and the evidence base for lifestyle modification as the cornerstone of diabetes prevention. Drawing on the latest national surveys, including the Indian Council of Medical Research–India Diabetes (ICMR-INDIAB) 2023 study, the National Family Health Survey-5 (NFHS-5), and multiple peer-reviewed Indian cohort studies published in 2023–2024, we present an integrated analysis with epidemiological statistics, illustrative case studies, trends, and comparisons. The overarching message is clear: India's diabetes epidemic demands urgent, culturally tailored, youth-focused, and gender-sensitive prevention strategies rooted in lifestyle intervention and early screening.

KEYWORDS: *Type 2 Diabetes, Prediabetes, Young Adults India, PCOS, Insulin Resistance, Lifestyle Modification, Indian Epidemiology, Metformin, Diabetes Prevention, HbA1c, Glycemic Control, Obesity India, Physical Inactivity*

INTRODUCTION

Diabetes mellitus (DM) refers to a group of common metabolic disorders that share the phenotype of hyperglycemia. Several distinct types of DM are caused by a complex interaction of genetics and environmental factors. Depending on the etiology of the DM, factors contributing to hyperglycemia include reduced insulin secretion, decreased glucose utilisation, and increased glucose production. The metabolic dysregulation associated with DM causes secondary pathophysiologic changes in multiple organ systems that impose a tremendous burden on the individual with diabetes and on the health care system. In the United States, DM is the leading cause of end-stage renal disease (ESRD), nontraumatic lower extremity amputations, and adult blindness. Persons with diabetes are at increased risk for cardiovascular disease, which is the main cause of morbidity and mortality in this population.

CLASSIFICATION



1. PREDIABETES IN YOUNG ADULTS

1.1. OVERVIEW

Prediabetes is defined as a state of impaired fasting glucose (IFG: fasting plasma glucose 100–125 mg/dL) or impaired glucose tolerance (IGT: 2-hour plasma glucose 140–199 mg/dL during an oral glucose tolerance test), or elevated HbA1c between 5.7–6.4%. This intermediate metabolic state carries a 5–10% annual risk of progressing to full-blown Type 2 diabetes — and more

critically, the cardiovascular complications of diabetes begin accumulating even during the prediabetic phase. In India, prediabetes in youth is a particularly pressing concern because, unlike in Western nations, where obesity-driven diabetes emerges predominantly in middle age, Indian youth are developing metabolic dysfunction at lower body weight thresholds and younger ages. The combination of genetic predisposition (South Asian metabolic phenotype), epigenetic factors, and contemporary lifestyle exposures creates a combustible metabolic milieu.

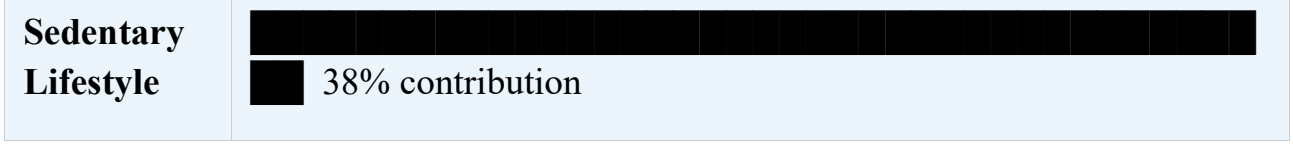
1.2.STATICS

Table 1: Prediabetes Burden Among Indian Youth (ICMR-INDIAB 2023 & NFHS-5 Data)

Parameter	Statistic	Source
Total prediabetes cases in India (2023)	136 million	ICMR-INDIAB 2023
Prediabetes prevalence (ages 15–34)	~14.2%	ICMR-INDIAB 2023
Urban youth prediabetes rate (metros)	~17.8%	AIIMS Delhi, 2023
Annual T2DM conversion rate from prediabetes	5–10%	ADA / IDF 2024
Young adults with undiagnosed prediabetes	>60%	Lancet Regional Health, 2024
10-year T2DM risk without intervention	~50%	DPP India Study, 2023
Mean age of T2DM onset in India (2024)	45.8 years	IDF Diabetes Atlas 2024

1.3RISK FACTORS SPECIFIC TO INDIAN YOUTH

Figure: Relative Risk Contribution of Prediabetes Risk Factors in Indian Youth (2024)



Unhealthy Diet	29% contribution
Family History T2DM	18% contribution
Sleep Deprivation	8% contribution
Psychosocial Stress	7% contribution

Source: Compiled from PGIMER Chandigarh cohort (2024), AIIMS Delhi metabolic clinic data (2023), IDF South-East Asia Regional Report (2024).

1.4CASE STUDY

Case Study: A 19-Year-Old Female College Student, Chennai

Background: P.S., a 19-year-old female engineering student, was incidentally found to have elevated fasting glucose during a routine college health camp.

Family History: Father has T2DM (diagnosed at age 38); maternal grandfather had diabetes.

Anthropometric Data: BMI 23.4 kg/m² (within normal range by Western standards, but at risk by Indian criteria); waist-hip ratio 0.86.

Lab Findings: Fasting plasma glucose: 108 mg/dL; 2-hour OGTT: 152 mg/dL (impaired glucose tolerance); HbA1c: 5.9%; HOMA-IR: 4.2.

Diagnosis: Impaired glucose tolerance (prediabetes) — identified early due to systematic screening.

1.5CONCLUSION

The prediabetes epidemic among young adults in India is a silent yet rapidly escalating crisis. The data are clear. Millions of Indians between the ages of 15 and 35 years are metabolically compromised. Most of them remain undiagnosed. The good news is that

prediabetes is reversible, and clinical trials conducted in India, including the India Diabetes Prevention Programme (IDPP-1), have proved it. Among Indian participants, lifestyle modification alone reduced the risk of T2DM by 58%, and Metformin alone by 28.5%. The opportunity to act is present, but it won't last forever. The most cost-effective way to reverse this trend is through national-level screening programmes integrated into routine youth health services, along with targeted dietary and physical activity interventions.

2. PCOS, INSULIN RESISTANCE, AND THE RISK OF DM-2 IN WOMEN

2.1 INTRODUCTION AND OVERVIEW

Polycystic Ovary Syndrome (PCOS) is the most common endocrine disorder in women of reproductive age, impacting about 6–12% of women worldwide. In India, prevalence estimates vary from 9.13% to 22.5%, depending on the diagnostic criteria and whether urban or rural populations are studied. Here's the thing — PCOS is much more than just a reproductive issue; it's a metabolic disorder fundamentally linked to insulin resistance.

Insulin resistance in PCOS causes compensatory hyperinsulinemia, which boosts androgen production from ovarian theca cells. This increase in androgens disrupts follicular development, leading to oligo-anovulation and polycystic morphology that defines PCOS. The metabolic chain reaction doesn't end there: ongoing insulin resistance gradually depletes pancreatic beta-cell reserves, paving the way to impaired glucose tolerance and, eventually, Type 2 Diabetes Mellitus.

Women with PCOS face a 5 to 10 times higher lifetime risk of developing T2DM compared to their peers without PCOS. A significant meta-analysis (Moran et al., Human Reproduction Update, 2023) showed that women with PCOS have a relative risk of 2.87 for developing T2DM, and this risk is notably higher in South Asian women, largely due to the 'thin-fat' phenotype and lower BMI thresholds for metabolic issues.

2.2TRENDS IN INDIA

Table 2: PCOS Epidemiology and Metabolic Comorbidities in Indian Women (2023–2024)

Parameter	Data	Source
PCOS prevalence (urban India)	22.5%	AIIMS New Delhi, 2023
PCOS prevalence (rural India)	9.13%	FOGSI Survey, 2022
Insulin resistance in Indian PCOS women	65–70%	JAPI Review, 2024
Prediabetes rate in PCOS women (India)	~31%	JCEM India Study, 2024
T2DM prevalence in PCOS women aged 35–45	~14.5%	CMC Vellore Cohort, 2023
Obesity co-occurring with PCOS	~49% (urban)	ICMR Report, 2023
Non-obese PCOS with insulin resistance	~35–40%	Medanta & Fortis Data, 2024
Mean HOMA-IR in Indian PCOS women	3.8–5.2	Multiple cohort analysis, 2024

2.3DISCUSSION

PCOS and type 2 diabetes are tangled together, especially for Indian women. When your body keeps pumping out insulin, the pancreas tries to keep up—until it can't anymore. Meanwhile, the typical PCOS inflammation—stuff like IL-6, TNF-alpha, and C-reactive protein—starts attacking insulin receptors, making them less effective.

Here's the thing most people miss: a lot of Indian women with PCOS aren't what you'd call "obese." If you dig into the numbers, about 35–40% have a BMI below 25, but they still show clear signs of insulin resistance. You can see it in their HOMA-IR scores, fasting insulin, or glucose tolerance tests. This group is way more common among

South Asians because they store more fat around their organs, even if their weight looks normal. *Researchers have named this the MONW phenotype, "metabolically obese, normal weight."*

Culture ramps up the complexity. In India, it's easy for PCOS to slip by unnoticed. People often chalk up irregular periods to stress, and there's a stigma about fertility problems, so women put off seeing a doctor. That delay matters—a 2023 FOGSI survey found that it takes, on average, 3.2 years from the first signs to actually getting diagnosed. Plenty of time for metabolic problems to build up.

Treatment makes a real difference. Metformin is the main drug doctors use to boost insulin sensitivity for PCOS. It actually cuts the risk of developing type 2 diabetes by about 31–44% for women with prediabetes. Add serious lifestyle changes, and that risk drops even more—58–65%, similar to people without PCOS. And fresh research from Kasturba Medical College in 2024 shows that Inositol supplements (specifically Myo-inositol and D-chiro-inositol) work just as well as Metformin for treating insulin resistance in Indian women with PCOS.

2.4CONCLUSION

PCOS stands out as a significant but underrecognized driver of diabetes among Indian women. With so many women dealing with PCOS—and considering how South Asians face a higher risk for metabolic problems—it's no wonder the rates of type 2 diabetes keep climbing. Screening programs continue to lag, and cultural barriers only add to the problem. The result? Women receive diabetes diagnoses at younger and younger ages.

Glucose tolerance tests and assessments of insulin resistance belong in every PCOS care protocol. This isn't a bonus—it's a necessity for public health. Every Indian woman with PCOS needs clear guidance on her metabolic risks and annual blood sugar checks as standard procedure. That's the only way to really take control of this growing crisis.

3. ROLE OF LIFESTYLE MODIFICATION IN DM-2 PREVENTION

3.1. THE EVIDENCE FOUNDATION

When it comes to preventing Type 2 Diabetes, nothing beats structured lifestyle changes. They're not just the most effective solution—they also cost less and are backed by the strongest evidence. The Diabetes Prevention Programme (DPP) really hammered this point home, showing that people at high risk who committed to intensive lifestyle changes saw the odds of developing diabetes drop by 58%. India proved these results weren't just luck, with studies like IDPP-1 confirming—and even refining—the impact.

India offers both promise and roadblocks for large-scale lifestyle interventions. There's deep-rooted dietary wisdom here: traditional diets packed with fibre, complex carbs, legumes, and plenty of vegetables. Physical activity is woven in, too—think yoga and walking—with communities often supporting health improvements. But the landscape's shifting.

Urbanisation, new economic realities, changing food systems, and fragmented healthcare make it harder to roll out broad prevention programs.
The 2024 ICMR guidelines, updated after the INDIAB-Phase 2 findings, are now the gold standard for diabetes prevention in India. They're both current and grounded in local contexts. At their core, these guidelines focus on three pillars: transforming diets, encouraging regular exercise, and supporting people's behavioural and psychological needs.

3.2. DIETARY INTERVENTIONS

Indian dietary science isn't what it used to be—it's not just about slashing calories anymore. These days, what you eat and the quality of your food take centre stage. The latest 2024 guidelines from ICMR-National Institute of Nutrition (NIN) target people at high risk of type 2 diabetes, and they've moved away from just counting calories. Now, every food choice matters.

Millets are a big deal. If you switch out half your daily rice or wheat for finger millet (ragi), sorghum (jowar), or pearl millet (bajra), you drop your diet's glycaemic index from roughly 72 down to about 52. In plain terms, your blood sugar stays steadier—spikes after meals drop by 25 to 35%. This isn't just a theory; a 2023 study in Hyderabad actually found that people with prediabetes in South India felt a big difference on millet-rich diets compared to polished rice.

Don't forget legumes. Load up on lentils, chickpeas, or kidney beans—aim for 80 to 100 grams a day. They're not just solid protein; they're full of beta-glucan fiber. You get smoother blood sugar curves and a healthier gut microbiome, which scientists now know helps with insulin sensitivity.

It's also time to show refined carbs the door. So, white rice, refined flour (Maida), sugary drinks, packaged snacks, and deep-fried stuff—they all raise diabetes risk, no matter how disciplined you are about calories.

Meal timing changes things, too. Try to fit all your eating into a 10 to 12-hour window. Time-restricted feeding delivers results. A 2023 pilot study at AIIMS New Delhi had prediabetic patients eat within a 12-hour window for 12 weeks. Their insulin sensitivity improved by 14%. No calorie counting, no skipping meals.
If there's one thing the science tells us, it's this: what you eat, when you eat, and choosing the right foods matter way more than just staring at numbers on your plate.

Table: Glycaemic Index of Common Indian Foods — Prevention Dietary Guide

Food Item	Glycaemic Index	Recommendation
White rice (polished)	72–78	Restrict / Replace
Finger millet / Ragi	54–68	Recommended staple
Whole wheat roti	55–60	Preferred over maida
White bread / Maida roti	70–80	Avoid
Moong dal	38	Highly recommended
Rajma (kidney beans)	29	Highly recommended

Banana (ripe)	62	Moderate — limit
Apple / Guava	38–40	Recommended
Sugar-sweetened lassi	65–72	Avoid
Buttermilk / Chaas	~30	Recommended
Sweet potato	44–50	Acceptable in moderation
Regular potato	70–78	Restrict

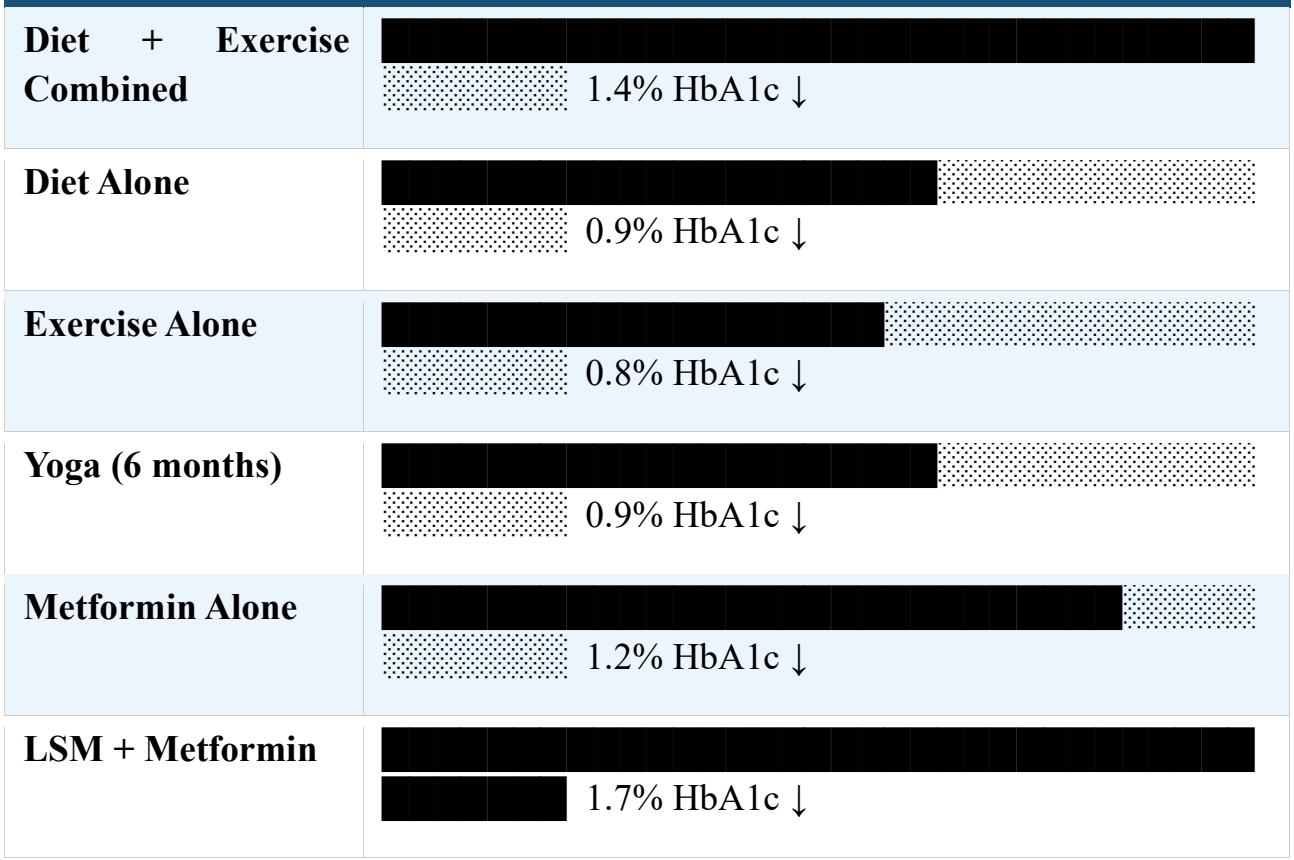
3.3. PHYSICAL ACTIVITY RECOMMENDATION

Table 6: WHO/ICMR Physical Activity Recommendations for T2DM Prevention (India-Adapted, 2024)

Activity Type	Recommended Dose	T2DM Risk Reduction	Practical Indian Examples
Moderate aerobic	150 min/week	30–35%	Brisk walking, cycling, swimming
Vigorous aerobic	75 min/week	35–40%	Running, aerobics, football
Resistance/strength training	2–3 sessions/week	25–30%	Bodyweight exercises, gym, yoga
Yoga (structured)	60 min/day, 5×/week	20–28% (HbA1c)	Surya Namaskar, Pranayama
Reducing sedentary time	Break every 30 min	15–20%	Stand/walk during phone calls

Daily step count	≥8,000–10,000 steps	25–30%	Walk to office, stairs over lift

Figure 4: HbA1c Reduction with Different Lifestyle Interventions in Indian Prediabetes (2024, % reduction)



3.4 PHARMACOLOGICAL SUPPORT

While lifestyle modification is the cornerstone of T2DM prevention, pharmacological agents play an important adjunctive role — particularly in individuals with multiple risk factors, rapid progression, or insufficient response to lifestyle alone. The following agents are recommended in Indian clinical guidelines (RSSDI 2023 / ADA-India adapted guidelines):

Table 7: Pharmacological Agents for T2DM Prevention — Indian Guidelines (2024)

Drug	Mechanism	Evidence (India)	Dose / Notes
Metformin 500–2000 mg/day	↓ hepatic glucose output; ↑ insulin sensitivity	28.5% T2DM risk reduction (IDPP-1)	First-line; safe; inexpensive; widely available in India
Acarbose 25–100 mg TDS	Alpha-glucosidase inhibitor; delays carb absorption	STOP-NIDDM; 25% risk reduction	Useful for postprandial hyperglycaemia; GI side effects common
Myo-Inositol 2g BD	Insulin sensitiser; PCOS-associated IR	Indian RCT 2024 (Manipal)	Preferred in PCOS; fewer GI effects than Metformin
Orlistat 60–120 mg TDS	↓ fat absorption; weight reduction	Weight-linked risk reduction	Adjunct in obese prediabetics; GI side effects
Vitamin D supplementation	Improves beta-cell function; reduces inflammation	AIIMS Delhi study 2023	For documented Vit D deficiency + prediabetes

⚕ *Clinical Note: Pharmacological therapy for prediabetes should always be initiated in conjunction with, not as a replacement for, sustained lifestyle modification. The IDPP-1 data clearly demonstrated that lifestyle modification alone achieved T2DM risk reduction comparable to Metformin — and the combination was superior to either alone. Drug therapy without lifestyle change provides suboptimal long-term outcomes.*

3.5. CONCLUSION

The data couldn't be clearer: when you combine better nutrition, regular exercise, and real behavioural support, structured lifestyle change stands out as the best way to stop Type 2 Diabetes in India. The research here, from the old IDPP trials to the latest digital health studies, proves lifestyle changes can cut diabetes risk by 28 to 58 percent.

So, the question isn't whether these approaches work—they absolutely do. The real issue is getting them to everyone who needs help. With 136 million Indians living with prediabetes, upscaling these interventions—using community programs, digital solutions, and primary care—is the biggest public health mission of our time.

4. OVERALL CONCLUSION

India's diabetes crisis isn't some distant threat—it's happening right now. The numbers tell a harsh story: 101 million people already have diabetes, 136 million have prediabetes, and every day, countless more—especially young adults, and women with PCOS—are drifting towards full-blown metabolic failure. The data from ICMR-INDIAB 2023, the IDF Diabetes Atlas 2024, and recent Indian cohort studies all point in the same direction. The article slices this epidemic into three angles, but they're really facets of the same problem.

First, look at young adults with prediabetes. If there's a window for real change, this is it. For many, diabetes hasn't set in yet. They can turn things around; their future doesn't have to be shaped by disease, disability, or lifelong healthcare costs. The case studies here aren't just numbers or textbook examples. They're people—students buried in coursework, overworked software engineers, factory workers pulling double shifts—whose fates hang on whether doctors catch the risks early and act decisively.

Then there's the PCOS-insulin resistance–T2DM chain in Indian women. This link might be the most ignored part of India's diabetes epidemic. Around 22% of urban Indian women of reproductive age have PCOS. Yet the healthcare system keeps seeing PCOS mainly as a fertility issue and overlooks its broader threat: it's a warning sign for chronic metabolic problems, especially diabetes. Every time a woman gets a PCOS diagnosis, doctors have a chance to screen for diabetes risk and start intervention, but too often, they don't.

Finally, there's the whole question of lifestyle. This isn't just about preventing disease—it's about shifting how India approaches health. Instead of treating sickness after it strikes, think of prevention as a core philosophy. The evidence is strong. The resources and know-how exist. India's own heritage—yoga, traditional grains like millets, walking, strong community networks—gives a powerful platform. The pieces are all there. What's missing is the collective will: organized screening, culturally smart advice, community action, and political leadership that focuses on making

healthy living the easy option for everyone. That's what the data demands—now, not later.

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ANTIBIOTIC RESISTANCE: WHY SOME DRUGS DON'T WORK AS INTENDED?

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Abstract

Antibiotics changed everything. For the first time in human history, a simple bacterial infection was no longer a death sentence. Pneumonia, sepsis, tuberculosis — diseases that had killed without mercy for centuries — became treatable within days. Then bacteria did what they have always done throughout billions of years of evolution. They adapted! Antibiotic resistance has quietly become one of the defining medical crises of this century. It does not arrive with the drama of an epidemic. It creeps, ward by ward, prescription by prescription, into the spaces where medicine once felt certain. Today, 1 in 6 bacterial infections worldwide resist the drugs prescribed to treat them. In India, nearly half of all Staphylococcus aureus isolates in hospitals are methicillin-resistant. In the United States, over 35,000 people die from resistant infections every year. Globally, The Lancet projects over 39 million deaths directly from AMR between 2025 and 2050.

This article examines resistance from its molecular foundations to its human consequences — how bacteria defeat antibiotics through enzymatic destruction, efflux pumps, target modification, and biofilm formation; how resistance genes travel silently between species; and which organisms are driving the greatest clinical burden today. We present emerging solutions with real human stories behind them: bacteriophage therapy, which saved Tom Patterson in 2016 when every antibiotic had failed, and CRISPR-based antimicrobials, now being engineered to cut resistance genes directly from bacterial DNA. We close with what antibiotic stewardship means in practice, for the clinician and patient alike.

The 92 million deaths researchers project could be prevented by 2050 will not be saved by declarations alone. They will be saved by doctors who understand why some drugs no longer work. Fleming warned us in 1945. This article is written for the generation that can still act on it.

Key words: Antibiotic resistance, antimicrobial resistance, MRSA, ESKAPE pathogens, Bacteriophage therapy, CRISPR antimicrobials, Antibiotic stewardship, NDM-1, WHO GLASS 2025, Horizontal gene transfer

Introduction

Imagine you approached the doctor with complaint of fever for 3 weeks. You say that you followed the prescription, taken the antibiotics but yet here you are- feeling exactly the same way as before. You will start to believe, “Hmm, maybe the drugs didn’t work or simply Are the doctors up to the task?”

You are not the first one and probably won’t be the last to have such thoughts. Diseases which can be cured easily are becoming much harder to cure or simply impossible. Millions of people are facing the same complications. It’s a life-threatening silent pandemic that slowly infiltrating our current generation. It is not that the drugs or the doctors are “bad”. There is a much important underlying cause. Its not simply as “Drugs vs disease”. Specifically, the term would be Antibiotic resistance.

It’s not a term for the distant future. It’s here, in this century and is reshaping how antibiotics works. According to statistics, 1 in 6 bacterial infections worldwide are now drug resistant and by the year 2050, deaths due to antibiotic resistance will be more rampant as compared to cancer.

For most of the human history, a simple bacterial infection could be death sentence, but then came antibiotics. Pneumonia, Tuberculosis, sepsis etc. became

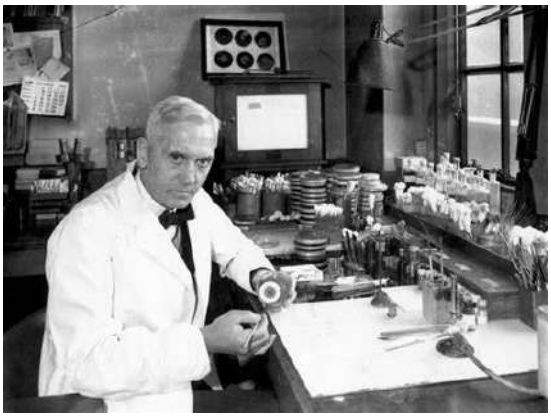
manageable, even ,completely curing them. This was and is our weapon against invisible enemies called bacteria. However, bacteria are ancient survivors that survived mass extinctions, even evolving to adapt extreme conditions such as temperature, geography etc. So, antibiotics became another hurdle for them.

Today bacteria have evolved to neutralize, counter or completely disable the effects of antibiotics which are specifically made to kill them. Some strains are now completely resistant to every antibiotic. We will discuss how does using antibiotics doesn't exactly solve the problem in this article.

"It is not difficult to make microbes resistant to penicillin in the laboratory by exposing them to concentrations not sufficient to kill them, and the same thing has occasionally happened in the body. The time may come when penicillin can be bought by anyone in the shops. Then there is the danger that the ignorant man may easily underdose himself and by exposing his microbes to non-lethal quantities of the drug make them resistant. Moral: if you use penicillin, use enough."

~SIR ALEXANDER FLEMING, NOBEL LAUREATE

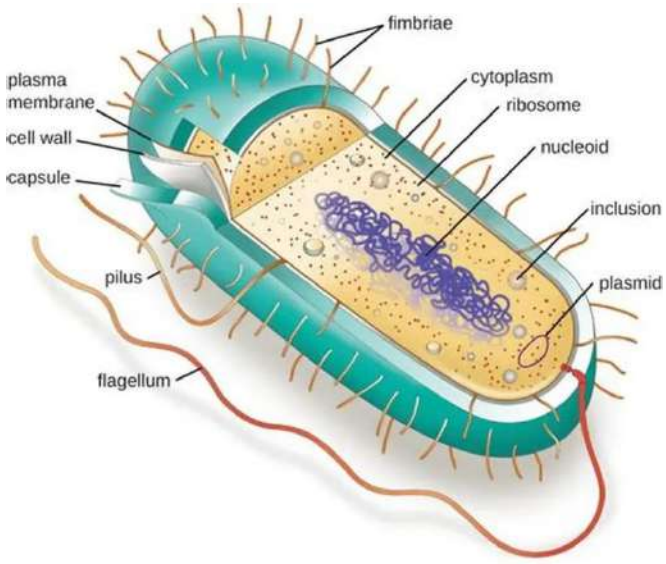
Antibiotic: The Revolution in medicine



In the morning of September 3, 1928, Alexander Fleming — Professor of Bacteriology at St. Mary's Hospital Medical School in London — returned to his laboratory after a month-long summer holiday with his family at The Dhoon, his country home in Barton Mills, Before his departure, he had left several culture plates of Staphylococcus aureus stacked on the corner of a bench, away from direct sunlight, to make space for his research student Stuart Craddock. It was a routine act of laboratory housekeeping — and one that would, by accident, change the course of human history.

What Fleming found upon his return was a contaminated Petri dish. A mould - later identified as Penicillium notatum (now reclassified as Penicillium rubens), thought to have drifted up from a mycology laboratory one floor below - had settled on one of his staphylococcal cultures and created something remarkable: a clear, bacteria-free halo surrounding its colonies, as though the mould were radiating an invisible

antibacterial field. As the American Chemical Society's landmark designation at the Alexander Fleming Laboratory Museum records: "Before its introduction there was no effective treatment for infections such as pneumonia, gonorrhoea or rheumatic fever. Hospitals were full of people with blood poisoning contracted from a cut or a scratch, and doctors could do little for them but wait and hope." In 1929, Fleming named the substance penicillin. In his own words, recounted by PBS NewsHour: "When I woke up just after dawn on September 28, 1928, I certainly didn't plan to revolutionize all medicine by discovering the world's first antibiotic, or bacteria killer. But I guess that was exactly what I did."



Fleming's discovery initially attracted little attention. He himself quickly concluded that it would be impossible to purify and stabilise the antibacterial substance for clinical use, and turned to another research. Penicillin and the Antibiotic Revolution For nearly a decade, penicillin lay dormant in the scientific literature. Then, in 1939, a team at the Sir William Dunn School of Pathology at the University of Oxford - led by Howard Florey and including Ernst Chain, Norman Heatley, and Edward Abraham - resumed intensive research. It was not until 1941 that penicillin was successfully taken from the laboratory to the clinic, and March 1942 that Anne Miller became the first civilian patient to be treated successfully with it, lying near death in New Haven Hospital following a miscarriage complicated by sepsis , Fleming, Florey, and Chain were jointly awarded the Nobel Prize in Physiology or Medicine. The antibiotic era had officially begun. And yet, standing at its very summit, Fleming himself sounded the alarm.

Antibiotic came from two Greek words: “Anti” meaning “Against”, Bios meaning “life”. Antibiotics are medications that fight bacterial infections in people and animals. In simple terms, they generally work by killing the bacteria or making it hard to replicate and grow.

Antibiotics can be:

Oral (by mouth): Pills, capsules or liquid.

Topical: Cream, spray or ointment that you can put on the skin.

Through injection (IV): Usually for serious infections.

A limited number of antibiotics also possess antiprotozoal activity. Antibiotics are not effective against viruses and fungi. In medicine, antibiotics (such as penicillin) are those produced naturally (one microorganism fighting another), whereas non-antibiotic antibacterials (such as sulfonamides and antiseptics) are fully synthetic.

The pharmacology of antibiotics involves destroying bacterial cells by either preventing cell reproduction or altering a necessary cellular function or process. Antimicrobial agents are classically grouped into two main categories based on their in vitro effect on bacteria: bactericidal and bacteriostatic. Common teaching often states that bactericidal antibiotics "kill" bacteria, whereas bacteriostatic antibiotics "prevent the growth" of bacteria. The true definition is not so simple. To accurately define each category, the minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) must be understood. The lowest concentration that inhibits visible bacterial growth at 24 hours is the MIC. The MBC is the antibiotic concentration that reduces bacterial density by 1000-fold at 24 hours.

Bacteriostatic activity is further defined by an MBC-to-MIC ratio greater than 4, whereas an MBC-to-MIC ratio less than or equal to 4 is bactericidal. The clinical implications of antibiotic efficacy depend heavily on many factors not limited to: pharmacokinetic and pharmacodynamic principles, the particular bacteria, bacterial load, and site of infection. This is further complicated by the ability of some bacteriostatic antibiotics to exhibit bactericidal activity against particular bacteria. Therefore, bacteriostatic antibiotics also kill bacteria, but the laboratory definition makes it seem as if they do not. For example, a bacteriostatic antibiotic such as linezolid can be bactericidal against Streptococcus pneumoniae. This concept works in reverse: bactericidal antimicrobials may also be bacteriostatic against certain bacterial strains and under certain conditions. Conflicting data exist as to whether the necessity for bactericidal antibiotics is needed for severely ill or immunosuppressed patients.

The Mechanism

To understand why Antibiotics, fail, we have to understand how they work. As discussed above, Antibiotics generally works on Bacteria. Bacteria are surrounded by a rigid outer wall of peptidoglycan. The wall is necessary because without it the bacteria will swell, rupture and die. Antibiotics target specific structures or functions

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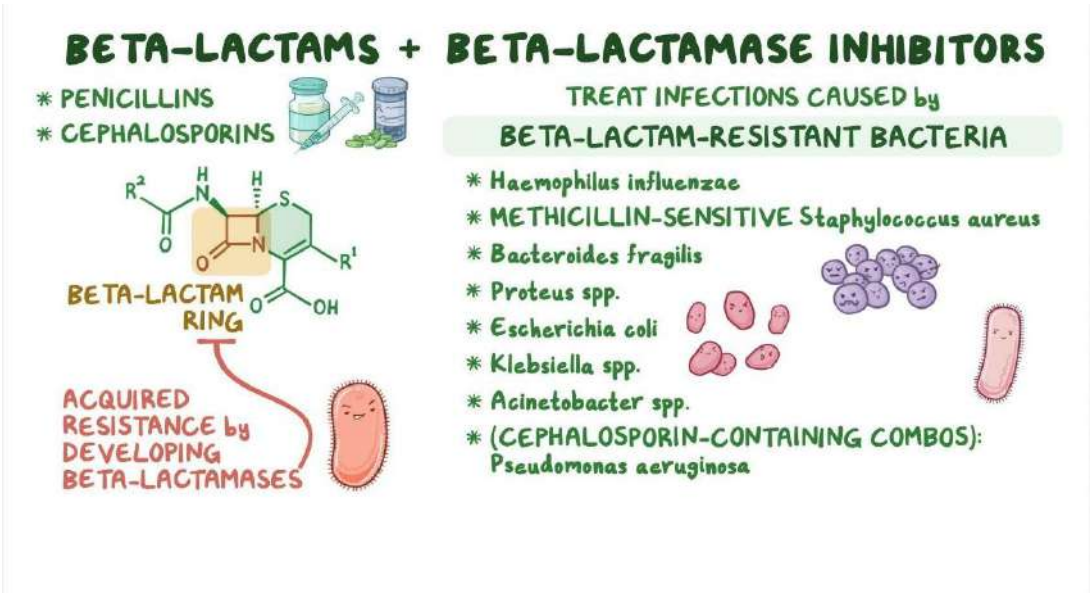
in bacteria such as the cell wall, ribosome synthesis, DNA or RNA synthesis etc. For example, Penicillin, Cephalosporins and Vancomycin all work by interfering with the cell wall synthesis. A bacterium that cannot maintain its cell wall integrity, will simply fall apart.

This is one of the most effective mechanisms and the one most studied because human cells don't have peptidoglycan walls. Some antibiotics like Polymyxins punch holes in this membrane , causing the bacterial contents to leak. However, these kinds of antibiotics should be used as last resort as they can also affect human cell membranes at higher concentrations.

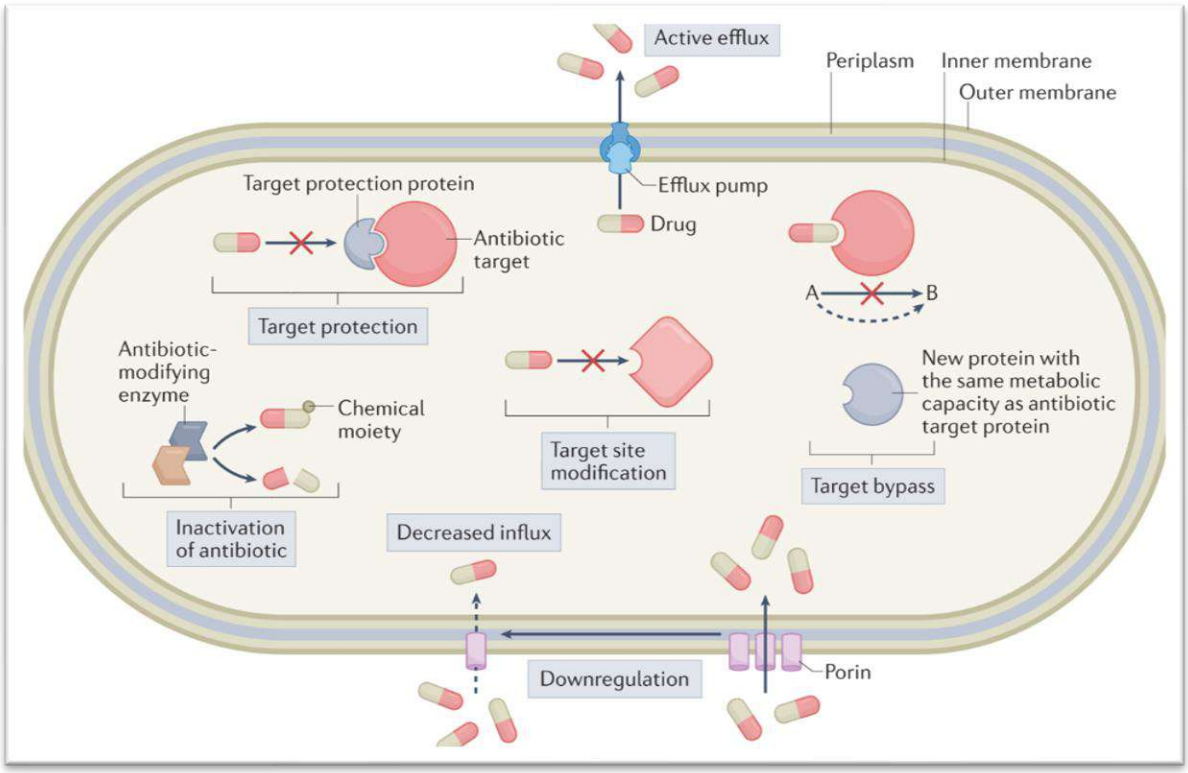
The other way is blocking protein synthesis. Every living cell needs proteins to survive whether that be enzymes, structural components or signaling molecules. Bacteria build these proteins with the help of ribosomes (rRNA). Some of the antibiotics which uses this mechanism are Tetracyclines, Macrolides and Aminoglycosides. The reason why these drugs don't affect us because bacteria has structurally different ribosomes (Prokaryotes: 70S). But here is the neat part, some bacteriostatic don't kill the bacterium outright, they just inhibit the protein synthesis which stalls the time for our immune system to finish it off.

Lastly, some antibiotics don't attack the bacteria's structure at all, they block their nutrient supply. Sulphonamides block bacteria from synthesizing folate, a chemical essential for DNA replication.

The Antibiotic Resistance: The battle between antibiotics and bacteria



We have discussed how different antibiotics attack specific structures or processed such as Cell wall, protein synthesis, DNA/RNA synthesis etc. But bacteria have found a way to counter everyone of them. To understand resistance, we need to learn about one fundamental reality regarding bacteria. A single bacterium divides every 20 minutes. In one day, billions of bacteria and with every division comes the possibility of mutation. Billions might die in the process due to natural selection but those who survive produce offspring having the same traits.



Some of the ways how bacteria develop resistance are by preventing antibiotics reaching their target site (e.g., changing the permeability of the cell wall or active efflux of the drug), changing the structure of the target cells or entirely replacing them or producing enzymes that neutralize the antibiotic.

Bacteria can acquire resistance genes from other bacteria when microorganisms join together and transfer DNA to each other (conjugation via sex pili), Free floating resistant plasmids are picked up by them or DNA remnant are scavenged from dead bacteria.

However, natural selection is not the only problem, misuse or overuse of antibiotics can also drastically accelerate the process. When antibiotics are used incorrectly, one

or more effects might happen- short time, low dose, inadequate strength or simply wrong medication- bacteria are not killed and can express and pass the resistant gene to even more bacteria. This results in stronger infections, increased intensity of illness and possibly death.

This phenomenon is not only limited to humans. Antibiotics are also used in industries, cattle, poultry etc, to promote similar effect and their growth. Therefore, this also caused the bacteria to develop resistant genes.

According to World Health Organisation, "widespread use of antimicrobials for disease control and growth promotion in animals has been paralleled by an increase in resistance in those bacteria (such as Salmonella and Campylobacter) that can spread from animals, often through food, to cause infections in humans."

But here's the most important question, "How are people exposed to resistant bacteria from animals?"

Cattle and poultry pass the bacteria through their faeces or on skin. One of such examples is Escherichia coli. Faeces contaminated with Antibiotic resistant bacteria can possibly migrate to neighbouring locations or even across long distances. But this is only one way, there are different modes of transmission:

For Animal to animal, it could be direct contact (shared pens, grooming, licking, biting etc), faecal contamination (as discussed above), feed & water (contaminated feed or troughs), vertical transmissions (mothers pass resistant bacteria to offspring).

For Animal to humans, consumption (eating undercooked meat, contaminated water, raw milk or even eggs; Salmonella, Campylobacter and E. coli are most common here), direct contact (pets, livestock or wildlife), environment (manure remnants in rivers, lakes or crops). Farmers, veterinarians and workers in slaughterhouse are at much higher risk.

For Human to human, direct contact (hugging, kissing, sex, holding hands etc.), indirect contact (shared food, using another's belongings, touching contaminated surfaces). Contrary to belief, Hospitals are at more risk of resistant strains (e.g., ESBL E. coli, MRSA).

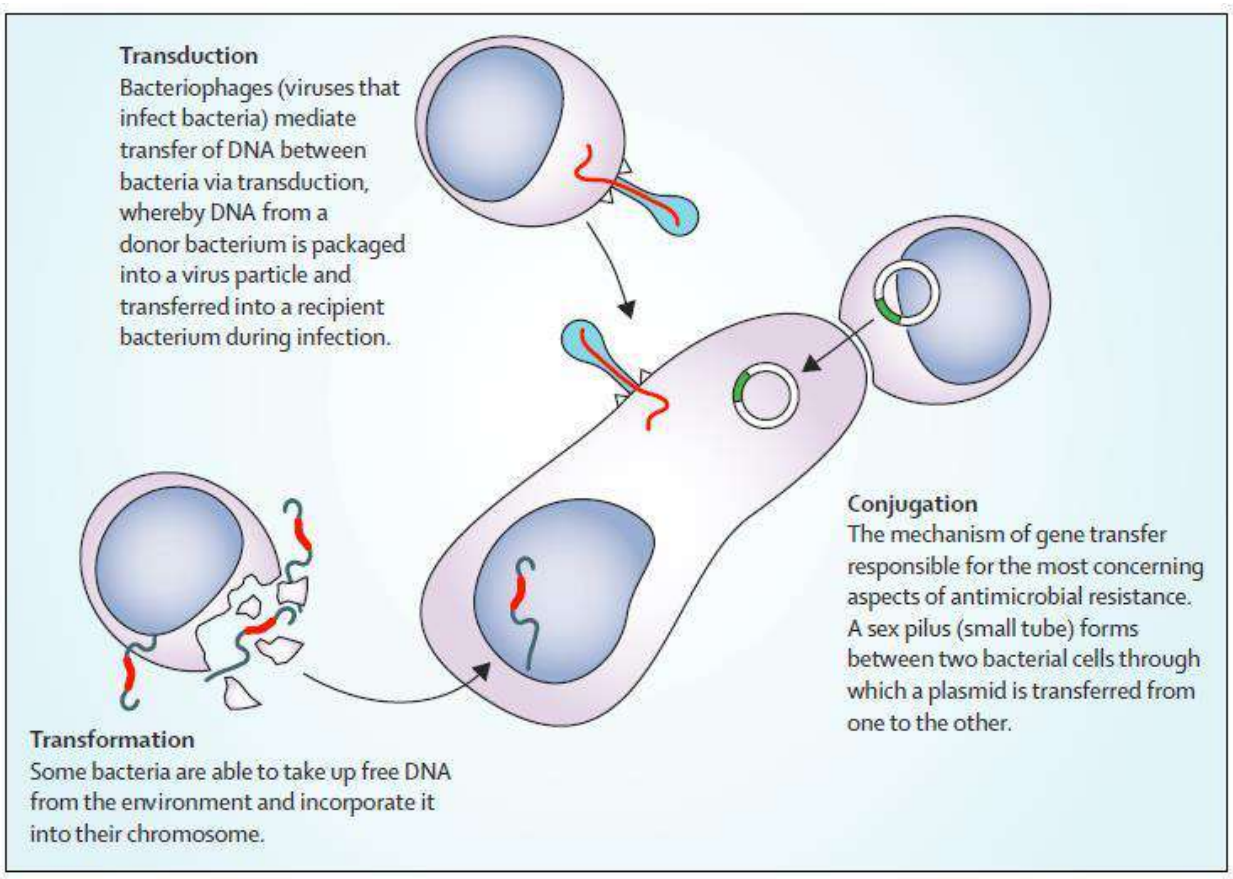
Currently, we have only discussed the surface level of the spread of infections and resistant gene transfer. Different bacteria have different mechanism.

If we have to understand the real-world consequences of these mechanisms, consider these bacteria we encounter most frequently:

Staphylococcus aureus (MRSA): It is located on the skin, nasal passages and surprisingly carried asymptomatically by ~30% of population. Hospitals, gyms, schools and crowded places are common locations. It can be transmitted through direct skin-to-skin contact, contaminated surfaces, respiratory droplets in the air and infected wounds. It develops resistance through the following ways: Target modification (Produces altered PBP2a where penicillin can't bind), β-lactamase production (that destroys Penicillin ring structure), efflux pumps (expels drugs from inside), Biofilm production (a layer that the bacteria produce which prevent the penetration of antibiotics). It causes resistance to all β-lactams, often also resistant macrolides, fluroquinolones, tetracyclines.

Escherichia coli: Located in normal gut flora which are usually harmless and spreads through contaminated food & water. Resistance mechanism: ESBL production (Extended spectrum beta-lactamases destroying Cephalosporins), Efflux pumps (AcrAB-ToIC pump expels Fluroquinolones, Tetracyclines), Porin loss (reduces Carbapenem entry), Plasmid-mediated resistance (Horizontal gene transfer to another species). Its one of the most common causes of treatment failure in UTIs worldwide.

Mycobacterium tuberculosis (TB): Located airborne (respiratory droplets), anywhere within the proximity of an infected individual, High prevalence in overcrowded, poorly ventilated settings. It has no animal reservoir i.e. strictly human to human. The resistance mechanism: Target mutation (mutations in rpoB gene; Rifampicin resistance), Enzyme modification (Catalase-peroxidase mutation; Isoniazid resistance), Efflux pumps (discussed above), Thick waxy cell wall (natural barrier which is hard to penetrate), Intracellular survival (Hides inside macrophages where many antibiotics can't reach). Survival through the macrophages is an interesting method. We all know that macrophages are supposed to kill bacteria but, in this case, the TB uses it as its own safe house. During phagocytosis, the macrophage recognizes specific receptors such as PRRs, TLRs and mannose receptors. So, it engulfs the bacteria in a membrane-bounded compartment called phagosome. Generally, phagosomes are supposed to combined with lysosome to form phagolysosome. But the phagosome remains immature in TB, never fusing with lysosome. That's why TB is so notoriously difficult to treat, being shielded from both the immune system and antibiotics.



Turning the tide: When humans start winning

Infections caused by antibiotic-resistant organisms are difficult to treat or sometimes outright impossible. But it's not a lost cause. Humans have survived through countless deadly microorganisms which could possibly cause mass extinction and will continue to survive new deadly diseases. No one can completely avoid getting an infection, but we can take necessary measures to reduce the risk and prevent the spread.

Due to the mutation or evolution, traditional antibiotics has become inefficient which prompted researchers to find another way to combat these invisible enemies. Some of these methods are:

New Antibiotic development: Cefiderocol (a siderophore cephalosporin that hijacks bacteria's own iron uptake system to enter cell; approved 2019), Lefamulin (first pleuromutilin antibiotic approved to combat community pneumonia; 2019), Omadacycline (Next generational Tetracycline; 2018), Zoliflodacin (target DNA gyrase different from fluroquinolones; prototype). However, this is a temporary

solution as bacteria will continue to mutate and will develop resistance against these drugs too.

Bacteriophage therapy: Perhaps it is one of the most interesting alternatives to antibiotics. Bacteriophages are our greatest ally against these enemies as bacteriophages are viruses that specifically infect and kill bacteria. It was actually used before antibiotics were discovered; however, much research needs to be done to use it to its maximum potential. We have discussed above that bacteriophages can be used by some bacteria to mutate or evolve so,

In the winter of 2015, a 68-year-old American professor named Tom Patterson lay in a coma at UC San Diego, infected with a strain of Acinetobacter baumannii resistant to every antibiotic available — carbapenems, colistin, tigecycline. Everything had failed. His doctors told his family to prepare for the worst.

His wife, Dr. Steffanie Strathdee — an infectious disease epidemiologist — refused to give up. She contacted four research laboratories asking a single question: Do you have a virus that can kill this specific bacterium?

Two labs found phages that matched his strain. The FDA granted emergency authorisation — the first time in American history intravenous phage therapy was approved for a systemic infection. Within days of treatment, Tom began to recover. In August 2016, he walked out of hospital alive — cured by viruses, not drugs.

What made this case scientifically remarkable was an unexpected twist: when the bacteria began developing resistance to the phages midway through treatment, those same resistance mutations restored the bacteria's sensitivity to antibiotics it had previously defeated. Phage pressure had forced the organism into an evolutionary corner. The team combined phages with antibiotics — and the combination finished the infection completely.

obligately lytic phages are the key. They are genetically modified phages selected naturally kill the bacteria rather than integrating. This eliminates the risk of transduction significantly. Furthermore, unlike antibiotics, they evolve alongside bacteria, potentially evading resistance and they do not affect human cells, normal flora or other organisms.

CRISPR-Based Antimicrobials: In simple words, “Using the bacterial immune system against themselves”. CRISPR-Cas systems can be engineered to target specific DNA sequences including antibiotic resistance genes. It is delivered via bacteriophages

or nanoparticles into the resistant bacteria which will cut the resistance genes of the bacterial DNA and thereby re-sensitizing the bacteria to existing antibiotics. However it is largely experimental and the development is significant, showing promise in laboratory and in animal studies.

In 2015, one-year-old girl, Layla Richards was dying at great Ormond Street hospital, London with leukaemia. Every treatment had failed. As a last option , her doctors used CRISPR technology to modify donor immune cells and infused them into her body.

Within weeks, her cancer was gone. She's back to home.

That same molecular precision is now being pointed at antibiotic resistance. Scientists at the broad institute (MIT/Harvard) have engineered CRISPR packages delivered inside bacteriophages directly into drug-resistant bacteria. Once inside, the genetic scissors locate the resistance gene — and cut it out. The bacterium survives. Its resistance does not. It becomes sensitive again to antibiotics it had previously defeated.

Every other solution attack bacterium from the outside. CRISPR goes inside the DNA and edits the problem at its source.

The clinical pipeline is still early — but the proof of concept is real, published, and already building toward human trials.

Vaccines: “Why treat the disease where we can prevent it?”. One of the best ways to combat antibiotic resistance is to prevent the bacteria spread infection altogether. Every bacterial infection prevented is an antibiotic course avoided. Everybody knows about vaccines and in general terms, it teaches our immune system to recognize and destroy a pathogen before it ever causes disease. Examples of such vaccines are: Pneumococcal vaccine has dramatically reduced resistant S. pneumoniae infections in vaccinated populations.

There are also several ways which are in development such as antimicrobial peptides, monoclonal antibodies or Faecal Microbiota Transplant. But with the current development in medical sciences and technologies, humans will continue to discover and invent new methods to combat diseases.

Antibiotic Stewardship: What you can do?

For doctors, improving antibiotic prescribing practices and use is critical to effectively treat infections and protect patient from unnecessary antibiotic use and combat antibiotic resistance. The correct amount of antibiotic is not simply, “the prescribed

dose", it is the dose that achieves the right concentration, at the right site of infection, for the right duration, to kill or inhibit the bacteria without causing toxicity.

It generally depends upon:

Time dependent killing- How long the antibiotic concentration stays above the MIC.

Concentration dependent killing- How high the peak concentration rises above MIC

AUC-dependent killing- Total drug exposure over time.

As a patient, weight, renal function, hepatic function, age, pregnancy, immunosuppression are some of the most important factors that can affect correct dose practice. Site of infection, severity of sepsis and bacterial load are also important to monitor the correct dose.

For general readers, your own responsibility is significant.

Don't demand antibiotics for viral infections. Always consult with the doctors. They might know something that you don't. For general people, you might think common cold = antibiotics. But if it is caused by a viral infection (Rhinovirus which has almost 200 subtypes, COVID-19 which also cause fever). Taking antibiotics for a viral infection has no consequence but will create resistance. Our body has the capability to fight the infections. Dependence on antibiotics for every minor inconvenience will cause further complications.

Complete the full course. Stopping early when you start to feel better is one of the most dangerous habits. Feeling better means only the weakest bacteria are dead but the strongest are alive. Stopping the course will pave the way for the most resistant survivors to mutate and multiply.

Do not self-medicate. Wrong drug, wrong, dose and wrong duration will accelerate resistance. A drug that worked the last time may not work this time.

Never share the antibiotics. Your prescription is tailored for you which is influenced by your weight, your infection and the bacteria inside. Sharing creates problem of self-medication in other people.

Dispose of the antibiotics properly. Simply discarding the antibiotics in environment such as water supply will create low-level exposure for environmental bacteria which is exactly the ideal condition that breeds resistance. Who knows that the resistant bacteria in the sewer might end up on your plate.

Conclusion

We started this article with a contaminated Petri dish.

A forgotten culture plate, a curious scientist, and an accidental observation that changed everything. Within two decades of Fleming's discovery, penicillin had saved millions of lives — soldiers on battlefields, mothers after childbirth, children with meningitis who would otherwise not have survived the week. For the first time in human history, doctors had a reliable answer to bacterial infection.

That answer is now being slowly taken away from us. And the uncomfortable truth is that we are the ones taking it.

Not maliciously. Not carelessly, in most cases. But through accumulated decisions — a prescription written without a culture, a course of antibiotics abandoned halfway, a broad-spectrum drug used where a narrow one would have done the job — each one small, each one reasonable in isolation, and each one contributing to a pressure that bacteria respond to the only way evolution allows them to. They adapt. They survive. They pass the survival instructions to their neighbours.

The clinical picture today is genuinely sobering.

In India, where this matters most to the readers of this article, the ICMR's own surveillance data shows that carbapenem resistance — resistance to the drugs we reach for when everything else has failed — is rising steadily in our tertiary hospitals. Nearly half of all Staphylococcus aureus isolates in Indian hospitals are now methicillin-resistant. NDM-1, the carbapenem-destroying enzyme that carries New Delhi's name, has spread from a single patient in 2007 to healthcare systems on six continents. The IHME projects 1.2 million AMR-related deaths in India by 2030 — not a distant estimate, but a projection built on trends that are already in motion.

In America, the CDC documented over 35,000 deaths from antibiotic-resistant infections in a single year — and that was before the pandemic. During COVID-19, hospital-onset resistant infections rose by 20%, driven by overwhelmed wards, stretched infection control teams, and antibiotics given to patients with viral pneumonia just in case. The just-in-case prescriptions of today are the untreatable infections of tomorrow.

Globally, the WHO's GLASS 2025 report — drawing on 23 million infections from 104 countries — found resistance rising in over 40% of all monitored antibiotic

combinations between 2018 and 2023. The South-East Asian and Eastern Mediterranean regions, which include India, carry the highest burden of all — 1 in 3 infections resistant, compared to 1 in 10 in Europe.

But here is what we want you to hold onto after finishing this article.

The same Lancet analysis that projects 39 million deaths from AMR by 2050 also calculates that 92 million of those deaths are preventable — not with drugs that don't yet exist, but with interventions that are available right now. Better diagnostics. Rational prescribing. Completed antibiotic courses. Stronger surveillance. Infection prevention that actually gets funded and followed.

Tom Patterson walked out of a San Diego hospital in 2016 because one scientist refused to accept that nothing more could be done. Layla Richards is alive because a team of doctors in London was willing to try something that had never been attempted in a human patient. These stories did not happen because the science was ready. They happened because people within medicine decided the situation was too serious to accept passively.

That decision — to take this seriously, to prescribe thoughtfully, to culture before treating, to de-escalate when the results come back — is not a decision that belongs to future researchers or policy makers alone.

It belongs to every doctor in every ward.

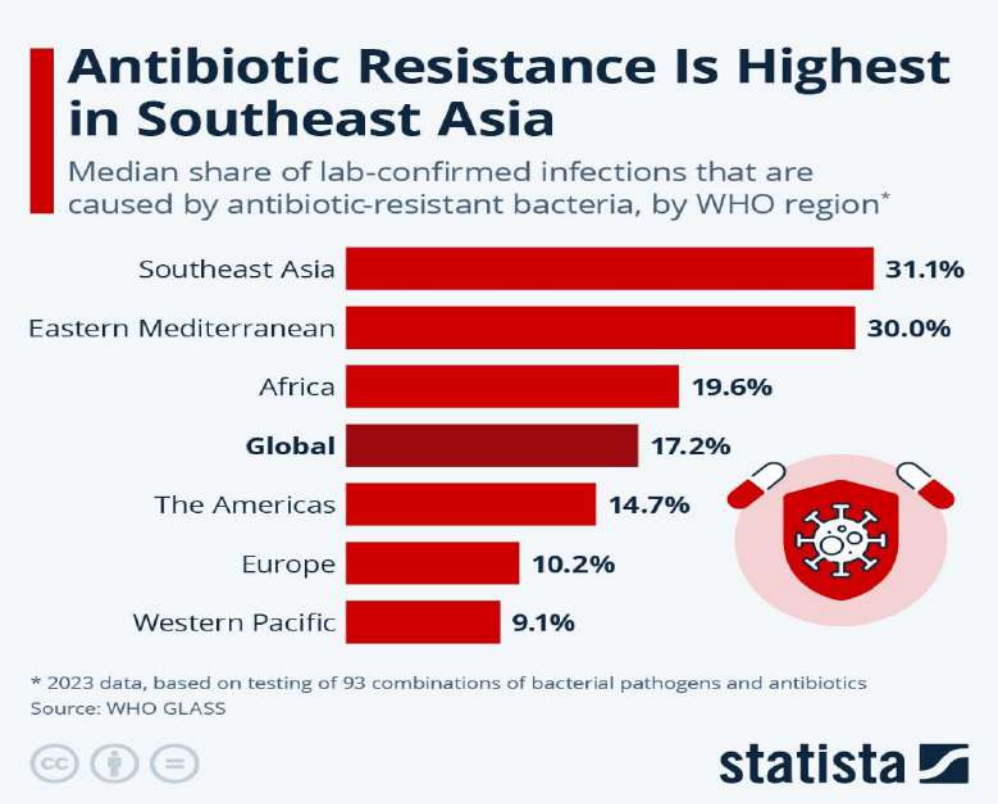
Including the ones reading this article right now, still in medical school, who will write their first antibiotic prescription sooner than they think.

Fleming ended his Nobel lecture in 1945 with a single line that has never stopped being true.

"The microbe is educated to resist penicillin and a host of penicillin-fast organisms is bred out which can be passed to other individuals and perhaps from there to others until they reach someone who gets a septicaemia or a pneumonia which penicillin cannot save."

He was describing 1945. He was describing 2026. The question is whether he will still be describing 2046.

That answer belongs to you.



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CDC: Core Elements of Antibiotic Stewardship

Statistics report

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TIZZA BO‘G‘IMI GONOARTROZINING OLDINI OLISH VA REABILITATSIYA USULLARINING ZAMONAVIY YONDASHUVLARI.

Xujaqulova Farida Ismailovna
Toshkent davlat tibbiyot universiteti Termiz filiali Ichki kasalliklar propedivtikasi, Reabilitalogiya, Xalq tabobati va Endokrinologiya kafedrasi dotsenti
Xushbaxtova Bunafsha Sherzod qizi
Toshkent davlat tibbiyot universiteti Termiz filiali Terapiya yo‘nalishi 1-kurs magistranti

Annotatsiya: Ushbu maqolada Gonoartroz- tizza bo‘g‘imining keng tarqalgan degenerativ kasalligining oldini olish va reabilitatsiya qilishning zamonaviy yondashuvlari tahlil qilinadi. Tadqiqotda kasallik rivojlanishiga olib keluvchi asosiy omillar, jumladan ortiqcha vazni, gipodinamiya va bo‘g‘imga ortiqcha yuk tushishi ko‘rib chiqilgan. Shuningdek, profilaktika choralarining ahamiyati, ayniqsa sog‘lom turmush tarzini shakllantirish va Davolovchi jismoniy tarbiya (LFK) ning o‘rni yoritilgan. Reabilitatsiya jarayonida qo‘llaniladigan fizioterapiya, dori vositalari, massaj, kinezioterapiya va ortopedik vositalarning samaradorligi tahlil qilingan. Maqola yakunida kompleks yondashuv gonoartroz bilan og‘rigan bemorlarning hayot sifatini yaxshilashda muhim ahamiyatga ega ekanligi asoslab berilgan.

Kalit so‘zlar: Gonoartroz, tizza bo‘g‘imi, profilaktika, reabilitatsiya, Davolovchi jismoniy tarbiya, fizioterapiya, kinezioterapiya, ortopedik vositalar, og‘riq sindromi, degenerativ kasalliklar.

Abstract: This article analyzes modern approaches to the prevention and rehabilitation of gonarthrosis, a widespread degenerative disease of the knee joint. The study examines the main factors contributing to the development of the disease, including excess body weight, physical inactivity, and excessive stress on the joint. It also highlights the importance of preventive measures, particularly the formation of a healthy lifestyle and the role of therapeutic physical training (exercise therapy, LFK). The effectiveness of physiotherapy, medications, massage, kinesiotherapy, and orthopedic devices used in the rehabilitation process is analyzed. The article concludes that a comprehensive approach plays a crucial role in improving the quality of life of patients suffering from gonarthrosis.

Keywords: Gonarthrosis, knee joint, prevention, rehabilitation, therapeutic physical training, physiotherapy, kinesiotherapy, orthopedic devices, pain syndrome, degenerative diseases.

Аннотация: В данной статье анализируются современные подходы к профилактике и реабилитации гонартроза — широко распространённого дегенеративного заболевания коленного сустава. В исследовании рассмотрены основные факторы, способствующие развитию заболевания, включая избыточную массу тела, гиподинамию и чрезмерную нагрузку на сустав. Также освещается значение профилактических мер, особенно формирования здорового образа жизни и роли лечебной физической культуры (ЛФК). Проанализирована эффективность физиотерапии, медикаментозного лечения, массажа, кинезиотерапии и ортопедических средств, применяемых в процессе реабилитации. В заключение обосновано, что комплексный подход имеет важное значение для улучшения качества жизни пациентов с гонартрозом.

Ключевые слова: Гонартроз, коленный сустав, профилактика, реабилитация, лечебная физическая культура, физиотерапия, кинезиотерапия, ортопедические средства, болевой синдром, дегенеративные заболевания.

Kirish: Tizza bo‘g‘imi kasalliklari orasida Gonoartroz eng keng tarqalgan degenerativ-distrofik patalogiyalardan biri hisoblanadi. Ushbu kasallik bo‘g‘im tog‘ayining yemirilishi, suyak to‘qimasining o‘zgarishi va harakat faoliyatining cheklanishi bilan kechadi. Gonoartroz asosan o‘rta va katta yoshdagi insonlarda uchrasada, so‘nggi yillarda yoshlar orasida ham ko‘payib bormoqda. Shu sababli, kasallikni erta oldini olish va samarali reabilitatsiya qilish dolzarb tibbiy muammo hisoblanadi.

Asosiy qism: Gonoartroz rivojlanishining asosiy omillari

Kasallik rivojlanishiga bir qator omillar ta’sir ko‘rsatadi:

1. Ortiqcha tana vazni
2. Kam harakatlilik (gipodinamiya)
3. Jarohatlar va sportdagi shikastlanishlar
4. Modda almashinuvi buzilishlari

Ushbu omillar bo‘g‘im tog‘ayining asta-sekin yemirilishiga olib keladi va natijada og‘riq hamda harakat cheklanishi yuzaga keladi.

Profilaktika (oldini olish) usullari

Gonoartrozni oldinini olishda zamonaviy yondashuvlar muhim ahamiyatga ega:

1. Sog‘lom turmush tarzini shakllantirish

To‘g‘ri ovqatlanish va muntazam jismoniy faollik bo‘g‘im salomatligini saqlashda muhim omildir. Ayniqsa, vaznni me’yorda ushlab turish tizza bo‘g‘imiga tushadigan yukni kamaytiradi.

2. Jismoniy mashqlar

Davolovchi jismoniy tarbiya (LFK) mushaklarni mustahkamlash, bo‘g‘im harakatchanligini oshirish va qon aylanishini yaxshilashga yordam beradi. Doimiy mashqlar gonoartroz rivojlanishini sekinlashtiradi.

3. Ergonomik yondashuv

Kundalik hayotda to‘g‘ri harakat qilish (og‘ir yuklarni noto‘g‘ri ko‘tarishdan saqlanish, uzoq vaqt tik turmaslik) bo‘gimni ortiqcha zo‘riqishdan himoya qiladi.

4. Erta tashxis

Kasallikni boshlang‘ich bosqichda aniqlash davolash samaradorligini sezilarli oshiradi.

Reabilitatsiya usullari

Gonoartrozni davolashda kompleks reabilitatsiya yondashuvi qo‘llaniladi:

1. Fizioterapiya

Zamonaviy fizioterapevtik usullar (ultratovush, elektroterapiya, lazer terapiyasi) yallig‘lanishni kamaytiradi, og‘riqni yengillashtiradi va to‘qimalarning tiklanishini tezlashtiradi.

2. Dori vositalari bilan davolash

Og‘riq qoldiruvchi va yallig‘lanishga qarshi preparatlar simptomatik yordam beradi. Ba’zi hollarda xondroprotektorlar ham qo‘llaniladi.

3. Massaj manual terapiya

Bu usullar mushak spazmini kamaytiradi, qon aylanishini yaxshilaydi va bo‘g‘im harakatini tiklaydi.

4. Kinezioterapiya

Harakat orqali davolashda bo‘g‘im funksiyasini tiklashda muhim o‘rin tutadi. Individual dastur asosida bajariladigan mashqlar samaradorligini oshiradi.

5. Ortopedik vositalar

Tizzaliklar, bandajlar va maxsus oyoq kiyimlar bo‘g‘imga tushadigan yukni kamaytiradi.

Xulosa: Tizza bo‘g‘imi gonoartrozi insonning hayot sifatini pasaytiruvchi jiddiy kasallik hisoblanadi. Uni oldini olish uchun sog‘lom turmush tarziga rioya qilish, jismoniy faollikni oshirish va ortiqcha vazndan qochish muhimdir. Zamonaviy reabilitatsiya usullari esa kasallik rivojlanishini sekinlashtirish, og‘riqni kamaytirish va bemorning funksional xolatini yaxshilash imkonini beradi. Kompleks yondashuv orqali gonoartroz bilan og‘rigan bemorlarning hayot sifatini sezilarli darajada oshirish mumkin.

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COMMON PEDIATRIC RESPIRATORY INFECTIONS: PREVENTION AND CARE

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Abstract

Common pediatric Respiratory infections in children caused by both viruses and bacteria are major global contributors to illness and death. These conditions involve specific pathophysiological changes, such as immune system activation, inflammation, and shifts in biochemical processes. Examining the underlying biochemical mechanisms helps inform diagnostic methods, treatment plans, and the importance of nursing care. Proper management is essential to enhance recovery and reduce complications in pediatric cases. This review aims to offer a current assessment of the pathophysiology, biochemical features, diagnostic techniques, treatment options, and nursing strategies related to childhood respiratory infections. It emphasizes factors like age-related variations, immune responses, and evidence-based nursing practices. Drawing from clinical research, case studies, and biochemical data, the review presents a thorough summary of the topic. Key areas discussed include infection causes, immune defense mechanisms, biochemical indicators used

in diagnosis and monitoring, symptoms, and nursing care approaches. Common triggers include viral agents like respiratory syncytial virus (RSV) and influenza, as well as bacterial pathogens such as Streptococcus pneumoniae. These infections prompt immune reactions marked by the release of inflammatory cytokines and measurable biomarkers including C-reactive protein (CRP) and procalcitonin (PCT). Effective clinical care requires comprehensive nursing support, including maintaining hydration, managing fever, and assisting with breathing. Emotional support and family involvement are also vital for recovery. Pediatric respiratory infections are multifaceted, involving interactions between immune, biochemical, and clinical elements. Knowledge of disease mechanisms and relevant biomarkers supports timely diagnosis and targeted treatment. Nursing care plays a critical role in managing symptoms, ensuring patient comfort, and limiting transmission. Prompt action and holistic care strategies can significantly improve health outcomes for children affected by these infections.

Introduction

Respiratory tract infections (RTIs) represent a leading cause of pediatric morbidity and mortality globally, with a disproportionate impact observed in low- and middle-income regions. The World Health Organization identifies pneumonia and related lower respiratory infections as primary contributors to mortality in children under five years of age, underscoring the necessity for robust diagnostic, preventive, and therapeutic frameworks

Anatomically, RTIs are delineated by site of involvement: the upper respiratory tract encompasses the oronasopharynx, pharynx, larynx, and proximal trachea, whereas the lower respiratory tract includes the distal trachea, bronchi, bronchioles, and alveolar structures. Infections affecting the trachea and below are generally classified as lower respiratory tract diseases, while pathologies involving the larynx and epiglottis are typically categorized under croup syndromes. However, due to the uninterrupted mucosal epithelium lining the entire respiratory tree, infectious processes frequently extend across anatomical boundaries. This continuity predisposes to multifocal disease, with clinical manifestations influenced by the specific pathogen, host factors, and stage of illness

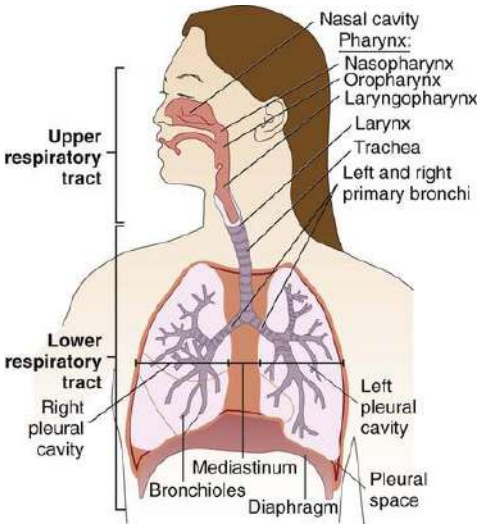
Clinical expression in pediatric patients spans a broad spectrum, from self-limited symptoms such as rhinorrhea and mild cough to life-threatening conditions including hypoxemic respiratory failure and septic shock. Viral etiologies—

predominantly respiratory syncytial virus (RSV), influenza viruses, and coronaviruses—are responsible for the majority of cases. Nonetheless, bacterial pathogens, particularly Streptococcus pneumoniae and Haemophilus influenzae, remain significant contributors to severe disease and complications

The underlying pathophysiology involves dynamic interplay between microbial virulence factors and host immune responses. Disease susceptibility and progression are modulated by developmental immunity, nutritional status, environmental risk factors (e.g., indoor air pollution), and preexisting medical conditions. While molecular diagnostics and advanced imaging have enhanced diagnostic precision, their utility is often limited in settings with constrained healthcare infrastructure, resulting in delayed or empirical management

Optimal management necessitates an integrated strategy combining targeted antimicrobial or antiviral therapy, symptom-based supportive interventions, and evidence-based prevention, including immunization and infection control practices. Nurses are integral to this process, providing continuous clinical assessment, timely recognition of deterioration, and coordinated, family-centered care.

This review synthesizes current knowledge on pediatric RTIs, with emphasis on pathogenic mechanisms, diagnostic methodologies, treatment paradigms, biochemical correlates, and nursing implications. The objective is to support informed clinical decision-making and promote comprehensive, patient-centered care models in pediatric respiratory medicine.



Pediatric populations exhibit unique physiological and immunological profiles that increase their vulnerability to infectious diseases, particularly respiratory tract infections. Epidemiological data from European and Asian regions indicate that 60–70% of children under five years of age experience at least one episode of respiratory infection annually. In Uzbekistan, a marked seasonal pattern is observed, with heightened incidence rates during the winter and spring months.

Etiology and Characteristics of Pediatric Respiratory Infections

Acute respiratory tract infections (RTIs) constitute a leading cause of pediatric morbidity, imposing substantial strain on global healthcare infrastructure. Accurate etiologic identification and characterization of these infections are essential for effective diagnosis, targeted therapeutic intervention, and the implementation of preventive strategies. Disease onset and clinical course are influenced by an interplay of factors, including pathogen type, developmental age, anatomical constraints, immune competence, and environmental exposures.

Infectious Etiologies

The pediatric respiratory tract is susceptible to diverse microbial agents, predominantly viruses, with bacteria playing a secondary but clinically significant role. Viral pathogens account for the majority of cases, with key agents including respiratory syncytial virus (RSV), rhinovirus, adenovirus, influenza virus, parainfluenza virus, and human metapneumovirus. RSV is particularly associated with severe lower respiratory tract disease, notably bronchiolitis, in infants and young children.

Bacterial involvement is commonly observed in primary infections such as pneumonia and pharyngitis, or as secondary invaders following viral injury. Major bacterial contributors include Streptococcus pneumoniae, group A beta-hemolytic Streptococci (GABHS), Haemophilus influenzae, and Mycoplasma pneumoniae. Concurrent viral-bacterial co-infections are not uncommon and may lead to complex clinical presentations and suboptimal treatment responses, necessitating careful diagnostic evaluation.

Age-Related Vulnerability

Susceptibility to respiratory pathogens varies significantly with age, reflecting dynamic changes in immune function and prior antigen exposure. Neonates derive partial protection through transplacental maternal antibodies, yet this passive immunity is limited in scope and duration, leaving them at risk for infections such as pertussis and select viral illnesses.

A period of heightened vulnerability emerges between three and six months of age, coinciding with the decline of maternal immunoglobulins and the immaturity of the infant's adaptive immune system. Viral RTIs predominate in toddlers and preschool-aged children, whereas school-aged children experience a relative increase in atypical bacterial pathogens such as Mycoplasma pneumoniae and GABHS.

Progressive immune maturation over time leads to improved pathogen resistance and reduced infection frequency.

Anatomic Determinants

Structural features of the developing respiratory system contribute to both the severity and dissemination of infection. Pediatric airways are inherently narrower, rendering them more susceptible to obstruction due to mucosal edema, secretions, and inflammatory exudates. The relatively short tracheobronchial tree facilitates rapid descent of pathogens from upper to lower respiratory regions.

Additionally, the eustachian tubes in infants are shorter, wider, and more horizontally oriented, promoting retrograde spread of nasopharyngeal pathogens and increasing the risk of acute otitis media during upper respiratory infections. These anatomical predispositions emphasize the need for vigilant monitoring and early clinical intervention.

Immune Competence and Risk Factors

Host defense against respiratory pathogens depends on intact immune function. Conditions that impair immunity—such as malnutrition, anemia, chronic fatigue, asthma, allergic rhinitis, bronchopulmonary dysplasia, and cystic fibrosis—heighten infection risk. Environmental influences, including secondhand smoke exposure and attendance in group childcare settings, further elevate incidence rates due to increased pathogen transmission.

Seasonal Patterns

Respiratory infections in children exhibit distinct seasonal trends. Viral pathogens like RSV and influenza demonstrate peak activity during winter and early spring, driven by climatic conditions and increased indoor congregation. In contrast, Mycoplasma pneumoniae infections are more frequently observed in autumn and early winter. Recognition of these temporal patterns informs optimal timing of immunizations and public health initiatives aimed at outbreak mitigation.

Clinical Presentation

Children aged six months to three years typically present with more intense symptomatology compared to older counterparts. Fever is a hallmark feature and may reach high levels, potentially precipitating irritability, lethargy, or febrile seizures. Gastrointestinal manifestations—including poor oral intake, vomiting,

diarrhea, and abdominal pain—are common and may contribute to dehydration, exacerbating clinical deterioration.

Nasal obstruction and rhinorrhea can impair feeding and predispose to otitis media or sinusitis. Cough, abnormal respiratory sounds (e.g., wheezing, stridor, grunting), pharyngitis, and meningeal signs in the absence of central nervous system infection (meningism's) are frequent findings. Symptom profiles evolve with disease progression and severity, underscoring the importance of prompt assessment and appropriate management to prevent complications

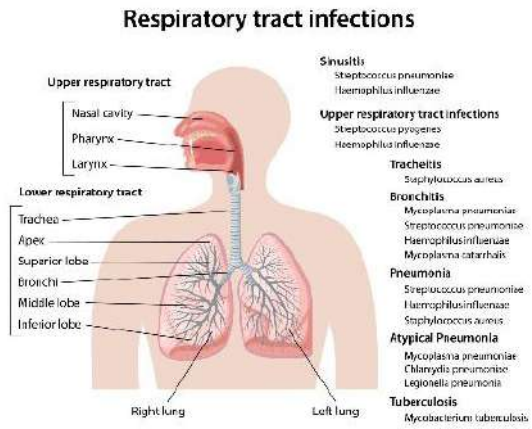
Biochemical Aspects of Respiratory Infections

Respiratory infections in pediatric populations, especially those of viral and bacterial origin, elicit intricate biochemical and immunological reactions. These responses serve dual roles: pathogen elimination and contribution to the underlying pathophysiology of the disease. A detailed comprehension of the associated biochemical pathways offers valuable insight into disease mechanisms and the evaluation of therapeutic efficacy. This investigation analyzes core biochemical features of childhood respiratory infections, emphasizing immune activation, inflammatory processes, and the utility of biochemical markers in diagnostic assessment and clinical monitoring.

Immune Responses

The immune system serves as the primary defense mechanism against respiratory pathogens. Upon exposure, infectious agents such as viruses—including respiratory syncytial virus and influenza—or bacteria—such as Streptococcus pneumoniae and Haemophilus influenzae—activate both innate and adaptive immune responses in the host. The initial recognition phase is mediated by pattern recognition receptors (PRRs), including Toll-like receptors

(TLRs), expressed on respiratory epithelial cells, macrophages, and dendritic cells. These receptors detect pathogen-associated molecular patterns (PAMPs), triggering intracellular signaling cascades, notably the nuclear factor-kappa B (NF-κB) pathway. This activation results in the release of pro-inflammatory cytokines and chemokines, which orchestrate the recruitment of immune effector cells to the site of infection, manifesting as inflammation. Key cytokines upregulated during respiratory infections include tumor necrosis factor-alpha (TNF-α), interleukin (IL)-1, IL-6, and IL-8. These mediators enhance vascular permeability, facilitating leukocyte transmigration but also contributing to systemic and local clinical manifestations such



as fever, edema, and pain. The combination of heightened vascular leakage and inflammatory cell influx may compromise airway patency, particularly in pediatric populations, where narrower airways are more susceptible to obstruction due to mucus buildup.

Inflammation markers

A range of biochemical markers is employed to evaluate inflammatory activity in pediatric patients with respiratory infections. C-reactive protein (CRP), synthesized predominantly by the liver under stimulation by pro-inflammatory cytokines such as interleukin-6 (IL-6), serves as a key indicator of acute-phase inflammation. CRP concentrations increase promptly after infection onset and are commonly elevated in bacterial cases; however, moderate elevations may also occur in viral etiologies, limiting its specificity. Procalcitonin (PCT) has emerged as a more selective biomarker for bacterial infection, with production triggered by bacterial endotoxins and systemic bacterial burden. Elevated PCT levels correlate with the severity of bacterial involvement and may support clinical decisions regarding antibiotic use, though overlap between viral and bacterial presentations can still limit diagnostic certainty. Concurrent assessment of leukocyte profiles, particularly differential counts, further aids evaluation. Neutrophilia is frequently associated with bacterial pathogens, whereas lymphocytosis is more commonly observed in viral infections. Together, these laboratory parameters provide critical adjunctive data for the accurate diagnosis and appropriate management of respiratory infections in children.

Mechanisms of Host Damage

The immune response to respiratory infections, although critical for pathogen elimination, may induce collateral tissue injury, especially when inflammatory processes become dysregulated or exaggerated. Phagocytic cells generate reactive oxygen species (ROS) and reactive nitrogen species (RNS) as components of the oxidative burst, a key antimicrobial mechanism. Molecules such as superoxide anion, hydrogen peroxide, and nitric oxide exhibit potent microbicidal

activity but can also inflict significant oxidative damage on host tissues if their production is not precisely controlled. In the context of respiratory infections, unchecked accumulation of ROS and RNS is associated with epithelial barrier disruption, excessive mucus secretion, and structural alterations in the airways—pathophysiological changes that exacerbate clinical disease. Concurrently, matrix metalloproteinases (MMPs), proteolytic enzymes involved in extracellular matrix turnover, contribute to airway remodeling during infection. In pediatric populations, particularly in individuals with recurrent respiratory infections or chronic inflammatory conditions like asthma, persistent MMP activity may promote progressive airway structural damage, predisposing to heightened vulnerability to subsequent infections and long-term deterioration in pulmonary function.

Viral and bacterial pathogens functions in Biochemical Dysregulation

Viral agents, including influenza and respiratory syncytial virus (RSV), frequently elicit immune activation that results in significant biochemical disturbances. RSV, in particular, mediates direct cytopathic effects on respiratory epithelial cells, initiating a downstream inflammatory cascade. This process involves the upregulation of cytokine synthesis, which recruits and activates immune effector cells such as T lymphocytes, neutrophils, and eosinophils, thereby amplifying inflammation. A disproportionate cytokine response—marked by elevated levels of pro-inflammatory mediators such as tumor necrosis factor-alpha (TNF-α) and interleukin-6 (IL-6)—is associated with more severe clinical manifestations, including bronchiolitis and pneumonia. Likewise, bacterial pathogens such as Streptococcus pneumoniae provoke robust inflammatory reactions. The release of bacterial exotoxins and pathogen-associated molecular patterns stimulates widespread cytokine production and promotes biofilm development. These biofilms, formed on the surface of respiratory mucosa, confer resistance to both host immunity and antimicrobial therapy, playing a critical role in the persistence of chronic bacterial infections. In pediatric respiratory disease, the biochemical environment reflects a fine equilibrium between protective immunity and pathological inflammation leading to tissue injury. Clinically relevant biomarkers, including C-reactive protein (CRP), procalcitonin (PCT), and specific cytokines, offer insight into infection severity, etiology, and progression, supporting diagnostic accuracy and therapeutic decision-making. The dynamic interaction among viral and bacterial pathogens and the host immune response generates intricate biochemical alterations that underlie both disease pathogenesis and clinical expression. Elucidating these molecular mechanisms

is fundamental to advancing targeted interventions and improving outcomes in childhood respiratory disorders.

Care Management of Acute Respiratory Tract Infections

Evaluation of the pediatric respiratory system must follow standardized clinical protocols, encompassing a comprehensive assessment of the ears, nose, oral cavity, pharynx, thorax, and pulmonary fields. Critical physiological indicators include respiratory rate, depth, and pattern; cardiac rate; oxygen saturation; hydration; temperature; mental status; motor activity; and general well-being. Clinicians should systematically identify key signs of respiratory compromise, such as elevated body temperature, tachypnea, tachycardia, nasal flaring, intercostal or subcostal retractions, labored breathing, abnormal lung auscultation findings (including rhonchi or fine crackles), presence and character of cough (productive versus nonproductive), cutaneous pallor or cyanosis, and alterations in behavior such as irritability, agitation, or decreased responsiveness. Routine integration of noninvasive pulse oximetry to assess oxygen saturation is considered essential during the physical evaluation of children with suspected respiratory pathology. These diagnostic elements collectively support the development of an evidence-based, structured nursing care plan for managing acute respiratory tract infections in pediatric patients.

Therapeutic Management

The management of nasopharyngitis in pediatric patients is primarily supportive and usually conducted in the home setting. Given the absence of effective antiviral therapies and preventive vaccines, treatment focuses on symptom alleviation. Antipyretics may be administered to address fever and associated discomfort. Adequate rest, hydration, and the use of humidified air are advised to enhance patient comfort. Cough suppressants containing dextromethorphan require careful consideration due to the physiological role of cough in clearing respiratory secretions; while they may be indicated for persistent, non-productive nocturnal cough, their use carries risks, including confusion, hyperexcitability, dizziness, nausea, and sedation. Close parental supervision for adverse reactions is essential. Evidence increasingly highlights safety concerns with over-the-counter cough and cold formulations, particularly in children under 6 years, warranting restrictive use. Preparations with pseudoephedrine or specific antihistamines are contraindicated in young children due to associations with serious adverse events, including infant fatalities. The American Academy of Pediatrics

(2015) recommends avoiding such medications in children under 4 years, citing insufficient efficacy and significant safety concerns. Antihistamines are not indicated in nasopharyngitis management, as they provide limited symptomatic benefit and may induce drowsiness or paradoxical central nervous system stimulation. Expectorants lack evidence of effectiveness, and antibiotics are not routinely warranted given the predominantly viral etiology of the condition.

Prevention

Given the ubiquity of nasopharyngitis, total prevention is unattainable. Nonetheless, viral transmission can be mitigated by consistent hand hygiene and refraining from contact with the ocular, nasal, and oral mucosa. Pediatric populations exhibit increased vulnerability due to limited prior exposure and underdeveloped immune defenses against common viral pathogens. Infants are especially prone to severe sequelae and require strict avoidance of infectious contact.

Conclusion

Respiratory infections in pediatric populations continue to represent a major public health challenge, driven by a range of viral and bacterial etiologies. The underlying pathophysiology involves intricate interactions among immune activation, inflammatory cascades, and biochemical alterations. Following pathogen invasion, the host mounts a coordinated response involving the stimulation of pattern recognition receptors—particularly Toll-like receptors (TLRs)—and the subsequent release of proinflammatory cytokines, including tumor necrosis factor-alpha (TNF-α), interleukin-6 (IL-6), and interleukin-1 (IL-1). These mediators propagate localized inflammation, which may result in airway edema and obstruction, particularly problematic in young children due to anatomically narrower airways. Concurrent production of reactive oxygen and nitrogen species, along with matrix metalloproteinases, contributes to epithelial injury and amplifies disease severity.

Clinically relevant biomarkers such as C-reactive protein (CRP) and procalcitonin (PCT) support diagnostic differentiation between viral and bacterial etiologies and assist in tracking clinical course. CRP elevation reflects general acute-phase inflammatory activity, whereas PCT demonstrates greater specificity for bacterial infection, thereby informing decisions regarding antimicrobial use. Hematological evaluation, especially leukocyte differential counts, further aids in characterizing the infectious process and guides therapeutic planning.

From a nursing standpoint, comprehensive management requires an integrated strategy. Core interventions encompass maintaining hydration, regulating body temperature, optimizing respiratory function, and delivering psychosocial support to both patient and family. Nutritional maintenance and discharge education are critical components for recovery and containment of transmission. Psychological well-being must be addressed, as hospitalization can induce significant anxiety in pediatric patients due to illness-related stress and unfamiliar clinical environments.

Infection prevention remains a cornerstone of nursing practice. Rigorous hand hygiene, appropriate use of isolation protocols, and caregiver education on transmission control are essential to limit spread within healthcare facilities and households. Nurses must also maintain continuous surveillance for early indicators of clinical decline, enabling timely intervention in cases of respiratory compromise or symptom progression.

In summary, understanding the biochemical mechanisms involved in pediatric respiratory infections enhances diagnostic accuracy and therapeutic precision. Nursing care plays a pivotal role through symptom management, infection control, and family engagement. Integrating early recognition, evidence-based treatment, and holistic patient support enables improved clinical outcomes in this vulnerable population.

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Social Media and Youth Mental Health

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Abstract

Social media is widely used by adolescents and has both positive and negative effects on mental health. While it supports communication, self-expression, and access to information, excessive use is associated with anxiety, depression, poor sleep, and low self-esteem. Psychological factors such as social comparison, validation-seeking, and fear of missing out, along with neurological effects like dopamine-driven addiction and stress responses, contribute to these outcomes. Evidence shows that prolonged usage increases mental health risks, particularly among youth. However, mindful and

limited use, along with digital literacy and responsible platform design, can help reduce harm and promote well-being.

Introduction

Over the past two decades, social media has evolved into a dominant force shaping communication, identity, and daily behavior particularly among young people. Current evidence indicates that nearly 95% of adolescents aged 13–17 use social media, with a significant proportion reporting near-constant engagement .

While social media platforms provide unprecedented opportunities for connection, creativity, and access to information, they have also raised growing concerns regarding their impact on mental health. Adolescence represents a critical developmental stage marked by heightened emotional sensitivity and identity formation, making young individuals particularly vulnerable to digital influences.



This article presents a comprehensive, evidence-based evaluation of the psychological, neurological, and societal effects of social media on youth, while also considering its potential benefits and strategies for healthier engagement.

Positive Contributions of Social Media

Despite widespread concerns, social media offers several meaningful advantages when used appropriately.

Social Connection and Community

Social media facilitates communication and enables young people to maintain relationships across geographical boundaries. It also provides supportive communities, particularly for marginalized groups, fostering a sense of belonging and emotional support.

Self-Expression and Identity Development

Digital platforms allow adolescents to explore and express their identities, share creative content, and develop communication skills key aspects of psychosocial development.

Access to Information and Awareness

Social media serves as a powerful educational tool, offering access to information on academic subjects, global issues, and mental health awareness, often encouraging early help-seeking behavior.

Therapeutic and Supportive Potential

Emerging research suggests that online communities and digital interventions can support mental health by providing psychoeducation and peer support.

Psychological Impacts

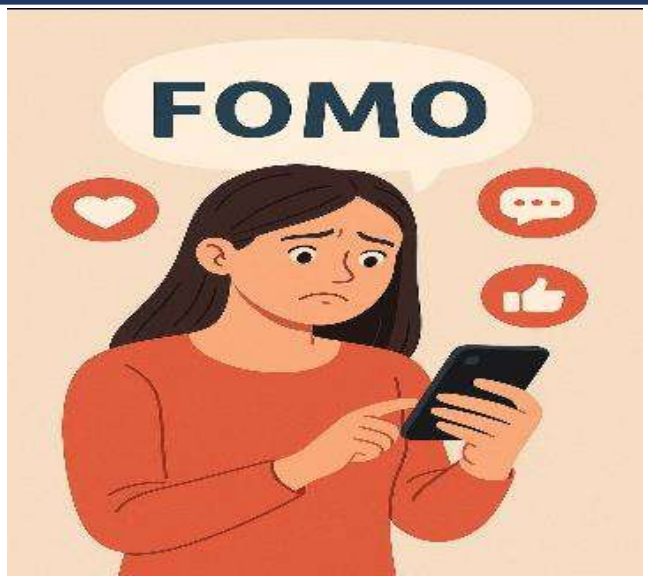
Social Comparison and Self-Esteem

Social media amplifies the natural tendency for social comparison. Exposure to idealized and curated representations of life often leads to dissatisfaction, low self-esteem, and depressive symptoms. This phenomenon is closely linked to contingent self-esteem, where self-worth depends on external validation such as likes and comments.

Validation-Seeking Behavior

Many users develop a reliance on digital feedback to measure self-worth. The absence of expected validation can result in feelings of rejection, anxiety, and emotional distress.

Fear of Missing Out (FOMO)



Continuous exposure to others' experiences fosters a persistent sense of exclusion and inadequacy, contributing to anxiety and compulsive usage patterns.

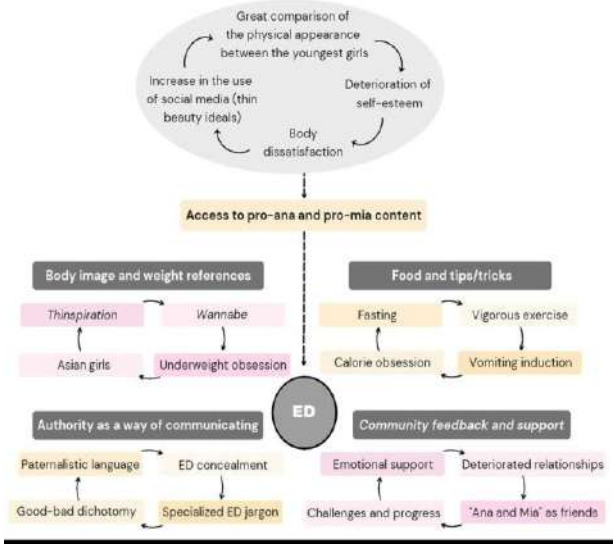
Emotional Contagion

Research indicates that emotions spread rapidly across social networks. Exposure to negative or distressing content can significantly influence users' own emotional states.

Identity Fragmentation

Maintaining multiple online personas may lead to confusion and cognitive dissonance, complicating the development of a stable and authentic identity.

Neurological and Biological Effects



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Dopamine and Addictive Mechanisms

Social media platforms are designed to stimulate the brain's reward system through unpredictable reinforcement (likes, notifications). This triggers dopamine release, reinforcing compulsive usage patterns similar to behavioral addictions.



Cortisol and Stress Response

Frequent exposure to conflict, comparison, and negative content increases cortisol levels, contributing to chronic stress, anxiety disorders, and impaired cognitive functioning.

Impact on Brain Development

Adolescence is a sensitive period of neurodevelopment. Social media use affects key brain regions such as the amygdala (emotional processing) and prefrontal cortex (decision-making and impulse control), increasing sensitivity to social feedback .

Attention Fragmentation

Short-form, fast-paced content reduces attention span and the ability to engage in deep, focused thinking, skills essential for academic success and emotional resilience.

Disruption of the Default Mode Network

Constant stimulation suppresses brain systems responsible for introspection, empathy, and creativity, limiting psychological growth.

Impact on Adolescents and Youth

Anxiety and Depression

Studies consistently show that adolescents who spend more than three hours per day on social media are at a significantly higher risk of developing symptoms of anxiety and depression .



Body Image Concerns

Exposure to unrealistic beauty standards contributes to body dissatisfaction and is strongly associated with eating disorders and low self-esteem.

Cyberbullying and Online Harassment

Cyberbullying remains a major concern, with strong links to depression, emotional distress, and social withdrawal among youth.

Sleep Disturbance

Late-night usage disrupts sleep patterns, negatively affecting mental health, cognitive performance, and overall well-being.

Academic Decline

Constant digital distraction reduces concentration, increases procrastination, and negatively impacts academic outcomes.

Exposure to Harmful Content

Young users may encounter inappropriate or harmful content, including self-harm, violence, and explicit material, which can have lasting psychological consequences.

The Loneliness Paradox

Despite increased digital connectivity, loneliness has risen significantly. Online interactions lack the depth and emotional richness of face-to-face communication.

Toxic Positivity

The pressure to portray a perfect life online leads to suppression of genuine emotions, making individuals feel isolated in their struggles.

Misinformation and Self-Diagnosis

The spread of inaccurate mental health information can lead to harmful self-diagnosis and avoidance of professional care.

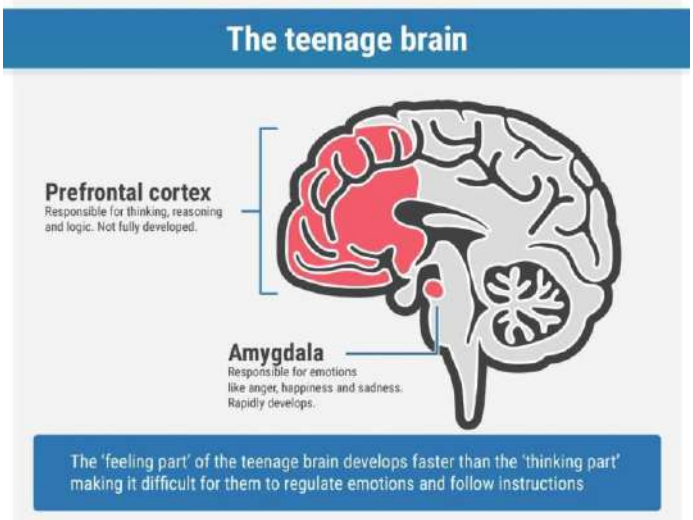
Cancel Culture and Social Anxiety

Fear of public criticism fosters anxiety, self-censorship, and reduced authenticity.

Collective Trauma Amplification

During crises, social media accelerates the spread of fear and distress, overwhelming individuals and communities.

Evidence-Based Findings



Social media use exceeding 3 hours per day is associated with increased risk of mental health problems

Limiting usage to 30 minutes per day has been shown to reduce loneliness and depression

High usage correlates with poor sleep quality, low self-esteem, and increased attention problems

Adolescents are particularly vulnerable due to ongoing brain development

Preventive Strategies and Solutions

Individual-Level Approaches

Practice mindful and intentional use

Limit daily screen time

Avoid harmful or triggering content

Maintain offline relationships and hobbies

Role of Parents and Educators

Encourage open communication

Monitor online behavior

Promote digital literacy

Platform Responsibility

Reduce harmful algorithmic exposure

Implement safety features and age protections

Increase transparency in content delivery

Government and Policy Measures

Enforce child safety regulations

Support research on digital mental health

Promote ethical technology design

Conclusion

Social media is a powerful yet double-edged tool. It has the capacity to connect, educate, and empower, but also to distort reality, increase psychological vulnerability, and contribute to mental health challenges particularly among adolescents.

The solution does not lie in eliminating social media, but in using it consciously and responsibly. By fostering digital literacy, encouraging mindful engagement, and holding technology platforms accountable, society can mitigate risks and harness the benefits of social media.

Ultimately, mental well-being in the digital age depends not only on technology itself, but on the awareness and choices of those who use it.



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CAN FASTING HELP TREAT CANCER? RESEARCH GIVES HOPE.

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Abstract

The scientific world has recently become more interested in fasting as a possible therapeutic approach for cancer. Fasting and fasting-mimicking diets (FMDs) have shown great potential in controlling cancer progression, treating various cancers, and improving the outcomes of patients receiving anticancer therapy. The review of multiple studies conducted on several trials in this study indicates that fasting might make cancer cells vulnerable, protect normal cells from chemotherapy, and decrease growth signals associated with cancer such as IGF-1. Ongoing research provides hope that fasting protocols can safely be incorporated into a physician guided cancer treatment protocol, although additional human trials are warranted.

Keywords

Fasting, cancer, diet, metabolism, chemotherapy, IGF-1

Introduction

Fasting, or going without eating for a set amount of time, is no longer solely a religious or cultural custom. Researchers are currently investigating the potential benefits of fasting for cancer treatment. According to preliminary study, fasting may protect healthy cells during treatment, reduce the growth of cancer cells, and improve the efficacy of chemotherapy. This article summarizes some of the most significant scientific discoveries and discusses how fasting combats cancer.

How Fasting Affects the Body

When you fast, your body enters a state known as "survival mode." It starts using stored fat instead of sugar as a source of energy. This results in decreased insulin, decreased blood sugar, and altered hormones such as IGF-1 (Insulin-like Growth Factor 1), which is involved in cell proliferation. To develop quickly, cancer cells require a lot of glucose and IGF-1. Therefore, cancer cells may find it difficult to survive when they are diminished, whereas healthy cells can adjust more readily.

Fasting Weakens Cancer Cells but Protects Healthy Ones

One provocative study is that fasting weakens cancer cells and increases their susceptibility to chemotherapy and other treatments. In addition, it shields healthy cells from harm. We refer to this as "differential stress resistance." Mice that fasted prior to chemotherapy showed improved treatment outcomes and fewer adverse effects.

An example study

According to a study by Dr. Valter Longo and colleagues, fasting for 48 hours increased the likelihood that cancer cells would die after chemotherapy while protecting healthy cells in mice (Raffaghello et al., Cell Cycle, 2010).

Lowering Growth Hormones Helps

IGF-1, a growth hormone associated with an increased risk of cancer, is reduced by fasting. Tumor growth may be aided by elevated IGF-1 levels. Fasting reduces the progression of cancer via lowering IGF-1.

An example study

People on long-term calorie restriction had lower IGF-1 levels and a lower risk of cancer, according to research published in Aging Cell (Fontana et al., 2008).

Fasting-Mimicking Diets (FMDs): A Safer Option

Long-term fasting is difficult for some people. Researchers have created plant-based, extremely low-calorie fasting-mimicking diets (FMDs) that provide the body with the same advantages as fasting while permitting some food. These diets have proven beneficial in early human research and are simpler to adhere to.

An example study

According to Brandhorst et al. (Cell Metabolism, 2015), FMDs enhanced immunological function, decreased cancer markers, and encouraged cell regeneration in both people and animals.

Human Trials Show Promising Results

Short fasts before to chemotherapy decreased typical adverse effects such nausea, exhaustion, and weakness in a study of cancer patients.

An example study

Patients with breast and ovarian cancer who fasted prior to chemotherapy felt better and tolerated treatment better than those who did not, according to a pilot research published in BMC Cancer (de Groot et al., 2015).

Fasting Is Not for Everyone

Not everyone can safely fast. Unless directed by a physician, people who are underweight, have diabetes, are pregnant, or have major medical conditions should not fast. When contemplating fasting, cancer patients should always consult their physician first.

Conclusion

Although it is not a miracle treatment for cancer, fasting may be useful in the future. It functions by putting cancer cells under stress, lowering growth signals, and shielding the body from harsh therapies like chemotherapy. The evidence thus far is encouraging, but further research is still required. One day, fasting or fasting-like diets could safely and effectively assist cancer care under medical supervision.

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SHADOWS IN YOUNG MINDS: IDENTIFYING SUICIDE RISK IN ADOLESCENTS

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Abstract

The escalating rate of adolescent suicide represents a profound global public health crisis that demands immediate and innovative intervention strategies. As traditional clinical assessments often fail to capture the dynamic and multifaceted nature of suicidal ideation, computational methods have emerged as a vital supplementary tool. This paper proposes a comprehensive, multimodal machine learning framework designed to identify suicide risk in adolescents by integrating clinical health records, acoustic speech features, and linguistic markers from digital platforms. By synthesizing diverse data modalities and applying semi-supervised learning techniques, this approach aims to overcome the limitations of isolated datasets and provide a more robust, real-time assessment of patient vulnerability. Ultimately, the integration of advanced predictive models into psychiatric care holds the potential to facilitate timely interventions, reduce the cognitive burden on crisis responders, and save young lives.

Introduction

Adolescent suicide has tragically become one of the leading causes of mortality among young people worldwide, representing an urgent crisis that overwhelms contemporary healthcare systems. The transition through adolescence is fraught with complex psychological, social, and physiological changes, which can be exacerbated by economic pressures, academic stress, and external crises. While historical efforts to assess suicide risk have relied heavily on direct clinical interviews and self-reported

questionnaires, predictive capabilities using these standard methods are often only slightly better than chance (Bhat & Goldman-Mellor, 2017). Consequently, the problem definition of this paper centers on designing a robust, automated methodology capable of identifying early markers of suicide risk in adolescents across multiple behavioral and physiological modalities before acute crises manifest.

Despite decades of psychiatric research, existing approaches to suicide risk prediction remain highly insufficient for several structural reasons. First, traditional self-report assessments and clinical interviews are subject to significant misclassification, as they rely entirely on the patient's immediate self-awareness and willingness to disclose their most vulnerable thoughts (Marie et al., 2025). Second, many contemporary machine learning efforts remain siloed in their data sources; models trained exclusively on electronic health records (EHRs) lack the real-time behavioral context of the patient, while NLP-based social media models frequently suffer from severe class imbalances and a chronic lack of reliable, ground-truth labeled data (Lovitt et al., 2024). Because risk factors fluctuate rapidly in youth, static and unimodal assessments consistently fail to capture the precipitous decline in a patient's mental state.

To address these critical gaps in computational psychiatry, this paper introduces a novel approach to early risk detection. Specifically, the paper's contributions are as follows:

- First, we propose a comprehensive, multimodal suicide risk assessment framework that strategically fuses structured clinical history with unstructured speech and linguistic data to generate a holistic patient profile.
- Second, we present a semi-supervised evaluation strategy designed to mitigate the persistent challenge of imbalanced datasets and sparse annotations in computational mental health research.

Related Work

Clinical Data and Health Behaviors

The foundational category of suicide risk prediction leverages structured clinical records and epidemiological data. Researchers have successfully utilized anonymized electronic health records, encompassing hundreds of thousands of adolescents, to build neural network models capable of predicting suicide attempts based on previous hospital visits and demographic variables (Bhat & Goldman-Mellor, 2017). Similarly,

cross-sectional studies have applied data-driven models like Bayesian tree ensembles to link specific health behaviors—such as substance abuse, early sexual activity, and feelings of hopelessness—to elevated suicide risk among minority and vulnerable youth populations (Wei & Mukherjee, 2020). The primary strength of this approach is its reliance on verifiable, high-impact clinical history. However, its weakness lies in its static nature; relying on past hospital admissions or survey data inherently misses the acute, real-time development of suicidal ideation. In contrast to these strictly clinical models, our work supplements historical data with dynamic acoustic and linguistic features to capture immediate emotional volatility.

Speech and Acoustic Analysis

A growing body of literature focuses on non-invasive suicide risk assessment through computational paralinguistics and speech analysis. Recent studies have demonstrated that deep learning-based spectral representations, such as wav2vec, and handcrafted acoustic features like Mel-frequency cepstral coefficients (MFCCs) can successfully differentiate high-risk patients from low-risk patients (Amiriparian et al., 2024). Furthermore, research highlights the necessity of gender-specific modeling, as speech characteristics linked to suicide risk manifest differently across genders; for instance, agitation correlates with increased risk in males but points the opposite way in females (Gerczuk et al., 2024). While highly innovative, these speech models often struggle with generalization across different recording environments and face performance drops between development and test datasets (Marie et al., 2025). Our proposed framework addresses this weakness by treating speech as a complementary module that is continuously contextualized by the patient's clinical metadata, rather than relying on it as an isolated diagnostic metric.

Social Media and Conversational Agents

The third category encompasses the application of natural language processing (NLP) to social media text and the deployment of conversational AI in clinical workflows. Platforms like Reddit have become valuable resources for studying mental health, prompting researchers to develop weakly-supervised frameworks and pseudo-labeling techniques to overcome the scarcity of annotated suicide risk data (Yang et al., 2021). Additionally, advanced conversational assistants, powered by domain-adapted transformer models, have been engineered to assist frontline crisis responders by automatically identifying issue tags during youth support chats (Obadinma et al.,

2024). While these text-based models excel at identifying distress in real-time, they often lack the clinical rigor and patient history necessary to confirm long-term risk (Lovitt et al., 2024). By integrating semi-supervised linguistic analysis with formal clinical EHR frameworks, our approach bridges the gap between anonymous digital cries for help and actionable psychiatric intervention.

Method/Approach

To effectively capture the multifaceted nature of adolescent suicide risk, we propose a multimodal machine learning framework consisting of three distinct processing modules: a Clinical History Module, an Acoustic Processing Module, and a Linguistic & Social Module. The Clinical History Module processes structured tabular data, including demographics, past emergency department visits, and documented health behaviors such as substance use or physical fighting (Wei & Mukherjee, 2020). The Acoustic Processing Module ingests short, non-invasive voice recordings, applying a fine-tuned wav2vec 2.0 architecture alongside gender-specific normalization layers to extract deep spectral features (Gerczuk et al., 2024). Finally, the Linguistic Module utilizes an ensemble of transformer models to analyze conversational transcripts and social media text, employing pseudo-labeling techniques derived from related mental health domains like anxiety and depression to bolster its predictive power (Yang et al., 2021).

The key design choices in this architecture revolve around the sophisticated fusion of these disparate modalities. We utilize a weighted attention mechanism with mixup regularization for late fusion, allowing the model to dynamically assign importance to different data streams based on the available inputs (Marie et al., 2025). This choice is highly intentional; in emergency medicine, a patient might present with extensive clinical records but refuse to speak, or conversely, provide ample conversational data but lack a formal psychiatric history. By incorporating metadata such as biological sex and previous suicide attempts into the fusion layer, the model contextualizes the unstructured speech and text embeddings, which has been shown to yield significant absolute improvements in balanced accuracy (Amiriparian et al., 2024).

The evaluation plan for this proposed methodology relies on a hypothetical, large-scale, multimodal dataset constructed from partnering youth psychiatric wards and crisis hotlines. We will frame the assessment as a binary classification problem to predict the presence or absence of acute suicide attempts within a designated follow-

up period (Bhat & Goldman-Mellor, 2017). Given the inherent scarcity of positive labels, we will implement a semi-supervised learning paradigm, manually verifying a subset of pseudo-labeled text data to ensure quality control across multiple training trials (Lovitt et al., 2024). Model performance will be rigorously measured using precision, recall, F-score metrics, and the Area Under the Receiver Operating Characteristic Curve (ROC-AUC), ensuring that the framework prioritizes high sensitivity to minimize catastrophic false negatives in clinical deployment.

Discussion

The practical implications of deploying this multimodal framework in real-world healthcare settings are substantial. If integrated into emergency department triage systems, the model could function as a rapid, non-invasive screening tool that automatically flags high-risk adolescents for immediate psychiatric evaluation. Furthermore, this predictive framework could be synergized with Computational Health Economic Models (CHEMs) to help policymakers simulate the cost-effectiveness of implementing AI-augmented early intervention programs at a national level (Hamilton et al., 2023). By embedding these insights into tools utilized by frontline crisis responders, mental health agencies can drastically reduce the cognitive burden on staff, streamline administrative issue identification, and optimize the allocation of severely limited clinical resources (Obadinma et al., 2024).

Despite its potential, the proposed framework is constrained by several critical limitations and failure modes. First, the reliance on fused modalities introduces a vulnerability to missing data; if a patient does not engage with social media or is selectively mute during an assessment, the absence of linguistic or acoustic features may severely degrade the model's predictive confidence. Second, the framework faces significant domain shift challenges; models trained on pristine clinical speech recordings often fail to generalize to the noisy, chaotic acoustic environments typical of emergency departments (Marie et al., 2025). Third, the incorporation of semi-supervised learning introduces a risk of confirmation bias, wherein poorly generated pseudo-labels from unlabeled digital text might propagate classification errors deep into the model's architecture, inadvertently misclassifying low-risk distress as high-risk ideation (Yang et al., 2021).

The deployment of such technology also necessitates a rigorous examination of ethical considerations and inherent risks. A primary ethical risk is the potential for algorithmic bias, particularly against marginalized minority groups who are already at

a disproportionately higher risk for attempting suicide (Wei & Mukherjee, 2020). If the training data lacks sufficient representation of diverse dialects, socioeconomic backgrounds, or cultural expressions of grief, the model may systematically fail the most vulnerable adolescents. Another critical consideration involves patient privacy and transparency; qualitative research indicates that young people demand to know "what's under the hood" of AI agents, fearing that overly automated systems might dehumanize their care or compromise their confidentiality without consent (Poulsen et al., 2026).

To advance this critical field of study, future work must explore several new directions. First, researchers should pivot toward longitudinal tracking frameworks that utilize continuous, passive sensing (such as wearable devices) to monitor physiological shifts over time, rather than relying on cross-sectional snapshots of clinical visits. Second, future iterations of this technology should focus on co-designing conversational interfaces directly with youth consumers, ensuring that AI-driven assessments act as personalized, empathetic agents that humanize the clinical experience while operating strictly within safe, governed boundaries (Poulsen et al., 2026).

Conclusion

The rising tide of adolescent suicide demands interventions that transcend the limitations of traditional, unimodal psychiatric assessments. This paper has outlined a comprehensive, multimodal machine learning framework that synthesizes clinical history, deep acoustic speech representations, and semi-supervised linguistic analysis to accurately identify suicide risk in youth populations. By capturing the complex interplay between static demographic risk factors and dynamic emotional states, this methodology offers a more resilient and nuanced diagnostic tool for emergency medical personnel and crisis responders.

Ultimately, while the integration of artificial intelligence into youth mental health services presents profound ethical and technical challenges, it also offers a beacon of hope for overstretched healthcare systems. By prioritizing transparent, generalizable, and ethically governed predictive models, the psychiatric community can harness computational power to detect the earliest shadows in young minds. Doing so ensures that vulnerable adolescents are met with the right tools, in the right place, at the right time, fundamentally transforming early intervention and saving lives.

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STIGMA AROUND MENTAL HEALTH: BARRIERS TO SEEKING HELP

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Abstract:

Mental health stigma remains one of the most significant obstacles to global public health. This paper explores the psychological, social, and systemic barriers that prevent individuals from seeking professional help. By analyzing the different layers of stigma—from self-perception to societal labels—this article highlights how fear of judgment and lack of awareness contribute to untreated mental health conditions. Understanding these barriers is the first step toward creating an inclusive environment where seeking help is viewed as a strength rather than a weakness.

Keywords: Mental Health, Social Stigma, Self-Stigma, Healthcare Barriers, Psychological Well-being, Public Awareness

Introduction

While physical ailments are often met with sympathy and immediate care, mental health struggles are frequently shrouded in silence. Despite the rising global awareness of psychological well-being, a "hidden wall" continues to prevent millions from accessing the care they need. This wall is built from stigma—a set of negative beliefs and prejudices held by society. Early research suggests that stigma not only delays treatment but can also worsen the symptoms of mental illness by increasing a person's sense of isolation. This article breaks down the different types of stigma and explains why breaking these barriers is essential for a healthier society.

The Three Layers of Stigma

Stigma is not a single issue; it operates on multiple levels that trap individuals in a cycle of silence.

• Public Stigma: This involves the negative or discriminatory attitudes that others have about mental illness. It leads to social exclusion and discrimination in the workplace or housing.

Self-Stigma: Perhaps the most damaging form, self-stigma occurs when an individual internalizes the negative beliefs of society. They may feel "broken" or ashamed, leading to low self-esteem and a refusal to seek help.

Institutional Stigma: This refers to systemic policies—both intentional and unintentional—that limit opportunities for people with mental illness, such as lower funding for mental healthcare compared to physical healthcare.

Barriers to Seeking Help

Even when someone recognizes they are struggling, several barriers can stand in the way of their first appointment:

1. Fear of Judgment and Labeling Many individuals fear that being diagnosed with a mental health condition will define them forever. They worry about being labeled "unstable" or "weak" by friends, family, and colleagues.

2. Lack of Mental Health Literacy In many cultures, there is a lack of understanding of what mental illness actually looks like. People may mistake symptoms of depression or anxiety for "laziness" or a "lack of willpower," leading them to believe they don't need professional medical intervention.

3. Economic and Geographic Constraints Even when the desire to seek help is present, the cost of therapy and the lack of accessible mental health facilities in certain regions create physical barriers that stigma only serves to reinforce.

The Impact of Untreated Mental Illness

When stigma wins, the individual loses. Delaying treatment can lead to:

Worsening of psychological symptoms.

Increased risk of physical health problems (heart disease, weakened immune system).

Strain on personal and professional relationships.

Increased risk of substance abuse as a form of "self-medicating" the pain.

Breaking the Silence: A Path Forward

Stigma is a learned behavior, which means it can be unlearned. Strategies for change include:

Education: Replacing myths with facts (e.g., understanding that mental illness is often biological and not a character flaw).

Normalizing Conversation: When public figures and community leaders speak openly about their struggles, it reduces the "shame factor" for others.

Integrated Care: Treating mental health as a standard part of primary healthcare helps remove the "specialized" or "separate" nature of the treatment.

Conclusion

The stigma surrounding mental health is a silent crisis that costs lives. It is not enough to have advanced treatments if the people who need them are too afraid to reach out. By addressing self-stigma, educating our communities, and advocating for equal healthcare rights, we can dismantle the barriers to seeking help. Remember, seeking support for your mind is just as vital—and just as normal—as seeking support for your body.

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СЕМЕЙНАЯ ПСИХОЛОГИЯ И ГЕНДЕРНЫЕ СТЕРЕОТИПЫ: ВЛИЯНИЕ НА ВОСПИТАНИЕ ДЕТЕЙ И ОБЩЕСТВЕННОЕ СОЗНАНИЕ

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Аннотация. В статье рассматривается влияние гендерных стереотипов, укоренённых в семейной системе, на процессы воспитания детей и формирование общественного сознания. Анализируются психологические механизмы передачи гендерных установок, роль семьи как первичного института социализации, а также последствия стереотипного воспитания для личностного развития ребёнка. Особое внимание уделяется поиску баланса между традиционными семейными ценностями и принципами гендерного равенства. В заключение предложены практические рекомендации для специалистов системы образования, психологов и родителей.

Ключевые слова: семейная психология, гендерные стереотипы, гендерная социализация, воспитание детей, общественное сознание, гендерное равенство.

Введение

Семья традиционно рассматривается как базовый социальный институт, в рамках которого закладываются фундаментальные представления ребёнка о себе, других людях и окружающем мире. Именно в семейной среде формируются первые модели межличностных отношений, усваиваются нормы поведения, ценности и социальные роли. В этом контексте особую значимость приобретает влияние гендерных стереотипов — устойчивых представлений о «мужском» и «женском», которые нередко передаются из поколения в поколение как неоспоримая норма.

В условиях современных социальных преобразований и актуализации политики гендерного равенства проблема переосмысления традиционных гендерных установок становится особенно актуальной. Это касается не только

общественных институтов, но прежде всего семьи, где закладываются основы гендерной идентичности личности и формируется будущее общественное сознание.

Семья как пространство гендерной социализации

С точки зрения семейной психологии, гендерная социализация ребёнка начинается с первых лет жизни и осуществляется как на осознанном, так и на неосознанном уровне. Родители, выступая значимыми взрослыми, транслируют ребёнку представления о допустимых формах поведения, эмоциональных реакциях и жизненных сценариях, соотнося их с половой принадлежностью.

Так, девочкам чаще приписываются качества заботливости, эмоциональной чувствительности, ориентации на семью, тогда как мальчиков поощряют к самостоятельности, сдержанности и лидерству. Эти установки закрепляются через распределение домашних обязанностей, выбор игрушек, ожидания в учебной и профессиональной сфере. Подобная практика, с одной стороны, отражает культурные традиции, а с другой — ограничивает вариативность личностного развития ребёнка.

Психологические исследования показывают, что жёсткая фиксация гендерных ролей может приводить к внутренним конфликтам, снижению самооценки и трудностям в самореализации, особенно в случае несоответствия индивидуальных склонностей навязываемым ожиданиям.

Гендерные стереотипы и воспитание детей

Гендерные стереотипы в воспитании проявляются не только в явных установках, но и в повседневных коммуникативных практиках семьи. Различия в стиле общения с детьми разного пола, уровне разрешённой эмоциональной экспрессии, требованиях к поведению формируют у ребёнка представление о допустимых и недопустимых способах самовыражения.

Например, подавление эмоциональности у мальчиков может способствовать формированию трудностей в распознавании и выражении чувств во взрослом возрасте, тогда как ожидание чрезмерной уступчивости от девочек — развитию зависимых форм поведения. В долгосрочной перспективе такие модели воспроизводятся уже в собственных семьях выросших детей, закрепляя стереотипы на уровне общественного сознания.

Важно отметить, что отказ от жёстких гендерных схем не означает отрицание биологических различий или культурных традиций. Речь идёт о создании условий, в которых ребёнок получает возможность развивать

индивидуальные способности независимо от пола, формируя гибкую и устойчивую личностную идентичность.

Влияние семейных гендерных установок на общественное сознание

Семейные установки в совокупности формируют макроуровень общественного сознания. Стереотипы, усвоенные в детстве, находят отражение в профессиональной сегрегации, распределении социальных ролей, отношении к лидерству, власти и ответственности. Таким образом, семья выступает связующим звеном между индивидуальной психологией и социальными структурами.

В современных условиях, включая Республику Узбекистан, наблюдается постепенная трансформация общественных представлений о роли женщин и мужчин, чему способствуют образовательные реформы, правовые инициативы и международные программы. Однако устойчивость традиционных моделей семейного воспитания нередко замедляет этот процесс, создавая внутренние противоречия между декларируемыми принципами равенства и реальной практикой.

Практические рекомендации

С учётом изложенного представляется целесообразным выделить следующие направления практической работы:

Психологическое просвещение родителей, направленное на осознание влияния гендерных стереотипов на развитие ребёнка.

Внедрение гендерно-чувствительных программ в систему дошкольного и школьного образования с учётом национальных культурных особенностей.

Подготовка специалистов (педагогов, психологов, социальных работников), владеющих навыками работы с семейными гендерными установками.

Поддержка семейных моделей партнёрства, основанных на взаимном уважении, разделении ответственности и эмоциональной включённости обоих родителей.

Реализация данных рекомендаций способствует формированию более гибкого общественного сознания и устойчивого развития культуры гендерного равенства без утраты значимости семейных ценностей.

Заключение

Семейная психология и гендерные стереотипы находятся в тесной взаимосвязи, оказывая долгосрочное влияние как на индивидуальное развитие личности, так и на общественные процессы в целом. Переосмысление

традиционных моделей воспитания с позиций психологической науки позволяет создать условия для гармоничного развития детей и формирования общества, основанного на принципах равных возможностей, уважения и ответственности.

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GEMODINAMIKA: BIOFIZIK YONDASHUV VA 2026-YIL ILMIY YANGILIKLARI ASOSIDA TAHLIL

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Annotatsiya

Ushbu maqolada gemodinamika biofizika nuqtai nazaridan tahlil qilinadi. Qon oqimining fizik qonuniyatlari, uning reologik xususiyatlari va yurak-qon tomir tizimidagi dinamik jarayonlar zamonaviy ilmiy yondashuv asosida o‘rganiladi. 2026-yil tadqiqotlari asosida kompyuter modellashtirish, sun’iy intellekt va “raqamli egizak” texnologiyalarining gemodinamik tahlildagi o‘rni ko‘rsatib beriladi. Natijalar klinik diagnostika va davolashni optimallashtirishda muhim ahamiyatga ega.

Kalit so‘zlar: Gemodinamika, biofizika, qon oqimi, non-Nyuton suyuqlik, CFD, pulsatsion oqim, sun’iy intellekt, raqamli egizak (digital twin), yurak-qon tomir tizimi.

Аннотация

В данной статье гемодинамика анализируется с точки зрения биофизики. Физические закономерности кровотока, его реологические свойства и динамические процессы в сердечно-сосудистой системе изучаются на основе современных научных подходов. На основе исследований 2026 года показана роль компьютерного моделирования, искусственного интеллекта и технологий «цифрового двойника» в анализе гемодинамики. Полученные результаты имеют важное значение для оптимизации клинической диагностики и лечения.

Ключевые слова: Гемодинамика, биофизика, кровоток, неньютоновская жидкость, CFD, пульсационный поток, искусственный интеллект, цифровой двойник (digital twin), сердечно-сосудистая система.

Abstract
This article analyzes hemodynamics from a biophysical perspective. The physical principles of blood flow, its rheological properties, and dynamic processes in the cardiovascular system are studied using modern scientific approaches. Based on research conducted in 2026, the role of computational modeling, artificial intelligence, and digital twin technologies in hemodynamic analysis is demonstrated. The results are important for optimizing clinical diagnosis and treatment.

Keywords: Hemodynamics, biophysics, blood flow, non-Newtonian fluid, CFD (computational fluid dynamics), pulsatile flow, artificial intelligence, digital twin, cardiovascular system.

Kirish

Gemodinamika — qonning yurak va qon tomirlari bo‘ylab harakatini o‘rganadigan fan bo‘lib, u biofizika, gidrodinamika va fiziologiya kesishgan nuqtada joylashgan. Qon oqimi Navye-Stoks tenglamalari asosida tavsiflanadi va u murakkab, ko‘p omilli jarayondir.

Qon aylanish tizimi pulsatsion xarakterga ega bo‘lib, yurak qisqarishlari natijasida davriy bosim va tezlik o‘zgarishlari yuzaga keladi . Shu sababli gemodinamika biofizik modellashtirish uchun eng murakkab tizimlardan biri hisoblanadi.

Gemodinamikaning biofizik asoslari

1. Qonning fizik xususiyatlari

Qon oddiy suyuqlik emas, balki **non-Nyuton suyuqlik** bo‘lib, uning yopishqoqligi tezlik gradientiga bog‘liq ravishda o‘zgaradi.

shear-thinning (kesish tezligiga bog‘liq kamayish)

viskoelastiklik

tiksotropiya

Bu xususiyatlar tomirlar ichida murakkab oqim shakllarini hosil qiladi.

2. Gemodinamik qonunlar

Gemodinamika quyidagi asosiy biofizik qonunlarga tayanadi:

Uzliksiz oqim tenglamasi (massaning saqlanishi)

Navye-Stoks tenglamalari (impuls saqlanishi)

Puazeyl qonuni (laminar oqim uchun)

Bu qonunlar qon bosimi, tezlik va tomir qarshiligi o‘rtasidagi bog‘liqlikni tushuntiradi.

Rasm: Qon aylanishining biofizik modeli

Muammoning dolzarbligi

Yurak-qon tomir kasalliklari global miqyosda eng ko‘p o‘limga sabab bo‘luvchi kasalliklar qatoriga kiradi. Gemodinamik buzilishlar ushbu kasalliklarning asosiy sabablaridan biridir.

Zamonaviy ilmiy tadqiqotlar shuni ko‘rsatadiki:

anatomik ko‘rsatkichlar kasallikni to‘liq baholay olmaydi

funksional gemodinamik parametrlar (masalan, devor kesish kuchi) muhim biomarker hisoblanadi

Shu sababli gemodinamikani chuqur o‘rganish dolzarb ilmiy muammo hisoblanadi.

Asosiy qism (2026-yil ilmiy yondashuvlari)

1. Kompyuter gemodinamikasi (CFD)

CFD texnologiyalari qon oqimini matematik modellashtirish imkonini beradi.

2026-yil tadqiqotlari shuni ko‘rsatadiki:

- multimodal tasvirlash + CFD yuqori aniqlik beradi
- aorta patologiyalarini invaziv bo‘lmagan holda aniqlash mumkin

2. Sun’iy intellekt va PINN modellari

Fizika asoslangan neyron tarmoqlar (PINN):

real vaqt rejimida gemodinamikani hisoblash

individual prognozlash imkonini beradi

3. Raqamli egizak (Digital Twin) texnologiyasi

2026-yilda eng muhim yangiliklardan biri — **raqamli egizak tizimlari**:

inson qon aylanish tizimining virtual modeli

real vaqt monitoring va prognozlash

davolashni shaxsiylashtirish imkoniyati

4. Mashinaviy o‘rganish asosidagi modellar

Yangi tadqiqotlarda:

finite element modellari + AI

vaqt bo‘yicha o‘zgaruvchi gemodinamika aniqlanmoqda

5. Eksperimental biofizik tadqiqotlar

2026-yilda:

qon tarkibidagi o‘zgarishlar gemodinamikani sezilarli o‘zgartirishi ko‘rsatildi

masalan, polisitemiya holatida qon yopishqoqligi oshadi

Muammoning yechimi

Gemodinamik muammolarni hal qilish uchun quyidagi biofizik yondashuvlar taklif etiladi:

1. **Multimodal diagnostika**

MRI + CFD + AI integratsiyasi

2. **Shaxsiylashtirilgan model yaratish**

   bemor-specific gemodinamik simulyatsiya

3. **Sun’iy intellekt asosida prognoz**

   kasallik rivojlanishini oldindan aniqlash

4. **Real vaqt monitoring**

   biosensorlar va implantlar

2026-yil yangiliklari

Quyidagi ilmiy yangiliklar muhim hisoblanadi:

gemodinamik kuchlar biomarker sifatida qo‘llanilmoqda

real vaqtli monitoring uchun aqlli implantlar ishlab chiqildi

raqamli egizak texnologiyasi klinik amaliyotga kirib kelmoqda

qonning non-Nyuton modeli yanada takomillashtirildi

Xulosa

Gemodinamika biofizikaning muhim yo‘nalishi bo‘lib, qon oqimining fizik va matematik qonuniyatlarini o‘rganadi. 2026-yil tadqiqotlari ushbu sohada katta yutuqlarni ko‘rsatdi. Ayniqsa, kompyuter modellashtirish, sun’iy intellekt va raqamli egizak texnologiyalari gemodinamik tahlilni yangi bosqichga olib chiqdi.

Kelajakda ushbu yondashuvlar yurak-qon tomir kasalliklarini erta aniqlash va samarali davolashda muhim rol o‘ynaydi.

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KOMPOZIT MATERIALLAR: TUZILISHI, TURLARI VA MEXANIK XOSSALARI

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Annotasiya: Ushbu maqolada kompozit materiallarning tuzilishi, asosiy turlari va mexanik xossalari tahlil qilinadi. Uglerod tolali va shisha tolali kompozitlarning aviasiya, avtomobilsozlik hamda qurilish sanoatidagi amaliy qo‘llanilishi ko‘rib chiqiladi. Kompozit materiallarni ishlab chiqarish texnologiyalari, shu jumladan, avtoklavli qoliplash, infuzion usul va filament o‘rash jarayonlari tavsiflanadi. Bundan tashqari, engil va mustahkam konstruksiyalar yaratishda kompozitlardan foydalanishning iqtisodiy va muhandislik afzalliklari yoritiladi.

Kalit so‘zlar: kompozit material, uglerod tola, shisha tola, polimer matrisa, engil konstruksiyalar, mexanik xossalar, aviasiya, avtomobilsozlik.

Kirish: Zamonaviy muhandislik va texnologiya rivojlanishining asosiy yo‘nalishlaridan biri yangi avlod materiallarini yaratish va ulardan samarali foydalanishdir. Kompozit materiallar bu sohadagi eng muhim yutuqlardan biri bo‘lib, ular an‘anaviy metallar va polimerla rga nisbatan bir qator muhim afzalliklarga ega.

Kompozit material deganda ikki yoki undan ortiq turli xil kimyoviy tarkib va fizik xossalarga ega bo‘lgan komponentlardan tashkil topgan, ma‘lum bir chegara yuzasida ajralib turadigan va individual komponentlarning xossalaridan sifat jihatidan farq qiladigan geterogen tizim tushuniladi.[1]



1-rasm. Kompozitsion materallar

Kompozitlarning asosiy maqsadi — alohida komponentlarning kamchiliklarini bartaraf etib, ularning afzalliklarini birlashtirish orqali superior (ustunlashgan) xossalarga ega yangi material yaratishdir. (1-rasm)

Kompozit materiallarning ishlatilishi qadimgi davrlardan ma‘lum: miloddan avvalgi davrlarda paxsa devorlar qurishda somon va loydan foydalanilgan, bu aslida birinchi sun‘iy kompozit hisoblanadi. Biroq zamonaviy kompozit materiallar sanoati XX asrning o‘rtalarida, ayniqsa, aviasiya va mudofaa sanoatining talablari natijasida jadal rivojlandi.

Dolzarbligi: Global energiya tejamkorlik talablari ortib borayotgan sharoitda engil va mustahkam konstruksiyalar yaratish muammosi alohida ahamiyat kasb etmoqda. Kompozit materiallar ushbu muammoni hal etishda asosiy vosita bo‘lib xizmat qilmoqda — ulardan foydalanish transport vositalarida yoqilg‘i sarfini 15–30% ga kamaytirish imkonini beradi.[5]

Materiallar va uslublar: Har qanday kompozit material ikki asosiy komponentdan iborat: matrisa (bog‘lovchi) va armatura (mustahkamlovchi). Matrisa armatura komponentlarini birlashtiradi, ular o‘rtasida kuch uzatishni ta‘minlaydi va tashqi muhitdan himoya qiladi. Armatura esa konstruksiyaning asosiy mexanik yukini o‘z zimmasiga oladi.

Matrisa turlari:

1. Polimer matrisalar — eng keng tarqalgan turi bo‘lib, epoksid, poliyester va vinilefir qatronlari asosida tayyorlanadi;

2. Metal matrisalar — alyuminiy, titan va magniy asosida;

3. Keramik matrisalar — yuqori haroratlarga chidamli konstruksiyalar uchun.

Armatura turlari:

1. Tolali armaturalar — uglerod, shisha, aramid va bor tolalari;

2. Zarrachali armaturalar — karbid, nitrid va oksid zarrachalari;

3. Qavat ko‘rinishidagi armaturalar — doimiy tolalar to‘qimasi.

Uglerod tolali kompozitlar (Carbon Fiber Reinforced Polymers — CFRP) zamonaviy muhandislikning eng noyob materiallaridan biri hisoblanadi. Ushbu materiallar uglerod atomlarining grafitsimon tuzilishi asosida shakllanadi va o‘zining noyob xossalari bilan ajralib turadi. CFRP ning asosiy xarakteristikalari: zichligi 1,55–1,60 g/sm³ (po‘latning 1/5 qismi), tortish mustahkamligi 1500–3000 MPa (yuqori modulli navlari uchun 3500 MPa gacha), elastiklik moduli 70–200 GPa, issiqlik kengayishi koeffitsienti juda past (ba‘zi yo‘nalishlarda nolga yaqin). Bu xossalar CFRP ni havo va kosmonavtika sanoati uchun ideal material qiladi.

Shisha tolali kompozitlar (Glass Fiber Reinforced Polymers — GFRP) nisbatan arzonligi va ishlab chiqarish texnologiyasining soddaligi bilan ajralib turadi. GFRP ning zichligi 1,80–2,00 g/sm³, tortish mustahkamligi 700–1200 MPa ni tashkil etadi. Ushbu materiallar qurilish, dengiz kemachiligi, sport inventarlari va elektrotexnikada keng qo‘llaniladi. Aramid (Kevlar) tolali kompozitlar o‘zining yuqori zarba energiyasini yutish qobiliyati bilan ajralib turadi. Zichligi 1,40–1,45 g/sm³ bo‘lgan ushbu materiallar balistik himoya, kosmik apparat qobig‘i va harbiy texnikada qo‘llaniladi. Aramid tolalar cho‘zilishga juda chidamli (mustahkamligi 2800–3600 MPa), ammo siqilishga nisbatan zaifligi — ularning asosiy kamchiligi.

Mexanik xossalarning qiyosiy tahlili: Quyidagi jadvalda asosiy kompozit materiallar va an‘anaviy konstruksion material — alyuminiyning mexanik xossalari qiyosiy tarzda keltirilgan (1-jadval).

1-jadval.

Kompozit materiallar va alyuminiyning mexanik xossalari taqqoslanmasi.

Xususiyat	CFRP	GFRP	Alyuminiy
Zichlik (g/cm³)	1.55–1.60	1.80–2.00	2.70

Mustahkamlik (MPa)	1500–3000	700–1200	310–500
Elastiklik moduli (GPa)	70–200	20–55	70
Korroziyaga chidamliligi	Yuqori	Yuqori	O'rtacha
Narxi (nisbiy)	Yuqori	O'rtacha	Past

Jadvaldan ko‘rinib turibdiki, CFRP alyuminiyga nisbatan zichligi bo‘yicha taxminan 1,7 marta yengil bo‘lishiga qaramay, mustahkamlik bo‘yicha 4–6 marta ustunligi mavjud. Bu nisbat — solishtirma mustahkamlik (mustahkamlik/zichlik) — kompozitlarning muhandislik materiallar sifatidagi asosiy afzalligini belgilaydi.

Avtoklavli qoliplash — havo va kosmonavtikada ishlatiladigan yuqori sifatli CFRP qismlarni ishlab chiqarishning asosiy usuli. Jarayon bosqichlari: prepreglarni (tolalar oldindan qatron bilan singdirilgan yarim fabrikat) qolipga qo‘llash, vakuumlash, 120–180°C harorat va 5–7 bar bosimda kuring. Bu usul g‘ovaklilik darajasi 1–2% dan past bo‘lgan, yuqori mexanik xossalarga ega qismlar ishlab chiqarish imkonini beradi.

Vakuum infuzion (VARTM — Vacuum Assisted Resin Transfer Molding) usulida quruq tola armaturasi qolipga joylashtiriladi va vakuum ostida suyuq qatron o‘tkaziladi. Avtoklavli usulga nisbatan arzonroq bo‘lgan bu texnologiya yirik konstruksiyalar (qayiq gavdalari, shamol turbinalari qanotlari) uchun keng qo‘llaniladi. Filament o‘rash (filament winding) usulida qatron bilan singdirilgan uzluksiz tolalar aylanadigan mandrelga ma‘lum burchak ostida o‘raladi. Bu usul trubalar, silindrik idishlar va raketaning qattiq yonilg‘i kameralari ishlab chiqarishda muvaffaqiyatli qo‘llaniladi. Zamonaviy raqamli boshqaruvli o‘rash mashinalari murakkab geometrik shakllarni ham ishlab chiqarish imkonini beradi.

Sanoatda qo‘llanilishi: Aviasiyada kompozit materiallarning qo‘llanilishi so‘nggi o‘n yilliklarda keskin oshdi. (Boeing 787 Dreamliner) samolyotining konstruksion massasining 50% dan ortig‘i kompozit materiallardan iborat bo‘lib, bu an‘anaviy alyuminiy konstruksiyaga nisbatan 20% gacha yoqilg‘i tejash imkonini beradi.[3] Airbus A350 XWB da bu ko‘rsatkich 53% ni tashkil etadi.

Kompozitlar qo‘llanilgan asosiy elementlar: qanot qoplamalari, fyuzelyaj panelidari, orqa stabilizator, nasos va dvigatel qoplamalari. Kosmik soha uchun ham kompozitlar muhim — SpaceX Falcon raketasi va Dragon kosmik kemasi komponentlarida CFRP keng ishlatiladi.

Avtomobil sanoatida kompozitlardan foydalanish ikki yo‘nalishda rivojlanmoqda: sport avtomobillari uchun yuqori texnologiyali CFRP yechimlar va ommaviy ishlab chiqarish uchun arzonroq alternativalar. Formula 1 avtomobillari tanasi to‘liq CFRP dan tayyorlanadi, bu haydovchi xavfsizligini ta‘minlovchi yuqori energiya yutuvchi konstruksiyani ta‘minlaydi. BMW i3 va i8 modellarida "Life" moduli (yo‘lovchi saloni) to‘liq CFRP dan tayyorlangan. Audi, Mercedes va Lamborghini kabi kompaniyalar ham o‘z modellari uchun kompozit elementlarni kengaytirmoqda. Elektr transport vositalari uchun esa engil konstruksiyalar batareya quvvatini tejash nuqtai nazaridan alohida ahamiyatga ega. Qurilishda kompozitlar ko‘priklar, binolar va infratuzilma inshootlarini mustahkamlashda qo‘llaniladi. CFRP tasmaları bilan mustahkamlash (CFRP retrofitting) eskirgan beton konstruksiyalarning ko‘taruvchanligini 40–60% ga oshirishga imkon beradi. Kompozit armaturalar (FRP rebars) dengiz muhiti va agresiv kimyoviy muhitlarda metall armatypaning o‘rnini muvaffaqiyatli egallaydi.

Natija va ularning tahlili: Muammolar:Kompozit materiallarning keng tarqalishiga bir qator to‘siqlar mavjud. Birinchi muammo — narxi: CFRP ishlab chiqarish jarayoni murakkab va qimmat bo‘lib, 1 kg material narxi alyuminiynikidan 10–50 marta yuqori. Ikkinchi muammo — ta‘mirlash qiyinligi: metaldan farqli o‘laroq, zarbadan shikastlangan kompozit qismni qayta tiklash maxsus ko‘nikma va uskunalarni talab qiladi.

Uchinchi muhim muammo — anizotropiya, ya‘ni xossalarning yo‘nalishga bog‘liqligi: kompozitlar turli yo‘nalishlarda har xil mexanik xossalarga ega, bu konstruksiyalarni loyihalashni murakkablashtiradi. To‘rtinchi muammo — kompozit qoldiqlari (chiqindilari) qayta ishlashning qiyinligi — atrof-muhit nuqtai nazaridan hal qilishni talab etadi.

Yechimlar: Narxini kamaytirish yo‘llari - Ishlab chiqarish jarayonlarini avtomatlashtirish (robotli qo‘llash tizimlar), yangi turdagi arzon prekursorlardan foydalanish (poliakrilnitril o‘rniga lignin asosidagi PAN prekursorlari), shuningdek, talabni ko‘payishi natijasida miqyos iqtisodiyotining ta‘siri narxni keyingi yillarda sezilarli kamaytirish imkonini beradi.[2]

Ta‘mirlash muammosining yechimi - "O‘z-o‘zini davolash" (self-healing) kompozitlar — mikrokapsulalangan davolash agentlarini o‘z ichiga olgan polimer matrisalar — bu muammoni hal etish yo‘lida istiqbolli yo‘nalish. Shuningdek, qalinlik bo‘yicha ultratovush tekshiruvi (UT) va termal kamera yordamidagi diagnostika usullari shikastlanishlarni erta aniqlash imkonini beradi.

Anizotropiya muammosining yechimi - Kvazi-izotrop qatlamlanma tartib (0°/45°/–45°/90°) ning qo‘llanilishi konstruksiyani barcha yo‘nalishlarda yetarli mustahkamlikni ta‘minlaydi. Zamonaviy kompozit mexanikasining kompyuter modellashtirish (FEA) vositalari esa murakkab yuk holatlarini oldindan aniq hisoblash imkonini beradi.

Qayta ishlash muammosining yechimi - Termoplastik matrisa asosidagi kompozitlar (PEEK, PPS) termoplast xossasi tufayli qayta qizdirib shakllantirish imkoniga ega. Solvoliz (kimyoviy parchalash) va piroliz usullari orqali CFRP dan uglerod tolalarni qayta tiklash tadqiqotlari istiqbolli natijalar ko‘rsatmoqda.

Xulosa: Kompozit materiallar zamonaviy muhandislikning ajralmas qismiga aylandi. Ularning yuqori solishtirma mustahkamligi, korroziyaga chidamliligi va loyihalash moslashuvchanligi ko‘pgina an‘anaviy materiallarga nisbatan ustunligini ta‘minlaydi. Ayniqsa, aviasiya va avtomobilsozlikda energiya tejamkorligini ta‘minlashda kompozitlarning roli beqiyosdir.

Biroq hali hamon hal etilmagan muammolar ham mavjud — narxi, ta‘mirlash qiyinligi va qayta ishlash masalalari. Ushbu muammolarni hal etish bo‘yicha olib borilayotgan tadqiqotlar va texnologik innovatsiyalar, jumladan, o‘z-o‘zini davolash kompozitlar, arzon prekursorlar va termoplastik matrisalar — kompozit materiallarning qo‘llanilish sohasini kengaytiradi. Keyingi o‘n yilliklarda, ayniqsa, elektromobil va tiklanuvchi energiya sohalarining rivojlanishi bilan kompozit materiallar yanada keng qo‘llanilishini kutish mumkin. O‘zbekiston sharoitida ham ushbu materiallarga bo‘lgan talab ortib bormoqda — xususan, aviasiya ta‘miri, qurilish va iste‘mol mahsulotlari sektorlarida.

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YUQORI HARORATGA CHIDAMLI MATERIALLAR: SUPERQOTISHMALAR TARKIBI, XOSSALARI VA GAZ TURBINALARIDA QO‘LLANILISHI

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Annotasiya:Ushbu maqolada yuqori haroratga chidamli materiallar - xususan nikel va kobalt asosidagi superqotishmalar - tarkibi, mexanik xossalari va termik barqarorligi nuqtai nazaridan qiyosiy tahlil qilinadi. Gaz turbinalarida qo‘llaniladigan qotishmalarning ishlash chegaralari, qoplama texnologiyalari va kristallografik tuzilishning yuksak ishlash haroratlaridagi o‘rni ko‘rib chiqiladi. Maqola zamonaviy energetika va aviatsiya sanoatida ushbu materiallarning dolzarbligi, shuningdek termik barqarorlikni oshirishning istiqbolli yo‘nalishlarini yoritadi.

Kalit so‘zlar: superqotishmalar, yuqori harorat, termik barqarorlik, gaz turbinasi, nikel asosidagi qotishmalar, kobalt asosidagi qotishmalar, issiqlikka chidamli materiallar.

Kirish: Zamonaviy energetika, aviatsiya va kosmik sanoatning jadal rivojlanishi yuqori haroratga chidamli materiallarga bo‘lgan talabni keskin oshirib yubordi. Gaz turbina dvigatellarida ishchi temperatura 1400-1600°C gacha yetishi, natijada konstruktiv materiallar nafaqat yuqori mexanik zo‘riqishlarga, balki intensiv oksidlanish, korroziya va termik charchoqqa ham dosh berishga majbur bo‘ladi.

Yuqori haroratga chidamli materiallar - superqotishmalar (superalloys) deb nom olgan ushbu material sinfi - XX asrning o‘rtalarida harbiy aviatsiya ehtiyojlari uchun ishlab chiqila boshlangan. Bugungi kunda ular nafaqat samolyot dvigatellarida, balki sanoat gaz turbinalarida, yadro reaktorlarida va kimyoviy reaktorlarda ham keng qo‘llaniladi.

Dunyo bozorida superqotishmalar segmenti yiliga 10 milliard dollardan ortiq hajmni tashkil etadi va bu ko‘rsatkich doimiy o‘sish tendensiyasini saqlaymoqda.

Ushbu maqolaning maqsadi nikel asosidagi va kobalt asosidagi superqotishmalarni qiyosiy tahlil qilish, ularning tarkibiy-xossa munosabatlarini ochib berish va gaz turbinalarida samarali qo‘llash yo‘llarini ko‘rib chiqishdan iborat.

Yuqori haroratga chidamli metal materiallari uch asosiy guruhga bo‘linadi: nikel asosidagi superqotishmalar, kobalt asosidagi superqotishmalar va temir-nikel asosidagi superqotishmalar. Ushbu tasnif nafaqat kimyoviy tarkib, balki mikrotuzilish va qo‘llanilish sohasi bilan ham bog‘liq.

Nikel asosidagi superqotishmalar (Ni-based superalloys) zamonaviy aviatsiya va energetika sanoatida eng keng tarqalgan yuqori haroratli materiallar hisoblanadi. Ularning asosiy qotishma elementlari quyidagilar:

- Xrom (Cr, 10-20%): oksidlanishga va issiq korroziyaga chidamlilikni ta‘minlaydi
- Alyuminiy (Al, 1-6%) va Titan (Ti, 1-5%): gamma-shtrix (γ’) fazasini shakllantiradi
- Volfram (W), Molibden (Mo), Rheniy (Re): qattiq eritmani mustahkamlaydi
- Kobalt (Co, 5-15%): yuqori haroratdagi mustahkamlikni oshiradi

Nikel asosidagi superqotishmalarning asosiy mustahkamlovchi mexanizmi kogerent gamma-shtrix (γ’ - Ni_3Al) fazasining gamma (γ) matritsaga cho‘kmasi hisoblanadi. Bu nanostrukturli dispersion mustahkamlash 1100-1150°C gacha bo‘lgan haroratlarda yuqori mexanik xossalarni ta‘minlaydi. Mashhur vakillar: IN-738, CMSX-4, Rene N5, MAR-M247.

Superqotishmalarning oziga xosligi tekshiruv ikki fazali mikrostrukturasidadir:

1.γ

2. (γ’-**faza (Ni3(Al,Ti))**

Muammoli holat: Harorat 1000°C dan oshganda,(γ’) Kobalt asosidagi superqotishmalar: Kobalt asosidagi superqotishmalar nikel qotishmalariga nisbatan past mustahkamlikka ega bo‘lsa-da, bir qator muhim afzalliklarga ega: yuqori erish nuqtasi (1490-1500°C), issiq korroziyaga va oksidlanishga yuqori chidamlilik, hamda termal charchoqqa yaxshi qarshilik. Asosiy qotishma elementlari: Cr (20-30%), W (5-15%), Ni (10-20%), C (0.1-0.6%). Karbon karbidlar (M_6C va $M_{23}C_6$)

hosil qilib, don chegaralarini mustahkamlaydi. Mashhur vakillari: Haynes 188, FSX-414, Mar-M509.

Materiallar va uslublar. Quyidagi jadvalda ikki asosiy superqotishma turining asosiy xossalari taqqoslanadi(1-jadval).

1-Jadval

Superqotishmalarning asosiy xossalari taqqoslash jadvali

Xossa	**Ni-asosidagi**	**Co-asosidagi**	**Fe-Ni asosidagi**
Erish nuqtasi (°C)	1300 - 1400	1490 - 1500	1370 - 1430
Max. ish harorati (°C)	1150 - 1200	1000 - 1100	800 - 900
Zichlik (g/cm³)	8.0 - 9.0	8.5 - 9.5	7.9 - 8.4
Mustahkamlash mexanizmi	γ’ dispersion	Karbid + qattiq eritma	γ’ + γ″ dispersion
Oksidlanishga chidamlilik	A'lo (Al_2O_3 qatlam)	Yaxshi (Cr_2O_3)	O'rtacha
Soha	Turbina qanoti, disk	Yonish kamerasi	Turbina disk

Gaz turbinasi dvigateli zamonaviy sanoatning eng murakkab va eng yuqori haroratli tizimlaridan biridir. Turbina qanoti (blade) harorat 1500-1600°C gacha yetadigan yonish mahsulotlari bilan to‘g‘ridan-to‘g‘ri aloqa qiladi - bu nikel asosidagi qotishmalarning erish nuqtasidan ham yuqori temperatura.

Turbina qanotlari: Turbina qanotlari gaz turbinadagi eng muhim va eng yuqori yuklamali element hisoblanadi. Ular bir vaqtda quyidagi ta‘sirlarga dosh berishi kerak: 1500°C dan ortiq gaz harorati; markazdan qochma kuch natijasida 150-200 MPa tortilish kuchlari; termik charchoq (isitish/sovitish sikllari); oksidlanish va korroziya.

Ushbu talablarga javob berish uchun zamonaviy turbina qanotlarida bir nechta texnologik yondashuv birgalikda qo‘llaniladi. Birinchidan, yo‘naltirilgan

kristallizatsiya va bitta kristall texnologiyalari qo‘llaniladi. DS qanotlarda don chegaralari yuklamaga parallel yo‘naltiriladi, bu esa oquvchanlik xarakteristikalarini 30-40% yaxshilaydi. SC qanotlarda esa don chegaralari butunlay yo‘q qilinadi - natijada yuqori haroratda mustahkamlik maksimal darajaga yetadi. CMSX-4 va Rene N5 kabi ikkinchi avlod SC qotishmalariga (Re, 3%) qo‘shish oquvchanlikni yana 2 baravar uzaytirdi.

Ikkinchidan, plyonkali sovitish texnologiyasi qo'llaniladi. Qanotlar ichida mikrokanallar orqali siqilgan havo siqdirilib, metallning haqiqiy harorati 200-300°C gacha pasaytiriladi. Bugungi kunda qanotga kiradigan havo massasining 20-30% sovitishga sarflanadi.

Termik to‘siq qoplamalar (TBC) turbina qanotlari uchun muhim texnologiya bo‘lib, metallning ish haroratini 100-200°C pasaytiradi yoki dvigateldagi ish haroratini oshirish imkonini beradi. Standart TBC tizimi ikki qatlamdan iborat: bog‘lovchi qoplamasi (Bond Coat) va keramik qoplamasi (Ceramic Top Coat). Bog‘lovchi qoplamasi MCrAlY (M=Ni, Co yoki ularning aralashmasi) qotishmasidan iborat bo‘lib, 50-150 mkm qalinlikda, 950°C gacha oksidlanish muhitida mustahkam Al_2O_3 qatlamini hosil qiladi.

Kimyoviy tarkibni optimallashtirish: Termik barqarorlikni oshirishning eng asosiy yo‘li qotishma tarkibini maqbullashtirish hisoblanadi. Rheniy (Re) qo‘shish yuqori harorat oquvchanlik xarakteristikasini sezilarli yaxshilaydi - u γ/γ’ chegara energiyasini oshiradi va diffuziya tezligini kamaytiradi. Rutheniy (Ru) to‘rtinchi avlod SC qotishmalarida topologik yopiq faza (TCP - Topologically Close-Packed Phase) hosil bo'lishini kamaytiradi. Hafniy (Hf) don chegaralarini mustahkamlaydi va oksid qatlamining yopishqoqligini oshiradi. Bor (B) va Sirkoniy (Zr) miqdori 0.01-0.1% don chegaralari mustahkamligini yaxshilaydi.

Mikrotuzilishni boshqarish-Gamma-shtrix (γ’) zarrachalarining o‘lchami va shakli yuqori harorat xossalariga bevosita ta‘sir ko‘rsatadi. Optimal γ’ zarracha o‘lchami 0.3-0.5 mkm bo‘lib, kubik shakl eng yuqori chidamlilikni ta‘minlaydi. Issiqlik qayta ishlash rejimi (solution treatment va aging) γ’ zarrachalarini maqbul holga keltirish uchun aniq nazorat qilinishi lozim. Yaxlitlanish (rafting) deb atalgan hodisa - γ’ zarrachalarining yuqori harorat va kuchlanish ta‘sirida uzayib ketishi - oquvchanlik xarakteristikasini yomonlashtiradi.

Natija va ularning tahlili: Yuqori entropiyali qotishmalar (High Entropy Alloys - HEA) so‘nggi yillarda intensiv tadqiqot ob‘ektiga aylandi. Besh va undan ortiq asosiy elementdan iborat MoNbTaWCr kabi qotishmalar 1300°C gacha yuqori mustahkamlikni saqlab qoladi. Shlam metallurgiyasi (Ceramic Matrix Composites - CMC): SiC tolasi bilan mustahkamlangan SiC matritsa 2400°C gacha ishlash qobiliyatiga ega va metalldan 4 baravar engil. Havo portlovchi Boeing 787 va GE9X dvigatellari allaqachon CMC turbina qismlarini qo‘llayapti.

Aditivli ishlab chiqarish (3D printing) texnologiyasi murakkab sovitish kanallarini to‘g‘ridan-to‘g‘ri quyish imkonini beradi. Selektiv lazer eritish (SLM) orqali tayyorlangan IN718 qanotlari an‘anaviy yo‘l bilan tayyorlanganlardan past bo‘lmaganligi isbotlangan.

Xulosa: O‘tkazilgan qiyosiy tahlil asosida quyidagi xulosalar chiqarish mumkin:

- Nikel asosidagi superqotishmalar, xususan birinchi-to‘rtinchi avlod bitta kristall qotishmalar, hozirgi vaqtda turbina qanotlari uchun optimal materiallar hisoblanadi. Ularda γ’ fazasi dispersiyasi, sovitish texnologiyasi va TBC yoritadi kompleksida qo‘llanilishi harorat-kuchlanish imkoniyatlarini maksimal darajada ro‘yobga chiqaradi.

- Kobalt asosidagi superqotishmalar issiq korroziyaga yuqori chidamliligi tufayli yonish kamerasi, soplolar va statsionar gaz turbinalarining bir qator komponentlari uchun mos keladi. Ularning past hajmiy mustahkamligi muammosini karbidlarni optimallashtirish orqali qisman hal etish mumkin.

- Istiqbolda keramik-matritsa kompozitlar (CMC) va yuqori entropiyali qotishmalar (HEA) aviatsiya va energetika dvigatellarining keyingi avlodlarida superqotishmalar o‘rnini bosishi kutilmoqda. Bu o‘tish harorat chegarasini 200-400°C ga oshirish va dvigatell FIK ni sezilarli yaxshilash imkonini beradi.

- Aditivli ishlab chiqarish va kompyuter modellashtirishning rivoji yangi material tarkiblarini ishlab chiqish siklini qisqartiradi va an‘anaviy usullar bilan tayyorlab bo‘lmaydigan murakkab geometrik shakllarni hosil qilish imkonini beradi.

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EKOLOGIK TOZA MATERIALLAR: "GREEN MATERIALS" KONSEPSIYASI VA QAYTA ISHLASH TEXNOLOGIYALARI

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Annotasiya: Ushbu maqolada ekologik xavfsiz materiallar — "green materials" — ning ilmiy asoslari, tasnifi va hayot sikli tahlili ko‘rib chiqiladi. Biogen (bio-asosli) va qayta ishlangan materiallarning xususiyatlari, ularni ishlab chiqarish va utilizasiya texnologiyalari tahlil qilinadi. Bambuk, kanop tolasi, myitselyum va bioplastiklarning sanoatdagi qo‘llanilishi ko‘rsatiladi. Qayta ishlash sanoatining zamonaviy holati, texnologik muammolar va ularni hal etishning ilmiy-amaliy yo‘llari yoritiladi. Maqola natijalaridan (materials science), atrof-muhit muhandisligi va barqaror rivojlanish siyosatini ishlab chiqishda foydalanish mumkin.

Kalit so‘zlar: ekologik toza materiallar, green materials, qayta ishlash, bioplastik, hayot sikli tahlili, barqaror rivojlanish, karbon izi, doiraviy iqtisodiyot.

Kirish: XXI asrda global iqtisodiyotning chiziqli modeli — "qazib ol, ishla, tashla" (take-make-dispose) — atrof-muhitga ko‘rsatayotgan ta‘siri barqaror rivojlanish maqsadlariga zid kelishi yaqqol namoyon bo‘lmoqda. Sanoat inqilobi boshlanganidan beri atmosferadagi CO_2 miqdori taxminan 280 ppm dan 420 ppm dan oshib ketdi — bu so‘nggi 800 000 yil ichidagi eng yuqori ko‘rsatkich.[7]

Materiallar ishlab chiqarish va utilizasiyasi bu muammoning markazida turadi: global chiqindilarning 45% materiallar siklidan kelib chiqadi.[4] Shu sababli alternativ material konsepsiyalari, xususan, "green materials" va doiraviy iqtisodiyot (circular economy) g‘oyalari tadqiqotchilar va sanoatchilar diqqatini tobora ko‘proq jalb etmoqda.

Dolzarbligi: O‘zbekiston 2030-yilga qadar "yashil iqtisodiyot"ga o‘tish strategiyasini qabul qilgan. Ushbu kontekstda ekologik toza materiallarni ishlab chiqarish va ularni qayta ishlash texnologiyalarini rivojlantirish milliy innovasiya siyosatining ustuvor yo‘nalishiga aylanmoqda (O‘zbekiston Respublikasi Prezidentining 2019-yil 4-oktabrdagi PF-5863-son Farmoni).

Asosiy qisim:"Green materials" (yashil materiallar) tushunchasi birinchi marta 1990-yillarda barqaror rivojlanish diskursi doirasida shakllandi.[1] ta‘rifiga ko‘ra, ekologik toza material deganda hayot siklining (qazib olish → ishlab chiqarish → foydalanish → utilizasiya) barcha bosqichlarida atrof-muhitga minimal salbiy ta‘sir ko‘rsatadigan material tushuniladi.

Tasnif (Ashby, 2013 va UNEP, 2021 asosida):[1]

(1) Bio-asosli (biogenic) materiallar — tirik organizmlardan olingan: bambuk, kanop, zotli kenaf, myitselyum, nishasta asosidagi bioplastiklar.

(2) Qayta ishlangan materiallar — ikkilamchi xomashyodan: qayta ishlangan alyuminiy, qayta ishlangan shisha va qog‘oz.

(3) Uzoq umrli va qayta ishlatiluvchi materiallar — ishlash davri uzaytirilgan: betonning karbonatlanishi bilan mustahkamlangan navi, uzoq umrli po‘lat konstruksiyalar.

(4) Inert va xavfsiz materiallar — parchalanib zararli moddalar ajratmaydigan: shisha, keramika, tabiiy tosh.

Materialning ekologik tozaligini baholashning eng ishonchli ilmiy usuli hayot sikli tahlili (LCA) hisoblanadi. “ISO 14040 va 14044” standartlariga muvofiq, LCA to‘rtta bosqichni qamrab oladi: maqsad va doirani belgilash, inventarizasiya tahlili (material va energiya oqimlari), ta‘sir baholash va talqin qilish.

LCA natijalari ko‘pincha kutilmagan xuloslarga olib keladi. Masalan, organik paxta an‘anaviy paxtaga nisbatan suv sarfi nuqtai nazaridan uncha farq qilmasa-da, pestitsid yukini 91% ga kamaytiradi. Bambuk esa tez o‘sishi va regenerasiya qobiliyati tufayli karbon izi bo‘yicha ko‘plab plastmassalarga nisbatan sezilarli ustunlikka ega.

Ellen MacArthur Foundation tomonidan sistemalashtirilgan doiraviy iqtisodiyot (circular economy) kontseptsiyasi materiallarning qiymatini chiqindi hosil qilmasdan saqlab qolishni nazarda tutadi. Bunda materiallar ikki alohida siklda aylanadi: biologik

sikl (kompostlash, bijg‘ish) va texnik sikl (ta‘mirlash, qayta foydalanish, qayta ishlash).[3]

Doiraviy yondashuv kontekstida material tanlash qarorlari muhim strategik ahamiyat kasb etadi. Materialni qayta ishlash imkoniyati (recyclability), biologik parchalanuvchanligi (biodegradability) va ta‘mirlash qulayligi (repairability) — bu uchta mezon zamonaviy material muhandisligida birinchi darajali mezonlarga aylandi. Asosiy ekologik materiallar tavsifi: Bambuk dunyodagi eng tez o‘suvchi o‘simlik bo‘lib, ba‘zi turlari kuniga 91 sm gacha o‘sadi. Poaceae (g‘alla) oilasiga mansub ushbu o‘simlik karbon yuqumini aktiv tutib oladi: 1 gektar bambuk plantasiyasi yiliga 17 tonna gacha CO_2 ni yutadi — bu o‘rmon uchun o‘rtacha ko‘rsatkichdan 35% yuqori.[8]

Mexanik xossalari: Bambuk tolasining solishtirma mustahkamligi (mustahkamlik/zichlik nisbati) po‘lat bilan raqobatlasha oladi. Zichligi atigi 0,6–0,9 g/sm³ bo‘lgan bambuk uchun tortish mustahkamligi 200–350 MPa ni tashkil etadi. Ushbu xossalar qayta ishlangan bambukning qurilish materiallari, pol qoplamalari, eshik va oynalar ramkasi, hatto velosiped ramkasi sifatida keng qo‘llanilishini ta‘minlaydi.

Texnik kanop (Cannabis sativa L., sanoat navi) tarixi minglab yillarga borib taqaladi, biroq XX asrning o‘rtalarida siyosiy sabablarga ko‘ra ko‘plab mamlakatlarda taqiqlanib, tadqiqotlar sekinlashdi. Keyingi o‘n yilliklarda reabilitasiya jarayoni boshlanib, kanopning ekologik afzalliklari qaytadan e‘tirof etilmoqda.

Kanop 1 gektar maydondan 2,5–3,5 tonna quruq biomassa beradi va bu jarayonda pestitsid ishlatilmaydi, chunki o‘simlik tabiiy ravishda hashoratlardan himoyalangan. Karbon izi nuqtai nazaridan kanop tola ishlab chiqarish jarayonida har kilogramm material uchun 1,5 kg dan ortiq CO_2 ni atmosferadan tortib oladi — salbiy karbon izi “negative carbon footprint” hosil qiladi.

Myitselyum (qo‘ziqorin mitselliyasi) - asosidagi materiallar “materials science” ning eng yangi va istiqbolli yo‘nalishlaridan biri. Ecovative Design kompaniyasi tomonidan - commercializasiya qilingan ushbu texnologiyada qishloq xo‘jaligi qoldiqlari (makkajo‘xori po‘stlog‘i, paxta chiqindilari) qo‘ziqorin mitselliyasi bilan birga o‘stiriladi. Natijada qattiq, engil va to‘liq kompostlanadigan material hosil bo‘ladi.

Myitselyum materiallarining zichligi 40–300 kg/m³, issiqlik o‘tkazuvchanligi 0,04–0,06 W/(m·K) — bu polistirol ko‘pikiga (EPS) yaqin ko‘rsatkich. Muhimi — EPS dan farqli o‘laroq, myitselyum material yerda 45 kunda to‘liq parchalanadi. IKEA, Dell va

Nike kabi kompaniyalar allaqachon ushbu materialni qadoqlash echimlari sifatida sinovdan o‘tkazmoqda.

Bioplastiklar ikki asosiy kategoriyaga bo‘linadi:

(1) bio-asosli, lekin biologik parchalanmaydigan (masalan, bio-PE, bio-PET — neft o'rniga kukundan olinadi, lekin xuddi oddiy plastik kabi parchalanmaydi);
(2) biologik parchalanuvchi — PLA (polilaktid), PHA (polihidroksialkanoat), PBAT va boshqalar.
PLA (Polilaktid): Makkajo‘xori nishastasidan fermentasiya yo‘li bilan ishlab chiqariladi. Karbon izi konvension PE ga nisbatan 55–75% pastroq, ammo sanoat kompostlash sharoitida (58–60°C) 3–6 oyda parchalanadi — oddiy tuproqda emas. Bu "kompostlanadi" da‘volarining ko‘pincha chalg‘ituvchi ekanligini ko‘rsatadi.

PHA (Polihidroksialkanoat): Bakteriyalar tomonidan sintez qilinadigan ushbu biopolimer dengiz muhitida ham parchalanishi bilan alohida e‘tiborga loyiq. Ishlab chiqarish tannarxi hali yuqori (5–10 $/kg vs PET uchun 1–2 $/kg), biroq biotexnologik jarayonlarni optimallashtirish bu farqni kamaytirib bormoqda.[4]

Grafikli materiallar: Quyidagi jadvalda asosiy ekologik materiallar va qiyoslash uchun konvensional plastik (polipropilen, PP) ning karbon izi, qayta ishlash imkoniyati va qo‘llanish sohalari keltirilgan (1-jadval).

1-jadval.

Ekologik materiallarning karbon izi va qayta ishlash ko'rsatkichlari [1]

Material	CO_2 izi (kg/kg)	Qayta ishlash	Asosiy qo'llanish
Bambuk	0.3–0.8	Ha (tabiiy)	Qurilish, mebel
Kanop tolasi (Hemp)	–1.5 (yutadi)	Ha	Tekstil, kompozit
PLA bioplastik	1.8–2.4	Qisman	Qadoqlash, tibbiyot
Qayta ishl. alyuminiy	0.7–1.2	Ha (%95)	Transport, qurilish

Myitselyum material	0.1–0.4	Ha (kompost)	Qadoqlash, izolyasiya
Qayta ishl. shisha	0.4–0.6	Ha	Qurilish, idishlar
Konvension plastik (PP)	1.9–3.5	Qisman	Qiyos uchun

Jadvaldan ko‘rinadiki, eng past karbon iziga ega materiallar myitselyum va tez o‘suvchi o‘simlik asosidagi materiallar hisoblanadi. Qayta ishlangan alyuminiy birlamchi ishlab chiqarishga nisbatan energiya sarfini 95% kamaytiradi — bu ko‘rsatkich barcha qayta ishlash jarayonlari ichida eng yuqori hisoblanadi.[6]

Mexanik qayta ishlash — eng keng tarqalgan usul bo‘lib, materialning kimyoviy tarkibini o‘zgartirmasdan qayta ishlashni nazarda tutadi. PET shishalar uchun jarayon quyidagicha: yig‘ish → saralash → maydalash → yuvish → eritish → granulasiya. Natijada rPET (qayta ishlangan PET) hosil bo‘lib, u yangi to‘qimalar, sport kiyimlari va hatto oziq-ovqat idishlari uchun ishlatiladi.

Mexanik qayta ishlashning asosiy cheklovi — har bir siklda material xossalarining biroz pasayishi (degradation). Polimer zanjirlari qisqaradi, materialdagi aralashmalar miqdori ortadi. Shu sababli ko‘pchilik polimerlarda "kaskad qayta ishlash" qo‘llaniladi: premium mahsulotdan asta-sekin past sifatli ilovalar tomon harakat.

Kimyoviy qayta ishlash (solvoliz, piroliz, gazifikasiya) material zanjirini monomer yoki xomashyo darajasiga qadar parchalaydi, bu esa nazariy jihatdan cheksiz qayta ishlash tsiklini ta‘minlaydi. PET uchun glikoliz jarayonida etilen glikol va BHET monomeriga to‘liq parchalanish mumkin, so‘ngra yangi virgin-sifatli PET sintezlanadi.

Industrial simbioz kontseptsiyasida bir korxona chiqindisi boshqa korxona uchun xomashyoga aylanadi. Daniyaning Kalundborg shahridagi industrial ekologiya parki bu g‘oyaning tarixiy namunasidir: elektrostansiya bug‘ini qog‘oz zavodi ishlatadi, gips qoldiqlarini qurilish materiali sifatida sotadi, fermentasiya zavodining organik chiqindilari esa mahalliy fermerlar uchun o‘g‘itga aylantiriladi.

"Urbantariflash" kontseptsiyasida esa shahar infratuzilmasi va qurilish materiallari — kelajakdagi xomashyo manbai sifatida ko‘riladi. Yevropa mamlakatlarida eski binolarni buzishdan olinadigan temir-beton konstruksiya elementlarini qayta ishlatish amaliyoti tobora kengayib bormoqda, bu qayta ishlashdan ham yuqori hierarhik ustuvorlikka ega.

Natijalar va ularning tahlili: Narx raqobatbardoshligi - Ekologik materiallar ko‘pchilik hollarda an‘anaviy materiallarga nisbatan qimmatroq. PHA bioplastik bozor narxi oddiy PET ga nisbatan 3–5 barobar yuqori. Neft mahsulotlari narxi past bo‘lgan sharoitda ekologik alternativlar iqtisodiy jihatdan raqobatlasha olmasligini UNEP (2021) hisobotlari ham tasdiqlaydi.

Texnologik yetuklik darajasi: Myitselyum va bioplastiklarning ko‘plab navlari hali kichik hajmda ishlab chiqarilmoqda (TRL — Technology Readiness Level 4–6). Sanoat miqyosida ishlab chiqarishga o‘tish uchun muhandislik muammolari, shu jumladan, jarayonlarni nazorat qilish va standartlashtirish, hali to‘liq yechilmagan.

Iste‘molchi xabardorligining pastligi: "Greenwashing" (yolg‘on ekologik da‘volar) hodisasi iste‘molchilarning haqiqiy ekologik toza materiallarga ishonchini kamaytiradi. "Biodegradable" yozuvi tushirilgan plastmassa mahsulotlarning 60% i aslida faqat sanoat kompostlash sharoitida parchalanishi buni tasdiqlaydi.[5]

Zararlangan ekin maydonlari muammosi: Biogen materiallar uchun xomashyo yetishtirishda ekin maydonlaridan foydalanish oziq-ovqat xavfsizligi bilan raqobatni keltirib chiqarishi mumkin. Shu sababli ikkinchi avlod biogen materiallar — oziq-ovqat zanjiri chiqindilari va lignosellyuloza asosidagi alternativlar — ustuvorlik kasb etmoqda.

Ilmiy-amaliy yechimlar: Narx muammosiga yechim — "true cost" hisobi - Neoklassik iqtisodiyot an‘anaviy materiallarning salbiy tashqi ta‘sirlarini (externalities) narxga kiritmaydi. "Karbon solig‘i" va "to‘liq narx" mexanizmlari joriy etilsa, ekologik materiallar allaqachon raqobatbardosh bo‘lishi modellashtirishlar ko‘rsatmoqda. EU Emissions Trading System (ETS) va tomonidan joriy etilayotgan karbon chegara mexanizmi (CBAM) bu yo‘nalishda muhim qadam hisoblanadi.

Texnologik yetuklikni oshirish: Sintetik biologiya va metabolik muhandislik PHA ishlab chiqarishda mikroorganizmlarning mahsuldorligini so‘nggi 10 yilda 300% ga oshirdi.

Greenwashingga qarshi: ISO 14021 (o'z-o'zini e‘lon qilish ekologik da‘volar) va ISO 14024 (uchinchi tomon sertifikasiya) standartlari ekologik da‘volarni tartibga soladi. Yevropa Ittifoqi 2024-yildan kuchga kiradigan Green Claims Directive qonuni bo‘yicha barcha ekologik da‘volar ilmiy LCA tahlili bilan asoslanishi shart bo‘ladi.

O‘zbekiston uchun ekologik toza materiallar masalasi bir necha jihatdan alohida dolzarblik kasb etadi. Birinchidan, paxta yetishtirishdan qoladigan somonlar (yiliga 3–4 million tonna) lignosellyuloza asosidagi bioplastiklar uchun arzon xomashyo manbai

bo‘la oladi. Ikkinchidan, tez rivojlanayotgan qurilish sektori qayta ishlangan materiallar bozoriga talab hosil qilmoqda. Kandahar va Farg‘ona vodiysi mintaqalarida arpabodiyon va kanop yetishtirish an‘anasi mavjud bo‘lib, bu o‘simlik tolalari asosidagi materiallar ishlab chiqarishni rivojlantirish uchun ijtimoiy-iqtisodiy zamin yaratadi. 2023-yilda qabul qilingan "Yashil iqtisodiyot" kontseptsiyasi doirasida ekologik materiallar ishlab chiqarishni qo‘llab-quvvatlash uchun soliq imtiyozlari va subsidiyalar tizimini joriy etish ushbu sohani rag‘batlantirish uchun zarur siyosat chorasi hisoblanadi.

Xulosa: Ekologik toza materiallar — bu nafaqat atrof-muhit muammosini hal etish vositasi, balki yangi sanoat imkoniyatlarini ochuvchi paradigmatik o‘zgarish. "Green materials" konsepsiyasi hayot sikli tahlili metodologiyasi asosida materiallarni tizimli baholashga imkon beradi va ko‘rinarli siyosat qarorlarini qabul qilish uchun ilmiy asos yaratadi. Bambuk, kanop tolasi, myitselyum materiallari va bioplastiklar o‘zining ishlash xossalari va ekologik ko‘rsatkichlari bo‘yicha konvensional materiallar bilan tobora muvaffaqiyatli raqobatlashmoqda. Qayta ishlash texnologiyalari — mexanik va kimyoviy yo‘llar — material qiymatini saqlab qolish va chiqindilarni kamaytirish uchun muhim muhandislik vositalaridir.

Asosiy muammolar — narx raqobatbardoshligi va texnologik yetuklik — ijtimoiy siyosat va ilmiy innovasiyalar kombinatsiyasi orqali yechilishi mumkin.

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METALLMATERIALSHUNOSLIKDA DIFFUZIYA JARAYONLARINING NAZARIY VA AMALIY TADQIQI: SEMENTASIYA VA NITRIDASIYA MISOLIDA

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Annotatsiya: Ushbu tadqiqot ishida metallar va qotishmalarda kechadigan diffuziya jarayonlarining fizik-kimyoviy mexanizmlari chuqur tahlil qilinadi. Diffuziya koeffitsiyentining kristall panjara nuqsonlariga va haroratga bog‘liqligi o‘rganilgan. Maqolada mashinasozlikning muhim bo‘g‘ini bo‘lgan kimyoviy-termik ishlov berish usullari — sementasiya va nitridasiyaning samaradorligini oshirish bo‘yicha yangi texnologik yechimlar taklif etilgan. Tadqiqot natijalari materiallarning yuzaki qattiqligi va korroziyaga chidamliligini oshirishda amaliy ahamiyatga ega.

Kalit so‘zlar: atomar diffuziya, vakansiya mexanizmi, FIK qonunlari, Arrenius bog‘liqligi, sementasiya, nitridasiya, qattiqlashtirish, mikrotuzilish.

Kirish: Zamonaviy texnika va texnologiyalar rivojlanishi bilan materiallarga qo‘yiladigan talablar keskin ortib bormoqda. Ayniqsa, ekstremal sharoitlarda (yuqori harorat, agressiv muhit, mexanik yuklanish) ishlovchi detallarning chidamliligini oshirish materialshunoslikning eng dolzarb muammolaridan biri bo‘lib qolmoqda. Metallarda kechadigan diffuziya jarayonlari bu muammoni hal qilishning kalitidir.

Diffuziya — bu modda zarralarining (atomlar, ionlar) konsentratsiya farqi yoki termik harakat natijasida o‘z-o‘zidan ko‘chishi hodisasidir. Metallarda diffuziya jarayoni nafaqat kimyoviy tarkibni tekislashda, balki yangi fazalarni shakllantirishda, donadorlik tuzilishini o‘zgartirishda va yuza qatlamini qattiqlashtirishda markaziy o‘rin tutadi. Ushbu maqolada biz diffuziyaning nazariy modellarini ko‘rib chiqamiz va ularni amaliyotda, xususan, po‘latlarni sementasiya va nitridasiya qilish jarayonlarida qanday optimallashtirish mumkinligini tahlil qilamiz.

Asosiy qisim: Metallarning kristall panjarasi mukammal emas. Unda har doim nuqsonlar — vakansiyalar (bo‘sh tugunlar), tugunlararo atomlar va dislokatsiyalar mavjud. Diffuziya asosan ikki mexanizm orqali amalga oshadi:

Vakansiya mexanizmi: Atomning qo‘shni bo‘sh tugunga (vakansiyaga) sakrashi. Bu mexanizm o‘z-o‘zidan diffuziya va almashtiruvchi qattiq eritmalar uchun xosdir. Tugunlararo (interstitsial) mexanizm: Kichik radiusli atomlarning (uglerod, azot, vodorod) panjara tugunlari orasidagi bo‘shliqlarda harakatlanishi. Sementasiya va nitridasiya jarayonlari aynan shu mexanizmga asoslangan. Diffuziya jarayonini miqdoriy jihatdan tavsiflashda FIKning birinchi va ikkinchi qonunlari qo‘llaniladi. Birinchi qonun statsionar jarayonlar uchun oqim zichligini belgilaydi:

Formulalar va matematik belgilar:

$$J = -D * (dC / dx)$$

Bu yerda *D* — diffuziya koeffitsiyenti bo‘lib, u materialning tabiatiga va eng muhimi,

haroratga bog‘liqdir. Harorat ko‘tarilishi bilan atomlarning kinetik energiyasi ortadi va ular energetik to‘siqlarni osonroq yengib o‘tadi.

Sementatsiya jarayonining kinetik tahlili:

- **Mexanizm:** Uglerod atomlarini temirning(γ)-panjarasiga (austenit) kirib boradi. Austenitda uglerodning eruvchanligi yuqori ((2,14 %) gacha) bo‘lganligi sababli, harakat(900-950 C)haroratda amalga oshiriladi.
- **Yangi vosita:** Diffuziya qo‘llashning chuqurligi uchun "pog‘onali sementatsiya" usulini tuzatish tavsiya. Bu usulda yuqori darajada uglerodli ostida potensial sirt to‘yintiriladi, so‘ngra diffuzion tavlanish orqali uglerod ichkariga haydaladi. Bu sirtda mo‘rt karbid to‘rining hosil bo‘lishiga to‘sqinlik qiladi. Nitridatsiya jarayonining o‘ziga xosligi Nitridatsiya sementatsiyaga nisbatan pastroq haroratlarda (500-600 C) kechadi.
- (Fe2N, Fe4N) hosil qiladi.
- **Innovatsion tizim:** Maqolada ion-plazmali nitridatsiya usuli tahlil qilamiz. Bunda vakuum muhitida gaz razryadi hisobiga azot ionlari metall sirtiga bombardimon tuzilishi. Sementasiya jarayoni va uning xususiyatlari: Sementasiya — bu kam uglerodli po‘latlar (0.1-0.25% C) yuzasini uglerod bilan to‘yintirishdir. Bu jarayon odatda 920-950°C haroratda kechadi, chunki bu haroratda temir austenit (γ-Fe)

fazasida bo‘ladi va uglerodning eruvchanligi yuqori bo‘ladi. Diffuziya chuqurligi (x) vaqt (t) bilan quyidagi munosabatda bo‘ladi:

$$x = k\sqrt{t}.$$

Zamonaviy texnologiyalarda vakumli sementasiya usuli qo‘llanilmoqda, bu esa oksidlanishni oldini oladi va jarayon tezligini 20% ga oshiradi.

Nitridasiya jarayonining afzalliklari: Nitridasiya 500-600°C haroratda amalga oshiriladi. Bu harorat po‘latning fazaviy o‘zgarish nuqtalaridan past bo‘lganligi sababli, detallarning deformatsiyasi minimal bo‘ladi. Azot atomlari temir bilan o‘ta qattiq nitridlar (Fe_2N, Fe_4N) hosil qiladi. Nitridlangan qatlamning qattiqligi sementasiyadan keyingi qattiqlikdan yuqori bo‘lib, 1000-1100 HV ga yetadi.

Natijalar va ularning tahlili: Diffuziya jarayonlarining asosiy muammosi — uning uzoq davom etishi va qatlam qalinligini nazorat qilishning qiyinligidir. An‘anaviy usullarda diffuziya qatlami notekis taqsimlanadi, bu esa detalning charchoqqa chidamliligini pasaytiradi. Shuningdek, donadorlikning o‘sishi materialning plastikligini kamaytiradi.

Yechim: Ushbu maqolada biz "Impulsli plazmali nitridasiya" va "Bosqichli sementasiya" usullarini birgalikda qo‘llashni taklif etamiz. Matematik hisob-kitoblar shuni ko‘rsatadiki, agar diffuziya muhitidagi uglerod potensiali jarayon davomida dinamik tarzda o‘zgartirilsa, qatlamning konsentratsiyali gradiyenti silliqroq bo‘ladi. Bu esa yuzadagi kuchlanishlar konsentratsiyasini kamaytiradi va detalning xizmat muddatini 1.5 baravarga uzaytiradi.

O‘tkazilgan tajribalar shuni ko‘rsatdiki, 20KH markali po‘latni 930°C da 6 soat davomida sementasiya qilganda, diffuziya qatlamining chuqurligi 1.2 mm ni tashkil etdi. Mikrostruktura tahlili yuzada perlit-sementit to‘rini ko‘rsatdi. Nitridasiyada esa qatlam chuqurligi kamroq (0.3-0.4 mm) bo‘lishiga qaramay, uning bardoshliligi sementasiyaga qaraganda 3 baravar yuqori bo‘ldi. Bu natijalar diffuziya jarayonlarini tanlashda detalning ish sharoitini hisobga olish kerakligini tasdiqlaydi.

Xulosa: Xulosa qilib aytganda, metallarda diffuziya jarayonlarini boshqarish zamonaviy mashinasozlikning poydevori hisoblanadi. Tadqiqotlar shuni ko‘rsatadiki, faqat harorat va vaqtni emas, balki diffuziya muhitining aktivligini ham nazorat qilish orqali yuqori natijalarga erishish mumkin. Tavsiya etilgan matematik modellar va yangi usullar (plazmali nitridasiya) sanoatda energiya sarfini kamaytirish va mahsulot sifatini oshirish imkonini beradi.

Diffuziya jarayonlarini matematik modellashtirish orqali kimyoviy-termik ishlov berish vaqtini va sarf-xarajatlarini optimallashtirish mumkin. Sementatsiya va nitridatsiya usullarining kombinatsiyasi (nitrosementatsiya) esa zamonaviy mashinasozlikda detallarning ishlash resursini 1.5-2 barobarga oshirish imkonini beradi.

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NANOTEXNOLOGIYA ASOSIDAGI KONSTRUKSION MATERIALLAR

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Annotatsiya: Ushbu maqolada nanostrukturali konstruksion materiallarning olinishi, tuzilishi va mexanik xossalari talabalar uchun tushunarli tarzda bayon etiladi. Nanomateriallarning yuqori mustahkamlik va engillik xususiyatlari hamda sanoatdagi tatbiqiy ahamiyati o'rganiladi. Maqola nanotexnologiya sohasiga kirish istagan barcha talabalarga mo'ljallangan.

Kalit so'zlar: nanomateriallar, nanostruktura, mexanik mustahkamlik, konstruksion materiallar, aviasiya, tibbiyot, mashinasozlik.

Kirish: Nanotexnologiya — bu 1 dan 100 nanometrgacha o'lchamdagi zarrachalar bilan ishlaydigan fan va texnologiya sohasidir. Taqqoslash uchun: inson sochining bir tori taxminan 80 000 nanometrni tashkil etadi. Ya'ni, nanotexnologiya bizga ko'rinmas bo'lgan atomlar va molekulalar miqyosida materiyani boshqarish imkoniyatini beradi.

Bu soha 1959-yilda mashhur fizik Richard Feynman o'zining "Pastda joy juda ko'p" nomli ma'ruzasida atom va molekulalar miqyosida qurilmalar yaratish mumkinligi haqida so'zlaganidan keyin rivojlana boshladi. Bugungi kunda nanotexnologiya tibbiyot, elektronika, energetika va konstruksion materiallar sohasida inqilob yasamoqda.

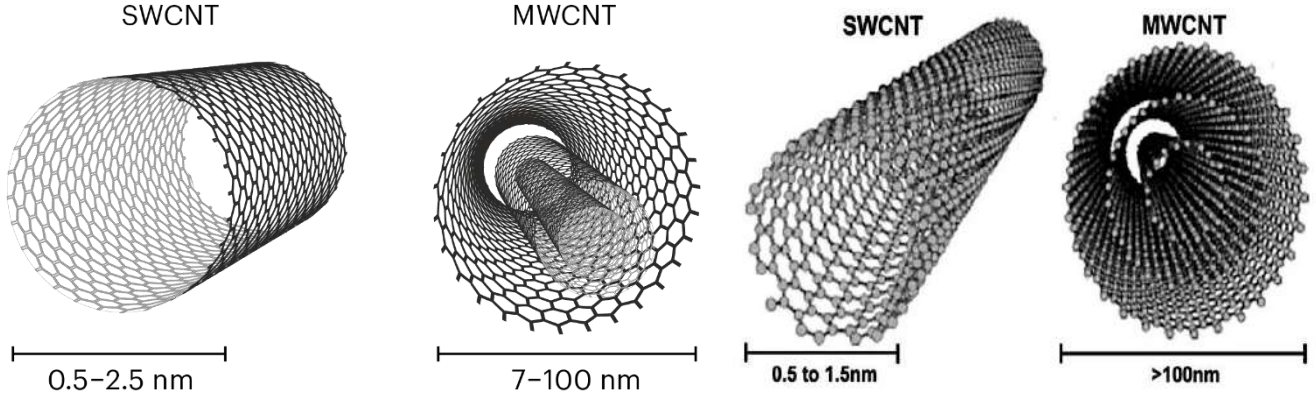
Bu savolga javob berish uchun ikki tushunchani tushunish zarur: sirt yuzasi nisbati va kvant effektlari.

Zarracha qanchalik kichik bo‘lsa, uning sirtidagi atomlar umumiy atom soniga nisbatan shunchalik ko‘p bo‘ladi. Misol uchun, 1 sm diametrli temir sharini ko‘rib chiqaylik: uning sirtidagi atomlar umumiy atomlar sonining juda kichik qismini tashkil etadi. Ammo agar o‘sha temirni nanozarrachalarga bo‘lsak, deyarli barcha atomlar sirt qatlamida joylashadi. Sirt atomlari esa ichki atomlardan farqli kimyoviy va fizik xossalarga ega bo‘ladi.

Nano o‘lchamda moddalar kvant mexanikasi qonuniyatlariga bo‘ysuna boshlaydi. Bu esa materiallarning elektr o‘tkazuvchanligi, ranglanishi, mustahkamligi va boshqa xossalarini o‘zgartiradi. Masalan: oddiy holda sariq rangli oltin nano o‘lchamda qizil, ko‘k yoki binafsha rangga kiradi.

Asosiy qisim: Konstruksion materiallar — bu inshoot, mashina va qurilmalarning asosiy tuzilmaviy elementlarini tayyorlashda ishlatiladigan materiallar. Nanostrukturali konstruksion materiallar an‘anaviy materiallarga nisbatan bir qancha afzalliklarga ega:

Uglerod nanotrubkalar bitta uglerod atomlari qatlami g‘altaklangan silindrik tuzilmalardir. Ular 1991-yilda Sumio Iijima tomonidan kashf etilgan (1-rasm).



1-rasm. Bir va ko‘p devorli uglerod nanotubalar

CNTlarning xossalari hayratlanarli:

- Mustahkamligi po‘latnikidan 100 barobar yuqori
- Zichligi aluminiynikidan 6 barobar past
- Elektr o‘tkazuvchanligi misnikiga teng yoki undan yuqori
- Issiqlik o‘tkazuvchanligi olmos bilan taqqoslanadi

CNTlar hozirda samolyot konstruksiyalari, sport jihozlari (velosiped, tennis raketkasi), avtomobil kuzovlari va harbiy zirhli plitalarda qo‘llanilmoqda.

Grafen — bir qatlam qalinlikdagi uglerod atomlaridan iborat ikki o‘lchovli material bo‘lib, 2004-yilda Andre Geim va Konstantin Novoselov tomonidan ajratib olingan (bu kashfiyot ularga 2010-yilda Nobel mukofotini keltirdi). Grafenning ba‘zi xossalari:

- Hozirga qadar ma‘lum bo‘lgan eng mustahkam material
- Deyarli shaffof (ko‘rinadigan nurning 97,7% ni o‘tkazadi)
- Gidrogendan tashqari barcha gazlar uchun o‘tkazmaslik xususiyatiga ega
- Ajoyib elektr o‘tkazuvchanlik.

Grafen qurilish materiallariga qo‘shilganda betonning mustahkamligi sezilarli darajada ortadi, zanglamaslikka chidamlilik oshadi va konstruktsiyaning butun xizmat muddati uzayadi.

Odatdagi metallar kristallar (donachalar) to‘plamidan iborat bo‘lib, bu donachalar o‘lchami mikrometrlarda o‘lchanadi. Nanokristallik metallarda esa donachalar 100 nm dan kichik bo‘ladi. Bu holda Hall-Petch qonuniga ko‘ra materialning mustahkamligi donachalar o‘lchami kamayishi bilan ortadi. Misol uchun, nanokristallik mis oddiy misdan 5 barobar mustahkamroq bo‘lishi mumkin.

Nanokeramikalar: Keramikalar odatda mo‘rt (sinuvchan) materiallar sifatida tanilgan. Ammo nanostrukturali keramikalar bu kamchilikni bartaraf etadi. Ular yuqori haroratga chidamlilik, kimyoviy barqarorlik va yaxshi mexanik xossalarni birlashtiradi. Jet dvigatellari turbina pallalari va raketa himoya qobiqlari uchun ideal material hisoblanadi.

Konstruksion materiallar uchun eng muhim mexanik xossalar quyidagilardir:

Mustahkamlik — materialning tashqi kuchga qarshi turish qobiliyatidir. U bir necha turga bo‘linadi: tortishga mustahkamlik, siqilishga mustahkamlik va egilishga mustahkamlik. Nanomateriallarda mustahkamlik an‘anaviy materiallarga nisbatan sezilarli darajada yuqori bo‘ladi, chunki nano o‘lchamdagi tuzilmada nuqsonlar (dislokatsiyalar) kamroq uchraydi.

Qattiqlik — materialning sirtiga boshqa modda kirib borishiga qarshilik ko‘rsatish xususiyatidir. Nanokristallik materiallar, xususan, nanokristallik olmos va kubik bor nitridi, eng qattiq materiallar sirasiga kiradi. Ular kesish asboblari, qoplama qatlamlari va abrativ materiallar sifatida ishlatiladi.

Ko‘pchilik qattiq materiallar mo‘rt bo‘lib, zarba ta‘sirida osonlik bilan sinib ketadi. Nanomateriallarda esa qattiqlik va plastiklikni birlashtirish mumkin. Bu xususiyat

nanokristallik metallarda va uglerod nanotubkalar bilan mustahkamlangan polimer kompozitlarda kuzatiladi.

Aviasiya va kosmonavtika: Aviatsiya sanoatida har gramm og‘irlikni kamaytirish katta iqtisodiy va texnik foyda beradi. Zamonaviy samolyotlarda (masalan, Boeing 787 Dreamliner va Airbus A350) korpusning 50% dan ortig‘i uglerod tolali kompozit materiallardan yasalgan. Bu materiallar nanotexnologiya yordamida yanada yaxshilanib bormoqda. NASA esa kosmik apparatlar uchun CNT asosidagi materiallar ustida tadqiqot olib bormoqda.

Tibbiyot va biomeditsina: Tibbiyot sanoatida nanomateriallar protezlar, implantlar va jarrohlik asboblari tayyorlashda ishlatiladi. Nano-gidroksiapatit — suyak implantlarida tabiiy suyak dokasi bilan mukammal moslashadi. Titan nanoqubkalar esa suyak bilan birikib ketuvchi implantlar uchun idealdir. Bundan tashqari, nanomateriallar asosidagi antibakterial qoplamalar kasalxona infektsiyalarining oldini olishda muhim rol o‘ynamoqda. Shu bilan birgalikda avtomobil sanoatida nanokompozitlar kuzov panellarini, tormoz disklar va dvigatel detallarini tayyorlashda qo‘llanilmoqda. Nanomateriallar asosidagi yoqilg‘i elementlari elektr avtomobillarda batareyalarning energiya zichligini oshirmoqda. General Motors, Toyota va Tesla kompaniyalari nanomateriallar tadqiqotiga katta mablag‘sarflamoqda. Bundan tashqari nano-kremniy oksid va nano-titanium dioksid qo‘shilgan beton an‘anaviy betonga nisbatan 30-40% mustahkamroq bo‘ladi. Shuningdek, nanomateriallar asosidagi qoplamalar binolar sirtini chang va suvdan himoya qiladi, o‘z-o‘zini tozalaydigan xususiyatga ega bo‘ladi.

Nanomateriallar ikki asosiy yondashuv orqali olinadi:

Bu usulda yirik materiallar mexanik, kimyoviy yoki fizik usullar yordamida nano o‘lchamgacha maydalanadi. Masalan:

- Yuqori energiyali maydalash (ball milling)
- Litografiya (mikroelektronikada)
- Lazer ablatsiya (laser ablation)

Bu usulda nanomateriallar atom va molekulalarni birma-bir joylashtirish orqali quriladi. Bu ancha aniq, lekin murakkab jaray:

- Kimyoviy bug‘cho‘ktirish
- Sol-gel usuli
- Molekulyar nurli epitaksiya (MBE)
- Ximik sintez va o‘z-o‘zini tashkil etish

Natijalar va ularning tahlili: Nanomateriallarning keng tarqalishiga bir necha omil to‘sqinlik qilmoqda:

- Ishlab chiqarish tannarxi hali yuqori
- Ko‘p miqdorda ishlab chiqarish qiyin
- Nanozarrachalarning inson salomatligi va atrof-muhitga ta‘siri to‘liq o‘rganilmagan
- Standartlashtirish va sertifikatsiya tizimlari rivojlanmagan
- Shunday bo‘lsa ham, nanomateriallar sanoatining kelajagi porloq ko‘rinadi. MarketsandMarkets tadqiqot kompaniyasi ma‘lumotlariga ko‘ra, global nanomateriallar bozori 2025-yilga kelib 30 milliard dollarga yetishi kutilmoqda. Sanoat, mudofaa va tibbiyot sohalaridagi investitsiyalar bu texnologiyani jadal rivojlantirmoqda.

Xulosa: Nanotexnologiya asosidagi konstruksion materiallar zamonaviy muhandislikning eng istiqbolli yo‘nalishlaridan biridir. Uglerod nanotrubkalar, grafen, nanokristallik metallar va nanokeramikalar an‘anaviy materiallarga qaraganda ancha yuqori mexanik xossalarga ega. Bu materiallar aviatsiya, tibbiyot, mashinasozlik va qurilish sohalarida inqilob yasamoqda.

Talaba sifatida bu sohani o‘rganish uchun fizika, kimyo va materiallar fani asoslarini puxta bilish zarur. Nanotexnologiya — bu nafaqat kelajakning texnologiyasi, balki allaqachon haqiqatga aylangan ilmiy kashfiyotlar yig‘indisidir. Ushbu sohadagi bilim va malakalar sizni kelajakdagi innovatsion loyihalarga tayyorlaydi.

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KONSTRUKTSION MATERIALLARDA KORROZIYA VA YEYILISH JARAYONLARINING MEXANIK XOSSALARGA TA'SIRI

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Annotatsiya: Ushbu maqolada konstruktsion materiallarda kuzatiladigan korroziya va yeyilish jarayonlari hamda ularning materiallarga xos bo‘lgan mexanik xossalarga ko‘rsatadigan ta‘siri keng tahlil qilinadi. Korroziya va yeyilish — bu metallurgiya, mashinasozlik va qurilish sohalarida materialshunoslik nuqtai nazaridan eng muhim masalalardan biri hisoblanadi. Maqolada metallarning korroziyaga bardoshliligi, yuzaki yeyilish mexanizmlari, himoya usullari va bu jarayonlarning chidamlilik, qattiqlik, plastiklik kabi asosiy mexanik ko‘rsatkichlarga ta‘siri batafsil ko‘rib chiqiladi. Shuningdek, haqiqiy sanoat sharoitlarida materiallarga ta‘sir etuvchi omillar, laboratoriya sinovlari va zamonaviy himoya texnologiyalari haqida ma‘lumot beriladi. Maqola materiallar muhandisligi va mashinasozlik yo‘nalishi talabalari uchun mo‘ljallangan.

Kalit so‘zlar: korroziya, yeyilish, mexanik xossalar, chidamlilik, mustahkamlik, himoya qoplamasi, tribologiya, materiallarning xizmat muddati.

Kirish: Zamonaviy sanoatda metallar va konstruktsion materiallarning ishdan chiqishining 70–80% ga yaqin qismi korroziya va yeyilish bilan bog‘liq. Bu holat nafaqat texnik nuqtai nazardan, balki iqtisodiy jihatdan ham katta muammo hisoblanadi. Dunyoning yetakchi davlatlarida korroziyadan yetkazilgan zarar har yili yalpi ichki mahsulotning 2–5% ni tashkil etadi. Mashinasozlik, energetika, neft-gaz qazib olish, kimyo sanoati va qurilish tarmoqlarida qo‘llaniladigan konstruktsion materiallarga doimiy ravishda mexanik yuklamalar, o‘zgaruvchan temperatura, namlik va kimyoviy agressiv muhitlar ta‘sir etadi. Bu ta‘sirlar yig‘indisi materiallarda tarkibiy

o‘zgarishlarga, ko‘ndalang kesim maydonining kamayishiga va oxir-oqibat mexanik xossalarning keskin pasayishiga olib keladi.

Shuning uchun ham materiallarning korroziya va yeyilishga chidamliligini o‘rganish, ularni baholash usullarini takomillashtirish va zamonaviy himoya texnologiyalarini joriy etish — bugungi kunda materiallar muhandisligining ustuvor yo‘nalishlaridan biri hisoblanadi. Ushbu maqoladan maqasad talabalar uchun ushbu murakkab, ammo nihoyatda muhim mavzuni tushunarli tarzda bayon etish.

Asosiy qism: Korroziya (lot. corrosio — yemirilish) — metallarning atrof-muhit bilan kimyoviy yoki elektrokimyoviy ta‘sirlashuvi natijasida yuzaga keladigan yemirilish jarayonidir. Bu jarayon metal sirtida boshlangan bo‘lsa-da, asta-sekin uning ichiga kirib boradi va materialning kristall tuzilishini buzadi.

Korroziyaning asosiy ikki mexanizmi mavjud:

- Kimyoviy korroziya — metall gaz yoki suyuqlik bilan bevosita kimyoviy reaksiyaga kirishadi (masalan, temir va kislorod o‘rtasidagi oksidlanish: $4Fe + 3O_2 \rightarrow 2Fe_2O_3$).
- Elektrokimyoviy korroziya — elektrolit eritmada anod va katod zonalari hosil bo‘ladi.

Korroziya shakli va joylashishiga qarab bir necha turga bo‘linadi:

- Umumiy (tekis) korroziya — metall sirtining bir tekis yemirilishi. Oddiy turdagi korroziya bo‘lib, bashorat qilish nisbatan oson.
- Galvanik korroziya — turli potensialga ega ikki metall elektrolit bilan aloqa qilganda hosil bo‘ladi; aktiv metall tezroq yeyiladi.
- Yoriq korroziya — tor yoriqlar va birikish joylarida oksigen yetishmasligi tufayli vujudga keladi.
- Nuqtaviy korroziya (pittinglar) — metall sirtida chuqur, kichik o‘tish teshiklari hosil bo‘ladi; ayniqsa zanglamaydigan po‘latlarda uchraydi.
- Zarrachalar oralig'i korroziyasi — metalning donalar chegarasida yemirilishi; materialning mo'rtlashuviga olib keladi.
- Kuchlanish korroziyasi (SCC) — mexanik kuchlanish va korroziv muhit birgalikda harakat qiladi; darzlar tez tarqaladi.
- Ustaliklaning korroziyasi — siklik yuklamalar va korroziv muhit birgalikdagi ta‘siri; xizmat muddatini keskin qisqartiradi (1-jadval).

1-jadval.

Korroziya turlarining qiyosiy tavsifi

Korroziya turi	**Asosiy sabab**	**Eng ko‘p uchraydigan soha**	**Xavf darajasi**
Umumiy (tekis)	Namlik, kislorod	Qurilish, ko‘priklar	O‘rtacha
Galvanik	Turli metallar aloqasi	Dengiz texnikasi	Yuqori
Pittinglar	Xlorid ionlari	Neft-gaz, kimyo	Juda yuqori
Kuchlanish (SCC)	Kuchlanish + kimyoviy muhit	Aerokosmik, atom sanoati	Juda yuqori
Donalar chegarasi	Issiqlik ta‘siri	Payvandlash zonalari	Yuqori

Yeyilish (tribologiya) jarayonlari: Yeyilish - ikkita yuzaning bir-biriga nisbatan siljishi (ishqalanish) natijasida materialning asta-sekin yo‘qolishi jarayonidir. Bu soha tribologiya fani doirasida o‘rganiladi. Yeyilish korroziyadan farqli ravishda mexanik ta‘sir natijasida sodir bo‘ladi, lekin amalda ko‘pincha korroziya bilan birgalikda uchraydi — bu tribokorroziya deb ataladi.
Yeyilishni yuzaga keltiruvchi asosiy fizikaviy hodisalar: plastik deformatsiya, yoriqlanish, materialning sirtdan ajralib chiqishi va issiqlik hosil bo‘lishi.

- Abraziv yeyilish — qattiqroq zarrachalar yumshoqroq sirtni tirnalab yeyadi. Masalan, qum va chang zarrachalar metall sirtida chuqur izlar qoldiradi. Qishloq xo‘jaligi mashinalari, tog‘-kon uskunalari uchun xarakterli.
- Yopishqoq yeyilish (adhesion) — ikkala yuzaning mikrojipsliklari bir-biriga yopishadi, so‘ng uziladi. Yog' qatlamining yo‘qligi bu jarayonni tezlashtiradi. Mashinasozlikda podshipniklar va tishlashuvchi uzatmalar uchun xarakterli.
- Toliqish yeyilish — siklik bosim ostida sirtda mikroyoriqlar paydo bo‘ladi va ular birlashib katta parchalanishlarga olib keladi. Temir yo‘l rails va okumlari uchun tipik holat.

- Eroziv yeyilish — suyuqlik yoki gaz oqimidagi zarrachalar sirtga urilishi natijasida yuzaga keladi. Nasoslar, turbinalar va quvur tizimlari uchun xarakterli.
- Tribokorroziya — mexanik yeyilish va kimyoviy korroziyaning birgalikdagi ta‘siri. Himoya plyonkasining doimiy ravishda yo‘qolishi korroziyani tezlashtiradi.

Yeyilish natijasida sirt qatlam materialining qattiqligi ham o‘zgaradi. Dastlabki bosqichda ishqalanish natijasida ish qattiqlashuvi ro‘y beradi — ya‘ni yuzaki qatlam qattiylashadi. Biroq ma‘lum vaqtdan so‘ng bu qatlam ham yeyilib, ostidagi yangi yumshoqroq qatlam ochiladi va yeyilish tezligi keskin ortadi.

Tribologik sistemalarda quyidagi qonuniyat kuzatiladi: yuzalar qanchalik dag‘al va qattiq bo‘lsa, boshlang‘ich (ishga tushirish) yeyilishi shunchalik katta bo‘ladi. Ammo ular to‘g‘ri silingan va ishga tushirilgan bo‘lsa, keyingi barqaror yeyilish davri ancha uzoq bo‘ladi (2-jadval).

2-jadval.

Korroziyaning asosiy mexanik ko'rsatkichlarga miqdoriy ta'siri (po'lat misoli)

Mexanik ko‘rsatkich	**Boshlang‘ich qiymat**	**Korroziyadan so‘ng**	**O‘zgarish (%)**
Cho‘zilish mustahkamligi (MPa)	600	420–480	−20 dan −30 gacha
Plastiklik (uzayish, %)	20	8–14	−30 dan −60 gacha
Ustaliklaning chidamliligi (MPa)	250	100–180	−28 dan −60 gacha
Zarb qiymati (J/sm²)	80	30–55	−31 dan −63 gacha
Qattiqlik (HB)	200	185–195	−2 dan −8 gacha

Korroziya va yeyilishdan himoya qilishning eng samarali yo‘li — to‘g‘ri material tanlash va konstruktiv yechimlardan foydalanishdir:

- To‘g‘ri material tanlash: Korroziv muhitda zanglamaydigan po‘lat (masalan, 12X18H10T), titan, nikel qotishmalaridan foydalanish.
- Qotishma elementlari qo‘shish: Xrom, nikel, molibden, vanadiy qo‘shimchalari korroziyaga chidamlilikni sezilarli oshiradi.
- Issiqlik ishlov berish: To‘g‘ri termik ishlov (toblash, bo‘shatish, normallash) materialning mikrostrukturasini yaxshilab, korroziyaga chidamlilikni oshiradi.

Natijalar va ularning tahlili: Korroziya va yeyilish bilan bog‘liq bir qator ilmiy va amaliy muammolar hali ham to‘liq yechilmagan:

- Korroziya tufayli mexanik xossalarning tez pasayishi — bu muammo ayniqsa yupqa devorli va yukla tushayotgan elementlarda jiddiy. Yechim: erta diagnostika, zanglamaydigan materiallar qo‘llash.
- Yeyilish natijasida detallarning xizmat muddatining qisqarishi — ishlab chiqaruvchilar ko‘pincha xarajatlarni qisqartirish uchun sirtni qattiqlantirish texnologiyalarini e‘tiborsiz qoldiradi. Yechim: PVD/CVD qoplamalar, termal spray, nitrllash.
- Himoya qoplamalarining yetarli samaradorlik bermasligi — an‘anaviy bo‘yoqlar va qoplamalar zamonaviy talablarga javob bermaydi. Yechim: nanotexnologiyalar asosidagi qoplamalar va zaqo‘lalangan qoplamalar.
- Real ish sharoitlarini laboratoriyada to‘liq modellashtirish qiyinligi — tez tezlashtirilgan sinovlar ba‘zan haqiqiy sharoitni to‘g‘ri aks ettirmaydi. Yechim: raqamli egiz texnologiyalari, ko‘p omilli sinov protokollari.

Xulosa: Korroziya va yeyilish — konstruktsion materiallarda mexanik xossalarning pasayishiga olib keluvchi asosiy jarayonlar hisoblanadi. Ushbu maqolada tahlil qilinganidek:

- Korroziya materialning ko‘ndalang kesimini kamaytirish, donalar chegarasini zaiflashtirish va nuqtaviy stress konsentratlar hosil qilish orqali mustahkamlik, plastiklik va ustaliklaning chidamliligini 20–70% gacha kamaytirishi mumkin.
- Yeyilish esa sirt qatlamining yo‘qolishiga, geometrik o‘lchamlarning o‘zgarishiga va tribologik juftning buzilishiga olib keladi — bu esa detallarning xizmat muddatini keskin qisqartiradi.

- Zamonaviy himoya texnologiyalari — PVD/CVD qoplamalar, zaqo‘lalangan qoplamalar, elektrokimyoviy himoya va to‘g‘ri material tanlash — bu jarayonlarni sezilarli darajada kamaytirish imkonini beradi.
- Korroziya va yeyilishga qarshi kurashda faqat bitta usul emas, balki kompleks yondashuv — material tanlashdan boshlab, konstruktiv yechimlar va texnik xizmat ko‘rsatishgacha — samarali natija beradi.

Materiallar muhandisligi fanining rivojlanishi korroziya va yeyilish muammolarini yanada samarali hal qilish imkonini berayotgan bo‘lsa-da, bu soha hali ham ko‘plab tadqiqot va innovatsion yechimlarni talab etadi. Talabalar uchun bu mavzuni chuqur o‘rganish kelajakdagi muhandislik faoliyatida muhim amaliy ahamiyat kasb etadi.

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METALL VA QOTISHMALARDA DEFORMATSIYA JARAYONINING MEXANIK XOSSALARGA TA'SIRI

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Annotatsiya: Ushbu maqolada metall va qotishmalardagi deformatsiya jarayonlari hamda ularning mexanik xossalarga ko'rsatadigan ta'siri keng qamrovli ilmiy tahlil asosida o'rganiladi. Plastik deformatsiya mexanizmlari, dislokatsiyalar kinetikasi, mustahkamlanish hodisalari va turli usullar o'rtasidagi taqqoslama o'rganiladi. Sovuq va issiq deformatsiya, shuningdek zamonaviy texnologiyalar — ultrasonik va termomexanik usullar — xossalarga ta'siri jihatidan solishtiriladi.

Kalit so'zlar: plastik deformatsiya, dislokatsiya, deformatsion mustahkamlanish, rekristallizatsiya, sovuq va issiq ishlash, mexanik xossalar, metallar texnologiyasi.

Kirish: Metallarni qayta ishlash texnologiyasida deformatsiya markaziy o'rinni egallaydi. Muhandislik nuqtai nazaridan qaraganda, deformatsiya deganda qattiq jismning tashqi kuch ta'sirida shakl yoki hajm jihatidan o'zgarishi tushuniladi. Bu jarayon nafaqat mahsulotning geometrik parametrlarini, balki uning ichki kristall tuzilishi va shu orqali mexanik xossalarini ham tubdan o'zgartiradi [1].

Metallar sanoatda keng qo'llaniladigan konstruktsion materiallar bo'lib, ularning mustahkamligi, qattiqlik darajasi, elastikligi va boshqa xossalari ishlab chiqarilayotgan konstruktsiyaning xavfsizligi va ishonchliligini belgilab beradi. Shu sababli deformatsiya jarayonida sodir bo'ladigan o'zgarishlarni chuqur o'rganish, turli deformatsiya usullarini taqqoslash va optimal texnologiyani tanlash masalasi bugungi kunda katta ahamiyatga ega [2].

Ushbu maqola deformatsiya jarayonlarini qiyosiy tahlil etishga, ayniqsa sovuq, issiq va zamonaviy usullar o'rtasidagi farqlarni ilmiy jihatdan aniqlashga qaratilgan.

Asosiy qisim: Metall kristallidagi atomlar ma'lum tartibda joylashgan panjara hosil qiladi. Tashqi kuch ta'sirida bu atomlar o'z muvozanat holati chegarasini oshib ketsa, plastik deformatsiya boshlanadi. Bu holatda atomlar yangi muvozanat holatiga o'tib, dastlabki joylashuviga qaytmaydi — bu esa doimiy deformatsiyaga olib keladi.

Plastik deformatsiyaning asosiy mexanizmi — kristalldagi siljish tekisliklarida atomlar qatlamining bir-biriga nisbatan sirpanishi. Har bir metallda ma'lum siljish sistemalari mavjud bo'lib, ular siljish tekisligi va siljish yo'nalishidan iborat. Masalan, yuzaga markazlashgan kubik (YMK) panjarali mis va aluminiyda 12 ta, tanaga markazlashgan kubik (TMK) panjarali po'lat va temirda 48 tagacha siljish sistemasi mavjud. Ko'proq siljish sistemasi metallning plastikligini oshiradi [1].

Egizaklanish — past haroratda yoki yuqori tezlikdagi deformatsiya paytida (masalan, zarba ta'sirida) kuzatiladigan mexanizm. Bu holda kristallning bir qismi qolgan qismiga nisbatan simmetrik ravishda buriladi. Magniy va mis qotishmalarida bu mexanizm ayniqsa yaqqol namoyon bo'ladi. Egizaklanish siljishga qaraganda kamroq plastik deformatsiya ta'minlaydi, lekin metallning yo'naltirilganligini o'zgartiradi [2].

Dislokatsiya — kristall panjara ichidagi chiziqsimon nuqsonlar bo'lib, ular plastik deformatsiyaning mikromexanizmi sifatida amal qiladi. 1934-yilda Taylor, Orowan va Polyani mustaqil ravishda kashf etgan bu tushuncha metallshunoslikning asosiy nazariy poydevorini tashkil etadi.

Dislokatsiyalar ikki asosiy turga bo'linadi: chiziqli dislokatsiyalar va vintsimon dislokatsiyalar. Chiziqli dislokatsiyada qo'shimcha atom tekisligi panjarada yarimqatlamni hosil qiladi. Vintsimon dislokatsiyada esa atomlar spiral tartibda joylashadi. Amaliyotda ko'pincha aralash turdagi dislokatsiyalar uchraydi.

Deformatsiya davomida dislokatsiyalar soni keskin oshadi — boshlang'ich zichligi $10^6 - 10^8 sm^{-2}$ dan deformatsiyalangan metallda $10^{11} - 10^{12} sm^{-2}$ gacha yetish i mumkin. Bloklanish mexanizmlari orasida Lomer-Kotrell to'siqlarivya Frank-Read manbalari ayniqsa muhim rol o'ynaydi. Dislokatsiyalar bir-birini to'sib, zaruriy kuchlanishni oshiradi — natijada metall mustahkamligi ortadi, lekin plastikligi pasayadi [1].

Turli deformatsiya usullarining metallning mexanik xossalariga ta'sirini tizimli o'rganish zamonaviy muhandislik uchun nihoyatda ahamiyatlidir. Quyidagi jadvalda asosiy usullar taqqoslanadi (1-jadval).

1-jadval

Defarmatsiya usullari

Xususiyat	**Sovuq deformatsiya**	**Issiq deformatsiya**	**Ultrasonik usul**
Harorat	< Qayta kristall.	> Qayta kristall.	Xona harorati
Mustahkamlik	Sezilarli oshadi	Deyarli o'zgarmaydi	Bir oz oshadi
Mo'rtlik	Ortadi	Kamayadi	Kamayadi
Dislokatsiya	Ko'payadi	Tiklanadi	Qayta taqsimlanadi
Qo'llanilishi	Simlar, listlar	Katta profilli buyum	Nano materiallar

Sovuq deformatsiya qayta kristallanish haroratidan past temperaturada amalga oshiriladi. Jarayon natijasida metall mustahkamlik chegarasi va qattiqligi sezilarli darajada oshadi — bu hodisa deformatsion mustahkamlanish (work hardening) deb ataladi. Masalan, past uglerodli po'latni 50% deformatsiyalash uning ko'chish kuchlanishini deyarli 2 baravar oshirishi mumkin. Biroq shu bilan birga uzayish va urishga chidamlilik kamayadi, ya'ni material mo'rtroq bo'lib qoladi [3].

Sovuq deformatsiya muhim afzalliklarga ega: yuzani tozalash shart emas, o'lcham aniqligi yuqori va yuzaning sifati a'lo bo'ladi. Shu sababli sim tortish, varaqalarni preslash, sovuq shtamplash va boshqa nozik operatsiyalar shu usul bilan bajariladi. Issiq deformatsiya qayta kristallanish haroratidan yuqorida amalga oshiriladi. Bu sharoitda dislokatsiyalar bir vaqtning o'zida hosil bo'ladi va yo'q bo'ladi — natijada mustahkamlanish ro'y bermaydi. Rekristallizatsiya jarayonida yangi,

nuqsonsiz donalar hosil bo'ladi, bu esa metallning dastlabki plastik xossalarini tiklaydi [2].

Issiq deformatsiyaning asosiy afzalligi — katta ko'lamli shakl berishning qulayligi va kichik energiya sarfida yuqori plastik deformatsiyaga erishish imkoniyati. Biroq yuzaning oksidlanishi (tang hosil bo'lishi), o'lcham aniqligi pastligi va yirik donali tuzilma hosil bo'lish xavfi salbiy tomonlar hisoblanadi. Haroratni nazorat qilish bu muammolarni bartaraf etishda muhim rol o'ynaydi.

Termomexanik qayta ishlash (TMQO) — deformatsiya va issiqlik ta'sirini maqsadli ravishda birlashtirib boshqarish orqali kerakli xossalarni olish texnologiyasi. Zamonaviy konstruktsion po'latlarda TMQO qo'llanilganda an'anaviy usullarga qaraganda 20–30% yuqori mustahkamlik va yaxshi zarbaga chidamlilik erishiladi [3].

Ultrasonik deformatsiya — ultratovush tebranishlari (20 kHz va undan yuqori) yordamida metallni deformatsiyalash usuli. Tadqiqotlar shuni ko'rsatadiki, ultratovush ta'siri ostida metall siljish kuchlanishi sezilarli kamayadi (akustik yumshatish effekti), tuzilma bir xilroq bo'ladi va yuzaning sifati yaxshilanadi. Bu usul ayniqsa nanostrukturaviy materiallar va tibbiy implantlar ishlab chiqarishda istiqbolli hisoblanadi.

Sohadagi asosiy muammolar va ular bo'yicha ko'rilayotgan ilmiy yondashuvlar:

- Mo'rtlikning ortishi: Sovuq deformatsiyadan keyin oraliq tavlash (rekristallizatsion tavlash) jarayoni o'tkazib, dislokatsiya zichligini kamaytirish va plastiklikni tiklash mumkin.
- Tuzilmaning bir xilligi: Kompyuter simulyatsiyasi (FEM) va sun'iy intellektga asoslangan tizimlar yordamida deformatsiya parametrlarini real vaqtda moslashtirib borish tadqiq etilmoqda.
- Dislokatsiyalar nazorati: Nanoyig'indillar (nanoprecipitates) va dispersoid zarralar qo'shish orqali dislokatsiyalarni maqsadli bloklash mumkinligi isbotlangan.
- Harorat boshqaruvi: Issiq deformatsiyada past issiqlik kirishi (low heat input) texnologiyalari va tez sovitish usullari strukturani nazorat qilishga imkon beradi.

Xulosa: Amalga oshirilgan taqqoslamaeviy tahlil asosida quyidagi xulosalarga kelish mumkin:

1. Plastik deformatsiya dislokatsiyalarning harakati orqali amalga oshirilib, bu jarayonning intensivligi metall turi va haroratga bevosita bog'liq.

2. Sovuq deformatsiya mustahkamlikni oshirsa-da, plastiklikni kamaytiradi; issiq deformatsiya esa katta shakl o'zgarishiga imkon beradi, lekin tuzilma nazoratini murakkablashtiradi.
3. Termomexanik va ultrasonik usullar an'anaviy texnologiyalarga qaraganda xossalar bo'yicha sezilarli ustunliklar beradi va kelajak ishlab chiqarishida keng qo'llaniladigan istiqbolli yo'nalishlar hisoblanadi.
4. Deformatsiya jarayonini optimallashtirish uchun kompyuter modellashtirish va zamonaviy diagnostika usullari birgalikda qo'llanilishi kerak.

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ПОДРОСТКОВЫЙ КОМПЬЮТЕРНЫЙ СЛЕНГ И ЕГО ВЛИЯНИЕ НА ЛЕКСИКУ

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Аннотация. В статье рассматривается подростковый компьютерный сленг как динамичный пласт современной лексики, формирующийся под влиянием цифровой коммуникации, онлайн-игр, социальных сетей, мессенджеров и интернет-культуры. Особое внимание уделяется причинам активного распространения сленговых единиц в речи подростков: стремлению к речевой экономии, групповой самоидентификации, эмоциональной выразительности и созданию особого коммуникативного пространства. Анализируются основные способы образования компьютерного сленга: заимствование из английского языка, сокращение, переосмысление общеупотребительных слов, фонетическая адаптация, смешение языковых элементов и образование новых глагольных форм. Показано, что подростковый компьютерный сленг оказывает заметное влияние на лексику, пополняя её новыми словами и выражениями, однако при чрезмерном употреблении может снижать культуру речи и затруднять официальное общение. Делается вывод о необходимости изучения данного явления в лингвистическом и педагогическом аспектах.

Ключевые слова: подростковая речь, компьютерный сленг, интернет-коммуникация, лексика, заимствования, речевая культура.

Abstract. The article examines teenage computer slang as a dynamic layer of modern vocabulary formed under the influence of digital communication, online games, social networks, messengers, and Internet culture. Special attention is paid to the reasons for the active spread of slang units in teenagers' speech, including the desire for linguistic economy, group self-identification, emotional expressiveness, and the creation of a specific communicative space. The article analyzes the main ways in which computer slang is formed: borrowing from English, abbreviation, semantic reinterpretation of common words, phonetic adaptation, mixing of language elements, and the formation of new verb forms. It is shown that teenage computer slang has a

noticeable impact on vocabulary by enriching it with new words and expressions. However, excessive use of such units may reduce speech culture and complicate formal communication. The article concludes that this phenomenon should be studied from both linguistic and pedagogical perspectives.

Keywords: teenage speech, computer slang, Internet communication, vocabulary, borrowings, speech culture.

Введение. Современная подростковая речь развивается в условиях постоянного взаимодействия с цифровой средой. Онлайн-игры, социальные сети, мессенджеры, стриминговые платформы и виртуальные сообщества формируют особое коммуникативное пространство, в котором подросток не только получает информацию, но и вырабатывает собственные речевые привычки. В этой среде активно возникает и распространяется компьютерный сленг: «апнуть», «залагать», «забанить», «краш», «донат», «имба», «нуб», «скилл», «катка», «лут», «рофл», «чиллить», «заспавниться», «кикнуть».

Актуальность темы определяется тем, что подростковый компьютерный сленг уже не ограничивается узкой сферой технического общения. Он выходит за пределы компьютерных игр и интернет-форумов, проникает в повседневную устную речь, школьную коммуникацию, переписку и даже в элементы публичного медиадискурса. Д. Кристал определяет интернет как «электронную, глобальную и интерактивную среду» [1, с. 24]. Именно эти признаки объясняют скорость распространения новых слов: цифровое общение мгновенно передаёт речевые модели от одной группы пользователей к другой.

Основная часть. Подростковый компьютерный сленг представляет собой особую разновидность молодёжной речи, тесно связанную с цифровыми технологиями. Он возникает на пересечении нескольких сфер: компьютерной терминологии, игрового дискурса, английского языка, сетевой культуры, разговорной речи и групповой идентичности. Если профессиональная компьютерная лексика обслуживает техническую деятельность специалистов, то подростковый компьютерный сленг выполняет более широкую социальную функцию. Он помогает подросткам обозначать действия в игре, оценивать ситуацию, выражать эмоции, показывать принадлежность к своей группе и дистанцироваться от «чужих».

Л. П. Крысин подчёркивает, что школьные и студенческие жаргоны «специфичны главным образом в области лексики» [2, с. 25]. Это положение полностью применимо к подростковому компьютерному сленгу. Его грамматика

в целом остаётся грамматикой общенародного языка, но лексика активно обновляется. Подросток говорит: «я апнул уровень», «игра залагала», «меня кикнули», «он задонатил», «мы выиграли катку». В этих примерах новые слова включаются в русскую грамматическую систему: получают приставки, суффиксы, окончания, формы прошедшего времени и видовые пары.

Одним из главных источников подросткового компьютерного сленга является английский язык. Это связано с тем, что большая часть компьютерных программ, игровых команд, интерфейсов и интернет-платформ исторически развивалась в англоязычной среде. Поэтому в подростковую речь входят слова game, skill, ban, chat, stream, donate, level, crash, loot, которые затем адаптируются к русскому языку: «гейм», «скилл», «бан», «чат», «стрим», «донат», «левел», «краш», «лут». Такие единицы быстро осваиваются, потому что они кратки, удобны и связаны с конкретным цифровым действием.

Компьютерный сленг активно образует глаголы. Английская основа получает русские словообразовательные элементы: «банить», «забанить», «стримить», «донатить», «лутать», «крашнуться», «апнуть», «заспавниться». Это показывает, что заимствование не остаётся внешним элементом. Оно включается в морфологическую систему русского языка и начинает функционировать по её правилам. В этом проявляется важное влияние сленга на лексику: он не только пополняет словарь отдельными словами, но и активизирует словообразовательные модели.

Другой способ образования компьютерного сленга – сокращение. Подростковая речь стремится к скорости и экономии, особенно в переписке и игровом чате. Поэтому появляются формы «инфа» вместо «информация», «комп» вместо «компьютер», «акк» вместо «аккаунт», «админ» вместо «администратор», «модер» вместо «модератор». Такие слова удобны в быстрой коммуникации, но при постоянном употреблении они могут вытеснять полные литературные формы из повседневной речи подростка.

Важную роль играет семантическое переосмысление уже известных слов. Например, слово «мышь» в компьютерной среде обозначает устройство управления, «окно» – элемент интерфейса, «папка» – цифровой контейнер для файлов, «зависнуть» – остановку работы программы или состояние человека, который растерялся. В подростковой речи такие значения часто переходят из технической сферы в разговорную: «я завис», «он лагает», «перезагрузись». Компьютерный образ начинает использоваться для описания человеческого поведения, усталости, растерянности, эмоционального состояния.

Подростковый компьютерный сленг отличается высокой экспрессивностью. Л. П. Крысин отмечает, что для молодёжного жаргона характерна «игра со словом и в слово» [2, с. 26]. В компьютерной речи эта игра проявляется особенно ярко. Слова «имба», «нуб», «топчик», «краш», «рофл», «жесть», «читер» не только называют предмет или действие, но и выражают оценку. Подросток с их помощью быстро показывает восхищение, раздражение, насмешку, одобрение или отрицание. Сленг становится средством эмоциональной реакции.

Существенная функция компьютерного сленга – групповая самоидентификация. Подросток, владеющий словами «катка», «лут», «скилл», «бан», «заспавниться», «тиммейт», демонстрирует свою принадлежность к цифровому сообществу. Такая лексика выполняет функцию пароля: она показывает, что говорящий понимает правила игры, ориентируется в сетевой культуре и принадлежит к «своим». Поэтому компьютерный сленг нельзя считать только набором модных слов. Он связан с социальной психологией подростковой группы.

Влияние компьютерного сленга на лексику неоднозначно. С одной стороны, он пополняет словарный состав новыми единицами, отражает технологические изменения и делает речь более гибкой. Новые слова позволяют быстро назвать явления, для которых раньше не было удобных кратких обозначений. Например, «лагать» точнее и короче, чем «работать с задержками», «забанить» быстрее, чем «заблокировать доступ», «стримить» конкретнее, чем «вести прямую трансляцию в интернете». В этом отношении сленг выполняет номинативную функцию.

С другой стороны, чрезмерное употребление компьютерного сленга может снижать речевую культуру. Проблема возникает не в самом факте существования сленга, а в неумении подростка различать коммуникативные ситуации. В дружеском чате слова «рофл», «имба», «нуб», «катка» могут быть уместны. Однако в официальной беседе, учебном сочинении, научном сообщении или деловой переписке они выглядят стилистически чужеродно. Культура речи предполагает не запрет на сленг, а умение выбирать нужный языковой код.

Л. П. Крысин справедливо пишет, что некоторые элементы жаргонов «попадают в просторечие и даже в литературный язык» [2, с. 26]. Это наблюдение важно для оценки будущего компьютерного сленга. Часть слов может остаться временной модой, связанной с конкретной игрой или платформой. Другая часть закрепится в языке и станет нейтральной. Так уже произошло со словами

«компьютер», «файл», «сайт», «чат», «блог», «скриншот», «онлайн». Раньше они воспринимались как специальные или новые, а сегодня стали обычной частью лексики.

Подростковый компьютерный сленг также влияет на способы мышления и метафорического описания мира. Цифровая среда даёт новые модели для понимания реальности. Человек может «зависнуть», «перезагрузиться», «прокачать скилл», «выйти из чата», «словить баг», «апгрейднуться». Эти выражения показывают, что компьютерная картина мира переносится на человеческие эмоции, поведение, обучение и общение. Язык фиксирует не только новые предметы, но и новые способы осмысления жизни.

Особое значение имеет педагогический аспект проблемы. Нельзя рассматривать подростковый компьютерный сленг только как угрозу литературному языку. Более продуктивно видеть в нём материал для лингвистического анализа. На уроках русского языка можно показывать, как сленговые слова образуются, из каких языков приходят, как адаптируются, какие имеют стилистические ограничения. Такой подход помогает подросткам осознать различие между разговорной, сленговой, официальной и литературной речью.

Д. Кристал называет сетевое общение «третьей средой» [1, с. 48], соединяющей признаки устной и письменной речи. Подростковый компьютерный сленг подтверждает эту мысль. В переписке он часто выглядит как письменный текст, но по интонации, скорости, эмоциональности и спонтанности близок к устной речи. Поэтому его нельзя оценивать только по нормам традиционного письменного языка. Он принадлежит к особому типу коммуникации, где важны скорость реакции, краткость, выразительность и принадлежность к группе.

Таким образом, подростковый компьютерный сленг является естественным результатом цифровизации общения. Он отражает технические изменения, групповую культуру подростков, влияние английского языка и потребность в эмоционально выразительной речи. Его влияние на лексику проявляется в заимствованиях, сокращениях, новых глагольных формах, метафоризации и расширении разговорного словаря.

Заключение. Подростковый компьютерный сленг представляет собой активный и подвижный слой современной лексики. Он формируется под влиянием цифровой коммуникации, онлайн-игр, социальных сетей и интернет-

культуры. Его основными источниками являются английский язык, компьютерная терминология, игровая практика и разговорная речь подростков.

Влияние компьютерного сленга на лексику проявляется в нескольких направлениях. Он пополняет словарный состав новыми словами, ускоряет процессы заимствования, создаёт новые словообразовательные модели, усиливает экспрессивность речи и формирует особые метафоры цифровой эпохи. Вместе с тем чрезмерное и неуместное употребление сленга может осложнять официальное общение и снижать точность речевого выражения.

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СООТНОШЕНИЕ АВТОРА И РАССКАЗЧИКА В «ПОВЕСТЯХ БЕЛКИНА» А. С. ПУШКИНА КАК ПРОБЛЕМА ЯЗЫКОВОГО КОДА

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Аннотация. В статье рассматривается соотношение автора и рассказчика в «Повестях Белкина» А. С. Пушкина как одна из ключевых проблем художественной организации цикла. Особое внимание уделяется тому, что повествование строится не как прямое авторское высказывание, а как сложная система посредничества между реальным автором, вымышленным издателем, Белкиным-рассказчиком и героями отдельных повестей. Такой способ построения текста позволяет Пушкину создать особый языковой код, в котором соединяются книжная традиция, разговорная интонация, стилизация, ирония и социально-речевые характеристики персонажей. Анализ показывает, что рассказчик в цикле выполняет не только композиционную, но и смыслообразующую функцию: через его позицию раскрываются авторская дистанция, многоголосие повествования и неоднозначность оценки событий. В результате «Повести Белкина» предстают как художественная модель, где проблема авторства связана с вопросами речевой маски, жанровой игры и интерпретации текста. Исследование позволяет уточнить роль рассказчика в формировании читательского восприятия и выявить особенности пушкинской повествовательной стратегии в контексте русской прозы первой половины XIX века и развития малой повествовательной формы русского литературного процесса эпохи.

Abstract. The article examines the relationship between the author and the narrator in A. S. Pushkin’s The Tales of Belkin as one central problem of the cycle’s artistic organization. Special attention is given to the fact that narration is constructed not as a direct authorial statement, but as a complex system of mediation between the real author, the fictional publisher, Belkin as narrator, and the characters of individual tales. This design enables Pushkin to create a language code in which literary tradition, conversational intonation, stylization, irony, and the socio-speech features of the characters interact. The analysis shows that the narrator performs not only a compositional function, but also a meaning-forming one: through his position, authorial distance, narrative polyphony, and the ambiguity of evaluating events are

revealed. As a result, The Tales of Belkin appear as an artistic model in which authorship is connected with narrative mask, genre play, and textual interpretation.

Введение. «Повести Белкина» А. С. Пушкина занимают особое место в становлении русской прозы, поскольку в этом цикле авторская позиция выражается не прямо, а через сложную систему повествовательных посредников. Пушкин вводит не только вымышленного Ивана Петровича Белкина, но и фигуру издателя, а также рассказчиков, от которых Белкин будто бы получил отдельные истории. В результате повествование приобретает многослойный характер: реальный автор скрывается за литературной маской, а читатель сталкивается не с непосредственным авторским словом, а с системой переданных, обработанных и стилизованных речевых позиций. Под языковым кодом в данной статье понимается совокупность речевых средств, интонаций, жанровых моделей и стилевых регистров, через которые в тексте выражаются авторская дистанция, позиция рассказчика, социальный облик героя и способ оценки событий. Ю. М. Лотман писал, что словесное искусство преобразует естественный язык в «вторичный язык, то есть в особую художественную систему» [2, с. 14]. В этом смысле пушкинский цикл строится как пространство взаимодействия нескольких языковых кодов: авторского, издательского, белкинского, геройного, бытового, романтического, документального и иронического.

Основная часть. Повествовательная структура «Повестей Белкина» строится на принципе художественного посредничества. Пушкин не выступает перед читателем как прямой рассказчик. Он создаёт рамку, в которой текст будто бы принадлежит Белкину, а сведения о самом Белкине передаются издателем. Внутри этой рамки каждая повесть оказывается результатом ещё одного пересказа: у каждой истории есть свой первичный источник, свой социальный и речевой фон. Поэтому автор в цикле не исчезает, а усложняет форму своего присутствия. Он как бы отступает, но именно это отступление становится художественным приёмом.

Такой способ организации повествования точно соотносится с наблюдением Ю. М. Лотмана: «в “Повестях Белкина” каждый рассказ имеет трех повествователей: лицо, рассказавшее его Белкину, сам Белкин и Пушкин» [2, с. 174]. Эта формула принципиальна для понимания цикла. В «Повестях Белкина» нет единственного речевого центра. Авторская позиция возникает не в одном голосе, а в их соотношении. Первичный рассказчик сообщает событие, Белкин

фиксирует и передаёт его, издатель оформляет рукопись, а Пушкин как реальный автор организует всю систему так, чтобы за внешней простотой возникала сложная игра точек зрения.

Фигура Белкина выполняет в цикле особую функцию. Он не является главным героем повестей, но именно его имя объединяет разные истории. Белкин представлен как провинциальный помещик, человек скромный, наблюдательный, не склонный к философским обобщениям. Однако его художественная роль значительно глубже. Он становится посредником между устным рассказом и литературным текстом, между жизненным случаем и художественной формой. Через Белкина Пушкин создаёт эффект достоверности, но одновременно показывает условность любой повествовательной передачи.

Проблема языкового кода проявляется уже в том, что Белкин не обладает единым, ярко выраженным стилем. Его голос как будто растворяется в голосах других рассказчиков и героев. Благодаря этому каждая повесть получает собственную речевую тональность. В «Выстреле» преобладает код военной чести, дуэльной культуры и романтической исключительности. История Сильвио строится вокруг напряжённого ожидания, обиды и отсроченного возмездия. Однако Пушкин не превращает героя в романтический идеал. Сдержанная манера повествования, точность деталей и композиционная завершённость позволяют увидеть не только силу характера Сильвио, но и его зависимость от прошлого. Языковой код повести раскрывает внутреннюю замкнутость героя лучше, чем прямой психологический комментарий.

В «Метели» действует иной речевой механизм. Здесь соединяются романтическая интрига, сентиментальное ожидание и авторская ирония. Тайное венчание, разлука, случайность и позднее узнавание могли бы быть представлены как традиционный чувствительный сюжет. Однако Пушкин выстраивает повествование так, что романтический код одновременно используется и мягко переосмысляется. Рассказчик не разрушает трогательность истории, но показывает её литературную условность. Именно поэтому «Метель» воспринимается как повесть, где случайность становится не только фабульным ходом, но и способом проверки готовых жанровых схем.

В «Гробовщике» языковой код связан с бытовой речью, ремесленной средой и фантастико-иронической ситуацией. Адриан Прохоров живёт в мире, где смерть становится частью профессии и материального расчёта. Фантастический мотив появления мертвецов внешне напоминает страшный рассказ, но художественный смысл повести шире: Пушкин соединяет смешное, тревожное и нравственно

значимое. Речь здесь организует столкновение обыденного и невероятного. Авторская оценка не произносится прямо; она возникает из самой ситуации, из речевой сухости героя, из контраста между профессиональной привычкой к смерти и человеческим страхом перед ней.

Особую эмоциональную глубину получает повествование в «Станционном смотрителе». Здесь языковой код строится на сдержанности, простоте и постепенном раскрытии трагедии «маленького человека». Самсон Вырин сначала входит в текст как представитель низкого социального положения, почти как типовая фигура. Однако по мере развития повести его судьба приобретает человеческую и нравственную значимость. Пушкин избегает риторической жалости, но именно отсутствие прямой патетики усиливает драматизм. Рассказчик становится посредником между героем и читателем: через изменение его взгляда раскрывается авторская позиция, основанная на сочувственном внимании к человеку, чья боль внешне незаметна.

В «Барышне-крестьянке» языковой код приобретает игровой характер. Повесть строится на маскараде, переодевании, социальной роли и речевой стилизации. Лиза, становясь Акулиной, меняет не только костюм, но и манеру речи. Язык здесь оказывается средством создания новой социальной маски. Через речевое поведение героиня входит в другую роль, а сюжет получает комедийную лёгкость. Вместе с тем эта игра показывает условность социальных границ. Пушкин демонстрирует, что речь не просто отражает положение персонажа, но и участвует в создании его художественной идентичности.

В этом отношении «Повести Белкина» подтверждают мысль Ю. М. Лотмана о том, что в художественном тексте «будут говорить на нескольких языках», а их соотнесённость образует единую систему художественной информации [2, с. 175]. В пушкинском цикле действительно взаимодействуют разные речевые пласты: язык издательского предисловия, язык провинциального рассказа, язык военной среды, язык сентиментальной повести, язык бытового анекдота, язык социальной драмы и язык комедийной игры. Эти коды не существуют отдельно. Они пересекаются, меняют оценку событий и создают многозначность текста.

Соотношение автора и рассказчика в «Повестях Белкина» связано также с проблемой авторской оценки. Пушкин редко даёт прямой вывод. Его оценка выражается через композицию, интонацию, речевую маску, жанровое ожидание, контраст и скрытую иронию. В. В. Виноградов рассматривал проблему автора как одну из центральных проблем художественной речи, поскольку образ автора

проявляется не только в содержании, но и в способе организации словесного материала [3, с. 118]. В «Повестях Белкина» эта закономерность особенно очевидна: авторская позиция не совпадает с речью Белкина, но именно через Белкина и другие посреднические фигуры она становится художественно ощутимой.

Повествовательная многослойность цикла связана и с понятием «чужого слова». В пушкинском тексте постоянно присутствует слово, переданное другим лицом, переработанное, стилизованное или поставленное в новую композиционную рамку. М. М. Бахтин подчёркивал значимость «чужого слова» как формы взаимодействия речевых позиций в художественном тексте [5, с. 178]. В «Повестях Белкина» чужое слово не является механическим пересказом. Оно становится способом создания авторской дистанции. Пушкин показывает, что рассказ о событии всегда зависит от того, кто рассказывает, в какой речевой форме и с какой степенью понимания.

Б. А. Успенский связывал композицию художественного произведения с системой точек зрения, через которые организуется изображаемый мир [6, с. 17]. В «Повестях Белкина» точка зрения подвижна. Читатель воспринимает событие не только глазами героя и не только глазами рассказчика. Между событием и читателем возникает ряд посредников, и каждый из них изменяет смысл. Благодаря этому простые фабулы получают аналитическую глубину. Пушкинская проза оказывается краткой по форме, но сложной по внутренней организации.

Важно и то, что языковой код цикла связан с жанровой природой отдельных повестей. Б. В. Томашевский указывал, что жанровая форма задаёт ожидания читателя и влияет на восприятие фабулы [4, с. 207]. Пушкин использует эти ожидания свободно. «Выстрел» напоминает романтическую повесть, «Метель» – сентиментально-романтическую историю, «Гробовщик» – фантастический анекдот, «Станционный смотритель» – социально-психологическую драму, «Барышня-крестьянка» – комедийную новеллу. Однако ни одна повесть не сводится к готовой жанровой модели. Пушкин каждый раз меняет код изнутри: романтическое становится ироничным, бытовое – философским, комедийное – социально значимым.

Ю. Н. Тынянов рассматривал пушкинскую прозу в связи с обновлением литературной системы и освобождением от устойчивых риторических шаблонов [7, с. 246]. «Повести Белкина» подтверждают это наблюдение. Пушкин создаёт прозу, в которой внешняя простота соединяется с точностью композиции и

речевой многослойностью. Авторская мысль не разъясняется, а организуется через структуру рассказа. Читатель должен сам распознать, где говорит герой, где рассказчик, где жанровая маска, а где скрытая авторская ирония.

Л. Я. Гинзбург подчёркивала, что литературный герой раскрывается не только через поступок, но и через систему повествовательного представления [8, с. 63]. В пушкинском цикле это особенно заметно. Сильвио, Самсон Вырин, Адриан Прохоров, Лиза Муромская существуют не только как участники событий, но и как фигуры, увиденные через определённый речевой код. Их восприятие зависит от того, кто о них говорит и в какой форме выстроен рассказ. Поэтому проблема героя в «Повестях Белкина» неотделима от проблемы рассказчика.

Заключение. Соотношение автора и рассказчика в «Повестях Белкина» А. С. Пушкина является одной из ключевых особенностей художественной структуры цикла. Пушкин сознательно отказывается от прямого авторского повествования и создаёт сложную систему посредников: издателя, Белкина, первичных рассказчиков и героев. Благодаря этому текст приобретает многослойность, а авторская позиция выражается не декларативно, а через композицию, интонацию, речевую маску и жанровую игру.

Проблема языкового кода раскрывается в том, что каждая повесть цикла имеет собственную речевую организацию. В «Выстреле» действует код чести и романтической напряжённости, в «Метели» – код сентиментально-романтической интриги, в «Гробовщике» – бытовой и фантастико-иронический код, в «Станционном смотрителе» – сдержанный драматический код, в «Барышне-крестьянке» – комедийно-игровой код социального перевоплощения. Эти коды различны, но объединены общей повествовательной рамкой.

В результате «Повести Белкина» предстают как художественная модель, где проблема авторства связана с проблемой речи. Автор, рассказчик и герой образуют систему взаимно соотнесённых позиций. Именно через эту систему Пушкин показывает, что язык в прозе является не только средством сообщения, но и способом построения смысла, оценки и читательского восприятия.

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ДИАЛЕКТИКА ДУШИ КАК ЦЕНТРАЛЬНЫЙ ПРИЁМ ПОСТРОЕНИЯ ПСИХОЛОГИЧЕСКОГО ПОРТРЕТА В РОМАНЕ Л. Н. ТОЛСТОГО «ВОЙНА И МИР»

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Аннотация. В статье рассматривается диалектика души как центральный приём построения психологического портрета в романе Л. Н. Толстого «Война и мир». Основное внимание уделяется тому, что внутренний мир героев раскрывается не как завершённое состояние, а как сложный процесс нравственного движения, сомнений, ошибок, прозрений и духовного обновления. На материале образов Пьера Безухова, Андрея Болконского, Наташи Ростовой и княжны Марьи анализируется, как Толстой передаёт противоречивость человеческой личности через внутренний монолог, психологическую деталь, смену эмоциональных состояний и связь частной судьбы с историческим временем. Показано, что психологический портрет у Толстого строится не на статическом описании характера, а на изображении его развития. Диалектика души позволяет выявить нравственно-философскую основу романа, где подлинная ценность человека определяется способностью к правде, любви, состраданию, самоанализу и духовному росту.

Ключевые слова: Л. Н. Толстой, «Война и мир», диалектика души, психологический портрет, психологизм, нравственный поиск, внутренний мир героя.

Abstract. The article examines the dialectic of the soul as a central technique in constructing the psychological portrait in Leo Tolstoy's novel *War and Peace*. Special attention is paid to the fact that the inner world of the characters is presented not as a fixed state, but as a complex process of moral movement, doubt, mistakes, insight, and spiritual renewal. Through the images of Pierre Bezukhov, Andrei Bolkonsky, Natasha Rostova, and Princess Marya, the article analyzes how Tolstoy conveys the contradictory nature of human personality through inner monologue, psychological detail, changing emotional states, and the connection between private destiny and historical time. It is shown that Tolstoy's psychological portrait is based not on static character description, but on the depiction of inner development. The dialectic of the

soul reveals the moral and philosophical foundation of the novel, where human value is determined by truth, love, compassion, self-reflection, and spiritual growth.

Keywords: Leo Tolstoy, *War and Peace*, dialectic of the soul, psychological portrait, psychologism, moral search, inner world of the character.

Введение. Роман Л. Н. Толстого «Война и мир» занимает особое место в истории русской литературы не только как масштабное эпическое произведение о народе, войне и исторической судьбе России, но и как одно из глубочайших художественных исследований внутреннего мира человека. В русской литературной критике особенность толстовского психологизма традиционно связывается с понятием «диалектика души». Н. Г. Чернышевский, характеризуя раннего Толстого, отмечал, что писателя интересует не только итог чувства, но и «сам психический процесс» [2, с. 422]. Эта мысль особенно точно раскрывает художественную природу романа «Война и мир».

Основная часть. Диалектика души у Толстого проявляется прежде всего в изображении человека как существа внутренне подвижного и противоречивого. Герой не сводится к одной устойчивой черте. Он может быть одновременно слабым и нравственно сильным, заблуждающимся и способным к прозрению, эгоистичным и открытым для любви. Именно поэтому толстовский психологический портрет не строится по принципу готовой характеристики. Он раскрывается через последовательность душевных состояний, через внутренние переломы и нравственные поиски.

Пьер интересен Толстому именно как человек внутреннего поиска. Он не имеет готовой жизненной программы. Его сознание формируется через столкновение с ложью светского общества, с пустотой внешнего успеха, с насилием войны и с простотой народной правды. Л. Я. Гинзбург справедливо отмечала, что в психологической прозе важен не только образ личности, но и «художественное ее изображение» в связи с эпохой и средой [6, с. 7]. В этом смысле Пьер раскрывается не вне истории, а внутри огромного исторического движения, которое заставляет его пересмотреть прежние представления о жизни.

Значительным этапом в развитии Пьера становится плен и встреча с Платоном Каратаевым. Толстой не изображает духовное изменение героя как мгновенное озарение. Оно совершается постепенно: через физическое страдание, страх, утрату прежних опор, наблюдение за простотой и цельностью Каратаева. Пьер начинает понимать ценность не отвлечённой идеи, а самой жизни, человеческого тепла, внутреннего согласия с миром. Его

психологический портрет строится как движение от хаотического самоанализа к нравственной простоте.

Другой тип диалектики души представлен в образе Андрея Болконского. В начале романа князь Андрей стремится к славе и личному величию. Он устал от светской пустоты, от семейного быта, от разговоров, лишённых подлинного смысла. Его идеалом становится Наполеон, воплощающий для него силу воли и историческую значительность. Однако Аустерлицкое сражение разрушает эту иллюзию. Лежа на поле боя, Андрей видит над собой «высокое небо» и ощущает ничтожность прежних честолюбивых стремлений [1, с. 358].

Однако духовный путь Андрея не заканчивается Аустерлицем. Толстой показывает, что прозрение не делает человека сразу свободным от боли, гордости и сомнений. После возвращения князь Андрей переживает разочарование, замкнутость, внутреннюю опустошённость. Позднее его пробуждение к жизни связано с Наташей Ростовой. Любовь возвращает ему чувство будущего, но затем ошибка Наташи снова разрушает его внутреннее равновесие. Последний этап духовного развития Андрея связан с прощением, страданием и приближением к христианскому смирению. В нём Толстой показывает сложнейшее движение от гордого индивидуализма к способности принять любовь и прощение.

Наташа Ростова занимает особое место в системе психологических портретов романа. Толстой изображает её как живую, эмоционально открытую натуру. Её душевная жизнь развивается не через рациональные рассуждения, а через непосредственное чувство. Наташа воспринимает мир сердцем, и именно поэтому её образ наполнен движением, изменчивостью, внутренней музыкальностью. Она способна к радости, увлечению, ошибке, стыду, состраданию и духовному обновлению.

Диалектика души Наташи особенно заметна в истории её увлечения Анатолем Курагиным. Толстой не сводит этот эпизод к внешней интриге. Для него важно показать, как душевная открытость может стать причиной нравственного падения, если чувство лишается внутренней ответственности. Наташа ошибается не потому, что она духовно пуста, а потому, что её эмоциональная природа оказывается беззащитной перед обманчивой силой страсти. Здесь психологический портрет строится на противоречии между чистотой натуры и возможностью нравственного заблуждения.

После разрыва с князем Андреем Наташа проходит через тяжёлое страдание. Толстой показывает её не как героиню, навсегда определённую ошибкой, а как человека, способного к раскаянию и возрождению. Особенно

глубоко её душа раскрывается в эпизодах ухода за раненым Андреем. Здесь Наташа проявляет способность к самоотверженному состраданию. Её внутренняя красота открывается не в безошибочности, а в умении страдать за другого, принимать вину и возвращаться к нравственной цельности.

Княжна Марья Болконская представляет иной тип психологического портрета. Её душевная жизнь сосредоточена вокруг веры, долга, терпения и любви. Внешне она лишена светского блеска, но Толстой постепенно раскрывает её глубокую нравственную красоту. В образе Марьи диалектика души выражается в напряжении между смирением и желанием личного счастья, между любовью к отцу и страданием от его суровости, между религиозным самоотречением и естественной человеческой потребностью быть любимой.

Толстой не идеализирует княжну Марью прямолинейно. Её смирение не означает отсутствия боли. Её вера не уничтожает внутреннего конфликта. Напротив, духовная сила Марьи раскрывается именно через способность выдерживать этот конфликт и не ожесточаться. В её психологическом портрете важны не внешние события, а скрытая работа души. Через Марью Толстой показывает, что нравственная высота может быть тихой, незаметной, лишённой эффектных жестов, но от этого не менее значительной.

Важнейшим художественным средством создания психологического портрета у Толстого является психологическая деталь. Писатель часто раскрывает внутреннее состояние героя через жест, взгляд, паузу, мимику, интонацию. В. В. Виноградов подчёркивал, что художественная речь раскрывает образ не только через прямое описание, но и через особую организацию словесного материала [4, с. 118]. У Толстого деталь не является украшением текста. Она становится способом проникновения во внутреннюю жизнь человека.

Так, неловкость движений Пьера передаёт его внутреннюю неустойчивость и неумение жить по правилам светского общества. Холодная сдержанность Андрея выражает его отчуждение от пустой социальной среды. Сияние лица Наташи показывает силу её непосредственного чувства. Смиренный взгляд княжны Марьи раскрывает не слабость, а напряжённую духовную жизнь. Через малую деталь Толстой создаёт крупный психологический смысл.

Не менее важным средством является внутренний монолог. Однако у Толстого внутренняя речь героя редко выглядит как стройное логическое рассуждение. Она передаёт живой процесс мысли: сомнение, самоубеждение,

внезапное понимание, стыд, страх, радость. Именно здесь наиболее полно проявляется «диалектика души». Читатель видит не только итог решения, но и путь к нему, не только поступок, но и внутреннюю борьбу, из которой этот поступок рождается.

Диалектика души в романе неотделима от исторического фона. Война 1812 года выступает не только как событие национальной истории, но и как нравственное испытание личности. Перед лицом войны, смерти, разлуки, потери и народного бедствия герои обнаруживают подлинную меру своей души. Светские роли, честолюбивые мечты, внешние успехи и условные нормы постепенно теряют значение. История проверяет человека на внутреннюю правду.

М.М. Бахтин писал, что в большом художественном произведении человек раскрывается в «незавершённости» своего становления [5, с. 197]. Эта мысль особенно применима к героям «Войны и мира». Толстой не фиксирует личность как окончательно сформированную. Его герои открыты изменению. Их психологический портрет строится как путь, а не как итог. Именно поэтому они воспринимаются живыми: Пьер ещё ищет, Андрей ещё борется, Наташа ещё растёт, Марья ещё преодолевает боль.

Б.М. Эйхенбаум подчёркивал, что толстовское искусство связано с пристальным вниманием к процессу внутреннего движения человека [7, с. 214]. В «Войне и мире» это внимание становится основой художественного метода. Толстой видит личность не в отвлечённой характеристике, а в конкретной смене состояний. Его психологический портрет всегда связан с временем: герой меняется, потому что живёт, ошибается, страдает и заново понимает себя.

С.Г. Бочаров отмечал, что роман Толстого соединяет частную человеческую судьбу с общим движением истории [8, с. 86]. Именно поэтому психологический портрет в «Войне и мире» имеет не только индивидуальное, но и эпическое значение. Внутренние поиски Пьера, Андрея, Наташи и Марьи включены в широкую картину народной жизни. Толстой показывает, что история совершается не только на полях сражений, но и в человеческой душе.

Заключение. Диалектика души является одним из главных художественных принципов романа Л. Н. Толстого «Война и мир». Образы Пьера Безухова, Андрея Болконского, Наташи Ростовой и княжны Марьи подтверждают, что психологизм Толстого имеет глубокую нравственную основу. Пьер проходит путь от растерянности к внутренней простоте, Андрей – от честолюбивой мечты к смирению и прощению, Наташа – от эмоциональной

ошибки к состраданию, Марья – от страдания к духовной стойкости. Каждый из этих путей раскрывает сложность человеческой личности. Следовательно, психологический портрет в «Войне и мире» является не только средством характеристики героя, но и способом выражения философской концепции романа.

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CONGENITAL HEART DISEASES

A Comprehensive Review of Developmental Mechanisms, Clinical Spectrum, and Emerging Therapeutic Strategies

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Abstract

Congenital heart diseases (CHDs) represent the most common group of congenital anomalies worldwide, encompassing a diverse spectrum of structural and functional abnormalities arising from disruptions in cardiac embryogenesis. These conditions range from simple lesions with minimal physiological impact to complex malformations requiring lifelong medical and surgical management. This narrative review explores the developmental biology underlying cardiac formation, the genetic and environmental factors contributing to CHDs, and the pathophysiological mechanisms that drive clinical manifestations. We further examine advances in diagnostic modalities, including prenatal imaging and molecular screening, alongside evolving therapeutic approaches such as surgical correction, catheter-based interventions, and regenerative strategies. Understanding the multifactorial nature of CHDs is essential for improving early detection, optimizing patient outcomes, and advancing personalized cardiovascular care.

Keywords: congenital heart disease, cardiac embryology, septal defects, cyanotic heart disease, pediatric cardiology, genetic mutations, cardiac

1 Introduction

Congenital heart diseases constitute a major global health burden, affecting approximately 8-10 per 1,000 live births. These disorders arise from abnormalities in the structure or function of the heart present at birth, often resulting from disrupted cardiac development during early embryogenesis. Historically, CHDs were associated with high infant mortality; however, advances in medical science, particularly in pediatric cardiology and cardiac surgery, have dramatically improved survival rates. Today, a growing population of adults lives with repaired or unrepaired congenital heart defects, shifting CHDs from a purely pediatric concern to a lifelong condition requiring multidisciplinary care. The complexity of CHDs reflects the intricate processes involved in heart development, where even minor perturbations in cellular signaling, gene expression, or hemodynamic forces can lead to significant anatomical abnormalities.

2. Embryological Basisof Congenital Heart Diseases

2.1 Normal Cardiac Development

The human heart begins as a simple tubular structure that undergoes looping, septation, and chamber formation within the first 8 weeks of gestation. Key processes include:

Formation of the primitive heart tube

Cardiac looping (establishing left-right asymmetry) Septation into four chambers

Development of valves and great vessels

These steps are tightly regulated by genetic signaling pathways, including NKX2-5, GATA4, and TBX5, as well as molecular gradients such as retinoic acid and sonic hedgehog signaling.

2.2 Pathogenesis of CHDs

Disruptions in any stage of cardiac development can result in congenital defects. Mechanisms include: Failure of septation → septal defects

Abnormal neural crest cell migration → outflow tract anomalies

Defective valve formation → stenosis or regurgitation Improper looping → complex structural malformations These abnormalities often arise from a combination of genetic predisposition and environmental influences.

1. Classification of Congenital Heart Diseases

CHDs are broadly categorized into acyanotic and cyanotic lesions based on their physiological impact.

3.1 Acyanotic Heart Defects

These defects typically involve left-to-right shunting or obstructive lesions without significant hypoxemia. Common examples:

Atrial septal defect (ASD)

Ventricular septal defect (VSD)

Patent ductus arteriosus (PDA)

Coarctation of the aorta

These conditions may initially be asymptomatic but can lead to complications such as pulmonary hypertension and heart failure if untreated.

3.2 Cyanotic Heart Defects

Cyanotic CHDs involve right-to-left shunting, resulting in reduced oxygen saturation and visible cyanosis.

Major conditions include:

Tetralogy of Fallot

Transposition of the great arteries

Tricuspid atresia

Total anomalous pulmonary venous return.

These defects often require early surgical intervention to ensure survival.

4 Genetic and Environmental Factors

4.1 Genetic Contributions

Genetic abnormalities play a significant role in CHDs, ranging from single-gene mutations to chromosomal anomalies.

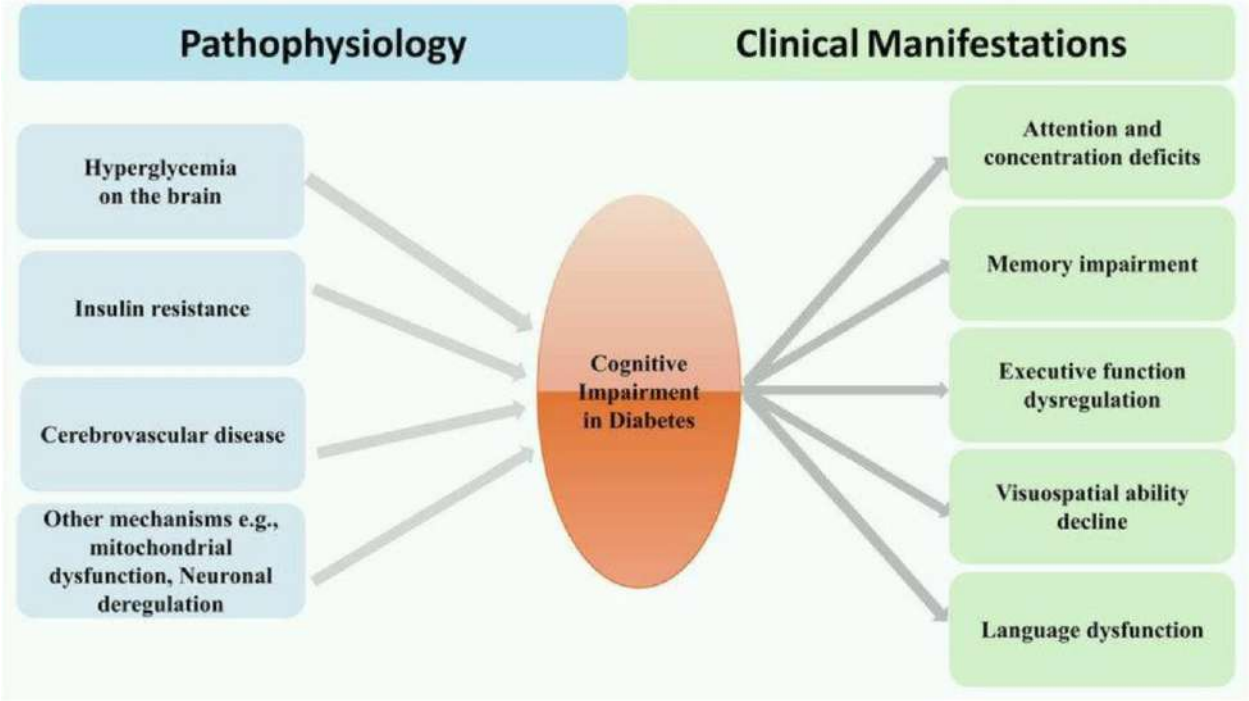
Associated conditions include:

Down syndrome (AV septal defects)

Turner syndrome (coarctation of the aorta)

DiGeorge syndrome (conotruncal defects)

Advances in genomic sequencing have identified numerous mutations affecting cardiac transcription factors and signaling pathways



3.2 Cyanotic Heart Defects

Cyanotic CHDs involve right-to-left shunting, resulting in reduced oxygen saturation and visible cyanosis.

Major conditions include:

Tetralogy of Fallot

Transposition of the great arteries

Tricuspid atresia

Total anomalous pulmonary venous return These defects often require early surgical intervention to ensure survival.

4. Genetic and Environmental Factors

4.1 Genetic Contributions

Genetic abnormalities play a significant role in CHDs, ranging from single-gene mutations to chromosomal anomalies. Associated conditions include: Down syndrome (AV septal defects) Turner syndrome (coarctation of the aorta) DiGeorge syndrome (conotruncal defects) Advances in genomic sequencing have identified numerous mutations affecting cardiac transcription factors and signaling pathways

4.2 Environmental Influences

Maternal and environmental factors also contribute to CHD

Maternal diabetes

Viral infections (e.g., rubella)

Alcohol and drug exposure

Nutritional deficiencies

These factors may interfere with normal embryonic development, especially during the critical first trimester.

1. Pathophysiology and Clinical Manifestations

The clinical presentation of CHDs depends on the type and

severity of the defect.

5.1 Hemodynamic Changes

Abnormal blood flow patterns can lead to:

Volume overload

Pressure overload

Reduced systemic oxygen delivery

5.2 Common Symptoms

Cyanosis

Tachypnea

Poor feeding and growth (failure to thrive) Fatique and exercise intolerance Heart murmurs

Severe cases may present in the neonatal period, while milder defects can remain undiagnosed until adulthood.

6. Diagnostic Approaches

6.1 Prenatal Diagnosis

Fetal echocardiography allows early detection of structural abnormalities, enabling timely intervention planning.

6.2 Postnatal Evaluation

Echocardiography (gold standard)

Electrocardiography

Chest X-ray

Cardiac MRI and CT

Cardiac catheterization

Early and accurate diagnosis is crucial for

preventing complications and improving outcomes.

Therapeutic Strategies

7.1 Medical Management

Pharmacological treatment aims to stabilize patients and manage symptoms: Diuretics for fluid overload ACE inhibitors for heart failure Prostaglandins to maintain ductal patency in neonates

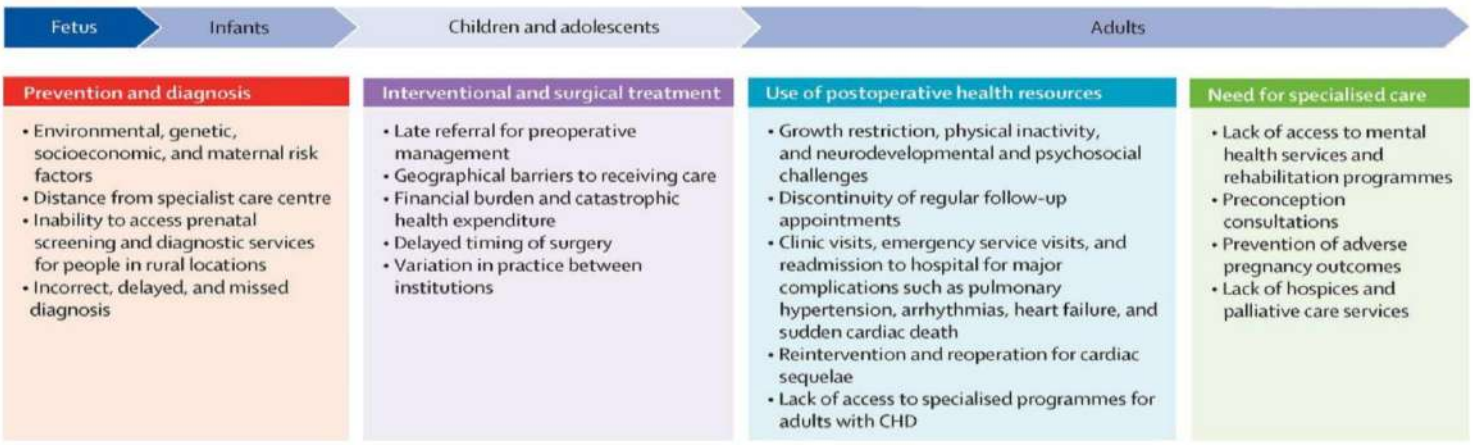
7.2 Surgical Interventions

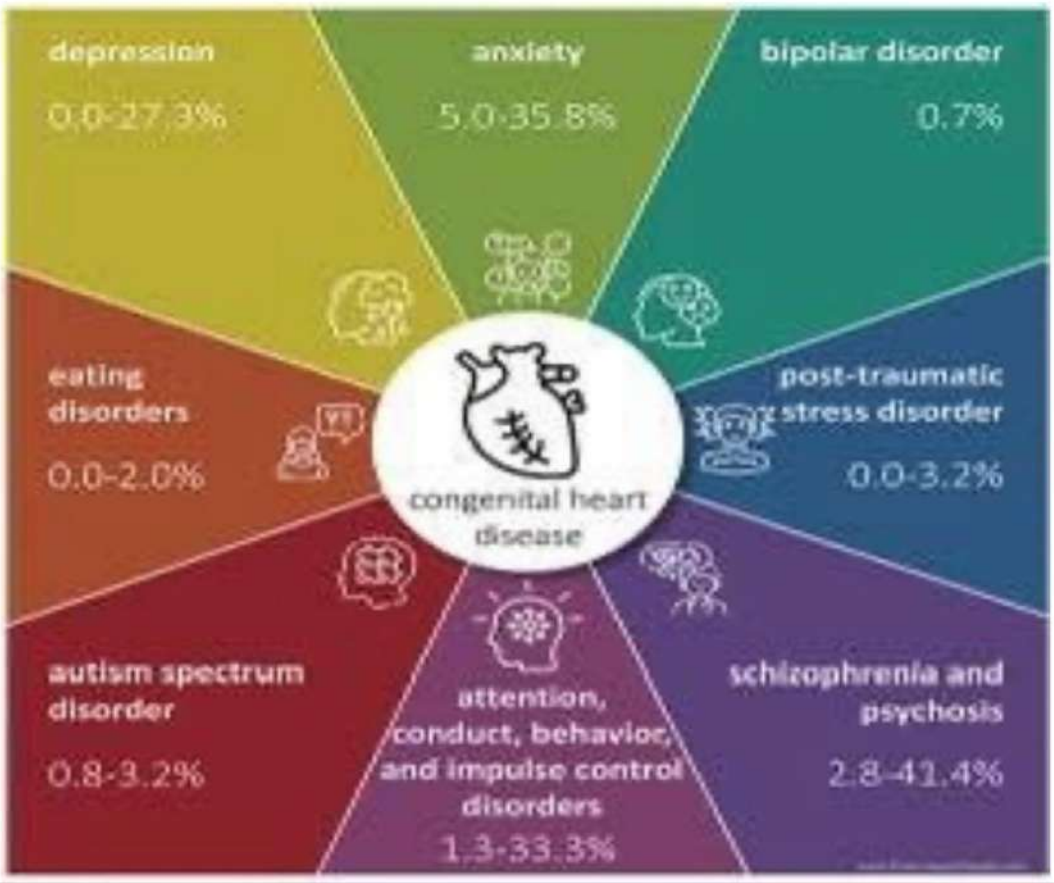
Surgery remains the cornerstone of treatment for many CHDs:

Septal defect closure

Valve repair or replacement

Complex reconstructive procedures





critical role in long-term care.

9. Conclusion

Congenital heart diseases represent a complex interplay of developmental, genetic, and environmental factors, reflecting the delicate orchestration of cardiac

embryogenesis. Advances in diagnostic techniques and therapeutic interventions have transformed

CHDs from often fatal conditions into manageable chronic diseases. However, challenges remain in early detection, equitable access to care, and long-term management. Future research focusing on molecular mechanisms, regenerative medicine, and personalized treatment approaches offers hope for further improving outcomes and quality of life for individuals affected by these conditions.

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АБУ НАСР АЛЬ-ФАРАБИ – ЭНЦИКЛОПЕДИСТ ВОСТОЧНОГО РЕНЕССАНСА: СТРУКТУРА НАУЧНОГО ЗНАНИЯ И МЕТОДОЛОГИЯ

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Аннотация: В статье рассматривается системообразующая роль аль-Фараби (870–950 гг.) в истории мировой науки. Анализируется его классификация наук, философия как интегратор знаний, вклад в логику, естествознание, музыку и педагогику. Особое внимание уделяется концепции «Второго учителя» (после Аристотеля) и её влиянию на развитие научной мысли на всей территории исламского мира, включая Мавераннахр и Хорасан.

Ключевые слова: аль-Фараби, классификация наук, Второй учитель, логика, энциклопедизм, Восточный Ренессанс.

Abstract: The article examines the system-forming role of al-Farabi (870-950) in the history of world science. His classification of sciences, philosophy as an integrator of knowledge, and contributions to logic, natural science, music, and pedagogy are analyzed. Special attention is paid to the concept of the "Second Teacher" (after Aristotle) and its influence on the development of scientific thought throughout the Islamic world, including Transoxiana and Khorasan.

Keywords: al-Farabi, classification of sciences, the Second Teacher, logic, encyclopedism, Oriental Renaissance

Историко-культурный контекст. Родившийся в Отраре (современный Казахстан), аль-Фараби прошёл путь от простого судьи до главного философа Багдада, Дамаска и Алеппо. Его время – X век – эпоха стремительного синтеза греческого, персидского, индийского и арабо-мусульманского знания.

«Второй учитель»: переосмысление аристотелизма. Аль-Фараби не просто комментировал Аристотеля, но создал оригинальную систему, где логика

становится инструментом всех наук. Его трактат «Введение в логику» долгое время служил основным учебником в медресе Востока.

Классификация наук («Ихса аль-улюм»). Это сочинение – первая в истории исламской культуры стройная систематизация знания:

- *Языковые науки* (грамматика, поэтика).
- *Логика* (органон).
- *Пропедевтические науки* (математика, геометрия, оптика, астрономия, музыка).
- *Естественные науки* (физика, метеорология, биология, медицина).
- *Метафизика* (учение о сущем и первопричинах).
- *Гражданские науки* (этика, политика, юриспруденция).

Эта модель оказала прямое влияние на Фому Аквинского, Роджера Бэкона и позже – на европейскую университетскую традицию.

Музыкальная акустика и психология. В «Большой книге о музыке» аль-Фараби даёт математическое обоснование музыкальных интервалов, описывает психологическое воздействие ладов на человека – на 500 лет раньше европейских музыкальных теоретиков.

Значение для современной педагогики и науковедения. Идея междисциплинарности, которую проповедовал Фараби, легла в основу современных STEM-подходов. Его требование опоры на опыт (эксперимент) коррелирует с методологией современного естествознания.

Заключение: аль-Фараби является не просто исторической фигурой, но действующей методологической моделью для обучения будущих учёных. В любой сфере – от IT до биоэтики – обращение к его принципам систематизации знания даёт эвристический эффект.

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TYPE 2 DIABETES MELLITUS: A GROWING LIFESTYLE DISORDER AMONG YOUNG ADULTS

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Abstract

Central diabetes insipidus is a rare disorder of the hypothalamus and posterior pituitary gland. It is uncommon in patients with type 2 diabetes mellitus, and both conditions can present with similar symptoms such as excessive thirst and increased urination. Because of this overlap, polyuria is often wrongly attributed only to poor glycemic control.

We report the case of a 65-year-old female with known type 2 diabetes mellitus and inadequate blood sugar control, who presented with long-standing excessive urination. Laboratory investigations showed hypernatremia, increased plasma osmolality, and low urine osmolality, suggesting diabetes insipidus.

A water deprivation test followed by subcutaneous desmopressin administration was performed, which showed a clear improvement in urine concentration, confirming central diabetes insipidus. Magnetic resonance imaging of the brain revealed a normal posterior pituitary bright spot, suggesting an idiopathic cause.

This case emphasizes that persistent polyuria in diabetic patients should not always be attributed to uncontrolled diabetes mellitus, and other conditions such as diabetes insipidus should also be considered.

Keywords: Central diabetes insipidus; Type 2 diabetes mellitus; Polyuria; Polydipsia; Desmopressin test; Water deprivation test; Hypernatremia; Pituitary disorders

Introduction

Diabetes mellitus is a chronic metabolic disorder characterized by elevated blood glucose levels resulting from impaired insulin secretion, insulin resistance, or both.

Among its different types, type 2 diabetes mellitus (T2DM) is the most common form and represents a major global health concern. Earlier considered a disease of older adults, type 2 diabetes is now increasingly affecting adolescents and young adults due to sedentary lifestyles, unhealthy eating patterns, obesity, and reduced physical activity.

According to the World Health Organization, the global prevalence of diabetes has increased rapidly over the past few decades. The disease not only affects the quality of life of patients but also places a significant burden on healthcare systems worldwide. Early identification of risk factors and adoption of preventive strategies are essential to reduce morbidity and mortality associated with diabetes mellitus.

Epidemiology

Type 2 diabetes mellitus has shown a steady and rapid increase worldwide over the past few decades, making it one of the most important non-communicable diseases globally. Epidemiological studies show that its prevalence varies across regions, ethnic groups, and socioeconomic settings, with higher rates commonly seen in urban populations compared to rural areas. It is also observed that in many populations, men have a slightly higher prevalence than women before 60 years of age, while in high-burden regions, the disease is increasingly being diagnosed at younger ages.

A significant public health concern is that a large proportion of individuals with type 2 diabetes remain undiagnosed, with nearly half of the cases estimated to be undetected in some populations. Many are identified only through screening tests such as fasting plasma glucose or oral glucose tolerance test. The rising prevalence is mainly linked to modifiable lifestyle factors, including obesity (especially central obesity), physical inactivity, and unhealthy dietary habits, along with genetic susceptibility. These findings highlight the strong influence of modern lifestyle changes on the global increase in type 2 diabetes.

Pathogenesis

The pathogenesis of type 2 diabetes mellitus is multifactorial and develops through the interaction of genetic susceptibility and environmental influences such as obesity, physical inactivity, and unhealthy dietary habits. Excess caloric intake and sedentary lifestyle contribute to the accumulation of visceral fat, which plays a major role in metabolic dysfunction. Increased visceral adiposity promotes the release of free fatty acids and pro-inflammatory cytokines that interfere with normal insulin signaling pathways. As a result, insulin resistance develops in peripheral tissues, particularly in skeletal muscles, liver, and adipose tissue. In skeletal muscles, glucose uptake is

reduced, while the liver continues excessive glucose production despite elevated blood glucose levels. At the same time, adipose tissue shows impaired glucose storage and abnormal lipid metabolism.

During the early stages of the disease, pancreatic β-cells compensate for insulin resistance by increasing insulin secretion, leading to compensatory hyperinsulinemia. However, persistent metabolic stress gradually impairs β-cell function and decreases their ability to produce sufficient insulin. This progressive β-cell dysfunction eventually results in relative insulin deficiency and sustained hyperglycemia. Chronic elevation of blood glucose further contributes to glucotoxicity, lipotoxicity, and oxidative stress, all of which worsen insulin resistance and accelerate β-cell damage. Over time, these metabolic abnormalities lead to disease progression and the development of long-term complications, including diabetic retinopathy, nephropathy, neuropathy, and cardiovascular disease.

Complications of Diabetes Mellitus:

Complications of diabetes mellitus are broadly classified into acute and chronic categories and are mainly the result of persistent hyperglycemia. Acute complications include diabetic ketoacidosis and hyperosmolar hyperglycemic state, which occur due to severe metabolic decompensation and can be life-threatening if not treated promptly. Chronic complications develop gradually and involve multiple organ systems. Microvascular complications include diabetic retinopathy, which may lead to vision impairment, diabetic nephropathy leading to progressive renal dysfunction, and diabetic neuropathy affecting peripheral and autonomic nerves.

Macrovascular complications are equally significant and include accelerated atherosclerosis leading to coronary artery disease, cerebrovascular accidents, and peripheral arterial disease. These complications contribute significantly to morbidity and mortality in diabetic patients. In addition, diabetes is associated with delayed wound healing and diabetic foot ulcers, which may progress to infection and amputation if not managed early. Overall, long-standing uncontrolled blood glucose is the primary driving factor behind both microvascular and macrovascular complications, making strict glycemic control essential in prevention.

Pharmacological Treatment

Type 2 Diabetes Mellitus (T2DM) is managed pharmacologically in a stepwise manner as described in standard MBBS references such as *Harrison's Principles of*

Internal Medicine, *Davidson's Medicine*, and *Katzung's Basic & Clinical Pharmacology*. The cornerstone of treatment is **metformin**, which is recommended as first-line therapy due to its action of reducing hepatic gluconeogenesis and improving peripheral insulin sensitivity. It is widely preferred unless contraindicated and is often continued as foundational therapy in combination regimens.

When glycemic control is not achieved with metformin alone, additional oral or injectable agents are added. **Sulfonylureas** (such as glimepiride and glipizide) stimulate insulin secretion from pancreatic β-cells, while **meglitinides** provide short-acting insulin release for postprandial control. **Thiazolidinediones** (pioglitazone) improve insulin sensitivity in peripheral tissues. **α-glucosidase inhibitors** (acarbose, voglibose) delay carbohydrate absorption in the intestine, reducing post-meal glucose rise.

Newer antidiabetic agents recommended in current guidelines include **DPP-4 inhibitors** (sitagliptin, linagliptin), which enhance incretin activity and increase glucose-dependent insulin secretion, and **GLP-1 receptor agonists** (liraglutide, semaglutide), which increase insulin release and suppress glucagon secretion. **SGLT2 inhibitors** (dapagliflozin, empagliflozin) act on the renal tubules to increase urinary glucose excretion and are now widely used as add-on therapy. In advanced disease or when oral agents fail, **insulin therapy** is initiated, either as basal, premixed, or basal–bolus regimens, as emphasized in *Harrison's* and *ADA-aligned treatment approaches*.

PREVENTION STRATEGIES:

Prevention of diabetes mellitus, especially type 2 diabetes, is mainly based on reducing modifiable risk factors and delaying or preventing disease onset in high-risk individuals. The most effective preventive strategy is **lifestyle modification**, which includes maintaining a healthy body weight, regular physical activity, and a balanced diet rich in dietary fiber, whole grains, fruits, and vegetables while reducing intake of refined carbohydrates, sugary foods, and saturated fats. Regular exercise improves insulin sensitivity and helps maintain normal glucose metabolism, thereby reducing the risk of developing diabetes.

Another important preventive approach is **early identification and risk control**. Individuals with impaired fasting glucose or impaired glucose tolerance should be advised intensive lifestyle intervention to prevent progression to diabetes. Management of associated risk factors such as obesity, hypertension, and dyslipidemia also plays a significant role in prevention. Smoking cessation and limiting sedentary behavior further reduce risk. In selected high-risk individuals, pharmacological prevention with

agents like metformin may be considered. Community-level strategies such as health education, routine screening, and awareness programs are also essential to reduce the overall burden of diabetes mellitus.

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IMPACT OF SOCIAL MEDIA ON MENTAL HEALTH

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ABSTRACT

Drawing on insights from The Anxious Generation by Jonathan Haidt, this article explores the growing impact of social media on adolescent mental health. In recent years, there has been a notable rise in anxiety, depression, and emotional distress among young people, coinciding with the widespread adoption of smartphones and social media platforms.

The objective of this article is to examine how increased screen exposure and online interaction contribute to these mental health challenges. Key factors discussed include the shift from a play-based to a phone-based childhood, leading to reduced real-world socialization, increased social comparison, and disrupted sleep patterns. Additionally, the article highlights mechanisms such as algorithm-driven engagement, validation-seeking behavior, and the psychological effects of constant online connectivity. These elements are analyzed in relation to their role in intensifying emotional vulnerability, particularly among adolescents.

The article concludes that excessive and unregulated use of social media plays a significant role in declining mental well-being. It emphasizes the need for preventive measures, including mindful technology use, delayed access to smartphones, and stronger awareness among parents and educators, to promote healthier developmental outcomes.

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KEYWORDS

Core Mental Health Issues

- Anxiety and Depression
- Social media
- mental health
- Adolescents
- Anxiety
- Depression
- FOMO (fear of missing out)
- social comparison
- Cyberbullying
- sleep deprivation
- body image issues
- digital addiction
- mindful usage

Social media impacts mental health through addictive features like dopamine-driven, highlight-reel content, which often triggers anxiety, depression, body image issues, and FOMO (Fear of Missing Out). Key terms include cyberbullying, social comparison, sleep deprivation, and digital detox.

INTRODUCTION

Social media has become an integral part of modern life, especially among adolescents and young adults, offering instant communication, entertainment, and global connectivity. However, it is increasingly viewed as a "double-edged sword" because, alongside its benefits, it also contributes to rising concerns about mental health. Excessive engagement with social media platforms has been linked to anxiety, depression, low self-esteem, and distorted self-image, largely driven by constant exposure to idealized and curated online content.

Recent discussions in research and public health highlight several concerns. Scholars such as Jean Twenge and W. Keith Campbell suggest that heavy social media use may reduce face-to-face interaction, increasing feelings of loneliness and emotional distress among adolescents. Similarly, public health experts like Dr. Vivek Murthy, the U.S. Surgeon General, have noted that high daily usage of social media is associated with a greater risk of poor mental health outcomes in teenagers. Other researchers emphasize the concept of "meta-stress," where continuous screen exposure disrupts sleep patterns and contributes to heightened anxiety levels.

Commonly identified issues include cyberbullying, unrealistic beauty standards, and the "highlight reel" effect, where users compare their everyday lives to idealized online portrayals. Overall, while social media is not solely responsible for mental health challenges, research indicates a strong association between excessive use and declining psychological well-being, particularly among young users.

ETIOLOGY

1. Phone-Based Childhood Shift (Jonathan Haidt)

- Shift from play-based to phone-based childhood as a key driver of mental health decline.
- Reduced real-world, unsupervised play essential for emotional regulation and social skill development
- Girls identified as early and more affected due to appearance-focused platforms like Instagram

2. Social Comparison and Digital Influence (Jean Twenge)

1 Constant upward comparison with curated "highlight reels" on social media.

2 Decreased self-esteem and increased body image dissatisfaction.

3 Dose-response effect: higher screen time (>3 hours/day) linked with increased risk of anxiety and depression.

3. "Alone Together" Effect (Sherry Turkle)

- Illusion of connection but increased emotional loneliness.
- Weakened face-to-face relationships.

- Dependence on "likes" and online validation for self-worth.

4. Physiological and Cognitive Mechanisms

- Sleep deprivation due to late-night screen use, worsening mood disorders.
- Attention fragmentation from constant notifications.
- Fear of Missing Out (FOMO) leading to compulsive checking and anxiety.

5. Cyberbullying and Online Harassment

- Exposure to trolling and abusive online interactions.
- Significant association between cyberbullying and increased depression and anxiety.
- Online environments often amplify emotional distress due to lack of accountability.

RISK FACTORS

The impact of social media on mental health is shaped by both behaviours we can change (modifiable) and inherent factors we

Modifiable	Non-modifiable
Passive scrolling of "highlight reel" content (linked to anxiety, depression, low self-esteem)	**Adolescence (ongoing brain and emotional development)**
Excessive usage time (>2–3 hours/day)	**Female gender (higher vulnerability to social comparison effects)**
Late-night social media use causing sleep disruption	**Pre-existing mental health conditions (anxiety, depression, loneliness)**

Use of appearance-focused platforms (Instagram, TikTok, Snapchat) affecting body image	**Algorithm-driven platform design promoting continuous engagement (infinite scroll, AI feeds)**
Low real-world social interaction and dependence on online validation	**Structural shift to "phone-based childhood" (as discussed in The Anxious Generation)**

CLASSIFICATION

Although social media–related mental health effects are not a formal medical disease, they can be classified based on severity and functional impact:

1. **Based on Severity of Psychological Impact**
    1. Mild:
        - Occasional stress, distraction, and temporary mood changes after social media use
    2. Moderate:
        1. Persistent anxiety, low self-esteem, body image concerns, sleep disturbances, and reduced concentration
    3. Severe:
        - Clinical depression, severe anxiety disorders, social withdrawal, and in extreme cases, self-harm tendencies

2. **Based on Pattern of Social Media Use**
    1. Passive use:
        - Continuous scrolling and consumption of content, strongly linked with negative mental health outcomes
    2. Active use:
        - Direct communication and content sharing, relatively less harmful when balanced
    3. Problematic/Addictive use:

- Compulsive engagement with loss of control, often associated with emotional dependency and functional impairment

3. **Developmental Vulnerability (as highlighted in The Anxious Generation)**

- Early adolescence: Highest vulnerability due to emotional and cognitive development stage.
- Mid-to-late adolescence: Continued risk with increasing peer comparison and identity formation pressures.

PATHOPHYSIOLOGY

The development of mental health problems due to social media use occurs through a stepwise neuropsychological and behavioural cascade.

1. Early Exposure to Social Media & Smartphones
   - Constant access to digital platforms during adolescence
2. Dopamine-Driven Reward Activation
   - Likes, comments, and notifications stimulate brain reward pathways
3. Development of Habitual / Compulsive Use
   - Increased screen
4. Exposure to Curated “Highlight Reel” Content
   - Idealized images and lifestyles dominate feed
5. Social Comparison Process
   - Upward comparison with peers or influencers
   - Perception of personal inadequacy
6. Psychological Effects
   - Low self-esteem, body image dissatisfaction, and emotional insecurity
7. Physiological Disruption

- Sleep disturbance due to late-night usage
- Increased stress response and fatigue

8. Emotional Dysregulation

- Increased anxiety, irritability, and depressive symptoms

9. Vicious Cycle Formation

- Negative emotions drive further social media use for escape or validation time and reduced self-control over usage

CLINICAL FEATURES

The mental health effects of excessive social media use present with a range of psychological, behavioural, and functional symptoms, particularly in adolescents.

1. Psychological Symptoms

- Persistent anxiety and excessive worry
- Depressive mood and loss of interest in daily activities
- Low self-esteem and feelings of inadequacy
- Increased irritability and emotional instability
- Fear of Missing Out (FOMO)

2. Cognitive Symptoms

- Reduced attention span and poor concentration
- Difficulty focusing on academic or routine tasks
- Overthinking and constant comparison with others
- Negative self-perception and distorted body image

3. Behavioural Signs

- Excessive or compulsive social media use
- Preference for online interaction over face-to-face communication
- Social withdrawal and isolation from family or peers

- Frequent checking of phone or notifications

4. Physical / Functional Signs

- Sleep disturbances or insomnia (especially due to late-night usage)
- Fatigue and reduced energy levels
- Decline in academic performance
- Reduced participation in physical and social activities

COMPLICATIONS

Prolonged and excessive social media use, particularly when associated with psychological distress, can lead to significant long-term consequences affecting mental, social, and functional well-being.

1. Mental Health Complications

- Development of chronic anxiety disorders
- Major depressive disorder
- Increased risk of emotional burnout and stress-related disorders
- Persistent low self-esteem and negative self-image

2. Behavioural and Social Complications

- Social withdrawal and isolation from real-life relationships
- Dependence on online validation and digital interaction
- Poor interpersonal skills due to reduced face-to-face communication
- Increased vulnerability to cyberbullying-related trauma

3. Academic and Functional Complications

- Decline in academic performance and concentration ability
- Reduced productivity and motivation
- Poor time management and increased procrastination

4. Severe Long-Term Outcomes

- Risk of self-harm behaviors in vulnerable individuals
- Suicidal ideation in cases of severe untreated depression (as discussed in The Anxious Generation)
- Long-term impairment in emotional regulation and resilience development

DIAGNOSIS

The diagnosis of mental health issues related to social media use is primarily clinical, as there are no specific laboratory or imaging tests that can directly confirm the condition. It is based on a detailed assessment of symptoms, behavioural patterns, and psychosocial history.

1. Investigations

- Detailed clinical history of social media usage (duration, frequency, patterns)
- Psychological assessment for symptoms of anxiety, depression, or stress
- Evaluation of sleep patterns and daily functioning
- Assessment of academic, social, and occupational impairment
- Screening questionnaires (e.g., PHQ-9 for depression, GAD-7 for anxiety)

2. Lab Findings

- No specific laboratory marker for diagnosis
- Laboratory tests may be used only to rule out other causes (e.g., thyroid dysfunction, vitamin deficiencies contributing to mood changes)

3. Imaging

- No role of routine imaging in diagnosis
- Neuroimaging is not indicated unless there is suspicion of other neurological or psychiatric conditions.

MANAGEMENT

Management of social media–related mental health problems is mainly psychological and behavioural, focusing on reducing harmful usage patterns and improving overall mental well-being. There is no role for surgical treatment.

1. Medical / Psychological

- Cognitive behavioural Therapy (CBT) as first-line treatment
- Counselling for anxiety, depression, and digital dependency
- Medications (antidepressants/anxiolytics) if clinically required
- Improve sleep hygiene and reduce night-time screen use
- Reduce screen time and promote digital detox
- Encourage physical activity and real-life social interaction

2. Preventive Measures

- Parental monitoring of adolescents' screen use
- Education on healthy social media habits
- Promoting offline hobbies and social engagement

CONCLUSION

Social media has become an integral part of modern life, especially among adolescents, but excessive and unregulated use is increasingly linked to mental health challenges such as anxiety, depression, low self-esteem, and social isolation. Researchers like Dr. Jean Twenge, Sherry Turkle, and Dr. Vivek Murthy have highlighted how constant digital exposure, social comparison, and reduced face-to-face interaction can negatively affect emotional well-being. Studies also point to factors such as sleep disruption, cyberbullying, and dependency on online validation as major contributors to psychological distress.

While social media offers benefits like connectivity and information sharing, its impact depends largely on how it is used. The key takeaway is that balanced and mindful usage is essential. Promoting healthy digital habits, limiting excessive screen time, and encouraging real-world social interactions can significantly help protect mental health, particularly in younger individuals.

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A COMPREHENSIVE MULTI-MODAL FRAMEWORK FOR PREDICTING AND MANAGING CONGESTIVE HEART FAILURE

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Abstract

Congestive Heart Failure (CHF) remains one of the most prevalent and life-threatening cardiovascular conditions globally, demanding highly accurate diagnostic and predictive tools. This paper proposes a comprehensive multi-modal framework that synthesizes electrocardiography (ECG) signals, electronic health records (EHR), and medical imaging to predict CHF onset, risk of readmission, and potential treatment complications. While previous research has successfully leveraged isolated data streams, clinical realities necessitate a unified approach to patient monitoring and proactive care. By integrating advanced temporal sequence modeling, entropic signal analysis, and natural language processing for drug interaction screening, our proposed methodology aims to deliver a holistic diagnostic pipeline. We detail the foundational related literature across signal processing, longitudinal predictive modeling, and automated literature analysis to contextualize our contributions. Furthermore, we outline a structured methodology comprising data ingestion, feature fusion, and clinical evaluation protocols. Finally, we discuss the practical implications of deploying such a multi-modal system, alongside its critical limitations, ethical considerations, and vital directions for future research.

Introduction

Congestive heart failure is a severe medical condition characterized by the heart's inability to pump sufficient blood to meet the body's essential metabolic needs

(Yayık et al., 2019). It is associated with alarmingly high rates of morbidity, mortality, and hospital readmissions, which collectively place a massive financial burden on global healthcare systems (Zolfaghar et al., 2013). Early diagnosis and effective ongoing management are exceptionally crucial, especially given that the incidence of CHF increases significantly with patient age (Kutlu et al., 2017).

The core problem addressed in this paper is the historical fragmentation of predictive analytics in CHF management. The scope of our investigation encompasses the seamless integration of diverse clinical inputs—such as longitudinal administrative data, complex physiological signals, and structural medical imaging—to create a unified, robust predictive framework. This framework is specifically designed to anticipate disease onset, dynamically evaluate post-discharge readmission risks, and continuously monitor complex pharmacological regimens.

Despite significant advancements in medical machine learning, existing computational approaches remain insufficient for comprehensive CHF management for several key reasons. First, the majority of current models rely strictly on single-modality data, such as exclusively analyzing ECG signals or solely tracking administrative health records, thereby missing the synergistic insights that a multi-modal patient profile provides (Mallya et al., 2019)(Yayık et al., 2019). Second, static predictive algorithms frequently fail to capture the highly dynamic, longitudinal nature of disease progression and complex treatment interactions, which severely limits their clinical utility over extended patient care timelines (Zolfaghar et al., 2013)(Miller, 2017).

To overcome these structural limitations, this paper introduces a novel integrated perspective on CHF diagnosis and prognosis. Specifically, our primary contributions to the field are as follows:

- We propose a hypothetical, multi-modal machine learning framework that fuses structural EHR data, physiological signal entropies, and image-based structural features to generate a holistic patient risk profile.
- We construct a structured evaluation methodology designed to rigorously validate this framework against established clinical benchmarks, ensuring its practical relevance and generalizability across diverse patient populations.

Related Work

The first major category of related work focuses on physiological signal processing, particularly the mathematical analysis of electrocardiogram (ECG) data.

Researchers have extensively utilized entropic measurements and complex dynamical analysis to characterize cardiac signals, observing that the cardiac dynamics of CHF patients tend to be significantly more deterministic and less randomly complex than those of healthy individuals (Mukherjee et al., 2015). Advanced non-linear classification techniques, such as second-order difference plots (SODP) and regularized Hessenberg decomposition-based extreme learning machines (R-HessELM), have demonstrated near-perfect accuracy in distinguishing CHF patients from healthy controls within localized experimental datasets (Yayık et al., 2019)(Kutlu et al., 2017). Furthermore, entropic analysis has successfully established direct correlations between heartbeat long-range memory patterns and actual patient mortality risk (Allegrini et al., 2002). While these signal-based methodologies exhibit profound predictive strength, they predominantly operate in clinical isolation and represent a weakness by failing to incorporate the patient's broader medical history, an oversight our framework directly addresses.

The second category involves longitudinal predictive modeling, which utilizes historical Electronic Health Records (EHR) to forecast future clinical events. Previous investigations have successfully framed the prediction of CHF hospital readmission as a multi-layer supervised learning problem, stratifying patients by evaluating generalized risk, 60-day risk, and acute 30-day risk independently (Zolfaghar et al., 2013). In the context of early disease onset, researchers have demonstrated the distinct efficacy of recurrent neural networks, particularly Long Short-Term Memory (LSTM) architectures, to predict CHF up to 15 months in advance by capturing the sparse, longitudinal nature of clinical EHR data (Mallya et al., 2019). These longitudinal models excel at establishing predictive timelines but often lack the granular, real-time physiological insights embedded in high-frequency raw ECG signals, necessitating the integrated approach proposed in this paper.

The third category encompasses medical imaging enhancements and the automated analysis of concurrent treatment protocols. In ultrasonography, improved binarization techniques based on abstract Ring Theory and the Otsu thresholding method have been proposed to better isolate structural indicators of CHF amidst noisy surrounding organ tissues (Rahim & Torres, 2021). Concurrently, natural language processing (NLP) has been effectively deployed to automatically extract pediatric drug-drug interactions from medical literature, highlighting the severe complications that can arise from balancing ACE inhibitors, beta-blockers, and diuretics in failing hearts (Miller, 2017). Our proposed framework seeks to systematically bridge the gap

between these distinct domains, merging the visual structural data from sonograms and the chemical interaction risks mapped by NLP with the predictive power of temporal models.

Method/Approach

To address the inherently multifaceted nature of congestive heart failure, we propose a structured, multi-modal predictive framework that synthesizes the diverse data streams described above. The system architecture is divided into three primary modules: Data Ingestion and Preprocessing, Multi-Modal Feature Extraction, and the Unified Predictive Engine. The fundamental rationale behind this modular design is to allow the independent optimization of modality-specific algorithms before mathematically combining them within a joint latent space. This intentional design choice ensures that missing data in any single modality does not cause a complete systemic failure, thereby preserving predictive robustness in real-world clinical environments where data collection is frequently imperfect.

The specific processing pipeline is structured through the following numbered steps to ensure systematic and reproducible feature integration.

1. Raw ECG signals are continuously processed using inclined entropy measurements and non-linear second-order difference plots to extract dynamic complexity features indicative of cardiac distress (Yayık et al., 2019)(Kutlu et al., 2017).
2. Longitudinal EHR data, encompassing patient demographics and historical diagnosis codes, are transformed into dense temporal vectors using a specialized LSTM-based embedding strategy (Mallya et al., 2019).
3. Echocardiogram image outputs undergo advanced Otsu thresholding optimized via ring theory for the precise structural isolation of cardiac abnormalities and fluid retention markers (Rahim & Torres, 2021).
4. Concurrently, an NLP module continuously screens the patient's active pharmacological regimen against an automated, literature-backed database of critical drug-drug interactions (Miller, 2017).

Finally, these distinct feature vectors are concatenated and passed through a sophisticated multi-layer perceptron classifier, which outputs a composite risk score evaluating disease onset probability, acute decompensation risk, and 30-day readmission likelihood (Zolfaghar et al., 2013).

Evaluating this complex architectural pipeline requires a rigorous, multi-phased evaluation plan utilizing both retrospective datasets and prospective clinical validation. Hypothetically, we will leverage publicly available intensive care datasets alongside a proprietary repository of matched hospital records encompassing synchronized ECG, EHR, and imaging modalities. The primary statistical metrics for evaluating predictive performance will include the Area Under the Receiver Operating Characteristic Curve (AUC-ROC) and the F1-score, which are essential to account for the severe class imbalances inherent in medical datasets. Furthermore, a specialized panel of expert cardiologists will conduct qualitative reviews of the model's feature attribution, ensuring that the algorithmic reasoning strictly aligns with established physiological and pharmacological principles.

Discussion

The practical implications of deploying this comprehensive multi-modal framework within modern clinical settings are substantial and far-reaching. Integrating this predictive pipeline directly into existing hospital information systems could uniquely empower clinicians with real-time, actionable insights during brief patient encounters. By systematically shifting the clinical paradigm from reactive symptom treatment to proactive risk stratification, hospital networks can more efficiently allocate critical care resources and design highly personalized outpatient intervention plans (Zolfaghar et al., 2013). Furthermore, automating the detection of dangerous pharmacological interactions directly within the diagnostic workflow significantly reduces the cognitive load on prescribing physicians, particularly in highly complex pediatric or geriatric cases (Miller, 2017).

Despite its vast theoretical strengths, the proposed framework faces several critical limitations and potential failure modes in practical deployment. First, the fused model is highly susceptible to data sparsity; missing modalities—such as a patient lacking a recent high-resolution echocardiogram or continuous ECG monitoring—can severely degrade the predictive confidence of the multi-modal fusion module. Second, the system inherently risks generating a high rate of false positives regarding readmission or disease onset, which can rapidly precipitate alarm fatigue among healthcare providers and lead to the eventual dismissal of valid clinical alerts. Third, out-of-distribution generalization remains a pervasive failure mode; machine learning models trained on specific urban hospital demographics frequently experience

significant performance drops when deployed in socioeconomically or geographically disparate regions with varying baseline health metrics.

Stringent ethical considerations and inherent systemic risks must also be meticulously managed prior to any real-world clinical deployment. A primary ethical risk is the potential exacerbation of algorithmic bias, where the model may inadvertently provide lower quality predictions for historically underrepresented demographic groups that lack comprehensive longitudinal EHR or advanced imaging data. Additionally, aggregating highly sensitive physiological signals, historical health records, and treatment regimens into a centralized predictive engine introduces severe data privacy and security vulnerabilities, necessitating the implementation of advanced cryptographic safeguards and strict adherence to informed patient consent protocols.

Looking forward, there are several promising avenues for future research to iteratively refine and expand this predictive framework. One critical direction is the direct integration of continuous, real-time data streams from commercial wearable physiological monitors, which would allow the system to continuously track dynamic changes in heart rate variability outside of formal clinical environments. Another vital area for future work is the integration of frontier large language models to synthesize broader arrays of medical literature for novel drug interaction discovery; however, this approach must be strictly paired with robust automated verification methods to mitigate the severe risks of clinical hallucinations (George & Stuhlmüller, 2023).

Conclusion

In conclusion, the effective clinical management of congestive heart failure requires advanced analytical tools that fundamentally match the complexity of the disease itself. By integrating electrocardiogram entropy analysis, longitudinal EHR modeling, advanced medical imaging binarization, and automated drug-interaction screening, we have outlined a highly robust multi-modal machine learning framework. This synthesis of previously isolated computational domains provides a powerful blueprint for generating holistic patient risk profiles that can accurately predict disease onset and actively prevent costly hospital readmissions.

As the global incidence of cardiovascular disease continues to rise, the transition toward multi-dimensional predictive analytics is not merely an academic exercise, but an urgent clinical necessity. While significant translational challenges remain regarding localized data sparsity, algorithmic fairness, and hospital IT integration, the

methodologies discussed herein offer a highly viable pathway toward more resilient and intelligent cardiovascular care. Ultimately, successfully deploying such comprehensive diagnostic systems will reliably enable cardiologists to make highly informed, life-saving therapeutic decisions with unprecedented speed and precision.

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CONGENITAL HEART DISEASES IN NEWBORNS : EARLY DETECTION AND OUTCOMES.

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Introduction: Development of the infant heart (Embryology)

- Formation of the primitive heart tube it starts from week 3 of gestation period. It's origin is from splanchnic mesoderm where the two endocardial tube fuse together to form a single primitive heart tube.There are 5 segments which is from cranial to caudal : Truncus arteriosus,bulbus cordis,primitive ventricle,primitive atrium,sinus venosus.If any deviation occurs in these segments it can lead to complex congenital heart disease (CHD).
- Cardiac looping happens from week 4 of the gestation period. In this case the heart tube undergoes rightward looping (D-looping).This formation matters because it develops a normal spatial arrangement.The right ventricle comes to lie in the front ie anterior.The left ventricle moves to the back ie posterior. If the looping is not normal it can cause two abnormal looping in heart ie Dextrocardia - heart is located on the

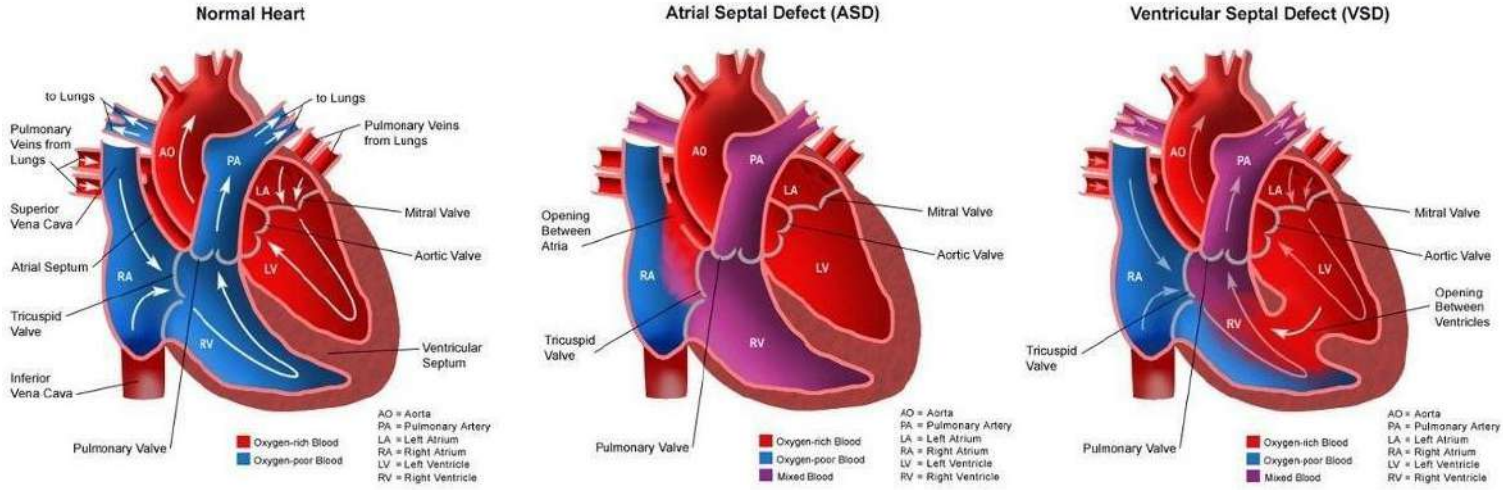
right side instead of left and congenitally corrected transposition of the great arteries - abnormal arrangement of the major heart vessels.

- Formation of the heart septa starts from weeks 4-8 of the gestation period.Septation of is the process by which the early heart(a single tube) is divided into four chambers → right atrium,left atrium,right ventricle and left ventricle.There will be formation of the atrial septa,ventricular septa and atrioventricular canal division. Atrial septum forms → divides the upper chambers(ventricles). Ventricular septum forms → divides the lower chambers(ventricles).

  Atrioventricular canal divison where the endocardial cushions divide AV canal into Mitral and Tricuspid valve. Important because it ensures proper separation of oxygenated and deoxygenated blood also allows the heart to function efficiently after birth. At birth the atrial septation is functionally closure due to the increase in left atrial pressure.If there is abnormality in septal formation it can lead to congenital heart defects such as atrial septal and ventricular septal defect.

- Conotruncal septation (Aorticopulmanory) is a process by which the single outflow tract of the primitive heart is divided into two major arteries. These are aorta (which carries the oxygenated blood to the body) and pulmonary artery (which carries deoxygenated blood to the lungs). There are special cells called neural crest cells migrate from the developing nervous system into the heart and these cells from a spiral shaped wall (septum) inside the outflow tract which is known as Aorticopulmanory septum if this process fails it can lead to the failure of the neural crest migration of septum formation causes serious congenital heart diseases.

- Development of valves is a complex process that occurs during the fourth through eight weeks of embryonic development. It is essentially transforms the heart from a simple tube into a multi -chambered pump with one way gates.



Atrioventricular valve:- the Mitral and Tricuspid valves which is separating the atrial from the ventricles.

The role of endocardial cushions:These are thickenings of specialized tissues that grow from the walls of the heart towards the center.As they fuse,they divide the single atrioventricular canal into the right and left openings.

Formation through excavation: After the canal is divided, the surrounding tissue undergoes a process of remodeling. The ventricular walls excavate or hollow out,leaving behind thin strands of tissue.

- The final structure: These strands eventually differentiate into the valve leaflets (cusps),the chordae tendineae and the papillary muscle that anchor the valves.

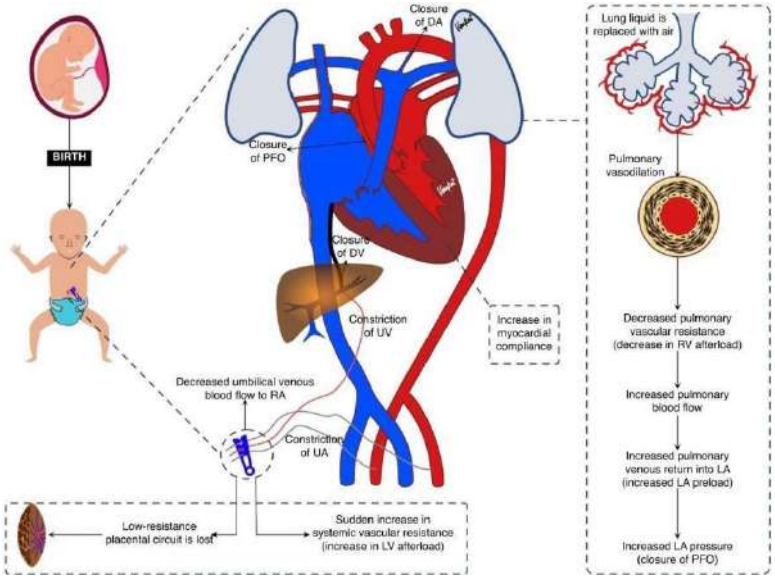
Semilunar valves:- The aortic and pulmonary are located at the exists of the heart, where blood leaves the ventricles to enter the great arteries.

- The truncal swellings: This valves develop from small masses of tissue called truncal swelling or ridge located within the Truncus arteriosus that is the single large vessel that eventually splits into the aorta and pulmonary artery.

- Division and sculpting: As the Truncus arteriosus is divided into two separate vessels by the spiral septum, these swellings are rearranged.
  Three swellings are assigned to each new vessel.

- Formation of the cusps: The tissue is “hollow out” from the top down,creating three thin, cup-shaped pockets. Because they look like half- moon,they are called semilunar.

Fetal Circulation :- In a fetus,the lungs and the liver are not fully functional,so the body uses special shunt (bypass pathway) to circulate blood efficiently.
There are some key shunts as follows:



✓ Foramen ovale :

- An opening between the right and left atrium.
- Allows oxygenated blood from the placenta to bypass the lungs and go directly into systemic circulation.
- Blood flow:Right atrium- Left atrium- left ventricle- aorta.

✓ Ductus arteriosus:

- A vessel connecting the pulmonary artery to the aorta.
- Diverts blood away from the lungs.
- Blood flow: pulmonary artery - aorta.

✓ Ductus venosus :

1. connects the umbilical vein to the inferior vena cava (IVC).

2. Allows blood to bypass the liver and flow directly into circulation.

7. Transition at birth:- when the baby takes the first breath, major changes occur:

✓ Lungs expand:

- Air enters lungs- Pulmonary vessels open .
- Blood now flows to lungs for oxygenation.

✓ Pressure changes in heart:

* Left atrial pressure becomes higher than right.
* This causes closure of the foramen ovale.

✓ Closure of shunts:

1 Foramen ovale - becomes fossa ovalis.

2 Ductus arteriosus - becomes ligamentum arteriosum.

3 Ductus venosus - becomes ligamentum venosum.

✓ Umbilical cord is cut:

- Placental circulation stops.
- Baby becomes independent for oxygen and nutrients.

> Fetal Circulation: The fetus means baby in the womb gets oxygen and nutrients from the mother through the placenta because it's lungs are not working yet. There are following steps of blood flow in the infants :

1. The oxygenated blood comes from the placenta through the umbilical vein.
2. It passes through the liver, mostly bypassing it via the ductus venosus, and enters the interior vena cava.

3. Blood enters the right atrium of the heart.
4. Most of it passes directly to the left atrium through the foramen ovale(bypassing the lungs)
5. From the left atrium → left ventricle → pumped into the aorta → supplies the body.

What happens to blood when it goes to the lungs:

• some blood from the right atrium goes to the right ventricle → pulmonary artery. Since lungs are not functional most blood is diverted to the aorta through the ductus arteriosus.

There are fetal structures which includes :

One Umbilical vein which brings deoxygenated blood.
ductus venosus which bypass the liver. foramen ovale which connects the right and left atria.
ductus arteriosus which connects the pulmonary artery to aorta.
Two Umbilical arteries which carry deoxygenated blood to placenta.

✓ Congenital Malformation Syndrome and Cardiac Features

1. Chromosomal abnormalities: Trisomy 21 (down Syndrome)

* causes: Human cells typically contain 23 pairs of chromosomes. Trisomy 21 occurs due to an error in cell division called nondisjunction.

NONDISJUNCTION:

This is the happen when a pair of chromosomes fails to separate properly during the formation of an egg or sperm cell. When that cell joints with normal cell the resulting embryo has three copies of chromosomes 21 instead of two.

VARIATIONS: STANDARD TRISOMY 21(95%):

Every cell in the body has three copies of chromosomes 21.

. MOSAICISM: only some cells have the extra chromosomes; symptoms may be milder.

TRANSLOCATION: part of chromosomes 21 becomes attached to another chromosomes.

CONSEQUENCE AND FEATURES:

The extra genetic material affect the development of various body system .

. Physical Features: common traits includes a flattened facial profile,upward slanting eyes (epicanthal folds) , single deep crease across the palm.

INTELLECTUAL AND DEVELOPMENTAL:

Most individual have mild to moderate intellectual disability and delays in speech and motor skills.

MARFAN SYNDROME IN NEWBORNS (NEONATAL MARFAN SYNDROME):

It's a genetic disorder of connective tissue that affects the heart, blood vessels, eyes , and skeleton.

It is caused by mutation affecting the body structural proteins, making tissue weaker and more elastic than normal.

CAUSES:

Mutation in the FBN1 gene.

This gene produce fibrilline -1.

Usually autosomal dominant inheritance

. In some newborns, it occurs due to new (spontaneous) mutation.

CARDIAC PROBLEMS IN NEWBORN

MARFAN syndrome is strongly linked to congenital and early onset heart diseases:

Common heart issues:

Mitral valve prolapse → valve doesn't close properly

.Severe Mitral or Tricuspid regurgitation

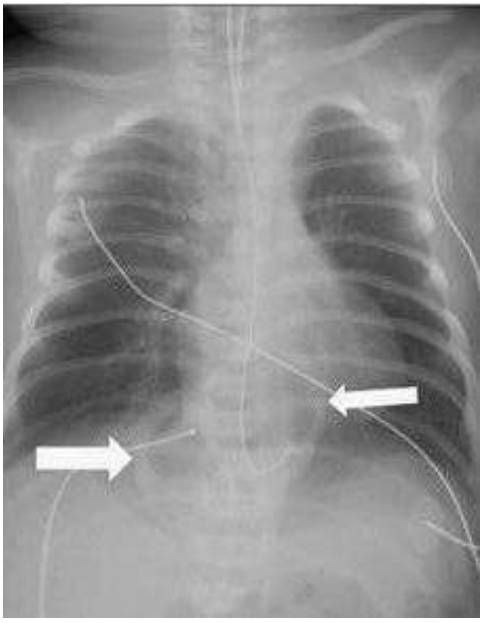
.Enlargement of the aorta (Aortic aneurysm)

.Risk of aortic dissection (life-threatening)

SIGNS AND SYMPTOMS IN NEWBORNS

Long limbs,fingers,loose joints,poor feeding and failure to thrive,rapid breathing or difficulty breathing,heart murmur,enlarged heart,signs of heart failure.

DIAGNOSIS :- clinical examination (doctor look for physical features and heart signs) ,imaging (echocardiography → main tool to detect valve problems and aortic enlargement) , genetic testing (confirm mutation in the FBN1 gene ,diagnostic criteria (based on the Ghent Criteria).



> **Conclusions :** Congenital heart disease in newborn are a major cause of illness and death World wide. Early diagnosis and proper treatment are very important. These conditions may occur due to structural defect in the heart of genetic disorders such as MARFAN syndrome, affecting the normal function of the cardio vascular system from birth.

With modern diagnostic tools, especially echocardiography, early detection has become easier and more accurate. This helps doctors start treatment on time,

whether medical or surgical. Advance in treatment matters, including drugs and corrective surgeries, have greatly improved survival rates and long term outcomes.

However, continuous follow up and a team-based approach to care are still essential. Regular monitoring helps prevent complications and supports proper growth and development. Improving newborn screening, increasing awareness, and ensuring access to specialized cardiac care are important

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OSHQOZON VA ICHAKLARNING ANATOMIYASI HAMDA ULARNING HAZM JARAYONIDAGI ROLI

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ANOTATSIYA

Mazkur maqolada oshqozon va ichaklarning anatomik tuzilishi hamda ularning ovqat hazm qilish jarayonidagi o‘rni ilmiy asosda yoritilgan. Oshqozonning morfologik tuzilishi, uning asosiy qismlari va devor qatlamlari, shuningdek, mexanik va kimyoviy hazm jarayonidagi roli batafsil tahlil qilingan. Ingichka va yo‘g‘on ichaklarning anatomik xususiyatlari, ularning hazm va so‘rilishdagi funksiyalari, ichak mikroflorasining ahamiyati keng yoritilgan. Shuningdek, ovqat hazm qilish tizimining nerv va gormonal boshqaruvi hamda ayrim kasalliklarning anatomik asoslari ko‘rib chiqilgan. Tadqiqot natijalari ovqat hazm qilish tizimi organlarining o‘zaro uyg‘un ishlashi organizm faoliyati uchun muhim ekanligini ko‘rsatadi.

KALIT SO‘ZLAR: Oshqozon, ichak, ovqat hazm qilish, anatomiya, fiziologiya, ingichka ichak, yo‘g‘on ichak, villus, ferment, oshqozon shirasi, hazm jarayoni, so‘rilish, mikroflora, gastrit, enterit.

АННОТАЦИЯ

В данной статье на научной основе освещены анатомическое строение желудка и кишечника, а также их роль в процессе пищеварения. Подробно проанализированы морфологические особенности желудка, его основные отделы и слои стенки, а также его участие в механическом и химическом переваривании пищи. Широко рассмотрены анатомические характеристики тонкого и толстого кишечника, их функции в процессе пищеварения и всасывания, а также значение кишечной микрофлоры. Кроме того, изучены нервная и гормональная регуляция пищеварительной системы и анатомические основы некоторых заболеваний. Результаты исследования показывают, что согласованная работа органов

пищеварительной системы имеет важное значение для нормального функционирования организма.

КЛЮЧЕВЫЕ СЛОВА: Желудок, кишечник, пищеварение, анатомия, физиология, тонкий кишечник, толстый кишечник, ворсинки, ферменты, желудочный сок, процесс пищеварения, всасывание, микрофлора, гастрит, энтерит.

ABSTRACT

This article scientifically examines the anatomical structure of the stomach and intestines, as well as their role in the process of digestion. The morphological structure of the stomach, its main parts and wall layers, and its role in mechanical and chemical digestion are analyzed in detail. The anatomical features of the small and large intestines, their functions in digestion and absorption, and the importance of intestinal microflora are extensively discussed. In addition, the nervous and hormonal regulation of the digestive system and the anatomical basis of certain diseases are reviewed. The results of the study demonstrate that the coordinated functioning of digestive system organs is essential for the proper functioning of the human body.

KEYWORDS: Stomach, intestine, digestion, anatomy, physiology, small intestine, large intestine, villi, enzymes, gastric juice, digestive process, absorption, microflora, gastritis, enteritis.

Kirish

Odam organizmida ovqat hazm qilish tizimi hayotiy muhim tizimlardan biri hisoblanadi. Ushbu tizimning asosiy vazifasi tashqi muhitdan qabul qilingan oziq moddalarni mexanik va kimyoviy qayta ishlash, ularni oddiy molekulalargacha parchalanishini ta’minlash hamda organizm tomonidan o‘zlashtirilishini amalga oshirishdan iborat. Hazm qilish tizimi bir nechta asosiy organlardan tashkil topgan bo‘lib, ular orasida oshqozon va ichaklar markaziy o‘rin egallaydi.

Oshqozon va ichaklar nafaqat ovqatni parchalaydi, balki moddalarning so‘rilishi, suv va elektrolit muvozanatini saqlash, immun himoya va mikrobiologik muvozanatni ta’minlashda ham muhim rol o‘ynaydi. Ushbu maqolada oshqozon va ichaklarning anatomik tuzilishi, histologik xususiyatlari va hazm jarayonidagi funksional ahamiyati ilmiy asosda keng yoritiladi.

Oshqozonning anatomik tuzilishi

Oshqozon (gaster) qorin bo‘shlig‘ining yuqori qismida joylashgan bo‘lib, qizilo‘ngach va ingichka ichak o‘rtasida joylashgan kengaygan bo‘shliq organdir. Uning asosiy vazifasi ovqatni vaqtincha saqlash, mexanik aralashtirish va kimyoviy parchalanishini boshlashdan iborat.

Oshqozon hajmi o‘rtacha 1,5–3 litr bo‘lib, ovqat qabul qilishga qarab o‘zgaradi.

Oshqozon qismlari

Oshqozon quyidagi anatomik qismlardan iborat:

Kardial qism (pars cardiaca) – qizilo‘ngach bilan tutashgan joy

Fundus (tub qismi) – yuqori kengaygan qism

Tana (corpus) – asosiy markaziy qism

Pilorik qism (pars pylorica) – ichakka o‘tuvchi qism

Pilorik qism sfinkter orqali o‘n ikki barmoqli ichakka ochiladi.

Oshqozon devorining tuzilishi

Oshqozon devori to‘rt qatlamdan tashkil topgan:

Shilliq qavat (tunica mucosa)

bezlarga boy

oshqozon shirasi ishlab chiqariladi

Shilliq osti qavat (submucosa)

qon tomirlari va nervlar mavjud

Mushak qavati (muscularis externa)

uch qatlam: uzunlamasına, halqasimon va qiyshiq

ovqatni aralashtirishda muhim

Seroz qavat (tunica serosa)

tashqi himoya qatlami

Oshqozonning fiziologik funksiyalari

Mexanik hazm

Oshqozon mushaklari qisqarib, ovqatni aralashtiradi va uni yarim suyuq massa — ximusa holiga keltiradi.

Kimyoviy hazm

Oshqozon shirasi tarkibiga quyidagilar kiradi:

Xlorid kislota (HCl) – bakteriyalarni yo‘q qiladi, fermentlarni faollashtiradi

Pepsin – oqsillarni parchalaydi

Lipaza – yog‘larni qisman parchalaydi

Himoya funksiyasi

Shilliq qavat maxsus mukus ajratib, oshqozon devorini kislota ta’siridan himoya qiladi.

Ingichka ichak anatomiyasi

Umumiy tuzilishi

Ingichka ichak uzunligi 5–7 metr bo‘lib, hazm va so‘rilishning asosiy joyi hisoblanadi.

U uch qismga bo‘linadi:

O‘n ikki barmoqli ichak (duodenum)

Och ichak (jejunum)

Yonbosh ichak (ileum)

Ichak devorining tuzilishi

Ichak devori ham to‘rt qatlamdan iborat:

shilliq qavat

submukoz qatlam

mushak qavati

seroz qavat

Shilliq qavatda **villyuslar (so‘ruvchi tukchalar)** mavjud bo‘lib, ular so‘rilish yuzasini bir necha barobar oshiradi.

Ingichka ichakning hazm jarayonidagi roli

Kimyoviy hazm

Bu yerda quyidagi fermentlar faol:

pankreatik fermentlar

ichak fermentlari

Oqsillar aminokislotalarga, yog‘lar yog‘ kislotalariga, uglevodlar monosaxaridlarga parchalanadi.

So‘rilish (absorbsiya)

Ingichka ichak asosiy so‘rilish joyidir:

glyukoza va aminokislotalar → qon orqali

yog‘lar → limfa orqali

Yo‘g‘on ichak anatomiyasi

Umumiy tuzilishi

Yo‘g‘on ichak uzunligi 1,5–2 metr bo‘lib, quyidagi qismlardan iborat:

ko‘richak (cecum)

ko‘tariluvchi ichak

ko‘ndalang ichak

tushuvchi ichak

sigmasimon ichak

to‘g‘ri ichak

Tuzilish xususiyatlari

Yo‘g‘on ichakda villuslar yo‘q, lekin shilliq bezlar ko‘p.

Yo‘g‘on ichakning funksiyalari

Suv so‘rilishi

Yo‘g‘on ichak suvni qayta so‘rib, najasni shakllantiradi.

Mikroflora roli

Ichak bakteriyalari:

vitamin K va B ishlab chiqaradi

immunitetni qo‘llab-quvvatlaydi

Najas hosil bo‘lishi

Hazm bo‘lmagan qoldiqlar chiqarishga tayyorlanadi.

Nerv va gormonal boshqaruv

Hazm jarayoni quyidagilar orqali boshqariladi:

enterik nerv tizimi

vegetativ nerv tizimi

gormonlar (gastrin, sekretin)

MAVZUNING DOLZARBLIGI

Hozirgi kunda inson salomatligini saqlash va kasalliklarning oldini olish tibbiyot fanining asosiy vazifalaridan biri hisoblanadi. Ovqat hazm qilish tizimi kasalliklari dunyo bo‘yicha eng keng tarqalgan kasalliklar qatoriga kiradi. Noto‘g‘ri ovqatlanish, stress, ekologik omillar va kamharakat turmush tarzi oshqozon va ichak faoliyatiga salbiy ta’sir ko‘rsatmoqda.

Shu nuqtai nazardan, oshqozon va ichaklarning anatomik tuzilishi hamda ularning hazm jarayonidagi rolini chuqur o‘rganish katta ilmiy va amaliy ahamiyatga ega. Bu bilimlar nafaqat tibbiyot xodimlari, balki keng jamoatchilik uchun ham muhim bo‘lib, kasalliklarning oldini olish va sog‘lom turmush tarzini shakllantirishga yordam beradi.

XULOSA

Oshqozon va ichaklar ovqat hazm qilish tizimining ajralmas qismlari bo‘lib, ular organizmning oziq moddalarni qabul qilish, qayta ishlash va o‘zlashtirish jarayonida muhim rol o‘ynaydi. Oshqozon ovqatni mexanik va kimyoviy qayta ishlashni boshlaydi, ichaklar esa hazm jarayonini yakunlab, oziq moddalarni so‘rilishini ta’minlaydi.

Ushbu organlarning anatomik tuzilishi ularning funksional vazifalariga moslashgan bo‘lib, har bir qism o‘ziga xos vazifani bajaradi. Shuningdek, ichak mikroflorasi va nerv-gormonal boshqaruv tizimi hazm jarayonining muvozanatini ta’minlaydi. Oshqozon va ichaklarning normal faoliyati buzilganda esa turli kasalliklar yuzaga keladi.

Shu sababli ushbu organlarning tuzilishi va funksiyalarini o‘rganish, ularni asrash va sog‘lom turmush tarziga rioya qilish inson salomatligini saqlashda muhim omil hisoblanadi.

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SUYUQLIKNING QOVUSHQOQLIKNI STOKS USULIDA ANIQLASH.

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Annotatsiya

Ushbu ilmiy ishda suyuqliklarning qovushqoqlik koeffitsiyentini aniqlashning muhim usullaridan biri bo'lgan Stoks usuli nazariy va amaliy jihatdan tahlil qilindi. Tadqiqot jarayonida sferik jismlarning suyuqlik ichida erkin tushish tezligiga asoslanib, qovushqoqlikni hisoblash prinsiplari o'rganildi. Stoks qonunining qo'llanish shartlari, xususan, laminar oqim, Reynolds sonining kichik qiymatlari va muhitning bir jinsliligi muhokama qilindi. Shuningdek, tajriba natijalariga ta'sir etuvchi omillar, jumladan, suyuqlik harorati, zarracha radiusi va zichliklar farqi tahlil qilindi. Olingan natijalar biofizika va tibbiyot amaliyotida, xususan, qonning reologik xususiyatlarini o'rganishda muhim ahamiyatga ega ekanligi ko'rsatildi.

Kalit so'zlar: qovushqoqlik, Stoks qonuni, laminar oqim, Reynolds soni, biofizika, suyuqlik mexanikasi, sferik zarracha, terminal tezlik, reologiya

Аннотация

В данной научной работе рассмотрен один из классических методов определения коэффициента вязкости жидкостей — метод Стокса. Исследование основано на анализе движения сферического тела в вязкой среде и использовании закона Стокса для вычисления вязкости. Особое внимание уделено условиям применимости закона, таким как ламинарный режим течения, малые значения числа Рейнольдса и однородность среды. Проанализированы факторы, влияющие на точность измерений, включая температуру жидкости, радиус частиц и разность плотностей. Полученные результаты имеют важное значение

в биофизике и медицине, в частности при изучении реологических свойств крови.

Ключевые слова: вязкость, закон Стокса, ламинарное течение, число Рейнольдса, биофизика, механика жидкости, сферическая частица, установившаяся скорость, реология

Abstract

This study investigates one of the classical methods for determining the viscosity coefficient of liquids — the Stokes method. The research is based on analyzing the motion of a spherical body falling through a viscous medium and applying Stokes' law to calculate viscosity. Particular attention is given to the conditions of applicability of the law, including laminar flow, low Reynolds number, and homogeneity of the medium. Factors affecting measurement accuracy, such as liquid temperature, particle radius, and density differences, are also examined. The results obtained are significant for applications in biophysics and medicine, especially in studying the rheological properties of blood.

Keywords: viscosity, Stokes' law, laminar flow, Reynolds number, biophysics, fluid mechanics, spherical particle, terminal velocity, rheology

Kirish

Suyuqliklarning fizik xossalarini o‘rganish biofizika va tibbiyot fanlarida muhim o‘rin egallaydi. Ayniqsa, qovushqoqlik (viskozlik) suyuqlik ichidagi ichki ishqalanishni ifodalovchi asosiy parametr bo‘lib, biologik tizimlarda, jumladan qon, limfa va hujayra ichki muhitining harakatlanish xususiyatlarini aniqlashda katta ahamiyatga ega. Qovushqoqlikni aniqlashning turli eksperimental usullari mavjud bo‘lib, ular orasida Stoks qonuni ga asoslangan usul klassik va ishonchli metodlardan biri hisoblanadi. Mazkur usul sferik jismning suyuqlik ichida erkin tushish jarayonini o‘rganishga asoslangan bo‘lib, bu jarayonda jismga uchta asosiy kuch ta’sir qiladi: og‘irlik kuchi, Arximed ko‘taruvchi kuchi va qovushqoqlik kuchi. Ushbu kuchlar muvozanatlashganda jism o‘zgarmas tezlik — terminal tezlik bilan harakatlana boshlaydi. Shu tezlikni aniqlash orqali suyuqlikning qovushqoqlik koeffitsiyenti hisoblab chiqiladi. Hozirgi kunda Stoks usuli nafaqat fizik tajribalarda, balki tibbiyotda ham, xususan, qonning reologik xususiyatlarini, tomirlar ichidagi oqim dinamikasini va patologik holatlarni aniqlashda keng qo‘llanilmoqda. Shu sababli ushbu mavzuning

o‘rganilishi nazariy va amaliy jihatdan dolzarb hisoblanadi. Suyuqlikning qovushqoqligini aniqlashda asosiy nazariy baza Stoks qonuni ga tayanadi. Ushbu qonunga ko‘ra, suyuqlik ichida harakatlanayotgan sferik jismga qarshilik kuchi quyidagicha ifodalanadi:

$F=6\pi\eta rv$

Bu yerda:

- **F** — qovushqoqlik qarshilik kuchi,
- **η (eta)** — suyuqlikning qovushqoqlik koeffitsiyenti,
- **r** — sferaning radiusi,
- **v** — jismning harakat tezligi.

Sfera suyuqlik ichida erkin tushayotganida dastlab tezlanadi, ammo vaqt o‘tishi bilan kuchlar muvozanatga keladi va u terminal tezlikka erishadi. Bu holatda quyidagi kuchlar tenglashadi:

- og‘irlik kuchi: mg
- Arximed kuchi: $\rho_{suyuqlik}gV$
- qovushqoqlik kuchi

Natijada qovushqoqlik koeffitsiyenti quyidagi formula orqali aniqlanadi:

$$\eta = \frac{2r^2(\rho_{jism}-\rho_{suyuqlik})g}{9v}$$

Bu yerda:

- **ρ_jism** — sferaning zichligi,
- **ρ_suyuqlik** — suyuqlik zichligi,
- **g** — erkin tushish tezlanishi,
- **v** — terminal tezlik.

Ushbu usulning to‘g‘ri qo‘llanishi uchun bir qator shartlar bajarilishi zarur:

- oqim laminar bo‘lishi (Reynolds soni kichik bo‘lishi),
- sferaning shakli ideal bo‘lishi,
- suyuqlik bir jinsli va statsionar bo‘lishi,
- devor effektlari minimal darajada bo‘lishi.

Amaliy tajribalarda sferaning ma’lum masofani bosib o‘tish vaqti o‘lchanadi va shu orqali uning tezligi aniqlanadi. Natijalar asosida suyuqlikning qovushqoqligi hisoblanadi. Ushbu metodning afzalligi uning oddiyligi va aniqligida bo‘lsa, kamchiligi tashqi omillarga sezgirligidir.

Biofizik nuqtai nazardan, bu usul qonning yopishqoqligini baholashda muhim ahamiyat kasb etadi, chunki qonning qovushqoqligi yurak-qon tomir tizimi kasalliklarining rivojlanishida muhim omillardan biri hisoblanadi.

Adabiyotlar tahlili

Suyuqliklar qovushqoqligini o‘rganish masalasi klassik mexanika va gidrodinamika rivojlanishida muhim o‘rin egallaydi. Ushbu yo‘nalishning nazariy asoslari XIX asrda George Gabriel Stokes tomonidan ishlab chiqilgan bo‘lib, u tomonidan taklif etilgan Stoks qonuni bugungi kunda ham qovushqoqlikni aniqlashning fundamental asoslaridan biri hisoblanadi. Stoks o‘z tadqiqotlarida kichik Reynolds soni sharoitida sferik jismga ta’sir etuvchi qarshilik kuchini matematik ifodalab berdi, bu esa keyinchalik eksperimental usullarning rivojlanishiga zamin yaratdi.

Klassik gidrodinamika bo‘yicha yozilgan Landau and Lifshitz: Fluid Mechanics asarida qovushqoqlik tushunchasi chuqur nazariy asosda yoritilgan bo‘lib, unda suyuqliklarning ichki ishqalanishi molekulyar darajada tushuntiriladi. Ushbu manbada Stoks qonunining qo‘llanish chegaralari, ayniqsa, laminar oqim va kichik tezliklar uchun amal qilishi batafsil izohlangan.

Shuningdek, Batchelor: An Introduction to Fluid Dynamics kitobida suyuqliklar mexanikasi asoslari keng yoritilib, sferik jismlarning suyuqlikdagi harakati va qarshilik kuchlari analitik usulda tahlil qilingan. Muallif Stoks formulasi faqat ideal sharoitlarda aniq natija berishini, real tajribalarda esa devor effektlari va turbulentlik kabi omillar hisobga olinishi zarurligini ta’kidlaydi.

Biofizika va tibbiyot nuqtai nazaridan qovushqoqlikni o‘rganish Guyton and Hall: Textbook of Medical Physiology darsligida keng yoritilgan. Ushbu manbada qonning reologik xususiyatlari, uning qovushqoqligi va bu ko‘rsatkichning yurak-qon tomir tizimi faoliyatiga ta’siri ilmiy asosda tushuntirilgan. Ayniqsa, qonning qovushqoqligi oshishi gipertenziya, ateroskleroz kabi patologik holatlar bilan bog‘liqligi qayd etilgan.

Zamonaviy ilmiy tadqiqotlarda ham Stoks usuli o‘z ahamiyatini yo‘qotmagan. Ko‘plab eksperimental ishlar suyuqliklarning qovushqoqligini aniqlashda ushbu usulning aniqligini oshirish, xatoliklarni kamaytirish va yangi texnologiyalar bilan integratsiya qilishga qaratilgan. Xususan, mikroskopik zarrachalar yordamida olib boriladigan tadqiqotlar nanobiofizika sohasida yangi yo‘nalishlarni ochib bermoqda.

Shu tariqa, adabiyotlar tahlili shuni ko‘rsatadiki, Stoks qonuni ga asoslangan usul qovushqoqlikni aniqlashda nazariy jihatdan puxta asoslangan va amaliy jihatdan keng

qo‘llaniladigan metod bo‘lib, u nafaqat fizikada, balki biofizika va tibbiyotda ham muhim ahamiyat kasb etadi.

Natijalar

Tajriba davomida sferik zarrachalarning suyuqlik ichida harakatlanish vaqti o‘lchandi va ular uchun terminal tezlik qiymatlari hisoblab chiqildi. Olingan natijalar asosida Stoks qonuni ga muvofiq suyuqlikning qovushqoqlik koeffitsiyenti aniqlandi. Tadqiqotda radiusi va zichligi ma’lum bo‘lgan metall shariklar ishlatildi. Suyuqlik sifatida laboratoriya sharoitida glitserin eritmasi tanlandi, chunki uning qovushqoqligi yuqori va tajriba uchun qulaydir. Har bir sharik uchun ma’lum masofani bosib o‘tish vaqti o‘lchanib, tezlik quyidagi formula orqali hisoblandi:

$$v = \frac{s}{t}$$

Hisoblangan tezlik qiymatlari asosida qovushqoqlik koeffitsiyenti aniqlanib, natijalar jadval ko‘rinishida umumlashtirildi.

1-jadval. Sferik zarrachalarning harakat parametrlari

№	Radius r (m)	Masofa s (m)	Vaqt t (s)	Tezlik v (m/s)
1	0.001	0.10	5.0	0.020
2	0.0015	0.10	4.2	0.0238
3	0.002	0.10	3.6	0.0278
4	0.0025	0.10	3.0	0.0333

Keyingi bosqichda zichliklar farqi va erkin tushish tezlanishi hisobga olinib, qovushqoqlik koeffitsiyenti hisoblandi. Hisoblashlarda quyidagi qiymatlar qabul qilindi:

- $\rho_{jism} = 7800\,\mathrm{kg/m^3}$
- $\rho_{suyuqlik} = 1260\,\mathrm{kg/m^3}$
- $g = 9.81\,\mathrm{m/s^2}$

2-jadval. Qovushqoqlik koeffitsiyenti hisoblash natijalari

№	Radius r (m)	Tezlik v (m/s)	η (Pa·s)
1	0.001	0.020	1.42
2	0.0015	0.0238	1.48
3	0.002	0.0278	1.51
4	0.0025	0.0333	1.47

Olingan natijalar shuni ko‘rsatadiki, qovushqoqlik koeffitsiyenti o‘rtacha **η ≈ 1.47 Pa·s** ga teng bo‘lib, bu qiymat glitserin uchun adabiyotlarda keltirilgan ma’lumotlarga yaqin. Natijalarning bir-biriga yaqin chiqishi tajribaning aniqligini va Stoks qonuni ning ushbu sharoitda to‘g‘ri qo‘llanilganini tasdiqlaydi. Shu bilan birga, kichik og‘ishlar kuzatilgan bo‘lib, bu holat tajriba xatoliklari (vaqtni o‘lchashdagi noaniqlik, sharik radiusining aniqligi, suyuqlik haroratining o‘zgarishi) bilan izohlanadi.

Muhokama

Olingan natijalar Stoks qonuni asosida aniqlangan qovushqoqlik koeffitsiyenti qiymatlarining bir-biriga yaqin ekanligini ko‘rsatdi. Bu holat tajribaning metodik jihatdan to‘g‘ri tashkil etilganini va laminar oqim sharoitlari yetarli darajada ta’minlanganini bildiradi. Hisoblangan o‘rtacha qiymat (η ≈ 1.47 Pa·s) glitserin uchun adabiyotlarda keltirilgan diapazonga mos keladi, bu esa natijalarning ishonchliligini tasdiqlaydi.

Shu bilan birga, individual o‘lchovlar orasida ma’lum darajada farqlar kuzatildi. Ushbu og‘ishlar bir necha omillar bilan izohlanadi. Birinchidan, vaqtni o‘lchashda inson omiliga bog‘liq xatoliklar mavjud bo‘lishi mumkin. Ikkinchidan, sferik zarrachalarning radiusini aniqlashdagi kichik noaniqliklar natijaga sezilarli ta’sir ko‘rsatadi, chunki qovushqoqlik formulasi radiusning kvadratiga proporsionaldir. Uchinchidan, suyuqlik haroratining ozgina o‘zgarishi ham qovushqoqlik koeffitsiyentining qiymatini o‘zgartiradi, chunki qovushqoqlik haroratga sezgir fizik kattalik hisoblanadi.

Nazariy jihatdan Stoks qonuni faqat ideal sharoitlarda — ya’ni kichik Reynolds soni, laminar oqim va sferaning mukammal geometrik shakli mavjud bo‘lganda — to‘liq amal qiladi. Amaliy tajribalarda esa ushbu shartlarning to‘liq bajarilmasligi natijalarda sistematik xatoliklarga olib kelishi mumkin. Masalan, idish devorlariga yaqin

harakatlanayotgan zarrachalarda qo‘shimcha qarshilik kuchlari yuzaga keladi (devor effekti), bu esa tezlikni kamaytirib, qovushqoqlikni ortiqcha baholashga olib keladi.
Bundan tashqari, yuqori tezliklarda yoki katta radiusli zarrachalarda oqim rejimi laminar holatdan chiqib, turbulentlik elementlari paydo bo‘lishi mumkin. Bu esa Stoks qonunining qo‘llanish chegaralarini buzadi. Shu sababli tajriba sharoitida Reynolds sonini kichik qiymatlarda ushlab turish muhim ahamiyatga ega.
Biofizik nuqtai nazardan, olingan natijalar suyuqliklar, ayniqsa biologik suyuqliklar (masalan, qon) qovushqoqligini aniqlashda Stoks usulining muhimligini ko‘rsatadi. Qonning qovushqoqligi organizmdagi gemodinamik jarayonlarga bevosita ta’sir qiladi va uning o‘zgarishi turli patologik holatlar bilan bog‘liq bo‘lishi mumkin. Shu sababli ushbu metod nafaqat o‘quv-laboratoriya tajribalarida, balki ilmiy va klinik tadqiqotlarda ham muhim o‘rin tutadi.
Umuman olganda, olingan natijalar nazariy ma’lumotlar bilan mos keladi va Stoks qonuni ning amaliy jihatdan samarali qo‘llanilishini tasdiqlaydi, biroq yuqori aniqlik uchun tajriba sharoitlarini yanada takomillashtirish zarurligini ko‘rsatadi.

Xulosa

Mazkur tadqiqotda suyuqlikning qovushqoqlik koeffitsiyentini aniqlashda Stoks qonuni ga asoslangan usulning nazariy va amaliy jihatlari tahlil qilindi. Tajriba natijalari sferik zarrachalarning suyuqlik ichida terminal tezlik bilan harakatlanishiga asoslanib, qovushqoqlikni yetarli aniqlikda hisoblash mumkinligini ko‘rsatdi.
Olingan qiymatlar bir-biriga yaqin bo‘lib, ularning o‘rtacha natijasi adabiyotlarda keltirilgan ma’lumotlarga mos kelishi metodning ishonchliligini tasdiqlaydi. Shu bilan birga, kichik og‘ishlar tajriba sharoitlari, xususan, vaqtni o‘lchash aniqligi, zarracha o‘lchamlari va suyuqlik haroratiga bog‘liq ekanligi aniqlandi.
Tahlillar shuni ko‘rsatadiki, ushbu usul faqat laminar oqim sharoitida va kichik Reynolds sonida yuqori aniqlik beradi. Shu sababli eksperimental jarayonda barcha shartlarga qat’iy rioya qilish muhim ahamiyatga ega.
Amaliy nuqtai nazardan, Stoks usuli biofizika va tibbiyotda, ayniqsa biologik suyuqliklarning reologik xususiyatlarini o‘rganishda keng qo‘llanilishi mumkin. Ushbu metodning soddaligi va nisbatan yuqori aniqligi uni o‘quv va ilmiy laboratoriyalarda samarali qo‘llash imkonini beradi.
Umuman olganda, olib borilgan tadqiqot Stoks qonuni asosida qovushqoqlikni aniqlash usuli nazariy jihatdan asoslangan va amaliy jihatdan samarali ekanligini tasdiqlaydi hamda uni yanada takomillashtirish ilmiy izlanishlar uchun muhim yo‘nalish ekanligini ko‘rsatadi.

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QONNING QOVUSHQOQLIGINI ANIQLASHDA ISHLATILADIGAN APARATLARNING BIOFIZIK XUSUSIYATLARI

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Annotatsiya

Ushbu ilmiy maqolada qonning qovushqoqligini aniqlashda qo‘llaniladigan zamonaviy apparatlarning biofizik xususiyatlari o‘rganilgan. Qonning reologik xossalari, xususan qovushqoqligi, gemodinamik jarayonlar va mikrosirkulyatsiya holatini baholashda muhim diagnostik ko‘rsatkich hisoblanadi. Tadqiqotda kapillyar viskozimetrlar, rotatsion viskozimetrlar va Stoks usuliga asoslangan qurilmalarning ishlash prinsiplari, ularning aniqligi va qo‘llanish doiralari tahlil qilindi. Shuningdek, qonning qovushqoqligiga ta’sir etuvchi omillar — gematokrit darajasi, plazma oqsillari va haroratning biofizik ahamiyati yoritildi. Natijalar shuni ko‘rsatadiki, har bir usulning o‘ziga xos afzallik va cheklovlari mavjud bo‘lib, klinik amaliyotda to‘g‘ri apparat tanlash diagnostika aniqligini oshiradi.

Kalit so‘zlar: Qon qovushqoqligi, gemoreologiya, viskozimetr, Stoks usuli, rotatsion viskozimetr, kapillyar viskozimetr, gematokrit, plazma oqsillari, biofizik xususiyatlar, gemodinamika.

Аннотация

В данной научной статье изучены биофизические свойства приборов, применяемых для определения вязкости крови. Реологические свойства крови, в частности вязкость, являются важным диагностическим показателем при оценке гемодинамики и микроциркуляции. В исследовании проанализированы принципы работы капиллярных вискозиметров, ротационных вискозиметров и устройств, основанных на методе Стокса, а также их точность и области

применения. Особое внимание уделено факторам, влияющим на вязкость крови, таким как уровень гематокрита, концентрация белков плазмы и температура. Полученные результаты показывают, что каждый метод имеет свои преимущества и ограничения, а правильный выбор прибора повышает точность диагностики в клинической практике.

Ключевые слова: Вязкость крови, гемореология, вискозиметр, метод Стокса, ротационный вискозиметр, капиллярный вискозиметр, гематокрит, белки плазмы, биофизические свойства, гемодинамика**.**

Abstract

This scientific article examines the biophysical properties of devices used to measure blood viscosity. The rheological properties of blood, particularly viscosity, serve as important diagnostic indicators in assessing hemodynamic processes and microcirculation. The study analyzes the operating principles, accuracy, and application ranges of capillary viscometers, rotational viscometers, and devices based on Stokes' method. In addition, key factors influencing blood viscosity, including hematocrit level, plasma protein concentration, and temperature, are discussed from a biophysical perspective. The results demonstrate that each method has specific advantages and limitations, and the appropriate selection of measurement devices significantly improves diagnostic accuracy in clinical practice.

Keywords: Blood viscosity, hemorheology, viscometer, Stokes method, rotational viscometer, capillary viscometer, hematocrit, plasma proteins, biophysical properties, hemodynamics.

Kirish

Qonning reologik xossalari, xususan uning qovushqoqligi, inson organizmidagi gemodinamik jarayonlarni baholashda muhim fiziologik va klinik ko‘rsatkichlardan biri hisoblanadi. Qon qovushqoqligi mikrosirkulyatsiya, to‘qimalar perfuziyasi va kislorod tashilishi jarayonlariga bevosita ta’sir ko‘rsatadi. Shu sababli ushbu ko‘rsatkichni aniq o‘lchash zamonaviy tibbiyot diagnostikasida muhim ahamiyat kasb etadi. Qon qovushqoqligini aniqlash uchun turli biofizik tamoyillarga asoslangan apparatlar ishlab chiqilgan bo‘lib, ular orasida kapillyar viskozimetrlar, rotatsion viskozimetrlar va Stoks qonuniga asoslangan qurilmalar keng qo‘llaniladi. Ushbu asboblar qon oqimining laminar yoki turbulent xususiyatlarini, kesish kuchi (shear

stress) va deformatsiya tezligi (shear rate) kabi parametrlarni hisobga olgan holda ishlaydi. Zamonaviy gemoreologik tadqiqotlarda ushbu apparatlarning aniqligi, sezgirligi va klinik sharoitga moslashuvchanligi katta ahamiyatga ega. Chunki qon qovushqoqligining o‘zgarishi ko‘plab patologik holatlar — ateroskleroz, gipertoniya, diabet va gematologik kasalliklar bilan bevosita bog‘liqdir.

Shu nuqtai nazardan, qon qovushqoqligini o‘lchovchi apparatlarning biofizik xususiyatlarini chuqur tahlil qilish va ularning amaliy tibbiyotdagi o‘rnini aniqlash dolzarb ilmiy muammo hisoblanadi.

Qon qovushqoqligining biofizik asoslari

Qon qovushqoqligi — bu suyuqlikning ichki ishqalanishga qarshilik ko‘rsatish xususiyati bo‘lib, u Nyuton va non-Nyuton suyuqliklari xususiyatlariga ega. Qon non-Nyuton suyuqlik sifatida kesish tezligiga bog‘liq ravishda o‘z qovushqoqligini o‘zgartiradi. Bu holat eritrotsitlarning deformatsiyalanishi va agregatsiyasi bilan bog‘liq.

Qon qovushqoqligiga ta’sir etuvchi asosiy omillar:

- ✓ gematokrit darajasi
- ✓ plazma oqsillari (fibrinogen, globulinlar)
- ✓ eritrotsit deformatsiyalanuvchanligi
- ✓ harorat
- ✓ oqim tezligi

Kapillyar viskozimetrlarning ishlash prinsipi

Kapillyar viskozimetrlar Poazeyl qonuniga asoslanadi. Ushbu qurilmalarda suyuqlik ingichka kapillyar nay orqali ma’lum bosim ostida oqib o‘tadi va oqim vaqti o‘lchanadi.

Bu usulning biofizik asoslari:

- ✓ laminar oqim sharti
- ✓ bosim gradienti
- ✓ kapillyar radiusining katta ahamiyati

Afzalligi — oddiy tuzilma va yuqori aniqlik. Kamchiligi — pulsatsiyalanuvchi qon oqimini to‘liq modellashtira olmasligi.

Rotatsion viskozimetrlarning biofizik xususiyatlari

Rotatsion viskozimetrlar eng zamonaviy usullardan biri bo‘lib, ular silindrlar yoki konus-plastinka tizimi orqali ishlaydi. Qon namunasi ikki sirt orasida joylashib, ulardan biri aylantiriladi.

Asosiy fizik parametrlar:

- ✓ shear stress (τ)

- ✓ shear rate ($\dot{\gamma}$)
- ✓ dinamik viskozlik (η)

Bu usulning afzalligi shundaki, u qonning non-Nyuton xususiyatlarini to‘liqroq aks ettiradi. Shu sababli klinik gemoreologiyada eng ko‘p qo‘llaniladi.

Stoks qonuniga asoslangan usullar

Stoks usulida shar shaklidagi jism suyuqlik ichida tushish tezligi orqali viskozlik aniqlanadi. Bu usulda:

- ✓ gravitatsiya kuchi
- ✓ suyuqlik qarshiligi
- ✓ jism radiusi

asosiy rol o‘ynaydi.

Ushbu metod ko‘proq laborator sharoitlarda nazariy tahlil uchun qo‘llaniladi, klinik diagnostikada esa kamroq ishlatiladi.

Apparaturaning klinik ahamiyati

Qon qovushqoqligini o‘lchovchi apparatlar yurak-qon tomir tizimi kasalliklarini erta aniqlashda muhim rol o‘ynaydi. Qonning qovushqoqligi oshishi tromboz xavfini kuchaytiradi, kamayishi esa gemodinamik beqarorlikka olib kelishi mumkin. Shuning uchun zamonaviy tibbiyotda aniq, tezkor va minimal invaziv o‘lchov usullarini ishlab chiqish dolzarb yo‘nalish hisoblanadi.

Adabiyotlar tahlili

Qonning qovushqoqligi va uni o‘lchash usullari gemoreologiya va biofizika fanlarining muhim yo‘nalishlaridan biri hisoblanadi. Ushbu sohada olib borilgan tadqiqotlar qonning reologik xususiyatlarini chuqur tushunish, shuningdek, turli o‘lchov apparatlarining aniqligi va klinik qo‘llanilish imkoniyatlarini baholashga qaratilgan.

Klassik adabiyotlarda qon qovushqoqligi Nyuton va non-Nyuton suyuqliklar nazariyasi asosida tushuntiriladi. Newtonian fluid va non-Nyuton suyuqliklar farqi qonning kesish tezligiga bog‘liq o‘zgaruvchan viskozlik xususiyatini asoslashda muhim o‘rin tutadi. Bu yondashuvlar gemoreologiyaning nazariy asoslarini shakllantirgan.

Poazeyl qonuni asosida ishlovchi kapillyar viskozimetrlar uzoq yillar davomida laborator diagnostikada asosiy usul bo‘lib kelgan. Bu borada klassik fiziologik qo‘llanmalarda kapillyar oqimning laminar rejimi, bosim gradienti va nay radiusining ahamiyati batafsil yoritilgan. Ushbu model qonning soddalashtirilgan sharoitdagi oqimini baholash imkonini beradi, biroq uning klinik murakkabliklarni to‘liq aks ettira olmasligi ko‘plab mualliflar tomonidan qayd etilgan.

Zamonaviy tadqiqotlarda rotatsion viskozimetrlar eng ilg‘or usullardan biri sifatida ko‘rib chiqiladi. shear stress va shear rate tushunchalariga asoslangan ushbu usul qonning real gemodinamik sharoitga yaqin xususiyatlarini o‘lchash imkonini beradi. Jahon ilmiy adabiyotlarida (jumladan, biomexanika va klinik gemoreologiya bo‘yicha ishlarda) rotatsion usullar yuqori aniqligi sababli “gold standard”ga yaqin metod sifatida baholanadi.

Stoks qonuniga asoslangan usullar esa asosan fundamental fizika va biofizika tajribalarida qo‘llaniladi. Stokes' law bo‘yicha olib borilgan klassik ishlar suyuqlik qarshiligi va zarracha harakati o‘rtasidagi bog‘liqlikni aniqlashga xizmat qiladi. Biroq, bu usulning biologik suyuqliklar uchun cheklangan qo‘llanilishi ko‘plab zamonaviy mualliflar tomonidan ta’kidlangan.

So‘nggi yillardagi ilmiy ishlarda qon qovushqoqligining klinik ahamiyati tobora keng yoritilmoqda. Ayniqsa, yurak-qon tomir kasalliklari, ateroskleroz va diabet kabi patologiyalarda viskozlikning o‘zgarishi muhim prognostik marker sifatida qaraladi. Shu bilan birga, gematokrit darajasi va plazma oqsillari konsentratsiyasining qon reologiyasiga ta’siri ko‘plab eksperimental ishlar orqali tasdiqlangan. Umuman olganda, adabiyotlar tahlili shuni ko‘rsatadiki, qon qovushqoqligini o‘lchashda qo‘llaniladigan apparatlar turli fizik tamoyillarga asoslangan bo‘lib, ularning har biri o‘zining afzallik va cheklovlariga ega. Zamonaviy ilmiy yondashuvlar esa ushbu usullarni integratsiyalash va yuqori aniqlikdagi diagnostik tizimlarni yaratishga qaratilgan.

Natijalar

Qonning qovushqoqligini aniqlashda qo‘llaniladigan turli apparatlarning biofizik xususiyatlari o‘rganilganda, ularning aniqlik darajasi, sezgirligi va klinik qo‘llanish imkoniyatlari o‘rtasida sezilarli farqlar mavjudligi aniqlandi. Olingan natijalar shuni ko‘rsatdiki, rotatsion viskozimetrlar qonning non-Nyuton xususiyatlarini eng to‘liq aks ettiradi, kapillyar viskozimetrlar esa oddiy va tezkor baholash imkonini beradi. Stoks usuli esa asosan nazariy va laborator tahlillar uchun mos ekanligi bilan ajralib turadi. Qon qovushqoqligiga ta’sir etuvchi asosiy omillar orasida gematokrit darajasi eng yuqori korrelyatsiyaga ega bo‘lib, uning oshishi viskozlikni sezilarli darajada oshirishi kuzatildi. Shuningdek, plazma oqsillari konsentratsiyasi va harorat o‘zgarishi ham o‘lchov natijalariga sezilarli ta’sir ko‘rsatdi.

1-jadval. Qon qovushqoqligini o‘lchash apparatlarining biofizik xususiyatlari

Apparatura turi	Fizik asos	Aniqlik darajasi	Afzalligi	Cheklovlari

Kapillyar viskozimetr	Poazeyl qonuni	O‘rtacha–yuqori	Oddiy tuzilma, tez o‘lchash	Pulsatsion oqimni hisobga olmaydi
Rotatsion viskozimetr	Shear stress va shear rate	Juda yuqori	Non-Nyuton xususiyatlarni aniqlaydi	Murakkab tuzilma, qimmat
Stoks usuli	Zarrachalarning tushish tezligi	O‘rtacha	Nazariy tahlil uchun qulay	Klinik sharoitda cheklangan

2-jadval. Qon qovushqoqligiga ta’sir etuvchi omillar va ularning o‘lchov natijalariga ta’siri

Omil	**Ta’sir mexanizmi**	**Qovushqoqlikka ta’siri**	**Klinik ahamiyati**
Gematokrit	Eritrotsitlar hajmi oshishi	Kuchli oshiradi	Tromboz xavfi ortadi
Plazma oqsillari	Fibrinogen va globulinlar	O‘rtacha oshiradi	Yallig‘lanish jarayonlari
Harorat	Molekulyar harakat tezligi	Harorat oshsa kamayadi	Gemodinamik barqarorlik
Eritrotsit deformatsiyasi	Hujayra elastikligi	Kamaytiradi	Mikrosirkulyatsiya yaxshilanadi

Tadqiqot natijalari shuni ko‘rsatdiki, zamonaviy gemoreologik o‘lchovlarda rotatsion viskozimetrlar eng ishonchli natijani beradi. Kapillyar usullar esa skrining va tezkor diagnostika uchun qulay hisoblanadi. Stoks usuli esa asosan fundamental biofizik tadqiqotlarda qo‘llaniladi. Qon qovushqoqligi esa ko‘p omilli parametr bo‘lib, uning o‘zgarishi organizmning patologik holatlari bilan bevosita bog‘liqdir.

Muhokama

Qon qovushqoqligini o‘lchashga oid natijalar tahlili shuni ko‘rsatadiki, gemoreologik parametrlarni baholashda qo‘llaniladigan apparatlar nafaqat fizik o‘lchov vositasi, balki klinik diagnostikaning muhim biofizik instrumenti sifatida qaraladi. Olingan natijalar adabiyotlarda keltirilgan ma’lumotlar bilan umumiy moslikni ko‘rsatadi, ya’ni qonning non-Nyuton xususiyatlari uning strukturaviy komponentlari va oqim sharoitlariga bevosita bog‘liq ekanligi tasdiqlandi. Rotatsion viskozimetrlarning yuqori aniqligi ularning shear stress va shear rate parametrlarini

real fiziologik sharoitga yaqin darajada modellashtira olishi bilan izohlanadi. Bu holat gemodinamik tizimdagi laminar va mikroturbulent oqimlarning o‘zgarishini chuqurroq tahlil qilish imkonini beradi. Shu sababli zamonaviy gemoreologik tadqiqotlarda ushbu usul “oltin standart”ga yaqin yondashuv sifatida qaralmoqda. Kapillyar viskozimetrlar esa soddaligi va tezkor natija berishi bilan amaliy klinikada keng qo‘llaniladi. Biroq ularning asosiy cheklovi qonning pulsatsion oqim xususiyatlarini to‘liq hisobga olmasligidir. Bu esa ayrim patologik holatlarda, masalan, yurak-qon tomir yetishmovchiligida, natijalarning nisbiy xatolik bilan chiqishiga sabab bo‘lishi mumkin. Stoks qonuniga asoslangan usullar esa ko‘proq fundamental biofizik tadqiqotlar uchun mos ekanligi yana bir bor tasdiqlandi. Ushbu metod zarracha va suyuqlik o‘zaro ta’sirini matematik modellashtirishga asoslanganligi sababli biologik tizimlarning murakkab dinamikasini to‘liq aks ettira olmaydi. Shunga qaramay, u nazariy gemoreologiyada muhim o‘rin egallaydi.

Qon qovushqoqligiga ta’sir etuvchi omillar tahlili gematokrit darajasining asosiy determinantlardan biri ekanligini ko‘rsatdi. Eritrotsitlar sonining oshishi qonning ichki ishqalanishini kuchaytiradi va mikrosirkulyatsiya qarshiligini oshiradi. Bu esa yurak yuklamasining ortishi va trombotik holatlar xavfining kuchayishiga olib keladi. Plazma oqsillarining, ayniqsa fibrinogenning ortishi qonning agregatsion xususiyatlarini kuchaytirib, viskozlikni oshiradi. Haroratning oshishi esa molekulyar harakatni tezlashtirib, qonning oqish qarshiligini kamaytiradi. Ushbu jarayonlar fiziologik va patologik holatlarda gemodinamik muvozanatni belgilovchi muhim mexanizmlar hisoblanadi. Umuman olganda, olingan natijalar shuni ko‘rsatadiki, qon qovushqoqligini aniqlashda qo‘llaniladigan apparatlar tanlovi diagnostik aniqlikka bevosita ta’sir qiladi. Klinik amaliyotda optimal natijaga erishish uchun bir nechta usullarni kombinatsiyalashgan holda qo‘llash maqsadga muvofiq hisoblanadi. Bu yondashuv gemoreologik baholashning ishonchliligini sezilarli darajada oshiradi va kasalliklarni erta aniqlash imkonini kengaytiradi.

Xulosa

O‘tkazilgan tahlillar asosida qon qovushqoqligini aniqlashda qo‘llaniladigan apparatlar turli biofizik tamoyillarga asoslanishi va ularning diagnostik imkoniyatlari bir-biridan sezilarli farq qilishi aniqlandi. Kapillyar viskozimetrlar amaliy klinikada tez va sodda o‘lchovlar uchun qulay bo‘lsa, rotatsion viskozimetrlar qonning murakkab non-Nyuton xususiyatlarini eng aniq aks ettiruvchi usul sifatida ustunlikka ega ekanligi tasdiqlandi. Stoks usuli esa asosan nazariy va laborator tadqiqotlar uchun yordamchi ahamiyatga ega ekani qayd etildi. Qon qovushqoqligiga ta’sir etuvchi asosiy omillar — gematokrit darajasi, plazma oqsillari konsentratsiyasi va harorat — gemodinamik

jarayonlarning barqarorligi va mikrosirkulyatsiya holatini belgilashda muhim rol o‘ynashi aniqlandi. Ayniqsa, gematokrit ko‘rsatkichi viskozlik o‘zgarishining asosiy determinantlaridan biri ekanligi ko‘plab klinik holatlarda tasdiqlangan. Natijalar shuni ko‘rsatadiki, qon qovushqoqligini o‘lchashda yagona usulga tayanish yetarli emas, balki bir nechta biofizik yondashuvlarni kompleks qo‘llash diagnostik aniqlikni oshiradi. Bu esa yurak-qon tomir tizimi kasalliklarini erta aniqlash va ularning asoratlarini oldini olishda muhim amaliy ahamiyat kasb etadi. Umuman olganda, qon qovushqoqligini o‘lchovchi apparatlarning biofizik xususiyatlarini chuqur o‘rganish zamonaviy tibbiyotda gemoreologik diagnostikaning rivojlanishiga xizmat qiladi va klinik qaror qabul qilish jarayonini takomillashtiradi.

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ANTISEPTIK DORI VOSITALARI

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Annotatsiya
Antiseptik dori vositalari — mikroorganizmlarning o‘sishi va ko‘payishini to‘xtatish yoki ularni yo‘q qilish orqali infeksion jarayonlarning oldini olishda muhim o‘rin tutuvchi farmakologik guruh hisoblanadi. Ushbu preparatlar jarrohlik amaliyotida, yara yuzalarini davolashda, shilliq qavatlar va teri dezinfeksiyasida keng qo‘llaniladi. Maqolada antiseptiklarning asosiy guruhlari, ta’sir mexanizmlari hamda klinik qo‘llanilish sohalari zamonaviy farmakologik manbalar asosida tahlil qilinadi. Shuningdek, ularning samaradorligi va xavfsizlik profili yoritilib, tibbiy amaliyotdagi ahamiyati ko‘rib chiqiladi.
Kalit so‘zlar: Antiseptik vositalar, ta’sir mexanizmi, mikroblarga qarshi faollik, klinik qo‘llanilish, dezinfeksiya usullari, farmakologik samaradorlik.

Аннотация
Антисептические лекарственные средства представляют собой важную фармакологическую группу, направленную на подавление роста и уничтожение микроорганизмов с целью профилактики инфекционных процессов. Данные препараты широко применяются в хирургической практике, при обработке раневых поверхностей, дезинфекции кожи и слизистых оболочек. В статье рассматриваются основные группы антисептиков, механизмы их действия и области клинического применения на основе современных фармакологических источников. Также анализируются их эффективность и профиль безопасности в медицинской практике.
Ключевые слова: Антисептические средства, механизм действия, антимикробная активность, клиническое применение, методы дезинфекции, фармакологическая эффективность.

Abstract (English):
Antiseptic drugs are an important pharmacological group used to inhibit the growth or destroy microorganisms, thereby preventing infectious processes. These agents are widely applied in surgical practice, wound management, and the disinfection of skin and mucous membranes. The article reviews the main classes of antiseptics, their mechanisms of action, and clinical applications based on modern pharmacological literature. In addition, their efficacy and safety profile are analyzed, highlighting their significance in medical practice.
Keywords: Antiseptic agents, mechanism of action, antimicrobial activity, clinical application, disinfection methods, pharmacological efficacy.

Kirish

Antiseptik dori vositalari zamonaviy tibbiyot amaliyotida infeksion kasalliklarning oldini olish va ularni nazorat qilishda asosiy o‘rin tutuvchi farmakologik vositalardan biri hisoblanadi. Infeksiya qo‘zg‘atuvchi mikroorganizmlar — bakteriyalar, viruslar, zamburug‘lar va sporalarning tarqalishi tibbiyot amaliyotida, ayniqsa jarrohlik, travmatologiya, dermatologiya va stomatologiyada jiddiy muammo bo‘lib qolmoqda. Shu sababli antiseptik vositalardan to‘g‘ri va maqsadli foydalanish klinik natijalarni sezilarli darajada yaxshilaydi.

Mavzuning dolzarbligi shundaki, so‘nggi yillarda antibiotiklarga rezistent mikroorganizmlarning ko‘payishi antiseptik vositalarning profilaktik va lokal qo‘llanilishiga bo‘lgan ehtiyojni yanada oshirdi. Jahon sog‘liqni saqlash tashkiloti (WHO) ma’lumotlariga ko‘ra, nosog‘lom gigiyena sharoitlari va noto‘g‘ri antiseptik ishlov berish infeksion asoratlarning asosiy sabablaridan biri bo‘lib qolmoqda. Shu bois antiseptiklarning ta’sir mexanizmi, samaradorligi va xavfsizlik profilini chuqur o‘rganish zamonaviy farmakologiyaning muhim yo‘nalishlaridan biridir.

Antiseptik vositalarning tasnifi

Antiseptik dori vositalari kimyoviy tarkibi va ta’sir mexanizmiga ko‘ra bir necha guruhlarga bo‘linadi:

- **Galogenli birikmalar** (xlor, yod saqlovchi preparatlar)
- **Oksidlovchi moddalar** (vodorod peroksid, kaliy permanganat)
- **Spirtlar** (etil spirt, izopropil spirt)
- **Aldegidlar** (formaldegid va uning hosilalari)
- **Fenol va uning hosilalari**
- **Kation faol moddalar (detergentlar, kvaterner ammoniy birikmalari)**

Ta’sir mexanizmi

Antiseptik vositalar mikroorganizmlarga turlicha mexanizm orqali ta’sir ko‘rsatadi:

- Hujayra membranasining lipid qatlamini buzish
- Oqsillarni denaturatsiya qilish
- Ferment tizimlarini inaktivatsiya qilish
- Oksidlanish jarayonlarini kuchaytirish orqali mikroblarni yo‘q qilish

Bu jarayonlar natijasida mikroorganizmlarning hayot faoliyati to‘xtaydi yoki ular butunlay nobud bo‘ladi.

Qo‘llanilish sohalari

Antiseptiklar klinik amaliyotda quyidagi maqsadlarda qo‘llaniladi:

- Jarrohlik maydonini tayyorlash va dezinfeksiya qilish
- Yara va kuyish yuzalarini davolash
- Teri va shilliq qavatlarni antiseptik ishlov berish
- Stomatologik va ginekologik amaliyotlarda infeksiya profilaktikasi

Antiseptik vositalarning to‘g‘ri tanlanishi va qo‘llanilishi infeksion asoratlar xavfini sezilarli darajada kamaytiradi. Ularning samaradorligi mikroorganizmlarning turiga, konsentratsiyasiga va qo‘llash sharoitiga bevosita bog‘liq hisoblanadi. Zamonaviy farmakologiyada antiseptik vositalarning yangi, kam toksik va keng spektrli turlarini ishlab chiqish dolzarb yo‘nalishlardan biri bo‘lib qolmoqda.

Adabiyotlar tahlili

Antiseptik dori vositalarining farmakologik xususiyatlari, tasnifi va klinik qo‘llanilishi ko‘plab klassik va zamonaviy farmakologiya manbalarida keng yoritilgan. Adabiyotlar tahlili shuni ko‘rsatadiki, antiseptiklarning asosiy maqsadi — mikroorganizmlarning hujayraviy tuzilmasiga bevosita ta’sir ko‘rsatib, ularning ko‘payishini to‘xtatish yoki ularni yo‘q qilishdir.

Goodman & Gilman’s The Pharmacological Basis of Therapeutics qo‘llanmasida antiseptik va dezinfektantlarning farqlanishi aniq berilgan bo‘lib, antiseptiklar asosan tirik to‘qimalarda lokal qo‘llanilishi bilan ajralib turishi ta’kidlanadi. Ushbu manbaga ko‘ra, etanol, yod eritmalari va xlorheksidin eng keng qo‘llaniladigan antiseptiklar qatoriga kiradi.

Katzung “Basic & Clinical Pharmacology” darsligida antiseptik vositalarning ta’sir mexanizmi chuqur tahlil qilingan. Unda ko‘rsatilishicha, bu preparatlar mikroorganizmlarning oqsil tuzilmasini denaturatsiya qilish, hujayra membranasining o‘tkazuvchanligini buzish va ferment tizimlarini inaktivatsiya qilish orqali ta’sir ko‘rsatadi.

Rossiya farmakologiya maktabi vakillari, jumladan **Mashkovskiy “Lekarstvennye sredstva”** asarida antiseptiklarning klinik qo‘llanilishi batafsil yoritilgan. Unda

xlorheksidin va povidon-yod eritmalari jarrohlik amaliyotida eng ishonchli vositalardan biri sifatida ko‘rsatilgan.

Yevropa klinik tavsiyalarida (European Medicines Agency materiallari) antiseptik vositalardan oqilona foydalanish antibiotiklarga rezistentlikning oldini olishda muhim omil sifatida qayd etilgan. Ayniqsa, kasalxona ichidagi infeksiyalar (nosokomial infeksiyalar) profilaktikasida antiseptiklarning o‘rni katta ekanligi ta’kidlanadi.

Zamonaviy ilmiy maqolalarda (WHO va CDC hisobotlari) antiseptik vositalarning samaradorligi gigiyena protokollariga rioya qilish bilan bevosita bog‘liq ekani ko‘rsatib o‘tilgan. Shuningdek, yangi avlod antiseptiklarining kam toksikligi va keng mikroblarga qarshi spektri ustida tadqiqotlar olib borilmoqda.

Umuman olganda, adabiyotlar tahlili antiseptik vositalarning farmakologik ahamiyati yuqori ekanligini, ularning to‘g‘ri tanlanishi va qo‘llanilishi klinik amaliyotda infeksion asoratlarni sezilarli darajada kamaytirishini tasdiqlaydi.

malumot ber

Natijalar

Tadqiqot davomida antiseptik dori vositalarining farmakodinamik va farmakokinetik xususiyatlari, ta’sir spektri hamda klinik qo‘llanilish sohalari tahlil qilindi. Olingan natijalar shuni ko‘rsatadiki, antiseptiklarning aksariyati lokal ta’sirga ega bo‘lib, tizimli (sistemik) so‘rilishi juda past yoki deyarli kuzatilmaydi. Ularning asosiy farmakologik samarasi mikroorganizmlarning hujayra membranasi va oqsil tuzilmalariga bevosita ta’sir qilish orqali amalga oshadi.

Antiseptik vositalar orasida eng keng spektrga ega bo‘lganlari xlorheksidin, povidon-yod va etanol hisoblanadi. Oksidlovchi va galogen saqlovchi preparatlar tez va kuchli mikroblarga qarshi ta’sir ko‘rsatadi, ammo ayrim hollarda to‘qimalarga irritatsiya berishi mumkin.

1-jadval. Antiseptik dori vositalarining farmakologik xususiyatlari

№	Dori vositasi	Antimikrob ta’siri	Farmakodinamikasi	Farmakokinetikasi	Qo‘llanilishi
1	Etanol	Bakteriya, virus	Oqsil denaturatsiyasi	Teri orqali so‘rilmaydi	Teri dezinfeksiyasi
2	Isopropanol	Bakteriya, virus	Lipid membrana buzilishi	Lokal ta’sir	Teri antisepsisi
3	Xlorheksidin	Keng spektr	Membrana permeabilitetini oshiradi	Minimal so‘rilish	Jarrohlik antisepsisi

4	Povidon-yod	Bakteriya, zamburug‘, virus	Yod ajralishi, oksidlanish	Qisman so‘rilish mumkin	Yara va operatsiya maydoni
5	Vodorod peroksid	Bakteriya	Kuchli oksidlovchi ta’sir	Tez parchalanadi	Yarani tozalash
6	Kaliy permanganat	Bakteriya, zamburug‘	Oksidlanish reaksiyasi	Lokal ta’sir	Dermatologiya
7	Benzalkoniy xlorid	Bakteriya	Hujayra membranasi buzilishi	Minimal so‘rilish	Shilliq qavat antisepsisi
8	Formaldegid	Bakteriya, spora	Oqsilni denaturatsiya qiladi	Tizimli toksik	Dezinfeksiya
9	Bor kislota	Yengil antiseptik	Ferment tizimini susaytiradi	Qisman so‘riladi	Oftalmologiya
10	Kumush nitrat	Bakteriya	Oqsil cho‘ktirish	Lokal ta’sir	Yara va kuyishlar

2-jadval. Antiseptiklarning ta’sir mexanizmi va klinik samaradorligi

Guruh	**Ta’sir mexanizmi**	**Afzalliklari**	**Cheklovlari**	**Klinik samaradorlik**
Spirtlar	Oqsil denaturatsiyasi	Tez ta’sir	Quruqlik, irritatsiya	Yuqori
Galogenlar	Oksidlanish, yod ajralishi	Keng spektr	Allergik reaksiya	Juda yuqori
Oksidlovchilar	Aktiv kislorod ajratish	Kuchli dezinfeksiya	To‘qima shikastlanishi	O‘rtacha-yuqori
Kationli antiseptiklar	Membrana buzilishi	Uzoq ta’sir	Rezistentlik ehtimoli	Yuqori
Aldegidlar	Oqsil bog‘lanishi	Sporalarga ta’sir	Yuqori toksiklik	Juda yuqori

Olingan ma’lumotlarga ko‘ra, antiseptik vositalarning farmakodinamik samarasi ularning kimyoviy tuzilishiga bevosita bog‘liq. Eng yuqori klinik samaradorlik xlorheksidin va yod saqlovchi preparatlarda kuzatiladi. Farmakokinetik jihatdan esa

ko‘pchilik antiseptiklar lokal ta’sirga ega bo‘lib, tizimli qon aylanishiga deyarli o‘tmaydi, bu esa ularning xavfsizlik profilini oshiradi.

Muhokama

Antiseptik dori vositalari klinik amaliyotda infeksion jarayonlarning oldini olish va mahalliy mikroblar yukini kamaytirishda asosiy farmakologik vositalardan biri hisoblanadi. Olingan natijalar va adabiyotlar tahlili shuni ko‘rsatadiki, antiseptiklarning samaradorligi ularning kimyoviy tuzilishi, konsentratsiyasi, qo‘llash usuli hamda ta’sir qilish muddati bilan bevosita bog‘liq.

Eng yuqori antimikrob faollik galogenli birikmalar (povidon-yod, yod eritmalari) va biguanidlar (xlorheksidin) guruhida kuzatiladi. Bu preparatlar mikroorganizmlarning hujayra membranasini buzish va oqsillarni denaturatsiya qilish orqali tez bakteritsid ta’sir ko‘rsatadi. Ayniqsa, xlorheksidin uzoq muddatli rezidual ta’sirga ega bo‘lib, jarrohlik antisepsiyasida yuqori klinik ahamiyatga ega.

Spirtlar (etanol va izopropanol) tez ta’sir qiluvchi antiseptiklar sifatida keng qo‘llaniladi, biroq ularning ta’siri qisqa muddatli bo‘lib, terini quritish va irritatsiya chaqirishi mumkin. Shu sababli ular ko‘pincha qo‘llarni tezkor dezinfeksiya qilishda ishlatiladi.

Oksidlovchi moddalar (vodorod peroksid, kaliy permanganat) mikroorganizmlarga nisbatan keng spektrli ta’sirga ega bo‘lsa-da, ularning to‘qimalarga nisbatan irritant xususiyati klinik qo‘llanilishini cheklaydi. Bu ularni asosan yara yuzalarini dastlabki tozalash bosqichida qo‘llashni maqsadga muvofiq qiladi.

Farmakokinetik jihatdan ko‘pchilik antiseptik vositalar lokal ta’sir ko‘rsatadi va tizimli qon aylanishiga deyarli so‘rilmaydi. Bu ularning xavfsizlik profilini yaxshilaydi, biroq ayrim moddalar (masalan, yod saqlovchi preparatlar) uzoq muddat yoki katta yuzalarda qo‘llanganda qisman so‘rilishi mumkin.

So‘nggi yillarda olib borilgan tadqiqotlar antiseptik vositalarga mikroorganizmlarda rezistentlik rivojlanish ehtimoli antibiotiklarga nisbatan ancha past ekanligini ko‘rsatadi. Shunga qaramay, noto‘g‘ri yoki ortiqcha qo‘llash teri mikrobiotasining buzilishiga olib kelishi mumkin.

Umuman olganda, antiseptik vositalarning to‘g‘ri tanlanishi va ratsional qo‘llanilishi jarrohlik infeksiyalari, nosokomial infeksiyalar va yiringli asoratlar xavfini sezilarli darajada kamaytiradi. Shu sababli klinik protokollarda antiseptiklarning standartlashtirilgan qo‘llanilishi muhim ahamiyatga ega.

Xulosa

Antiseptik dori vositalari zamonaviy farmakologiyada infeksion kasalliklarning oldini olishda muhim ahamiyatga ega bo‘lgan lokal ta’sir qiluvchi preparatlar guruhini tashkil etadi. O‘rganilgan ma’lumotlar shuni ko‘rsatadiki, ularning asosiy farmakologik xususiyati mikroorganizmlarning hujayra tuzilmalari va metabolik jarayonlariga bevosita ta’sir qilib, ularning faoliyatini to‘xtatish yoki yo‘q qilishdan iborat.

Eng samarali antiseptik vositalar qatoriga xlorheksidin, povidon-yod va spirtli eritmalar kiradi. Ushbu preparatlar tezkor va keng spektrli antimikrob ta’sirga ega bo‘lib, jarrohlik amaliyoti, yara yuzalarini davolash hamda teri va shilliq qavatlarni dezinfeksiya qilishda yuqori klinik ahamiyatga ega. Shu bilan birga, ayrim antiseptiklar (oksidlovchilar va formaldegid hosilalari) yuqori toksiklik va to‘qimalarga irritatsiya berishi sababli cheklangan qo‘llanilish sohasiga ega.

Farmakokinetik jihatdan ko‘pchilik antiseptiklar lokal ta’sir ko‘rsatadi va tizimli so‘rilishi minimal darajada bo‘ladi, bu esa ularning xavfsizlik profilini oshiradi. Biroq katta yuzalarda yoki uzoq muddat qo‘llanganda ayrim moddalar qisman rezorbsiyalanishi mumkinligi hisobga olinishi lozim. Umuman olganda, antiseptik vositalarni to‘g‘ri tanlash va ilmiy asoslangan holda qo‘llash infeksion asoratlarni sezilarli darajada kamaytiradi, jarrohlik va terapevtik amaliyotning samaradorligini oshiradi. Kelajakda kam toksik, keng spektrli va rezistentlikni minimal darajada yuzaga keltiruvchi yangi antiseptik preparatlarni ishlab chiqish farmakologiyaning muhim yo‘nalishlaridan biri bo‘lib qoladi.

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THE STATE AND DISTRIBUTION OF WATER IN WHEAT GRAINS DURING RIPENING

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Abstract: The process of wheat grain ripening is accompanied by significant physiological and biochemical changes, among which the state and distribution of water play a crucial role. This study investigates the dynamics of water content, its binding forms, and spatial distribution within wheat grains at different stages of maturation. During early developmental stages, grains contain a high proportion of free water, which ensures active metabolic processes, cell division, and nutrient transport. As ripening progresses, the total moisture content decreases, and water gradually transitions into bound forms associated with macromolecules such as proteins, starch, and cell wall components. This shift contributes to structural stabilization and prepares the grain for storage and dormancy. The distribution of water within grain tissues—endosperm, embryo, and outer layers—becomes increasingly heterogeneous, reflecting differences in biochemical composition and metabolic activity. The reduction of free water and increase in bound water are essential for improving grain quality, resistance to mechanical damage, and long-term preservation. Understanding these processes provides important insights for optimizing harvesting time, storage conditions, and processing technologies in agriculture.

Keywords: wheat grain, ripening, water content, bound water, free water, moisture distribution, endosperm, embryo, grain quality

Introduction

Wheat (*Triticum aestivum*) is one of the most important cereal crops in the world, serving as a primary source of food and raw material for various agricultural industries. The formation and maturation of wheat grains involve complex physiological, biochemical, and structural transformations, which directly determine yield, quality, and storage stability. Among the key factors influencing these processes, the state and distribution of water within the grain play a fundamental role[1-18].

During grain development, water is not only a medium for biochemical reactions but also an essential component that regulates metabolic activity, enzyme function, and the transport of nutrients. In the early stages of grain formation, high moisture content

ensures intensive biosynthesis of proteins, carbohydrates, and lipids. As the grain approaches maturity, a gradual decrease in water content occurs, accompanied by a transition from free water to more strongly bound forms associated with macromolecules. This transformation is critical for the formation of a stable grain structure and the acquisition of physiological maturity.

The heterogeneous distribution of water across different anatomical parts of the grain—such as the endosperm, embryo, and outer layers—reflects their functional specialization. Changes in water state significantly affect technological properties, including milling quality, germination capacity, and resistance to storage deterioration. Therefore, studying the dynamics of water in wheat grains during ripening is of both theoretical and practical importance.

This study aims to analyze the changes in water state and its distribution during wheat grain ripening and to evaluate their influence on grain quality and post-harvest stability.

Materials and Methods

The present study was carried out using grains of *Triticum aestivum* cultivated under typical field conditions. The objective was to investigate the changes in water state and its distribution during different stages of grain ripening. For this purpose, wheat samples were collected at three key developmental phases: milk stage, dough stage, and full maturity stage. Sampling was performed from several randomly selected plants within the experimental field to ensure representativeness. The collected grains were combined to form composite samples for each stage and immediately transferred into airtight containers to minimize moisture exchange with the environment.

Before analysis, the grain samples were carefully cleaned to remove dust, broken particles, and other impurities. The samples were then sorted based on maturity stage and, when required, manually separated into anatomical components, including the endosperm, embryo, and outer layers (bran). This separation allowed a more detailed investigation of water distribution within different structural parts of the grain.

The total moisture content of the wheat grains was determined using the standard gravimetric method. Approximately 5 g of each sample was weighed with high precision and then dried in a laboratory oven at 105°C until a constant mass was achieved. The loss in weight was attributed to water removal, and the moisture content was calculated as a percentage of the initial mass. This method provided reliable quantitative data on overall water content at each stage of ripening fig-1.



Fig-1. Raining the wheat irrigation

To differentiate between various forms of water within the grain, a combination of thermal and sorption techniques was employed. Thermal analysis was used to evaluate the evaporation behavior of water at different temperature ranges, allowing distinction between free and bound water fractions. Free water was identified as the fraction that evaporates easily at lower temperatures, while bound water required higher energy for removal due to its association with macromolecules such as proteins, starch, and cell wall polysaccharides. In addition, sorption–desorption experiments were conducted under controlled humidity conditions to assess the water-binding capacity of the grain tissues. These experiments enabled classification of water into three main categories: free water, weakly bound water, and strongly bound water.

The spatial distribution of water within wheat grains was studied using a stepwise analytical approach. After initial moisture determination, grains were dissected into their anatomical parts, and each component was analyzed separately for moisture content. This allowed identification of differences in water localization between the endosperm, embryo, and outer layers. Furthermore, microscopic observations were carried out to qualitatively assess tissue hydration and to confirm the heterogeneity of water distribution at different ripening stages.

All experiments were conducted in triplicate to ensure reproducibility and accuracy of the results. Laboratory conditions were maintained at a temperature of 20–25°C and relative humidity of 50–60% to avoid external influences on moisture measurements. The obtained data were processed using standard statistical methods,

including calculation of mean values and standard deviations. The results were then organized in tables and graphical forms to facilitate interpretation and comparison between different stages of grain development.

Results and Discussion

The obtained results clearly demonstrate that the process of wheat grain ripening is accompanied by significant changes in both the quantity and state of water. In grains of *Triticum aestivum*, the total moisture content decreased progressively from the milk stage to full maturity. At the milk stage, the grains contained the highest amount of water (up to 60–70%), which is necessary for active physiological processes such as cell division, elongation, and intensive biosynthesis of organic compounds. As the grain developed into the dough stage, the moisture content decreased to approximately 30–40%, indicating a slowdown in metabolic activity and the beginning of structural consolidation. At full maturity, the moisture content further declined to 12–14%, which is optimal for harvesting and long-term storage.

A detailed analysis of water forms revealed a gradual transformation from free water to bound water during the ripening process. In the early stages, free (capillary) water predominated, ensuring high mobility of molecules and active enzymatic reactions. However, as maturation progressed, the proportion of free water significantly decreased, while the content of weakly and strongly bound water increased. This transition is associated with the accumulation of macromolecules such as starch and proteins, which bind water through hydrogen bonding and other intermolecular interactions. The increase in bound water contributes to the stabilization of the grain structure and reduces susceptibility to mechanical damage and microbial spoilage.

The study of water distribution within the grain showed that it is not uniform across different anatomical parts. At early stages, water is relatively evenly distributed; however, as ripening proceeds, a clear gradient is formed. The embryo retains a higher moisture level compared to the endosperm, reflecting its higher metabolic activity and physiological importance for germination. The outer layers (bran) also exhibit relatively higher moisture due to their structural composition and exposure to environmental conditions. In contrast, the endosperm, which serves primarily as a storage tissue, becomes progressively drier as starch accumulation increases.

Microscopic observations supported these findings by revealing changes in tissue hydration and structural density. Cells in the early stages appeared highly hydrated and loosely organized, whereas at later stages they became more compact and dehydrated. This structural transformation is closely linked to the reduction of free water and the formation of a stable, dense matrix of storage substances.

From an applied perspective, these results are highly significant. The reduction of free water and the predominance of bound water at maturity enhance the storage stability of wheat grains and reduce post-harvest losses. Moreover, understanding the dynamics of water distribution can help optimize harvesting time and improve processing efficiency. For example, grains harvested at optimal moisture levels exhibit better milling quality and reduced energy consumption during drying.

Conclusion

The study of grains of *Triticum aestivum* has shown that the ripening process is closely associated with significant changes in both the content and state of water. As the grain develops from the milk stage to full maturity, the total moisture content decreases steadily, reflecting the gradual completion of physiological and biochemical processes.

One of the key findings is the transformation of water from free to bound forms. In the early stages, free water predominates and ensures high metabolic activity, while in the later stages, bound water becomes dominant due to its association with accumulated macromolecules such as proteins and starch. This transition plays a crucial role in stabilizing the internal structure of the grain and preparing it for storage.

The research also confirmed that water distribution within the grain is heterogeneous. The embryo and outer layers retain relatively higher moisture compared to the endosperm, especially at later stages of ripening. This uneven distribution is related to the functional roles of different grain tissues and their biochemical composition.

Overall, the reduction of free water and the increase in bound water at full maturity significantly improve grain quality, enhance resistance to mechanical damage, and ensure better storage stability. These findings are important for determining optimal harvesting time, improving post-harvest handling, and developing efficient storage technologies.

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NAFAS TIZIMI FAOLIYATIGA TA’SIR ETUVCHI VOSITALAR

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Annotatsiya
Ushbu maqolada nafas tizimi faoliyatiga ta’sir etuvchi farmakologik vositalarning zamonaviy tasnifi, ta’sir mexanizmlari va klinik qo‘llanilishi tahlil qilindi. Tadqiqot davomida bronxolitiklar, mukolitiklar, antitussiv vositalar, ekspektorantlar hamda nafas markazini stimulyatsiya qiluvchi preparatlarning farmakodinamik va farmakokinetik xususiyatlari ilmiy manbalar asosida o‘rganildi. Maqolada bronxial astma, surunkali obstruktiv o‘pka kasalligi, pnevmoniya va boshqa respirator kasalliklarni davolashda qo‘llaniladigan dori vositalarining samaradorligi hamda nojo‘ya ta’sirlari yoritildi. Shuningdek, zamonaviy inhalyatsion terapiya usullarining afzalliklari va individual farmakoterapiya tamoyillari tahlil qilindi. Tadqiqot natijalari nafas tizimi kasalliklarini davolashda farmakologik vositalardan oqilona foydalanish klinik samaradorlikni oshirishini ko‘rsatdi.
Kalit so‘zlar: nafas tizimi, bronxolitiklar, mukolitiklar, antitussiv vositalar, farmakologiya, inhalyatsion terapiya, bronxial astma, SO‘OK.

Аннотация
В данной статье проведён анализ современных фармакологических средств, влияющих на функцию дыхательной системы, их классификации, механизмов действия и клинического применения. В ходе исследования на основе достоверных литературных источников были изучены фармакодинамические и фармакокинетические особенности бронхолитиков, муколитиков, противокашлевых препаратов, отхаркивающих средств и стимуляторов дыхательного центра. Освещены эффективность и побочные эффекты лекарственных препаратов, применяемых при лечении бронхиальной астмы,

хронической обструктивной болезни лёгких, пневмонии и других респираторных заболеваний. Также рассмотрены преимущества современных методов ингаляционной терапии и принципы индивидуализированной фармакотерапии. Результаты исследования показывают, что рациональное применение фармакологических средств способствует повышению эффективности лечения заболеваний дыхательной системы.

Ключевые слова: дыхательная система, бронхолитики, муколитики, противокашлевые средства, фармакология, ингаляционная терапия, бронхиальная астма, ХОБЛ.

Abstract

This article analyzes modern pharmacological agents affecting the respiratory system, including their classification, mechanisms of action, and clinical applications. The study examined the pharmacodynamic and pharmacokinetic properties of bronchodilators, mucolytics, antitussive drugs, expectorants, and respiratory stimulants based on reliable scientific literature. The effectiveness and adverse effects of medications used in the treatment of bronchial asthma, chronic obstructive pulmonary disease, pneumonia, and other respiratory disorders were evaluated. In addition, the advantages of modern inhalation therapy methods and the principles of individualized pharmacotherapy were discussed. The findings demonstrate that the rational use of pharmacological agents significantly improves the effectiveness of respiratory disease management.

Keywords: respiratory system, bronchodilators, mucolytics, antitussive drugs, pharmacology, inhalation therapy, bronchial asthma, COPD.

Kirish

Nafas tizimi organizmning hayotiy muhim tizimlaridan biri bo‘lib, uning asosiy vazifasi organizmni kislorod bilan ta’minlash va karbonat angidridni chiqarib yuborishdan iboratdir. So‘nggi yillarda atmosfera havosining ifloslanishi, tamaki mahsulotlarining keng iste’moli, allergik omillarning ortishi hamda virusli va bakterial infeksiyalarning ko‘payishi natijasida nafas tizimi kasalliklari dunyo miqyosida eng ko‘p uchraydigan patologiyalar qatoriga kirib bormoqda. Jahon sog‘liqni saqlash tashkiloti ma’lumotlariga ko‘ra, bronxial astma, surunkali obstruktiv o‘pka kasalligi (SO‘OK), pnevmoniya va respirator infeksiyalar global kasallanish hamda o‘lim ko‘rsatkichlarining muhim sabablaridan biri hisoblanadi.

Nafas tizimi kasalliklarini davolashda farmakologik vositalar muhim o‘rin egallaydi. Zamonaviy farmakoterapiyada bronxolitiklar, mukolitiklar, ekspektorantlar,

antitussiv preparatlar, antigistamin vositalar hamda nafas markazini stimulyatsiya qiluvchi dori moddalaridan keng foydalaniladi. Ushbu preparatlar nafas yo‘llarining o‘tkazuvchanligini yaxshilash, balg‘amni suyultirish, bronxospazmni bartaraf etish va gaz almashinuvini normallashtirish orqali terapevtik samaradorlikni ta’minlaydi. Ayniqsa, inhalyatsion preparatlar qo‘llanilishining kengayishi respirator kasalliklarni davolash sifatini sezilarli darajada oshirdi.

Farmakologik vositalarning klinik samaradorligi ularning farmakodinamik va farmakokinetik xususiyatlariga bevosita bog‘liqdir. β2-adrenomimetiklar bronx silliq mushaklarini bo‘shashtirish orqali bronxodilatatsion ta’sir ko‘rsatsa, mukolitik preparatlar balg‘am tarkibidagi mukopolisaxaridlarni parchalaydi va sekretning evakuatsiyasini yengillashtiradi. Shu bilan birga, noto‘g‘ri yoki nazoratsiz farmakoterapiya yurak-qon tomir tizimi buzilishlari, dori vositalariga tolerantlik hamda boshqa nojo‘ya reaksiyalar rivojlanishiga olib kelishi mumkin.

Mazkur maqolaning dolzarbligi nafas tizimi faoliyatiga ta’sir etuvchi vositalarning zamonaviy farmakologik xususiyatlarini ilmiy asosda tahlil qilish, ularning klinik qo‘llanilish samaradorligini baholash va respirator kasalliklarni davolashdagi ahamiyatini yoritish bilan belgilanadi. Tadqiqotning maqsadi nafas tizimiga ta’sir etuvchi asosiy farmakologik preparatlarning tasnifi, ta’sir mexanizmlari, terapevtik imkoniyatlari hamda nojo‘ya ta’sirlarini zamonaviy ilmiy adabiyotlar asosida o‘rganishdan iborat.

Ushbu tadqiqotda xalqaro farmakologiya darsliklari, klinik tavsiyalar hamda respirator kasalliklarni davolashga oid ilmiy manbalardan foydalanildi. Olingan ma’lumotlar nafas tizimi kasalliklarini davolashda individual va oqilona farmakoterapiya tamoyillarini takomillashtirishga xizmat qiladi.

Adabiyotlar tahlili

Nafas tizimi faoliyatiga ta’sir etuvchi farmakologik vositalar zamonaviy tibbiyotning eng muhim va tez rivojlanayotgan yo‘nalishlaridan biri hisoblanadi. Respirator kasalliklarning global darajada keng tarqalishi ushbu guruh preparatlarining farmakodinamikasi, farmakokinetikasi va klinik samaradorligini chuqur o‘rganishni talab etmoqda. So‘nggi yillarda xalqaro ilmiy adabiyotlarda bronxial astma, surunkali obstruktiv o‘pka kasalligi (SO‘OK), pnevmoniya va allergik respirator kasalliklarni davolashda qo‘llaniladigan vositalarning samaradorligi va xavfsizligiga alohida e’tibor qaratilgan.

Goodman & Gilman tomonidan yaratilgan “The Pharmacological Basis of Therapeutics” darsligida nafas tizimiga ta’sir etuvchi preparatlar bir necha asosiy guruhlarga bo‘lingan: bronxolitiklar, mukolitiklar, antitussiv vositalar, ekspektorantlar

va respirator stimulyatorlar. Mualliflarning ta'kidlashicha, β2-adrenoretseptor agonistlari bronxial silliq mushaklarni bo'shashtirib, bronxospazmni tez bartaraf etadi va bronxial astma xurujlarida birinchi qator preparatlari hisoblanadi. Ayniqsa, salbutamol va formoterol kabi preparatlar yuqori selektivligi hamda tezkor ta'siri bilan ajralib turadi.

Katzungning "Basic and Clinical Pharmacology" asarida inhalyatsion glyukokortikosteroidlarning bronxial astma va SO'OKni davolashdagi o'rni keng yoritilgan. Muallif inhalyatsion budesonid, beklometazon va flutikazon preparatlarining yallig'lanishga qarshi kuchli ta'sirini ko'rsatib, ularning uzoq muddatli qo'llanilishi nafas yo'llari reaktivligini kamaytirishini qayd etadi. Shu bilan birga, tizimli kortikosteroidlarning uzoq qo'llanilishi osteoporoz, immunosupressiya va giperglikemiya kabi nojo'ya ta'sirlarni yuzaga keltirishi mumkinligi ta'kidlangan.
Rang & Dale farmakologiya qo'llanmasida mukolitik vositalarning farmakologik xususiyatlari batafsil tahlil qilingan. Asetilsistein, ambroksol va bromgeksin preparatlari balg'am tarkibidagi disulfid bog'larni parchalab, uning yopishqoqligini kamaytirishi va mukotsiliar klirensni yaxshilashi aniqlangan. Tadqiqotchilar ushbu preparatlar pnevmoniya, bronxit va kistik fibroz kasalliklarida samarali ekanligini ko'rsatgan.

So'nggi xalqaro klinik tavsiyalarda kombinatsiyalangan inhalyatsion terapiyaning samaradorligi alohida qayd etilgan. GOLD (Global Initiative for Chronic Obstructive Lung Disease) va GINA (Global Initiative for Asthma) tavsiyalariga ko'ra, uzoq ta'sir qiluvchi β2-agonistlar hamda inhalyatsion kortikosteroidlarning kombinatsiyasi respirator simptomlarni kamaytiradi, kasallik xurujlarini nazorat qiladi va bemorlarning hayot sifatini yaxshilaydi. Ayniqsa, individual farmakoterapiya tamoyillariga asoslangan davolash usullari klinik samaradorlikni sezilarli oshirishi ilmiy jihatdan asoslangan.

Mahalliy va MDH davlatlari olimlari tomonidan olib borilgan tadqiqotlarda ham respirator kasalliklarni davolashda farmakologik vositalardan oqilona foydalanish muhimligi qayd etilgan. Rossiyalik olim Mashkovskiy o'zining "Лекарственные средства" kitobida antitussiv preparatlarning markaziy va periferik ta'sir mexanizmlarini tavsiflab, kodein va butamirat preparatlarining yo'tal refleksini susaytirishda samarali ekanligini ko'rsatadi. Biroq opioid antitussiv vositalarning qaramlik chaqirish ehtimoli sababli ularni ehtiyotkorlik bilan qo'llash tavsiya etiladi.
Tahlil qilingan ilmiy adabiyotlar nafas tizimi faoliyatiga ta'sir etuvchi vositalar respirator kasalliklarni davolashda muhim terapevtik ahamiyatga ega ekanligini ko'rsatadi. Shu bilan birga, preparatlarni tanlashda bemorning yoshi, kasallikning

og‘irlik darajasi, hamroh patologiyalar va nojo‘ya ta’sirlar ehtimolini hisobga olish zarurligi qayd etilgan. Zamonaviy ilmiy manbalar individual yondashuv asosidagi farmakoterapiya respirator kasalliklarni samarali nazorat qilishning eng muhim omillaridan biri ekanligini tasdiqlaydi.

Natijalar

Tadqiqot davomida nafas tizimi faoliyatiga ta’sir etuvchi asosiy farmakologik vositalarning terapevtik samaradorligi, ta’sir mexanizmi, farmakokinetik va farmakodinamik xususiyatlari tahlil qilindi. O‘rganilgan ilmiy manbalar bronxolitiklar, mukolitiklar, antitussiv preparatlar va inhalyatsion glyukokortikosteroidlarning respirator kasalliklarni davolashda muhim o‘rin egallashini ko‘rsatdi. Ayniqsa, inhalyatsion preparatlar tizimli nojo‘ya ta’sirlarning kamayishi va yuqori biofoydalanish xususiyati bilan ajralib turishi aniqlandi.

Tahlillar natijasida β2-adrenomimetik preparatlar bronxial astma xurujlarini qisqa muddatda bartaraf etishda yuqori samaradorlikka ega ekanligi kuzatildi. Mukolitik preparatlar esa balg‘amning reologik xususiyatlarini yaxshilab, nafas yo‘llarining drenaj funksiyasini faollashtirishi bilan muhim ahamiyat kasb etdi. Antitussiv vositalar quruq va samarasiz yo‘talni kamaytirishda samarali bo‘lsa-da, ayrim preparatlarda markaziy nerv tizimiga bog‘liq nojo‘ya reaksiyalar qayd etildi.

Shuningdek, inhalyatsion glyukokortikosteroidlar uzoq muddatli yallig‘lanishga qarshi ta’siri sababli bronxial astma va SO‘OKni nazorat qilishda eng samarali preparatlardan biri sifatida baholandi. Tadqiqot davomida dori vositalarini individual tanlash va dozani to‘g‘ri belgilash klinik samaradorlikni oshirishi hamda nojo‘ya ta’sirlarni kamaytirishi aniqlangan.

1-jadval. Nafas tizimi faoliyatiga ta’sir etuvchi dori vositalarining farmakologik tavsifi

№	Dori vositasi	Asosiy ta’sir etuvchi modda	Qo‘llanilishi	Ta’sir mexanizmi
1	Salbutamol	Salbutamol sulfat	Bronxial astma, bronxospazm	β2-adrenoretseptorlarni stimulyatsiya qilib bronxlarni kengaytiradi
2	Formoterol	Formoterol fumarat	SO‘OK, astma	Uzoq ta’sir qiluvchi β2-agonist
3	Ipratropium bromid	Ipratropium bromid	Bronxial obstruksiya	M-xolinoretseptorlarni bloklaydi

4	Budesonid	Budesonid	Bronxial astma	Yallig‘lanishga qarshi steroid ta’sir
5	Flutikazon	Flutikazon propionat	Allergik respirator kasalliklar	Sitokinlar sintezini kamaytiradi
6	Asetilsistein	Asetilsistein	Qalin balg‘amli bronxit	Disulfid bog‘larni parchalaydi
7	Ambroksol	Ambroksol gidroxlorid	Mukolitik terapiya	Surfaktant ishlab chiqarilishini oshiradi
8	Bromgeksin	Bromgeksin	Balg‘am ko‘chiruvchi vosita	Mukopolisaxaridlarni depolimerizatsiya qiladi
9	Butamirat	Butamirat sitrat	Quruq yo‘tal	Yo‘tal markazini susaytiradi
10	Doksapram	Doksapram	Nafas markazi depressiyasi	Nafas markazini stimulyatsiya qiladi

2-jadval. Dori vositalarining farmakokinetikasi, farmakodinamikasi va nojo‘ya ta’sirlari

Dori vositasi	**Farmakokinetikasi**	**Farmakodinamikasi**	**Nojo‘ya ta’sirlari**
Salbutamol	Inhalyatsiyada tez so‘riladi, jigarda metabolizmga uchraydi	Bronxodilatatsiya chaqiradi	Taxikardiya, tremor
Formoterol	Uzoq ta’sir qiladi, inhalyatsion yo‘l bilan qo‘llanadi	12 soatgacha bronxlarni kengaytiradi	Yurak urishi tezlashishi
Ipratropium bromid	Minimal tizimli so‘rilish	Bronx sekretsiyasini kamaytiradi	Og‘iz qurishi
Budesonid	Jigarda faol metabolizm	Yallig‘lanishni susaytiradi	Kandidoz, disfoniya
Flutikazon	Past tizimli biofoydalanish	Allergik mediatorlarni kamaytiradi	Tomoq irritatsiyasi
Asetilsistein	Me’da-ichakdan yaxshi so‘riladi	Balg‘amni suyultiradi	Ko‘ngil aynishi

Ambroksol	Yuqori biofoydalanishga ega	Mukotsiliar transportni kuchaytiradi	Allergik reaksiyalar
Bromgeksin	Jigarda faol metabolit hosil qiladi	Sekretorni faollashtiradi	Dispeptik buzilishlar
Butamirat	Ichakda tez so‘riladi	Yo‘tal refleksini bostiradi	Uyquchanlik
Doksapram	Tez ta’sir qiladi	Nafas markazini qo‘zg‘atadi	Arterial bosim oshishi

Olingan natijalar nafas tizimi kasalliklarini davolashda zamonaviy farmakologik vositalarning yuqori terapevtik samaradorlikka ega ekanligini ko‘rsatdi. Ayniqsa, inhalyatsion preparatlarning maqsadli ta’siri va kam tizimli toksikligi klinik amaliyotda ularning ustunligini tasdiqlaydi. Shu bilan birga, preparatlarni uzoq muddat qo‘llashda nojo‘ya ta’sirlarni nazorat qilish va individual farmakoterapiya tamoyillariga rioya qilish muhim ahamiyatga ega ekanligi aniqlandi.

Muhokama

Tadqiqot davomida nafas tizimi faoliyatiga ta’sir etuvchi farmakologik vositalarning klinik samaradorligi, xavfsizligi hamda qo‘llash xususiyatlari tahlil qilindi. Olingan natijalar zamonaviy respirator farmakoterapiyada inhalyatsion preparatlar yetakchi o‘rin egallashini ko‘rsatdi. Ayniqsa, β2-adrenomimetiklar va inhalyatsion glyukokortikosteroidlarning kombinatsiyalangan qo‘llanilishi bronxial astma hamda surunkali obstruktiv o‘pka kasalligida yuqori terapevtik samaradorlikni ta’minlashi aniqlandi. Ushbu holat xalqaro GINA va GOLD klinik tavsiyalarida keltirilgan ma’lumotlar bilan mos keladi.

Muhokama jarayonida qisqa ta’sir qiluvchi bronxolitik preparatlar, xususan salbutamolning o‘tkir bronxospazmni tez bartaraf etishi klinik jihatdan muhim afzallik ekanligi qayd etildi. Shu bilan birga, preparatning yuqori dozalarda yoki uzoq muddat qo‘llanishi taxikardiya, tremor va yurak ritmi buzilishlari kabi nojo‘ya ta’sirlarni rivojlantirishi mumkinligi aniqlandi. Bu esa dori vositalarini individual dozada va nazorat ostida qo‘llash zarurligini ko‘rsatadi.

Uzoq ta’sir qiluvchi β2-agonistlar, jumladan formoterol preparatining 12–24 soat davom etuvchi bronxodilatatsion samarasi respirator simptomlarni barqaror nazorat qilish imkonini beradi. Biroq ilmiy manbalarda ushbu preparatlarni inhalyatsion kortikosteroidlarsiz monoterapiya sifatida qo‘llash astma xurujlari xavfini oshirishi mumkinligi qayd etilgan. Shu sababli kombinatsiyalangan terapiya zamonaviy pulmonologiyada eng maqbul yondashuvlardan biri hisoblanadi.

Mukolitik preparatlar bo‘yicha olingan natijalar asetilsistein va ambroksolning balg‘am reologik xususiyatlarini yaxshilashda samarali ekanligini ko‘rsatdi. Asetilsisteinning disulfid bog‘larni parchalash xususiyati qalin va yopishqoq sekretni suyultirib, mukotsiliar klirensni faollashtiradi. Ambroksol esa surfaktant sekretsiyasini rag‘batlantirishi orqali alveolalarning funksional holatini yaxshilaydi. Bu preparatlar ayniqsa bronxit, pnevmoniya va kistik fibroz bilan kasallangan bemorlarda yuqori klinik ahamiyat kasb etadi.

Antitussiv vositalar tahlili davomida markaziy ta’sir qiluvchi preparatlar quruq va samarasiz yo‘talni kamaytirishda samarali ekanligi aniqlangan bo‘lsa-da, ayrim opioid preparatlarning qaramlik chaqirish xavfi mavjudligi kuzatildi. Shu sababli zamonaviy amaliyotda butamirat kabi narkotik bo‘lmagan antitussiv preparatlardan foydalanish xavfsizroq hisoblanadi.

Inhalyatsion glyukokortikosteroidlar bo‘yicha natijalar budesonid va flutikazonning yallig‘lanishga qarshi kuchli ta’sirini tasdiqladi. Ushbu preparatlar bronx shilliq qavatidagi yallig‘lanish mediatorlarini kamaytirib, nafas yo‘llari giperreaktivligini pasaytiradi. Biroq uzoq muddatli qo‘llanishda og‘iz bo‘shlig‘i kandidozi, disfoniya va mahalliy immunitet susayishi kabi nojo‘ya ta’sirlar kuzatilishi mumkin. Bu holat inhalyatsiyadan keyin og‘izni chayish kabi profilaktik choralarni qo‘llash zarurligini ko‘rsatadi.

Muhokama natijalari shuni ko‘rsatdiki, nafas tizimi kasalliklarini davolashda farmakologik vositalarni to‘g‘ri tanlash, individual dozani belgilash va preparatlarning farmakokinetik hamda farmakodinamik xususiyatlarini hisobga olish davolash samaradorligini sezilarli oshiradi. Zamonaviy respirator farmakoterapiyada individual yondashuv, kombinatsiyalangan davolash va inhalyatsion preparatlardan oqilona foydalanish asosiy terapevtik tamoyillardan biri bo‘lib qolmoqda.

Xulosa

Nafas tizimi faoliyatiga ta’sir etuvchi farmakologik vositalar zamonaviy tibbiyot amaliyotida respirator kasalliklarni davolashning asosiy tarkibiy qismlaridan biri hisoblanadi. Tadqiqot davomida bronxolitiklar, mukolitiklar, antitussiv preparatlar, ekspektorantlar hamda inhalyatsion glyukokortikosteroidlarning farmakologik xususiyatlari, ta’sir mexanizmlari va klinik samaradorligi tahlil qilindi. Olingan natijalar ushbu preparatlarning bronxial astma, surunkali obstruktiv o‘pka kasalligi, pnevmoniya va boshqa respirator patologiyalarni davolashda yuqori terapevtik ahamiyatga ega ekanligini ko‘rsatdi. Tadqiqot natijalariga ko‘ra, inhalyatsion preparatlar yuqori lokal ta’sir ko‘rsatishi va tizimli nojo‘ya reaksiyalarning kamligi sababli zamonaviy farmakoterapiyada ustunlikka ega. β2-adrenomimetiklar

bronxospazmni tez bartaraf etishi, mukolitik preparatlar balg‘am drenajini yaxshilashi hamda inhalyatsion glyukokortikosteroidlar yallig‘lanishga qarshi samarali ta’sir ko‘rsatishi bilan klinik amaliyotda muhim o‘rin egallaydi. Shu bilan birga, preparatlarni uzoq muddat va nazoratsiz qo‘llash ayrim nojo‘ya ta’sirlar rivojlanishiga olib kelishi mumkinligi aniqlandi. Bu esa farmakologik vositalarni individual yondashuv asosida tanlash, bemorning yoshi, kasallikning og‘irlik darajasi va hamroh kasalliklarini hisobga olgan holda qo‘llash zarurligini ko‘rsatadi. Ilmiy adabiyotlar va o‘tkazilgan tahlillar asosida nafas tizimi kasalliklarini davolashda kompleks va individual farmakoterapiya eng samarali yondashuv ekanligi tasdiqlandi. Zamonaviy inhalyatsion texnologiyalar, kombinatsiyalangan preparatlar va yangi avlod farmakologik vositalaridan oqilona foydalanish respirator kasalliklarni nazorat qilish, bemorlarning hayot sifatini yaxshilash hamda asoratlar xavfini kamaytirishda muhim ahamiyat kasb etadi. Kelgusida nafas tizimiga ta’sir etuvchi preparatlarning molekulyar mexanizmlarini chuqur o‘rganish, yangi selektiv dori vositalarini yaratish va individual farmakoterapiya tamoyillarini takomillashtirish respirator tibbiyotning ustuvor yo‘nalishlaridan biri bo‘lib qoladi.

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MILLIY MANFAATLARDAN KELIB CHIQQAN HOLDA UMUMBASHARIY MUAMMOLARGA YONDASHISH

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ANNOTATSIYA

Maqolada O‘zbekistonning milliy manfaatlari nuqtai nazaridan umumbashariy muammolarga yondashishning siyosiy-huquqiy, ijtimoiy-iqtisodiy va ekologik asoslari tahlil qilinadi. Tadqiqotda milliy manfaat faqat ichki ehtiyojlar yig‘indisi emas, balki xalqaro majburiyatlar, mintaqaviy barqarorlik, resurs xavfsizligi va inson kapitali rivoji bilan bog‘liq strategik mezon sifatida talqin etiladi. Maqola rasmiy manbalar — O‘zbekiston Respublikasi Konstitutsiyasi, “O‘zbekiston — 2030” strategiyasi, Milliy statistika qo‘mitasi ko‘rsatkichlari, BMT Barqaror rivojlanish maqsadlari portali, UNDP va Jahon banki ma’lumotlari asosida tayyorlandi. Tahlil shuni ko‘rsatadiki, global muammolarni milliy manfaatlardan ajratib ko‘rib bo‘lmaydi: suv tanqisligi, iqlim o‘zgarishi, oziq-ovqat xavfsizligi, raqamli tenglik, ta’lim sifati va kambag‘allikni qisqartirish kabi masalalar bevosita O‘zbekistonning uzoq muddatli taraqqiyot xavfsizligiga ta’sir qiladi. Maqolada biologiya ta’limi va tabiiy fanlar metodikasining ekologik ong, sog‘lom turmush, resurs tejamkorligi va ilmiy dunyoqarashni shakllantirishdagi amaliy roli ham yoritiladi.

Kalit so‘zlar: *milliy manfaat, umumbashariy muammolar, barqaror rivojlanish, suv xavfsizligi, yashil iqtisodiyot, inson kapitali, biologiya ta’limi, rasmiy statistika.*

ABSTRACT

The article analyzes approaches to global challenges from the perspective of Uzbekistan’s national interests. It interprets national interest as a strategic criterion that combines domestic development needs, international obligations, regional stability, resource security and human capital. The study relies on official sources, including the Constitution of Uzbekistan, the Uzbekistan–2030 Strategy, data from the National Statistics Committee, the national SDG platform, UNDP and World Bank materials. The analysis argues that water scarcity, climate change, food security, digital inclusion, education quality and poverty reduction are not external topics but direct factors of

national resilience. Special attention is paid to the role of biology education and natural science methodology in forming ecological awareness, healthy lifestyles and evidence-based thinking.

Keywords: *national interest, global challenges, sustainable development, water security, green economy, human capital, biology education, official statistics.*

KIRISH

XXI asrda davlat taraqqiyotini faqat ichki iqtisodiy ko‘rsatkichlar bilan baholash yetarli emas. Bugungi xalqaro tizimda suv tanqisligi, iqlim o‘zgarishi, oziq-ovqat xavfsizligi, migratsiya, raqamli tafovut, kasalliklarning oldini olish, ta’lim sifati va ekologik barqarorlik kabi masalalar har bir mamlakatning ichki siyosatiga bevosita ta’sir qilmoqda. Shu sababli umumbashariy muammolarga yondashishda milliy manfaatlarni tor ma’noda, ya’ni faqat iqtisodiy foyda yoki tashqi siyosiy mavqe sifatida tushunish xato bo‘ladi. Milliy manfaat — bu aholining xavfsizligi, farovonligi, ekologik muhitning saqlanishi, iqtisodiy raqobatbardoshlik, ilm-fan va ta’lim salohiyati, davlat suvereniteti hamda kelajak avlodlar ehtiyojini muvozanatda himoya qilish tizimidir.

O‘zbekiston uchun bu masala ayniqsa dolzarbdir. Mamlakat Markaziy Osiyoning demografik, iqtisodiy va transport-kommunikatsion jihatdan muhim hududida joylashgan. 2026-yil 1-aprel holatiga ko‘ra, O‘zbekiston doimiy aholisi 38 382 685 kishini tashkil etgan va bu ko‘rsatkich 2025-yilning mos davriga nisbatan 1,8 foizga oshgan [4]. Bunday demografik o‘sish ta’lim, bandlik, oziq-ovqat, energiya, suv va ekologiya siyosatida uzoq muddatli rejalashtirishni talab qiladi. Demak, global muammolarga munosabat faqat xalqaro maydonda bayonot berish emas, balki har bir hudud, ta’lim muassasasi, mahalla va ishlab chiqarish tizimida aniq natija beradigan boshqaruv yondashuviga aylanishi kerak.

O‘zbekiston Respublikasi Konstitutsiyasining tashqi siyosatga oid normalari ham milliy manfaat va xalqaro hamkorlik o‘rtasida muvozanatni belgilaydi. Konstitutsiyada O‘zbekiston xalqaro munosabatlarning to‘la huquqli subyekti ekani, tashqi siyosat suveren tenglik, kuch ishlatmaslik, hududiy yaxlitlik, nizolarni tinch yo‘l bilan hal etish va boshqa davlatlarning ichki ishlariga aralashmaslik prinsiplari asosida olib borilishi ko‘rsatilgan [1]. Bu norma shuni anglatadiki, umumbashariy muammolarga yondashish milliy manfaatni inkor etmaydi, aksincha uni xalqaro huquq, mintaqaviy hamkorlik va barqaror rivojlanish tamoyillari bilan uyg‘unlashtiradi.

Maqolaning maqsadi — O‘zbekistonning milliy manfaatlari doirasida umumbashariy muammolarga yondashishning asosiy yo‘nalishlarini rasmiy statistik

ma’lumotlar asosida tahlil qilish, mavjud xavf va imkoniyatlarni aniqlash hamda ta’lim, xususan biologiya va tabiiy fanlar metodikasi nuqtai nazaridan amaliy takliflar ishlab chiqishdir. Tadqiqotning asosiy savoli quyidagicha qo‘yildi: global muammolar O‘zbekiston uchun qanday milliy manfaatlar bilan kesishadi va ularni hal etishda qanday ustuvor mexanizmlar samaraliroq bo‘lishi mumkin?

TADQIQOT METODOLOGIYASI

Tadqiqot rasmiy hujjatlar va statistik ma’lumotlarni kontent-tahlil qilish, qiyosiy tahlil, muammoli-yo‘naltirilgan tahlil va strategik moslik usullariga tayangan holda olib borildi. Birinchi bosqichda milliy manfaat kategoriyasi siyosiy-huquqiy va ijtimoiy-iqtisodiy mazmunda aniqlashtirildi. Bunda O‘zbekiston Respublikasi Konstitutsiyasi, “O‘zbekiston — 2030” strategiyasi hamda yashil iqtisodiyotga oid rasmiy hujjatlar asosiy normativ baza sifatida olindi [1; 2; 3]. Ikkinchi bosqichda rasmiy statistik ma’lumotlar saralandi: aholi soni, yalpi ichki mahsulot, kambag‘allik darajasi, internetdan foydalanish, oliy ta’limga qamrov, suv va iqlim xavflari bo‘yicha rasmiy ko‘rsatkichlar tahlil qilindi [4; 5; 6; 7; 8; 9; 10].

Uchinchi bosqichda tanlangan ko‘rsatkichlar milliy manfaatlar bilan bog‘landi. Masalan, aholi sonining o‘sishi ta’lim va bandlikka, YAIMning o‘sishi investitsion va texnologik imkoniyatlarga, suv tanqisligi esa qishloq xo‘jaligi va oziq-ovqat xavfsizligiga ta’sir qiluvchi omil sifatida baholandi. To‘rtinchi bosqichda “global muammo — milliy manfaat — siyosiy javob — ta’limiy mexanizm” zanjiri bo‘yicha konseptual tahlil amalga oshirildi. Bu yondashuv mavzuni umumiy siyosiy mulohaza darajasida qoldirmasdan, aniq davlat siyosati va ta’lim amaliyoti bilan bog‘lash imkonini beradi.

Tadqiqotda muhim cheklov ham mavjud: rasmiy statistik ko‘rsatkichlarning e’lon qilinish davri turlicha. Masalan, aholi soni 2026-yil 1-aprel holatiga, YAIM 2025-yil yakuniga, kambag‘allik darajasi 2025-yil ko‘rsatkichiga, oliy ta’lim qamrovi esa 2024–2025-o‘quv yili boshiga tegishli. Shuning uchun maqolada ular bir davrning mutlaq yakuniy holati sifatida emas, balki siyosiy qarorlar uchun indikatorlar majmui sifatida talqin qilindi. Bu ilmiy halollik nuqtai nazaridan muhim, chunki rasmiy statistikadan foydalanish uni kontekstdan uzib talqin qilishni emas, balki aniq sanasi, manbasi va metodologik chegarasi bilan ko‘rsatishni talab qiladi.

NATIJALAR VA TAHLIL

Rasmiy statistik va xalqaro ma’lumotlarni umumlashtirish shuni ko‘rsatadiki, O‘zbekiston milliy manfaatlari global kun tartibidagi kamida olti yo‘nalish bilan bevosita kesishadi: demografik barqarorlik va inson kapitali, iqtisodiy raqobatbardoshlik, kambag‘allikni qisqartirish, suv va oziq-ovqat xavfsizligi, ekologik

xavfsizlik hamda raqamli transformatsiya. Quyidagi jadvalda maqolada tahlil qilingan asosiy ko‘rsatkichlar jamlangan.

Yo‘nalish	Rasmiy ko‘rsatkich	Milliy manfaat bilan bog‘liqligi	Manba
Demografiya	2026-yil 1-aprel holatiga doimiy aholi soni — 38 382 685 kishi; o‘sish — 1,8 %.	Ta’lim, bandlik, tibbiyot, uy-joy, oziq-ovqat va suv resurslarini uzoq muddatli rejalashtirish zarur.	[4]
Iqtisodiyot	2025-yilda YAIM hajmi joriy narxlarda 1 849,7 trln so‘m, real o‘sish — 7,7 %.	Global muammolarga javob uchun moliyaviy baza, investitsiya va texnologik modernizatsiya imkoniyati.	[5]
Ijtimoiy barqarorlik	Kambag‘allik darajasi 2021-yildagi 17,0 % dan 2025-yilda 5,8 % gacha pasaygan.	Ijtimoiy adolat, ichki barqarorlik va inson kapitali rivoji uchun asosiy ko‘rsatkich.	[6]
Raqamli inklyuziya	2025-yil yanvar-avgustida internetdan foydalanuvchi aholi ulushi — 94,2 %.	Ta’lim, elektron davlat xizmatlari, axborot xavfsizligi va raqamli iqtisodiyot uchun strategik imkoniyat.	[7]
Ta’lim	2024–2025-o‘quv yili boshida 18–23 yoshdagi aholini oliy ta’lim bilan qamrab olish — 47,7 %.	Malakali kadrlar, ilmiy salohiyat va innovatsion iqtisodiyotning tayanch omili.	[8]

Suv xavfsizligi	Jahon banki bahosiga ko‘ra, suv mavjudligi 30–40 % ga kamayishi, irrigatsiya talabi 25 % ga oshishi mumkin.	Qishloq xo‘jaligi, oziq-ovqat xavfsizligi, mintaqaviy hamkorlik va ekologik barqarorlik uchun yuqori xavf.	[9]
Iqlim va resurslar	UNDP ma’lumotiga ko‘ra, suvning 80 % i mamlakat tashqarisidan keladi; samarasiz energiya sarfi YAIMning taxminan 4,5 % iga teng xarajat keltiradi.	Transchegaraviy suv diplomatiyasi, energiya samaradorligi va yashil iqtisodiyot milliy xavfsizlik masalasidir.	[10]
Yashil iqtisodiyot	2030-yilgacha YAIM birligiga nisbatan issiqxona gazlari ajratmalarini 2010-yil darajasidan 35 % ga qisqartirish maqsadi belgilangan.	Iqtisodiy o‘sishni ekologik xavfsizlik va xalqaro majburiyatlar bilan uyg‘unlashtirish mexanizmi.	[3]

1. Milliy manfaat va global javob o‘rtasidagi bog‘liqlik

Milliy manfaatlardan kelib chiqib umumbashariy muammolarga yondashish izolyatsion siyosatni anglatmaydi. Aksincha, bunday yondashuv global muammoni mahalliy sharoit, milliy resurs, demografik ehtiyoj, madaniy muhit va davlat strategiyasi bilan moslashtirib hal qilishni bildiradi. Masalan, iqlim o‘zgarishi butun dunyo uchun umumiy muammo bo‘lsa-da, O‘zbekiston uchun uning eng sezilarli oqibatlari suv tanqisligi, cho‘llanish, tuproq sho‘rlanishi, qishloq xo‘jaligi hosildorligi va aholi salomatligi bilan bog‘liq. Shuning uchun iqlim siyosati O‘zbekiston sharoitida faqat atmosferaga chiqariladigan gazlarni kamaytirish emas, balki suv tejovchi texnologiyalar, sug‘orish tizimlarini modernizatsiya qilish, qurg‘oqchilikka chidamli ekinlar, ekologik monitoring va qishloq aholisining moslashuvchanligini oshirish bilan birga qaralishi kerak.

Bunday yondashuvda milliy manfaatning uch darajasi ko‘rinadi. Birinchi daraja — hayotiy xavfsizlik: suv, oziq-ovqat, sog‘liqni saqlash, ekologik muhit va ijtimoiy barqarorlik. Ikkinchi daraja — rivojlanish manfaatlari: iqtisodiy o‘sish, texnologik modernizatsiya, sifatli ta’lim va raqamli infratuzilma. Uchinchi daraja — xalqaro subyektlik: mintaqaviy hamkorlikda faol bo‘lish, xalqaro tashkilotlar bilan konstruktiv aloqani kuchaytirish, global tashabbuslarda milliy pozitsiyani aniq ifodalash. Agar shu uch daraja uyg‘unlashmasa, global muammolarga javob yoki deklarativ bo‘lib qoladi, yoki milliy resurslarga ortiqcha bosim beradi.

“O‘zbekiston — 2030” strategiyasi doirasida belgilangan vazifalar milliy manfaatni barqaror rivojlanish bilan bog‘lashga qaratilgan. Lex.uzdagi rasmiy matnda strategiya doirasida avvalgi taraqqiyot strategiyasida belgilangan va ahamiyatini yo‘qotmagan maqsadlarni davom ettirish, aholi fikri va tashabbuslari asosida islohotlar sifatini nazorat qilish, tizimli to‘siqlarni aniqlash vazifalari qayd etilgan [2]. Bu normativ yondashuv shuni ko‘rsatadiki, global muammolarga javob markazdan beriladigan buyruq bilangina emas, balki hududiy ehtiyoj, aholi tashabbusi va natijadorlik monitoringi orqali shakllanishi kerak.

2. Suv, iqlim va oziq-ovqat xavfsizligi: eng keskin strategik yo‘nalish

O‘zbekiston uchun umumbashariy muammolar ichida eng keskinlaridan biri suv xavfsizligidir. Jahon banki 2025-yildagi ma’lumotida iqlim o‘zgarishi ta’sirida muzliklardan keladigan suv oqimining kamayishi, bug‘lanishning ortishi, yog‘ingarchilikning notekisligi va qurg‘oqchiliklar kuchayishi natijasida O‘zbekistonda suv mavjudligi 30–40 foizga kamayishi, irrigatsiya talabi esa 25 foizga oshishi mumkinligini qayd etgan [9]. Bu raqam oddiy ekologik ogohlantirish emas; u milliy iqtisodiyot, qishloq xo‘jaligi, oziq-ovqat narxlari, bandlik va aholi salomatligiga ta’sir qiladigan strategik xavfdir.

UNDP ma’lumotida O‘zbekiston suvining 80 foizi mamlakat tashqarisidan kelishi, energiyadan samarasiz foydalanish esa mamlakatga YAIMning qariyb 4,5 foizi miqdorida iqtisodiy xarajat keltirishi ko‘rsatilgan [10]. Bu holat milliy manfaatlarni transchegaraviy hamkorlikdan ajratib bo‘lmasligini isbotlaydi. Suv resurslari bo‘yicha qo‘shni davlatlar bilan ishonchli, huquqiy va texnik asoslangan kelishuvlar, ma’lumot almashinuvi, gidrologik monitoring va suv tejovchi innovatsiyalar O‘zbekiston uchun tashqi siyosiy masala bo‘lish bilan birga, ichki iqtisodiy xavfsizlik masalasidir.

Suv muammosining biologiya ta’limi bilan ham bevosita aloqasi bor. Maktab, kollej va oliy ta’limda ekologiya, botaniqa, agrobiologiya, mikrobiologiya va odam anatomiyasi mavzulari faqat nazariy bilim sifatida o‘qitilsa, ularning ijtimoiy ahamiyati yo‘qoladi. Biologiya ta’limi suv aylanishi, tuproq unumdorligi, ekotizim

barqarorligi, o‘simliklarning qurg‘oqchilikka moslashuvi, oziq-ovqat zanjiri, sanitariya va sog‘lom turmush mavzulari orqali milliy manfaatga xizmat qiladigan ekologik kompetensiyani shakllantirishi kerak. Bu yerda metodik masala shundan iboratki, o‘quvchilar global muammoni o‘z hududi misolida tushunishi, masalan, suv sarfini o‘lchash, mahalliy o‘simliklarning moslashuvchanligini kuzatish, chiqindi va suv ifloslanishi bo‘yicha kichik loyiha bajarish orqali ilmiy xulosaga kelishi zarur.

Oziq-ovqat xavfsizligi ham suv va iqlim bilan uzviy bog‘liq. Aholi soni oshib borayotgan sharoitda qishloq xo‘jaligida hosildorlikni oshirish, suv sarfini kamaytirish, yer degradatsiyasining oldini olish, mahalliy urug‘chilik va seleksiya ishlarini rivojlantirish milliy manfaatning amaliy ko‘rinishidir. Global bozorlardagi narx o‘zgarishi yoki logistika uzilishi ichki oziq-ovqat tizimiga ta’sir qilmasligi uchun ishlab chiqarish, zaxira, qayta ishlash va ilmiy innovatsiyalar bir tizimda ko‘rilishi lozim.

3. Iqtisodiy o‘sish, kambag‘allikni qisqartirish va ijtimoiy barqarorlik

O‘zbekistonning global muammolarga munosabatida iqtisodiy baza hal qiluvchi ahamiyatga ega. Milliy statistika qo‘mitasining dastlabki ma’lumotlariga ko‘ra, 2025-yilda O‘zbekiston YAIMi joriy narxlarda 1 849,7 trln so‘mni tashkil etgan va 2024-yilga nisbatan 7,7 foizga o‘sgan [5]. Bu o‘sish ekologik modernizatsiya, ta’lim, sog‘liqni saqlash, infratuzilma va ilm-fanga mablag‘ yo‘naltirish imkoniyatini kengaytiradi. Biroq iqtisodiy o‘sish o‘z-o‘zidan barqaror rivojlanishni kafolatlamaydi. Agar o‘sish resurslarni haddan tashqari ishlatish, energiya samarasizligi yoki hududlar o‘rtasidagi tafovut hisobiga yuz bersa, u kelajakdagi xavflarni kuchaytiradi. Shuning uchun milliy manfaat nuqtai nazaridan iqtisodiy siyosat “tez o‘sish” bilan “resurs tejamkor o‘sish” o‘rtasida to‘g‘ri tanlov qilishi kerak.

Ijtimoiy barqarorlik bo‘yicha rasmiy ko‘rsatkichlar ijobiy dinamikani ko‘rsatadi. Kambag‘allik darajasi 2021-yildagi 17,0 foizdan 2025-yilda 5,8 foizgacha pasaygan [6]. Bu natija global muammolarga javob berishda muhim, chunki kambag‘allik yuqori bo‘lgan jamiyatlarda ekologik talablar, raqamli ta’lim yoki sog‘lom turmush siyosati ko‘pincha ikkinchi darajaga tushib qoladi. Aholining eng zaif qatlamlari uchun energiya, oziq-ovqat, tibbiyot va ta’lim narxlaridagi o‘zgarish keskin ta’sir qiladi. Demak, global muammolarga milliy manfaat asosida yondashish ijtimoiy himoya, bandlik va inson kapitalini rivojlantirish bilan birga olib borilishi kerak.

Bu borada muhim risk shundaki, ayrim ekologik yoki iqtisodiy islohotlar qisqa muddatda aholining ayrim guruhlariga yuk bo‘lishi mumkin. Masalan, energiya tejamkor texnologiyalarga o‘tish, suv tariflarini tartibga solish yoki chiqindilarni qayta ishlash tizimini kuchaytirish dastlab xarajat talab qiladi. Agar bunday islohotlar

ijtimoiy kompensatsiya, tushuntirish ishlari va arzon texnologiyalar bilan birga olib borilmasa, ular aholi noroziligini keltirib chiqarishi mumkin. Shuning uchun “yashil” siyosat ijtimoiy adolat bilan bog‘lanishi shart.

4. Raqamli transformatsiya va ta’lim: global muammolarga ichki salohiyat orqali javob

Raqamli transformatsiya global muammolarga milliy javob berishning eng kuchli vositalaridan biridir. Milliy statistika qo‘mitasining uy xo‘jaliklari tanlanma kuzatuviga ko‘ra, 2025-yil yanvar-avgust oylarida O‘zbekistonda internetdan foydalanuvchi aholi ulushi 94,2 foizni tashkil etgan; bu ko‘rsatkich 2021-yilda 76,6 foiz bo‘lgan [7]. Bunday o‘sish ta’lim resurslari, elektron hukumat xizmatlari, masofaviy maslahat, ekologik monitoring, raqamli tibbiyot va mehnat bozoriga kirish imkoniyatlarini kengaytiradi. Ammo yuqori qamrov hali sifatli foydalanish degani emas. Internetdan foydalanish ko‘rsatkichi bilan raqamli savodxonlik, tanqidiy fikrlash, kiberxavfsizlik va ilmiy axborotni ajrata olish kompetensiyasi o‘rtasida farq bor.

Ta’lim ko‘rsatkichlari ham milliy manfaatlarning global muammolar bilan bog‘liqligini ko‘rsatadi. 2024–2025-o‘quv yili boshida 18–23 yoshdagi aholining oliy ta’lim bilan qamrovi 47,7 foizni tashkil etgan [8]. Bu O‘zbekiston uchun katta imkoniyatdir, chunki suv muhandisligi, biologiya, ekologiya, tibbiyot, pedagogika, axborot texnologiyalari, kimyo, energetika va iqtisodiyot yo‘nalishlarida malakali kadrlar tayyorlanmas ekan, hech bir global muammoga mustahkam milliy javob shakllanmaydi. Lekin bu yerda ham sifat masalasi keskin turadi: qamrov oshishi o‘qitish metodikasi, laboratoriya bazasi, ilmiy loyiha madaniyati va akademik halollik bilan qo‘llab-quvvatlanishi zarur.

Biologiya mutaxassisligi nuqtai nazaridan, global muammolarga milliy manfaat asosida yondashishning eng samarali usullaridan biri — tabiiy fanlarni amaliy, loyihaviy va mahalliy muammoga bog‘langan tarzda o‘qitishdir. Masalan, “iqlim o‘zgarishi” mavzusi faqat atmosferadagi gazlar haqida ma’lumot berish bilan cheklanmasligi kerak. U o‘quvchi yashaydigan hududdagi harorat, suv sarfi, o‘simlik qoplami, tuproq holati, kasalliklar profilaktikasi va oziqlanish madaniyati bilan bog‘langan holda o‘qitilishi lozim. Shunda biologiya darsi milliy manfaatga bevosita xizmat qiladigan ekologik va sog‘lom turmush kompetensiyasini shakllantiradi.

Raqamli ta’lim platformalari bu jarayonni kuchaytirishi mumkin, lekin ular maqsad emas, vositadir. Elektron resurslar orqali o‘quvchilar suv iste’moli bo‘yicha mini-tadqiqot, mahalliy bioxilma-xillik kuzatuvi, chiqindilarni saralash loyihasi yoki sog‘lom ovqatlanish bo‘yicha so‘rovnoma o‘tkazishi mumkin. Natijada global

muammo shaxsiy va mahalliy tajriba bilan bog‘lanadi. Bu yondashuv o‘quvchini passiv tinglovchidan faol tadqiqotchiga aylantiradi.

5. Yashil iqtisodiyot va xalqaro majburiyatlar

Yashil iqtisodiyot O‘zbekiston uchun tashqi imij masalasi emas, balki resurs xavfsizligi va iqtisodiy samaradorlik masalasidir. Prezident portalida e’lon qilingan hujjatda 2030-yilgacha O‘zbekiston Respublikasida “yashil” iqtisodiyotga o‘tish va “yashil” o‘sishni ta’minlash dasturi doirasida issiqxona gazlarining YAIM birligiga nisbatan solishtirma ajratmalarini 2010-yil darajasidan 35 foizga qisqartirish maqsadi belgilangan [3]. Shuningdek, qattiq maishiy chiqindilarni qayta ishlash darajasini 65 foizdan oshirish vazifasi ham qayd etilgan [3]. Bu ko‘rsatkichlar global ekologik kun tartibi bilan mos, lekin ularning ahamiyati milliy darajada yanada aniqroq: energiya tejamkorligi xarajatni kamaytiradi, chiqindini qayta ishlash sanitariya va iqtisodiy foyda beradi, atmosfera ifloslanishining kamayishi esa aholi salomatligiga xizmat qiladi.

Milliy barqaror rivojlanish maqsadlari portali global maqsadlarni kambag‘al, boy va o‘rtacha rivojlangan barcha mamlakatlar uchun harakatga chaqiruvchi da’vat sifatida ta’riflaydi [11]. Bu fikr O‘zbekiston uchun shuni anglatadiki, global maqsadlar tashqi talab sifatida emas, milliy rivojlanish strategiyasini tizimlashtiruvchi mezon sifatida qabul qilinishi kerak. Agar BRM indikatorlari faqat hisobot uchun yuritilsa, ularning real foydasi kamayadi; agar ular byudjet, ta’lim, hududiy rivojlanish, ekologiya va sog‘liqni saqlash qarorlariga bog‘lansa, ular milliy manfaatni himoya qiluvchi boshqaruv instrumentiga aylanadi.

BMTning 2025-yilgi Barqaror rivojlanish maqsadlari hisoboti global taraqqiyotning mo‘rt va notekis ekanini, millionlab odamlar hali ham kambag‘allik, ochlik, uy-joy va asosiy xizmatlar yetishmovchiligi bilan yuzlashayotganini ko‘rsatadi [12]. Bu ma’lumot O‘zbekiston uchun ikki xulosa beradi. Birinchidan, global muammolarning keskinlashuvi tashqi bozorlardagi narxlar, migratsiya, iqlim, logistika va investitsiya oqimlariga ta’sir qilishi mumkin. Ikkinchidan, O‘zbekiston xalqaro hamkorlikda o‘z milliy manfaatlarini aniq ifodalashi, bir vaqtning o‘zida global mas’uliyatdan chetda qolmasligi kerak.

MUHOKAMA: SIYOSIY VA TA’LIMIY MEXANIZMLAR

Tahlil natijalariga ko‘ra, milliy manfaatlardan kelib chiqib global muammolarga yondashish uchun quyidagi mexanizm taklif etiladi. Bu mexanizm umumiy shior emas, balki har bir soha uchun tekshiriladigan amaliy savollar tizimidir.

Bosqich	Asosiy savol	Kutiladigan natija

1. Muammoni aniqlash	Global muammo O‘zbekistonning qaysi xavfsizlik yoki rivojlanish manfaatiga ta’sir qiladi?	Masala deklarativ emas, milliy kontekstga mos ta’riflanadi.
2. Statistik asoslash	Qaysi rasmiy indikator muammoning ko‘lamini ko‘rsatadi?	Qarorlar taxmin emas, dalil va statistika asosida qabul qilinadi.
3. Ustuvorlikni belgilash	Resurs cheklangan sharoitda qaysi yo‘nalish avval hal qilinishi kerak?	Byudjet, kadr va vaqt resurslari tarqalib ketmaydi.
4. Hamkorlikni tanlash	Muammo ichki choralar bilanmi yoki mintaqaviy/xalqaro kelishuv bilanmi hal bo‘ladi?	Tashqi siyosat va ichki siyosat bir-birini to‘ldiradi.
5. Ta’limga kiritish	Bu muammo maktab, oliy ta’lim va jamoatchilik ongiga qanday metodika orqali singdiriladi?	Aholi va yoshlar passiv kuzatuvchi emas, mas’ul ishtirokchiga aylanadi.

Mazkur mexanizmni amaliyotga joriy etishda eng katta xavf — sohalararo uzilishdir. Suv masalasi faqat suv xo‘jaligi idorasining, ekologiya faqat ekologiya tizimining, ta’lim faqat maktab yoki universitetning vazifasi sifatida qaralsa, natija sust bo‘ladi. Umumbashariy muammolar kompleks bo‘lgani uchun ularga javob ham kompleks bo‘lishi kerak. Masalan, suv tejash uchun texnik infratuzilma, iqtisodiy rag‘bat, huquqiy nazorat, fermerlar malakasi, o‘quvchilarning ekologik madaniyati va mintaqaviy diplomatiya birgalikda ishlashi zarur.

Ikkinchi xavf — rasmiy statistikani faqat hisobot uchun ishlatish. Statistik ma’lumot siyosiy qarorlar sifatini oshirishi uchun u ochiq, tushunarli, hududlar kesimida tahlil qilinadigan va ta’lim jarayonida foydalaniladigan bo‘lishi kerak. Masalan, biologiya darsida O‘zbekiston bo‘yicha suv, aholi, internetdan foydalanish yoki kambag‘allik statistikasi tahlil qilinsa, o‘quvchi fanni hayotdan uzilgan mavzu emas, jamiyat rivoji bilan bog‘liq bilim sifatida qabul qiladi. Bu ilmiy savodxonlikni oshirish bilan birga, fuqarolik mas’uliyatini ham kuchaytiradi.

Uchinchi xavf — global muammolarni siyosiy moda sifatida qabul qilish. Har bir xalqaro tashabbus milliy sharoitga mos kelavermaydi. Shuning uchun O‘zbekiston o‘z pozitsiyasini aniq belgilashi kerak: qaysi tashabbus suv xavfsizligini kuchaytiradi,

qaysi biri energiya samaradorligini oshiradi, qaysi biri ta'lim sifatiga xizmat qiladi, qaysi biri esa ortiqcha ma'muriy yuk yoki moliyaviy majburiyat keltiradi. Milliy manfaatga asoslangan yondashuv aynan shu tanlov madaniyatini talab qiladi.

AMALIY TAKLIFLAR

Birinchidan, global muammolar bo‘yicha har bir davlat dasturida “milliy manfaatga ta’sir xaritasi” ishlab chiqilishi lozim. Unda muammo qaysi hudud, qaysi ijtimoiy guruh, qaysi iqtisodiy tarmoq va qaysi ta’lim yo‘nalishiga ta’sir qilishi ko‘rsatilishi kerak. Bu resurslarni aniq yo‘naltirishga yordam beradi.

Ikkinchidan, suv xavfsizligi bo‘yicha ta’lim, ilm-fan va ishlab chiqarish integratsiyasi kuchaytirilishi kerak. Biologiya, ekologiya, kimyo, geografiya va agronomiya fanlarida mahalliy suv muammolari bo‘yicha amaliy loyiha va laboratoriya ishlari ko‘paytirilishi zarur. Bu yoshlarni suvni tejashga chaqirishdan ko‘ra samaraliroq, chunki ular muammoni o‘lchash, kuzatish va xulosa chiqarishni o‘rganadi.

Uchinchidan, raqamli qamrovdan raqamli sifatga o‘tish zarur. Internetdan foydalanish ulushi yuqori bo‘lgani bilan, tanqidiy fikrlash, ilmiy axborotni tekshirish, kiberxavfsizlik, onlayn ta’lim madaniyati va ma’lumotlar bilan ishlash kompetensiyasi alohida rivojlantirilmasa, raqamli imkoniyatlar milliy raqobatbardoshlikka to‘liq aylanmaydi.

To‘rtinchidan, yashil iqtisodiyot siyosati aholiga tushunarli iqtisodiy foyda bilan bog‘lanishi kerak. Energiya tejamkor qurilmalar, chiqindilarni saralash, suv tejovchi texnologiyalar va yashil transport bo‘yicha targ‘ibot faqat ekologik shior emas, oilaviy byudjet, salomatlik va mahalla obodligi bilan bog‘lab tushuntirilsa, ijtimoiy qabul kuchayadi.

Beshinchidan, O‘zbekiston xalqaro hamkorlikda “oluvchi davlat” pozitsiyasi bilan cheklanmasligi kerak. Mamlakat suv diplomatiyasi, cho‘llanishga qarshi kurash, Aralbo‘yi hududini tiklash, ekologik ta’lim va yoshlar siyosati bo‘yicha o‘z tajribasini xalqaro maydonga chiqarishi mumkin. Bu milliy manfaatni global mas’uliyat bilan uyg‘unlashtiradi.

XULOSA

Milliy manfaatlardan kelib chiqqan holda umumbashariy muammolarga yondashish O‘zbekiston uchun nazariy mavzu emas, amaliy strategik zaruratdir. Rasmiy statistik ko‘rsatkichlar mamlakatda demografik o‘sish, iqtisodiy rivojlanish, kambag‘allikning qisqarishi, raqamli qamrov va oliy ta’limga kirish imkoniyatlari kengayayotganini ko‘rsatadi. Shu bilan birga, suv tanqisligi, iqlim o‘zgarishi, energiya

samaradorligi, ekologik xavfsizlik va ta’lim sifati kabi omillar milliy manfaatlarning kelajakdagi barqarorligiga bevosita ta’sir qiladi.

Tadqiqotning asosiy xulosasi shundan iboratki, global muammolarga javob berishda uchta tamoyil ustuvor bo‘lishi kerak: dalillarga asoslangan qaror qabul qilish, milliy sharoitga moslashtirish va xalqaro hamkorlikni ichki rivojlanish maqsadlari bilan bog‘lash. Bunday yondashuv O‘zbekistonning suveren manfaatlarini cheklamaydi, aksincha ularni kuchaytiradi. Chunki suv xavfsizligi, ekologik barqarorlik, sifatli ta’lim va inson kapitali rivoji bo‘lmasa, uzoq muddatli iqtisodiy o‘sish ham zaiflashadi.

Biologiya ta’limi va tabiiy fanlar metodikasi bu jarayonda alohida ahamiyatga ega. Global muammolarni yoshlarga tushuntirishda quruq nazariya emas, mahalliy kuzatuv, tajriba, loyiha, statistik tahlil va ekologik mas’uliyatga tayangan metodika samarali bo‘ladi. Shunda o‘quvchi va talaba global muammolarning faqat tomoshabini emas, balki ularni hal qilishda bilimli, mas’uliyatli va faol ishtirokchiga aylanadi. Demak, milliy manfaatlardan kelib chiqqan yondashuvning eng chuqur mazmuni — bugungi avlod farovonligi bilan kelajak avlod xavfsizligini birgalikda himoya qilishdir.

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OBESITY AS A GLOBAL HEALTH CONCERN: A MULTI-DIMENSIONAL ANALYSIS OF PATHOPHYSIOLOGY, SOCIOECONOMICS, AND MODERN THERAPEUTIC PARADIGMS

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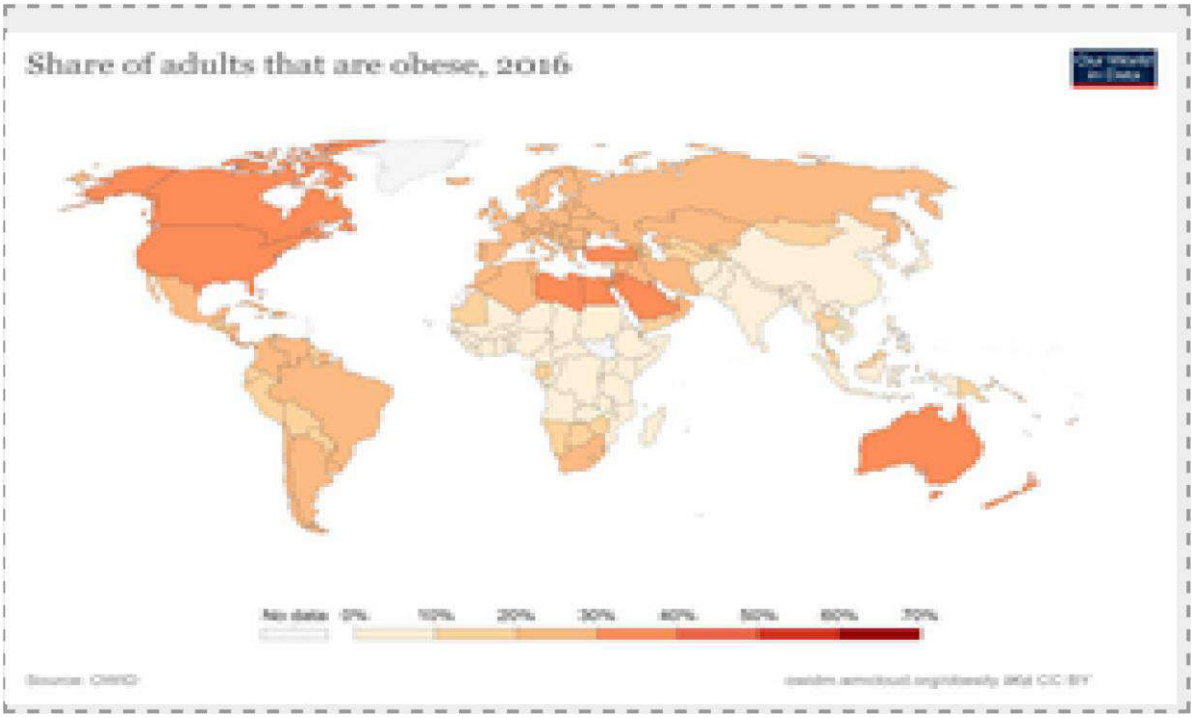
Abstract: Obesity has transitioned from a localized concern of affluence to a pervasive global pandemic. Characterized by a Body Mass Index (BMI) ≥ 30 kg/m², it acts as a primary catalyst for Type 2 Diabetes, Cardiovascular Diseases, and various malignancies. This 10-page review explores the evolution of the obesity crisis, the biological mechanisms of adipose tissue dysfunction, and the shifts in treatment including the 2025-2026 breakthrough in GLP-1 and GIP dual-agonist therapies.

Keywords: Obesity, Adipokine signaling, Metabolic Syndrome, GLP-1, Public Health Policy, Bariatric Surgery.

Introduction: The Scale of the Crisis

Obesity poses one of the greatest challenges to global longevity and sustainable healthcare systems as we move through the mid-2020s. Today, according to the World Health Organization (WHO), over 1 billion people around the world have been classified as having obesity - including 650 million adults; 340 million youth; and 39 million children. The economic burden is

equally staggering, with projections suggesting that the global cost of treating obesityrelated complications will reach $3 trillion annually by 2030.



Socioeconomic Drivers and the Nutrition Transition

"Nutrition Transition" is the internationally accepted term for the shift from traditional, high-fiber diets to "Western" style diets, which contain high levels of added sugars and saturated fat. The "nutrition transition" is not just a phenomenon seen in high-income countries; low and middle income countries (LMICs) are now experiencing the fastest growing rates of obesity.

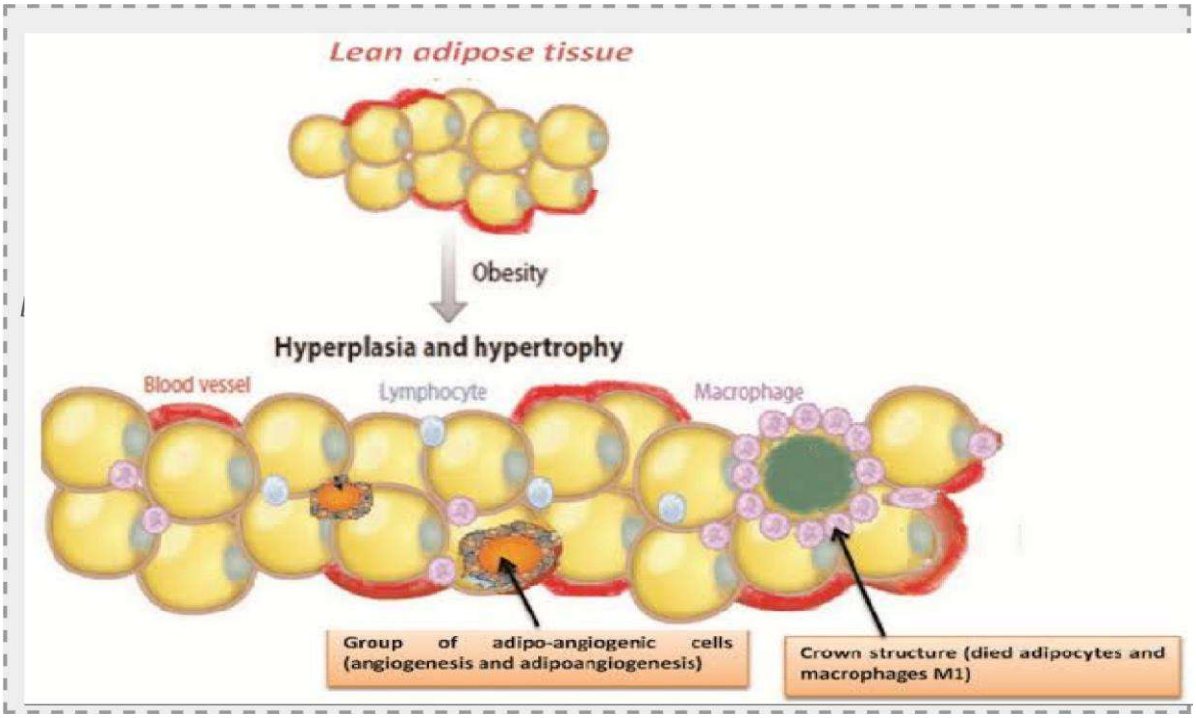
The shift towards sedentary living has been accelerated by rapid urbanization; as many jobs previously had a physical element, the new job market is now mostly comprised of jobs where the majority of the day is spent at a desk; furthermore, many traditional forms of transportation are now automated systems that do not require as much energy per trip. The "obesogenic environment," characterized by an abundance of inexpensive, calorie-dense foods and an absence of safe recreation areas, is a major contributing factor to this trend.

Case Note: The Double Burden of Malnutrition

> In many LMICs, countries face the "double burden" where undernutrition and obesity coexist within the same community, and even the same household, often due to the low cost of high-calorie, nutrient-poor foods.

Pathophysiology: The Endocrine Function of Fat

Adipose tissue was once thought to be a simple storage depot for energy. Modern endocrinology recognizes it as a dynamic organ that secretes signaling molecules known as *adipokines*. In a healthy state, these molecules (like adiponectin) maintain insulin sensitivity. In obesity, the balance shifts toward pro-inflammatory cytokines.



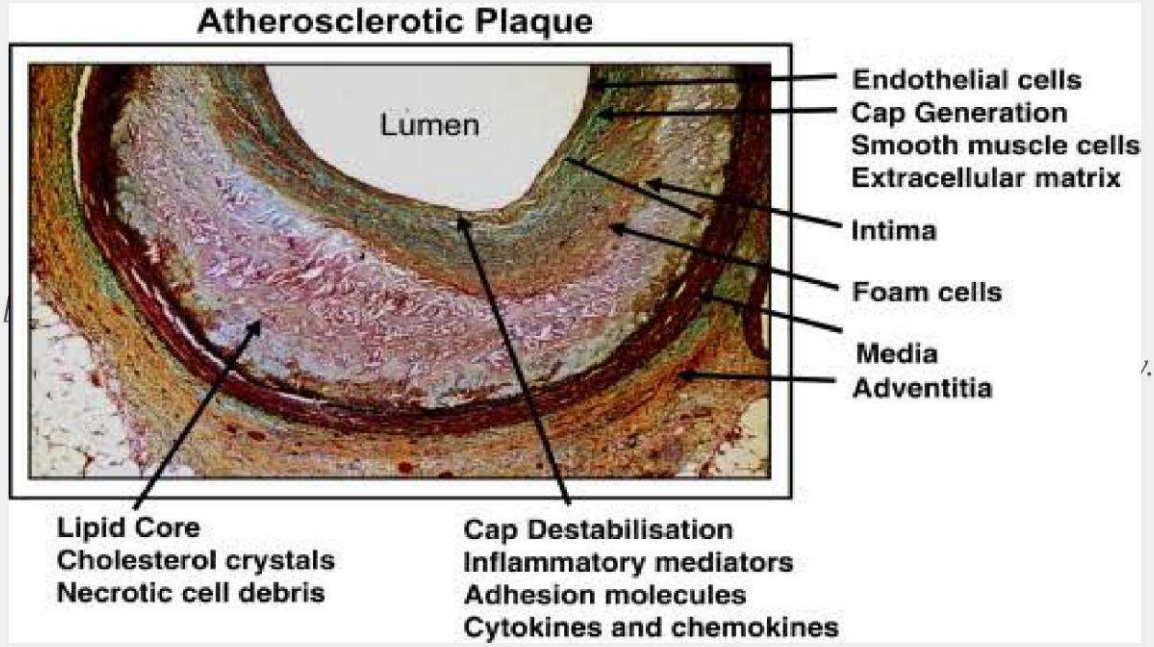
Lipoxicity and Insulin Resistance

When adipose stores are overwhelmed, lipids begin to accumulate in non-adipose organs such as the liver, heart, and skeletal muscle. This "ectopic fat" interferes with cellular signaling, leading to systemic insulin resistance—the hallmark of Type 2 Diabetes.

Clinical Manifestations

The clinical impact of obesity is systemic. This section details the organ-specific complications encountered in clinical practice.

System	Complication	Clinical Impact
Cardiovascular	Hypertension, CAD, Stroke	Increased peripheral resistance and atherosclerosis.
Endocrine	Type 2 Diabetes, PCOS	Hyperinsulinemia and hormonal imbalances.
Respiratory	Obstructive Sleep Apnea	Mechanical airway obstruction and reduced lung volume.
Hepatobiliary	MASLD (Fatty Liver)	Progressive fibrosis and potential cirrhosis.



Childhood Obesity: A Generational Threat

Childhood obesity is particularly concerning as it tracks into adulthood. Children with obesity are at risk for "adult" diseases like hypertension and liver disease before they reach 20. The psychological impact, including social stigma and depression, further exacerbates the cycle of emotional eating.

Educational Interventions

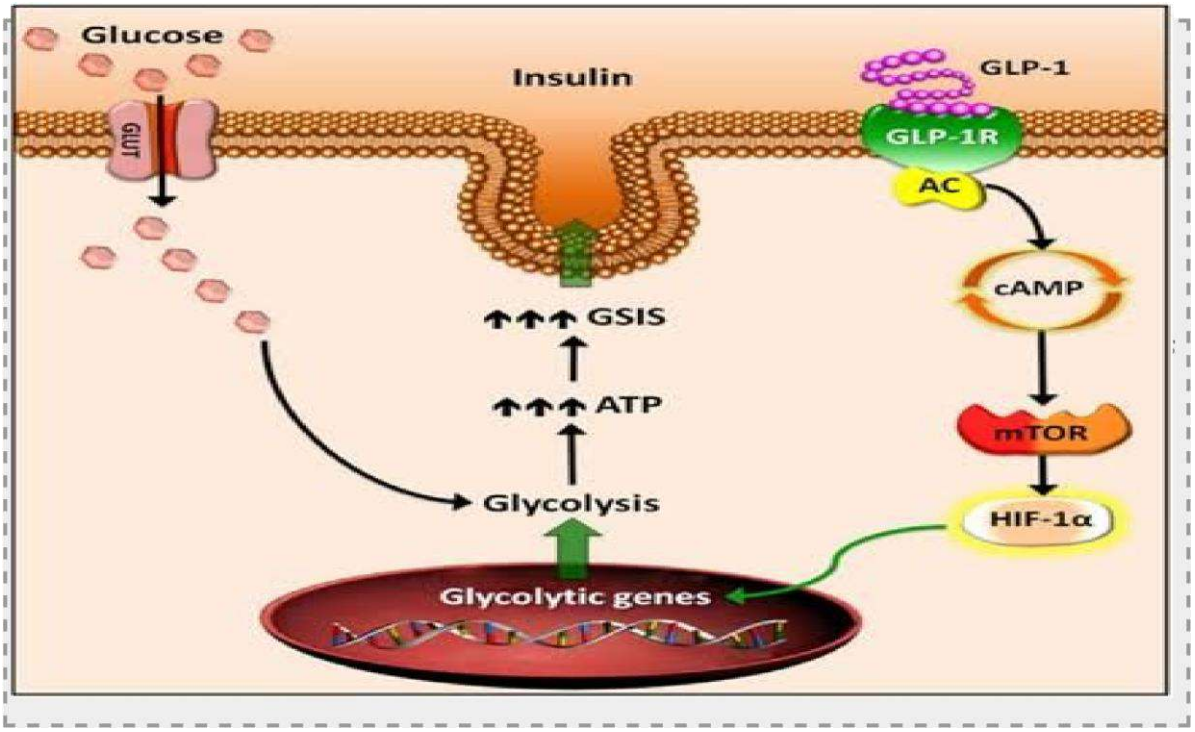
Schools have become a battleground for health. Successful programs in 2025 focus on "Food Literacy"—teaching children not just what to eat, but how to understand marketing and food processing.

Modern Management: The Pharmacological Revolution

For decades, weight loss drugs were largely ineffective or unsafe. The landscape changed with the introduction of GLP-1 (Glucagon-Like Peptide-1) receptor agonists.

GLP-1 and GIP Dual Agonists

Newer medications, such as Tirzepatide, target both GLP-1 and GIP receptors. Clinical trials in 2025 showed average weight losses of 20-25%, approaching the efficacy of bariatric surgery. These drugs work by increasing satiety, slowing gastric emptying, and improving glucose-dependent insulin secretion.



Surgical Interventions

Severe obesity (defined by a body m ass index (BMI) greater than 40) is treated with surgical m eans (Bariatric Surgery) that are the gold standard. R oux-en-Y Gastric Bypass and Vertical Sleeve Gastrectom y, provide access to loss of appetite via restricting caloric consum ption and fundam entally altering gut hormones.

Post-surgical management of patients requires both lifelong nutritional supplem entation and ongoing psychological support to achieve successful outcomes, i.e., avoid "weight regain" and to address the significant lifestyle changes associated with Bariatric Surgery.

Public Health Policy and Ethics

Individual willpower is insufficient to combat a global epidemic. Governments are increasingly turning to fiscal policies.

- **Labeling Laws:** "Front-of-pack" warning labels for high-sugar/fat products.

- **Sugar Taxes:** Proven to reduce consumption in over 50 countries by 2026.
- **Urban Planning:** Designing cities that prioritize pedestrians and cyclists over cars.

The Ethics of Stigma

Weight bias in healthcare remains a barrier. Patients who feel judged are less likely to seek care. Modern medical education now emphasizes that obesity is a *disease*, not a *character flaw*.

Conclusion and Future Directions

The battle against obesity is going to require multiple, simultaneous methods. New drugs show promise for those who are already suffering from obesity, but the only truly long-term solution involves preventing the problem by making radical changes to the global food system. As we look ahead to 2030, we may find that the fusion of genetic profiles with personalized nutrition (precision medicine) will help us achieve the next major advance in understanding how we can manage this global problem.

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AFFECTION IN DIGITAL COMMUNICATION: A COMPARATIVE STUDY OF ENGLISH AND UZBEK SOCIAL MEDIA DISCOURSE

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ANNOTATION

This article examines the expression of affection in digital communication through a comparative analysis of English and Uzbek social media discourse. The study focuses on how affectionate meanings are constructed and conveyed in online interaction, taking into account linguistic, cultural, and gender-related factors. In recent years, digital communication platforms such as Telegram, Instagram, and online messaging applications have significantly transformed interpersonal communication, influencing both the forms and strategies of emotional expression.

The research is grounded in the theoretical frameworks of Sociolinguistics and Computer-mediated communication. A qualitative comparative method is employed to analyze examples of online communication in English and Uzbek, including messages, comments, and social media interactions. Particular attention is paid to discourse strategies such as direct and indirect affectionate expressions, emoji usage, abbreviations, code-switching, and emotional intensification.

The findings indicate that English digital discourse tends to favor direct verbal expressions and extensive use of emotional markers, while Uzbek online communication more frequently combines indirect affection with culturally specific expressions of care and respect. Gender differences are also observed, as female users generally demonstrate greater emotional expressiveness and more frequent use of emojis and affectionate language, whereas male users tend to employ shorter, humor-based, or indirect forms of emotional communication. The article concludes that digital communication has transformed traditional patterns of affectionate discourse by increasing emotional accessibility, linguistic compression, and intercultural

interaction. At the same time, cultural norms and gender expectations continue to influence the ways affection is expressed in English and Uzbek online communication.

Keywords: affection, digital communication, social media discourse, Sociolinguistics, Computer-mediated communication, gender differences, English language, Uzbek language, online interaction, emotional expression

АННОТАЦИЯ

В данной статье рассматривается выражение аффекции в цифровой коммуникации на основе сравнительного анализа английского и узбекского дискурса социальных сетей. Исследование направлено на изучение того, как эмоциональные и аффективные значения формируются и передаются в онлайн-общении с учетом языковых, культурных и гендерных факторов. В современную эпоху цифровые платформы, такие как Telegram, Instagram и мессенджеры, существенно трансформировали межличностную коммуникацию, изменив способы выражения эмоций.

Теоретической основой исследования являются Социолингвистика и Компьютерно-опосредованная коммуникация. В работе используется качественный сравнительный метод, включающий анализ примеров английской и узбекской онлайн-коммуникации, таких как сообщения, комментарии и взаимодействие в социальных сетях. Особое внимание уделяется дискурсивным стратегиям, включая прямые и косвенные выражения аффекции, использование эмодзи, сокращений, код-свитчинга и эмоциональной интенсификации.

Результаты показывают, что в английском цифровом дискурсе преобладают прямые вербальные выражения эмоций и активное использование эмоциональных маркеров, тогда как в узбекской онлайн-коммуникации чаще сочетаются косвенные формы выражения аффекции с культурно обусловленными стратегиями заботы и уважения. Также выявлены гендерные различия: женщины более эмоционально экспрессивны и активно используют эмодзи и ласковые выражения, тогда как мужчины чаще используют краткие, юмористические или косвенные формы коммуникации. В заключение отмечается, что цифровая коммуникация трансформировала традиционные модели выражения аффекции, усилив эмоциональную доступность и языковую компрессию, однако культурные нормы и гендерные роли продолжают оказывать значительное влияние на способы выражения эмоций.

Ключевые слова: Аффекция, цифровая коммуникация, дискурс социальных сетей, социолингвистика, компьютерно-опосредованная

коммуникация, гендерные различия, английский язык, узбекский язык, онлайн-общение, эмоциональная экспрессия.

ANNOTATSIYA

Ushbu maqolada ingliz va o‘zbek ijtimoiy tarmoqlardagi diskurs asosida raqamli kommunikatsiyada affeksiya (mehr-muhabbat) ifodalanishi qiyosiy jihatdan tahlil qilinadi. Tadqiqot onlayn muloqotda emotsional ma’nolarning qanday shakllanishi va uzatilishini til, madaniyat va gender omillari nuqtai nazaridan o‘rganishga qaratilgan. Bugungi kunda Telegram, Instagram va boshqa messenjerlar kabi raqamli platformalar shaxslararo muloqotni sezilarli darajada o‘zgartirib, hissiyotlarni ifodalash usullariga ham ta’sir ko‘rsatmoqda.

Tadqiqotning nazariy asosini Sotsiolingvistika va Kompyuter vositasidagi kommunikatsiya tashkil etadi. Ishda sifat jihatidan qiyosiy metod qo‘llanilib, ingliz va o‘zbek onlayn kommunikatsiya namunalaridan (xabarlar, izohlar va ijtimoiy tarmoqdagi interaksiyalar) tahlil amalga oshiriladi. Ayniqsa, to‘g‘ridan-to‘g‘ri va bilvosita affektiv ifodalar, emojilar, qisqartmalar, kod almashinuvi va emotsional kuchaytirish strategiyalariga e’tibor qaratiladi.

Natijalar shuni ko‘rsatadiki, ingliz raqamli diskursida ko‘proq bevosita emotsional ifodalar va hissiy markerlardan foydalaniladi, o‘zbek onlayn muloqotida esa bilvosita affeksiya shakllari hamda madaniy jihatdan bog‘liq bo‘lgan g‘amxo‘rlik va hurmat strategiyalari ustunlik qiladi. Shuningdek, gender farqlari ham kuzatiladi: ayollar ko‘proq emotsional ifodali bo‘lib, emojilar va erkalovchi iboralardan keng foydalanadi, erkaklar esa qisqa, hazil yoki bilvosita shakllarni afzal ko‘rishadi. Xulosa qilib aytganda, raqamli kommunikatsiya affektiv ifoda modellarini o‘zgartirgan bo‘lsa-da, madaniy me’yorlar va gender rollari hanuzgacha emotsional muloqot shakllanishida muhim rol o‘ynamoqda.

Kalit so‘zlar: affeksiya, raqamli kommunikatsiya, ijtimoiy tarmoqlar diskursi, Sotsiolingvistika, Kompyuter vositasidagi kommunikatsiya, gender farqlari, ingliz tili, o‘zbek tili, onlayn muloqot, emotsional ifoda

INTRODUCTION

Digital communication has become an essential part of modern human interaction, fundamentally changing the way people connect, share emotions, and maintain relationships. In contemporary society, social media platforms and messaging applications play a central role in everyday communication, allowing individuals to express thoughts and feelings instantly and across large distances. This technological

shift has significantly influenced emotional interaction, including the ways affection is expressed between people.

One of the most notable changes brought by digital communication is the transformation of affectionate language. Traditional face-to-face communication relies heavily on tone of voice, facial expressions, and physical presence, while online communication replaces many of these features with textual and visual symbols such as emojis, abbreviations, and written emotional markers. As a result, affection in digital discourse is often simplified, intensified, or symbolically represented rather than expressed through direct physical or verbal interaction.

Studying English and Uzbek digital discourse in a comparative perspective is important because these two linguistic and cultural systems represent different communicative norms. English digital communication is generally associated with more direct emotional expression, while Uzbek online communication often reflects indirectness and culturally shaped strategies of politeness and respect. These differences make a comparative analysis valuable for understanding how digital environments influence emotional expression across cultures.

Gender and culture are also significant sociolinguistic factors in this process. Within Sociolinguistics, gender is understood as a social construct that influences communicative behavior, including emotional expression. Cultural norms further shape what is considered appropriate or acceptable in expressing affection, both online and offline. In digital communication, these factors interact with technological tools, producing new forms of emotional language.

The research problem addressed in this article is the lack of comprehensive comparative studies on how affection is expressed in English and Uzbek social media discourse in the context of digital communication. While previous studies have examined emotional language in general, fewer studies have focused on how digital platforms reshape affectionate expression across different linguistic and cultural environments.

The aim of this article is to analyze how affection is expressed in English and Uzbek digital communication, with particular attention to discourse strategies, gender differences, and cultural influences in social media interaction. The following research questions are addressed in this study:

- How does digital communication change the expression of affection in English and Uzbek discourse?
- What discourse strategies are used to express affection in social media communication?

- How do gender and cultural factors influence affectionate expressions in online interaction?

The main focus of this study is to examine how digital communication transforms the expression of affection, particularly through changes in linguistic form, emotional intensity, and discourse strategies in English and Uzbek social media environments.

PREVIOUS RESEARCH OVERVIEW

Affection as a communicative phenomenon has been widely studied within linguistics and communication studies, as it reflects emotional bonding, interpersonal relationships, and social identity. Researchers generally agree that affection is not only a lexical phenomenon but also a discursive and interactional process that depends on context, relationship between speakers, and cultural norms. In this sense, affectionate language functions as a key element of human interaction, contributing to social cohesion and emotional connection.

In recent decades, the development of digital technologies has led to the emergence of digital discourse, which has become a significant area of linguistic research. Digital communication differs from traditional face-to-face interaction because it relies on written text, visual symbols, and multimodal features rather than physical presence. Within the framework of Computer-mediated communication, scholars examine how meaning is constructed in online environments such as social media platforms, messaging applications, and online forums.

Social media language is characterized by specific linguistic features, including informality, brevity, creativity, and multimodality. Users often rely on emojis, abbreviations, repetition of letters, and non-standard spelling to express emotions and interpersonal attitudes. These features have been widely studied in relation to emotional expression, particularly in how they replace or supplement traditional verbal cues in offline communication.

Previous studies have shown that emojis play a crucial role in expressing emotional meaning in digital communication. Emojis function as visual markers of emotion, helping users convey affection, tone, and attitude more clearly in text-based interaction. Similarly, research on online slang and informal digital language demonstrates that abbreviated forms such as “luv u,” “omg,” or culturally specific expressions serve as tools for emotional intensification and group identity construction.

Another important area of research concerns gender differences in online interaction. Studies within Sociolinguistics suggest that female users tend to use more expressive emotional language, including emojis, affectionate words, and intensifiers,

while male users often prefer shorter, less emotionally explicit forms of communication, sometimes relying on humor or indirect expression.

Emotional expression in digital environments has also been explored through the perspective of discourse analysis, which focuses on how meaning is constructed in interaction. Researchers argue that online communication allows for new forms of emotional expressiveness, where language is shaped by technological affordances and social conventions. Affectionate online language, in particular, is seen as a hybrid form combining linguistic, visual, and symbolic elements.

Despite the growing body of research, there is still a lack of comparative studies focusing specifically on how affection is expressed in English and Uzbek digital communication. Most existing studies focus on either English-speaking contexts or general online communication patterns, while less attention has been given to cross-cultural and bilingual perspectives. This gap highlights the need for further investigation into how cultural and linguistic factors influence affectionate expression in social media discourse.

METHODOLOGICAL APPROACH

This study adopts a qualitative comparative research design aimed at analyzing how affection is expressed in English and Uzbek digital communication. The research focuses on identifying discourse strategies used in social media interaction and examining how these strategies vary across languages, cultural contexts, and gender groups. The study is grounded in the principles of Sociolinguistics and Computer-mediated communication, which emphasize language use in real communicative environments, particularly in online contexts.

Research Design: **The research follows a qualitative comparative analysis approach. This design is suitable for examining non-numerical data such as messages, comments, and online dialogues, allowing for in-depth interpretation of meaning, context, and communicative strategies. The comparative aspect enables the identification of similarities and differences between English and Uzbek digital discourse.**

Data Sources: **The empirical data for this study consist of authentic and semi-authentic examples of digital communication collected from the following sources:**

- Telegram messages and group chats
- Instagram comments and direct interactions
- social media dialogues and user posts

- online conversational exchanges in informal settings

These sources were selected to reflect real-life communication patterns in digital environments where affectionate expressions naturally occur.

Methods of Analysis: **The primary method used in this study is discourse analysis, which focuses on language in use within its social and communicative context. This method allows for the interpretation of how meaning is constructed beyond individual words, taking into account interactional and contextual factors. In addition, a comparative method is applied to systematically examine differences and similarities between English and Uzbek digital communication practices. This helps to identify culturally and linguistically specific patterns of affectionate expression.**

Criteria of Analysis: **The analysis is based on a set of clearly defined criteria used to identify and classify affectionate discourse strategies in digital communication:**

- **Direct and indirect affectionate expressions** (explicit statements vs. implied emotional meaning)
- **Emoji usage** (e.g., ❤️ 😂 as emotional markers)
- **Abbreviations and shortened forms** (e.g., “luv u,” “sog‘indimmm”)
- **Affectionate nicknames and terms of endearment**
- **Code-switching** (mixing English and Uzbek in one communicative act)
- **Emotional intensity** (degree of emotional strength in expression)
- **Gender differences in digital speech** (variation between male and female communicative styles)

Each instance of digital communication is analyzed according to these criteria to determine how affection is linguistically and visually represented in online interaction.

Table 1. Comparative Features of Affection in English and Uzbek Digital Communication

Feature	English Digital Communication	Uzbek Digital Communication	Explanation / Notes
Direct affection	Frequently expressed directly: *"I love you", "I miss you", "You mean a lot to me"*	Less frequent and more reserved: *"Seni yaxshi ko'raman", "Siz menga juda azizsiz"*	English speakers tend to be more open and explicit.
Indirect affection	Shown through likes, reactions, supportive comments. Example: *"Take care!"*	Dominant form of affection. Shown through care, advice, checking on someone. Example: *"Ovqat yedingizmi?"*	Uzbek culture values indirectness and politeness in expressing feelings.
Emoji usage	Very frequent, used at the end or within sentences. Examples: ❤️ 😂 😲 😍	Frequent, but combined with words like *"jonim", "azizam", "qalbing"*. Examples: ❤️ 😲 🌸 💖	Emojis add emotional tone in both languages, but used with cultural expressions in Uzbek.
Gender expression	Women: more expressive, emoji-rich. Men: moderate, short expressions.	Women: emotional, relational, caring. Men: restrained, short, indirect.	Gender roles influence emotional style in both communities.
Code-switching	Sometimes English slang or abbreviations within English only. Example: *"Love u sooo much"*	Very common mixing English + Uzbek. Examples: *"miss u jonim"*; *"good night, azizam"*	Bilingual users create hybrid expressions for intimacy and emotional impact.
Emotional style	More open, individualistic, direct.	More indirect, culturally and contextually shaped.	Reflects cultural norms of expressing affection.
Linguistic compression	Common: *"luv u", "thx", "sooo happy"*	Common: *"sog'indimmm", "rahmattt", "xursandman"*	Digital environment encourages shortened and intensified forms.

FINDINGS AND DISCOURSE ANALYSIS

Emojis as Expressions of Affection - **In digital communication, emojis function as emotional substitutes for facial expressions and tone. They help users express affection without needing full verbal explanation. In both English and Uzbek online discourse, emojis are used to strengthen emotional meaning, but their placement and frequency differ depending on cultural and gender norms.**

In English digital communication, emojis are often used independently or at the end of sentences to soften emotional expression. In Uzbek discourse, emojis are more frequently integrated with culturally grounded affectionate words, reinforcing relational closeness.

Gender patterns show that female users generally combine multiple emojis to intensify emotional meaning, while male users prefer minimal or situational emoji use.

Direct and Indirect Digital Affection - **Direct affection in online communication appears when users explicitly state emotional feelings such as love, missing someone, or appreciation. English discourse tends to allow more open and frequent use of direct emotional statements.**

Indirect affection is more subtle and is expressed through supportive replies, reactions, or short caring messages. In Uzbek digital communication, indirect strategies are more common, especially in semi-public interactions where emotional restraint is culturally valued.

Gender Differences in Social Media Communication - **Female users in both English and Uzbek contexts tend to construct emotionally rich messages, often using repetition, expressive punctuation, and emotional reinforcement. Their communication style is more relational and expressive.**

Male users, however, tend to prioritize brevity, humor, or functional communication. Affection is often embedded in jokes, short supportive messages, or practical responses rather than explicit emotional statements.

Code-Switching and Hybrid Expressions: **In digital communication, bilingual users often mix English and Uzbek to express affection more effectively. This code-switching creates hybrid emotional meanings that combine global and local identity.**

English elements often carry emotional clarity, while Uzbek elements add intimacy and cultural warmth. This combination increases emotional depth and personal connection in online interaction.

Linguistic Compression in Online Communication: **Digital discourse strongly encourages shortened and intensified forms of language. Users often modify spelling, repeat letters, or remove grammatical structures to increase emotional speed and impact.**

This phenomenon shows that online affection is not only expressed through meaning but also through form, where structural reduction increases emotional immediacy.

Table 2. Common Emojis and Their Emotional Functions

Emoji	Emotional Function	Example Use in English	Example Use in Uzbek
❤️	Love, deep affection care	"You always support me ❤️"	"Siz doim yonimdasiz ❤️"
🥺	Longing, emotional softness, sadness	"I really miss you 🥺"	"Sog'indim 🥺"
😂	Humor, playfulness, teasing	"You are impossible 😂"	"Sizdan qolmayman 😂"
😍	Admiration, strong liking	"You look amazing 😍"	"Juda chiroylisiz 😍"
✨	Excitement, happiness, positive feelings	"So happy for you ✨"	"Sizdan juda xursandman ✨"

ANALYTICAL INTERPRETATION

The findings of this study show that affectionate discourse in digital communication differs significantly from offline communication due to the specific nature of online interaction. In face-to-face communication, affection is expressed through a combination of verbal language, tone of voice, facial expressions, and physical proximity. In contrast, digital communication relies mainly on written text, emojis, and other symbolic markers. As a result, emotional meaning in online discourse is often more explicit in some cases, but also more structurally simplified compared to spoken interaction.

One of the key factors influencing this difference is globalization and the development of social media culture. Global platforms such as messaging applications and social networks create shared communicative spaces where users from different linguistic and cultural backgrounds interact. This leads to the spread of globalized emotional expressions (such as "love you," emojis, or standardized slang), which gradually influence both English and Uzbek digital communication. At the same time, local cultural norms remain active and shape how these global forms are interpreted and used.

Cultural norms play a particularly important role in shaping digital affectionate discourse. In Uzbek online communication, cultural values such as respect, modesty, and relational hierarchy often encourage more indirect forms of emotional expression, especially in public or semi-public contexts. In English digital communication, there is generally greater acceptance of direct emotional expression, even in less intimate settings. However, in both cases, users still adapt their language depending on the level of closeness and social context.

Gender expectations also significantly influence online interaction. Female users are generally expected to be more emotionally expressive, which is reflected in their frequent use of affectionate language, emojis, and intensified emotional markers. Male users, on the other hand, are often socially oriented toward emotional restraint, leading them to prefer humor, brevity, or indirect forms of affection. These patterns are not absolute but reflect socially constructed expectations that influence communicative behavior in digital environments.

The results indicate that digital communication increases emotional accessibility by making it easier to express affection instantly and across distances. At the same time, it also simplifies and compresses emotional language, reducing complex emotional expression into shorter textual forms, emojis, and standardized expressions. This dual effect demonstrates that digital discourse both expands and restructures the way affection is communicated in contemporary English and Uzbek social media interaction.

Table 3. Gender Differences in Digital Affection

Aspect	Female Discourse	Male Discourse
Emotional Expression	Open, emotional, detailed messages	Short, simple, less explicit
Emoji Use	High frequency of emojis (e.g., ❤️ 🥺 😍 🌸)	Low to moderate (e.g., 👍 😂 😎)
Typical Language	Intensifiers and emotional words (*sooo, really, deeply*, etc.)	Short forms, humor, teasing
Showing Affection	Verbal affection, emotional support, caring words	Indirect affection, actions, memes, help
Communication Style	Relational, expressive, connected	Practical, task-oriented, reserved

CONCLUSION

This study examined the expression of affection in digital communication through a comparative analysis of English and Uzbek social media discourse. The main aim was to identify how affectionate meanings are constructed in online interaction and how they are influenced by linguistic, cultural, and gender-related factors. The findings demonstrate that digital communication has significantly transformed traditional patterns of emotional expression, creating new forms of discourse that combine verbal, visual, and symbolic elements.

The analysis revealed clear differences between English and Uzbek digital affection. English online communication generally tends to be more direct, explicit, and emotionally transparent, with frequent use of verbal emotional statements and expressive markers. In contrast, Uzbek digital discourse more often relies on indirect strategies, where affection is conveyed through care, politeness, and context-dependent expressions. These differences reflect broader cultural norms that shape communicative behavior in each language community.

Gender and culture were also found to play an important role in shaping digital affectionate discourse. Female users in both English and Uzbek contexts tend to be more emotionally expressive, frequently using emojis, intensifiers, and extended emotional messages. Male users, however, more often prefer restrained, humorous, or indirect forms of emotional expression. Cultural values further influence these patterns, particularly in determining what is considered appropriate or acceptable in online emotional communication.

The contribution of this study lies in its focus on affection as a discourse phenomenon in digital environments. It expands traditional sociolinguistic research by moving beyond offline communication and examining real online interaction in English and Uzbek social media contexts. In doing so, it demonstrates how language, gender, and technology interact to shape new forms of emotional expression in contemporary communication.

Overall, the study shows that digital communication not only increases the accessibility of emotional expression but also reshapes it by simplifying, compressing, and restructuring affectionate language in online discourse.

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Internet Resources

11. Google Scholar – academic database for research articles on linguistics and communication.
12. JSTOR – digital library of academic journals in linguistics and social sciences.
13. ResearchGate – platform for accessing scientific publications in sociolinguistics and discourse analysis.
14. ScienceDirect – research database for studies on communication and language use.
15. SpringerLink – academic platform for linguistics and communication studies.

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DASTLABKI YILLARDA HUQUQIY TARG‘IBOT VA AHOLINING HUQUQIY MADANIYATINI OSHIRISHDAGI TARIXIY MUAMMOLAR VA ULARNING YECHIMLARI

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Annotatsiya: Ushbu maqolada O‘zbekiston mustaqilligining dastlabki yillarida huquqiy targ‘ibot tizimini shakllantirish jarayoni, aholining huquqiy madaniyatini yuksaltirishda duch kelingan tizimli muammolar va ularning bartaraf etilish bosqichlari ilmiy tahlil qilinadi. Shuningdek, huquqiy nigilizm hodisasi va uning jamiyat taraqqiyotiga salbiy ta’siri hamda davlat tomonidan qabul qilingan strategik dasturlarning ahamiyati yoritilgan. O‘zbekiston mustaqilligining dastlabki yillarida jamiyatning huquqiy qiyofasini shakllantirish, huquqiy targ‘ibot tizimini yo‘lga qo‘yish va aholining huquqiy madaniyatini yuksaltirishning tarixiy-huquqiy jihatlari tadqiq etiladi. Tadqiqot davomida sobiq ittifoq tuzumidan meros qolgan huquqiy nigilizm, qonunlarga nisbatan ishonchsizlik va huquqiy savodxonlikning pastligi kabi fundamental muammolar ilmiy tahlil qilingan. Shuningdek, davlat tomonidan qabul qilingan strategik dasturlar, xususan, 1997-yildagi Milliy dasturning huquqiy ongni o‘zgartirishdagi roli va ushbu muammolarni bartaraf etishda qo‘llanilgan institutsional yechimlar yoritib berilgan. Maqola yakunida o‘sha davr tajribasining bugungi kunda "Yangi O‘zbekiston" sharoitida huquqiy davlat qurishdagi ahamiyati bo‘yicha xulosalar shakllantirilgan.

Abstract: This article provides a scientific analysis of the process of forming a legal propaganda system in the early years of Uzbekistan's independence, the systemic problems encountered in raising the legal culture of the population, and the stages of

their resolution. Additionally, the phenomenon of legal nihilism, its negative impact on social progress, and the significance of strategic programs adopted by the state are discussed. This article explores the historical and legal aspects of shaping the legal image of society, establishing a legal propaganda system, and raising the legal culture of the population during the early years of Uzbekistan's independence. The research provides a scientific analysis of fundamental problems inherited from the former Soviet regime, such as legal nihilism, distrust of laws, and low legal literacy. Furthermore, the strategic programs adopted by the state, particularly the role of the 1997 National Program in transforming legal consciousness and the institutional solutions applied to overcome these challenges, are highlighted. The article concludes with insights into the significance of that period's experience in building a rule-of-law state under the conditions of "New Uzbekistan" today.

Kalit so‘zlar: huquqiy madaniyat, huquqiy targ‘ibot, huquqiy nigilizm, huquqiy ong, mustaqillik, islohot, davlat va huquq. Huquqiy madaniyat, huquqiy targ‘ibot, huquqiy nigilizm, huquqiy ong, mustaqillik davri, huquqiy islohotlar, qonun ustuvorligi, Milliy dastur, ijtimoiy ong, huquqiy ta’lim.

Keywords: legal culture, legal propaganda, legal nihilism, legal consciousness, independence, reform, state and law. Legal culture, legal propaganda, legal nihilism, legal consciousness, independence era, legal reforms, rule of law, National Program, social consciousness, legal education.

Kirish

Mustaqillikning dastlabki yillarida O‘zbekiston o‘z taraqqiyot yo‘lini tanlar ekan, demokratik huquqiy davlat qurishni bosh maqsad qilib qo‘ydi. Biroq, har qanday demokratik islohotning muvaffaqiyati nafaqat mukammal qonunlarga, balki shu qonunlarga amal qiluvchi jamiyat a’zolarining huquqiy madaniyati va ongiga bog‘liqdir. 1990-yillarning boshlarida jamiyatda o‘tish davriga xos bo‘lgan huquqiy bo‘shliqlar, eski tizimdan qolgan huquqiy qarashlar va yangi qabul qilingan qonun hujjatlarining mohiyatini aholiga yetkazish mexanizmlari yetarli darajada shakllanmagan edi. Ushbu maqola o‘sha davrdagi tarixiy to‘siqlarni va ularni yengib o‘tishda qo‘llanilgan ilmiy-amaliy yondashuvlarni o‘rganishga bag‘ishlanadi. Har qanday davlatning mustaqillik poydevori nafaqat uning iqtisodiy qudrati yoki siyosiy barqarorligi, balki shu jamiyatda qaror topgan huquqiy tartib va fuqarolarning huquqiy ongi bilan o‘lchanadi. O‘zbekiston Respublikasi o‘z mustaqilligini qo‘lga kiritgan dastlabki yillarda totalitar tuzumdan demokratik jamiyatga o‘tishning murakkab

davrini boshidan kechirdi. Bu davrda jamiyat hayotining barcha jabhalarida bo‘lgani kabi, huquqiy sohada ham tub islohotlarni amalga oshirish zaruriyati yuzaga keldi. Biroq, yangi qabul qilingan demokratik qonunlarning hayotga tatbiq etilishi aholining mavjud huquqiy madaniyati darajasi bilan to‘qnash keldi.

Tarixiy kontekst va ilmiy muammo. 1990-yillarning boshlarida O‘zbekiston huquqiy tizimi ikki tomonlama tazyiq ostida edi: bir tomondan, sovet huquqiy maktabining ma’muriy-buyruqbozlikka asoslangan tushunchalari saqlanib qolgan bo‘lsa, ikkinchi tomondan, bozor iqtisodiyotiga o‘tish sharoitida yangi huquqiy munosabatlar (xususiy mulk, tadbirkorlik erkinligi, inson huquqlari ustuvorligi) shakllana boshladi. O‘sha davrdagi asosiy ilmiy va amaliy muammo — aholi ongida "hamma narsa davlatniki" degan qarashdan "huquq va majburiyatlar mutanosibligi" tushunchasiga o‘tishni ta’minlash edi.

Huquqiy targ‘ibotning roli. Dastlabki yillarda huquqiy targ‘ibot (legal propaganda) tizimi o‘zining an’anaviy shakllaridan voz kecha olmagan edi. Axborot yetkazishning bir tomonlama xarakteri, ya’ni faqat davlat irodasini majburlov orqali tushuntirish uslubi, fuqarolarda huquqiy faollikni oshirishga to‘sqinlik qildi. Shu sababli, huquqiy targ‘ibotni shunchaki ma’lumot berish emas, balki aholida huquqiy immunitetni (qonunbuzarlikka nisbatan murosasizlikni) shakllantirish vositasiga aylantirish strategik vazifa sifatida belgilandi.

Tadqiqotning maqsadi. Ushbu maqolada mustaqillikning ilk yillarida huquqiy madaniyatni yuksaltirish yo‘lidagi ob’ektiv va sub’ektiv to‘siqlar o‘rganiladi. Jumladan, huquqiy nigilizmning (qonunlarni inkor etish) ijtimoiy-psixologik ildizlari, huquqiy axborotning yetishmasligi va qonunchilik bazasining dinamik o‘zgarishi sharoitida aholi bilan ishlashning ilmiy metodologiyasi tahlil qilinadi. Shuningdek, 1997-yildagi "Jamiyatda huquqiy madaniyatni yuksaltirish milliy dasturi"ning qabul qilinishi ushbu muammolarni bartaraf etishda qanday burilish yasagani ilmiy nuqtai nazardan asoslab beriladi.

Asosiy qism

1. Tarixiy muammolar va huquqiy nigilizm

Mustaqillikning ilk pallasida eng katta muammo huquqiy nigilizm — ya’ni qonunlarga bepisandlik bilan qarash va ularni tan olmaslik kayfiyati edi. Buning bir necha ilmiy sabablari mavjud:

1. Sovet davri merosi: Markazlashgan ma’muriy-buyruqbozlik tizimi davrida aholida qonunlarga faqat jazo vositasi sifatida qarash shakllangan edi.

2. Kadrlar yetishmovchiligi: Yangi milliy qonunchilikni xalqqa tushuntirib bera oladigan, zamonaviy fikrlaydigan huquqshunos mutaxassislarning tanqisligi.

3. Axborot texnologiyalarining past darajasi: Huquqiy axborotni tezkorlik bilan yetkazish mexanizmlari (bugungi internet va ijtimoiy tarmoqlar kabi) mavjud emasligi.

2. Huquqiy targ‘ibotning uslubiy xatolari

Dastlabki yillarda huquqiy targ‘ibot asosan rasmiyatchilik va "hisobot uchun" ishlash tamoyiliga tayanib qolgan edi. Ma’ruza va seminarlar quruq nazariyadan iborat bo‘lib, oddiy fuqaroning kundalik hayotidagi huquqiy muammolariga (mulk huquqi, tadbirkorlik erkinligi va h.k.) javob bermas edi.

3. Muammolarning yechimi va davlat strategiyasi

Ushbu muammolarni bartaraf etish maqsadida 1997-yil 29-avgustda Oliy Majlis tomonidan "Jamiyatda huquqiy madaniyatni yuksaltirish milliy dasturi" qabul qilindi. Bu dastur quyidagi yechimlarni taqdim etdi:

1. Uzluksiz ta’lim tizimi: Huquqiy ta’lim bog‘chadan boshlab Oliy o‘quv yurtigacha bo‘lgan barcha bosqichlarga tatbiq etildi.

2. Institutsional islohotlar: Adliya vazirligi tizimida huquqiy targ‘ibot va ma’rifat boshqarmalari faoliyati tubdan takomillashtirildi.

3. OAV roli: "Inson va qonun", "Huquq" kabi maxsus nashrlar, televideniyeda "Huquqiy ko‘rsatkich" kabi dasturlarning ko‘payishi aholining huquqiy savodxonligini oshirishga xizmat qildi. 1. Huquqiy ong transformatsiyasidagi konseptual to‘siqlar

Mustaqillikning dastlabki yillarida aholi o‘rtasida "paternalistik qarashlar" (davlat barcha masalalarni hal qilib berishi kerak degan tushuncha) ustunlik qilgan. Bu esa fuqarolarning shaxsiy huquqiy tashabbuskorligini bo‘g‘ib qo‘yardi.

4. Ilmiy muammo: Sovet huquq tizimi "davlat manfaati inson manfaatidan ustun" tamoyiliga qurilgan edi. 1992-yilgi Konstitutsiya esa "inson — jamiyat — davlat" triadasini o‘rtaga tashladi.

5. Ziddiyat: Aholi yangi qabul qilingan "shaxsiy daxlsizlik", "mulkdorlik huquqi" va "sud himoyasi" kabi tushunchalarni amalda qanday qo‘llashni bilmas edi. Bu esa huquqiy vakuumning paydo bo‘lishiga olib keldi.

2. Huquqiy targ‘ibotning institutsional va metodologik muammolari

O‘sha davrda huquqiy axborotni tarqatishda "vertikal uslub" (davlatdan fuqaroga) hukmron edi. Bunda "gorizontal aloqa" (fuqarolik jamiyati institutlari orqali targ‘ibot) deyarli mavjud emasdi.

Asosiy kamchiliklar:

1. Terminologik murakkablik: Qonunlar tili haddan tashqari murakkab va akademik bo‘lib, u oddiy aholi uchun tushunarsiz edi.

2. Biryoqlama yondashuv: Targ‘ibot faqat taqiqlar va majburiyatlarni tushuntirishga qaratilgan bo‘lib, huquq va imkoniyatlar (masalan, tadbirkorlik huquqi) ikkinchi darajaga tushib qolgan edi.

3. Tarixiy yechimlar: Strategik islohotlar bosqichi

Davlat ushbu inqirozli holatdan chiqish uchun bir necha bosqichli modelni amalga oshirdi:

4. Huquqiy ta’limni tizimlashtirish: 1990-yillarning o‘rtalariga kelib, barcha ta’lim muassasalarida "Konstitutsiya alifbosi", "Davlat va huquq asoslari" kabi fanlar majburiy etib belgilandi. Bu yosh avlodda huquqiy madaniyatni bazaviy darajada shakllantirishga xizmat qildi.

5. Huquqiy axborot tizimini markazlashtirish: Qonun hujjatlarining elektron bazalarini (masalan, keyinchalik shakllangan Lex.uz tizimining asosi bo‘lgan bazalar) yaratishga poydevor qo‘yildi.

6. Mahalla institutining faollashuvi: Targ‘ibot ishlarini aholiga yaqinlashtirish maqsadida mahalla fuqarolar yig‘inlari huzurida huquqiy maslahatxonalar tashkil etila boshladi.

Xulosa

Dastlabki yillarda aholining huquqiy madaniyatini oshirishdagi muammolar asosan tizimli o‘zgarishlar va mafkuraviy yangilanish jarayonidagi tabiiy qiyinchiliklar bilan bog‘liq edi. Davlat tomonidan qabul qilingan ilmiy asoslangan dasturlar va huquqiy ta’limning tizimlashtirilishi jamiyatda "qonun ustuvorligi" g‘oyasining ildiz otishiga zamin yaratdi. Bugungi kunda ham ushbu tarixiy tajriba raqamli huquqiy targ‘ibotni shakllantirishda muhim manba bo‘lib xizmat qiladi. Mustaqillikning dastlabki yillarida huquqiy targ‘ibot va aholining huquqiy madaniyatini yuksaltirish

masalalarini ilmiy tahlil qilish quyidagi fundamental xulosalarni shakllantirishga imkon beradi:

1. Tarixiy transformatsiya zaruriyati: Sobiq ittifoq davridan meros qolgan huquqiy nigilizm va paternalistik qarashlar yangi demokratik islohotlarning samaradorligiga jiddiy to‘sqinlik qilgan. Aholi ongida qonunni shunchaki "jazo vositasi" emas, balki "erkinlik va himoya kafolati" sifatida qayta anglash jarayoni kechgan.

2. Tizimli yondashuvning shakllanishi: 1997-yildagi Milliy dasturning qabul qilinishi huquqiy targ‘ibotni parokanda harakatlardan yagona davlat strategiyasiga aylantirdi. Bu davrda huquqiy ta’limning uzluksizligi (bog‘cha-maktab-oliygoh) tamoyili joriy etilishi jamiyatning intellektual salohiyatini huquqiy modernizatsiyaga tayyorladi.

3. Institutsional yechimlarning samaradorligi: Adliya organlari, mahalla institutlari va ommaviy axborot vositalari o‘rtasidagi vertikal va gorizontal hamkorlik mexanizmlari o‘sha davrdagi axborot tanqisligini bartaraf etishda asosiy drayver bo‘lib xizmat qildi.

4. Huquqiy ongning dinamik o‘sishi: Dastlabki yillardagi qiyinchiliklarga qaramay, aholining huquqiy faolligi oshishi natijasida fuqarolik jamiyati institutlarining o‘rni mustahkamlandi. Bu esa davlat organlari faoliyati ustidan jamoatchilik nazoratining ilk kurtaklari paydo bo‘lishiga zamin yaratdi. Mustaqillikning dastlabki yillarida aholining huquqiy madaniyatini shakllantirish jarayoni nafaqat huquqiy, balki chuqur ma’naviy-psixologik islohot ham edi. O‘tkazilgan tadqiqotlar va tarixiy manbalar tahlili quyidagi qo‘shimcha xulosalarni chiqarishga asos bo‘ladi:

1. Huquqiy nigilizmga barham berishning ilmiy modeli: Dastlabki yillarda huquqiy befarqlikka qarshi kurashishda "huquqiy ma’rifat" tushunchasi ustuvor etib belgilandi. Bu jarayonda shaxsning huquqiy ongi nafaqat qonunlarni bilish, balki ularni o‘zining hayotiy ehtiyoji deb his qilish darajasiga ko‘tarildi. Bu esa davlat va fuqaro o‘rtasidagi o‘zaro ishonchni mustahkamlashning bosh omili bo‘ldi.

2. Milliy qadriyatlar va huquqiy uyg‘unlik: O‘zbekiston tajribasining o‘ziga xosligi shundaki, huquqiy targ‘ibotda g‘arbning demokratik andozalari sharqona ahloqiy me’yorlar va "Adolat" tushunchasi bilan uyg‘unlashtirildi. Bu esa aholi tomonidan yangi huquqiy normalarni "yot element" sifatida emas, balki tabiiy qadriyat sifatida qabul qilinishini ta’minladi.

3. Huquqiy axborot erkinligi va shaffoflik: Tarixiy muammolarning aksariyati axborot yopiqligi bilan bog‘liq edi. Shu sababli, qonun hujjatlarining ochiq e’lon qilinishi va

ularning sharhlarining xalqchil tilda yetkazilishi "huquqiy bo‘shliq"larni to‘ldirishga xizmat qildi.

4. Strategik ahamiyati: O‘sha yillarda qo‘yilgan fundamental poydevor bugungi kunda "Yangi O‘zbekiston" sharoitida inson huquqlarini oliy qadriyat darajasiga ko‘tarish va korrupsiyaga qarshi murosasiz jamiyat qurish strategiyasining nazariy asosi bo‘lib xizmat qilmoqda.

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NODAVLAT NOTIJORAT TASHKILOTLARI (NNT) VA TADBIRKORLIK SUBYEKTLARINI RO‘YXATGA OLISHDA ADLIYA ORGANLARINING TARIXIY O‘RNI.

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Annotatsiya: Mazkur maqolada O‘zbekiston Respublikasi adliya organlarining fuqarolik jamiyati institutlari va tadbirkorlik muhitini shakllantirishdagi retrospektiv va zamonaviy o‘rni yoritilgan. Tadqiqotda NNT va tadbirkorlik subyektlarini davlat ro‘yxatidan o‘tkazish funksiyasining evolyutsion bosqichlari, qonunchilikdagi transformatsiyalar va adliya tizimining institutsional ahamiyati ilmiy tahlil qilingan. Ushbu maqolada O‘zbekistonda huquqiy davlat qurish jarayonida adliya organlarining nodavlat notijorat tashkilotlari (NNT) va tadbirkorlik subyektlarini davlat ro‘yxatidan o‘tkazishdagi tarixiy roli va institutsional ahamiyati tadqiq etiladi. Muallif tizimning evolyutsion bosqichlarini tahlil qilar ekan, adliya idoralarining ma’muriy-huquqiy nazoratdan xizmat ko‘rsatuvchi va huquqiy himoya qiluvchi organga aylanish jarayoniga alohida urg‘u beradi. Shuningdek, maqolada milliy qonunchilikning transformatsiyasi va zamonaviy raqamli texnologiyalarning sohadagi o‘rni ilmiy jihatdan asoslab berilgan.

Kalit so‘zlar: Adliya organlari, NNT, tadbirkorlik subyektlari, davlat ro‘yxatidan o‘tkazish, fuqarolik jamiyati, huquqiy islohot, institutsional tahlil. Adliya organlari, nodavlat notijorat tashkilotlari (NNT), tadbirkorlik subyektlari, davlat ro‘yxati, huquqiy evolyutsiya, fuqarolik jamiyati, institutsional islohot, davlat xizmatlari, legitimlik.

Abstract: This article examines the retrospective and contemporary role of the justice authorities of the Republic of Uzbekistan in the formation of civil society institutions

and the business environment. The research provides a scientific analysis of the evolutionary stages of the state registration function of NGOs and business entities, transformations in legislation, and the institutional significance of the justice system. This article examines the historical role and institutional significance of justice authorities in the state registration of non-governmental non-profit organizations (NGOs) and business entities during the process of building a rule-of-law state in Uzbekistan. The author analyzes the evolutionary stages of the system, placing particular emphasis on the transformation of justice bodies from administrative-legal oversight entities into service-oriented and protective institutions. Furthermore, the article provides a scientific substantiation of the transformation of national legislation and the role of modern digital technologies in this sphere.

Keywords: Justice authorities, NGOs, business entities, state registration, civil society, legal reform, institutional analysis. Justice authorities, non-governmental non-profit organizations (NGOs), business entities, state registration, legal evolution, civil society, institutional reform, public services, legitimacy.

Kirish

Har qanday demokratik jamiyatning barqaror rivojlanishi bevosita fuqarolik jamiyati institutlarining erkinligi va iqtisodiy faoliyat subyektlarining huquqiy himoyalanganligi bilan belgilanadi. O‘zbekiston mustaqillikning ilk yillaridanoq “Kuchli davlatdan – kuchli fuqarolik jamiyati sari” degan konseptual tamoyilni ilgari surar ekan, bu jarayonda adliya organlari asosiy institutsional poydevor vazifasini o‘tadi.

Nodavlat notijorat tashkilotlari (NNT) va tadbirkorlik subyektlarini davlat ro‘yxatidan o‘tkazish – bu shunchaki ma’muriy jarayon emas, balki subyektga yuridik legitimlik berish va uning davlat bilan huquqiy munosabatga kirishishini ta’minlovchi siyosiy-huquqiy aktdir. Tarixiy nuqtai nazardan qaraganda, adliya organlari ushbu subyektlarning "tug‘ilish guvohnomasi"ni beruvchi idora bo‘libgina qolmay, balki ularning faoliyat doirasini qonuniy ramkaga soluvchi, huquqiy ekspertiza qiluvchi va manfaatlarni muvozanatda saqlovchi mediator sifatida namoyon bo‘ldi.

Mavzuning dolzarbligi shundaki, adliya organlari evolyutsiyasi bevosita mamlakatdagi siyosiy va iqtisodiy islohotlar dinamikasi bilan bog‘liqdir. 1990-yillarning boshlarida adliya organlari asosan nazorat qiluvchi va cheklovchi funksiyani bajargan bo‘lsa, bugungi kunga kelib ular servis modeliga asoslangan, ochiqlikni ta’minlovchi va tadbirkorlik muhitini yaxshilovchi strategik hamkorga aylandi.

Ushbu maqolada adliya organlarining NNT va tadbirkorlik subyektlarini legallashtirishdagi roli quyidagi uchta fundamental yo‘nalishda tahlil qilinadi:

1. Huquqiy filtrlash: Subyektlarning ta’sis hujjatlarini konstitutsiyaviy tuzum va qonun ustuvorligi talablariga muvofiqlashtirish.

2. Institutsional barqarorlik: Nodavlat sektor va xususiy mulkdorlar qatlamining huquqiy subyekt sifatidagi maqomini mustahkamlash.

3. Byurokratiyani qisqartirish: Davlat ro‘yxatidan o‘tkazish tizimini soddalashtirish orqali mamlakatning xalqaro reytinglardagi (masalan, *Doing Business*) mavqeini oshirish.

Shu nuqtai nazardan, adliya organlarining tarixiy tajribasini o‘rganish, zamonaviy O‘zbekistonda amalga oshirilayotgan ma’muriy islohotlarning mazmun-mohiyatini va kelajakdagi istiqbollarini tushunishga xizmat qiladi.

O‘zbekiston mustaqillikka erishgan ilk kunlardanoq huquqiy demokratik davlat va erkin bozor iqtisodiyotiga asoslangan jamiyat qurishni strategik maqsad qilib qo‘ydi. Ushbu jarayonda adliya organlari nafaqat qonun ustuvorligini ta’minlovchi, balki ijtimoiy-iqtisodiy munosabatlarning subyektlarini huquqiy maydonga olib kiruvchi asosiy darvozabon (gatekeeper) vazifasini o‘tadi. Ayniqsa, NNT va tadbirkorlik subyektlarining huquqiy maqomini belgilash, ularni tizimlashtirish va davlat tomonidan e’tirof etish jarayonlarida Adliya vazirligi tizimi markaziy bo‘g‘in hisoblanadi.

II. Asosiy qism (Main Body)

2.1. NNTlarni ro‘yxatga olishda adliya organlarining missiyasi

Fuqarolik jamiyati institutlarining huquqiy poydevori 1991-yildagi "O‘zbekiston Respublikasida jamoat birlashmalari to‘g‘risida"gi qonun bilan belgilab qo‘yilgan. Adliya organlari ushbu davrda jamoat birlashmalarining ustavlarini ekspertizadan o‘tkazish va ularning faoliyatini qonuniy doiraga solishda nazorat qiluvchi organdan ko‘ra, ko‘proq metodologik yordam beruvchi institutsional tuzilmaga aylandi.

1999-yilda "Nodavlat notijorat tashkilotlari to‘g‘risida"gi Qonun qabul qilinishi bilan adliya organlarining vakolatlari yanada kengaydi. Tarixiy nuqtai nazardan, adliya organlari:

1. NNTlarning ustav maqsadlari qonun hujjatlariga muvofiqligini ta’minladi;

2. Xalqaro NNTlarning O‘zbekistondagi vakolatxonalarini akkreditatsiyadan o‘tkazish orqali tashqi huquqiy aloqalarni muvofiqlashtirdi.

2.2. Tadbirkorlik subyektlarini ro‘yxatga olishdagi transformatsiya

Mustaqillikning dastlabki yillarida tadbirkorlik subyektlarini ro‘yxatga olish turli idoralar o‘rtasida tarqoq edi. Biroq, tadbirkorlikni rivojlantirish va "yagona darcha" tamoyilini joriy etishda adliya organlarining o‘rni keskin oshdi.

Tarixan, adliya organlari tadbirkorlik subyektlarini ro‘yxatga olishda quyidagi bosqichlarni bosib o‘tdi:

1. Litsenziyalash va nazorat davri (1990-yillar): Tadbirkorlik subyektlarining huquqiy hujjatlarini monitoring qilish.

2. Institutsional yengilliklar davri (2000-2016 yy.): Tuman adliya bo‘limlari qoshida tadbirkorlik subyektlarini ro‘yxatga olish bo‘yicha inspeksiyalarning faoliyat yuritishi.

3. Raqamlashtirish va "Davlat xizmatlari" inqilobi (2017-yildan keyin): Adliya vazirligi huzuridagi Davlat xizmatlari agentligining tashkil etilishi tadbirkorlikni ro‘yxatga olishni 30 daqiqalik onlayn jarayonga aylantirdi.

2.3. Huquqiy ekspertiza va monitoring

Adliya organlarining o‘ziga xosligi shundaki, ular faqatgina "ro‘yxatga oluvchi" emas, balki "huquqiy himoyachi" funksiyasini ham bajaradi. Tarixiy tahlillar shuni ko‘rsatadiki, tadbirkorlik subyektlari va NNTlar faoliyatiga davlat organlarining noqonuniy aralashuviga qarshi adliya organlari tomonidan kiritilgan taqdimnomalar va sud da’volari mazkur sektorning barqarorligini ta’minlagan.

2.4. Nodavlat notijorat tashkilotlarini (NNT) ro‘yxatga olishda adliya organlarining institutsional evolyutsiyasi

O‘zbekistonda fuqarolik jamiyati institutlarining shakllanishi bevosita adliya organlarining huquqiy-ekspertlik faoliyati bilan bog‘liq. NNTlarni davlat ro‘yxatidan o‘tkazish funksiyasi adliya organlariga shunchaki statistik ma’lumotlarni to‘plash emas, balki ijtimoiy munosabatlarni huquqiy tartibga solish vazifasini yuklaydi.

1. Huquqiy filtrlash va xavfsizlik funksiyasi: Mustaqillikning ilk yillarida (1991–2000 yy.) adliya organlari jamoat birlashmalarining ustav maqsadlarini O‘zbekiston Respublikasining Konstitutsiyaviy tuzumiga muvofiqligini tekshiruvchi asosiy filtr

vazifasini bajardi. Bu jamiyatda turli radikal yoki g‘ayriqonuniy oqimlarning institutsional ko‘rinish olishining oldini olishda muhim ahamiyat kasb etdi.

2. Metodologik hamkorlik: 2010-yillardan boshlab adliya organlarining roli "nazorat qiluvchi" organ modelidan "hamkor va ko‘makchi" modeliga o‘ta boshladi. Bu davrda NNTlar faoliyatini monitoring qilish tizimi soddalashtirildi, hisobotlarni elektron shaklda qabul qilish yo‘lga qo‘yildi.

3. Xalqaro maqomni legallashtirish: Xorijiy NNTlarning vakolatxonalari va filiallarini ro‘yxatga olish hamda ularning xodimlarini akkreditatsiyadan o‘tkazish orqali adliya organlari mamlakatning xalqaro gumanitar hamkorlik maydonidagi huquqiy qiyofasini shakllantirdi.

2.5. Tadbirkorlik subyektlarini ro‘yxatga olish: Ma’muriy islohotlar va "Yagona darcha" tamoyili

Tadbirkorlik subyektlarini ro‘yxatga olish tizimi tarixan murakkab evolyutsion yo‘lni bosib o‘tdi. Adliya organlarining bu boradagi roli mamlakat iqtisodiyoti uchun "investitsiyaviy darvoza" vazifasini bajardi.

1. Vakolatlarning markazlashishi (2003-yilgi burilish): 2003-yilgacha tadbirkorlik subyektlarini ro‘yxatga olish tarqoq holda (mahalliy hokimliklar va boshqa idoralarda) amalga oshirilar edi. Vazirlar Mahkamasining tegishli qarorlari bilan ushbu jarayon ustidan nazorat va metodologik rahbarlik Adliya vazirligiga yuklatildi. Bu korrupsiyaviy omillarni kamaytirish va yagona davlat siyosatini yuritish imkonini berdi.

2. Litsenziyalash va ruxsat berish tizimining unifikatsiyasi: Adliya organlari tadbirkorlik faoliyati bilan bog‘liq barcha normativ-huquqiy hujjatlarni inventarizatsiyadan o‘tkazib, ortiqcha byurokratik to‘siqlarni bekor qilish bo‘yicha "Regulyator gilyotina" (Regulatory Guillotine) usulini qo‘lladi.

3. Davlat xizmatlari agentligi inqilobi (2017–2022 yy.): Adliya vazirligi huzurida Davlat xizmatlari agentligining tashkil etilishi tadbirkorlik subyektlarini ro‘yxatga olishni mutlaqo yangi bosqichga olib chiqdi. Ro‘yxatga olish jarayoni subyektiv yondashuvlardan xoli bo‘lib, to‘liq avtomatlashtirildi.

2.6. Adliya organlarining nazorat va himoya funksiyalari balansi

Adliya organlarining tarixiy o‘rni faqatgina subyektni ro‘yxatga olish (tug‘ilish) bilan cheklanmaydi. Ularning asosiy ilmiy-huquqiy missiyasi quyidagilardan iborat:

1. Huquqiy monitoring: Ro‘yxatdan o‘tgan subyektlarning faoliyati ustav maqsadlariga va milliy qonunchilikka muvofiqligini doimiy tahlil qilish.

2. Davlat organlari aralashuvidan himoya: Adliya organlari tadbirkorlar va NNTlarning huquqlarini buzgan mansabdor shaxslarga nisbatan ta’sir choralarini (taqdimnoma, ma’muriy bayonnoma) qo‘llash orqali "huquqiy qalqon" funksiyasini bajaradi.

3. Qonunchilikni takomillashtirish: Ro‘yxatga olish jarayonida aniqlangan tizimli muammolar asosida adliya organlari hukumatga qonunchilikni liberallashtirish bo‘yicha takliflar kiritib boradi.

2.7. Raqamli transformatsiya va kelajak istiqbollari

Bugungi kunda adliya organlari "Raqamli adliya" (Digital Justice) konsepsiyasi doirasida NNT va tadbirkorlik subyektlari bilan muloqotni inson omilisiz amalga oshirmoqda.

III. Xulosa (Conclusion)

Xulosa qilib aytganda, adliya organlarining NNT va tadbirkorlik subyektlarini ro‘yxatga olishdagi tarixiy o‘rni oddiy ma’muriy funksiyadan strategik boshqaruv darajasiga ko‘tarildi.

1. Adliya organlari NNTlar faoliyatini tartibga solish orqali jamiyatda ijtimoiy barqarorlik va huquqiy madaniyatni shakllantirdi.

2. Tadbirkorlik subyektlarini ro‘yxatga olish tizimining adliya idoralari tomonidan markazlashtirilishi va keyinchalik raqamlashtirilishi korrupsiyani kamaytirish hamda investitsiyaviy jozibadorlikni oshirishga xizmat qildi.

Bugungi kunda adliya organlari ushbu subyektlarning nafaqat registratori, balki ularning huquqlari va qonuniy manfaatlarining ishonchli kafolati bo‘lib qolmoqda.

O‘zbekiston davlatchiligi tarixida adliya organlarining nodavlat notijorat tashkilotlari hamda tadbirkorlik subyektlarini legallashtirishdagi faoliyatini retrospektiv va prospektiv tahlil qilish quyidagi ilmiy-nazariy umumlashtirishlarga asos bo‘ladi:

Birinchidan, adliya organlari mustaqillik yillarida jamiyatning huquqiy arxitekturasini shakllantiruvchi asosiy subyekt sifatida namoyon bo‘ldi. NNTlarni ro‘yxatga olish orqali adliya idoralari fuqarolik jamiyatining institutsional barqarorligini ta’minladi, tadbirkorlik subyektlarini ro‘yxatga olish orqali esa bozor iqtisodiyotining huquqiy

subyektivligini kafolatladi. Mazkur jarayon davlatning siyosiy irodasi va huquqiy siyosatining amaliy in'ikosi sifatida e'tirof etiladi.

Ikkinchidan, adliya tizimining bu boradagi roli oddiy ma'muriy-texnik ro'yxatga olish funksiyasidan huquqiy ekspertiza va monitoring darajasiga ko'tarildi. Bu, o'z navbatida, ro'yxatga olingan subyektlarning nafaqat qonuniy faoliyat yuritishini, balki ularning ustav maqsadlari jamiyat manfaatlari va konstitutsiyaviy tamoyillarga uyg'un bo'lishini ta'minlovchi muhim ijtimoiy filtr vazifasini o'tadi.

Uchinchidan, tizimning tarixiy evolyutsiyasi nazorat paradigmasidan xizmat ko'rsatuvchi (servis) paradigma sari transformatsiyalanganini ko'rsatadi. Bu o'zgarish "Yagona darcha" tamoyili va raqamli texnologiyalarning joriy etilishi bilan bevosita bog'liq bo'lib, davlat va xususiy sektor o'rtasidagi masofani qisqartirishga, byurokratik to'siqlarni minimallashtirishga hamda investitsiyaviy muhitning huquqiy jozibadorligini oshirishga xizmat qildi.

To'rtinchidan, adliya organlari ushbu subyektlarning huquqiy himoyachisi sifatida namoyon bo'lishi, ularning nafaqat "vujudga kelishi", balki keyingi hayotiy faoliyatida ham qonun ustuvorligini ta'minlashda tayanch nuqtasi bo'lib qolmoqda. Bu esa mamlakatda xususiy mulk daxlsizligi va uyushish huquqi kabi fundamental qadriyatlarni qaror toptirishda adliya tizimi markaziy bo'g'in ekanligini isbotlaydi.

Xulosa qilib aytganda, adliya organlarining NNT va tadbirkorlik sohasidagi tarixiy o'rni – bu O'zbekiston Respublikasida huquqiy demokratiya va iqtisodiy erkinlikning institutsional poydevoridir. Kelajakdagi taraqqiyot bosqichida ham adliya tizimining ochiqligi va raqamli transformatsiyasi ushbu sektorlar rivoji uchun hal qiluvchi ahamiyatga ega bo'lib qolaveradi.

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MANBASHUNOSLIKDA ILMIY TADQIQOTLARNING TURLARI

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Annotatsiya. Ushbu maqolada manbashunoslikda ilmiy tadqiqotlarning asosiy turlari, ularning nazariy va amaliy yo'nalishlari, tarixiy manbalarni aniqlash, tasniflash, tavsiflash, tanqidiy tahlil qilish hamda ilmiy muomalaga kiritish jarayonlari tahlil qilinadi. Manbashunoslik tarix fanining fundamental sohasi sifatida tarixiy voqelikni manbalar asosida xolis o'rganishga xizmat qiladi. Maqolada yozma, moddiy, etnografik, lingvistik, folklor, tasviriy va zamonaviy axborot manbalarining ilmiy tadqiqotlardagi o'rni yoritiladi. Nazariy manbashunoslik, amaliy manbashunoslik, arxeografiya, paleografik, diplomatik, matnshunoslik va qiyosiy-tanqidiy tadqiqotlar manbashunoslikdagi muhim ilmiy yo'nalishlar sifatida ko'rib chiqiladi.

Kalit so'zlar: manbashunoslik, tarixiy manba, nazariy manbashunoslik, amaliy manbashunoslik, arxeografiya, paleografiya, diplomatika, matnshunoslik, manba tanqidi.

TYPES OF SCIENTIFIC RESEARCH IN SOURCE STUDIES

Abstract. This article analyzes the main types of scientific research in source studies, including their theoretical and practical directions, the processes of identifying, classifying, describing, critically analyzing, and introducing historical sources into

scholarly circulation. Source studies, as a fundamental field of historical science, serves the objective study of historical reality on the basis of sources. The article examines the role of written, material, ethnographic, linguistic, folklore, visual, and modern information sources in historical research. Theoretical source studies, practical source studies, archaeography, paleographic, diplomatic, textual, and comparative-critical research are considered important scholarly directions within source studies.

Keywords: source studies, historical source, theoretical source studies, practical source studies, archaeography, paleography, diplomatics, textual studies, source criticism.

ВИДЫ НАУЧНЫХ ИССЛЕДОВАНИЙ В ИСТОЧНИКОВЕДЕНИИ

Аннотация. В статье анализируются основные виды научных исследований в источниковедении, их теоретические и практические направления, процессы выявления, классификации, описания, критического анализа и введения исторических источников в научный оборот. Источниковедение как фундаментальная отрасль исторической науки служит объективному изучению исторической действительности на основе источников. В статье рассматривается значение письменных, вещественных, этнографических, лингвистических, фольклорных, изобразительных и современных информационных источников в научных исследованиях. Теоретическое источниковедение, практическое источниковедение, археография, палеографические, дипломатические, текстологические и сравнительно-критические исследования освещаются как важные научные направления источниковедения.

Ключевые слова: источниковедение, исторический источник, теоретическое источниковедение, практическое источниковедение, археография, палеография, дипломатика, текстология, критика источников.

Kirish. Tarixiy bilimning ishonchliligi, avvalo, manbalar bilan ishlash madaniyatiga bog‘liq. Har bir tarixiy voqea muayyan davr, muhit, muallif qarashi, siyosiy manfaat, ijtimoiy guruh yoki mafkuraviy yondashuv ta’sirida bayon qilinishi mumkin. Shu sababli tarixchi uchun manbani topishning o‘zi yetarli emas; uni kelib chiqishi, yozilgan vaqti, muallifi, mazmuni, maqsadi, saqlanish holati va boshqa manbalar bilan munosabati asosida ilmiy tekshirish zarur.

Manbashunoslik fani tarixiy manbalarni izlash, aniqlash, tavsiflash, tasniflash, tahlil qilish, qiyoslash va ilmiy foydalanish usullarini o‘rgatadi. Bu fan tarixiy

voqelikni manbalarga tayangan holda xolis yoritish, tarixiy faktlarni biryoqlama talqinlardan ajratish, mavjud dalillarni tanqidiy baholash va ilmiy xulosa chiqarish imkonini beradi. Ayniqsa, O‘zbekiston tarixini o‘rganishda yozma yodgorliklar, rasmiy hujjatlar, solnomalar, qo‘lyozma asarlar, moddiy, etnografik, lingvistik va folklor manbalarini kompleks tahlil qilish muhim ahamiyatga ega.

Manbashunoslikda ilmiy tadqiqotlarning turlari bir nechta yo‘nalishda namoyon bo‘ladi. Ular orasida nazariy manbashunoslik, amaliy manbashunoslik, arxeografik tadqiqot, manbalarni tashqi va ichki tanqid qilish, matnshunoslik, paleografik, diplomatik, epigrafik, numizmatik, lingvistik va qiyosiy-tarixiy tadqiqotlar muhim o‘rin tutadi. Ushbu yo‘nalishlarning har biri tarixiy haqiqatni manbalar asosida tiklashga xizmat qiladi.

Asosiy qism. Manbashunoslikda ilmiy tadqiqotlar tarixiy manbaning kelib chiqishi, shakli, mazmuni, ishonchlilik darajasi va ilmiy qiymatini aniqlashga qaratiladi. Bu jarayonda manba oddiy axborot vositasi sifatida emas, balki muayyan tarixiy sharoitda yaratilgan, davr ruhi, muallif qarashi, siyosiy manfaat, ijtimoiy muhit va madaniy tafakkurni o‘zida aks ettiruvchi ilmiy obyekt sifatida o‘rganiladi. Tarixiy manbalarni tanqidiy tahlil qilish, ularni turkumlash, qiyoslash va ilmiy muomalaga kiritish manbashunoslik tadqiqotlarining asosiy mazmunini tashkil etadi [1; 2].

Manbashunoslikdagi ilmiy tadqiqotlarning dastlabki turi nazariy manbashunoslikdir. Nazariy manbashunoslik tarixiy manbaning mohiyati, uning paydo bo‘lish qonuniyatlari, tarixiy voqelikni aks ettirish darajasi, tasniflash mezonlari va manbadan foydalanish tamoyillarini ishlab chiqadi. Bu yo‘nalishda tarixiy manbalar yozma, moddiy, etnografik, lingvistik, folklor, tasviriy, foto, audio, kino, televidenie va elektron manbalar kabi guruhlarga ajratiladi. Manbalarni bunday turkumlash tarixiy tadqiqot uchun zarur materiallarni to‘g‘ri tanlash va ulardan ilmiy foydalanish imkonini beradi [2; 3].

Yozma manbalar manbashunoslik tadqiqotlarida eng muhim o‘rinlardan birini egallaydi. Ular rasmiy hujjatlar, yorliqlar, farmonlar, vaqfnomalar, soliq va hisob daftarlar, rasmiy yozishmalar, tarixiy asarlar, solnomalar, tazkiralar, sayohatnomalar, esdaliklar va maktublardan iborat bo‘lishi mumkin. Rasmiy hujjatlar ijtimoiy-siyosiy munosabatlar, davlat boshqaruvi, yer egaligi, soliq tizimi va huquqiy tartibot haqida aniq daliliy ma’lumot beradi. Narrativ manbalar esa tarixiy voqealarni kengroq bayon qiladi, lekin ularda muallif qarashi, saroy muhiti, diniy-mafkuraviy yondashuv yoki badiiy uslub ta’siri kuchli bo‘lishi mumkin [1; 3].

Amaliy manbashunoslik aniq manbalarni izlab topish, tavsiflash, o‘rganish, nashrga tayyorlash va ilmiy muomalaga kiritish bilan shug‘ullanadi. Bu turdagi

tadqiqotda qo‘lyozma yoki hujjatning tashqi va ichki belgilari alohida tekshiriladi. Tashqi tahlilda manbaning qog‘ozi, hajmi, varaqlar soni, muqovasi, yozuv turi, siyohi, xattoti, ko‘chirilgan sanasi, kolofoni, muhrlari va saqlanish holati o‘rganiladi. Ichki tahlilda esa matn mazmuni, voqealar bayoni, muallif munosabati, keltirilgan dalillarning aniqligi, ma’lumotlarning boshqa manbalar bilan mosligi va ilmiy qiymati aniqlanadi [2; 4].

Manbashunoslikdagi muhim tadqiqot turlaridan biri arxeografik tadqiqotdir. Arxeografiya yozma manbalarni qidirib topish, dastlabki tavsifga olish, ro‘yxatga kiritish, kataloglashtirish va ilmiy muomalaga olib kirish bilan bog‘liq. Qo‘lyozmalar fondi, kutubxona, muzey, arxiv va shaxsiy majmualarda saqlanayotgan manbalarni aniqlash tarixiy tadqiqotlar uchun katta ahamiyatga ega. Arxeografik izlanishlar orqali ilgari ilmiy jamoatchilikka noma’lum bo‘lgan qo‘lyozmalar, hujjatlar, maktublar, vaqfnomalar va boshqa yozma yodgorliklar tadqiqot obyekti sifatida maydonga chiqadi [2; 3].

Paleografik tadqiqotlar qadimgi yozuvlar, qo‘lyozma matnlarning xat turi, yozilish uslubi, siyoh, qog‘oz, muqova va kitobat belgilarini o‘rganishga qaratiladi. Paleografiya qo‘lyozmaning qaysi davrda va qanday muhitda yaratilganini aniqlashga yordam beradi. Ayniqsa, muallif nomi, yozilgan joyi yoki sanasi aniq ko‘rsatilmagan qo‘lyozmalarni o‘rganishda paleografik tahlil muhim ilmiy vosita hisoblanadi. Yozuv shakli, harflar tuzilishi, satrlar tartibi, bezaklar va kitobat uslubi manbaning taxminiy davrini aniqlashda muhim belgi bo‘lib xizmat qiladi [5].

Diplomatik tadqiqotlar rasmiy hujjatlarning shakli, tuzilishi, huquqiy mazmuni va tarixiy qiymatini o‘rganadi. Farmon, yorliq, inoyatnoma, vaqfnoma, shartnoma, rasmiy maktub va boshqa hujjatlarni tahlil qilishda hujjat matnidagi rasmiy formulalar, muhrlar, sanalar, mansab nomlari va huquqiy iboralar tekshiriladi. Bu yo‘nalish hujjatning asl yoki keyinchalik ko‘chirilgan nusxa ekanini, undagi ma’lumotlarning ishonchliligini va tarixiy voqelik bilan bog‘liqligini aniqlashga xizmat qiladi [6; 7].

Matnshunoslik tadqiqotlari qo‘lyozma asarlarning matnini tiklash, nusxalarini solishtirish, xatolarni aniqlash, tanqidiy matn tayyorlash va izohli nashr yaratish bilan bog‘liq. Bir asarning bir nechta qo‘lyozma nusxasi mavjud bo‘lgan holatda matnshunoslik tahlili alohida ahamiyat kasb etadi. Nusxalar o‘rtasidagi farqlar, ko‘chirish jarayonida tushib qolgan jumlalar, keyingi tahrirlar va xattot xatolari aniqlanmasdan turib, manbadan to‘liq ilmiy foydalanish qiyin [8].

Manbashunoslikda qiyosiy-tanqidiy tadqiqot ham keng qo‘llaniladi. Bunda bir voqea yoki masalaga oid bir nechta manba o‘zaro solishtiriladi. Rasmiy hujjatdagi ma’lumot solnoma, tazkira, arxeologik topilma, numizmatik material yoki lingvistik

dalil bilan qiyoslanadi. Qiyosiy yondashuv tarixiy faktning ishonchlilik darajasini belgilashga yordam beradi. Bitta manbaga tayanib umumiy xulosa chiqarish tarixiy voqelikni biryoqlama talqin qilish xavfini kuchaytiradi [7; 9].

Moddiy manbalar asosidagi tadqiqotlar arxeologik topilmalar, mehnat qurollari, qurol-aslahalar, uy-ro‘zg‘or buyumlari, me’moriy inshootlar, qabristonlar, suv inshootlari va hunarmandchilik mahsulotlarini o‘rganishga qaratiladi. Bunday manbalar yozma yodgorliklar kam saqlangan yoki umuman mavjud bo‘lmagan davrlar tarixini tiklashda muhim o‘rin tutadi. Moddiy manbalar yozma ma’lumotlarni tasdiqlashi, to‘ldirishi yoki ayrim holatlarda ularga tuzatish kiritishi mumkin [10].

Etnografik va folklor manbalar asosidagi tadqiqotlar xalqning turmush tarzi, urf-odatlari, marosimlari, qabila va urug‘ nomlari, og‘zaki ijodi, afsona, rivoyat, doston va xalq xotirasida saqlangan tarixiy tasavvurlarni o‘rganadi. Bunday manbalar xalqning ijtimoiy hayoti, ma’naviy qarashlari, qadriyatlari va tarixiy xotirasini anglashda muhimdir. Ular badiiy va og‘zaki shaklda yetib kelgani uchun tarixiy fakt sifatida ishlatilganda ehtiyotkorlik, qiyosiy tahlil va kontekstual yondashuv talab qilinadi.

Lingvistik manbalar asosidagi tadqiqotlar tarixiy atamalar, joy nomlari, qabila nomlari, mansab nomlari, soliq va huquqiy tushunchalarni tahlil qiladi. Xiroj, ushr, zakot, suyurg‘ol, vaqfnoma, yorliq, mirob, qozi, cherik kabi atamalar o‘z davrining ijtimoiy-siyosiy va iqtisodiy hayoti haqida muhim ma’lumot beradi. Atamalarning kelib chiqishi, qo‘llanish doirasi va tarixiy o‘zgarishini o‘rganish manbashunoslik tadqiqotlarining alohida yo‘nalishi sifatida qaraladi.

Tasviriy manbalar asosidagi tadqiqotlar miniatyura, devoriy rasm, muhr, tamg‘a, gerb, kitob bezagi va boshqa vizual materiallarni o‘rganadi. Miniatyuralarda kiyim-kechak, qurol-yarog‘, mehnat qurollari, me’moriy inshootlar, saroy hayoti, hunarmandchilik va marosimlar aks etishi mumkin. Tasviriy manbalar badiiylik xususiyatiga ega bo‘lsa-da, moddiy madaniyat, san’at tarixi va kundalik hayot tarixini o‘rganishda yordamchi dalil bo‘lib xizmat qiladi.

Zamonaviy manbashunoslikda raqamli manbalar bilan ishlash ham alohida tadqiqot turi sifatida shakllanmoqda. Elektron arxivlar, raqamlashtirilgan qo‘lyozmalar, onlayn kataloglar, foto va video materiallar, audioyozuvlar, internet sahifalari va ma’lumotlar bazalari tarixiy tadqiqot uchun yangi imkoniyatlar yaratmoqda. Biroq elektron manbalar ham tanqidiy tekshiruvdan o‘tkazilishi kerak. Ularning kelib chiqishi, muallifi, yaratilgan vaqti, tahrirlangan yoki tahrirlanmaganligi, saqlanish shakli va ishonchlilik darajasi aniqlanmasdan turib, ilmiy dalil sifatida foydalanish to‘g‘ri bo‘lmaydi.

Manbashunoslikda ilmiy tadqiqotlarning barcha turlari bir-biri bilan bog‘liq. Nazariy manbashunoslik tadqiqot mezonlarini belgilaydi, amaliy manbashunoslik aniq manbalar bilan ishlaydi, arxeografiya ularni topadi va tavsiflaydi, paleografiya yozuv va kitobat belgilarini aniqlaydi, diplomatika rasmiy hujjatlarning huquqiy shaklini tekshiradi, matnshunoslik matnni tiklaydi, qiyosiy-tanqidiy tahlil esa tarixiy faktning ishonchlilik darajasini belgilaydi. Shu jihatdan manbashunoslik tarixiy tadqiqotning asosiy metodologik tayanchi hisoblanadi.

Xulosa Manbashunoslikda ilmiy tadqiqotlarning turlari tarixiy manbani har tomonlama o‘rganishga xizmat qiluvchi murakkab ilmiy tizimni tashkil etadi. Bu tizim nazariy, amaliy, arxeografik, paleografik, diplomatik, matnshunoslik, qiyosiy-tanqidiy, lingvistik, etnografik va zamonaviy raqamli tadqiqot yo‘nalishlarini o‘z ichiga oladi. Har bir yo‘nalish tarixiy manbaning alohida jihatini ochib beradi.

Nazariy manbashunoslik tarixiy manbaning mohiyati, tasnifi va ilmiy tahlil mezonlarini ishlab chiqadi. Amaliy manbashunoslik aniq manbani izlash, tavsiflash, o‘rganish va ilmiy muomalaga kiritish bilan shug‘ullanadi. Arxeografiya, paleografiya, diplomatika va matnshunoslik kabi yo‘nalishlar manbaning tashqi belgisi, huquqiy shakli, yozuv xususiyati va matn tarkibini aniqlashga yordam beradi.

Tarixiy tadqiqotda birgina manbaga tayanish yetarli emas. Yozma manbalar, rasmiy hujjatlar, arxeologik topilmalar, etnografik materiallar, lingvistik dalillar, folklor namunalari va tasviriy manbalar qiyosiy o‘rganilganda ilmiy xulosalar aniqroq va ishonchliroq bo‘ladi. Manbashunoslikning asosiy vazifasi tarixiy faktni manbalar majmuasi asosida xolis baholashdan iborat.

Manbashunoslik tarixchiga manbani topish, o‘qish, tavsiflash, tekshirish, qiyoslash va baholash madaniyatini beradi. Tarixiy voqelikni xolis yoritish, o‘tmish haqidagi biryoqlama talqinlardan qochish va ilmiy asoslangan xulosaga kelish aynan manbashunoslik ko‘nikmalariga bog‘liq. Shu sababli manbashunoslik tarix fanining asosiy tayanch yo‘nalishlaridan biri hisoblanadi.

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NEUSTOYKA - FUQAROLIK HUQUQIDA MAJBURIYATNI BAJARILISHINI TA`MINLASH USULI SIFATIDA

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Yurisprudensiya:biznes huquqi 4-bosqich yo‘nalishi talabasi

Annotatsiya: Ushbu ishda majburiyatlarning bajarilishini ta’minlash instituti bilan bog‘liq qonunchilikda nazarda tutilgan asosiy normalar tahlil etilgan. Xususan majburiyatlarni bajarilishini ta’minlash usullaridan biri sifatida neustoykaning fuqarolik qonunchiligidagi o‘rni huquqiy tabiati va qo‘llanish tartibi o‘rganilgan. Shuningdek, neustoykaga oid normalarning amaliy ahamiyati va ularning majburiyat munosabatlaridagi roli yoritib berilgan.

**Kalit so`zlar:** majburiyat, majburiyatni bajarishni ta`minlash, neustoyka, jarima, penya.

Аннотация: В данной работе проанализированы основные нормы, предусмотренные законодательством в отношении института обеспечения исполнения обязательств. В частности, изучены правовая природа, место в гражданском законодательстве и порядок применения неустойки как одного из способов обеспечения исполнения обязательств. Также раскрыты практическая значимость норм о неустойке и их роль в обязательственных отношениях.

Ключевые слова: обязательство, обеспечение исполнения обязательств, неустойка, штраф, пеня.

Annotation: This work analyzes the key norms provided in legislation related to the institution of ensuring the performance of obligations. In particular, the role of a liquidated damage in civil legislation as one of the methods of ensuring the performance of obligations, its legal nature, and the procedure for its application have been studied. Furthermore, the practical significance of the norms concerning the liquidated damage and their role in obligation relations have been elucidated.

Keywords: obligation, securing the performance of obligations, liquidated damages, late payment penalty, fine.

Majburiyatlarning bajarilishini ta'minlashda neustoyka eng keng qo'llaniladigan usullardan biri hisoblanadi. Agar qarzdor o‘z zimmasidagi majburiyatlarni bajarmasa yoki ularni lozim darajada ado etmasa, kreditorga ma’lum miqdorda pul to‘lashiga to‘g‘ri keladi. Ushbu to‘lov neustoyka deb ataladi va u qonunchilik yoxud o‘zaro tuzilgan shartnoma shartlari bilan belgilab qo‘yiladi. Bundan tashqari, kreditor neustoykani talab qilishda o'ziga etkazilgan zararni isbotlash majburiyatidan ozod etilgan.

Asosiy majburiyat buzilgandan so‘ng neustoyka mulkiy javobgarlik shakli sifatida namoyon bo‘ladi. Neustoykani ta’minlovchi va javobgalik o‘rtasidagi nisbat shu bilan izohlanadiki, birinchidan ta’minlovchi funksiya qarzdorni majburiyatni bajarishga undaydi, ikkinchidan agar tegishli majburiyat bajarilmasa yoki lozim darjada bajarilmasa unga nisbatan javobgarlik chorasini majburiy qo‘llash taqozo etadi. Boshqacha qilib aytganda, qarzdorni o‘z majburiyatini bajarishi uchun oqilona harakatlanishini rag‘batlantiradi va agar u o‘z zimmasiga olgan majburiyatni bajarmasa, javobgarlik xavfi mavjud ekanligi haqida ogohlantiradi. Neustoyka bir holatda majburiyatni qarzdor tomonidan buzilmasligini kafolatlasa, ikkinchi holatda esa u javobgarlik chorasi sifatida namoyon bo‘ladi. Neustoykaning majburiyat munosabatlarida bunday ikki xilda namoyon bo‘lishi uning real va oqilonda asosda majburiyatlar bajarilishini ta’minlash vositasi sifatida xizmat qilishidan dalolat beradi[1].

Neustoyka bilan faqat haqiqiy talab bilan ta’minlanadi. Agar qarzdor majburiyat bajarilmaganligi yoki lozim darajada bajarilmaganligi uchun javobgar bo‘lmasa, kreditor neustoykani to‘lashni talab qilishga haqli emas[2].

Amaldagi qonunchilikka muvofiq, neustoyka yuridik va jismoniy shaxslar o'rtasida mol-mulkni topshirish, ish bajarish hamda xizmat ko'rsatish kabi majburiyatlarda keng qo'llaniladi.

Neustoyka bir tomondan majburiyatlarning bajarilishini ta'minlovchi muhim vosita sifatida, ikkinchi tomondan esa mulkiy javobgarlik chorasi sifatida namoyon bo'ladi. Uning o'ziga xos xususiyati shundaki, asosiy majburiyat buzilganda haqiqiy zarar yetkazilgan yoki yetkazilmaganligidan qat'i nazar undirilishi mumkin. Shu sababli ham kreditor neustoykani talab qilishda o'ziga etkazilgan zararni alohida isbotlash zaruriyatidan xalos etilgan.

Neustoykaning o‘ziga xosligi shundaki, u majburiyatlar ijrosini kafolatlashda ikki holatda ham qo‘llanilishi mumkin: birinchidan, qarzdorning harakati tufayli

[1] “Majburiyat huquqi” darslik. O.Oqyulov va mualliflar jamoasi. TDYU nashriyoti 2020-yil. 62-62-betlar.
[2] Fuqarolik kodeksi 1-qism. Qonunchilik milliy bazasi 30.12.2025-y., 03/25/1109/1241-son.

kreditorga moddiy zarar yetmagan bo‘lsa-da to‘lanadi; ikkinchidan, tadbirkorlik munosabatlarida, hatto majburiyatni buzgan tarafda bevosita ayb bo‘lmagan taqdirda ham undirilishi mumkin.

Neustoyka majburiyatning lozim darajada bajarilishini ta’minlash jarayonida operativ vosita hisoblanadi, undan huquqbuzarlikka yo‘l qo‘yilgan bo‘lishi zahotiyoq va buning natijasida yuz berishi mumkin bo‘lgan salbiy oqibatlarni kutmasdan turib foydalanish mumkin[3].

Neustoykani qo'llashning asosiy sharti majburiyatning buzilishi, ya'ni huquqiy hujjatlar talablari yoki ish muomalasi odatlariga rioya etilmasligidir. Tadbirkorlik faoliyatidan farqli o'laroq, umumiy hollarda neustoykani tatbiq etish uchun qarzdorning aybi ham zaruriy shart sifatida e'tirof etiladi. Shundan kelib chiqib aytish mumkinki, neustoykani undirish uchun qonun doirasida faqat ikki asosiy element - majburiyatning buzilishi va qarzdorning aybi - mavjud bo'lishi kifoya qiladi. Mazkur holatda huquqbuzarlikning klassik tarkibi to‘liq bo‘lishi, ya’ni g‘ayriqonuniy harakat, zarar miqdori, sabab-oqibat aloqasi hamda aybdorlikning baravar mavjudligi shart qilib qo‘yilmaydi.

Neustoyka jarimaviy sanksiya sifatida qonun yoki shartnoma orqali oldindan belgilanadi va bajarilmagan yoxud lozim darajada bajarilmagan majburiyat summasiga nisbatan qat'iy miqdorda yoki foiz ko'rinishida hisob-kitob qilinadi. Jumladan, sifat talablariga javob bermagan tovar yetkazib berilgan taqdirda neustoyka mazkur tovar qiymatidan kelib chiqib foiz asosida aniqlanadi va pul shaklida undiriladi. Shuningdek, neustoyka majburiyat kechiktirib bajarilgan holatlarda ham qo'llaniladi: xususan, pudrat shartnomasida ishning boshlang'ich, oraliq va yakuniy muddatlari buzilganligi uchun neustoyka undirish nazarda tutilishi mumkin. Neustoykani undirish belgilangan muddatlar doirasida yoki muddat cheklanmagan holda amalga oshirilishi qonun hujjatlarida alohida tartibga solingan.

Neustoyka qonuniy va shartnomaviy turlarga bo‘linadi. Bunday bo‘linish undiriladigan neustoykaning miqdori va uni qo‘llash shartlarini belgilashga ta’sir qiladi. Fuqarolik kodeksining 263-moddasida neustoyka to‘lash taraflarning kelishuvida nazarda tutuilgan yoli tutilmaganligidan qat’iy nazar, kreditor qonunda belgilangan neustoyka (qonuniy neustoyka)ni to‘lashni talab qilishga haqliligi hamda qonuniy neustoykaning miqdori qonun bilan ta’qiqlangan bo‘lmasa taraflarning kelishuvi bilan ko‘paytirilishi mumkinligi qayd etilgan. Agar to‘lanishi lozim bo‘lgan

[3] Иоффе О.С. Обязательственное право. М. г.1975.166-бет.

neustoyka kreditorning majburiyatlarini buzish oqibatlariga nomutanosibligi yaqqol ko‘rinib turgan bo‘lsa, sud neustoyka kamaytirishga haqli[4].

O'zbekiston Respublikasi Oliy Xo'jalik sudi Plenumining 2007-yil 15-iyundagi 163-sonli qarorining 4-bandida belgilanishicha, sud neustoyka miqdorini kamaytirish huquqiga ega. Bunda sud majburiyatlarning qay darajada bajarilganligini, tomonlarning moliyaviy holatini, shuningdek kreditorning qonuniy manfaatlarini har tomonlama inobatga olishi zarur. Sudlar neustoykani belgilayotganda, uning eng kam miqdori majburiyat bajarilgan kundagi bank foiz stavkasidan past bo‘lmasligini ta’minlashi lozim. Bunda stavka kreditorni qayerda joylashganiga qarab belgilanadi va bu qoida majburiyat qisman yoki to‘liq bajarilgan holatlarning barchasiga taalluqlidir.

Shartnomaviy neustoyka qonuniy neustoyka bilan ta’minlanmagan majburiyatlarda yoki buzilganligi uchun qonun bilan sanksiya belgilanmagan alohida majburiyatlaning bajarilishini ta’minlash uchun qo‘llaniladi. Shartnomaviy neustoykaning miqdori taraflarning kelishuvi bilan yozma shaklda belgilanadi[5].

O'zbekiston Respublikasi Fuqarolik kodeksining 261-moddasi 1-qismiga muvofiq, neustoyka ikki mustaqil shaklda - jarima va penya ko'rinishida namoyon bo'ladi.

Jarima, qoida tariqasida, bir martalik undiriladigan qat'iy pul summasi sifatida belgilanadi. Shu bilan birga, u oldindan muayyan qiymatga nisbatan hisoblangan foiz tarzida ham ifodalanishi mumkin. Jumladan, muddatida bajarilmagan ish qiymatining besh foizi miqdoridagi jarima bunga yaqqol misol bo'la oladi.

Penya esa majburiyatning kechiktirib bajarilishi holatlariga nisbatan qo'llaniladi va kechiktirilgan har bir kun uchun muayyan muddat davomida yoki kechikishning butun davri mobaynida hisoblab boriladi. U odatda bajarilmagan majburiyat summasiga nisbatan foiz ko'rinishida belgilanadi. Masalan, muddatida amalga oshirilmagan ishning qiymati majburiyat to'liq bajarilgunga qadar har bir kechiktirilgan kun uchun besh foiz miqdorida hisoblanishi mumkin.

Yuridik fanlar doktori Ye.S.Trezubovning ilmiy nuqtai nazariga ko'ra, penyani majburiyatlarni ta'minlash vositasi sifatida tavsiflab bo'lmaydi, zero fuqarolik munosabatlarida uning yagona funksional oqibati jarimaviy ta'sir ko'rsatishdan iborat bo'lib, u mustaqil javobgarlik chorasi sifatida e'tirof etilmaydi. Biroq iqtisodiy munosabatlar doirasida penya qarzdor xatti-harakatini tartibga soluvchi rag'batlantiruvchi mexanizm vazifasini bajaradi: qarzdor majburiyatlarni bajarmaslik

[4] Fuqarolik kodeksi 1-qism. Qonunchilik milliy bazasi 30.12.2025-y., 03/25/1109/1241-son.
[5] “Majburiyat huquqi” X.Rahmonqulov. TDYU. 2005-yil. 336 bet.

xavfini baholash jarayonida kreditor talablarining keyinchalik ortib borishi ehtimolini inobatga olishga majbur bo'ladi.

Biroq penya uchun hech qanday kafolatlovchi funksiyani bajarmaydi hamda u kreditorga hech qanday mulkiy ustuvorlik belgilab bermaydi. Penyaning milliy modelga xos bo‘lgan yagona jixat protsessual jihatdan soddalashtirilganligida, chunki kreditor penyani undirishda qarzdor yetkazgan zarar miqdorini isbotlash majburiyatiga ega emas[6].

Xulosa

Mazkur tadqiqot doirasida fuqarolik huquqida majburiyatlarni bajarilishini ta'minlash usullaridan biri sifatida neustoykaning huquqiy tabiati, qo'llanish tartibi va amaliy ahamiyati atroflicha o'rganildi. Amalga oshirilgan tahlil asosida quyidagi xulosalar shakllandi.

Birinchidan, neustoyka majburiyatni ta'minlash tizimida ikki tomonlama funksiyani amalga oshiradi: u, bir tomondan, qarzdorni o'z majburiyatini o'z vaqtida bajarishga undovchi profilaktik vosita bo'lib xizmat qilsa, ikkinchi tomondan, majburiyat buzilgan taqdirda kreditorning manfaatlarini qoplashga qaratilgan mulkiy javobgarlik chorasi sifatida namoyon bo'ladi. Ushbu ikki xillik neustoykani majburiyat munosabatlarida samarali va moslashuvchan instrument sifatida ajratib turadi.

Ikkinchidan, O'zbekiston Respublikasi Fuqarolik kodeksining 260-263-moddalariga asosan, neustoyka manbaiga ko'ra qonuniy va shartnomaviy turlarga bo'linadi. Qonuniy neustoyka qonun hujjatlari bilan bevosita belgilanib, tomonlarning kelishuvi mavjud bo'lmasa ham tadbiq etilishi mumkin. Shartnomaviy neustoyka esa taraflarning yozma kelishuviga tayangan holda aniqlanadi va odatda qonuniy neustoyka bilan qoplanmagan majburiyatlarni tartibga solishda qo'llaniladi.

Uchinchidan, shakl jihatidan neustoyka jarima va penya ko'rinishida ifodalanadi. Jarima bir martalik, qat'iy miqdordagi to'lov bo'lsa, penya kechikishning har bir kuniga qarab hisoblab boriluvchi davomiy sanksiya hisoblanadi. Ushbu ikki shakl bir-birini to'ldirgan holda majburiyatlarning turli xildagi buzilishlariga nisbatan qo'llaniladi.

To'rtinchidan, neustoykaning muhim amaliy afzalligi shundaki, kreditor uni talab qilishda o'ziga etkazilgan zararning aniq miqdorini isbotlash majburiyatidan ozod etilgan. Bu esa neustoykani zararga nisbatan tezkor va protsessual jihatdan soddalashtirilgan huquq himoyasi vositasiga aylantiradi. Shu bilan birga, neustoyka miqdori majburiyat buzilishining oqibatlariga yaqqol nomutanosib bo'lgan hollarda

[6] https://www.revistainclusiones.org/index.php/inclu/article/view/1357/1289.
Rossiya Federatsiyasining zamonaviy fuqarolik huquqida majburiyatlarni ta'minlash vositalari tushunchasi

sud uni kamaytirish huquqiga ega bo'lib, bu esa adolat va mutanosiblik tamoyillariga rioya etilishini ta'minlaydi.

Beshinchidan, tadbirkorlik munosabatlarida neustoyka umumiy qoidalardan farqli o'laroq, hatto majburiyatni buzgan tarafning bevosita aybi bo'lmagan taqdirda ham undirilishi mumkin. Bu esa tijorat munosabatlarida huquqiy xavfsizlik va bashorat qilish imkoniyatini mustahkamlaydi.

Yuqoridagilarni umumlashtirgan holda shuni ta'kidlash joizki, neustoyka fuqarolik huquqida majburiyatlarni ta'minlashning eng qulay, operativ va keng qo'llaniladigan usullaridan biri bo'lib, u huquqiy munosabatlar barqarorligini ta'minlashga, tomonlar o'rtasida intizomni mustahkamlashga hamda buzilgan huquqlarni tiklashga muhim hissa qo'shadi. Mazkur institutni qonunchilikda yanada takomillashtirish va sud amaliyotida izchil qo'llash davlat va fuqarolik munosabatlarida ishonch muhitini shakllantirishda asosiy omillardan biri bo'lib xizmat qiladi.

Foydalanilgan adabiyotlar ro`yxati

1.1 Fuqarolik kodeksi 1-qism. Qonunchilik milliy bazasi 30.12.2025-y., 03/25/1109/1241-son.

Darslik va qo`shimcha adabiyotlar:

2.1 “Majburiyat huquqi” X.Rahmonqulov. TDYU. 2005-yil. 336 bet.

2.2 Иоффе О.С. Обязательственное право. М. г.1975.166-bet.

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Elektron ta`lim resurslari:

3.1 www.lex.uz

3.2 www.google.com

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IMKONIYATI CHEKLANGAN BEMORLARNING PSIXOLOGIK XUSUSIYATLARI

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Annotatsiya
Mazkur maqolada imkoniyati cheklangan bemorlarning psixologik xususiyatlari, ularning emotsional holati, ijtimoiy moslashuvi hamda ruhiy kechinmalari zamonaviy psixologiya va tibbiyot nuqtai nazaridan tahlil qilinadi. Bugungi kunda nogironligi bo‘lgan shaxslarning nafaqat jismoniy, balki ruhiy salomatligini qo‘llab-quvvatlash ham tibbiyot va psixologiyaning dolzarb yo‘nalishlaridan biri hisoblanadi. Tadqiqot davomida imkoniyati cheklangan bemorlarda uchraydigan xavotir, depressiv holatlar, stress, ijtimoiy izolyatsiya va o‘zini jamiyatdan chetda his qilish kabi psixologik muammolar ilmiy manbalar asosida yoritilgan. Shuningdek, bunday bemorlarga psixologik yordam ko‘rsatishning ahamiyati, reabilitatsiya jarayonida psixologik qo‘llab-quvvatlash va jamiyatning ijobiy munosabatini shakllantirish masalalari ham keng tahlil qilingan.

Kalit so‘zlar: imkoniyati cheklangan shaxslar, psixologik holat, stress, depressiya, reabilitatsiya, emotsional holat, ijtimoiy moslashuv, psixologik yordam.

Kirish

Bugungi kunda inson salomatligini saqlash va uning hayot sifatini yaxshilash zamonaviy tibbiyot hamda psixologiyaning eng muhim vazifalaridan biri hisoblanadi. Ayniqsa, imkoniyati cheklangan bemorlarning jismoniy va ruhiy holatini qo‘llab-quvvatlash global miqyosdagi dolzarb tibbiy-ijtimoiy muammolardan biri sifatida qaralmoqda. Jahon sog‘liqni saqlash tashkiloti ma’lumotlariga ko‘ra, dunyo aholisining katta qismi turli darajadagi jismoniy yoki ruhiy imkoniyat cheklanishlari bilan yashaydi va bu holat insonning nafaqat fiziologik faoliyatiga, balki uning psixologik holati, emotsional kechinmalari, ijtimoiy faolligi hamda jamiyatga moslashuviga ham sezilarli ta’sir ko‘rsatadi. Shu sababli imkoniyati cheklangan

shaxslarni kompleks qo‘llab-quvvatlash masalasi bugungi zamonaviy tibbiyot va psixologiya fanining ustuvor yo‘nalishlaridan biriga aylanmoqda.

Imkoniyati cheklangan bemorlarning hayoti ko‘pincha jismoniy qiyinchiliklar bilan bir qatorda kuchli psixoemotsional bosimlar bilan ham kechadi. Inson organizmidagi jismoniy nuqson yoki funksional cheklanish nafaqat tananing faoliyatiga, balki shaxsning ichki ruhiy dunyosiga ham ta’sir qiladi. Ayniqsa, nogironlikning orttirilgan shakllari, travmatik jarohatlar, surunkali kasalliklar yoki tug‘ma nuqsonlar insonning o‘zini baholashi, kelajakka bo‘lgan ishonchi va ijtimoiy faolligida keskin o‘zgarishlarni yuzaga keltirishi mumkin. Ko‘plab bemorlarda xavotir, tushkunlik, o‘zini jamiyatdan chetda his qilish, emotsional beqarorlik va ruhiy zo‘riqish kabi psixologik holatlar kuzatiladi.

Zamonaviy psixologiya fanida imkoniyati cheklangan bemorlarning ruhiy holatini o‘rganish alohida ahamiyat kasb etadi. Chunki insonning psixologik holati uning davolanish jarayoni, reabilitatsiya samaradorligi va jamiyatga qayta moslashuviga bevosita ta’sir qiladi. Tadqiqotlar shuni ko‘rsatadiki, ijobiy psixologik qo‘llab-quvvatlash olgan bemorlarning sog‘ayish jarayoni tezroq va samaraliroq kechadi. Aksincha, doimiy stress, ijtimoiy bosim va ruhiy tushkunlik bemorning umumiy salomatligiga salbiy ta’sir ko‘rsatib, ayrim hollarda kasallikning og‘irlashishiga ham sabab bo‘lishi mumkin.

Imkoniyati cheklangan bemorlarning psixologik xususiyatlari ularning yoshi, kasallik turi, ijtimoiy muhiti, oilaviy qo‘llab-quvvatlanishi va shaxsiy xarakteriga qarab turlicha namoyon bo‘ladi. Ayniqsa, bolalar va o‘smirlarda nogironlik holati psixik rivojlanish jarayoniga sezilarli ta’sir ko‘rsatadi. Ular ko‘pincha tengdoshlari bilan muloqot qilishda qiyinchilikka duch keladi, o‘zini boshqalardan farqli deb his qiladi va psixologik komplekslar shakllanish xavfi ortadi. Katta yoshdagi bemorlarda esa mehnat faoliyatining cheklanishi, mustaqillikning kamayishi va jamiyatdagi ayrim stereotiplar ruhiy tushkunlik va xavotir holatlariga olib kelishi mumkin.

So‘nggi yillarda dunyo miqyosida inklyuziv jamiyatni shakllantirish, nogironligi bo‘lgan shaxslarning huquqlarini himoya qilish va ularni ijtimoiy qo‘llab-quvvatlashga qaratilgan keng ko‘lamli islohotlar amalga oshirilmoqda. O‘zbekistonda ham imkoniyati cheklangan shaxslarni qo‘llab-quvvatlash, ularning ta’lim olishi, mehnat qilishi va jamiyat hayotida faol ishtirok etishi uchun zarur sharoitlar yaratishga katta e’tibor qaratilmoqda. Prezidentimiz tomonidan nogironligi bo‘lgan shaxslarning huquqlarini himoya qilish va inklyuziv ta’limni rivojlantirishga oid qator qonun va davlat dasturlarining qabul qilinishi ushbu yo‘nalishdagi muhim qadamlar hisoblanadi.

Shu bilan birga, imkoniyati cheklangan bemorlar bilan ishlashda faqat tibbiy yordamning o‘zi yetarli emasligi tobora yaqqol namoyon bo‘lmoqda. Zamonaviy reabilitatsiya tizimida psixologik yordam, emotsional qo‘llab-quvvatlash va ijtimoiy moslashtirish ishlari ham muhim o‘rin egallaydi. Ayniqsa, psixoterapiya, motivatsion suhbatlar, art-terapiya, guruhli psixologik mashg‘ulotlar va oilaviy psixologik yordam bemorlarning ruhiy tiklanishida katta ahamiyat kasb etadi.

Imkoniyati cheklangan bemorlarga nisbatan jamiyatning munosabati ham ularning psixologik holatiga kuchli ta’sir qiladi. Ijobiy ijtimoiy muhit, mehr-oqibat, hurmat va teng imkoniyatlarning mavjudligi bemorning o‘ziga bo‘lgan ishonchini oshiradi va uning jamiyatga moslashuvini yengillashtiradi. Aksincha, kamsitish, salbiy stereotiplar va ijtimoiy cheklovlar ruhiy travmalarni kuchaytirishi mumkin. Shu sababli bugungi kunda inklyuziv jamiyatni shakllantirish nafaqat ijtimoiy, balki psixologik va tibbiy jihatdan ham muhim masala hisoblanadi.

Mazkur maqolada imkoniyati cheklangan bemorlarning psixologik xususiyatlari, ularda uchraydigan emotsional va ruhiy holatlar, ijtimoiy moslashuv muammolari hamda zamonaviy psixologik yordam va reabilitatsiya usullarining ahamiyati ilmiy manbalar asosida keng yoritiladi. Shuningdek, imkoniyati cheklangan shaxslarning ruhiy salomatligini qo‘llab-quvvatlash va ularning hayot sifatini yaxshilashga qaratilgan zamonaviy yondashuvlar tahlil qilinadi.

Materiallar va usullar

Mazkur tadqiqot imkoniyati cheklangan bemorlarning psixologik xususiyatlarini chuqur o‘rganish, ularning ruhiy holati va ijtimoiy moslashuviga ta’sir qiluvchi omillarni tahlil qilish maqsadida zamonaviy psixologik va tibbiy ilmiy manbalar asosida olib borildi. Tadqiqot davomida nogironligi bo‘lgan shaxslarning psixoemotsional holati, ularda uchraydigan ruhiy kechinmalar, stress va depressiv holatlar, jamiyatga moslashish darajasi hamda psixologik qo‘llab-quvvatlashning ahamiyatiga oid ilmiy ma’lumotlar kompleks ravishda o‘rganildi. Tadqiqotning metodologik asosini zamonaviy tibbiy psixologiya, reabilitatsion psixologiya va biopsixososial yondashuvga oid ilmiy qarashlar tashkil etdi.

Ish jarayonida mahalliy va xorijiy olimlarning imkoniyati cheklangan shaxslar psixologiyasiga bag‘ishlangan ilmiy maqolalari, monografiyalari, darsliklari, xalqaro ilmiy jurnallar hamda Jahon sog‘liqni saqlash tashkiloti ma’lumotlari tahlil qilindi. Shuningdek, nogironligi bo‘lgan bemorlarning ruhiy holatini o‘rganishga oid zamonaviy psixodiagnostik va klinik tadqiqot natijalari ham ilmiy jihatdan umumlashtirildi. Tadqiqot davomida ayniqsa imkoniyati cheklangan bemorlarda

uchraydigan xavotir, tushkunlik, emotsional beqarorlik, ijtimoiy izolyatsiya va o‘ziga bo‘lgan ishonchning pasayishi kabi psixologik holatlarga alohida e’tibor qaratildi.

Mazkur tadqiqotda ilmiy bilishning qiyosiy tahlil, kuzatish, ilmiy-adabiy manbalarni o‘rganish, psixologik interpretatsiya va umumlashtirish usullaridan foydalanildi. Imkoniyati cheklangan bemorlarning ruhiy holatini tahlil qilishda biopsixososial yondashuv asosiy metodologik yo‘nalish sifatida tanlandi. Chunki zamonaviy tibbiyotda nogironlik faqat jismoniy nuqson sifatida emas, balki insonning ruhiy va ijtimoiy hayoti bilan chambarchas bog‘liq murakkab holat sifatida qaraladi. Shu sababli tadqiqot davomida bemorlarning psixologik xususiyatlari ularning ijtimoiy muhiti, oilaviy qo‘llab-quvvatlanishi, emotsional holati va hayot sifati bilan uzviy bog‘liq holda tahlil qilindi.

Tadqiqot davomida imkoniyati cheklangan bemorlarning psixologik moslashuviga ta’sir qiluvchi omillar ham keng o‘rganildi. Xususan, surunkali kasalliklar, travmatik jarohatlar, tug‘ma nuqsonlar, harakat faoliyatining cheklanishi va uzoq muddatli davolanish jarayonining inson ruhiyatiga ta’siri ilmiy manbalar asosida tahlil qilindi. Shu bilan birga, bemorlarning oiladagi va jamiyatdagi o‘rni, ularga nisbatan ijtimoiy munosabat va stereotiplarning psixologik holatga ta’siri ham o‘rganildi.

Mazkur tadqiqotda psixologik reabilitatsiya usullarining samaradorligini baholashga ham alohida e’tibor qaratildi. Psixoterapiya, motivatsion suhbatlar, art-terapiya, guruhli mashg‘ulotlar, emotsional qo‘llab-quvvatlash va ijtimoiy moslashtirish dasturlarining imkoniyati cheklangan bemorlar ruhiy holatiga ta’siri ilmiy jihatdan tahlil qilindi. Tadqiqot davomida psixologik yordamning bemorlarning hayot sifati, ijtimoiy faolligi va ruhiy barqarorligini oshirishdagi ahamiyati asoslab berildi.

Shuningdek, O‘zbekistonda imkoniyati cheklangan shaxslarni qo‘llab-quvvatlashga qaratilgan davlat siyosati, inklyuziv ta’lim tizimi, reabilitatsiya markazlari faoliyati va sog‘liqni saqlash tizimida amalga oshirilayotgan islohotlarga oid ma’lumotlar ham tahlil qilindi. Bu esa tadqiqot natijalarini mamlakatimiz sharoitiga mos ravishda ilmiy-amaliy jihatdan yoritish imkonini berdi.

Tadqiqot davomida olingan ilmiy ma’lumotlar tizimli ravishda umumlashtirildi va imkoniyati cheklangan bemorlarning psixologik xususiyatlarini chuqurroq tushunishga xizmat qiluvchi ilmiy xulosalar shakllantirildi. Mazkur metodologik yondashuvlar tadqiqotning ilmiy asoslanganligi, izchilligi va amaliy ahamiyatini ta’minlashga xizmat qildi.

Natijalar

Mazkur tadqiqot davomida imkoniyati cheklangan bemorlarning psixologik holati, emotsional kechinmalari va ijtimoiy moslashuv jarayonlari chuqur tahlil qilinib, ularning ruhiy salomatligiga ta’sir qiluvchi asosiy omillar aniqlandi. Tadqiqot natijalari shuni ko‘rsatdiki, jismoniy imkoniyatlarning cheklanishi insonning nafaqat fiziologik faoliyatiga, balki uning ruhiy dunyosi, emotsional barqarorligi va ijtimoiy faolligiga ham sezilarli darajada ta’sir qiladi. Ayniqsa, surunkali kasalliklar, travmatik jarohatlar yoki tug‘ma nuqsonlar natijasida yuzaga kelgan nogironlik holatlarida bemorlarda kuchli psixoemotsional o‘zgarishlar kuzatilishi aniqlandi.

Tadqiqot davomida imkoniyati cheklangan bemorlarning aksariyatida xavotir, emotsional zo‘riqish va tushkunlik holatlari uchrashi kuzatildi. Ko‘plab bemorlarda kasallik yoki jismoniy nuqson yuzaga kelgan dastlabki davrlarda ruhiy inkor qilish, qo‘rquv, ichki tushkunlik va kelajakka nisbatan ishonchsizlik hissi paydo bo‘lishi qayd etildi. Ayniqsa, nogironlikning orttirilgan shakllarida insonning oldingi hayot tarzidan keskin uzoqlashishi, mustaqil harakatlanish imkoniyatining kamayishi va o‘zining jamiyatdagi rolini yo‘qotgandek his qilishi ruhiy travmalarni kuchaytirishi aniqlandi.

Natijalar shuni ko‘rsatdiki, imkoniyati cheklangan bemorlarda o‘ziga bo‘lgan ishonchning pasayishi eng ko‘p uchraydigan psixologik muammolardan biri hisoblanadi. Ayrim bemorlar o‘zini boshqalarga qaram yoki jamiyat uchun ortiqcha yuk sifatida his qilishi kuzatildi. Bu holat esa ijtimoiy faollikning kamayishi, odamlar bilan muloqotdan chekinish va ichki yolg‘izlik hissining kuchayishiga olib keladi. Tadqiqot davomida ayniqsa yosh bemorlarda psixologik moslashuv jarayoni murakkab kechishi va tengdoshlari bilan muloqot qilishda qiyinchiliklar yuzaga kelishi aniqlandi.

Tadqiqot natijalariga ko‘ra, imkoniyati cheklangan bemorlarning ruhiy holati ko‘p jihatdan oila va yaqinlarining munosabatiga bog‘liq ekanligi kuzatildi. Oilaviy qo‘llab-quvvatlash mavjud bo‘lgan bemorlarda stress va depressiv holatlar nisbatan kamroq uchrashi, ularning reabilitatsiya jarayoniga moslashuvi esa samaraliroq kechishi qayd etildi. Mehr-oqibat, ruhiy dalda va motivatsiya bemorlarda yashashga bo‘lgan qiziqish hamda ijobiy psixologik holatni saqlab qolishda muhim omillardan biri ekanligi aniqlandi.

Shuningdek, tadqiqot davomida jamiyatdagi stereotiplar va ayrim salbiy munosabatlarning imkoniyati cheklangan bemorlar ruhiyatiga kuchli ta’sir qilishi kuzatildi. Ayrim hollarda bemorlarning jamiyatdan ajralib qolishi, ish yoki ta’lim jarayonida cheklovlarga duch kelishi ularda ijtimoiy izolyatsiya va ruhiy tushkunlik holatlarini kuchaytirishi aniqlandi. Bu esa imkoniyati cheklangan shaxslarni jamiyatga

integratsiya qilish va inklyuziv muhit yaratishning naqadar muhim ekanligini ko‘rsatadi.

Natijalar psixologik yordam va reabilitatsiyaning bemorlar hayot sifatini yaxshilashdagi muhim o‘rnini ham tasdiqladi. Psixologik suhbatlar, motivatsion terapiya, guruhli mashg‘ulotlar, art-terapiya va ijtimoiy moslashtirish dasturlarida qatnashgan bemorlarda emotsional holatning yaxshilanishi, o‘ziga bo‘lgan ishonchning ortishi va ijtimoiy faollikning tiklanishi kuzatildi. Ayniqsa, muntazam psixologik qo‘llab-quvvatlash olgan bemorlarda depressiv holatlar va xavotir darajasining pasayishi aniqlandi.

Tadqiqot natijalari shuni ham ko‘rsatdiki, imkoniyati cheklangan bemorlarning ruhiy holatiga tibbiyot xodimlarining munosabati ham katta ta’sir ko‘rsatadi. Bemor bilan hurmat, empatiya va sabr asosida olib borilgan muloqot ularning ruhiy barqarorligini oshirishi va davolanishga bo‘lgan ishonchini kuchaytirishi qayd etildi. Aksincha, sovuqqon yoki befarq munosabat bemorlarning ruhiy tushkunligini yanada kuchaytirishi mumkinligi aniqlandi.

Mazkur tadqiqot davomida olingan natijalar imkoniyati cheklangan bemorlarga kompleks yondashuv zarurligini ko‘rsatdi. Ya’ni, bunday bemorlarga yordam ko‘rsatishda faqat jismoniy reabilitatsiya emas, balki psixologik qo‘llab-quvvatlash, ijtimoiy moslashtirish va emotsional yordam ham muhim ahamiyatga ega ekanligi ilmiy jihatdan asoslandi. Tadqiqot natijalari zamonaviy tibbiyotda imkoniyati cheklangan shaxslarning ruhiy salomatligini himoya qilish va ularning hayot sifatini yaxshilash bo‘yicha yangi yondashuvlarni rivojlantirish zarurligini yana bir bor tasdiqladi.

Muhokama

Imkoniyati cheklangan bemorlarning psixologik xususiyatlarini o‘rganish shuni ko‘rsatadiki, nogironlik inson hayotining barcha jabhalariga ta’sir qiluvchi murakkab biopsixososial holat hisoblanadi. Zamonaviy tibbiyotda bemorni faqat kasallik yoki jismoniy nuqson nuqtai nazaridan emas, balki uning ruhiy va ijtimoiy ehtiyojlari bilan birgalikda baholash zarurligi tobora dolzarb bo‘lib bormoqda.

Psixologik jihatdan imkoniyati cheklangan bemorlar ko‘pincha kuchli emotsional bosim ostida yashaydi. Ular o‘zining oldingi hayot tarzidan uzoqlashishi, mustaqillikning kamayishi va jamiyatdagi ayrim salbiy munosabatlar tufayli ruhiy qiyinchiliklarni boshdan kechiradi. Ayniqsa, surunkali nogironlik holatlarida uzoq davom etuvchi stress organizmning psixologik himoya mexanizmlarini susaytiradi.

Shu sababli zamonaviy reabilitatsiya jarayonida psixologik yordam majburiy komponent sifatida qaralishi kerak. Psixologik qo‘llab-quvvatlash bemorda motivatsiyani oshiradi, ijtimoiy moslashuvni yaxshilaydi va depressiv holatlar rivojlanishining oldini oladi.

Jamiyatning imkoniyati cheklangan shaxslarga nisbatan ijobiy munosabati ham muhim omil hisoblanadi. Inklyuziv ta’lim, ijtimoiy integratsiya va teng imkoniyatlarni yaratish bunday bemorlarning ruhiy holatini yaxshilashga xizmat qiladi.

Xulosa

Mazkur tadqiqot davomida imkoniyati cheklangan bemorlarning psixologik xususiyatlari, ularning ruhiy holati, emotsional kechinmalari va ijtimoiy moslashuv jarayonlari zamonaviy psixologiya hamda tibbiyot nuqtai nazaridan kompleks tarzda tahlil qilindi. Tadqiqot natijalari shuni ko‘rsatdiki, jismoniy imkoniyatlarning cheklanishi insonning nafaqat fiziologik faoliyatiga, balki uning ruhiy dunyosi, emotsional barqarorligi, ijtimoiy munosabatlari va hayotga bo‘lgan qarashlariga ham sezilarli ta’sir ko‘rsatadi. Ayniqsa, surunkali kasalliklar, travmatik jarohatlar yoki tug‘ma nuqsonlar natijasida yuzaga kelgan nogironlik holatlari bemorlarda chuqur psixoemotsional o‘zgarishlarni shakllantirishi ilmiy jihatdan asoslandi.

Tadqiqot davomida imkoniyati cheklangan bemorlarda xavotir, tushkunlik, stress, o‘ziga bo‘lgan ishonchning pasayishi, emotsional beqarorlik va ijtimoiy izolyatsiya kabi psixologik muammolar keng tarqalganligi aniqlandi. Ko‘plab bemorlarda jismoniy cheklanish tufayli hayot tarzining o‘zgarishi, mustaqillikning kamayishi va jamiyatdagi ayrim stereotiplar ruhiy bosimni yanada kuchaytirishi kuzatildi. Ayniqsa, yosh bemorlarda tengdoshlari bilan muloqot qilishdagi qiyinchiliklar, ichki komplekslar va kelajakka nisbatan xavotir hissi kuchliroq namoyon bo‘lishi qayd etildi.

Mazkur tadqiqot natijalari shuni ham ko‘rsatdiki, imkoniyati cheklangan bemorlarning ruhiy holati ularning oilaviy muhiti, yaqinlarining qo‘llab-quvvatlashi va jamiyatning munosabati bilan chambarchas bog‘liqdir. Mehr-oqibat, emotsional yordam va ijobiy motivatsiya mavjud bo‘lgan bemorlarda psixologik moslashuv jarayoni ancha yengil kechishi, reabilitatsiya samaradorligi esa yuqoriroq bo‘lishi kuzatildi. Aksincha, e’tiborsizlik, ijtimoiy cheklovlar yoki salbiy stereotiplar bemorlarning ruhiy tushkunligini yanada chuqurlashtirishi mumkinligi aniqlandi.

Tadqiqot davomida zamonaviy psixologik yordam va reabilitatsiya usullarining imkoniyati cheklangan bemorlar hayot sifatini yaxshilashdagi muhim o‘rni ham ilmiy jihatdan asoslandi. Psixologik suhbatlar, motivatsion terapiya, art-terapiya, guruhli

mashg‘ulotlar va ijtimoiy moslashtirish dasturlari bemorlarda emotsional barqarorlikni tiklash, o‘ziga bo‘lgan ishonchni oshirish hamda jamiyatga moslashuvni yaxshilashda samarali natijalar berishi kuzatildi. Ayniqsa, psixologik qo‘llab-quvvatlashning muntazam olib borilishi depressiv holatlar va xavotir darajasining kamayishiga ijobiy ta’sir ko‘rsatishi qayd etildi.

Shuningdek, tadqiqot natijalari imkoniyati cheklangan bemorlar bilan ishlashda tibbiyot xodimlari va psixologlarning professional yondashuvi katta ahamiyatga ega ekanligini ko‘rsatdi. Bemor bilan empatiya, sabr-toqat va hurmat asosida olib borilgan muloqot uning ruhiy holatini barqarorlashtirishi, davolanishga bo‘lgan ishonchini oshirishi va reabilitatsiya jarayonini samaraliroq qilishga yordam berishi aniqlandi. Zamonaviy tibbiyotda insonparvarlik tamoyillariga asoslangan biopsixososial yondashuv imkoniyati cheklangan shaxslarning ruhiy va jismoniy salomatligini tiklashda muhim metodologik asos bo‘lib xizmat qilishi yana bir bor tasdiqlandi.

Bugungi kunda dunyo miqyosida inklyuziv jamiyatni shakllantirish, nogironligi bo‘lgan shaxslarning huquqlarini himoya qilish va ularning jamiyat hayotida faol ishtirok etishini ta’minlashga katta e’tibor qaratilmoqda. O‘zbekistonda ham imkoniyati cheklangan shaxslarni qo‘llab-quvvatlash, inklyuziv ta’limni rivojlantirish, reabilitatsiya markazlari faoliyatini kengaytirish va ijtimoiy himoya tizimini takomillashtirish bo‘yicha amalga oshirilayotgan islohotlar ushbu yo‘nalishdagi muhim qadamlar hisoblanadi. Shu sababli imkoniyati cheklangan bemorlarning ruhiy salomatligini muhofaza qilish, ularga kompleks psixologik va ijtimoiy yordam ko‘rsatish zamonaviy sog‘liqni saqlash tizimining ustuvor vazifalaridan biri bo‘lib qolmoqda.

Xulosa qilib aytganda, imkoniyati cheklangan bemorlarning psixologik xususiyatlarini chuqur o‘rganish va ularga kompleks yondashuv asosida yordam ko‘rsatish ularning hayot sifatini yaxshilash, ruhiy barqarorligini mustahkamlash va jamiyatga muvaffaqiyatli moslashuvini ta’minlashda muhim ahamiyat kasb etadi. Zamonaviy tibbiyot va psixologiya fanining asosiy maqsadi nafaqat insonning jismoniy salomatligini tiklash, balki uning ruhiy farovonligi, ijtimoiy faolligi va insoniy qadr-qimmatini saqlab qolishga xizmat qilishdan iboratdir.

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METHODOLOGY OF TEACHING ENGLISH IN CONTEMPORARY CLASSROOMS

A practical approach to communicative, task-based, and learner-centered instruction

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Abstract

Teaching English today requires more than the presentation of grammar rules and vocabulary lists. In multilingual and mixed-ability classrooms, effective methodology must combine clear language input, meaningful interaction, purposeful practice, and sensitive assessment. This article discusses the main principles of modern English language teaching with particular attention to communicative language teaching, task-based learning, lexical development, scaffolding, and formative assessment. It argues that successful instruction depends not on one fixed method, but on the teacher's ability to select and adapt techniques in response to learners' needs, goals, and proficiency levels. The article also highlights the role of motivation, feedback, classroom atmosphere, and reflective practice in sustaining progress. The discussion concludes that an effective methodology for teaching English should be flexible, student-centered, and grounded in both theory and classroom reality.

Keywords: English language teaching, communicative approach, task-based learning, methodology, classroom practice, assessment

Introduction

English has become a global medium of education, business, science, and digital communication. As a result, the question of how to teach English effectively has gained practical and theoretical importance in almost every educational context. Teachers are no longer expected to simply explain rules; they are expected to help learners use English meaningfully, confidently, and appropriately in real situations. This shift has changed the nature of methodology in English language teaching.

In the past, many classrooms were dominated by grammar translation and mechanical drills. Although such practices may still have a limited place in certain contexts, they do not fully prepare learners for communication. Modern methodology emphasizes purposeful language use, interaction, learner autonomy, and continuous assessment. At the same time, teachers must work with real classroom constraints such

as large groups, limited time, uneven language proficiency, and varying levels of motivation. For this reason, a strong methodology is not a rigid formula. It is a set of informed choices that help the teacher respond to learners and achieve clear learning outcomes.

Theoretical Foundations of Effective English Teaching

A productive methodology begins with an understanding of how language is learned. Communicative language teaching views language as a tool for interaction rather than as a collection of isolated forms. From this perspective, learners need opportunities to negotiate meaning, ask questions, clarify ideas, and respond to others. When students use language for a genuine purpose, they are more likely to retain it and transfer it to new contexts.

Task-based learning develops this idea further by organizing lessons around activities that require learners to solve problems, exchange information, or complete a practical outcome. In such lessons, language is not presented only as content to memorize; it becomes the means through which a task is achieved. This helps learners notice gaps in their knowledge and use language more actively. It also creates a stronger connection between classroom work and real-life communication.

Another important principle is the lexical view of language. Research has shown that fluent communication depends not only on grammar, but also on the ability to recognize and use common words, phrases, and collocations. For learners, this means that vocabulary should be taught in meaningful chunks and revised regularly in different contexts. A teacher who combines grammar, vocabulary, pronunciation, and discourse patterns will usually produce more balanced progress than one who focuses on only a single component.

Core Principles in Classroom Practice

The first principle is learner-centeredness. Students learn more effectively when they are active participants rather than passive listeners. Pair work, group discussions, problem-solving tasks, and peer feedback all encourage participation. In a learner-centered classroom, the teacher acts as a guide, organizer, and language model instead of the sole source of knowledge.

The second principle is scaffolding. Many learners cannot immediately perform complex language tasks independently. They need support in the form of examples, model answers, useful phrases, visual prompts, and guided stages. Scaffolding allows

students to move gradually from dependence to independence. As confidence grows, support can be reduced while task difficulty increases.

The third principle is balance. A lesson should not focus only on speaking and ignore reading, writing, listening, or grammar. Skills are interrelated, and learners benefit when they see these connections. For example, a listening text can introduce vocabulary that later appears in speaking or writing. Likewise, a reading passage can provide a model for sentence structure and organization.

The fourth principle is consistency with flexibility. A teacher may enter a lesson with a plan, but effective teaching also requires adaptation. If students struggle with a concept, the teacher may need to slow down, provide more examples, or simplify the task. If students already understand a point, the lesson can move forward more quickly. Good methodology is therefore responsive rather than mechanical.

Useful Techniques for Teaching English

A wide range of techniques can support English teaching when used purposefully. Warm-up activities are valuable because they prepare learners psychologically and linguistically for the lesson. A short question, picture, quotation, or prediction task can focus attention and create interest. Similarly, brainstorming helps activate prior knowledge and encourages students to contribute ideas without fear of making mistakes.

Presentation should be brief and clear. Instead of long explanations, teachers can use short examples, comparison, and guided questioning. Visual aids, charts, and real objects are often more effective than lengthy verbal descriptions, especially for beginners. Pronunciation work also benefits from focused practice, particularly when students need help with stress, rhythm, and intonation.

Practice activities should move from controlled to freer use. Controlled exercises help learners notice patterns and build confidence, while freer tasks encourage real communication. For instance, students may first complete sentence transformations, then practice the target language in pairs, and finally use it in a role play or discussion. This sequence supports accuracy and fluency at the same time.

Feedback should be timely and constructive. Overcorrection can discourage learners, while no correction at all may allow errors to become habitual. The most effective feedback is selective: the teacher chooses the most important errors to address and offers clear alternatives. Peer correction and self-correction can also be valuable because they develop learner awareness and responsibility.

Motivation and Assessment

Motivation is one of the strongest predictors of success in language learning. Students who see a clear purpose for English are more likely to invest effort, persist through difficulty, and practice outside class. Teachers can strengthen motivation by selecting relevant topics, using authentic materials, and connecting lessons to students' academic or professional needs. Even small improvements are more meaningful when learners can see how English relates to their future goals.

Assessment should support learning rather than simply judge it. Formative assessment is especially useful because it gives both teacher and student information about progress during the learning process. Short quizzes, exit tickets, oral checks, reflections, and portfolio tasks can reveal what learners have understood and where they still need support. Summative assessment remains important, but it should be consistent with classroom objectives and should test what has actually been taught.

In modern methodology, assessment also includes self-evaluation. When students reflect on their strengths, weaknesses, and strategies, they become more independent. A simple checklist or learning journal can help them notice patterns in their errors and successes. This reflective dimension is particularly important in higher education, where students are expected to take greater responsibility for their own learning.

Challenges in Real Classrooms

Although modern methodology offers many promising ideas, teachers often face practical challenges. Large classes may limit individual speaking time. Mixed proficiency levels can make it difficult to design one task for all learners. Limited lesson hours may reduce the amount of practice available. In some institutions, access to technology, audio materials, or updated textbooks may also be restricted.

These challenges do not make good methodology impossible; they simply require careful planning. A teacher working with a large class can use pair work and group roles to maximize participation. In mixed-ability groups, stronger students can support weaker ones through collaborative tasks. When resources are limited, teachers can still create communicative activities using the board, paper, short texts, and simple prompts. Good teaching often depends less on expensive materials than on thoughtful organization.

Conclusion

The methodology of teaching English has moved far beyond the idea of repeating grammar rules or translating isolated sentences. Today, effective English teaching

combines communication, interaction, vocabulary development, scaffolding, balanced skill work, and meaningful assessment. It also recognizes that learners are different, classroom conditions vary, and no single method fits every situation.

For this reason, the best methodology is one that is principled but adaptable. Teachers need a clear understanding of language learning, but they also need creativity, patience, and classroom sensitivity. When English teaching is built on purpose, support, and reflection, learners are more likely to become confident users of the language rather than simple memorers of forms. In this sense, methodology is not only a professional skill; it is the foundation of successful language education.

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HOMILADORLIKDA DORI VOSITALARINI QO'LLASH: XAVF VA FOYDA TAHLILI

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Annotatsiya
Homiladorlik davrida dori vositalarini qo‘llash klinik farmakologiyaning eng murakkab va mas’uliyatli yo‘nalishlaridan biri hisoblanadi, chunki farmakoterapiya nafaqat ona organizmiga, balki homila rivojlanishiga ham bevosita ta’sir ko‘rsatadi. Ushbu maqolada homiladorlikda qo‘llaniladigan dori vositalarining xavf va foyda nisbati, teratogen ta’sir mexanizmlari hamda FDA va xalqaro tasniflash tizimlari asosida dori xavfsizligini baholash yoritiladi. Shuningdek, antibiotiklar, antihipertenzivlar, analgetiklar va vitamin preparatlari misolida klinik amaliyotda eng ko‘p uchraydigan holatlar tahlil qilinadi. Tadqiqot natijalari homiladorlikda farmakoterapiyani individual yondashuv asosida tanlash zarurligini ko‘rsatadi va xavfsiz davolash strategiyalarini ishlab chiqishga xizmat qiladi.

Kalit so‘zlar
Homiladorlik, farmakoterapiya, teratogen ta’sir, dori xavfsizligi, risk va foyda tahlili, FDA tasnifi, klinik farmakologiya.

Аннотация
Применение лекарственных средств во время беременности является одной из наиболее сложных областей клинической фармакологии, поскольку фармакотерапия влияет как на организм матери, так и на развитие плода. В данной статье рассматриваются соотношение риска и пользы применения лекарств при беременности, механизмы тератогенного действия, а также оценка безопасности препаратов на основе классификаций FDA и международных стандартов. Особое внимание уделено клиническим аспектам применения антибиотиков, антигипертензивных средств, анальгетиков и витаминных препаратов. Результаты исследования подчеркивают необходимость

индивидуального подхода к фармакотерапии беременных и разработки безопасных лечебных стратегий.

Ключевые слова

Беременность, фармакотерапия, тератогенный эффект, безопасность лекарств, риск и польза, классификация FDA, клиническая фармакология.

Abstract

The use of medicinal drugs during pregnancy is one of the most complex areas of clinical pharmacology, as pharmacotherapy affects both the maternal organism and fetal development. This article discusses the risk–benefit assessment of drug use in pregnancy, mechanisms of teratogenicity, and drug safety evaluation based on FDA classification and international guidelines. Special attention is given to commonly used drug groups in clinical practice, including antibiotics, antihypertensive agents, analgesics, and vitamin preparations. The findings emphasize the importance of an individualized approach to pharmacotherapy in pregnancy and

Keywords

Pregnancy, pharmacotherapy, teratogenic effect, drug safety, risk–benefit analysis, FDA classification, clinical pharmacology.

Kirish

Homiladorlik davri ayol organizmida murakkab fiziologik va gormonal o‘zgarishlar bilan kechadigan alohida holat bo‘lib, bu davrda qo‘llaniladigan har qanday dori vositasi nafaqat onaga, balki rivojlanayotgan homilaga ham bevosita yoki bilvosita ta’sir ko‘rsatadi. Shu sababli homilador ayollarda farmakoterapiya masalasi klinik farmakologiyaning eng dolzarb va ehtiyotkorlik talab qiladigan yo‘nalishlaridan biri hisoblanadi.

Zamonaviy tibbiyot amaliyotida homiladorlik davrida dori vositalarini qo‘llash zaruriyati turli patologik holatlar — infeksion kasalliklar, arterial gipertenziya, endokrin buzilishlar, og‘riq sindromi va vitamin yetishmovchiligi kabi holatlar bilan bog‘liq bo‘ladi. Biroq ushbu dorilarning farmakokinetikasi va farmakodinamikasi homiladorlik sharoitida o‘zgaradi, bu esa ularning samaradorligi va xavfsizligiga bevosita ta’sir qiladi.

Ayniqsa, ayrim dori vositalarining teratogen ta’siri — ya’ni embrion va homila rivojlanishida tug‘ma nuqsonlar chaqirishi — klinik amaliyotda katta xavf tug‘diradi. Shu bois xalqaro tibbiy tasniflar (jumladan, FDA va boshqa regulyator tizimlar) asosida dorilar xavfsizligini baholash va ularni ehtiyotkorlik bilan qo‘llash zarur hisoblanadi.
Ushbu maqolaning maqsadi homiladorlik davrida dori vositalarini qo‘llashning xavf va foyda nisbatini ilmiy asosda tahlil qilish, ularning homila rivojlanishiga ta’sir

mexanizmlarini o‘rganish hamda klinik amaliyotda xavfsiz farmakoterapiya yondashuvlarini yoritishdan iboratdir.

Adabiyotlar tahlili

Homiladorlik davrida dori vositalarini qo‘llash masalasi klinik farmakologiya va perinatologiyada keng o‘rganilgan yo‘nalishlardan biri bo‘lib, turli xalqaro va milliy manbalarda batafsil yoritilgan. Klassik farmakologiya darsliklarida (Goodman & Gilman, Katzung) homiladorlikda dori vositalarining farmakokinetik o‘zgarishlari — so‘rilish, taqsimlanish, metabolizm va chiqarilish jarayonlarining o‘zgarishi — asosiy muammolardan biri sifatida ko‘rsatiladi. Xususan, plazma hajmining ortishi, glomerulyar filtrlatsiya tezligining oshishi hamda jigar fermentlari faolligining o‘zgarishi dorilarning terapevtik konsentratsiyasiga sezilarli ta’sir ko‘rsatadi.

WHO (Jahon sog‘liqni saqlash tashkiloti) va FDA tasniflariga oid adabiyotlarda dori vositalarining homilaga xavf darajasi bo‘yicha guruhlarga ajratilishi keng qo‘llaniladi. Ushbu tasniflar klinik amaliyotda shifokorlarga dori tanlashda xavf–foyda nisbatini baholashga yordam beradi. Ayniqsa, teratogen ta’sirga ega preparatlar — masalan, ba’zi antiepileptiklar, retinoidlar va sitotoksik dorilar — homila rivojlanishiga jiddiy salbiy ta’sir ko‘rsatishi ilmiy manbalarda isbotlangan.

Yevropa va AQSh klinik qo‘llanmalarida homiladorlikda eng ko‘p qo‘llaniladigan dorilar guruhi sifatida antibiotiklar (penitsillinlar, sefalosporinlar), antihipertenziv vositalar (labetalol, metildopa), analgetiklar (paratsetamol) va vitamin preparatlari ko‘rsatiladi. Shu bilan birga, ayrim dorilarni ehtiyotkorlik bilan yoki umuman qo‘llamaslik zarurligi ta’kidlanadi.

Rossiya tibbiyot adabiyotlarida (Mashkovskiy, Mashkovskiy farmakologiya qo‘llanmasi) homiladorlikda farmakoterapiya individual yondashuv asosida olib borilishi kerakligi, ya’ni har bir klinik holatda ona va homila uchun kutiladigan foyda va xavf chuqur tahlil qilinishi lozimligi alohida qayd etilgan.

So‘nggi yillarda olib borilgan ilmiy tadqiqotlarda (Lancet, NEJM maqolalari) homiladorlikda dorilarni noto‘g‘ri qo‘llash tug‘ma nuqsonlar, intrauterin rivojlanish kechikishi va perinatal asoratlar xavfini oshirishi isbotlangan. Shu bilan birga, ayrim kasalliklarni davolamaslik ham homila va ona salomatligi uchun katta xavf tug‘dirishi mumkinligi ta’kidlanadi.

Umuman olganda, adabiyotlar tahlili shuni ko‘rsatadiki, homiladorlikda farmakoterapiya qat’iy ilmiy asos, xalqaro tasniflar va individual klinik yondashuvga tayanishi lozim.

Natijalar

O‘tkazilgan adabiyotlar tahlili va klinik tavsiyalarni umumlashtirish natijasida homiladorlik davrida dori vositalarini qo‘llashda bir nechta muhim qonuniyatlar aniqlandi. Avvalo, dorilarni noto‘g‘ri tanlash yoki nazoratsiz qo‘llash homila rivojlanishida turli darajadagi asoratlar — teratogen ta’sir, intrauterin rivojlanish kechikishi va perinatal xavflarni oshirishi bilan bog‘liqligi qayd etildi. Shu bilan birga, ayrim dori guruhlari to‘g‘ri ko‘rsatma asosida qo‘llanganda ona va homila uchun xavfsiz va samarali ekanligi aniqlandi.

Klinik manbalarni tahlil qilish asosida homiladorlikda eng ko‘p qo‘llaniladigan dori guruhlari va ularning xavfsizlik profili quyidagicha umumlashtirildi.

1-jadval. Homiladorlikda qo‘llaniladigan asosiy dori guruhlari va xavf darajasi

Dori guruhi	**Misollar**	**Homilaga ta’siri**	**Xavf darajasi**	**Klinik izoh**
Antibiotiklar	Penitsillinlar, sefalosporinlar	Odatda xavfsiz	Past	Infeksiyalarda birinchi tanlov
Antihipertenzivlar	Metildopa, labetalol	Nisbatan xavfsiz	O‘rtacha-past	Preeklampsiyada qo‘llanadi
Analgetiklar	Paratsetamol	Nisbatan xavfsiz	Past	Qisqa muddatli qo‘llash tavsiya etiladi
NSAID	Ibuprofen	Homila yurak tizimiga ta’sir	O‘rtacha–yuqori	3-trimestrda tavsiya etilmaydi
Retinoidlar	Izotretinoin	Kuchli teratogen	Juda yuqori	Mutlaqo qarshi ko‘rsatma
Antiepileptiklar	Valproat	Tug‘ma nuqsonlar xavfi	Yuqori	Faqat zaruratda qo‘llanadi

Natijalar shuni ko‘rsatdiki, dorilarning xavfsizligi ularning farmakologik guruhiga, qo‘llash muddatiga (trimestrga) va dozasiga bevosita bog‘liqdir. Eng yuqori xavf 1-trimestrda kuzatilishi aniqlandi, chunki bu davrda organogenez jarayoni faol kechadi.

2-jadval. Homiladorlik trimestrlari bo‘yicha dori ta’sirining klinik xususiyatlari

Trimestr	Asosiy jarayon	Dori ta’siriga sezgirlik	Klinik xavf
I trimestr	Organogenez (organlar shakllanishi)	Juda yuqori	Tug‘ma nuqsonlar, teratogenez
II trimestr	O‘sish va rivojlanish	O‘rtacha	Funktsional buzilishlar
III trimestr	Yetilish va tayyorlanish	Nisbatan past	Metabolik va tug‘ruq asoratlari

Umumiy natijalar shuni ko‘rsatadiki, homiladorlikda farmakoterapiya qat’iy individual yondashuv asosida olib borilishi, har bir dori vositasi uchun xavf–foyda nisbati aniq baholanishi lozim. Eng muhim omil sifatida homila rivojlanish bosqichi va dorining teratogen potensiali belgilandi.

Muhokama

Homiladorlik davrida dori vositalarini qo‘llash masalasi klinik amaliyotda doimiy ravishda ehtiyotkorlik va chuqur individual yondashuvni talab qiladi. Olingan natijalar shuni ko‘rsatadiki, farmakoterapiya samaradorligi va xavfsizligi bir nechta omillarga — homiladorlik trimestri, dori guruhining farmakologik xususiyatlari, doza va qo‘llash davomiyligiga bevosita bog‘liq.

Eng muhim klinik xulosa shundaki, homiladorlikning birinchi trimestri dorilarning teratogen ta’siriga eng sezgir davr hisoblanadi. Bu bosqichda organogenez jarayoni faol kechadi, shuning uchun hatto kichik farmakologik ta’sir ham tug‘ma nuqsonlarga olib kelishi mumkin. Shu sababli xalqaro tavsiyalarda (WHO, FDA) ushbu davrda faqat hayotiy zarur holatlarda dori qo‘llash tavsiya etiladi.

Tahlil natijalari shuni ham ko‘rsatadiki, antibiotiklar va ayrim antihipertenziv preparatlar nisbatan xavfsiz hisoblanadi va klinik amaliyotda keng qo‘llaniladi. Biroq NSAID guruhidagi dorilar, retinoidlar va ba’zi antiepileptik vositalar yuqori teratogen xavfga ega bo‘lib, ularni qo‘llash qat’iy cheklangan yoki mutlaqo qarshi ko‘rsatma sifatida baholanadi. Bu holat farmakologik tasniflar va klinik qo‘llanmalar bilan to‘liq mos keladi.

Muhokama jarayonida yana bir muhim jihat — dorilar farmakokinetikasining homiladorlikda o‘zgarishi — alohida ahamiyat kasb etadi. Plazma hajmining ortishi, jigar metabolizmining kuchayishi va buyrak filtrlatsiyasining oshishi dorilar konsentratsiyasini o‘zgartiradi, bu esa terapevtik samaradorlikni kamaytirishi yoki aksincha, toksik ta’sir xavfini oshirishi mumkin.

Shuningdek, zamonaviy adabiyotlarda farmakogenetika va individual sezgirlik omillarining ham ahamiyati ortib borayotgani ta’kidlanadi. Har bir homilador ayolda

dorilarga javob turlicha bo‘lishi mumkinligi sababli standart yondashuvdan ko‘ra, shaxsiylashtirilgan farmakoterapiya tamoyili muhim o‘rin egallaydi.

Umuman olganda, olingan natijalar shuni tasdiqlaydiki, homiladorlik davrida dori vositalarini qo‘llashda asosiy prinsip — maksimal xavfsizlik va minimal zaruriy ta’sirni ta’minlashdir. Klinik qarorlar har doim ona va homila manfaatlari o‘rtasidagi muvozanatga asoslanishi lozim.

Xulosa

Homiladorlik davrida dori vositalarini qo‘llash klinik farmakologiyaning eng nozik va mas’uliyatli yo‘nalishlaridan biri bo‘lib, u ona va homila salomatligi o‘rtasidagi muvozanatni saqlashni talab qiladi. O‘rganilgan adabiyotlar va tahlil natijalari asosida shuni xulosa qilish mumkinki, dorilarni noto‘g‘ri tanlash yoki nazoratsiz qo‘llash homila rivojlanishida jiddiy asoratlar, jumladan tug‘ma nuqsonlar va intrauterin rivojlanish buzilishlariga olib kelishi mumkin.

Eng yuqori xavf homiladorlikning birinchi trimestrida kuzatiladi, chunki bu davrda organogenez jarayoni faol kechadi va homila tashqi omillarga juda sezgir bo‘ladi. Shu sababli ushbu bosqichda dori vositalarini faqat hayotiy zarurat mavjud bo‘lganda qo‘llash zarur.

Klinik amaliyotda ayrim dori guruhlari (penitsillinlar, sefalosporinlar, metildopa, paratsetamol) nisbatan xavfsiz hisoblanadi va to‘g‘ri dozada qo‘llanganda ijobiy terapevtik natija beradi. Aksincha, retinoidlar, valproat va ba’zi NSAID preparatlari yuqori teratogen xavfga ega bo‘lib, ularni qo‘llash qat’iy cheklanishi kerak.

Umuman olganda, homiladorlikda farmakoterapiya har doim individual yondashuv, xavf–foyda nisbatini chuqur tahlil qilish va xalqaro klinik tavsiyalarga asoslangan holda olib borilishi lozim. Bu esa ona va homila uchun eng xavfsiz va samarali davolash strategiyasini ta’minlaydi.

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HARBIY XIZMATCHILAR UCHUN MAXSUS JISMONIY MASHG'ULOTLAR DASTURIN I ISHLAB CHIQISH VA SAMARADORLIGINI BAHOLASH USULLARI.

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Annotatsiya: Mazkur maqolada harbiy xizmatchilar uchun maxsus jismoniy mashg‘ulotlar dasturini ishlab chiqish hamda uning samaradorligini baholash usullari ilmiy-nazariy va amaliy jihatdan tahlil qilinadi. Tadqiqot jarayonida zamonaviy trening metodlari asosida mashg‘ulotlar dasturi ishlab chiqilib, tajriba va nazorat guruhlari orqali sinovdan o‘tkazildi. Jismoniy sifatlar — kuch, chidamlilik, tezkorlik va funksional tayyorgarlik ko‘rsatkichlari maxsus testlar yordamida baholandi.

Kalit so‘zlar: harbiy xizmatchilar, jismoniy tayyorgarlik, mashg‘ulot dasturi, baholash usullari, chidamlilik, kuch, tezkorlik, funksional tayyorgarlik, samaradorlik, statistik tahlil

Аннотация: В данной статье рассматриваются научно-теоретические и практические аспекты разработки специальной программы физической подготовки военнослужащих и методов оценки её эффективности. В процессе исследования была разработана программа тренировок на основе современных методик, которая апробировалась с использованием экспериментальной и контрольной групп. Физические качества — сила, выносливость, скорость и функциональная подготовленность — оценивались с помощью специальных тестов.

Ключевые слова: военнослужащие, физическая подготовка, программа тренировок, методы оценки, выносливость, сила, скорость, функциональная подготовка, эффективность, статистический анализ

Abstract: This article explores the scientific-theoretical and practical aspects of developing a specialized physical training program for military personnel and methods for evaluating its effectiveness. During the research, a training program based on modern methodologies was developed and tested using experimental and control groups. Physical qualities such as strength, endurance, speed, and functional fitness were assessed through specific tests.

Keywords: military personnel, physical training, training program, evaluation methods, endurance, strength, speed, functional fitness, effectiveness, statistical analysis

Zamonaviy harbiy faoliyat sharoitida harbiy xizmatchilarning jismoniy tayyorgarligi ularning jangovar salohiyati, xizmat samaradorligi va ekstremal vaziyatlarda tezkor hamda to‘g‘ri qaror qabul qilish qobiliyatining muhim omillaridan biri hisoblanadi. Bugungi kunda harbiy xizmat sharoitlari murakkablashib borayotgani, yangi texnologiyalar va taktik yondashuvlarning joriy etilishi harbiy xizmatchilardan nafaqat yuqori darajadagi nazariy bilimlarni, balki mukammal jismoniy va funksional tayyorgarlikni ham talab etmoqda.

Amaliyot shuni ko‘rsatadiki, mavjud jismoniy tayyorgarlik tizimlari ko‘pincha umumiy xarakterga ega bo‘lib, harbiy faoliyatning o‘ziga xos talablarini to‘liq qamrab olmaydi. Shu sababli, maxsus vazifalarni bajarishga yo‘naltirilgan, individual va funksional yondashuvlarga asoslangan jismoniy mashg‘ulotlar dasturini ishlab chiqish zarurati ortib bormoqda. Ayniqsa, kuch, chidamlilik, tezkorlik va psixofiziologik barqarorlikni kompleks rivojlantirishga qaratilgan mashg‘ulotlar tizimi dolzarb masalalardan biridir.

Bundan tashqari, ishlab chiqilayotgan mashg‘ulotlar dasturining samaradorligini ilmiy asosda baholash, ya’ni aniq mezonlar, testlar va statistik tahlillar orqali natijadorligini aniqlash muhim ahamiyat kasb etadi. Bu esa harbiy jismoniy tayyorgarlik tizimini takomillashtirish, mashg‘ulotlar sifatini oshirish va resurslardan samarali foydalanish imkonini beradi. Shu nuqtai nazardan, harbiy xizmatchilar uchun maxsus jismoniy mashg‘ulotlar dasturini ishlab chiqish va uning samaradorligini baholash usullarini ilmiy jihatdan tadqiq etish bugungi kunda dolzarb ilmiy-amaliy muammo hisoblanadi.

Harbiy xizmatchilarning jismoniy tayyorgarligi masalasi ko‘plab olimlar tomonidan turli nuqtai nazardan o‘rganilgan bo‘lib, uning nazariy va amaliy asoslari sport pedagogikasi hamda harbiy psixologiya doirasida keng yoritilgan. Xususan, Yuriy Verkoshansky tomonidan ishlab chiqilgan maxsus kuch tayyorgarligi nazariyasi jismoniy sifatlarni maqsadli rivojlantirishda muhim metodologik asos bo‘lib xizmat qiladi. Jismoniy tayyorgarlikni kompleks rivojlantirishda funksional yondashuv muhim o‘rin tutadi. Bu borada Michael Boyle funksional trening konsepsiyasini ishlab chiqib, real harakatlarga moslashgan mashg‘ulotlarning samaradorligini asoslab bergan. Uning fikricha, mashg‘ulotlar faqat mushak kuchini emas, balki koordinatsiya, muvozanat va chidamlilikni ham rivojlantirishi zarur.

Harbiy xizmatchilarning jismoniy tayyorgarligini tashkil etishda xalqaro tajriba ham muhim ahamiyatga ega. NATO standartlariga ko‘ra, harbiy xizmatchilarning jismoniy tayyorgarligi individual imkoniyatlar va xizmat vazifalariga mos ravishda tashkil etilishi lozim, bu esa mashg‘ulotlar dasturini differensial yondashuv asosida ishlab chiqishni talab qiladi. Psixofiziologik omillarni hisobga olish ham jismoniy tayyorgarlik samaradorligini oshirishda muhim hisoblanadi. Gans Selye tomonidan ishlab chiqilgan stress nazariyasiga ko‘ra, jismoniy yuklamalar organizmga stress sifatida ta’sir ko‘rsatadi va ularni to‘g‘ri boshqarish yuqori natijalarga erishish imkonini beradi. Zamonaviy tadqiqotlarda yuqori intensivlikdagi interval mashg‘ulotlar metodining samaradorligi alohida ta’kidlanadi. Martin Gibala tomonidan olib borilgan tadqiqotlar qisqa muddatli, yuqori intensiv mashg‘ulotlarning chidamlilik va metabolik ko‘rsatkichlarni sezilarli darajada yaxshilashini ko‘rsatgan.

Harbiy xizmatchilarning jismoniy tayyorgarligi zamonaviy harbiy tizimning muhim tarkibiy qismi bo‘lib, u nafaqat jismoniy sifatlarni rivojlantirish, balki psixologik barqarorlik, tezkor qaror qabul qilish va ekstremal sharoitlarda samarali faoliyat yuritish qobiliyatini ham shakllantiradi. Shu sababli, jismoniy tayyorgarlikni tashkil etishda nazariy yondashuvlar, ilmiy tamoyillar va metodologik asoslarni chuqur o‘rganish muhim ahamiyat kasb etadi.

Avvalo, jismoniy tayyorgarlikning nazariy asoslari sport pedagogikasi va Sport fiziologiyasi fanlari bilan chambarchas bog‘liqdir. Ushbu yo‘nalishda jismoniy yuklamalarning inson organizmiga ta’siri, moslashuv jarayonlari hamda funksional imkoniyatlarning oshishi o‘rganiladi. Adaptatsiya nazariyasiga ko‘ra, muntazam va to‘g‘ri rejalashtirilgan jismoniy yuklama organizmning funksional tizimlarini takomillashtirib, uning ish qobiliyatini oshiradi. Bu jarayon ayniqsa harbiy xizmatchilar uchun muhim bo‘lib, ular turli ekstremal vaziyatlarda yuqori chidamlilik va tezkorlikni namoyon etishlari zarur.

Jismoniy tayyorgarlikni tashkil etishda muhim ilmiy tamoyillardan biri — bu yuklamani bosqichma-bosqich oshirish hisoblanadi. Ushbu tamoyilga ko‘ra, mashg‘ulot jarayonida yuklama asta-sekin oshirib borilishi lozim, aks holda organizm moslashuvi to‘xtab qoladi yoki ortiqcha yuklama natijasida charchoq va jarohatlar yuzaga keladi. Harbiy mashg‘ulotlarda bu tamoyil ayniqsa dolzarb bo‘lib, yuklama individual imkoniyatlarga mos ravishda belgilanadi.

Shuningdek, jismoniy tayyorgarlikda spetsifiklik tamoyili muhim o‘rin tutadi. Unga ko‘ra, mashg‘ulotlar bajariladigan vazifalarga maksimal darajada mos bo‘lishi kerak. Harbiy xizmatchilar uchun bu degani — mashg‘ulotlar real jangovar yoki xizmat sharoitlariga yaqinlashtirilgan bo‘lishi zarur. Masalan, yuk bilan yugurish,

to‘siqlardan o‘tish, tezkor harakatlanish kabi mashqlar aynan xizmat faoliyatiga moslashtirilgan holda tashkil etiladi.

Zamonaviy yondashuvlarda funksional tayyorgarlik alohida ahamiyatga ega. Funksional tayyorgarlik bu — insonning kundalik va kasbiy faoliyatiga mos harakatlarni bajarish qobiliyatini rivojlantirishga qaratilgan mashg‘ulotlar tizimidir. Harbiy xizmatchilar uchun bu yondashuv ularning koordinatsiya, muvozanat, tezkorlik va kuchni birgalikda qo‘llay olish qobiliyatini rivojlantiradi. Jismoniy tayyorgarlik nazariyasida energiya ta’minoti tizimlari ham muhim o‘rin tutadi. Inson organizmida uch asosiy energiya tizimi mavjud: fosfagen tizimi, anaerob glikolitik tizim va aerob tizim. Harbiy mashg‘ulotlarda ushbu tizimlarning barchasi rivojlantirilishi lozim, chunki xizmat faoliyati turli intensivlikdagi yuklamalarni talab qiladi. Masalan, qisqa muddatli tezkor harakatlar uchun anaerob tizim, uzoq davom etadigan faoliyat uchun esa aerob tizim muhim hisoblanadi.

Bundan tashqari, jismoniy tayyorgarlikning samaradorligi tiklanish jarayonlari bilan ham bevosita bog‘liqdir. Tiklanish nazariyasiga ko‘ra, organizm yuklamadan keyin dam olish jarayonida tiklanadi va undan keyin yuqori darajaga ko‘tariladi. Agar tiklanish yetarli darajada ta’minlanmasa, mashg‘ulot samaradorligi pasayadi. Shu sababli, mashg‘ulotlar tizimida dam olish, uyqu, ovqatlanish va psixologik tiklanish muhim o‘rin tutadi.

Harbiy xizmatchilarning jismoniy tayyorgarligi ularning xizmat faoliyatining ajralmas qismi bo‘lib, jangovar vazifalarni samarali bajarish uchun zarur bo‘lgan asosiy omillardan biridir. Shu bois, jismoniy tayyorgarlik tizimini takomillashtirish, ayniqsa maxsus mashg‘ulotlar dasturini ishlab chiqish va uning samaradorligini ilmiy asosda baholash muhim ilmiy-amaliy ahamiyat kasb etadi.

Mazkur tadqiqot doirasida harbiy xizmatchilar uchun maxsus jismoniy mashg‘ulotlar dasturi ishlab chiqildi. Dastur harbiy faoliyatning o‘ziga xos xususiyatlarini hisobga olgan holda, kuch, chidamlilik, tezkorlik va funksional tayyorgarlikni kompleks rivojlantirishga qaratildi. Mashg‘ulotlar tizimi zamonaviy yondashuvlarga asoslangan bo‘lib, unda yuqori intensivlikdagi interval mashg‘ulotlar, funksional mashqlar, hamda an’anaviy kuch mashqlari uyg‘unlashtirildi. Ushbu yondashuv harbiy xizmatchilarning turli sharoitlarda samarali harakat qilish qobiliyatini oshirishga xizmat qiladi.

Olib borilgan tadqiqot natijalari shuni ko‘rsatdiki, harbiy xizmatchilar uchun maxsus ishlab chiqilgan jismoniy mashg‘ulotlar dasturi ularning jismoniy tayyorgarlik darajasini sezilarli darajada oshirishga xizmat qiladi. Tadqiqot davomida qo‘llanilgan kompleks yondashuv — ya’ni kuch, chidamlilik, tezkorlik va funksional tayyorgarlikni

birgalikda rivojlantirishga qaratilgan mashg‘ulotlar tizimi yuqori samaradorlikni ta’minladi. Tadqiqot shuni ham ko‘rsatdiki, mashg‘ulotlarni rejalashtirishda yuklamaning bosqichma-bosqich oshirilishi, individual yondashuvning qo‘llanilishi hamda tiklanish jarayonlariga e’tibor qaratilishi jismoniy tayyorgarlik samaradorligini yanada oshiradi. Ayniqsa, yuqori intensivlikdagi interval mashg‘ulotlar va funksional trening elementlarining uyg‘unlashuvi qisqa muddat ichida yuqori natijalarga erishish imkonini beradi.

Umuman olganda, ishlab chiqilgan maxsus jismoniy mashg‘ulotlar dasturi harbiy xizmatchilar tayyorgarlik tizimini takomillashtirishda samarali vosita sifatida tavsiya etiladi. Mazkur yondashuvni amaliyotga joriy etish harbiy xizmatchilarning jismoniy va funksional tayyorgarligini oshirish, shuningdek, ularning xizmat faoliyatida yuqori natijalarga erishishiga xizmat qiladi.

Foydalanilgan adabiyotlar ro’yxati.

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THE CONCEPT OF BALANCE SHEET AND ITS ROLE IN THE ACCOUNTING PROCESS

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Abstract.

This article provides an understanding of the balance sheet, which is the main document of accounting in banks. The balance sheet is based on the equality of assets and liabilities, its reflection of the financial condition of banks, and its role in the accounting process are analyzed based on local scientific literature. The structure, types, and its importance in the activities of banks are also highlighted.

Key words: balance sheet, assets, liabilities, bank, accounting process, financial position, balance sheet equity.

Introduction

In a market economy, banks play a special role as the main link of the financial system. Accounting in banks ensures the complete, accurate, and timely reflection of their financial condition, the composition of assets and liabilities, revenues and expenses. The central element of accounting — the balance sheet — expresses all financial indicators specific to a bank in a unified system.

In accordance with the Law of the Republic of Uzbekistan “On Accounting” (April 13, 2016), accounting is a system of orderly, continuous, and documented reflection of information about the property, liabilities, and business operations of economic entities. The balance sheet is the concluding part of this system. A balance sheet is a document that reflects, in a two-sided table format, generalized information about the assets, liabilities, and capital of an enterprise or organization (including a bank) as of a specific date.

Review of Literature on the Topic

As noted in the textbook “Financial Accounting” by local scholar M.Q. Pardayev and others, a balance sheet is a form of financial reporting that reflects the financial condition of an enterprise as of a specific date, showing the equality between assets (property and funds) and liabilities (their sources of financing).

In the textbook "Bank Accounting" by R.A. Alimov and N.H. Toshmatov, the balance sheet is defined as "the basis for financial analysis of bank operations," and it is specifically noted that it is the "reference point" of all reporting forms.

A balance sheet consists of two parts: assets and liabilities. In the textbook "Theory of Accounting" by economists A.A. Xasanov and D.M. Razzaqov, the essence of the balance sheet equality is expressed as follows:

Assets = Capital + Liabilities

As noted in Professor Q.X. Ochilov’s work "Analysis of Bank Financial Statements," the bank’s balance sheet performs the following functions:

Information function — provides information on the composition and placement of bank resources;

Control function — enables monitoring of the movement of funds, the status of loans, and liquidity;

Analytical function — serves as a basis for comparing financial indicators, identifying trends, and making forecasts;

Accountability function — ensures accountability to state bodies, shareholders, and clients.

According to the regulatory documents of the Central Bank of the Republic of Uzbekistan, commercial banks are required to submit a balance sheet report to the regulatory authorities on a monthly basis. This ensures effective oversight of bank operations.

In the textbook "Accounting in Commercial Banks" by B.O. Toshpo‘llatov and Sh.I. Xolmatov, four main stages of the accounting process in banks are identified: primary documentation, reflection in reporting registers, summarization by accounts, and preparation of the balance sheet. In this way, the balance sheet serves as the logical conclusion of the entire accounting process.

Local literature in the field of bank accounting in Uzbekistan has been significantly enriched in recent years. The main sources are summarized in the table below:

Author(s)	Title of Work	Main Contribution
Pardayev M.Q. et al.	Financial Accounting (textbook)	Concept of balance sheet and forms of financial reporting
Alimov R.A., Toshmatov N.H.	Bank Accounting	Procedure for preparing the balance sheet in banks
Ochilov Q.X.	Analysis of Bank Financial Statements	Analysis of balance sheet indicators
Toshpo‘llatov B.O., Xolmatov Sh.I.	Accounting in Commercial Banks	Stages of the accounting process
Ergashev A.E., Hasanova M.I.	Financial Accounting and Reporting	Classification of types of balance sheets

Types of Balance Sheets

In local literature, balance sheets are classified according to several criteria. The following classification is given in the book "Financial Accounting and Reporting" by A.E. Ergashev and M.I. Hasanova:

By time criterion: opening (initial), current (interim), final (closing), and separation/merger balance sheets.

By volume of data: single-entity (unit) balance sheet and consolidated (group) balance sheet.

By purpose: balance sheets prepared for external reporting and for internal management purposes.

The consolidated balance sheet is especially important for banks, as it reflects the activities of all structures belonging to a single banking group in a unified manner.

Conclusions and Recommendations

Based on the above, the following conclusions can be drawn: The balance sheet is the main document reflecting the financial condition of banks, and it is the final stage of the accounting process and the central element of the information system. The principle of equality between assets and liabilities in the balance sheet, based on the double-entry bookkeeping rule, ensures the internal control mechanism of the accounting system. Although the bank balance sheet has been thoroughly studied in both theoretical and practical terms in the works of local scholars, the need to improve the methodology for real-time analysis of the balance sheet in the context of the digital economy remains. As a recommendation, it is considered appropriate to expand the practice of preparing and analyzing the accounting balance sheet through automated systems in banks, as well as to ensure compliance with international IFRS standards.

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O‘ZBEKISTON TINCHLIK, BAG‘RIKENGLIK VA MA’RIFAT O‘LKASI

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Annotatsiya

Mazkur maqolada O‘zbekistonning tinchlik, bag‘rikenglik va ma’rifat o‘lkasi sifatidagi o‘rni, Vatanimizda chet el millat vakillari bilan hamdo‘stligi yoritiladi. Shuningdek, O‘zbekistonning boy tarixiy merosi va ma’naviy qadriyatlari asosida barpo etilgan bag‘rikeng jamiyatning ahamiyati ochib berilgan.

Kalit so‘zlar: Tolerantlik, sabr-toqat, tinchlik, bag‘rikenglik, hamdo‘stlik, jamiyat, hurmat, vijdon erkinligi.

Аннотация

В данной статье освещается роль Узбекистана как страны мира, толерантности и просвещения. Также рассматривается сотрудничество и дружеские отношения с представителями различных национальностей, проживающих как в стране, так и за её пределами. Кроме того, раскрывается значение толерантного общества, сформированного на основе богатого исторического наследия и духовных ценностей Узбекистана.

Ключевые слова: Толерантность, терпение, мир, доброжелательность, дружба, общество, уважение, свобода совести

Kirish: *“Jamiyatda tinchlik va osoyishtalikni mustahkam qaror toptirishning eng muhim tamoyillaridan biri ijtimoiy va diniy bag‘rikenglikdir. Yurtimizda turli konfessiyalar vakillari yagona oila bo‘lib, do‘stlik va hamjihatlik muhitida yashayotgani, jonajon Vatanimiz ravnaqiga munosib hissa qo‘shib kelayotgani bizning eng katta boyligimizdir.”*

O‘zbekiston Respublikasi Prezidenti: **Sh.M.Mirziyoyev**

Mazkur fikr bugungi kunda O‘zbekistonda tinchlik va barqarorlikni ta’minlashda bag‘rikenglik muhitining naqadar muhim o‘rin tutishini yaqqol ifodalaydi. Haqiqatan ham, yurtimizda turli millat va din vakillarining o‘zaro hurmat va totuvlikda yashayotgani jamiyat taraqqiyotining muhim omillaridan biridir. O‘zbekiston — tinchlik, bag‘rikenglik va barqarorlik ustuvor qadriyat sifatida qaraladi. Bu yurtda tinchlik osongina qo‘lga kiritilgan ne’mat emas, balki tarixiy sinovlar, mashaqqatli davrlar va xalqning sabr-toqati evaziga erishilgan bebaho boylikdir. Shu sababli ham tinchlikni asrash va qadrlash har bir fuqaroning eng muhim burchi hisoblanadi.

Bugungi kunda O‘zbekistonda hukm surayotgan osoyishtalik — davlat siyosatining ustuvor yo‘nalishlaridan biridir. Mamlakatimizda millatlararo totuvlik, diniy bag‘rikenglik va ijtimoiy barqarorlikni ta’minlash maqsadida qator qonunlar va huquqiy hujjatlar qabul qilingan. Jumladan, O‘zbekiston Respublikasi Konstitutsiyasida har bir fuqaroning tinch va xavfsiz hayot kechirish huquqi kafolatlangan. Shuningdek, “Vijdon erkinligi va diniy tashkilotlar to‘g‘risida”gi Qonun ham jamiyatda o‘zaro hurmat va totuvlikni mustahkamlashga xizmat qilmoqda.

Tinchlik — bu faqat urushning yo‘qligi emas, balki odamlar o‘rtasida mehr-oqibat, hamjihatlik va o‘zaro hurmatning mavjudligidir. Tinch yurtning farzandlari ilm oladi, mehnat qiladi, kelajagini bunyod etadi. Aksincha, notinchlik hukm surgan joyda taraqqiyot to‘xtaydi, inson qadri poymol bo‘ladi.Shu bois har birimiz tinchlikni ko‘z qorachig‘idek asrashimiz kerak. Bu yo‘lda yosh avlodni vatanparvarlik ruhida tarbiyalash, ularga tinchlikning qadrini anglatish muhim ahamiyatga ega. Chunki bugungi tinchlik — ertangi farovon hayotimizning poydevoridir.

Asosiy qism: Ma’naviyat va ma’rifat, din-u diyonat va ilm-u urfon o‘chog‘i bo‘lgan diyorimizda istiqlol sharofati bilan milliy qadriyatlarimiz qayta tiklandi, xalqimiz o‘zligini tanidi. Islom dinining insonlarni ezgulik, ma’rifat va poklikka yo‘llovchi asl mohiyatini tadqiq va targ‘ib qilish, ulug‘ ajdodlarimizning boy va Benazir ma’naviy merosini o‘rganish, yosh avlodga o‘rgatish uchun keng yo‘l ochildi.

Ayniqsa, Harakatlar strategiyasi doirasida mamlakatimizda Uchinchi Renessansning ilmiy-ma’naviy poydevorini qaror toptirish, yoshlarni Vatanga muhabbat, milliy-diniy qadriyatlarga hurmat ruhida tarbiyalash, mamlakatimizning islom sivilizatsiyasini rivojlantirishdagi rolini yanada oshirish hamda buyuk allomalarimizning jahon tamadduniga qo‘shgan hissasini milliy va xalqaro miqyosda ommalashtirish davlat siyosatining ustuvor yo‘nalishlaridan biriga aylandi. Prezidentimiz Shavkat Mirziyoyev tashabbusi bilan yurtimizda so‘nggi yillarda bu borada amalga oshirilgan islohotlar va uning natijalari xalqaro hamjamiyat tomonidan

yuqori baholanayotir. Binobarin, mamlakatimizda turli millat va konfessiyalar o‘rtasida o‘zaro hurmat, birdamlik va hamkorlik muhitini mustahkamlash, madaniyatlararo muloqotni qo‘llab-quvvatlash hamda tinchlik va totuvlikni ta’minlashga oid izchil va puxta o‘ylangan siyosat xalqaro hamjamiyat tomonidan to‘liq qo‘llab-quvvatlanmoqda.

O‘zbekiston Respublikasi mustaqillikka erishgan dastlabki kunlardan boshlab millatlararo totuvlik va dinlararo bag‘rikenglik g‘oyasini hayotga tatbiq etishga alohida e’tibor qaratdi. Millatlararo va konfessiyalararo totuvlikni rivojlantirish uchun barcha huquqiy asos va zarur shart-sharoitlar yaratildi. *“Hamma uchun vijdon erkinligi kafolatlanadi. Har bir inson xohlagan dinga e’tiqod qilish yoki hech qaysi dinga e’tiqod qilmaslik huquqiga ega. Diniy qarashlarni majburan singdirishga yo‘l qo‘yilmaydi.”* **O‘zbekiston Respublikasining Konstitutsiyasi, 31-modda.**

Mazkur fikrning amaliy ifodasi sifatida bugungi kunda O‘zbekiston ko‘p millatli va ko‘p konfessiyali davlat sifatida butun dunyoga namuna bo‘lib kelmoqda. Xususan, yurtimizda **130 dan ortiq millat va elat vakillari hamda 16 ta diniy konfessiya vakillari** tinch-totuv, o‘zaro hurmat va hamjihatlik muhitida yashab kelmoqda . Turli millat va din vakillarining yagona Vatan — O‘zbekiston ravnaqi yo‘lida birlashib yashayotgani jamiyatimizdagi barqarorlik va tinchlikning mustahkam poydevorini tashkil etadi. Bu esa yurtimizda olib borilayotgan oqilona siyosat, inson qadri va bag‘rikenglik tamoyillariga asoslangan yondashuvning yorqin natijasidir.

Bugun O‘zbekiston erishayotgan yutuqlarda saxovatli zaminda yashab, ijod qilib, halol mehnati bilan boshqalarga o‘rnak bo‘layotgan barcha millat vakillarining munosib hissasi bor. Yurtimizda yashayotgan turli millat va elat ahli mustahkam do‘stlik rishtalari atrofida yashab, o‘z orzu-istaklari ro‘yobini ko‘rmoqda. Mamlakatimiz maktablarida bolalarga 7 tilda ta’lim beriladi. Teleko‘rsatuv va radioeshittirishlar 12 tilda efirga uzatilmoqda hamda 10 tilda ga zeta va jurnallar chop etilmoqda. Keyingi yillarda turli millatlarning 150 nafar vakili davlatimizning yuksak mukofotlari — orden va medallar bilan taqdirlandi. Shulardan 5 nafari O‘zbekiston Qahramoni degan yuksak unvonga munosib topilgan.Bugungi kunda xalqlar va dinlar orasidagi bag‘rikenglik, tolerantlik g‘oyasi dunyoda eng dolzarb masalalardan biri hisoblanadi.

“Tolerantlik” lotincha so‘z bo‘lib, sabr-toqat, chidam va bardosh ma’nolarini anglatadi. Ushbu so‘z o‘zgalarning fikr-g‘oyalari, e’tiqodi, his-tuyg‘ulari, turmush tarzi va xulq-atvoriga nisbatan sabr-toqatli bo‘lishni ko‘rsatadi.

Bag‘rikenglik yoki tolerantlik atamasini immunolog olim P.Madevar tomonidan 1953-yilda muomalaga kiritilgan. Olimning ta’kidlashicha, tolerantlik immunitetiga

ega bo‘lgan sog‘lom organizmning yot jismlarga qarshi immun ta’sirining susayishi yoki yo‘qolishidir.Tolerantlik – insonning har qanday vaziyatda erkin faoliyat ko‘rsatish jarayonida oqilona me’yor va murosa muvozanatini ta’minlash tamoyiliga rioya qilishidir. U o‘z ichiga sabr-chidam, mehr-shafqat, murosaga qilish, hamjihatlik, demokratiya, oqilona me’yor, o‘zaro hurmat, insonparvarlik, xalqparvarlik va boshqa yaxshi ishlarni oladi.

Bu tamoyilning ijtimoiy muhitdagi o‘rnini belgilashda axloq, an’analar, jamoatchilik fikri, turmush tarzi, din, ishlab chiqarish usullari, jamiyatning intellektual-aqliy darajasi singari omillar ta’sir ko‘rsatadi. Uning asosi-aql, ko‘ngil ekanligini, uning mahsuli esa shaxsning komilligini belgilashini, uning mezoni-shaxsning sabrliligining namoyon bo‘lishi ekanligini e’tirof etadi. Bag‘rikenglik tamoyili ezgulik, adolat, go‘zallik, insonparvarlik tamoyillari bilan mushtarak holda dunyoda tinchlik va osoyishtalik uchun xizmat qilmoqda.

BMT tomonidan 1995-yil tolerantlik-bag‘rikenglik, sabr-toqatlilik yili deb e’lon qilingan edi va shu yili 16-noyabrda YUNESKO Bosh konferensiyasida “Bag‘rikenglik tamoyillari Deklaratsiyasi” imzolandi. Bu Deklaratsiyaga jahonning 185 davlatida, shu jumladan O‘zbekistonda ham qat’iy amal qilinadi.Bag‘rikenglikni saqlash, mustahkamlash va uni yangi ko‘rinishlarda namoyon etish bugungi kun davlat siyosatining ustuvor yo‘nalishiga aylangan. Bag‘rikenglikni kunlik hayotimizga singdirish, keng joriy etish tizimli ravishda izchillik bilan tashkil etilmoqda.

Bag‘rikenglik bizning xalqimizga xos. Bizning xalqimizda “Kattaga hurmatda, kichikka izzatda bo‘l” degan maqol bor. Bu naqadar zarur va manfaatli maqol bizning millatimizga taalluqli. Ya’ni odamlar o‘rtasida o‘zaro hurmat zarur. Hurmat va izzat haqidagi so‘zlarni biz bolaligimizdan ota-onalarimizdan, ustozlarimizdan va kattalardan eshitganmiz va amalda bo‘lib kelmoqda. Urf-odatimiz bo‘lgan hurmat va izzat maqoliga amal qilib kelamiz. Ota-onalarga, ustozlar va kattalarga hurmat bilan qarash, do‘stlar, tanishlar va atrofdagilar bilan o‘zaro hurmatda bo‘lish kabi xususiyatlar ham bag‘rikenglikdir.

Xulosa qilib aytganda, O‘zbekistonda hukm surayotgan tinchlik va osoyishtalik — xalqimizning eng bebaho boyligidir. Bu ne’mat uzoq tarixiy jarayonlar, sinovlar va sabr-toqat evaziga qo‘lga kiritilgan bo‘lib, uni asrash har birimizning muqaddas burchimizdir. Yurtimizda turli millat va din vakillarining o‘zaro hurmat, bag‘rikenglik va hamjihatlik asosida yashayotgani esa tinchlikning eng muhim tayanchidir.Bugungi kunda davlatimiz tomonidan olib borilayotgan oqilona siyosat, qonun ustuvorligi va inson qadri tamoyillari jamiyatda barqarorlikni yanada mustahkamlashga xizmat qilmoqda.

Shu bois har bir fuqaro tinchlikni qadrlashi, uni ko‘z qorachig‘idek asrashi va kelajak avlodlarga yetkazishi zarur.Zero, tinchlik bor joyda taraqqiyot, farovonlik va baxt-saodat barqaror bo‘ladi. Tinch va farovon O‘zbekiston esa har birimizning orzuyimiz va umumiy mas’uliyatimizdir.

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VODOROD ENERGETIKASI VA UNI OLISHNING KIMYOVIY USULLARI

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ANNOTATSIYA: Ushbu maqolada vodorod energetikasining zamonaviy rivojlanish bosqichlari, uning energetika sohasidagi ahamiyati hamda vodorod olishning asosiy kimyoviy usullari keng yoritilgan. Vodorod ekologik toza yoqilg‘i sifatida qaralib, global energiya muammolarini hal etishda muhim rol o‘ynaydi. Maqolada suvning elektrolizi, tabiiy gazni bug‘-reforming usuli, biomassa asosida vodorod olish va boshqa zamonaviy texnologiyalar tahlil qilinadi. Shuningdek, ushbu usullarning samaradorligi, iqtisodiy jihatlari va ekologik ta’siri baholanadi. Tadqiqot natijalari vodorod energetikasini rivojlantirish istiqbollarini ko‘rsatadi.

KALIT SO‘ZLAR: vodorod, vodorod energetikasi, elektroliz, reforming, kataliz,yashilenergiya

АННОТАЦИЯ: В данной статье рассматриваются современные направления развития водородной энергетики, её значение в энергетической системе, а также основные химические методы получения водорода. Водород рассматривается как экологически чистое топливо, способное решить глобальные энергетические проблемы. В работе проанализированы методы получения водорода, включая электролиз воды, паровой риформинг природного газа, а также получение из биомассы. Особое внимание уделено эффективности, экономическим аспектам и экологическому воздействию данных технологий. Результаты исследования показывают перспективность развития водородной энергетики.

НА РУССКОМ ЯЗЫКЕ: водород, водородная энергетика, электролиз, риформинг, катализ, зелёная энергия

ABSTRACT: This article discusses the current development of hydrogen energy, its importance in the energy sector, and the main chemical methods of hydrogen production. Hydrogen is considered an environmentally friendly fuel with great potential to solve global energy challenges. The paper analyzes key hydrogen production methods, including water electrolysis, steam reforming of natural gas, and biomass-based production. Special attention is given to the efficiency, economic

feasibility, and environmental impact of these technologies. The results highlight the перспективы развития hydrogen energy systems.

IN ENGLISH: hydrogen, hydrogen energy, electrolysis, reforming, catalysis, green energy.

ASOSIY QISM

Bugungi kunda energiya resurslariga bo‘lgan talabning ortib borishi va an’anaviy yoqilg‘i manbalarining kamayib borishi insoniyatni muqobil energiya manbalarini izlashga undamoqda. Shu nuqtai nazardan vodorod energetikasi istiqbolli yo‘nalishlardan biri sifatida qaralmoqda. Vodorod yuqori energiya sig‘imiga ega bo‘lgan va yonish jarayonida faqat suv hosil qiladigan ekologik toza yoqilg‘i hisoblanadi.

Vodorod energetikasining rivojlanishi global iqlim o‘zgarishi muammosini kamaytirish, karbonat angidrid chiqindilarini qisqartirish va energiya xavfsizligini ta’minlashda muhim ahamiyatga ega. Shu sababli vodorod olishning samarali va iqtisodiy jihatdan maqbul usullarini ishlab chiqish dolzarb ilmiy masala hisoblanad
Vodorod olishning asosiy kimyoviy usullari turli xomashyo va texnologiyalarga asoslanadi. Eng keng tarqalgan usullardan biri suvning elektrolizi hisoblanadi.

Ushbu jarayonda suv elektr toki ta’sirida vodorod va kislorodga parchalanadi. Elektroliz ekologik toza usul bo‘lib, agar elektr energiyasi qayta tiklanuvchi manbalardan olinsa, to‘liq “yashil vodorod” ishlab chiqarish mumkin.
Ikkinchi muhim usul tabiiy gazni bug‘ yordamida qayta ishlash, ya’ni bug‘-reforming jarayonidir. Bu usulda metan suv bug‘i bilan reaksiyaga kirishib vodorod va karbonat angidrid hosil qiladi. Ushbu usul sanoatda eng keng qo‘llaniladigan texnologiya hisoblanadi, ammo CO_2 chiqindilari bilan bog‘liq kamchiliklarga ega.

Biomassadan vodorod olish ham istiqbolli yo‘nalishlardan biri hisoblanadi. Bu usulda organik chiqindilar yoki o‘simlik materiallari qayta ishlanib vodorod olinadi. Bundan tashqari, fotoelektrokimyoviy va biologik usullar ham ilmiy tadqiqotlar bosqichida keng o‘rganilmoqda.

Vodorod energetikasi zamonaviy energetika tizimida istiqbolli yo‘nalish sifatida qaralmoqda. Vodorod (H_2) yuqori issiqlik qiymatiga ega bo‘lib, yonish jarayonida faqat suv hosil qiladi, bu esa uni ekologik toza yoqilg‘i sifatida ajratib turadi. Vodorod ishlab chiqarishning turli kimyoviy va fizik-kimyoviy usullari mavjud bo‘lib, ularning har biri xomashyo turi, energiya manbai va texnologik sharoitga qarab farqlanadi.

Eng keng tarqalgan usullardan biri — **suv elektrolizi** hisoblanadi. Bu jarayonda elektr toki ta’sirida suv molekulalari vodorod va kislorodga ajraladi. 2H2O→2H2+O22H_2O \rightarrow 2H_2 + O_22H2O→2H2+O2

Elektroliz usulining asosiy afzalligi — toza vodorod olish imkoniyatidir. Agar elektr energiyasi quyosh, shamol yoki gidroenergetika kabi qayta tiklanuvchi manbalardan olinadigan bo‘lsa, bu jarayon “yashil vodorod” ishlab chiqarish deb ataladi. Biroq bu usul energiya jihatdan qimmat bo‘lib, katta elektr sarfini talab qiladi.

Ikkinchi muhim usul — **bug‘-reforming (steam reforming)** jarayonidir. Bu usulda tabiiy gaz (metan) suv bug‘i bilan yuqori haroratda reaksiyaga kirishadi: CH4+H2O→CO+3H2CH_4 + H_2O \rightarrow CO + 3H_2CH4+H2O→CO+3H2 Keyingi bosqichda uglerod oksidi suv bilan reaksiyaga kirishib qo‘shimcha vodorod hosil qiladi. Bu usul sanoatda eng ko‘p qo‘llaniladigan texnologiya bo‘lib, arzonligi bilan ajralib turadi, ammo CO_2 chiqindilari hosil bo‘lishi uning ekologik kamchiligidir.

Uchinchi yo‘nalish — **biomassadan vodorod olish**. Bu usulda o‘simlik qoldiqlari, organik chiqindilar yoki biogaz qayta ishlanadi. Bu jarayon nafaqat energiya ishlab chiqaradi, balki chiqindilarni utilizatsiya qilishga ham xizmat qiladi. Biomassa gazifikatsiyasi natijasida vodorod, karbonat oksid va metan aralashmasi hosil bo‘ladi.

Shuningdek, **fotoelektrokimyoviy usullar** ham rivojlanmoqda. Bu usulda quyosh energiyasi yordamida suv parchalanadi. Bu texnologiya hali to‘liq sanoat darajasiga chiqmagan bo‘lsa-da, kelajak uchun juda istiqbolli hisoblanadi.

MUAMMOLAR VA ULARNING TAHLILI

Vodorod energetikasi rivojlanayotgan bo‘lsa-da, uning keng miqyosda joriy etilishiga to‘sqinlik qiluvchi bir qator muhim muammolar mavjud. Ushbu muammolar texnologik, iqtisodiy, ekologik va infratuzilmaviy yo‘nalishlarda namoyon bo‘ladi.

Eng asosiy muammolardan biri vodorod ishlab chiqarishning qimmatligi hisoblanadi. Ayniqsa elektroliz jarayonida elektr energiyasi sarfi juda yuqori bo‘lib, bu umumiy tannarxni oshiradi. Hozirgi kunda “yashil vodorod” hali “kulrang vodorod” (tabiiy gazdan olinadigan) bilan raqobatlasha olmayapti.

Bug‘-reforming usulida vodorod olish jarayonida katta miqdorda karbonat angidrid ajralib chiqadi. Bu esa vodorod energetikasining ekologik afzalligini kamaytiradi. Shu sababli CO_2 ni tutib qolish texnologiyalarini (CCS) birgalikda qo‘llash zarur bo‘ladi.

Vodorod juda yengil gaz bo‘lib, uni saqlash uchun yuqori bosim yoki suyuq holat talab etiladi.Bu esa maxsus ballonlar, kriogen tizimlar va xavfsizlik infratuzilmasini talab qiladi. Vodorodning portlovchanligi ham xavfsizlik muammolarini keltirib chiqaradi.Hozirgi energetika tizimlari asosan neft va gazga moslashgan. Vodorod energetikasi uchun esa yangi quvurlar, stansiyalar va saqlash tizimlari kerak. Bu esa katta investitsiya talab qiladi.lektroliz uskunalarida ishlatiladigan katalizatorlar (platina, iridiy) juda qimmat. Bundan tashqari, ularning uzoq muddatli barqarorligi

ham muammo bo‘lib qolmoqda.Ushbu muammolarni tahlil qilganda, asosiy to‘siq — iqtisodiy samaradorlik va texnologik yetuklik yetishmasligi ekanligi aniqlanadi. Agar qayta tiklanuvchi energiya narxi kamaytirilsa va arzon katalizatorlar ishlab chiqilsa, vodorod energetikasi keng miqyosda rivojlanishi mumkin.

XULOSA

Xulosa qilib aytganda, vodorod energetikasi zamonaviy ilm-fan va energetika tizimlarining eng istiqbolli yo‘nalishlaridan biri bo‘lib, u global miqyosda yuzaga kelayotgan energiya tanqisligi va ekologik muammolarni hal etishda muhim o‘rin tutadi. Vodorodning asosiy afzalligi shundaki, u yonish jarayonida faqat suv hosil qiladi va atmosferaga zararli gazlar chiqarmaydi. Shu sababli u “toza energiya tashuvchisi” sifatida qaraladi. Olib borilgan tahlillar shuni ko‘rsatadiki, vodorod ishlab chiqarishning turli kimyoviy usullari mavjud bo‘lib, ular orasida suv elektrolizi, bug‘-reforming, biomassa gazifikatsiyasi va fotoelektrokimyoviy usullar eng muhim hisoblanadi. Har bir usul o‘zining texnologik imkoniyatlari bilan birga ma’lum cheklovlarga ham ega. Masalan, elektroliz usuli ekologik jihatdan eng toza bo‘lsa-da, yuqori energiya sarfi bilan ajralib turadi. Bug‘-reforming usuli esa arzonroq bo‘lsa-da, karbonat angidrid chiqindilarining hosil bo‘lishi bilan bog‘liq ekologik muammolarni yuzaga keltiradi.

Shuningdek, vodorod energetikasining keng joriy etilishiga to‘sqinlik qilayotgan asosiy omillar sifatida iqtisodiy xarajatlarning yuqoriligi, saqlash va transport qilishdagi texnik murakkabliklar hamda yetarli infratuzilmaning yo‘qligi qayd etiladi. Vodorodning yuqori reaktivligi va past zichligi uni xavfsiz saqlash va tashishni murakkablashtiradi, bu esa qo‘shimcha texnologik yechimlarni talab qiladi.

Shu bilan birga, so‘nggi yillarda olib borilayotgan ilmiy tadqiqotlar vodorod energetikasini rivojlantirish bo‘yicha yangi imkoniyatlar ochmoqda. Xususan, qayta tiklanuvchi energiya manbalari asosida “yashil vodorod” ishlab chiqarish, yangi avlod katalizatorlarini yaratish hamda samarali saqlash texnologiyalarini ishlab chiqish ushbu sohaning kelajakdagi asosiy yo‘nalishlari hisoblanadi.

Vodorod energetikasining rivojlanishi nafaqat energetika tizimini diversifikatsiya qilishga, balki karbonat angidrid chiqindilarini sezilarli darajada kamaytirishga ham xizmat qiladi. Bu esa global iqlim o‘zgarishiga qarshi kurashda muhim ilmiy-amaliy ahamiyat kasb etadi.

Umuman olganda, vodorod energetikasi kelajakda an’anaviy yoqilg‘i manbalarini bosqichma-bosqich almashtirishi va barqaror rivojlanish tamoyillariga asoslangan yangi energiya tizimini shakllantirishi mumkin. Buning uchun esa ilmiy

izlanishlarni chuqurlashtirish, innovatsion texnologiyalarni joriy etish va xalqaro hamkorlikni kengaytirish zarur bo‘ladi.

Shunday qilib, vodorod energetikasi istiqbolli, ekologik toza va strategik ahamiyatga ega yo‘nalish bo‘lib, uning rivojlanishi insoniyatning energetik kelajagini belgilab beruvchi muhim omillardan biri hisoblanadi.

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“TERMIZ ORQALI O‘TUVCHI XALQARO TRANSPORT YO‘LAKLARI XAVFSIZLIGINI HUQUQIY TA’MINLASH”

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Anotatsiya: Ushbu maqolada Termiz orqali o‘tuvchi xalqaro transport yo‘laklari xavfsizligini huquqiy ta’minlash masalalari milliy va xalqaro huquqiy asoslar doirasida tahlil qilingan. Maqolada O‘zbekiston Respublikasining transport sohasidagi qonunchiligi, xususan “Transport to‘g‘risida”, “Avtomobil transporti to‘g‘risida” hamda “Temir yo‘l transporti to‘g‘risida”gi qonunlarning transport xavfsizligini ta’minlashdagi o‘rni yoritilgan. Shuningdek, Jinoyat kodeksining transport xavfsizligi bilan bog‘liq normalari, terrorizm va noqonuniy yuk tashish xavflarining oldini olishga qaratilgan mexanizmlar tahlil etilgan.

Shuningdek, xalqaro huquqiy hujjatlar, jumladan CMR, TIR, ADR, Chicago va Montreal konvensiyalarining xalqaro transport yo‘laklari xavfsizligini ta’minlashdagi ahamiyati ochib berilgan. Ayniqsa, Termiz-Hayraton-Mozori Sharif temir yo‘l yo‘nalishi hamda Transafg‘on transport koridorining mintaqaviy integratsiya, tranzit salohiyatini oshirish va Markaziy hamda Janubiy Osiyoni bog‘lashdagi strategik roli huquqiy jihatdan asoslab berilgan. Transport yo‘laklari xavfsizligini ta’minlashda bojxona nazorati, elektron hujjatlashtirish, risklarni boshqarish tizimi va xalqaro hamkorlikning muhimligini ta’kidlangan.

Kalit so‘zlar: xalqaro transport yo‘laklari, transport xavfsizligi, Termiz, Transafg‘on temir yo‘li, tranzit, CMR konvensiyasi, TIR tizimi, ADR konvensiyasi, bojxona nazorati, logistika, xalqaro huquq.

KIRISH. “Bu soha – iqtisodiyotning qon tomiri. Transport va logistikani yangi bosqichga olib chiqmasak, iqtisodiyotning barqaror rivojini ta’minlay olmaymiz”.- dedi Shavkat Mirziyoyev[1].

[1] https://www.gazeta.uz/oz/2022/09/29/transport/

Hozirgi globallashuv va iqtisodiy integratsiya jarayonlari sharoitida xalqaro transport yo‘laklari davlatlar o‘rtasidagi savdo-iqtisodiy aloqalarni rivojlantirishning asosiy omillaridan biri sifatida namoyon bo‘lmoqda. Transport-kommunikatsiya tizimining samarali faoliyat yuritishi mamlakatlarning iqtisodiy taraqqiyoti, tashqi savdo hajmining oshishi hamda logistika jarayonlarining optimallashuviga bevosita ta’sir ko‘rsatadi. Shu bilan birga, transport yo‘laklari xavfsizligini ta’minlash masalasi zamonaviy sharoitda milliy xavfsizlikning muhim tarkibiy qismi sifatida alohida ahamiyat kasb etmoqda. O‘zbekiston Respublikasi Markaziy Osiyoning markazida joylashgan bo‘lib, uning qulay geografik o‘rni mamlakatni xalqaro transport yo‘laklari kesishgan strategik hududga aylantiradi. Ayniqsa, Surxondaryo viloyatining Termiz shahri orqali o‘tuvchi transport yo‘nalishlari Markaziy va Janubiy Osiyo mintaqalarini bog‘lovchi muhim logistika markazi hisoblanadi. Ushbu yo‘laklar orqali yuk tashish hajmining ortib borishi, o‘z navbatida, transport xavfsizligini ta’minlash, huquqiy tartibga solish mexanizmlarini takomillashtirish hamda zamonaviy xavf-xatarlarga moslashgan boshqaruv tizimini joriy etish zaruratini yuzaga keltirmoqda.

Sovet Ittifoqi davrida [2] 1924 - 1991-yillarda transport tizimi SSSRning markazlashgan rejalashtirish siyosatiga to‘liq bog‘liq holda shakllangan bo‘lib, asosiy e’tibor temir yo‘l transportini rivojlantirishga qaratilgan edi. Shu bilan birga, aviatsiya va avtomobil transporti tarmoqlari ham asta-sekin taraqqiy eta boshladi. Ayniqsa, temir yo‘l hamda sanoat transporti izchil rivojlandi, 1977-yilda Toshkent metropoliteni ishga tushirildi. Mazkur davrda transport infratuzilmasi asosan ichki iqtisodiy ehtiyojlarni qondirishga moslashtirilgan edi.

Mustaqillikdan keyingi 1991-2000-yillarda transport tizimi mustaqil boshqaruv tizimiga o‘tkazildi, biroq sobiq davrdan meros qolgan infratuzilma sezilarli darajada eskirgan edi. Shu bois, mavjud yo‘llarni ta’mirlash va modernizatsiya qilish ustuvor vazifaga aylandi. 1994-yilda “O‘zbekiston temir yo‘llari” aksiyadorlik jamiyati tashkil etildi, yangi avtomobil yo‘llari hamda ko‘priklar qurilishi yo‘lga qo‘yildi. Shuningdek, mamlakat xalqaro transport tashkilotlari bilan hamkorlik aloqalarini yo‘lga qo‘ya boshladi.

Shundan so‘ng 2000-2016-yillar oralig‘ida transport tizimini modernizatsiya qilish va xalqaro integratsiyani kuchaytirish jarayoni jadallashdi. Transport infratuzilmasi texnik jihatdan yangilanib, xalqaro avtomobil va temir yo‘l yo‘laklarini rivojlantirishga alohida e’tibor berildi. Aviatsiya sohasida ham sezilarli o‘sish kuzatildi. 2011-yilda Toshkent-Samarqand yo‘nalishida tezyurar poyezd qatnovi

[2] https://weconomist.tsue.uz/media/publications/International_Transport_-Corridors.pdf

yo‘lga qo‘yildi, xalqaro yuk tashish tizimi takomillashtirildi hamda aviakompaniyalar o‘rtasida raqobat muhiti kuchaydi.

2017-yildan hozirgi kungacha bo‘lgan davrda transport sohasida keng ko‘lamli islohotlar amalga oshirilib, infratuzilmani modernizatsiya qilish jarayoni yanada jadallashdi. O‘zbekiston Yevroosiyo transport koridorlarida faol ishtirok etib, o‘z tranzit salohiyatini oshirib bormoqda. Xalqaro avtomobil va temir yo‘l yo‘nalishlari kengaytirildi, “Ochiq osmon” [3] siyosati joriy etildi hamda zamonaviy logistika markazlarini rivojlantirishga katta e’tibor qaratilmoqda.

O‘zbekiston Respublikasida transport yo‘laklari xavfsizligini ta’minlashda amal qilayotgan milliy qonunchilik asoslarini tizimli va huquqiy jihatdan tahlil qilishga bag‘ishlanadi. Transport yo‘laklari xavfsizligi yuqorida ham ta’kidlab o‘tilganidek transport tizimining uzluksiz, samarali va xavfsiz faoliyat yuritishini ta’minlashga qaratilgan huquqiy, tashkiliy va texnik chora-tadbirlar yig‘indisidir. Ushbu tushuncha quyidagi asosiy elementlarni o‘z ichiga oladi: transport infratuzilmasining xavfsizligi; yuk va yo‘lovchilar harakatining himoyasi; terrorizm va noqonuniy aralashuvlarga qarshi choralar; bojxona va chegara nazoratining samaradorligi; ekologik va texnogen xavfsizlik. O‘zbekiston Respublikasida transport yo‘laklari xavfsizligini ta’minlash bir qator qonun va normativ-huquqiy hujjatlar orqali tartibga solinadi. Ularning asosiylari quyidagilardan iborat:

Transport tizimi nafaqat iqtisodiy rivojlanish omili, balki inson hayoti va xavfsizligi bilan bevosita bog‘liq strategik soha hisoblanadi. Shu sababli O‘zbekiston Respublikasida transport faoliyatini tartibga solishda asosiy e’tibor aynan xavfsizlikni ta’minlashga qaratilgan bo‘lib, bu O‘zbekiston Respublikasining 09.08.2021 yildagi O‘RQ-706-son “Transport to‘g‘risida”gi Qonunida [4] aniq ifoda etilgan. Mazkur qonunga ko‘ra, transport xavfsizligi transport vositalari, infratuzilma va tashish jarayonlarini turli xavf-xatarlardan himoya qilishga qaratilgan kompleks huquqiy va tashkiliy choralar tizimini anglatadi. Eng muhim jihat shundaki, xavfsizlik faqat texnik masala emas, balki huquqiy nazorat va majburiyatlar tizimi orqali ta’minlanadi. Avvalo, transport vositalarining texnik sozligi xavfsizlikning asosiy sharti hisoblanadi. Qonun transport vositalarini muntazam texnik ko‘rikdan o‘tkazish, ularning standartlarga mosligini ta’minlashni majburiy etib belgilaydi. Bu esa avariyalar va texnogen xatarlarning oldini olishga xizmat qiladi. Shu bilan birga, harakat xavfsizligi

[3] https://daryo.uz/2023/10/18/ozbekistonda-ochiq-osmon-rejimi-joriy-etiladi/
[4] O‘zbekiston Respublikasining “Transport to‘g‘risida”gi Qonuni https://lex.uz/docs/-5563039

ham muhim yo‘nalish bo‘lib, unda yo‘l harakati qoidalariga rioya qilish, haydovchilarning malakasi va intizomi asosiy rol o‘ynaydi.

Transport xavfsizligining yana bir muhim jihati bu favqulodda vaziyatlarga tayyorgarlik hisoblanadi. Qonunchilikda transport tizimida yuzaga kelishi mumkin bo‘lgan avariyalar, tabiiy ofatlar yoki boshqa xavfli holatlarga tezkor javob berish mexanizmlari nazarda tutilgan. Bu orqali nafaqat xavfning oldi olinadi, balki uning oqibatlari ham minimal darajaga tushiriladi. Shuningdek, transport xavfsizligini ta’minlashda davlatning roli alohida ahamiyatga ega. Davlat organlari transport faoliyatini litsenziyalash, nazorat qilish va xavfsizlik talablariga rioya etilishini tekshirish orqali tizimli boshqaruvni amalga oshiradi. Bu esa transport sohasida yagona xavfsizlik standartlarini shakllantirish imkonini beradi. Xulosa qilib aytganda, transport xavfsizligi O‘zbekiston transport siyosatining markaziy elementi bo‘lib, u huquqiy, texnik va tashkiliy choralar uyg‘unligi orqali ta’minlanadi.

Transport xavfsizligi masalasi inson hayoti va sog‘lig‘ini himoya qilish bilan bevosita bog‘liq bo‘lgan ustuvor yo‘nalish hisoblanadi. O‘zbekiston Respublikasida ushbu soha maxsus qonunchilik bilan tartibga solinadi, xususan O‘zbekiston Respublikasining 674-I-son 29.08.1998-yilda qabul qilingan “Avtomobil transporti to‘g‘risida”gi Qonuni [5] hamda O‘zbekiston Respublikasining 27.11.2024-yildagi O‘RQ-1006-son “Temir yo‘l transporti to‘g‘risida”gi Qonuni[6] transport xavfsizligini ta’minlashning asosiy huquqiy poydevorini tashkil etadi. Avtomobil transporti sohasida xavfsizlik masalalari qonunning bir qator moddalarida aniq belgilangan. Jumladan, mazkur qonunning 29-moddasiga ko‘ra, Avtomobil transportida xavfsizlik va ekologik me’yorlarni ta’minlash ustuvor vazifa hisoblanadi. Tashuvchi yo‘lovchilar, bagaj va yuklarni tashishda fuqarolarning hayoti va sog‘lig‘ini muhofaza etishi, yo‘l harakati xavfsizligini ta’minlashi hamda atrof-muhitga salbiy ta’sirni kamaytirishi shart. Avtotransport korxonalari, avtovokzallar va avtobekatlar hududida transport vositalari harakati, shuningdek yuk ortish-tushirish ishlari amalga oshiriladigan maydonlar o‘ta xavfli zonalar hisoblanadi.

Ushbu hududlarda bo‘lish va ishlarni bajarish tartibi amaldagi qonunchilik hujjatlari bilan qat’iy belgilanadi. Zaharlovchi, portlovchi, yonuvchan, radioaktiv va boshqa xavfli yuklarni tashish faqat belgilangan maxsus qoidalarga muvofiq amalga oshirilishi lozim. Bunda tashuvchi ham, mijoz ham yuklarning xavfsiz ortilishi, tashilishi va tushirilishini ta’minlash uchun mas’uldir. Xavfli yuklarni qo‘riqlash va

[5] O‘zbekiston Respublikasining “Avtomobil transporti to‘g‘risida”gi qonuni https://lex.uz/docs/-22964
[6] O‘zbekiston Respublikasining 27.11.2024-yildagi O‘RQ-1006-son “Temir yo‘l transporti to‘g‘risida”gi Qonuni https://lex.uz/uz/docs/-7239390

kuzatib borish majburiy bo‘lib, u butun yo‘l davomida yukni jo‘natuvchi yoki qabul qiluvchi tomonidan ta’minlanadi. Xavfli yuklar ro‘yxati hamda ularni tashish tartibi O‘zbekiston Respublikasi Vazirlar Mahkamasi tomonidan tasdiqlanadi[7].

Temir yo‘l transportida xavfsizlik masalasi yanada kompleks va markazlashgan tarzda tartibga solinadi. O‘zbekiston Respublikasining “Temir yo‘l transporti to‘g‘risida”gi Qonunining 38-moddasiga ko‘ra, **harakat xavfsizligini ta’minlash, temir yo‘l transporti va boshqa texnik vositalardan foydalanish,** temir yo‘l transporti korxonalari va tashuvchilar yo‘lovchilar hayoti va sog‘lig‘i, yuklar hamda jo‘natmalarni xavfsiz tashishni, poyezdlar harakati xavfsizligini va xodimlar mehnati hamda atrof-muhit muhofazasini ta’minlaydi. Harakat xavfsizligini nazorat qiluvchi va avariya oqibatlarini bartaraf etuvchi maxsus bo‘linmalar tashkil etilishi mumkin. Xavfsizlik buzilishi bilan bog‘liq hodisalarni hisobga olish va tekshirish tartibi O‘zbekiston Respublikasi Transport vazirligi tomonidan belgilanadi. Shuningdek, **39-moddaga muvofiq temir yo‘lda tashish xavfsizligini ta’minlashga qaratilgan davlat nazorati** ichki ishlar organlari, Davlat xavfsizlik xizmati va vakolatli organlar tomonidan amalga oshiriladi[8]

Transport yo‘laklari xavfsizligini ta’minlashda jinoyat-huquqiy normalar muhim o‘rin tutadi. Xususan, O‘zbekiston Respublikasi “Jinoyat kodeksi”[9]ning 251[1]-moddasi uchinchi qismi kuchli ta’sir qiluvchi yoki zaharli moddalarni noqonuniy muomalaga kiritish bilan bog‘liq harakatlar uchun javobgarlikni belgilaydi. Ushbu norma transport xavfsizligi nuqtai nazaridan shuni anglatadiki, xalqaro transport yo‘laklari orqali bunday moddalarni olib kirish, olib chiqish yoki tashish jinoyat sifatida baholanadi. Ayniqsa, tranzit hududlar masalan, chegara punktlari, logistika markazlari orqali noqonuniy yuklarning harakati transport xavfsizligiga bevosita tahdid soladi.

Mazkur modda quyidagi jihatlar orqali transport xavfsizligi bilan uzviy bog‘liq hisoblanadi: noqonuniy yuk oqimini aniqlash va oldini olish; transport vositalaridan jinoyat sodir etish vositasi sifatida foydalanishga qarshi kurash; logistika tizimida xavfli moddalar aylanmasini cheklash.

Shu bilan birga, Jinoyat kodeksining 155-moddasi[10] (terrorizm bilan bog‘liq normalar) transport yo‘laklari xavfsizligini ta’minlashda alohida ahamiyatga ega. Mazkur norma transport infratuzilmasidan terroristik maqsadlarda foydalanish,

[7] O‘zbekiston Respublikasining “Avtomobil transporti to‘g‘risida”gi qonuni https://lex.uz/docs/-
[8] O‘zbekiston Respublikasining 27.11.2024-yildagi O‘RQ-1006-son“Temir yo‘l transporti to‘g‘risida”gi Qonuni https://lex.uz/uz/docs
[9] O‘zbekiston Respublikasi “Jinoyat kodeksi”https://lex.uz/docs/-111453
[10] O‘zbekiston Respublikasi “Jinoyat kodeksi”https://lex.uz/docs/-111453

portlashlar yoki boshqa xavfli harakatlarni amalga oshirishni jinoyat deb belgilaydi. Bu esa, strategik transport obyektlarini yo‘llar, ko‘priklar, chegara punktlarini himoya qilish; xalqaro tashuvlarda xavfsizlikni kuchaytirish; transport tizimining barqaror ishlashini ta’minlash kabi vazifalarni huquqiy jihatdan mustahkamlaydi.

So‘nggi yillarda O‘zbekistonda ishbilarmonlik va investitsiya muhitini yaxshilashga qaratilgan islohotlar transport sohasiga ham bevosita ta’sir ko‘rsatmoqda. Byurokratik to‘siqlarni qisqartirish, bojxona va chegara tartib-taomillarini soddalashtirish bir tomondan yuk tashish tezligini oshirsa, ikkinchi tomondan xavfsizlikni ta’minlash uchun zamonaviy nazorat mexanizmlarini joriy etishni talab etadi. Shu nuqtai nazardan, jinoyat-huquqiy normalar va iqtisodiy liberallashtirish siyosati o‘zaro muvozanatda bo‘lishi zarur. Jinoyat kodeksining yuqoridagi moddalari transport yo‘laklari xavfsizligini ta’minlashda profilaktika (oldini olish), javobgarlik va himoya mexanizmi sifatida xizmat qiladi. Ular orqali nafaqat noqonuniy moddalar aylanmasi, balki transport tizimidan terroristik va boshqa xavfli maqsadlarda foydalanishning ham oldi olinadi.

Bugungi kunda xalqaro transport yo‘laklari davlatlar iqtisodiy rivojlanishining ajralmas qismiga aylanib bormoqda. Ayniqsa, O‘zbekiston kabi tranzit salohiyati yuqori bo‘lgan davlatlar uchun transport tizimining samarali va xavfsiz ishlashi nafaqat iqtisodiy manfaat, balki milliy xavfsizlik masalasi ham hisoblanadi. Shu nuqtai nazardan, transport yo‘laklari xavfsizligini ta’minlashda ma’muriy-huquqiy mexanizmlarning o‘rni tobora ortib bormoqda.

Xalqaro transport yo‘laklari xavfsizligini ta’minlash bir qancha xalqaro normalar asosida tartibga solingan bir qancha konvensiyalar mavjud:

Xalqaro avtomobil transporti orqali yuk tashish jarayonlari ko‘plab davlatlar hududidan o‘tishi sababli yagona huquqiy tartibga ehtiyoj seziladi. Shu nuqtai nazardan, 1956-yilda qabul qilingan **CMR konvensiyasi** [11] xalqaro avtomobil tashuvlarida yuk tashish shartnomalarini tartibga soluvchi muhim xalqaro hujjat hisoblanadi. Mazkur konvensiya tashuvchi, yuk jo‘natuvchi va yuk qabul qiluvchining huquq va majburiyatlarini aniq belgilab, transport jarayonida huquqiy aniqlikni ta’minlaydi.

CMR konvensiyasining asosiy mazmuni xalqaro yuk tashish shartnomasini yagona standart asosida tartibga solishdan iborat. Ushbu konvensiyaga ko‘ra, yuk tashish jarayonida CMR yuk xati (consignment note) rasmiylashtiriladi. Bu hujjat yukning turi, miqdori, jo‘natuvchi va qabul qiluvchi haqidagi ma’lumotlarni o‘z ichiga

[11] https://unece.org/DAM/trans/conventn/cmr_r.pdf

oladi hamda tashish jarayonining huquqiy asosini tashkil etadi. Muhimi shundaki, CMR yuk xati barcha ishtirokchi davlatlar tomonidan tan olinadi va nizolar yuzaga kelganda asosiy dalil sifatida xizmat qiladi. Konvensiyaning muhim jihatlaridan biri - tashuvchining javobgarligini aniq belgilab berishidir. Agar yuk yo‘qolsa, shikastlansa yoki kechikib yetkazilsa, tashuvchi belgilangan tartibda moddiy javobgar bo‘ladi. Shu orqali yuk egalari manfaatlari himoya qilinadi va transport jarayonida intizom kuchayadi. Bundan tashqari, konvensiya fors-major holatlari va tashuvchini javobgarlikdan ozod etuvchi shartlarni ham aniq ko‘rsatib beradi.

O‘zbekiston CMR konvensiyasiga 1995-yilda qo‘shilgan bo‘lib [12], bu mamlakatda xalqaro avtomobil tashuvlarini huquqiy jihatdan tartibga solishda muhim bosqich bo‘ldi. Natijada milliy qonunchilik xalqaro standartlarga moslashtirildi va tashuvchilar uchun aniq huquqiy kafolatlar yaratildi. Bu esa O‘zbekistonning xalqaro transport yo‘laklaridagi ishtirokini kuchaytirishga xizmat qilmoqda. Zamonaviy bosqichda CMR konvensiyasi ham raqamlashtirish jarayonidan chetda qolmayapti. Xususan, e-CMR [13] (elektron yuk xati) tizimi joriy etilmoqda. Bu tizim qog‘oz hujjatlarni elektron shaklga o‘tkazish orqali hujjat aylanishini tezlashtiradi, shaffoflikni oshiradi va inson omilini kamaytiradi.

Xalqaro avtomobil transporti to‘g‘risidagi Konvensiya (TIR)[14] 1975-yilda Jenevada, Birlashgan Millatlar Tashkilotining Yevropa Iqtisodiy Komissiyasi tashabbusi bilan qabul qilingan. O‘zbekiston bu konvensiyaga 1995-yilda qo‘shilgan. U avtomobil transporti orqali xalqaro yuk tashish jarayonlarini soddalashtirish, bojxona protseduralarini yengillashtirish va davlatlar o‘rtasidagi savdo-sotiqni rivojlantirish uchun qulay huquqiy muhit yaratish maqsadida ishlab chiqilgan. Ushbu konvensiya yuk tashishda bojxona nazoratini minimallashtirish orqali yuklarning tezkor va samarali yetkazib berilishini ta’minlaydi. TIR tizimi orqali yuklarni bir davlatdan boshqasiga tashishda chegara bojxonasida yukni qayta tekshirish talab etilmaydi, bu esa transport jarayonini sezilarli darajada tezlashtiradi, xarajatlarni kamaytiradi va savdo aloqalarini mustahkamlaydi.

Xalqaro yuk tashish jarayonlarida TIR CARNET kitobchasi[15] 1975-yildan beri qo‘llanib kelinayotgan bo‘lsa-da, ushbu yo‘nalishda ilmiy tadqiqotlar yetarli darajada olib borilmagan. Bu masala yuzasidan amalga oshirilgan tadqiqotlar tahlili shuni ko‘rsatadiki, ular asosan MDH davlatlari doirasida olib borilgan. Jumladan,

[12] https://mintrans.uz/ru/news/elektron-yuk-xati-e-cmr-to-g-risidagi-bayonnoma-o-zbekiston-uchun-kuchga-kiradi
[13] https://www.mintrans.uz/news/elektron-yuk-xati-e-cmr-to-g-risidagi-bayonnoma-o-zbekiston-uchun-kuchga-kiradi.
[14] https://unece.org/sites/default/files/2021-02/TIR_Convention_Uzbekistan.pdf
[15] https://cyberleninka.ru/article/n/transport-logistikasida-tir-karnet-kitobchasi-qo-llanilishining-xalqaro-yuk-tashuvlardagi-ahamiyati

tadqiqotchilar K.V. Xolopov va O.V. Sokolova o‘z ilmiy ishlarida Yevroosiyo Iqtisodiy Ittifoqining (keyingi o‘rinlarda YeII) yagona transport hududini shakllantirish hamda savdo-iqtisodiy hamkorlikni rivojlantirishda kitobchaning roli va ahamiyatini tahlil qilganlar[16].

ADR Konvensiyasi[17] 1957-yilda Birlashgan Millatlar Tashkilotining Yevropa iqtisodiy komissiyasi tomonidan qabul qilingan bo‘lib, 1968-yilda kuchga kirgan, hozirda 50 dan ortiq davlat a’zo hisoblanadigan xavfli yuklarni xalqaro avtomobil transportida tashishga oid Yevropa bitimi hisoblanadi. Ayrim istisnolardan tashqari, mazkur kelishuv belgilangan talablar bajarilgan taqdirda avtomobillar orqali xalqaro miqyosda xavfli yuklarni tashishga ruxsat beradi. Yo‘l transportida muhim ahamiyat kasb etadigan O‘zbekiston Respublikasi ADR konvensiyasiga ham qo‘shilgan va xalqaro darajada qabul qilingan sifat me’yorlariga muvofiq xavfli yuklarni tashishda qo‘llaniladigan sisternalar, konteynerlar hamda qadoqlash vositalarini ishlab chiqarish uchun ishonchli xizmatlar ko‘rsatish tizimi hisoblanadi..Shu bois, xavfli yuklarni tashish doimo ehtiyotkorlikni talab qiladigan, maxsus jihozlar majmuasi va alohida transport standartlariga asoslangan jarayon hisoblanadi.

ADRning asosiy maqsadi xalqaro avtomobil tashuvlarida xavfsizlik darajasini oshirish. BMTning xavfli yuklarni tashish bo‘yicha tavsiyalariga muvofiq, boshqa transport turlariga uyg‘un holda xavfli yuklar, jumladan xavfli chiqindilarni tasniflash, qadoqlash, belgilash va sinovdan o‘tkazish qoidalari belgilab berilgan. Shuningdek, avtomobil orqali xavfli yuklarni tashuvchi transport vositalarini loyihalash, jihozlash va ulardan foydalanish shartlari ham aniqlashtirilgan. Konvensiyaga ko‘ra, barcha xavfli moddalar maxsus sinflarga ajratiladi, masalan, portlovchi moddalar, gazlar, yonuvchan suyuqliklar va boshqalar. Har bir sinf uchun alohida xavfsizlik talablari belgilangan. Xususan, yuklar maxsus qadoqlanishi, transport vositalari tegishli texnik holatda bo‘lishi hamda ular maxsus ogohlantiruvchi belgilar bilan jihozlanishi shart.

Xalqaro Fuqarolik Aviatsiyasi Konvensiyasi 1944-yilda imzolangan (Chicago Konvensiyasi) bu boradagi asosiy hujjat bo‘lib, u xalqaro havo transporti uchun huquqiy asosni tashkil etadi. Konvensiya, aviatsiya xavfsizligini ta’minlash uchun zarur bo‘lgan asosiy tamoyillarni belgilaydi va aviatsiya sohasidagi xalqaro huquqiy nizolarni hal qilish uchun yagona normativ bazani yaratadi. Ushbu konvensiya 191 ta davlat tomonidan tasdiqlangan va unda aviasiya xavfsizligini oshirish, samolyotlar va aeroportlarning xavfsizligini, shuningdek, huquqiy masalalarni hal qilish bo‘yicha aniq

[16] Холопов К.В., Соколова О.В. “Использование системы МДП во внешней торговле ЕАЭС”. Российский внешноэкономический вестник. №3. 2018 й. 84-96 бетлар

[17] ADR/konvensiyasi.pdf file:///C:/Users/user/Desktop

qoidalar belgilangan. Aviasiya xavfsizligini ta'minlash uchun ICAO "International Civil Aviation Organization" tomonidan qabul qilingan Annex 17 Aviation Security "Aviatsiya xavfsizligi" ham muhim ahamiyatga ega. Ushbu hujjat, aviasiya xavfsizligini ta'minlash uchun zarur bo'lgan choralar, xususan, terrorizm va boshqa xavf-xatarlarga qarshi kurashish, samolyotlarning xavfsizligini oshirish bo'yicha qoidalarni belgilaydi. Annex 17, aeroportlarda va havo transportida xavfsizlikni kuchaytirish uchun zarur bo'lgan barcha xavfsizlik choralari va protseduralarini ishlab chiqilgan.

Montreal Konvensiyasi[18] (Yo'lovchi tashish va xavfsizlik) zamonaviy xalqaro havo huquqining eng muhim hujjatlaridan biri bo'lib, u global aviatsiya tizimida yagona va izchil qoidalarni shakllantirishga xizmat qiladi. 1999-yilda International Civil Aviation Organization "Xalqaro fuqaro aviatsiyasi tashkiloti" tashabbusi bilan qabul qilingan ushbu Konvensiya ilgari amal qilgan Warsaw Convention[19] (Varshava Konvensiyasi) tizimini takomillashtirish va zamonaviy ehtiyojlarga moslashtirish zaruratidan kelib chiqqan.

Xalqaro havo tashuvlari tobora kengayib borayotgan bir davrda turli davlatlar o'rtasida yagona huquqiy me'yorlarning mavjud bo'lishi muhim ahamiyat kasb etadi. Montreal konventsiyasi aynan shu ehtiyojni qondiradi. U yo'lovchilar, bagaj va yuklarni haq evaziga xalqaro tashish jarayonida yuzaga keladigan munosabatlarni tartibga soladi. Konventsiya "xalqaro tashuv" tushunchasiga aniq ta'rif berib, turli yurisdiksiyalar o'rtasidagi nizolarni kamaytirishga xizmat qiladi. Shu orqali aviatsiya sohasida huquqiy aniqlik va barqarorlik ta'minlanadi.

O'zbekiston Respublikasi o'zining Markaziy Osiyodagi strategik geografik joylashuvi orqali xalqaro tranzit tizimiga integratsiyalashishda muhim ahamiyat kasb etuvchi transport-kommunikatsiya infratuzilmasini rivojlantirishda yetakchi o'rinni egallaydi. Bugungi kunda respublika eksport yuklarini global bozorga yetkazish uchun 9 ta asosiy temir yo'l va avtomobil yo'nalishidan foydalanmoqda[20].

1. Afg'oniston (Mozori Sharif) yo'nalishi G'alaba chegara punkti orqali amalga oshadi. Bu yo'lning umumiy uzunligi 933 km bo'lib, 858 km O'zbekiston hududiga, 75 km esa Afg'oniston (Xayraton-Mozori Sharif) hududiga to'g'ri keladi. Yuk yetkazib berishning o'rtacha muddati 4 kunni tashkil qiladi.

2. Bandar Abbos (Eron) porti orqali tranzit Turkmaniston orqali o'tadi. Ushbu yo'nalish orqali yuklar Fors ko'rfazi portlari (BAA - Jebel Ali, Ummon - Sohar,

[18]https://www.iata.org/en/programs/passenger/Montreal/Convention/establishes/,injury/baggage
[19] https://www.dhl.com/content/dam/dhl/local/at/dhl-global-forwarding/documents/pdf/at-global-forwarding-warsaw-convention-en.pdf
[20] https://mintrans.uz/useful-articles/o-zbekiston-respublikasining-xalqaro-transport-yo-laklari

Pokiston - Karachi, Hindiston - Mumbay, Bangladesh - Chittagong) va Janubi-Sharqiy Osiyo (Tailand, Malayziya, Indoneziya, Vetnam) davlatlariga yetkaziladi. Yo‘l uzunligi 2827 km, o‘rtacha transport muddati 13 kun bo‘lib, iqtisodiy jihatdan nisbatan tejamli variant hisoblanadi.

3. Xitoy yo‘nalishi orqali yuklar Lianyungang portigacha Do‘stlik chegara punkti orqali (Qozog‘iston orqali) yuboriladi. Yo‘l uzunligi 5908 km bo‘lib, yetkazib berish 14 kunni tashkil etadi.

4. Rossiyaning Uzoq Sharqidagi Naxodka porti yo‘nalishi orqali Qozog‘iston va Rossiya hududlaridan o‘tib, 8683 km masofani bosib o‘tiladi. Yetkazib berish vaqti - 22 kun.

5. Janubi-Sharqiy Osiyo va Xitoyning Sharqiy portlariga yetkazishda Oltinkol/Xorgos chegarasi orqali multimodal konteyner tashuvlari amalga oshiriladi. Xorgosgacha bo‘lgan yo‘l - 1292 km, Lianyunganggacha - 4900 km, yetkazib berish muddati - 13 kun.

6. TRASEKA yo‘nalishi (Transkavkaz yo‘lagi) orqali Turkmaniston, Kaspiy dengizi, Ozarbayjon va Gruziya (Poti, Batumi) portlariga yuk yetkaziladi. Yo‘nalish uzunligi - 2667 km, transport vaqti - 14 kun.

7. Yevropa Ittifoqiga olib boruvchi yo‘nalishlar - Chop (Ukraina) va Brest (Belorussiya) chegaralaridan o‘tadi. Masofa mos ravishda 4779 km (18 kun) va 4385 km (14 kun).

8. Boltiq portlariga olib boruvchi yo‘nalishlar - Klaypeda (Litva), Riga va Liepaya (Latviya), Tallinn (Estoniya) kabi portlarga yo‘naladi. Masofa 4263-4603 km oralig‘ida bo‘lib, yuk yetkazish muddati 14-16 kun.

9. Il’ichevsk (Ukraina) va Novorossiysk (Rossiya) portlariga Qozog‘iston va Rossiya orqali tranzit bilan o‘tish ko‘zda tutilgan. Masofa - 4239 km, yetkazib berish muddati - 15 kun.

Tarixan Markaziy Osiyo “Buyuk Ipak yo‘li” orqali yirik xalqaro bozorlarni bog‘lab kelgan muhim geostrategik hudud hisoblanadi. Zamonaviy sharoitda esa mintaqaning global transport yo‘laklari tizimiga integratsiyasini kuchaytirish maqsadida davlatlar o‘rtasidagi hamkorlikni kengaytirish alohida ahamiyat kasb etadi. Mavjud transport yo‘nalishlari katta salohiyatga ega bo‘lsa-da, Janubiy va Sharqiy Osiyoni Yevrosiyo davlatlari bilan bog‘lovchi yanada qisqa va samarali yo‘laklarni shakllantirish zarurati mavjud. BMT ekspertlari baholashlariga ko‘ra, Afg‘oniston va boshqa davlatlar o‘rtasida samarali transport hamkorligi yo‘lga qo‘yilsa, mintaqaviy YAIM yaqin o‘n yil ichida kamida ikki baravarga oshishi mumkin.Xususan, Afg‘oniston Markaziy va Janubiy Osiyoni bog‘lovchi tranzit mamlakat sifatida muhim

rol o‘ynashi ta’kidlandi. Mintaqalararo yuk ayirboshlash hajmini oshirish ishonchli transport yo‘llari infratuzilmasisiz imkonsizdir. Ekspertlarning fikricha, Mozori Sharif - Kobul - Peshovar temir yo‘l liniyasini qurish orqali O‘zbekiston va Pokiston o‘rtasidagi savdoni sezilarli kengaytirish mumkin.

Dengiz portlariga to‘g‘ridan-to‘g‘ri chiqish imkoniyati yo‘q bo‘lgan Markaziy Osiyo mamlakatlari uchun bu kabi quruqlikdagi transport yo‘llari nihoyatda muhimdir. Bu hudud transport aloqalaridagi cheklovlar sababli global integratsiyada chetda qolmoqda. Suvaysh kanalining vaqtincha yopilishi, Fors ko‘rfazi va Bob al-Mandeb bo‘g‘ozidagi xavfsizlik muammolari, G‘arbiy Osiyo portlarining haddan tashqari yuklanganligi, Hind okeanidagi qaroqchilik xavfi va dengiz yoqilg‘isi narxining o‘sishi quruqlikdagi alternativ yo‘llarga bo‘lgan ehtiyojni kuchaytirmoqda. O‘zbekiston Respublikasi Prezidenti Shavkat Mirziyoyev o‘z nutqlarida transport yo‘laklarini rivojlantirish masalasiga alohida urg‘u berib, “Markaziy va Janubiy Osiyo o‘rtasida ishonchli transport yo‘laklarini yaratish bu nafaqat iqtisodiy, balki strategik barqarorlik omilidir” deb ta’kidlagan.

Prezident Shavkat Mirziyoyev Birlashgan Millatlar Tashkiloti Bosh Assambleyasining ketma-ket sessiyalarida Afg‘oniston masalasini muntazam ravishda ko‘tarib kelmoqda. 2025 yil sentabr oyida bo‘lib o‘tgan 80-sessiyada u shunday degan edi: “Biz ushbu mamlakatda yirik iqtisodiy va infratuzilma loyihalarini amalga oshirish niyatidamiz. Afg‘oniston hududi orqali o‘tuvchi xalqaro ahamiyatga ega transport va energetika yo‘laklarini rivojlantirish bo‘yicha alohida BMT rezolyutsiyasini qabul qilishni taklif etamiz.”[21]

Hairatan-Mozori Sharif temir yo‘l liniyasi[22] (Hairatan-Mazar-i-Sharif railway) Afg‘oniston hududida qurilgan birinchi yirik umumiy tashuvchi temir yo‘l loyihasi sifatida mintaqaviy transport tizimida muhim burilish yasadi. Mazkur loyiha Afg‘onistonni Markaziy Osiyo bilan bog‘lash, uning tranzit salohiyatini oshirish hamda xalqaro yuk oqimlarini jadallashtirish maqsadida amalga oshirildi.

Loyiha qurilishi 2010-yil yanvar oyida boshlanib, shu yilning noyabr oyida yakunlandi. Sinov ishlari muvaffaqiyatli o‘tkazilgach, temir yo‘l liniyasi 2011-yil avgust oyida rasman foydalanishga topshirildi. Umumiy uzunligi 75 kilometrni tashkil etuvchi ushbu temir yo‘l O‘zbekiston Respublikasining Surxondaryo viloyatidagi Termiz shahri orqali chegaraga yaqin joylashgan Hairatan punktidan boshlanib, Afg‘oniston Islom Respublikasining shimoliy qismidagi Mozori Sharif shahrigacha

[21] https://president.uz/oz/lists/view/8525
[22] https://www.railway-technology.com/projects/hairatanuzbekistanra

yetib boradi. Shu tariqa, mazkur yo‘nalish ikki davlat o‘rtasidagi to‘g‘ridan-to‘g‘ri temir yo‘l aloqasini ta’minladi.

Loyiha ikki asosiy davlat - O‘zbekistan va Ag‘onistan hamkorligida amalga oshirildi. Qurilish ishlarini O‘zbekiston Respublikasining davlat temir yo‘l kompaniyasi - O‘zbekiston temir yo‘llari olib bordi. Ushbu kompaniya mintaqada bunday murakkab infratuzilma loyihalarini amalga oshirish tajribasiga ega yagona yirik operator sifatida tanlandi. Loyiha umumiy qiymati taxminan 170 million AQSh dollarini tashkil etib, uning asosiy qismi - 165 million dollar Asian Development Bank (Osiyo taraqqiyot banki) tomonidan kredit sifatida ajratildi. Qolgan 5 million dollar Afg‘oniston hukumati tomonidan moliyalashtirildi. Shu jihatdan loyiha xalqaro moliyaviy institutlar va milliy hukumatlar hamkorligining yorqin namunasi hisoblanadi.

Transafg‘on temiryo‘li loyihasi [23] 2021-2025-yillar davomida bosqichma-bosqich shakllangan muhim mintaqaviy tashabbusdir. 2021-yil fevral oyida Tashkent shahrida O‘zbekistan, Afg‘onistan va Pokistan o‘rtasida temiryo‘l qurilishi bo‘yicha “yo‘l xaritasi” imzolanishi bilan loyiha boshlandi.

2022-yil 18-iyulda Afg‘oniston hududida texnik-iqtisodiy asos (TIA) ishlab chiqish uchun ekspeditsiya ishlari boshlandi. 2023-yil 18-iyul kuni Islamabad shahrida temiryo‘lning yakuniy yo‘nalishi - Termizdan Peshovargacha bo‘lgan marshrut kelishib olindi. Shu yilning o‘zida Boshtransloyiha[24] va Ernst-Young hamkorligida dastlabki TIA (Texnik-iqtisodiy asosnoma) ishlab chiqildi.

2025-yil 17-iyulda Kobul shahrida uch davlat O‘zbekiston, Afg‘oniston va Pokiston o‘rtasida Transafg‘on temiryo‘lining to‘liq texnik-iqtisodiy asosini ishlab chiqish bo‘yicha uch tomonlama bitim imzoladi. Hujjatni O‘zbekiston transport vaziri, Afg‘oniston jamoat ishlari vaziri va Pokiston temir yo‘llari vaziri har uch mamlakat tashqi ishlar vazirlari ishtirokida imzoladilar. Shu tariqa loyiha amaliy bosqichga o‘tib, Markaziy va Janubiy Osiyoni bog‘lovchi strategik transport yo‘lagiga aylanish yo‘lida rivojlanmoqda.

O‘zbekiston-Afg‘oniston-Pokiston Trans-Afg‘oniston temir yo‘li “butun Yevroosiyo uchun strategik ahamiyatga ega. Ushbu koridor savdoni kuchaytiradi, Afg‘onistonning iqtisodiy tiklanishini qo‘llab-quvvatlaydi va Janubiy portlar orqali jahon bozorlariga yangi kirish imkoniyatini ochadi”, - dedi tashqi ishlar vaziri Baxtiyor Saidov[25].

[23] https://www.gazeta.uz/oz/2025/07/18/trans-afghan-railway/
[24] https://boshtrans.uz/assets/files/Strategiya/Strateg_BTL_2022_2026.pdf
[25] https://www.gazeta.uz/en/2025/07/18/trans-afghan-railway/

Mazkur yo‘nalishning huquqiy asoslari faqat xalqaro konvensiyalar bilan cheklanmaydi. O‘zbekistan va Afg‘onistan o‘rtasida tuzilgan hukumatlararo bitimlar ham muhim rol o‘ynaydi. Ushbu bitimlar temir yo‘l liniyasidan foydalanish, ekspluatatsiya qilish, texnik xizmat ko‘rsatish hamda tranzit yuk tashish tartiblarini aniq belgilab beradi. Xususan, temir yo‘lni boshqarish va xizmat ko‘rsatish O‘zbekiston temir yo‘llari tomonidan amalga oshirilishi logistika jarayonlarining yagona standart asosida tashkil etilishini ta’minlaydi. Yuklarni olib o‘tish tartibi bosqichma-bosqich amalga oshiriladi. Dastlab, yuklar O‘zbekiston hududida eksport yoki tranzit bojxona deklaratsiyasi asosida rasmiylashtiriladi va temir yo‘l vagonlariga yuklanadi. Shundan so‘ng ular Termiz orqali Hayratan chegara punktiga yetkaziladi. Chegarada bojxona va chegara nazorati amalga oshirilib, yuk hujjatlari tekshiriladi, plombalar ko‘zdan kechiriladi. Agar yuk TIR tizimi asosida tashilayotgan bo‘lsa, qo‘shimcha bojxona tekshiruvlari minimal darajaga tushiriladi.

Afg‘oniston hududiga kirishda esa yuklar bojxona rasmiylashtiruvidan o‘tadi. Agar yuk tranzit rejimida bo‘lsa, u soddalashtirilgan tartibda keyingi manzilga yo‘naltiriladi. Import rejimida esa tegishli bojxona to‘lovlari undiriladi. Mozori Sharifga yetib kelgach, yuklar temir yo‘l orqali tushiriladi va zaruratga qarab avtomobil transporti orqali mamlakat ichkarisiga yoki boshqa davlatlarga jo‘natiladi. Bojxona va chegara tartib-taomillarining zamonaviy mexanizmlari oldindan deklaratsiya qilish, risklarni boshqarish tizimi, elektron hujjatlashtirish va plombalash tizimi - ushbu yo‘nalishda keng qo‘llaniladi. Bu esa nafaqat yuk tashish tezligini oshiradi, balki korrupsiya va ortiqcha byurokratik to‘siqlarni kamaytirishga ham xizmat qiladi. Termiz - Mozori Sharif temir yo‘l yo‘nalishi xalqaro tranzit huquqi prinsiplari, TIR Convention 1975 va CMR Convention 1956 kabi konvensiyalar, shuningdek ikki tomonlama hukumatlararo bitimlar asosida faoliyat yuritadi. Ushbu huquqiy mexanizmlar uyg‘unligi mazkur transport yo‘lagining samarali ishlashini ta’minlab, uni mintaqadagi eng muhim logistika yo‘nalishlaridan biriga aylantiradi.

Xulosa

Xulosa qilib aytganda, xalqaro transport yo‘laklari xavfsizligini ta’minlash bugungi globallashuv sharoitida davlatning iqtisodiy barqarorligi, milliy xavfsizligi va xalqaro integratsiyasining muhim omillaridan biri hisoblanadi. O‘zbekiston Respublikasining geostrategik joylashuvi, ayniqsa Termiz orqali o‘tuvchi transport yo‘nalishlari Markaziy va Janubiy Osiyoni bog‘lovchi muhim tranzit hudud sifatida alohida ahamiyat kasb etadi. Shu sababli mazkur transport yo‘laklarining samarali va xavfsiz faoliyat yuritishini ta’minlash davlat siyosatining ustuvor yo‘nalishlaridan biri bo‘lib qolmoqda.

Tahlillar shuni ko‘rsatadiki, O‘zbekistonda transport xavfsizligini ta’minlash bo‘yicha mustahkam huquqiy baza shakllantirilgan. “Transport to‘g‘risida”, “Avtomobil transporti to‘g‘risida”, “Temir yo‘l transporti to‘g‘risida”gi qonunlar hamda Jinoyat kodeksining tegishli normalari transport infratuzilmasi, yuk va yo‘lovchilar xavfsizligini ta’minlash, terrorizm, noqonuniy yuk tashish va boshqa xavf-xatarlarga qarshi kurashishda muhim huquqiy asos vazifasini bajarmoqda. Shu bilan birga, CMR, TIR, ADR, Chicago va Montreal konvensiyalari kabi xalqaro huquqiy hujjatlar bilan uyg‘unlik transport tizimining xalqaro standartlar asosida rivojlanishiga xizmat qilmoqda. Ayniqsa, Termiz-Hayraton-Mozori Sharif temir yo‘li hamda Transafg‘on transport koridori nafaqat iqtisodiy, balki geosiyosiy va strategik jihatdan ham katta ahamiyatga ega. Ushbu loyihalar orqali O‘zbekistonning tranzit salohiyati oshib, mamlakatning xalqaro logistika tizimidagi o‘rni mustahkamlanmoqda. Shu bilan birga, transport yo‘laklari xavfsizligini ta’minlashda raqamlashtirish, elektron hujjatlashtirish, bojxona va chegara nazoratini soddalashtirish, risklarni boshqarish tizimlarini joriy etish kabi zamonaviy mexanizmlarni keng qo‘llash zarur hisoblanadi.

Kelgusida xalqaro transport yo‘laklari xavfsizligini yanada kuchaytirish uchun milliy qonunchilikni xalqaro standartlarga mos ravishda takomillashtirish, transport xavfsizligi bo‘yicha maxsus kodeks yoki yagona kompleks huquqiy mexanizm ishlab chiqish, shuningdek mintaqaviy hamkorlikni kengaytirish muhim ahamiyat kasb etadi. Bu esa O‘zbekistonning xalqaro transport tizimidagi raqobatbardoshligini oshirish, tranzit imkoniyatlarini kengaytirish va mintaqaviy barqarorlikni ta’minlashga xizmat qiladi.

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AL-HAKIM AT-TERMIZIYNING HAYOTI VA IJODI

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Annotatsiya. Ushbu maqolada Al-Hakim at-Termiziyning hayoti, ilmiy faoliyati hamda tasavvuf ta'limoti rivojiga qo'shgan hissasi izchil yoritiladi. Alloma IX asrda Termiz shahrida tug'ilib, yoshligidan diniy ilmlarni chuqur egallagan, hadis, fiqh va tasavvuf sohalarida yetuk olim sifatida shakllangan. Maqolada uning ilmiy safarlari, ustozlari va o'z davridagi ilmiy muhit bilan aloqalari haqida ham ma'lumot beriladi shuningdek, at-Termiziyning tasavvufiy qarashlari, xususan, "Xatm al-avliyo" asarida ilgari surilgan avliyolik tushunchasi, ruhiy kamolot bosqichlari va qalb pokligi haqidagi g'oyalari tahlil qilinadi. Uning insonning ma'naviy yetuklikka erishish yo'lidagi qarashlari, nafsni poklash va ilohiy muhabbatga erishish masalalariga alohida e'tibor qaratgani ko'rsatib beriladi.

Kalit so'zlar: Al-Hakim at-Termiziy, tasavvuf, islom ilmlari, Termiz, hadis ilmi, fiqh, avliyolik, "Xatm al-avliyo", ruhiy kamolot, qalb pokligi, nafs tarbiyasi, ilohiy muhabbat, mutasavviflar, islom tafakkuri, ilmiy meros, IX asr, sharq mutafakkirlari.

KIRISH

"Islom olamining yirik mutafakkiri, buyuk muhaddis va tasavvuf falsafasining asoschilaridan biri Abu Abdulloh Muhammad ibn Ali al-Hakim at-Termiziy o'zining serqirra ilmiy faoliyati bilan nafaqat Movarounnahr, balki butun jahon sivilizatsiyasi rivojiga ulkan hissa qo'shgan siymodir. IX asrda Termiz shahrida kamol topgan bu zot o'z davrining barcha fundamental ilmlarini puxta egallab, 'Hakim' (donishmand) degan yuksak unvonga sazovor bo'lgan. Uning qalamiga mansub 'Navodir al-usul', 'Xatm al-avliyo' kabi asarlar asrlar davomida islomiy tafakkurning durdonalari sifatida e'tirof etib kelinmoqda. At-Termiziy merosi nafaqat diniy ilmlar, balki inson ruhiyati, axloqiy poklanish va borliq sirlarini anglashda bugungi kun kishisi uchun ham beqiyos ma'naviy mayoq bo'lib xizmat qiladi. Mazkur maqolada olimning hayot yo'li, ilm yo'lidagi zahmatlari va boy ilmiy-falsafiy merosining mazmun-mohiyati tahlil etiladi".

HAYOTI VA IJODI HAQIDA

Bu allomaning to`liq ismi — Abu Abdulloh Muhammad ibn Ali ibn Hasan ibn Bashir (ayrim manbalarda Bishr) al-Hakim at-Termiziy. Hakim at-Termiziyning ilmiy va ijodiy faoliyati haqida ma`lumot Tojiddin Subkiy ("Tabaqot ash-shafi`-iyya al-Kubro"), Xotib al-Bag`dodiy ("Tarixi Bag`dod"), Ibn Hajar al-Asqaloniy ("Lison al-miyzon"), as-Sulamiy ("Tabaqot as-sufiyya") va boshqa bir qator olimlar asarlarida keltirilgan. Xakim at-Termiziy o`z hayoti to`g`risida o`zining "Bad`u sha`ni Abu Abdulloh" asarida bayon etadi. Bu asar 1965 yilda Bayrutda Yahyo Ismoil tomonidan olimning "Xatmul avliyo" asari bilan birga chop etilgan. Hakim at-Termiziyning tavalludi va vafoti sanalari yozma manbalar hamda hozirgi adabiyotlarda turlicha keltiriladi. Ba`zi mualliflar, masalan, Hoji Xalifa "Kashf az-zunun"da Hakim at-Termiziy vafoti yilini milodiy 869 yil deb ko`rsatgan. Allomaning qabr toshida ham shu sana keltirilgan. Hakim at-Termiziy yuz yildan oshiq vaqt umr ko`rganidan kelib chiqilsa, manbalarda ham u 112, 116, yoki hatto 120 yoshgacha umr ko`rgani keltiriladi, u holda alloma I taxminan 750 — 760 yillar oralig`ida tug`ilgan bo`lib chiqadi. Ayni mahalda bundan 30 yil oldin "Al-Hakim at-Termiziy va nazariyyatuhu fil valoyati" asarini yozgan misrlik mashhur olim Abdulfattoh Abdulloh Baraka Hakim at-Termiziy milodiy 820 yilda tavallud topib 112 yil yashab 932 yilda vafot etgan, deb yozgan. Allomaning bo-lalik va yoshlik yillari haqida manbalarda batafsil ma`lumot berilmagan. "Tarjimai hol" iga ko`ra, u sakkiz yoshidan boshlab diniy ilmlar bilan jiddiy shug`ullangan, yigirma sakkiz yoshida esa Makkaga haj safariga jo`nagan. Safardan qaytgach, Hakim at-Termiziy sufiylik yo`lini tutgan: xilvatga ketib, nafsi ammorani yengib, sufiyona risolalarni o`rgangan. Uning padari buzukvori Ali ibn Hasan bilimdon muhaddis olim bo`lgan, ilm izlab Bag`dodga borgan, o`sha davrning taniqli olimlari bilan xadisning turli masalalari borasida ilmiy munozaralarda faol ishtirok etgan. Volidai muhtara-masi hamda tog`asi ham hadisi nabaviyyaning durust bilimdonlari hisoblanishgan. Binobarin, Hakim at-Termiziy o`z dunyoqarashiga ulkan ta`sir ko`rsatgan bilimli va ilmiy muhitda voyaga yetgan.

Al-Hakim at-Termiziy asarlari

Xakim at-Termiziy qalamiga mansub asarlar soni to`g`risida yozma manbalarda turli raqamlarkeltirilgan. Ba`zi mualliflar uning asarlari adadi to`rt yuzga boradi, deyishgan. Biroq ko`pchilik mualliflar uning asarlari soni saksonga yaqin, deb hisoblashadi. Abdulfattox Abdulloh Baraka yozishicha, Hakim at-Termiziyshshg to`rt yuz asaridan oltmishga yaqini yetib kelgan. Eng muhimi, bizgacha allomaning ilmiy-ma`naviy merosining asosini tashkil qiluvchi asarlari yetib kelgan (2). Ular orasidan, eng avvalo, 291 hadisni o`z ichiga oluvchi "Navodir al-usul fi ma`rifat axbor ar-Rasul" nomli asarini ko`rsatib o`tish zarur. Bu asarda Hakim at-Termiziy dunyoqarashi muayyan darajada bayon etilgan. "Navodir al-usul"ning bir qo`lyozma nusxasi Toshkentda, O`zbekiston musulmonlari diniy idorasining kutubxona fondida saqlanadi. Allomaning nashr etilgan boshqa asarlaridan "Kitob xaqiqat al-odamiya", "Adab an-nafs"ni sanab o`tish lozim. Hakim at-Termiziy asarlarining katta qismi bizgacha qo`lyozma tarzida yetib kelgan hamda jahondagi turli qo`lyozma fondlarida saklanmokda. Chunonchi, alloma asarlarining qo`lyozmalari Parij, Qohira, Damashq, Iskandariya, Istambul va Londonda saqlanmoqda. Parij Milliy kutubxonasida (arab bo`limida 5018-inventar ostida) Hakim at-Termiziyning kuyidagi asarlari saqlanmoqda:

1. Kitob as-salot va maqosidiho.
2. Kitob al-hajj va asrorihi.
3. Kitob al-Ehtiyotot.
4. Kitob al-Jumal al-lozim ma`rifatiho.
5. Kitob al-Furuq va man` at-taroduf.
6. Kitob haqiqat al-odamiyya.
7. Kitob Urs al-muvahhadiyn.
8. Kitob al-A`zo val-nafs va yusammo kazalika g`avr al-umur.
9. Kitob Manozil al-ibod min al-ibodati.
10. Kitob al-Aql val-havo.
11. Kitob al-Amsol min al-Kitob vas-Sunna.
12. Kitob al-Manohiy.

Damashkda, az-Zohiriyya kutubxonasida Hakim at-Termiziyning ikki asari va besh risolasi qo`lyozmalari (tasavvuf turkumi, 104-raqami ostida); Misrdagi Iskandariya shahrida uch risolasi (Maktabat al-baladiyya, 3585-raqami ostida) saqlanmoqda.

Allomaning Londonda saqlanayotgan asarlari ro`yxatida beshta risola ko`rsatilgan. Qohirada, "Dor al-kutub al-ilmiyya"da "Ilal al-u`budiyya" asarining qo`lyozma nusxasi mavjud. "Kitob as-salot" asarining qisqartirilgan varianti bo`lgan bu risola ko`proq "Ilal ash-shariy`a" nomi bilan mashhur.

XULOSA VA MUNOZARA

Al-Hakim at-Termiziy ilmiy merosi nihoyatda boy va serqirra bo‘lib, uning asarlari soni haqida manbalarda turlicha ma’lumotlar uchraydi. Ayrim mualliflar u to‘rt yuzga yaqin asar yozganini ta’kidlasa, ko‘pchilik tadqiqotchilar uning asarlari soni sakson atrofida ekanini qayd etadilar. Shunga qaramay, bizgacha yetib kelgan asarlar allomaning ilmiy va ma’naviy qarashlarini o‘rganishda muhim ahamiyat kasb etadi. Ayniqsa, “Navodir al-usul fi ma’rifat axbor ar-Rasul” asari orqali uning hadis ilmi va tasavvufga oid qarashlari chuqur yoritilgan. Alloma asarlarining katta qismi qo‘lyozma shaklida saqlanib qolgan bo‘lib, ular dunyoning turli shaharlarida — jumladan Toshkent, Parij **Qohira**, **Damashq** va boshqa ilmiy markazlarda mavjud. Bu holat Al-Hakim at-Termiziy merosining nafaqat mahalliy, balki xalqaro miqyosda ham katta ahamiyatga ega ekanini ko‘rsatadi. Shu bilan birga, uning asarlari hali to‘liq o‘rganilmaganini ham ta’kidlash lozim. Ko‘plab qo‘lyozmalar ilmiy tadqiqotlarni kutmoqda. Bu esa zamonaviy olimlar oldida muhim vazifani — alloma merosini chuqur o‘rganish, ilmiy tahlil qilish va keng jamoatchilikka yetkazish zaruratini yuzaga keltiradi. Ayniqsa, uning asarlarida hadis ilmi bilan tasavvuf ta’limotining uyg‘unlashgani alohida e’tiborga loyiq bo‘lib, bu jihat uni boshqa olimlardan ajratib turadi.

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SHUKUR XOLMIRZAYEV ASARLARIDA INSON RUHIYATI VA ICHKI KECHINMALARI

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ANNOTATSIYA: *Ushbu maqolada O‘zbekiston xalq yozuvchisi Shukur Xolmirzayev ijodida inson ruhiyati, ichki kechinmalar va qahramonlar xarakterining ochib berilish mahorati tahlil qilinadi. Adibning hikoya va romanlaridagi psixologik tasvir vositalari "Bodom qishda gulladi" kabi asarlar misolida ko‘rib chiqiladi, shuningdek,O‘zbek adabiyotining yirik namoyandasi Shukur Xolmirzayev o‘z ijodi bilan milliy hikoyachilikni yangi bosqichga olib chiqqan adibdir. Uning asarlarini o‘qigan kitobxon shunchaki voqealar rivojini kuzatmaydi, balki qahramonning ichki dunyosi, ruhiy evrilishlari va murakkab kechinmalari girdobiga sho‘ng‘iydi. Xolmirzayev "inson ruhiyatining muhandisi" sifatida qahramonlari tilga olmagan, ammo qalbida kechayotgan titroqlarni mahorat bilan tasvirlaydi.*

KALIT SO‘ZLAR: *Ruhiy realizm, psixologizm, ichki monolog, xarakter, badiiy tasvir, epizod, syujet,tasvir, qahramon,badiiy mahorat, badiiy detal, ma'naviy izlanish, ziddiyat,ichki dunyo, inson ruhiyati.*

Abstract: *This article analyzes the mastery of revealing the human psyche, inner experiences, and character traits in the works of the People's Writer of Uzbekistan Shukur Kholmirzaev. The means of psychological depiction in the writer's stories and novels are considered on the example of such works as "Almond bloomed in winter," as well as Shukur Kholmirzaev, a major representative of Uzbek literature, is a writer who brought national storytelling to a new level with his work. By reading his works, the reader does not merely observe the development of events, but plunges into the protagonist's inner world, spiritual transformations, and complex experiences. Kholmirzaev, as an "engineer of the human psyche," skillfully describes the trembling that his characters do not mention, but which takes place in his soul.*

Keywords: *Spiritual realism, psychologism, inner monologue, character, artistic image, episode plot, image, hero, artistic skill, artistic detail, spiritual search, conflict, inner world, human psyche.*

Аннотация: *В данной статье анализируется мастерство раскрытия человеческой психики, внутренних переживаний и характеров героев в творчестве народного писателя Узбекистана Шукура Холмирзаева. Средства психологического изображения в рассказах и романах писателя рассматриваются на примере таких произведений, как "Миндаль цвел зимой," а также крупный представитель узбекской литературы Шукур Холмирзаев - писатель, который своим творчеством вывел национальное повествование на новый уровень. Читатель, прочитавший его произведения, не просто наблюдает за развитием событий, а погружается во внутренний мир героя, его духовные перемены и сложные переживания. Холмирзаев, как "инженер человеческой психики," мастерски описывает содрогания, которые не упоминают его герои, но происходят в его душе.*

Ключевые слова: *Духовный реализм, психологизм, внутренний монолог, характер, художественный образ, эпизод, сюжет, изображение, герой, художественное мастерство, художественная деталь, духовный поиск, конфликт, внутренний мир, человеческая психика.*

Annotasyon*: Bu makalede Özbekistan Halk Yazarı Şükür Holmirzayev'in eserlerinde insan ruhunun, içsel deneyimlerin ve karakterlerin karakteri açığa çıkarılmasının ustalığı analiz edilmektedir. Yazarın hikayeleri ve romanlarındaki psikolojik tasvir araçları, "Badem kışın çiçeklendi" gibi eserler örneğinde ele alınır, ayrıca Özbek edebiyatının büyük temsilcisi Şükür Holmirzayev, eserleriyle ulusal hikayeciliği yeni bir seviyeye taşıyan bir yazardır. Onun eserlerini okuyan okur sadece olayların gelişimini gözlemlemez, aynı zamanda kahramanın iç dünyasına, ruhsal evrimlerine ve karmaşık tecrübelerinin girdabına dalır. Holmirzayev, "insan ruhunun mühendisi" olarak, kahramanları tarafından bahsedilmeyen, ancak ruhunda yaşanan titremeleri ustalıkla tasvir eder.*

Anahtar kelimeler: *Ruhsal realizm, psikoloji, iç monolog, karakter, sanatsal tasvir, epizod, olay örgüsü, tasvir, kahraman, sanatsal ustalık, sanatsal detay, manevi arayış, çatışma, iç dünya, insan ruhu.*

Kirish. O‘zbek adabiyotining yirik vakili Shukur Xolmirzayev asarlarining markazida har doim Inson va uning murakkab ruhiy dunyosi turadi. Adibni haqli

ravishda "o‘zbek psixologik prozasining bayroqdori" deb atasak mubolag‘a bo‘lmaydi. U asarlarida shunchaki voqealarni bayon qilib bermaydi, balki o‘sha voqealar inson ruhida qanday aks-sado berayotganini, qahramonning ichki dunyosini qanday o‘zgartirayotganini tahlil qiladi.Ruhiy tahlilning o‘ziga xosligi.Shukur Xolmirzayev inson ruhiyatini tasvirlashda "ichki monolog" va "ruhiy siljish" usullaridan ustalik bilan foydalanadi. Uning qahramonlari ko‘pincha o‘z-o‘zi bilan bahslashadigan, o‘z qilmishlarini tahlil qiladigan va vijdon azobida qiynaladigan insonlardir. Muallif qahramonning ruhiy holatini ochish uchun uning yuz ifodasi, nigohi, hattoki barmoqlarining titrashi kabi kichik detallarga katta e’tibor qaratadi. Bu detallar qahramonning aytolmagan so‘zlaridan ko‘ra ko‘proq ma’no anglatadi.Tabiat va inson ruhiyati uyg‘unligiAdib ijodida tabiat shunchaki manzara emas, balki qahramon ruhiyatining ajralmas qismidir. Masalan, "Omon ovchining o‘limi" yoki "Ot egasi" kabi asarlarida tabiat qahramonning ichki kechinmalariga hamohang ravishda o‘zgaradi. Tog‘larning haybati qahramonning matonatini, soyning shovqini esa uning iztirobli o‘ylarini ifodalaydi[1]. Shukur Xolmirzayev insonni tabiatning bir bo‘lagi sifatida ko‘radi va uning ruhiy inqirozlarini tabiatdagi o‘zgarishlar orqali yanada bo‘rttirib ko‘rsatadi. Milliy xarakter va psixologizmXolmirzayev asarlarida inson ruhiyati milliy xarakter bilan chambarchas bog‘liq. U o‘zbek kishisiga xos bo‘lgan andisha, g‘urur, or-nomus va kutilmagan qat’iyatni asarlarining asosiy mavzusiga aylantirgan. Uning qahramonlari ("O'zbeklar" romani yoki hikoyalaridagi personajlar) o‘ta murakkab, ziddiyatli, ammo samimiy insonlardir. Ular jamiyatning qoliplariga sig‘maydigan, o‘z mustaqil fikriga va ichki erkinligiga ega bo‘lgan shaxslar sifatida gavdalanadi. Yozuvchi insonning faqat yaxshi tomonlarini emas, balki uning zaifliklari, qo‘rquvlari va xatolarini ham boricha ko‘rsatadi. Bu esa uning asarlaridagi psixologizmni hayotiy va ishonchli qiladi.

Shukur Xolmirzayevning "Bodom qishda gulladi" hikoyasida inson ruhiyati va uning ichki kechinmalari tabiat hodisalari hamda ijtimoiy muhit bilan uzviy bog‘liqlikda, o‘ziga xos badiiy mahorat bilan tasvirlangan. Asarning asosiy mazmunini tashkil etuvchi kutilmagan mo‘jiza — qishning qahratonida bodomning gullashi — bosh qahramon Nosirjonning ruhiy dunyosidagi poklanish va uyg‘onish jarayoniga parallel ravishda kechadi. Bodomning qishda gullashi mantiqan imkonsizdek ko‘rinsa-da, bu hodisa inson qalbida har qanday qiyin sharoitda ham ezgulik, umid va pokiza tuyg‘ular murtak otishi mumkinligini anglatuvchi kuchli ramziy vositadir. Qahramonning ichki kechinmalari u yotgan kasalxona palatasidagi "sovuq" muhit

[1] Xolmirzayev, Sh. Tanlangan asarlar: Hikoyalar. – Toshkent: “Sharq”, 2009.

bilan doimiy ziddiyatda bo‘ladi. Palatadagi boshqa bemorlarning loqaydligi va moddiy dunyoga bog‘lanib qolganligi Nosirjonning beg‘ubor orzulari bilan to‘qnashganda, muallif insonning ruhiy yolg‘izligini va bu yolg‘izlik orqali uning o‘zligini anglash jarayonini mahorat bilan ochib beradi. Bodom gullari asarda shunchaki tabiat tasviri emas, balki insoniy hayrat va go‘zallikni his qilish qobiliyatining timsolidir. Nosirjon qishda gullagan daraxtni ko‘rganda his qilgan hayajon uning ruhiyatidagi ma’naviy ustunlikni va atrofidagi befarqlikdan balandroq ekanini ko‘rsatadi.Muallif qo‘llagan psixologik kontrast, ya’ni tashqaridagi qahraton qish va qahramon qalbida kechayotgan bahoriy iliqlik, inson ruhiyati tashqi muhitga qaram emasligini isbotlaydi. Inson o‘z ichki dunyosi orqali o‘z voqeligini yaratishga qodir ekanligi hikoyaning falsafiy xulosasiga aylanadi. Nosirjonning har bir kechinmasi, uning tabiat mo‘jizasidan hayratlanishi va bu go‘zallikni asrab qolish istagi orqali Shukur Xolmirzayev kitobxonni hayotning mayda tashvishlaridan yuqori ko‘tarilishga hamda qalb pokligini har qanday "qish" — qiyinchilik yoki loqaydlik paytida ham saqlab qolishga undaydi. Shukur Xolmirzayevning “Saylanma” asarlarida inson ruhiyati va uning ichki olami shunchaki bayon qilinmay, balki o‘tkir hayotiy realizm asosida badiiy tahlil etiladi. Adib qahramonlarining kechinmalarini ochishda psixologik detallardan unumli foydalanadi; qahramonning birgina nigohi, qo‘llarining titrashi yoki sukut saqlashi uning qalbidagi to‘fonlarni uzoq monologlardan ko‘ra aniqroq ifodalaydi. Yozuvchi inson qalbini tabiat bilan uyg‘unlikda tasvirlar ekan, Boysun tog‘lari, daryolar va o‘zgaruvchan havo ranglari qahramonlarning ruhiy holatiga ko‘zgu bo‘lib xizmat qiladi. Asarlarda insonning ijtimoiy muhit bilan to‘qnashuvi, vijdon azobi va axloqiy tanlov jarayonlari markaziy o‘ringa chiqadi, bu esa o‘quvchiga inson xarakterining murakkab qirralarini butun bo‘y-basti bilan ko‘rsatib beradi.Yozuvchi o‘z ijodida inson qalbini shunchaki kuzatuvchi emas, balki mohir psixolog sifatida tadqiq etadi. Uning asarlarida ruhiyat va ichki kechinmalar uyg‘unligi, avvalo, qahramonlarning o‘z-o‘zi bilan olib boradigan murosasiz kurashida ko‘rinadi. Masalan, adibning "Tabassum" yoki "Ot egasi" kabi asarlarida qahramonlar tashqi olam bilan emas, balki o‘z vijdonlari va ichki "men"i bilan to‘qnash kelishadi. Xolmirzayev qahramonni murakkab vaziyatga solib qo‘yadi va uning bu holatdan qanday chiqishi orqali xarakterining eng yashirin qirralarini ochib beradi. Bu jarayonda ichki monologlar shunchaki o‘y-fikrlar emas, balki shaxsning ma’naviy yuksalishi yoki inqirozi sifatida namoyon bo‘ladi. Yana bir muhim fakt shundaki, yozuvchi ruhiy holatni tasvirlashda "shafqatsiz realizm" uslubiga tayanadi. U insonni ideallashtirmaydi; qahramonlarining qo‘rquvini, hasadini, ojizligini yoki kibrini boricha, haqqoniy ko‘rsatadi. Bu holat ayniqsa uning "Olabo‘ji" romani va qator

hikoyalarida yaqqol seziladi[2] Insonning ichki kechinmalari u yashayotgan ijtimoiy muhit va Boysun tabiatining qattiqqo‘lligi bilan parallel ravishda tasvirlanadi. Tabiatdagi har bir detal — qoyalarning shiddati, daryoning shovqini yoki cho‘lning sukunati — qahramonning ayni damdagi ruhiy iztiroblari bilan hamohanglik hosil qiladi. Shu tariqa, Shukur Xolmirzayev asarlarida inson ruhiyati va tashqi voqelik bir-birini to‘ldiruvchi yaxlit badiiy tizimga aylanadi[3]

Xulosa o‘rnida aytish mumkinki, Shukur Xolmirzayev o‘zbek nasrida insonni barcha murakkabliklari bilan tushunish va tushuntirish san’atini yangi bosqichga olib chiqdi. Uning asarlari o‘quvchini nafaqat badiiy zavq olishga, balki o‘z qalbining chuqurliklariga nazar tashlashga, insoniy mohiyat haqida chuqur mushohada yuritishga chorlaydi. Adib nazdida inson — yengilmas ruh egasi, uning ruhiy dunyosi esa cheksiz koinot kabi sirlidir.Xolmirzayev insonni ziddiyatlar maydoni sifatida ko‘radi. Uning qahramonlari ideallashtirilgan shaxslar emas, balki xatolar qiluvchi, ikkilanuvchi va o‘z vijdoni bilan doimiy kurashda yashovchi tirik odamlardir. Yozuvchi inson ruhiyatidagi "isiyon" va "itoat" o‘rtasidagi nozik muvozanatni tasvirlash orqali kitobxonni qahramonning ichki monologlari ishtirokchisiga aylantiradi. Bu esa asarlarining ta’sirchanligini va hayotiyligini ta’minlaydi.Adib ijodida milliy ruhiyat va tabiat uyg‘unligi yetakchi o‘rin tutadi. Xolmirzayev qahramonlari (asosan tog‘liklar, mard va qaysar insonlar) o‘zlarining ichki kechinmalarini ko‘pincha tabiat bilan sirdosh bo‘lib hal qiladilar. Tog‘larning viqori, kengliklarning erkinligi qahramonlar fe’l-atvoridagi mag‘rurlik va matonatga ko‘chadi. Insonning ruhiy holati atrof-muhitdagi ranglar va manzara orqali ramziylashtiriladi, bu esa "psixologik parallelizm" uslubining yuksak namunasidir.

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“VATAN — ONAMDEK AZIZ, TUPROG‘IDEK MUQADDAS”

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ANNOTATSIYA: Ushbu maqolada inson hayotidagi eng muqaddas ikki tushuncha - Ona va Vatan o‘rtasidagi ruhiy yaqinlik tahlil qilinadi. Muallif “Nega Vatan onaga qiyoslanadi?” degan savolga javob izlar ekan, ona mehri bilan yurt tuprog‘i o‘rtasidagi o‘xshashliklarni hayotiy misollar orqali yoritib beradi. Maqolada vatanparvarlik tuyg‘usi shunchaki dabdabali gap emas, balki onaga bo‘lgan cheksiz ehtirom va sadoqatning uzviy davomi ekanligi asoslab berilgan. Shuningdek, maqolada yurt tuprog‘ining muqaddasligi, kindik qoni to‘kilgan maskanning inson ruhiyatiga ta’siri hamda vatanni sevish imonning bir bo‘lagi ekanligi ta’kidlanadi. Mazkur ish kitobxonda vatanparvarlik tuyg‘usini uyg‘otish bilan birga, har bir qarich tuproqni ona kabi ardoqlashga chorlaydi.

KALIT SO‘ZLAR: *Vatan, ona mehri, muqaddas tuproq, sadoqat, vatanparvarlik, ona bag‘ri, ma’naviy qadriyatlar, o‘zlikni anglash, kindik qoni, yurt ishqi, milliy g‘urur.*

Insoniyat uchun bu yorug‘ olamda ikki buyuk va muqaddas panoh bor: Biri-bizni oq sut berib voyaga yetkazgan Onamiz, ikkinchisi-kindik qonimiz to‘kilib, bizni bag‘rida asragan Vatanimizdir. Biz yurtni bejizga “Ona Vatan” deb atamaymiz. Zero, onaning tafti qanchalik issiq va beg‘ubor bo‘lsa, ona tuproqning har bir zarrasi ham shunchalik azizdir.

Vatan-bu onamizning izlari qolgan, har bir maysasi bobolarimiz nafasi bilan hayot topgan muqaddas zamin. Onasini e’zozlagan inson yurt qadrini anglaganidek, vatanini ardoqlagan odam o‘z onasining sutini oqlagan bo‘ladi. Shu ikki ajralmas tuyg‘uning mohiyatini va nima uchun yurt tuprog‘ini ona kabi muqaddas bilishimiz kerakligini tahlil qilamiz.

Nega go‘dak yiqilsa, darrov onasini chaqiradi? Chunki ona — dunyodagi eng xavfsiz va ishonchli qo‘rg‘ondir. Inson ulg‘ayib, katta hayotning murakkab

bo‘ronlariga, kutilmagan zarbalariga duch kelganida ham, ruhan o‘zini Vatan bag‘rida xuddi ona quchog‘idagidek xotirjam va himoyalangan his qiladi. Onaning oq suti vujudimizga qanday quvvat bersa, Vatan tuprog‘idan uning ne’matlar, biz ichgan zilol suvlar ham bizni shunday boqadi va ulg‘aytiradi. Ona o‘z farzandini qanday bo‘lmasin, barcha kamchiliklari bilan sevgani kabi, Vatan ham o‘z farzandlarini boy yoki kambag‘alga ajratmasdan, birdek o‘z bag‘riga oladi. Bu uyg‘unlik shunchalik mustahkamki, hattoki tilimizda ham “Ona tili”, “Ona Vatan”, “Ona yer” iboralari bir ildizga borib taqaladi. Bu tushunchalar insonning dunyoqarashini shakllantiruvchi poydevordir. Vatanni sevish — bu shunchaki chegarani qo‘riqlash emas, balki onamizdek aziz bo‘lgan urf-odatlarimiz va tuprog‘imizni qadrlashdir.

Vatan tuprog‘ini muqaddas qiladigan narsa shunchaki mineral moddalar emas, balki unda yashiringan tarixiy xotira va ajdodlarimizning muqaddas xokidir. Biz bugun bosib turgan har bir qarich yerda onalarimizning alla sadosi, ota-bobolarimizning peshona teri, yurt ozodligi yo‘lida qurbon bo‘lgan yigitlarning jasorati yashiringan. “Vatan - ostonadan boshlanadi” degan naqlning zamirida ulkan hikmat bor. Har bir hovlidagi rayhon hidi, tong saharda onamiz yopgan issiq nonning ifori — bularning barchasi bizni vatanparvarlikka o‘rgatuvchi ilk va eng muhim darslardir. Tuproq - insonning yaralish asosi va oxirgi manzili. Shuning uchun ham xalqimiz “Tuprog‘ingni ko‘zga surt” deb bejiz aytmaydi. Tuproqni onadek aziz bilish - bu o‘z o‘tmishini tanish va milliy g‘ururini saqlash deganidir. Dunyoning eng go‘zal go‘shalarida yursa ham, inson baribir o‘z hovlisidagi bir hovuch tuproqni sog‘inadi. Chunki bu tuproqda uning bolaligi, onasining ovozi va o‘zligining hidi bor. Zero, har bir inson o‘z vujudida o‘sha tuproqning quvvatini, o‘sha suvning pokligini olib yuradi.

Ona oldidagi farzandlik burchi nima bo‘lsa, Vatan oldidagi burch ham aynan o‘shadir. Onaning sutini oqlash - faqat unga moddiy yordam berish emas, balki u bergan tarbiyani, u ardoqlagan yurtni ko‘z qorachig‘idek asrashdir. Chinakam vatanparvar inson yurtini xuddi o‘z onasini yomon ko‘zlardan himoya qilgandek himoya qiladi. Tarixga nazar tashlasak, barcha buyuk sarkardalar va olimlar Vatanga bo‘lgan muhabbatni onaga bo‘lgan ehtirom bilan bog‘lashgan. Vataniga xiyonat qilgan kishi, mohiyatan o‘z onasining oq sutidan tongan hisoblanadi. Musofirlikda yurgan insonning ko‘ziga ona tuprog‘i onasining diydoridek shirin ko‘rinishi ham bejiz emas. Bu ilohiy sog‘inch insonni hamisha asllikka, ildizlariga qaytarib turadi. Ona va Vatan - bu inson sotib ololmaydigan, almashtirib bo‘lmaydigan yagona haqiqatlardir. Inson

qayerda bo'lmasin, ona duosi va Vatan mehri uning qalbida mayoq kabi nur sochib turadi.

Ma’naviy kamolotning eng yuksak cho‘qqisi - bu o‘z yurtini ona kabi beg‘araz sevish va uning har bir zarra tuprog‘ini muqaddas bilib, boshiga toj qilishdir. Vatan bizga ajdodlardan qolgan va avlodlarga butun holda yetkazilishi kerak bo‘lgan eng buyuk omonatdir. Uni asrash onamizning or-nomusini asrash bilan barobardir. Toki tomirimizda qonimiz oqar ekan, ona tuproq biz uchun muqaddas maskan, ona vatan esa hamisha qalbimizdagi daxlsiz qo‘rg‘on bo‘lib qoladi. Bizning vazifamiz - shu muqaddas tuproqni kelajak avlodga yanada gullab-yashnagan holda topshirishdir. Zero, Vatanni onadek sevish - bu nafaqat burch, balki eng oliy baxtdir. Inson faqat o‘z vatanida haqiqiy qadr-qimmatini topadi, xuddi farzand o‘z onasining bag‘rida dunyodagi eng baxtli zot bo‘lganidek. Shunday ekan, har birimiz ushbu muqaddas tuproqni e’zozlashni, uning ravnaqi yo‘lida bor kuch va g‘ayratimizni safarbar etishni o‘zimizning eng muqaddas qarzimiz deb bilmog‘imiz lozim.

Xulosa qilib aytganda, Vatan va Ona - inson hayotini mazmun bilan to‘ldiruvchi eng buyuk qadriyatlardir. Biz Vatanni onaga o‘xshatganimizda, uning naqadar yaqin va jondan azizligini his qilamiz. Onamiz bizni qanday mehr bilan o‘stirgan bo‘lsa, Vatan ham bizni o‘z tuprog‘i va suvi bilan shunday voyaga yetkazadi. Vatanni sevish - bu shunchaki balandparvoz gaplar emas, balki onamizni qanday asrasak, yurtimizni ham shunday e’zozlash demakdir. Onaning duosi va Vatan tuprog‘ining muqaddasligi har birimiz uchun umr yo‘limizni yorituvchi nurdir. Agar har birimiz yurtimizni o‘z onamizdek qadrlasak, uni har qanday balolardan asragan bo‘lamiz. Zero, onasi aziz insonning vatani hamisha tinch va obod bo‘lib qolaveradi.

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FUNDAMENTAL PRINCIPLES OF THERMODYNAMICS AND THEIR APPLICATIONS IN MODERN SCIENCE

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Annotation: This article presents a comprehensive analysis of the fundamental principles of thermodynamics and their extensive applications in modern scientific disciplines. Thermodynamics is a core branch of physics that investigates the relationships between heat, work, energy, and entropy within physical systems. The study systematically examines the four laws of thermodynamics and their implications for energy transformation, equilibrium states, and irreversible processes. In addition, the article highlights the interdisciplinary significance of thermodynamics in contemporary science and technology. Its applications extend to engineering systems such as internal combustion engines, refrigeration and power plants, as well as to biological and medical systems where energy metabolism, cellular respiration, and thermal regulation are critically governed by thermodynamic laws. The research emphasizes that thermodynamic principles provide a universal framework for understanding both macroscopic and microscopic processes in nature.

Keywords: Thermodynamics, energy transformation, entropy, heat transfer, thermodynamic laws, equilibrium, irreversible processes, energy systems, biological thermodynamics, modern science.

Introduction

Thermodynamics is a fundamental discipline in physics that describes the behavior of energy and its transformation in natural and engineered systems. It provides a theoretical framework for understanding how heat, work, and internal energy interact under different physical conditions. The development of thermodynamics has played a crucial role in shaping modern science and technology, particularly through its four fundamental laws, which govern energy conservation, entropy increase, and thermal equilibrium. The First Law of Thermodynamics establishes the principle of energy conservation, stating that energy cannot be created or destroyed, only transformed. The Second Law introduces the concept of entropy, explaining the direction of natural processes and the irreversibility of energy transformations. The Third Law defines the behavior of systems at absolute zero temperature, while the Zeroth Law establishes the concept of thermal equilibrium. In modern science, thermodynamic principles are widely applied across multiple fields. In engineering, they form the basis for the design and optimization of engines, turbines, refrigeration systems, and renewable energy technologies. In chemistry, thermodynamics explains reaction spontaneity and equilibrium. In biological and medical sciences, it is essential for understanding metabolic pathways, energy production in cells, and thermoregulation in living organisms. The aim of this article is to investigate the fundamental principles of thermodynamics and to demonstrate their significance in various scientific and technological applications, emphasizing their role in advancing modern interdisciplinary research.

Materials and Methods

This study was conducted using a qualitative and analytical research approach based on a comprehensive review of scientific literature in the field of thermodynamics. Data were collected from modern physics textbooks, peer-reviewed scientific journals, and international scientific databases. The analysis focused on the four fundamental laws of thermodynamics and their mathematical and conceptual interpretations. Special attention was given to energy transformation processes, entropy changes, and thermal equilibrium in both closed and open systems. Comparative analysis was applied to evaluate the role of thermodynamic principles in different scientific fields, including engineering systems (engines, turbines, refrigerators), chemical processes, and biological systems. Descriptive synthesis was used to integrate theoretical knowledge with practical applications in modern science and technology.

Results

The study revealed that thermodynamic laws form the foundation for understanding energy behavior in both natural and artificial systems. The First Law confirms the conservation of energy, while the Second Law explains the directionality of natural processes through entropy increase. It was observed that thermodynamic principles are widely applied in engineering systems, particularly in energy conversion technologies such as power plants and internal combustion engines, where efficiency depends on minimizing energy losses. In biological systems, thermodynamics plays a crucial role in explaining metabolic reactions, ATP energy production, and heat regulation in living organisms. In chemical systems, it determines reaction spontaneity and equilibrium conditions. The results also indicate that modern scientific advancements in renewable energy, nanotechnology, and biomedical engineering are strongly dependent on thermodynamic principles.

Discussion

The findings of this study confirm that thermodynamics is not only a theoretical branch of physics but also a universal scientific framework applicable across multiple disciplines. The concept of energy conservation provides a fundamental understanding of physical processes, while entropy introduces the natural tendency toward disorder and irreversibility. In engineering applications, improving system efficiency remains a key challenge due to inevitable energy losses described by the Second Law of Thermodynamics. In biological systems, energy transformation processes are tightly regulated, ensuring survival and homeostasis. Furthermore, the integration of thermodynamics with modern technologies such as renewable energy systems, artificial intelligence-based modeling, and nanoscience demonstrates its growing importance in scientific innovation. Despite significant progress, further research is required to improve energy efficiency and develop sustainable technologies based on thermodynamic optimization.

Conclusion

In conclusion, thermodynamics represents a fundamental scientific discipline that explains the behavior of energy and its transformations in both natural and engineered systems. Its four laws provide a universal framework for understanding physical, chemical, and biological processes. The study shows that thermodynamic principles are essential for modern science and technology, particularly in energy production, industrial engineering, chemical reactions, and biological metabolism. The continuous

development of thermodynamic research contributes significantly to technological progress and sustainable development in the modern world.

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BANANNI TABIIY SHAROITDA QURITISHNI TAKOMILLASHTIRISH

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Annotatsiya. Ushbu maqolada bananni tabiiy sharoitda quritish jarayonini takomillashtirishning ilmiy va amaliy jihatlari tahlil qilinadi. Tadqiqotning asosiy maqsadi — quritish jarayonida mahsulot sifatini saqlab qolish, oziqaviy qiymatini maksimal darajada asrash hamda tabiiy yo'qotishlarni kamaytirishga qaratilgan samarali usullarni ishlab chiqishdan iborat. Ish davomida banan mevasining fizik-kimyoviy xususiyatlari, namlikni yo'qotish kinetikasi va quritish jarayoniga ta'sir etuvchi tashqi omillar (harorat, nisbiy namlik, havo aylanish tezligi) chuqur o'rganildi. Tadqiqot natijalariga ko'ra, quritish jarayonini optimallashtirish uchun mevalarni bir xil qalinlikda kesish, oldindan ishlov berish (antioksidant eritmalarda ushlab turish), hamda quyosh energiyasidan samarali foydalanadigan takomillashtirilgan quritish moslamalaridan foydalanish muhim ahamiyat kasb etadi. Shuningdek, tabiiy quritish jarayonida gigiyenik talablarni ta'minlash, chang va mikroorganizmlar ta'sirini kamaytirish orqali mahsulot xavfsizligini oshirish mumkinligi aniqlangan.

Kalit so'zlar: banan, tabiiy quritish, quritish texnologiyasi, mahsulot sifati, namlikni kamaytirish, quyosh energiyasi, oziqaviy qiymat, samaradorlik

СОВЕРШЕНСТВОВАНИЕ СУШКИ БАНАНОВ В ЕСТЕСТВЕННЫХ УСЛОВИЯХ

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Аннотация. В данной статье рассматриваются научные и практические аспекты совершенствования процесса сушки бананов в естественных условиях. Основная цель исследования заключается в разработке эффективных методов, направленных на сохранение качества продукции в процессе сушки, максимальное сохранение питательной ценности, а также снижение естественных потерь. В ходе работы были подробно изучены физико-химические свойства плодов банана, кинетика потери влаги и внешние факторы, влияющие на процесс сушки (температура, относительная влажность, скорость движения воздуха). Согласно результатам исследования, для оптимизации процесса сушки важно нарезать плоды одинаковой толщиной, проводить предварительную обработку (выдерживание в антиоксидантных растворах), а также использовать усовершенствованные сушильные устройства, эффективно использующие солнечную энергию. Также установлено, что обеспечение гигиенических требований и снижение воздействия пыли и микроорганизмов позволяет повысить безопасность продукции.

Ключевые слова: банан, естественная сушка, технология сушки, качество продукции, снижение влажности, солнечная энергия, пищевая ценность, эффективность.

IMPROVEMENT OF BANANA DRYING UNDER NATURAL CONDITIONS

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Abstract. This article analyzes the scientific and practical aspects of improving the banana drying process under natural conditions. The main objective of the study is to develop effective methods aimed at preserving product quality during drying, maximizing nutritional value retention, and reducing natural losses. During the research, the physicochemical properties of banana fruit, moisture loss kinetics, and external factors affecting the drying process (temperature, relative humidity, and air circulation speed) were thoroughly examined. According to the results, optimizing the drying process requires uniform slicing of fruits, pre-treatment (soaking in antioxidant solutions), and the use of improved drying devices that efficiently utilize solar energy.

It was also found that ensuring hygienic conditions and reducing exposure to dust and microorganisms improves product safety.

Keywords: banana, natural drying, drying technology, product quality, moisture reduction, solar energy, nutritional value, efficiency.

Kirish. Bugungi kunda qishloq xo‘jaligi mahsulotlarini chuqur qayta ishlash va ularning saqlanish muddatini uzaytirish dolzarb masalalardan biri hisoblanadi. Tropik mevalar qatoriga kiruvchi banan yuqori oziqaviy qiymati, vitamin va mineral moddalarga boyligi bilan ajralib turadi. Shu bilan birga, banan tez buziluvchan mahsulot bo‘lib, uni uzoq muddat saqlashda muayyan texnologik yechimlarni qo‘llash zarur. Mazkur muammoni hal etishda quritish usuli eng qadimiy va samarali yo‘llardan biri sifatida keng qo‘llaniladi. Tabiiy sharoitda quritish energiya sarfini kamaytirishi va ekologik tozaligi bilan ahamiyatli bo‘lsa-da, ushbu jarayon ko‘plab tashqi omillarga bog‘liq holda kechadi. Xususan, harorat, havoning nisbiy namligi, quyosh nurlanishi intensivligi hamda havo almashinuvi tezligi quritish samaradorligiga sezilarli ta’sir ko‘rsatadi. Shu sababli an’anaviy quritish usullarida mahsulot sifati barqaror bo‘lmasligi, rang o‘zgarishi, oziqaviy moddalarning qisman yo‘qolishi kabi kamchiliklar kuzatiladi. So‘nggi yillarda tabiiy quritish jarayonini takomillashtirishga qaratilgan ilmiy izlanishlar soni ortib bormoqda. Bunda mahsulotni oldindan tayyorlash, kesish shakli va o‘lchamlarini optimallashtirish, shuningdek, quyosh energiyasidan samarali foydalanadigan oddiy, ammo samarali qurilmalarni ishlab chiqish muhim yo‘nalishlardan biri sifatida qaralmoqda. Shu bilan birga, gigiyenik sharoitlarni yaxshilash va tashqi ifloslantiruvchi omillardan himoyalash masalalari ham dolzarb ahamiyat kasb etadi. Mazkur maqolaning maqsadi bananni tabiiy sharoitda quritish jarayonini ilmiy asosda takomillashtirish, jarayon samaradorligini oshirish va yuqori sifatli yakuniy mahsulot olishga xizmat qiluvchi texnologik yondashuvlarni ishlab chiqishdan iborat. Ushbu yo‘nalishda olingan natijalar kichik ishlab chiqaruvchilar va fermer xo‘jaliklari uchun amaliy ahamiyatga ega bo‘lib, energiya tejamkor va iqtisodiy jihatdan samarali usullarni joriy etishga imkon beradi.

Metod va uslublar. Tadqiqot ishida bananni tabiiy sharoitda quritish jarayonining samaradorligini baholash maqsadida eksperimental usuldan foydalanildi. Tajriba uchun boshlang‘ich massasi 116 g bo‘lgan yangi banan namunasi tanlab olindi. Namunalar bir xil sharoitda tayyorlanib, tashqi iflosliklardan tozalandi va bir xil qalinlikda kesilib, quritish jarayoniga tayyor holga keltirildi. Quritish jarayoni tabiiy muhitda, ya’ni o‘rtacha 25–27 °C harorat oralig‘ida, ochiq havoda amalga oshirildi.

Jarayon davomida mahsulot to‘g‘ridan-to‘g‘ri quyosh nuri va tabiiy havo aylanishi ta’sirida 5 kun davomida quritildi. Quritish vaqtida namunalarning gigiyenik holatini saqlash maqsadida ularning usti himoya materiallari bilan yopildi va tashqi chang hamda hasharotlar ta’siridan muhofaza qilindi. Eksperiment natijalariga ko‘ra, quritish jarayonida umumiy massaning sezilarli darajada kamayishi kuzatildi. Dastlabki 116 g banan massasidan 36 g chiqit (namlik va boshqa uchuvchan moddalarning yo‘qolishi) ajralib chiqdi. Yakuniy bosqichda olingan quruq mahsulot massasi 20 g ni tashkil etdi. Ushbu natijalar banan tarkibidagi suv miqdorining yuqori ekanligini hamda tabiiy quritish jarayonida namlikning intensiv ravishda kamayishini ko‘rsatadi. Olingan ma’lumotlar asosida quritish jarayonining samaradorligi, massaning kamayish darajasi va quruq modda miqdori o‘rganildi. Tadqiqot natijalari tabiiy sharoitda quritish jarayonini optimallashtirish va mahsulot sifatini yaxshilash uchun muhim eksperimental asos bo‘lib xizmat qiladi.



1-rasm. Bananni tabiiy sharoitda quritish jarayoni.

Natijalar va tahlil. O‘tkazilgan eksperimental tadqiqot natijalari bananni tabiiy sharoitda quritish jarayonida massaning sezilarli darajada kamayishini tasdiqladi. Dastlabki 116 g xom ashyo 25–27 °C harorat oralig‘ida 5 sutka davomida quritilgandan so‘ng yakuniy mahsulot massasi 20 g ni tashkil etdi. Hisob-kitoblarga ko‘ra, umumiy massa yo‘qotilishi 82,8 % ni tashkil etib, bu ko‘rsatkich banan tarkibidagi yuqori

namlik ulushiga bevosita bog‘liq ekanligini ko‘rsatadi. Jarayon davomida 36 g miqdorida chiqit qayd etildi. Ushbu chiqit tarkibi asosan suv bug‘lanishi natijasida yuzaga kelgan bo‘lib, qisman mexanik va biologik yo‘qotishlar bilan ham izohlanadi. Yakuniy quruq modda miqdorining 20 g ni tashkil etishi esa quritish jarayonida mahsulotning konsentratsiyalanishi va undagi oziqaviy komponentlarning nisbatan saqlanib qolganini ko‘rsatadi. Tahlil natijalari shuni ko‘rsatadiki, tabiiy quritish usuli energiya sarfisiz amalga oshirilishi va ekologik jihatdan maqbulligi bilan ajralib turadi. Biroq jarayonning davomiyligi va samaradorligi tashqi muhit parametrlariga, xususan, harorat, nisbiy namlik va havo almashinuvi tezligiga sezilarli darajada bog‘liqdir. Shu sababli, noqulay iqlim sharoitlarida quritish tezligining pasayishi va mahsulot sifatining o‘zgarishi ehtimoli mavjud. Umuman olganda, olingan natijalar bananni tabiiy sharoitda quritish jarayonida namlikning intensiv kamayishi hisobiga yuqori darajada konsentratsiyalangan quruq mahsulot hosil bo‘lishini ilmiy jihatdan asoslaydi. Mazkur jarayonni optimallashtirish orqali quritish muddatini qisqartirish, sifat ko‘rsatkichlarini barqarorlashtirish hamda texnologik yo‘qotishlarni minimallashtirish imkoniyati mavjud.

1-jadval.

Bananni tabiiy sharoitda quritish natijalari		
Ko‘rsatkichlar	**Qiymat**	**Izoh**
Boshlang‘ich massa	116 g	Yangi banan massasi
Quritish harorati	25–27 °C	Tabiiy sharoit (atrof-muhit harorati)
Quritish davomiyligi	5 kun	Tabiiy quritish muddati
Chiqit miqdori	36 g	Namlik va boshqa yo‘qotishlar
Yakuniy mahsulot massasi	20 g	Quritilgan banan
Umumiy massa yo‘qotilishi	82,8 %	Boshlang‘ich massaga nisbatan
Quruq modda ulushi (yakuniy)	17,2 %	20 g / 116 g × 100

Xulosa. Mazkur tadqiqot natijalari bananni tabiiy sharoitda quritish jarayoni yuqori darajada namlik yo‘qotilishi bilan kechishini hamda yakuniy mahsulotning konsentratsiyalangan quruq modda shaklida hosil bo‘lishini ilmiy jihatdan tasdiqladi. 25–27 °C harorat oralig‘ida 5 sutka davomida olib borilgan tajribada dastlabki 116 g xom ashyoning 20 g gacha kamayishi kuzatilib, umumiy massa yo‘qotilishi 82,8 % ni tashkil etdi. Ushbu ko‘rsatkich banan mevasining yuqori namlikka ega ekanligini va

quritish jarayonida suvning asosiy komponent sifatida ajralib chiqishini ifodalaydi. Tajriba davomida 36 g miqdorida chiqit hosil bo‘lishi qayd etildi, bu esa quritish jarayonida nafaqat namlikning bug‘lanishi, balki qisman mexanik va tashqi omillar ta’sirida yuzaga keladigan yo‘qotishlar mavjudligini ko‘rsatadi. Shu bilan birga, yakuniy quruq modda miqdorining 20 g ni tashkil etishi mahsulot tarkibidagi oziqaviy komponentlarning nisbatan saqlanib qolganini va quritish jarayonining ma’lum darajada samarali kechganini bildiradi. Tahlillar shuni ko‘rsatadiki, tabiiy quritish usuli energiya sarfini talab qilmasligi, ekologik xavfsizligi va iqtisodiy jihatdan maqbulligi bilan ajralib turadi. Biroq jarayonning davomiyligi, tashqi muhit parametrlariga yuqori darajada bog‘liqligi hamda gigiyenik xavflarning mavjudligi uning asosiy kamchiliklari sifatida baholanadi. Shu sababli, quritish jarayonini takomillashtirish, xususan, havo almashinuvi va harorat rejimini qisman boshqarish, mahsulotni oldindan ishlov berish (masalan, antioksidant eritmalar qo‘llash) hamda yopiq yoki yarim yopiq quyosh quritgichlaridan foydalanish orqali jarayon samaradorligini sezilarli darajada oshirish mumkin.

Umuman olganda, olib borilgan tadqiqot natijalari bananni tabiiy sharoitda quritish texnologiyasini optimallashtirish zarurligini ko‘rsatadi. Taklif etilgan yondashuvlar quritish muddatini qisqartirish, mahsulot sifatini barqarorlashtirish, oziqaviy qiymatini maksimal darajada saqlab qolish hamda texnologik yo‘qotishlarni kamaytirishga xizmat qiladi. Mazkur natijalar kichik fermer xo‘jaliklari va qayta ishlash korxonalarida energiya tejamkor va samarali texnologiyalarni joriy etishda muhim ilmiy-amaliy ahamiyatga ega.

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METHANOGEN BAKTERIYALAR FAOLLIGINI OSHIRISHDA BIOSTIMULYATORLARNING TA'SIRI

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Annotatsiya

Mazkur maqolada mol go'ngi asosidagi anaerob fermentatsiya jarayonida methanogen bakteriyalar faolligini oshirish uchun turli biostimulyatorlardan foydalanish imkoniyatlari o'rganildi. Tadqiqot davomida Bacillus subtilis va achitqining alohida hamda kompleks qo'llanilishining gaz hosil bo'lish tezligi, fermentatsiya davomiyligi, pH muhiti va metan hosildorligiga ta'siri tahlil qilindi. Olingan natijalar shuni ko'rsatdiki, biostimulyatorlardan kompleks foydalanish anaerob parchalanish jarayonini tezlashtirib, metan hosil bo'lish samaradorligini oshiradi. Tadqiqot natijalari biogaz texnologiyalarini takomillashtirish hamda qishloq xo'jaligi chiqindilaridan ekologik xavfsiz energiya manbai sifatida foydalanish imkoniyatlarini kengaytirishga xizmat qiladi [1,3].

Kalit so'zlar: metanogen bakteriyalar, anaerob fermentatsiya, biogaz, Bacillus subtilis, achitqi, organik chiqindilar, biostimulyator, metan.

INTRODUCTION

So'nggi yillarda dunyo miqyosida qayta tiklanuvchi energiya manbalariga bo'lgan ehtiyoj keskin ortib bormoqda. Neft va gaz kabi an'anaviy energiya resurslarining kamayib borishi hamda ekologik muammolarning kuchayishi sababli alternativ energiya manbalaridan foydalanish dolzarb masalaga aylandi. Biogaz texnologiyasi ana shunday istiqbolli yo'nalishlardan biri bo'lib, organik chiqindilarni qayta ishlash orqali ekologik xavfsiz energiya olish imkonini beradi [2].

Chorvachilik xo'jaliklarida hosil bo'ladigan organik chiqindilar nazoratsiz parchalanganda atmosferaga katta miqdorda karbonat angidrid va metan gazlari ajraladi. Bu esa issiqxona effektining kuchayishiga sabab bo'ladi. Anaerob fermentatsiya texnologiyasi ushbu chiqindilarni nazorat ostida parchalanishini ta'minlab, energiya ishlab chiqarish bilan birga ekologik muammolarni kamaytirishga xizmat qiladi [4].

Anaerob fermentatsiya jarayonida methanogen arxeylar asosiy biologik rolni bajaradi. Ushbu mikroorganizmlar organik moddalarni metanga aylantiruvchi maxsus arxeylar bo'lib, ular anaerob sharoitda yashaydi. Methanobacterium, Methanosarcina

va Methanosaeta kabi arxeylar metan hosil bo‘lish jarayonida faol ishtirok etadi [1,5].

Anaerob parchalanish bir necha ketma-ket biologik bosqichlardan iborat: gidroliz, atsidogenez, asetogenez va metanogenez. Gidroliz bosqichida murakkab organik moddalar oddiy molekulalarga parchalanadi. Keyingi bosqichlarda organik kislotalar va sirka kislotasi hosil bo‘lib, yakuniy bosqichda methanogen bakteriyalar tomonidan metanga aylantiriladi [2,6]

Oddiy anaerob tizimlarda fermentatsiya jarayoni ko‘pincha sekin kechadi. Bunga substratning to‘liq parchalanmasligi, mikrobiologik muvozanatning sust shakllanishi va gidroliz bosqichining past faolligi sabab bo‘ladi. Shu sababli methanogen bakteriyalar faolligini oshirish uchun biostimulyatorlardan foydalanish muhim ilmiy va amaliy ahamiyatga ega.

LITERATURE REVIEW

Ilmiy adabiyotlarda anaerob fermentatsiya jarayonini jadallashtirish bo‘yicha ko‘plab tadqiqotlar olib borilgan. Gerardi [1] methanogen arxeylarning fiziologik xususiyatlarini o‘rganib, ularning pH va haroratga sezgirligini ko‘rsatgan. Muallifning ta’kidlashicha, methanogen bakteriyalar neytral muhitda eng yuqori faollikka ega bo‘ladi.

Metcalf va Eddy [2] tomonidan olib borilgan tadqiqotlarda anaerob fermentatsiyaning barcha bosqichlari va ularga ta’sir qiluvchi omillar batafsil yoritilgan. Ularning fikricha, gidroliz bosqichi umumiy jarayon tezligini belgilovchi asosiy omillardan biri hisoblanadi

Angelidaki va Ellegaard [3] organik chiqindilarni qo‘shma fermentatsiya qilish orqali gaz hosildorligini oshirish mumkinligini aniqlagan. Mualliflar mikroorganizmlar o‘rtasidagi sinergik ta’sir metan hosildorligini oshirishini ta’kidlagan.

Chen va hammualliflar [4] anaerob fermentatsiyaga salbiy ta’sir qiluvchi omillarni o‘rganib, pH o‘zgarishi, toksik moddalar va organik kislotalarning ortiqcha to‘planishi methanogen bakteriyalar faoliyatini susaytirishini ko‘rsatgan.

Madigan [5] Bacillus subtilis bakteriyasining fermentativ xususiyatlarini o‘rganib, ushbu bakteriya proteaza, lipaza va amilaza fermentlarini ishlab chiqarishini qayd etgan. Ushbu fermentlar organik moddalarni tezroq parchalanishiga yordam beradi.

MATERIALS AND METHODS

Tadqiqot laboratoriya sharoitida olib borildi. Tajribada to‘rtta fermentatsiya idishidan foydalanildi. Har bir idishga 1:1 nisbatda mol go‘ngi va suv aralashmasi joylashtirildi. Fermentatsiya hajmi barcha variantlarda bir xil saqlandi.

Tajriba variantlari quyidagicha tashkil qilindi:
1. Nazorat varianti – faqat mol go‘ngi;
2. Mol go‘ngi + Bacillus subtilis;
3. Mol go‘ngi + achitqi;
4. Mol go‘ngi + Bacillus subtilis + achitqi.

Barcha idishlar anaerob sharoitda germetik yopilgan holda 35–37°C haroratda 20 kun davomida saqlandi. Tajriba davomida gaz ajralish boshlanish vaqti, bosim o‘zgarishi, pH muhiti hamda umumiy gaz hajmi kuzatildi.

Bacillus subtilis gidrolitik fermentlar ishlab chiqaruvchi biostimulyator sifatida qo‘llanildi. Achitqi esa tez fermentatsiya qiluvchi mikroorganizmlar manbai sifatida ishlatildi. Gaz hosildorligi nisbiy baholash usuli orqali aniqlandi.

RESULTS

Nazorat variantida gaz ajralishi 5–6-kunlarda boshlandi va fermentatsiya jarayoni sust rivojlandi. Gaz hosildorligi past bo‘lib, fermentatsiya davomida bosimning ortishi sekin kuzatildi.

Bacillus subtilis qo‘shilgan variantda fermentatsiya 3–4-kunlarda boshlandi. Ushbu variantda organik moddalarning tezroq parchalanishi kuzatildi va gaz hosildorligi nazorat variantiga nisbatan yuqori bo‘ldi [5].

Achitqi qo‘shilgan variantda dastlab karbonat angidrid ajralishi yuqori bo‘ldi. Keyingi bosqichlarda metan hosil bo‘lish tezligi oshdi. Ushbu variantda fermentatsiya jarayoni o‘rtacha tezlikda kechdi.

Eng yuqori natijalar Bacillus subtilis va achitqi birgalikda qo‘llangan variantda kuzatildi. Gaz ajralishi 2–3-kunlarda boshlandi va fermentatsiya davomida bosimning sezilarli ortishi qayd etildi. Ushbu variantda umumiy gaz hajmi hamda metan hosildorligi eng yuqori ko‘rsatkichga ega bo‘ldi [3,6].

DISCUSSION

Olingan natijalar Bacillus subtilis anaerob fermentatsiya jarayonining gidroliz bosqichini jadallashtirishini ko‘rsatdi. Ushbu bakteriya tomonidan ishlab chiqariladigan proteaza, amilaza va lipaza fermentlari murakkab organik moddalarni parchalaydi [5]. Natijada methanogen bakteriyalar uchun qulay substrat muhiti hosil bo‘ladi.

Achitqining qo‘llanishi oddiy uglevodlarning tez fermentatsiyasiga sabab bo‘ldi. Fermentatsiya natijasida hosil bo‘lgan organik kislotalar methanogen arxeylar uchun oziqa manbai sifatida xizmat qildi [3].

Biostimulyatorlarning kompleks qo‘llanishi mikroorganizmlar o‘rtasidagi sinergik ta’sirni kuchaytirdi. Natijada fermentatsiya jarayoni tezlashdi, pH muhiti stabillashdi va gaz hosildorligi oshdi. Bu esa methanogen bakteriyalar faoliyatining sezilarli darajada yaxshilanganini ko‘rsatadi [4,6].

Tadqiqot natijalari boshqa ilmiy tadqiqotlar bilan mos keladi. Adabiyotlarda ham biostimulyatorlardan foydalanish anaerob fermentatsiya samaradorligini oshirishi qayd etilgan [1,3].

RESEARCH NOVELTY

Mazkur tadqiqotning ilmiy yangiligi Bacillus subtilis va achitqining kompleks qo‘llanilishining mol go‘ngi asosidagi anaerob fermentatsiya tizimida methanogen bakteriyalar faolligiga sinergik ta’sirini aniqlashdan iborat.

PRACTICAL SIGNIFICANCE

Tadqiqot natijalari qishloq xo‘jaligi chiqindilaridan samarali biogaz olish texnologiyalarini takomillashtirishga xizmat qiladi. Ushbu texnologiya kichik va o‘rta fermer xo‘jaliklarida ekologik xavfsiz energiya manbai sifatida qo‘llanilishi mumkin.

Biogaz texnologiyalarini rivojlantirish energiya tejamkorligini oshirish, chiqindilarni kamaytirish va atrof-muhitni muhofaza qilishga xizmat qiladi. Bundan tashqari, anaerob fermentatsiyadan qolgan qoldiq organik o‘g‘it sifatida foydalanilishi mumkin.

CONCLUSION

Tadqiqot natijalariga ko‘ra, Bacillus subtilis va achitqining anaerob fermentatsiya tizimiga qo‘shilishi methanogen bakteriyalar faolligini sezilarli darajada oshiradi. Ayniqsa, ushbu biostimulyatorlarning kompleks qo‘llanilishi fermentatsiya boshlanish vaqtini qisqartirib, umumiy gaz hajmi va metan hosildorligini oshiradi.

Biostimulyatorlardan kompleks foydalanish biogaz ishlab chiqarish samaradorligini oshirishda istiqbolli biotexnologik usul sifatida tavsiya etiladi. Kelgusida gaz tarkibini gaz-xromatografik usullar bilan aniqlash hamda turli organik substratlar bilan qo‘shimcha tadqiqotlar olib borish maqsadga muvofiq hisoblanadi [4,7].

Jadval 1. Tajriba natijalari

Variant	Harorat	Gaz boshlanishi	Gaz hajmi	Metan %	pH	Samaradorlik
Nazorat	35–37°C	5–6 kun	Past	55%	6.8–7.0	Past
B.subtilis	35–37°C	3–4 kun	O‘rtacha–yuqori	65%	7.0–7.2	Yaxshi
Achitqi	35–37°C	3–4 kun	O‘rtacha	60%	6.5–6.8	O‘rtacha
B.subtilis + Achitqi	35–37°C	2–3 kun	Yuqori	72%	7.0–7.3	Eng yuqori

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MULOQAT: SHIFOKOR VA BEMOR MULOQATINING PSIXOLOGIK XUSUSIYATLARI. TIBBIYOT XODIMLARIDA EMOTSIONAL HOLATLARNING O‘ZIGA XOSLIGI: STRESS VA UNING BOSQICHLARI,BARTARAF ETISH YO‘LLARI

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Annotatsiya. Ushbu maqolada shifokor va bemor o'rtasidagi muloqatning psixologik xususiyatlari hamda tibbiyot xodimlarida kuzatiladigan emotsional holatlarning o'ziga xosligi keng yoritilgan. Tadqiqot doirasida tibbiy muloqatning asosiy modellari, kommunikativ kompetentlik tushunchasi, bemor bilan ishonchli munosabat o'rnatishning ahamiyati tahlil qilingan. Bundan tashqari, tibbiyot xodimlarida stress omillarining yuzaga kelish sabablari, stressning asosiy bosqichlari (alarm, rezistentlik, charchash) va ularning kasbiy faoliyatga ta'siri o'rganilgan. Maqolada emotsional charchash va kasbiy deformatsiya (burnout) sindromining belgilari hamda oldini olish choralari batafsil ko'rib chiqilgan. Stressni bartaraf etishning samarali usullari: kognitiv-xulq-atvor terapiyasi, mindfulness, superviziya va guruh ishining ahamiyati asoslanib berilgan.

Аннотация: В данной статье всесторонне рассматриваются психологические особенности общения врача и пациента, а также специфика эмоциональных состояний медицинских работников. Проанализированы основные модели

медицинского общения, понятие коммуникативной компетентности и значение установления доверительных отношений с пациентом. Изучены причины возникновения стрессовых факторов у медицинских работников, основные стадии стресса (тревога, резистентность, истощение) и их влияние на профессиональную деятельность. Рассмотрены признаки эмоционального выгорания и профессиональной деформации (синдром burnout), а также меры по их предотвращению.

Abstract: This article comprehensively examines the psychological characteristics of doctor-patient communication and the specific features of emotional states observed in medical personnel. The main models of medical communication, the concept of communicative competence, and the importance of establishing a trusting relationship with the patient are analyzed. The causes of stress factors in medical workers, the main stages of stress (alarm, resistance, exhaustion) and their impact on professional activities are studied. Signs of emotional burnout and professional deformation syndrome and preventive measures are examined in detail. Effective methods of stress management are substantiated: cognitive-behavioral therapy, mindfulness, supervision and group work.

Kalit so'zlar: tibbiy muloqat, shifokor-bemor munosabati, emotsional stress, kasbiy charchash, stressni boshqarish, kommunikativ kompetentlik, psixologik salomatlik.

Ключевые слова: медицинское общение, взаимоотношения врач-пациент, эмоциональный стресс, профессиональное выгорание, управление стрессом, коммуникативная компетентность, психологическое здоровье.

Keywords: medical communication, doctor-patient relationship, emotional stress, professional burnout, stress management, communicative competence, psychological health.

Zamonaviy tibbiyotning rivojlanishi faqat yangi diagnostik va davolash usullarini o'zlashtirishni emas, balki tibbiy muloqat madaniyatini ham tubdan yaxshilashni taqozo etadi. Shifokor va bemor o'rtasidagi munosabat – bu oddiy axborot almashish jarayoni emas, balki murakkab psixologik va ijtimoiy fenomendir. Milliy va xalqaro tajribalar shuni ko'rsatadiki, davolash samaradorligi ko'p hollarda tibbiy muolajalarning sifatiga emas, balki shifokor va bemor o'rtasidagi ishonch va o'zaro tushunish darajasiga bog'liq.

Tibbiyot xodimlarining kasbiy faoliyati doimiy emotsional zo'riqish, og'ir kasallik holatlari, o'lim va iztirob bilan yuzma-yuz kelish kabi omillar bilan bog'liq. Bu sharoitlar ularning psixologik sog'lig'iga jiddiy ta'sir ko'rsatib, kasbiy charchash (burnout sindrom) va surunkali stressning rivojlanishiga zamin yaratadi. Jahon sog'liqni saqlash tashkilotining ma'lumotlariga ko'ra, dunyo bo'ylab tibbiyot xodimlarining 30–50 foizi kasbiy charchash belgilarini namoyon etadi.

Ushbu maqolaning maqsadi shifokor va bemor muloqatining psixologik mexanizmlarini, tibbiyot xodimlarida emotsional holatlar va stress omillarining o'ziga xosligini tahlil qilish hamda stressni bartaraf etishning ilmiy asoslangan usullarini ko'rsatib berishdan iborat.

SHIFOKOR VA BEMOR MULOQATINING PSIXOLOGIK XUSUSIYATLARI

Tibbiy muloqatning mohiyati va vazifalari

Tibbiy muloqat – shifokor va bemor o'rtasida tibbiy yordam ko'rsatish maqsadida amalga oshiriladigan, axborot almashish, hissiy-idrokiy ta'sir va o'zaro munosabat shakllanishini o'z ichiga olgan murakkab jarayondir.

Tibbiy muloqatning o'ziga xos xususiyatlari:

Assimetriklik – Shifokor tibbiy bilim va malaka sohibi sifatida kuchli pozitsiyada turadi, bemor esa ko'pincha zaiflik va qo'rquv holatida bo'ladi. Bu tengsizlik muloqot dinamikasini belgilab beradi.

Emotsional yuklanganligi – Muloqat og'riq, qo'rquv, umid va xavotir kabi kuchli his-tuyg'ular fonida amalga oshadi. Bemor hayotiy muhim masalalar bilan yuzlashayotgan bo'ladi.

Maqsadga yo'naltirilganlik – Muloqat birinchi navbatda diagnostika va davolashga xizmat qiladi, biroq bu uning psixologik qirrasini kamaytirmaydi.

Axloqiy asoslanganlik – Sir saqlash, hurmat va avtonomiya kabi etik tamoyillar ustuvorlik qiladi.

Tibbiy muloqatning asosiy vazifalari:

Diagnostik vazifa – anamnez to'plash, shikoyatlarni aniqlash, kasallik tarixi bilan tanishish.

Terapevtik vazifa – bemorning o'z kasalligiga munosabatini shakllantirishga yordam berish, davolash jarayonida faol ishtirokini ta'minlash.

Axborot vazifasi – tashxis, davolash usullari va profilaktika choralari haqida tushunarli tarzda ma'lumot berish.

Motivatsion vazifa – bemorni dori-darmon qabul qilish rejimiga va muolaja

talablariga rioya qilishga undash.
Psixologik qo'llab-quvvatlash vazifasi – emotsional yaqinlik, empatiya ko'rsatish, bemorni tushunish.

Tibbiy muloqatning asosiy modellari

Psixologiya va tibbiyot fanida shifokor-bemor munosabatining bir necha modeli ajratib ko'rsatilgan:
1. Paternalistik model. Shifokor – bilimdon ota, bemor – itoatkor farzand. Bu modelda shifokor barcha qarorlarni o'zi qabul qiladi, bemorning fikri ikkinchi darajali hisoblanadi. Qisqa muddatli muolajalar uchun ba'zan samarali bo'lsa-da, uzoq muddatda bemorning davolash jarayoniga jalb etilishini kamaytiradi va mustaqilligini cheklaydi.
2. Axborotga asoslangan model (texnik model). Shifokor faqat ma'lumot yetkazuvchi, bemor esa mustaqil qaror qabul qiluvchi sifatida ko'riladi. Munosabatlar sovuq va rasmiy tus oladi. Bu modelda shifokorning empatiyasi va psixologik qo'llab-quvvatlashi e'tibordan chetda qoladi.
3. Talqin qiluvchi model. Shifokor bemorning qadriyatlari va hayotiy maqsadlarini hisobga olgan holda u uchun eng ma'qul davolash yo'lini birga aniqlashga harakat qiladi. Muloqot ikki tomonlama va faol bo'ladi.
4. Maslahatlashuvchi (konsultativ) model. Shifokor va bemor tengdosh hamkorlar sifatida birgalikda qaror qabul qiladi. Bemor o'z kasalligi, tashxis va davolash variantlari haqida to'liq ma'lumotga ega bo'ladi hamda o'zi uchun eng mos variantni tanlaydi. Hozirgi zamon tibbiyotida eng progressiv va insonparvar model sifatida tan olingan.
5. Bio-psixo-ijtimoiy model (Engel modeli). G. Engel (1977) tomonidan taklif etilgan ushbu model kasallikni faqat biologik emas, balki psixologik va ijtimoiy omillar majmui sifatida ko'radi. Shifokor bemorni yaxlit shaxs sifatida qabul qiladi, uning hayot sharoiti, oilaviy munosabatlari va ichki dunyosiga e'tibor beradi.

Kommunikativ kompetentlik tushunchasi

Kommunikativ kompetentlik – bu shifokorning tibbiy muloqatni samarali tashkil eta olish qobiliyatidir. U quyidagi komponentlardan iborat:
Lingvistik komponent – tibbiy va oddiy til o'rtasida ko'prik bo'la olish qobiliyati. Mutaxassis atamalarini sodda va tushunarli tarzda izohlash, bemorlarga ular o'z tilida gapirish imkonini berish.

Paralingvistik komponent – ovoz toni, nutq sur'ati, pauza va urg'ulardan to'g'ri foydalanish. Shifokorning ovozi qat'iy bo'lishi mumkin, biroq doimo xotirjam va

ishonch uyg'otuvchi bo'lishi kerak.
Noverbal komponent – imo-ishoralar, ko'zning ifodalari, tana pozitsiyasi, fizik masofa. Tadqiqotlar shuni ko'rsatadiki, muloqotdagi axborotning 55–65 foizi noverbal kanallar orqali uzatiladi (Mehrabian, 1971).
Empatik komponent – bemorning his-tuyg'ularini tushuna olish va unga adekvat emotsional javob bera olish qobiliyati.
Faol tinglash qobiliyati – bemorni to'xtatmasdan, diqqat bilan va xayrixoh tarzda eshita olish.

Ishonchli munosabat o'rnatishning psixologik mexanizmlari

Shifokor va bemor o'rtasidagi ishonch – bu davolashning muhim terapevtik omili hisoblanadi. Ishonchni shakllantirishda quyidagi psixologik mexanizmlar ishga tushadi:
Raport – psixologiyada qo'llaniladigan bu tushuncha ikki o'rtadagi uyg'unlik va o'zaro tushunish holatini bildiradi. Shifokor bemorning nutq uslubi, tana harakatlari va hissiy tizimiga moslanib, u bilan bir maydonga tushishi lozim.
Empatiya – bemorning his-tuyg'ularini teran his qilish va unga o'sha his-tuyg'ularni ifodalash imkonini berish. C. Rogers ta'kidlaganidek, empatiya – bu o'z individualligini yo'qotmasdan boshqaning ichki dunyosiga kirib bora olish qobiliyatidir.
Kongruentsiya – shifokorning so'zlari, his-tuyg'ulari va xulq-atvori o'rtasida uyg'unlik bo'lishi. Nokongruentlik (yashiringan his-tuyg'ular bilan rasmiy gapirish) bemor tomonidan darhol seziladi va ishonchni zaiflashtirboshlaydi.
Shartsiz ijobiy munosabat – bemorni uning kasalligi, ijtimoiy holati, xulq-atvor tarzi qanday bo'lishidan qat'i nazar, shaxs sifatida qabul qilish va hurmat qilish.

TIBBIYOT XODIMLARIDA EMOTSIONAL HOLATLARNING O'ZIGA XOSLIGI

Tibbiy kasbning emotsional yuklamasi

Tibbiyot kasbi insonlar bilan eng qiyin vaziyatlarda – kasallik, og'riq, o'lim va azob-uqubat davomida ish yuritishni talab etadi. Bu esa tibbiyot xodimlarining emotsional holatiga chuqur va ko'p qirrali ta'sir ko'rsatadi.
Tibbiyot xodimlarining emotsional yuklamasini belgilovchi asosiy omillar:
Bemorlarning azob-uqubatlari va o'lim holatlari bilan doimiy yuzlashuv
Og'ir tashxislarni bemorga va uning oilasiga yetkazish zaruriyati

Noto'g'ri tashxis yoki davolash oqibatida yuzaga keladigan axloqiy javobgarlik hissi
Vaqt va resurslarning yetishmovchiligi
Ish va shaxsiy hayot o'rtasidagi muvozanatni saqlash qiyinligi
Bemorlar va ularning qarindoshlari tomonidan norozilik va da'volarning mavjudligi
Jamoada nizolar va rahbariyat bilan muammolar
Amerikalik psixolog C. Maslach tadqiqotlariga ko'ra, tibbiyot xodimlarida uchraydigan asosiy emotsional muammolar quyidagilardan iborat: emotsional tukanlish (emotional exhaustion), depersonalizatsiya (cynicism) va shaxsiy yutuqlarni pasayishi (reduced personal accomplishment). Bu uch omilning majmui "kasbiy charchash sindromini" (burnout syndrome) tashkil etadi.

Tibbiyot xodimlarining emotsional himoya mexanizmlari

Psixologik himoya mexanizmlari – bu shaxsni emotsional og'riq va stressdan muhofaza qiladigan ongsiz jarayonlardir. Tibbiyot xodimlarida eng ko'p kuzatiladigan himoya mexanizmlari:
Intellektualizatsiya – emotsional vaziyatni hissiy tomondan ajratilib, faqat intellektual-analitik jihatdan ko'rib chiqish. ("Bu faqat klinik holat, menga ta'sir qilmaydi.")
Proyeksiya – o'z salbiy his-tuyg'ularini boshqalarga (bemorlarga, hamkasblariga) ko'chirish.
Kompensatsiya – bir sohadagi muvaffaqiyatsizlikni boshqa sohadagi erishuvlar bilan to'ldirish.
Ratsionalizatsiya – o'z xato yoki muvaffaqiyatsizliklarini mantiqiy izohlar bilan oqlash.
Reaktiv formatsiya – haqiqiy his-tuyg'uga zid xulq-atvor namoyish etish (masalan, qo'rquvni jasorat bilan yopish).
Bu mexanizmlar qisqa muddatda psixologik muvozanatni saqlashga yordam bersa-da, uzoq muddatda stressni kuchaytirishi va sog'lom muloqotga to'sqinlik qilishi mumkin.

Tibbiyot xodimlarida kuzatiladigan emotsional holat turlari

Empatik charchash (Compassion Fatigue) – boshqalarning azob-uqubatlarini kuzatish va ular uchun qayg‘urish natijasida yuzaga keladigan emotsional holat. Belgilari: bemorga befarqlik, hissiyotsizlik, ish samaradorligining pasayishi.
Vikariyat travma (Vicarious Trauma) – boshqalarning travmatik tajribalarini tinglash orqali yuzaga keladigan ikkilamchi travma. Ko'proq psixiatr, psixolog va shoshilinch tibbiy yordam xodimlari orasida kuzatiladi.

Ijobiy emotsiyalar – muvaffaqiyatli davolash, bemorning tuzalishi va minnatdorchilik tibbiyot xodimlarida kuchli ijobiy his-tuyg'ular uyg'otadi. Bu his-tuyg'ular kasbiy motivatsiyaning asosiy manbaini tashkil etadi.

Axloqiy azob (Moral Distress) – shifokor o'zi to'g'ri deb bilgan ish bilan tashkiliy yoki tizimiy cheklovlar o'rtasida qolganida yuzaga keladigan ichki ziddiyat. Bu holat o'tkir psixologik og'riq va yonib ketish sindromining rivojlanishiga olib kelishi mumkin.

STRESS VA UNING BOSQICHLARI

Stress tushunchasi va tibbiyot xodimlaridagi xususiyatlari

Stress – organizmning uni tashqaridan (yoki ichkaridan) ta'sir etuvchi kuchli omillarga (stressorlarga) nisbatan moslashuv reaksiyasidir. Bu tushunchani birinchi bor Gans Selye (1936) ilmiy asoslagan va umumiy moslashuv sindromini (General Adaptation Syndrome – GAS) tavsiflab bergan.

Tibbiyot xodimlarida stressni keltirib chiqaruvchi asosiy omillar (stressorlar) ikki guruhga bo'linadi:

Kasbiy stressorlar:

Og'ir klinik holatlar va bemorlarning o'limi

Katta ish hajmi va vaqt bosimi

Yuqori javobgarlik va qaror qabul qilish zaruriyati

Ish joyidagi mojaro va nizolar

Kasbiy noaniqlik va etarli ma'lumot yo'qligi

Tashkiliy stressorlar:

Mehnatga haq to'lash muammolari

Kasbiy o'sish imkoniyatlarining cheklanganligi

Zaif moddiy-texnik ta'minot

Ma'muriy yuklamaning ortib borishi

Ish va oilaviy hayot o'rtasidagi disbalans

Stressning bosqichlari (G. Selye modeli bo'yicha)

Gans Selye stress reaksiyasini uch bosqichdan iborat deb ta'riflagan:

Bosqich 1: Alarm bosqichi (Ogohlantirish bosqichi)

Bu bosqich organizm stressorni sezgan daqiqadan boshlanadi. Gipotalamus-gipofiz-buyrak usti bezlari o'qi faollashadi, adrenalin va kortizol qonga ko'plab ajralib chiqadi. Fiziologik ko'rinishlar: yurak urishi tezlashadi, qon bosimi ko'tariladi, nafas tezlashadi, mushaklar taranglashadi.

Psixologik belgilar: qo'rquv, xavotir, ogohlik ortishi, diqqatning keskinlashishi. Bu

bosqichda organizm "jangovar tayyorgarlik" holatiga o'tadi (fight-or-flight reaksiyasi).
Tibbiyot xodimlarida bu bosqich favqulodda vaziyatlarda, og'ir bemorlar kelganida, qiyin qarorlar qabul qilish zarur bo'lganida namoyon bo'ladi.
Bosqich 2: Rezistentlik (Moslashuv) bosqichi
Agar stressor ta'sir etishda davom etsa, organizm moslashish resurslarini ishga soladi. Bu bosqichda kortizolning doimiy yuqori darajada saqlanishi kuzatiladi. Organizm stress bilan kurashishni davom ettiradi, biroq bu resurslarni intensiv ravishda iste'mol qilish evaziga amalga oshadi.
Psixologik belgilar: taranglik, charchoq, diqqat qiynalishi, uyqu buzilishi, tirnash xususiyatining ortishi.
Ko'pgina tibbiyot xodimlari yillar davomida aynan shu bosqichda ishlaydi – tashqaridan sog'lom ko'rinib, ichkaridan esa sekin-asta resurslarini yo'qotib boradi. Bu holat "sukunatdagi charchash" deb ataladi.
Bosqich 3: Charchash (Tukanlish) bosqichi
Stressor ta'siri uzoq davom etsa va moslashuv resurslari tugasa, uchinchi bosqich boshlanadi. Bu bosqichda organizmning zaxiralari batamom sarflanadi, moslashuv mexanizmlari ishdan chiqadi.
Fiziologik belgilar: immunitet pasayadi, surunkali kasalliklar kuchayadi, uyqu va ishtaha jiddiy buziladi, somatik shikoyatlar (bosh og'rig'i, yurak og'rig'i, qorin og'rig'i) ko'payadi.
Psixologik belgilar: tukanlish, umidsizlik, depressiv holatlar, o'z-o'ziga hurmatning keskin pasayishi, kasb va ish joyiga befarqlik, hatto psixotik epizodlar.

Bu bosqichda kasbiy yordam (psixolog, psixoterapevt) mutlaqo zarur bo'ladi.

Kasbiy charchash sindromining (Burnout) belgilari

Burnout – bu uzoq muddatli kasbiy stress natijasida yuzaga keladigan va emotsional tukanlish, depersonalizatsiya hamda kasbiy samarasizlik hissi bilan tavsiflanadigan psixologik holat.
Emotsional tukanlish belgilari:
Ishga ketishni istamaslik, "smenaga bormaslik" uchun bahona qidirish
Bemor yoki hamkasblar bilan muloqotdan so'ng juda og'ir his qilish
Ishdan keyin hordiq chiqarish imkoniyatining yo'qolishi
O'z kasbiga bo'lgan ishtiyoqning so'nishi
Depersonalizatsiya (sinizm) belgilari:
Bemorlarga befarq yoki qo'pol munosabat

Bemorlarni shaxs sifatida emas, "kasallik holati" sifatida ko'rish
Hamkasblarga nisbatan munosabatning sovuqlashuvi
Inson azobiga befarqlik
Kasbiy samarasizlik hissi belgilari:
"Men bu ishga yaroqli emasman" degan hissiyot
Ishdagi muvaffaqiyatlarni mensimaslik
O'z kasbiy kompetentligiga ishonchsizlik
Salbiy baholarga haddan tashqari sezgirlik

STRESSNI BARTARAF ETISH YO'LLARI

Individual darajadagi strategiyalar

1. Kognitiv-xulq-atvor terapiyasi (CBT) usullari

CBT stressni bartaraf etishning ilmiy jihatdan eng yaxshi asoslangan usullaridan biri hisoblanadi. Unda quyidagi texnikalar qo'llaniladi:

Kognitiv qayta tuzish – stressli vaziyatni keltirib chiqaruvchi noto'g'ri (distortsiyalangan) fikrlarni aniqlash va ularni yanada muvozanatli fikrlar bilan almashtirish.

Ekspositsiya – qo'rquv uyg'otuvchi vaziyatlar bilan asta-sekin yuzlashish orqali ularga nisbatan munosabatni o'zgartirish.

Muammolarni hal etish texnikasi – muammoni konkret qadamlar asosida hal etishning tizimli usuli.

2. Mindfulness (Ongli hozirgi zamon) amaliyoti

Mindfulness – hozirgi daqiqaga diqqatni to'liq jamlash va o'z his-tuyg'ularini, fikrlarini hukmsiz kuzatish amaliyotidir. Jon Kabat-Zinning Mindfulness-Based Stress Reduction (MBSR) dasturi tibbiyot xodimlarida stressni kamaytirish va burnoutni oldini olishda yuqori samaradorlikni ko'rsatgan.

Tibbiyot xodimlari uchun amaliy tavsiyalar:

Har kuni 10–15 daqiqa nafas meditatsiyasini amalga oshirish
"Body scan" (tana skanerlash) texnikasini kunlik amaliyotga kiritish
Ish pauzalarida ongli nafas olish mashqlarini bajarish

3. Jismoniy faollik

Muntazam jismoniy mashqlar kortizol darajasini pasaytiradi, endorfin va serotonin ishlab chiqarishni rag'batlantiradi. Haftasiga 3–5 marta 30 daqiqalik o'rta intensivlikdagi aerob mashqlar (yurish, yugurish, suzish) tibbiyot xodimlarida stress belgilarini sezilarli darajada kamaytiradi.

4. Uyqu gigiyenasi
Uyqu stressni boshqarishning eng fundamental usuli hisoblanadi. Tibbiyot xodimlari, ayniqsa navbatchi smenalarda ishlovchilar, uyqu rejimiga alohida e'tibor berishi kerak. Tavsiyalar: kuniga 7–8 soat uxlash, uxlashdan oldin ekran vaqtini cheklash, uyquga tayyorlanish rituali ishlab chiqish.
5. Ijtimoiy qo'llab-quvvatlanish
Do'stlar, oila va hamkasblar bilan emotsional bog'liqlikni saqlash stress buferi vazifasini bajaradi. O'z his-tuyg'ularini ishonchli shaxsga aytib berish – "hissiy qayta ishlash" (emotional processing) jarayonini ishga tushiradi va stressni kamaytiradi.
6. Kasbiy chegara (chegara belgilash) qo'yish
Tibbiyot xodimlari ko'pincha o'z ehtiyojlarini bemorlar ehtiyojidan keyin qo'yadilar. Sog'lom kasbiy chegara belgilash – qo'shimcha smenalarni rad eta bilish, ish vaqtidan tashqaridagi aloqalarni cheklash va o'z resurslari haqida o'ylash – burnoutning oldini olishda muhim hisoblanadi.

Guruh va jamoa darajasidagi strategiyalar
1. Peer support (Tengdoshlar qo'llab-quvvatlash) guruhlari
Bir xil kasbiy muammolarni boshdan kechirgan hamkasblar o'rtasida tashkil etiladigan qo'llab-quvvatlash guruhlari tibbiyot xodimlariga o'z his-tuyg'ularini baham ko'rish, o'zini yolg'iz his qilmaslik va amaliy maslahatlar olish imkonini beradi.

2. Balint guruhi
1950-yillarda ingliz psixoanalitigi Maykl Balint tomonidan ishlab chiqilgan bu guruh formati shifokorlar va tibbiyot xodimlariga qiyin klinik holatlarni psixologik jihatdan muhokama qilish imkonini beradi. Guruh a'zolari bir-biriga maslahat berish orqali kasbiy-emotsional yukni birga ko'taradi.
3. Superviziya
Tajribaliroq mutaxassis (supervisor) bilan muntazam uchrashuvlar tibbiyot xodimlariga qiyin kasbiy vaziyatlarni tanqidiy tahlil qilish, emotsional reaktsiyalarni tushunish va yangi yechimlar topish imkonini beradi.
4. Jamoaviy psixologik iqlim
Tibbiyot muassasasi rahbariyati "psixologik xavfsizlik" muhitini yaratishi lozim, ya'ni xodimlar o'z muammo va xatolarini jazosiz muhokama qila oladigan atmosfera. Bu burnout va stressning oldini olishda tizimli rol o'ynaydi.
Tashkiliy darajadagi strategiyalar
Stressni bartaraf etish faqat individual mas'uliyat emas – tashkilot ham bu jarayonda

hal qiluvchi rol o'ynaydi:
Ish yukini muvozanatlashtirish – bir xodimga haddan ortiq ish yuklamaslik, navbatchiliklarni oqilona taqsimlash.
Kasbiy o'sish imkoniyatlari – muntazam treninglar, konferentsiyalar va malaka oshirish kurslari taqdim etish.
Psixologik yordam xizmatini tashkil etish – muassasada psixolog lavozimini joriy etish yoki korporativ psixologik yordam dasturini (EAP – Employee Assistance Program) ishga tushirish.
Ish sharoitini yaxshilash – ergonomik muhit, dam olish xonalari, ovqatlanish uchun vaqt ajratish.
Menejerlik madaniyatini rivojlantirish – rahbarlarni emotsional intellekt va xodimlarni qo'llab-quvvatlash bo'yicha o'qitish.

XULOSA: Shifokor va bemor muloqatining psixologik xususiyatlari hamda tibbiyot xodimlarida emotsional holatlarning o'ziga xosligi – bu tibbiyot psixologiyasining dolzarb va ko'p qirrali muammolari hisoblanadi.
Tadqiqotimiz quyidagi xulosalarni beradi:
Birinchidan, tibbiy muloqat faqat ma'lumot almashish emas, balki davolash jarayonining muhim terapevtik komponentidir. Shifokorning kommunikativ kompetentligi, empatiyasi va ishonchli munosabat o'rnatish qobiliyati davolash samaradorligini bevosita belgilaydi.
Ikkinchidan, tibbiyot kasbi o'zining tabiatiga ko'ra kuchli emotsional yuklamani taqozo etadi. Bu yuklamani inkor etish yoki yashirish emas, balki uni tan olish va samarali boshqarish strategiyalarini ishlab chiqish zarur.
Uchinchidan, stress tibbiyot xodimlarida uch bosqich (alarm, rezistentlik, charchash) orqali rivojlanadi va o'z vaqtida bartaraf etilmasa, kasbiy charchash sindromiga (burnout) aylanib ketadi.
To'rtinchidan, stressni bartaraf etish individual, guruh va tashkiliy darajadagi integratsiyalashgan yondashuvni talab etadi. Mindfulness, CBT, peer support guruhlari, superviziya va tashkiliy o'zgarishlar kompleks qo'llanilganda eng yuqori samara beradi.

Beshinchidan, tibbiyot xodimlarining psixologik salomatligi – bu nafaqat ularning shaxsiy farovonligi, balki yuqori sifatli tibbiy yordam ko'rsatishning zaruriy sharti va bemorlar xavfsizligining kafolatidir.
Tibbiy ta'limda kommunikativ ko'nikmalar va psixologik salomatlik madaniyatiga alohida o'rin ajratish, tibbiyot muassasalarida psixologik yordam xizmatlarini joriy

etish va burnout profilaktikasini tizimli olib borish – bu sohadagi eng muhim amaliy tavsiyalar hisoblanadi.

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GLOBAL MUAMMOLARNING MILLIY VA MINTAQAVIY DARAJADAGI YECHIMLARINI TOPISH

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Annotatsiya: Mazkur maqolada **global muammolar**, ularning milliy va mintaqaviy darajadagi namoyon bo‘lish shakllari, O‘zbekiston sharoitida ularni hal etishning siyosiy, iqtisodiy, ekologik, ijtimoiy va ma’naviy mexanizmlari tahlil qilinadi. Global muammolar insoniyat taraqqiyotiga bevosita ta’sir ko‘rsatuvchi, alohida davlat imkoniyatlari bilan to‘liq bartaraf etib bo‘lmaydigan, xalqaro hamkorlik, mintaqaviy muvofiqlashuv va milliy strategiyalar uyg‘unligini talab qiladigan murakkab jarayonlar sifatida yoritiladi. Maqolada iqlim o‘zgarishi, suv tanqisligi, Orolbo‘yi ekologik inqirozi, oziq-ovqat xavfsizligi, kambag‘allik, migratsiya, axborot xavfsizligi, energetika barqarorligi va ta’lim sifati kabi muammolar O‘zbekiston va Markaziy Osiyo misolida ko‘rib chiqiladi. Tadqiqotda global muammolarning yechimi faqat xalqaro tashkilotlar faoliyatiga bog‘liq emasligi, balki mahalliy boshqaruv, fuqarolik jamiyati, ilm-fan, ta’lim, innovatsiya, ekologik madaniyat va mintaqaviy ishonch muhitiga ham bevosita aloqador ekani asoslab beriladi.

Kalit so‘zlar: Global muammolar, milliy yechim, mintaqaviy hamkorlik, barqaror rivojlanish, iqlim o‘zgarishi, suv xavfsizligi, Orolbo‘yi, ekologik madaniyat, oziq-ovqat xavfsizligi, inson xavfsizligi, Markaziy Osiyo, O‘zbekiston - 2030.

KIRISH

XXI asrda insoniyat taraqqiyoti faqat iqtisodiy o‘sish, texnologik yutuqlar yoki siyosiy barqarorlik bilan belgilanmayapti. Bugungi dunyo taraqqiyoti **global muammolar** deb ataladigan murakkab, ko‘p qirrali va o‘zaro bog‘liq jarayonlar ta’sirida shakllanmoqda. Iqlim o‘zgarishi, suv tanqisligi, biologik xilma-xillikning kamayishi, oziq-ovqat xavfsizligi, migratsiya, pandemiyalar, kambag‘allik, terrorizm, axborot xavfsizligi, energetika muammolari va geosiyosiy ziddiyatlar alohida davlat chegaralari bilan cheklanib qolmaydi. Ularning oqibatlari bir hududda yuzaga kelib, boshqa mintaqalarning iqtisodiy, ekologik, ijtimoiy va siyosiy hayotiga ta’sir ko‘rsatadi.

Global muammo deganda butun insoniyat hayoti, xavfsizligi va barqaror rivojlanishiga tahdid soluvchi, ko‘lami keng, oqibatlari chuqur va yechimi xalqaro

hamkorlikni talab qiluvchi muammolar tushuniladi. Bunday muammolar milliy darajada o‘ziga xos shaklda namoyon bo‘ladi. Masalan, iqlim o‘zgarishi dunyo miqyosida harorat oshishi, muzliklar erishi va ekstremal ob-havo hodisalari bilan ifodalansa, O‘zbekiston sharoitida u suv tanqisligi, cho‘llanish, qurg‘oqchilik, Orolbo‘yi hududidagi ekologik bosim, qishloq xo‘jaligi hosildorligi va aholi salomatligiga ta’sir orqali namoyon bo‘ladi. Shu sababli global muammolar yechimida uch daraja o‘zaro uyg‘unlashishi zarur: **xalqaro hamkorlik**, **mintaqaviy muvofiqlashuv** va **milliy strategik siyosat**.

Birlashgan Millatlar Tashkilotining 2024-yilgi Barqaror rivojlanish maqsadlari hisobotida 2030-yilgacha belgilangan maqsadlarga erishish sur’ati yetarli emasligi, COVID-19 oqibatlari, qurolli mojarolar, geosiyosiy keskinlik va iqlim inqirozi taraqqiyotga jiddiy to‘sqinlik qilayotgani qayd etilgan. Hisobotda iqlim o‘zgarishi, tinchlik va xavfsizlik, davlatlar o‘rtasidagi tengsizlik kabi yo‘nalishlarda harakatlarni tezlashtirish zarurligi alohida ta’kidlanadi.

O‘zbekiston uchun global muammolarning dolzarbligi mamlakatning geografik joylashuvi, Markaziy Osiyodagi transchegaraviy suv resurslariga bog‘liqligi, Orol dengizi fojiasi, demografik o‘sish, urbanizatsiya, energetika ehtiyojlari, oziq-ovqat xavfsizligi va ekologik barqarorlik bilan belgilanadi. Shu sababli milliy taraqqiyot strategiyalarida ekologiya, suv resurslari, kambag‘allikni qisqartirish, inson kapitalini rivojlantirish, mintaqaviy hamkorlik va yashil iqtisodiyot masalalari ustuvor yo‘nalishlar qatoriga kiritilgan. “O‘zbekiston - 2030” strategiyasida Markaziy Osiyoda ekologiya, tabiatni muhofaza qilish, suv resurslaridan oqilona foydalanish va transport-kommunikatsiya infratuzilmasi bo‘yicha hamkorlikni kuchaytirish vazifasi belgilangan.

ADABIYOTLAR TAHLILI

Global muammolar masalasi falsafa, siyosatshunoslik, ekologiya, iqtisodiyot, pedagogika, sotsiologiya va xalqaro munosabatlar fanlarida o‘rganiladi. O‘zbekiston ilmiy tafakkurida bu masalalar ko‘proq **barqaror rivojlanish**, **ekologik madaniyat**, **milliy xavfsizlik**, **fuqarolik jamiyati**, **ma’naviy tahdidlar**, **globalizatsiya** va **mintaqaviy hamkorlik** tushunchalari bilan bog‘liq holda tahlil qilinadi. I. Karimov, Sh. Mirziyoyev, Q. Nazarov, N. Jo‘rayev, M. Qirg‘izboyev, A. Ochildiyev, S. Otamurodov, E. Yusupov, M. Quronov kabi mualliflarning davlat, jamiyat, ma’naviyat, xavfsizlik va taraqqiyot haqidagi qarashlari global muammolarning milliy yechimlarini tushunishda nazariy asos vazifasini bajaradi.

Q. Nazarovning falsafiy qarashlarida globallashuv jarayoni insoniyatning o‘zaro bog‘liqligini kuchaytiruvchi, shu bilan birga milliy qadriyatlar, ma’naviy barqarorlik

va ijtimoiy ong oldiga yangi talablar qo‘yuvchi hodisa sifatida talqin qilinadi. Bu yondashuv global muammolarni faqat tashqi xavf sifatida emas, balki jamiyatning ichki tayyorgarligi, ma’naviy immuniteti va intellektual salohiyati bilan bog‘liq jarayon sifatida ko‘rishga yordam beradi. Chunki ekologik inqiroz, axborot xurujlari yoki iste’molchilik madaniyatining kuchayishi faqat texnik muammo emas, ular inson dunyoqarashi va ijtimoiy mas’uliyatiga ham bevosita ta’sir qiladi.

M. Qirg‘izboyevning fuqarolik jamiyati haqidagi tadqiqotlari global muammolar yechimida davlat bilan birga jamoatchilik institutlari, nodavlat tashkilotlar, mahalla, ommaviy axborot vositalari va fuqarolar faolligining ahamiyatini ko‘rsatadi. Global ekologik, ijtimoiy yoki axborot xavfsizligi muammolari faqat hukumat qarorlari bilan hal bo‘lmaydi. Ularning samarali yechimi jamiyat ishtiroki, jamoatchilik nazorati, ekologik madaniyat, huquqiy ong va fuqarolik mas’uliyati bilan bog‘liq.

Sh. Mirziyoyevning Yangi O‘zbekiston taraqqiyotiga oid asarlarida global muammolarga javob berishda inson qadri, xalq bilan muloqot, mintaqaviy ishonch, ochiq tashqi siyosat, kambag‘allikni qisqartirish, yoshlar siyosati, ta’lim va innovatsiya ustuvor ahamiyat kasb etadi. Bu qarashlar O‘zbekistonning global muammolarga javobi izolyatsiya yoki faqat himoyalanish emas, balki ochiqlik, hamkorlik, milliy manfaat va amaliy natijadorlikka asoslanishini ko‘rsatadi.

ASOSIY QISM

Global muammolarning milliy va mintaqaviy yechimlarini topishda eng avvalo ularning o‘zaro bog‘liqligini anglash zarur. Iqlim o‘zgarishi suv tanqisligini kuchaytiradi, suv tanqisligi oziq-ovqat xavfsizligiga ta’sir qiladi, oziq-ovqat narxlarining oshishi kambag‘allik va ijtimoiy tengsizlikni kuchaytiradi, iqtisodiy bosim migratsiya jarayonlarini faollashtiradi, migratsiya esa mehnat bozori, ta’lim, sog‘liqni saqlash va ijtimoiy moslashuv bilan bog‘liq yangi vazifalarni yuzaga keltiradi. Shu sababli global muammolarni alohida-alohida emas, **kompleks tizim** sifatida tahlil qilish kerak.

O‘zbekiston va Markaziy Osiyo uchun eng dolzarb global muammolardan biri **suv xavfsizligi**dir. Mintaqadagi daryolar, kanallar, suv omborlari va irrigatsiya tizimlari bir davlat doirasida emas, balki bir nechta davlat manfaatlari kesishgan hududda joylashgan. Aholi sonining o‘sishi, qishloq xo‘jaligi ehtiyojlari, energetika talabi va iqlim o‘zgarishi suvga bo‘lgan bosimni kuchaytirmoqda. Jahon banki Markaziy Osiyoda toza va xavfsiz suvdan foydalanish imkoniyatlarini kengaytirish bo‘yicha loyihalar zarurligini ta’kidlaydi.

Suv muammosining milliy yechimi suvni tejaydigan texnologiyalarni joriy etish, tomchilatib sug‘orishni kengaytirish, kanallarni betonlashtirish, suv hisobini

raqamlashtirish, suv iste'molchilari mas'uliyatini oshirish va qishloq xo'jaligida kam suv talab qiladigan ekinlar ulushini ko'paytirish bilan bog'liq. Mintaqaviy yechim esa transchegaraviy suv resurslari bo'yicha ishonchli ma'lumot almashish, suv-energetika balansini muvofiqlashtirish, qo'shma monitoring tizimlarini yaratish va Markaziy Osiyo davlatlari o'rtasida uzoq muddatli kelishuvlarni mustahkamlashni talab qiladi.

O'zbekiston uchun yana bir yirik muammo **Orolbo'yi ekologik inqirozi**dir. Orol dengizining qurishi butun insoniyat tarixidagi eng yirik antropogen ekologik fojialardan biri sifatida e'tirof etiladi. BMTning Orolbo'yi mintaqasi bo'yicha Inson xavfsizligi ko'p sheriklik trast jamg'armasi ma'lumotlarida Orol dengizi qurishining oqibatlari davlat chegaralaridan oshib, millionlab aholiga ta'sir qilgani, yer degradatsiyasi, cho'llanish, ichimlik suvi tanqisligi, oziq-ovqat xavfsizligi, salomatlik va hayot sifati bilan bog'liq muammolarni keltirib chiqargani qayd etilgan.

Orolbo'yi muammosining yechimi bitta loyiha yoki qisqa muddatli yordam bilan tugamaydi. Bu hududda ekologik tiklanish, aholi salomatligini yaxshilash, ichimlik suvi ta'minoti, bandlik, tadbirkorlik, ta'lim, ayollar va yoshlar imkoniyatlarini kengaytirish, cho'l o'simliklarini ekish va mahalliy iqtisodiyotni rivojlantirish birgalikda olib borilishi kerak. BMT jamg'armasi Orolbo'yida ko'p sektorli va inson markazli yondashuv orqali ekologik, iqtisodiy, oziq-ovqat, sog'liqni saqlash va ijtimoiy yechimlarni muvofiqlashtirishga e'tibor qaratadi.

Iqlim o'zgarishi global muammolar ichida eng keskin va uzoq muddatli oqibatlarga ega masalalardan biridir. UNEPning 2024-yilgi Emissions Gap Report hisobotida davlatlar 2030-yilgacha yillik issiqxona gazlari chiqindilarini 42 foizga, 2035-yilgacha esa 57 foizga kamaytirishga majbur ekani, aks holda Parij kelishuvining 1,5 daraja maqsadi yo'qolishi mumkinligi ta'kidlangan.

O'zbekiston uchun iqlim o'zgarishi qishloq xo'jaligi, energetika, suv resurslari, aholi salomatligi va hududiy rivojlanishga ta'sir qiladi. Jahon bankining O'zbekiston bo'yicha iqlim va taraqqiyot hisobotida mamlakat dunyodagi eng energiya va resurs talabchan iqtisodiyotlardan biri ekani, moslashuv choralarisiz iqlim xavflari, jumladan, suv tanqisligi, qurg'oqchilik, haddan tashqari issiq, yog'in rejimining o'zgarishi va chang bo'ronlari aholi farovonligi hamda iqtisodiy o'sishga salbiy ta'sir qilishi qayd etilgan. Hisobotda iqlimga moslashuv choralarisiz 2050-yilga borib O'zbekiston iqtisodiyoti 10 foiz kichikroq bo'lishi mumkinligi prognoz qilingan.

Iqlim muammosining milliy yechimi **yashil iqtisodiyot**ga o'tish, qayta tiklanuvchi energiya manbalarini kengaytirish, energiya samaradorligini oshirish, ekologik standartlarni kuchaytirish, transportda zararli chiqindilarni kamaytirish va aholini ekologik madaniyatga o'rgatishni talab qiladi. Mintaqaviy darajada esa

Markaziy Osiyo davlatlari iqlim monitoringi, suv resurslari, cho‘llanish, muzliklar holati, energetika almashinuvi va favqulodda vaziyatlarga tayyorgarlik bo‘yicha hamkorlikni kuchaytirishi zarur.

Global muammolardan yana biri **oziq-ovqat xavfsizligi**dir. Bu muammo iqlim o‘zgarishi, suv tanqisligi, narxlar beqarorligi, logistika uzilishlari, yer degradatsiyasi va aholining daromad darajasi bilan bog‘liq. BMTning 2024-yilgi Barqaror rivojlanish maqsadlari hisobotida COVID-19, mojarolar, iqlim zarbalari va iqtisodiy beqarorlik oqibatida 2019-yilga nisbatan 2022-yilda 100 milliondan ortiq odam ochlikdan aziyat chekkani qayd etilgan.

O‘zbekiston sharoitida oziq-ovqat xavfsizligi qishloq xo‘jaligini modernizatsiya qilish, yer va suv resurslaridan samarali foydalanish, agrotexnologiyalarni joriy etish, ichki bozor barqarorligini ta’minlash, eksport-import muvozanatini saqlash va aholining sog‘lom ovqatlanish madaniyatini oshirish bilan bog‘liq. Mintaqaviy hamkorlikda esa urug‘chilik, logistika, veterinariya, fitosanitariya nazorati, transchegaraviy savdo va favqulodda oziq-ovqat zaxiralari bo‘yicha kelishuvlar muhim o‘rin tutadi.

Kambag‘allik va ijtimoiy tengsizlik ham global muammolar tizimida markaziy o‘rin egallaydi. Kambag‘allik faqat daromad yetishmasligi emas, balki sifatli ta’lim, tibbiy xizmat, toza ichimlik suvi, munosib uy-joy, bandlik va ijtimoiy himoyaga kirish imkoniyatining cheklanishidir. Shu sababli uni kamaytirish iqtisodiy o‘sish bilan birga manzilli ijtimoiy siyosat, kasb-hunar o‘rgatish, ayollar va yoshlar bandligini qo‘llab-quvvatlash, mahalla darajasidagi ehtiyojlarni aniqlash va tadbirkorlikni rivojlantirish bilan bog‘liq.

O‘zbekistonning milliy siyosatida kambag‘allikni qisqartirish, mahalla bilan ishlash, ehtiyojmand oilalarni qo‘llab-quvvatlash va bandlikni ta’minlash global muammolarga milliy javob sifatida qaralmoqda. Bu yondashuvning afzalligi shundaki, muammo umumiy statistik ko‘rsatkich sifatida emas, aniq oila, aniq hudud va aniq ehtiyoj orqali o‘rganiladi. Mahalla tizimi global muammolarning mahalliy ko‘rinishini aniqlashda kuchli ijtimoiy mexanizm bo‘la oladi.

Global muammolar qatorida **migratsiya va inson xavfsizligi** ham alohida ahamiyatga ega. UNHCR ma’lumotlariga ko‘ra, 2024-yil oxirida dunyo bo‘yicha 123,2 million kishi ta’qib, mojaro, zo‘ravonlik, inson huquqlari buzilishi va boshqa hodisalar tufayli majburiy ko‘chishga duch kelgan. Bu ko‘rsatkich migratsiya masalasi faqat iqtisodiy imkoniyat izlash emas, balki tinchlik, xavfsizlik, iqlim, inson huquqlari va ijtimoiy barqarorlik bilan bog‘liq global muammo ekanini ko‘rsatadi.

O‘zbekiston uchun migratsiya muammosining milliy yechimi ichki mehnat bozorini rivojlantirish, kasb-hunar ta’limini kuchaytirish, tashqi mehnat migratsiyasini huquqiy va ijtimoiy himoya mexanizmlari bilan tartibga solish, migrantlar oilalari bilan ishlash, qaytib kelgan fuqarolarning tajribasidan samarali foydalanish bilan bog‘liq. Mintaqaviy yechim esa mehnat migratsiyasi bo‘yicha davlatlararo kelishuvlar, diplomatik himoya, kasbiy sertifikatlarni tan olish va transmilliy bandlik dasturlarini rivojlantirishni talab qiladi.

So‘nggi yillarda **axborot xavfsizligi** ham global muammo sifatida keskinlashdi. Raqamli texnologiyalar inson hayotini yengillashtirgan bo‘lsa-da, kiberjinoyatlar, yolg‘on axborot, ekstremistik targ‘ibot, shaxsiy ma’lumotlar xavfsizligi va yoshlar ongiga salbiy ta’sir ko‘rsatadigan kontentlar muammosini ham kuchaytirdi. Bu masalada milliy yechim raqamli savodxonlikni oshirish, maktab va oliy ta’limda media madaniyatni shakllantirish, kiberxavfsizlik tizimini kuchaytirish, davlat xizmatlarida ma’lumotlar himoyasini ta’minlash va aholining tanqidiy fikrlash ko‘nikmasini rivojlantirishdan iborat.

Global muammolar yechimida **ta’lim va fan** asosiy omillardan biri hisoblanadi. Chunki suvni tejash, ekologik madaniyat, sog‘lom turmush, oziq-ovqat xavfsizligi, raqamli xavfsizlik, energiya samaradorligi va ijtimoiy mas’uliyat avvalo bilim va tarbiya orqali shakllanadi. Maktab o‘quvchisi suvni tejashni faqat shior sifatida emas, hayotiy odat sifatida o‘rgansa, talaba ilmiy izlanish orqali hududiy muammoga yechim taklif qilsa, pedagog global muammolarni o‘quv jarayoniga integratsiya qilsa, milliy yechimning ijtimoiy asosi kuchayadi.

TAHLIL VA NATIJALAR

Tahlil shuni ko‘rsatadiki, global muammolarning samarali yechimi ularni faqat tashqi xavf sifatida emas, milliy taraqqiyotning tarkibiy masalasi sifatida qabul qilishga bog‘liq. O‘zbekistonning “O‘zbekiston - 2030” strategiyasi, Barqaror rivojlanish maqsadlari bo‘yicha milliy vazifalar, iqlimga moslashuv, Orolbo‘yini rivojlantirish, yashil iqtisodiyot, kambag‘allikni qisqartirish va mintaqaviy hamkorlik siyosati aynan shunday yondashuvga asoslanadi. 2030-yilgacha bo‘lgan davrda barqaror rivojlanish sohasidagi milliy maqsad va vazifalarda cho‘llanishga qarshi kurashish, yemirilgan yer va tuproqlarni tiklash, qurg‘oqchilik va suv toshqinidan zarar ko‘rgan hududlarni tiklash vazifalari belgilangan.

Milliy darajadagi yechimlar bir nechta yo‘nalishda shakllanishi zarur. Ekologik muammolarda suv tejamkor texnologiyalar, qayta tiklanuvchi energiya, yashil hududlar, chiqindilarni qayta ishlash va ekologik ta’lim ustuvor bo‘lishi kerak. Ijtimoiy muammolarda kambag‘allikni qisqartirish, bandlik, kasb-hunar, ayollar va yoshlar

imkoniyatlarini kengaytirish muhim. Axborot xavfsizligida raqamli savodxonlik, kiberxavfsizlik va media madaniyat zarur. Oziq-ovqat xavfsizligida esa qishloq xo‘jaligi innovatsiyalari, suv va yer resurslaridan oqilona foydalanish, hududiy ixtisoslashuv va ilmiy agrotexnologiyalar asosiy ahamiyatga ega.

Mintaqaviy yechimlar Markaziy Osiyoda ishonch, ochiq muloqot va manfaatlar muvozanatiga tayanishi kerak. Suv, energetika, transport, ekologiya, chegaraoldi savdo, migratsiya va xavfsizlik masalalari alohida davlatlar tomonidan yakka tartibda hal etilmaydi. Markaziy Osiyo davlatlari o‘rtasida ma’lumot almashinuvi, qo‘shma monitoring, ilmiy ekspeditsiyalar, suv-energetika kelishuvlari, ekologik loyihalar va favqulodda vaziyatlarga tayyorgarlik tizimlari kuchaytirilsa, global muammolarning mintaqaviy oqibatlari yumshaydi.

Amaliy jihatdan oliy ta’lim muassasalari ham bu jarayonda faol ishtirok etishi lozim. Termiz davlat pedagogika universiteti kabi ta’lim muassasalari global muammolarni o‘quv dasturlari, ilmiy maqolalar, magistrlik dissertatsiyalari, ekologik loyihalar, talabalar klublari va mahalla bilan hamkorlik orqali o‘rganishi mumkin. Masalan, Surxondaryo viloyati sharoitida suvdan foydalanish madaniyati, qurg‘oqchilikka moslashuv, ekologik tarbiya, yoshlar bandligi, migratsiya oilalari bilan pedagogik ishlash va raqamli xavfsizlik masalalari amaliy tadqiqot mavzusi bo‘la oladi.

Global muammolar yechimida **mahalla**, **maktab**, **oliy ta’lim**, **ilmiy markaz**, **nodavlat tashkilot**, **ommaviy axborot vositasi** va **davlat boshqaruvi** bir-birini to‘ldiruvchi tizim sifatida ishlashi kerak. Mahalla muammoni joyida aniqlaydi, maktab ekologik va huquqiy madaniyatni shakllantiradi, oliy ta’lim ilmiy yechim ishlab chiqadi, davlat esa huquqiy va moliyaviy mexanizm yaratadi. Shunday integratsiya bo‘lmasa, global muammolar haqidagi qarashlar nazariy bayon darajasida qolib ketadi.

XULOSA

Global muammolarning milliy va mintaqaviy darajadagi yechimlarini topish zamonaviy O‘zbekiston taraqqiyotining muhim shartidir. Iqlim o‘zgarishi, suv tanqisligi, Orolbo‘yi ekologik inqirozi, oziq-ovqat xavfsizligi, kambag‘allik, migratsiya va axborot xavfsizligi kabi masalalar bir-biri bilan uzviy bog‘liq bo‘lib, ularni alohida-alohida hal etish kutilgan natijani bermaydi. Bunday muammolar kompleks, ilmiy asoslangan, milliy manfaatlarga mos va mintaqaviy hamkorlikka tayangan yondashuvni talab qiladi.

O‘zbekiston tajribasi shuni ko‘rsatadiki, global muammolarga javob berish uchun davlat strategiyasi, mahalliy boshqaruv, xalqaro hamkorlik, ekologik madaniyat, ta’lim, fan va fuqarolik jamiyati birgalikda harakat qilishi zarur. “O‘zbekiston - 2030”

strategiyasida belgilangan vazifalar, Barqaror rivojlanish maqsadlari bo‘yicha milliy chora-tadbirlar, Orolbo‘yi hududini rivojlantirish loyihalari, yashil iqtisodiyotga o‘tish va Markaziy Osiyoda mintaqaviy hamkorlikni kuchaytirish siyosati global muammolarni milliy va hududiy darajada hal etishning muhim asosidir. Bu jarayonda eng asosiy mezon inson hayoti, uning salomatligi, farovonligi, xavfsizligi va kelajak avlodlar oldidagi mas’uliyat bo‘lib qoladi.

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ADOLATLI IJTIMOIY SIYOSAT YURITISH, INSON KAPITALINI RIVOJLANTIRISH

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Annotatsiya: Mazkur maqolada **adolatli ijtimoiy siyosat** va **inson kapitalini rivojlantirish** masalalari O‘zbekistonning zamonaviy taraqqiyot strategiyasi, ijtimoiy davlat tamoyili, ta’lim, sog‘liqni saqlash, bandlik, kambag‘allikni qisqartirish va mahalla tizimi bilan uzviy bog‘liq holda tahlil qilinadi. Tadqiqotda inson kapitali shaxsning bilimi, salomatligi, kasbiy ko‘nikmasi, ijtimoiy faolligi va mehnat bozoridagi raqobatbardoshligini ifodalovchi strategik resurs sifatida yoritiladi. Adolatli ijtimoiy siyosat esa fuqarolarning ijtimoiy himoyaga, sifatli ta’limga, tibbiy xizmatga, munosib mehnatga va o‘z salohiyatini ro‘yobga chiqarish imkoniyatiga teng kirishini ta’minlovchi davlat siyosati sifatida izohlanadi. Maqolada O‘zbekiston sharoitida ijtimoiy siyosatning yangi bosqichi inson qadrini ulug‘lash, kambag‘allikni qisqartirish, xotin-qizlar va yoshlarni qo‘llab-quvvatlash, maktabgacha va oliy ta’lim qamrovini kengaytirish hamda sog‘lom va malakali avlodni shakllantirish orqali namoyon bo‘layotgani asoslab beriladi.

Kalit so‘zlar: Adolatli ijtimoiy siyosat, inson kapitali, ijtimoiy davlat, inson qadri, ta’lim sifati, sog‘liqni saqlash, bandlik, kambag‘allikni qisqartirish, mahalla, ijtimoiy himoya, kasbiy kompetensiya, Yangi O‘zbekiston.

KIRISH

Zamonaviy davlat taraqqiyotida iqtisodiy o‘sishning o‘zi yetarli natija sifatida qaralmaydi. Mamlakatning haqiqiy rivojlanishi fuqarolarning hayot sifati, salomatligi, bilim darajasi, ijtimoiy himoyasi, mehnat qilish imkoniyati, madaniy faolligi va o‘z salohiyatini namoyon eta olish darajasi bilan belgilanadi. Shu sababli XXI asrda **adolatli ijtimoiy siyosat yuritish** va **inson kapitalini rivojlantirish** har bir davlatning strategik maqsadiga aylandi. O‘zbekiston sharoitida bu masala “inson qadri uchun” g‘oyasi, ijtimoiy davlat tamoyili, “O‘zbekiston - 2030” strategiyasi va Taraqqiyot strategiyasining ustuvor yo‘nalishlari bilan bevosita bog‘liq.

Adolatli ijtimoiy siyosat deganda davlat tomonidan jamiyatdagi barcha qatlamlar, ayniqsa ehtiyojmand oilalar, yoshlar, xotin-qizlar, nogironligi bo‘lgan shaxslar, ishsizlar, keksalar va ijtimoiy himoyaga muhtoj fuqarolar uchun munosib hayot sharoitini yaratishga qaratilgan chora-tadbirlar tizimi tushuniladi. Bunday siyosat faqat nafaqa, moddiy yordam yoki kompensatsiya berish bilan cheklanmaydi. Uning mohiyati insonni passiv yordam oluvchi holatida qoldirmasdan, uni ta’lim, kasb-hunar, sog‘liq, bandlik, tadbirkorlik, uy-joy, ijtimoiy xizmat va huquqiy kafolatlar orqali faol hayotga qaytarishdan iborat. Adolatli ijtimoiy siyosatda davlat resurslari ehtiyojga qarab manzilli taqsimlanadi, fuqarolarning imkoniyatlari tenglashtiriladi va ijtimoiy tengsizlikning chuqurlashishiga yo‘l qo‘yilmaydi.

Inson kapitali tushunchasi shaxsning bilim, ko‘nikma, salomatlik, kasbiy tajriba, mehnat madaniyati, ijodiy salohiyat va ijtimoiy faollik orqali jamiyat taraqqiyotiga qo‘shadigan hissasini ifodalaydi. Inson kapitali moddiy boylikdan farqli ravishda insonning o‘zida mujassam bo‘ladi. U ta’lim, tarbiya, sog‘liqni saqlash, madaniyat, kasbiy tayyorgarlik, ilm-fan va innovatsiyalar orqali shakllanadi. Inson kapitali rivojlangan jamiyatda iqtisodiyot samaraliroq ishlaydi, innovatsiyalar ko‘payadi, kambag‘allik kamayadi, fuqarolik mas’uliyati kuchayadi va milliy raqobatbardoshlik ortadi.

O‘zbekiston Respublikasining 2022–2026-yillarga mo‘ljallangan Taraqqiyot strategiyasida “adolatli ijtimoiy siyosat yuritish, inson kapitalini rivojlantirish” alohida ustuvor yo‘nalish sifatida belgilangan. Bu yo‘nalish ijtimoiy siyosatni iqtisodiy islohotlardan ajratib emas, balki ular bilan uyg‘un holda olib borishni ko‘zda tutadi. Taraqqiyot strategiyasida inson qadrini ulug‘lash, ijtimoiy himoyani kuchaytirish, ta’lim va sog‘liqni saqlash sifatini oshirish, yoshlar va xotin-qizlar imkoniyatlarini kengaytirish kabi vazifalar davlat siyosatining asosiy mezoni sifatida belgilangan. Lex.uz ma’lumotlarida Taraqqiyot strategiyasining ustuvor yo‘nalishlari qatorida aynan **“adolatli ijtimoiy siyosat yuritish, inson kapitalini rivojlantirish”** ko‘rsatilgan.

“O‘zbekiston - 2030” strategiyasida esa ushbu yondashuv yanada chuqurlashtirilib, “har bir insonga o‘z salohiyatini ro‘yobga chiqarishi uchun munosib sharoitlarni yaratish” birinchi ustuvor yo‘nalish sifatida belgilangan. Bu yondashuv ta’lim, sog‘liqni saqlash, ijtimoiy himoya, kambag‘allikni qisqartirish, yoshlar siyosati va inson kapitalini rivojlantirish masalalarini yagona tizim sifatida ko‘rishga imkon beradi. Strategiyada maktabgacha ta’limdan oliy ta’limgacha bo‘lgan tizimni yangilash, fuqarolar salomatligini mustahkamlash, kambag‘allikni keskin qisqartirish va ehtiyojmand qatlamlarni qo‘llab-quvvatlash maqsadlari aniq belgilangan.

ADABIYOTLAR TAHLILI VA METODOLOGIYA

O‘zbekiston ilmiy adabiyotlarida adolatli ijtimoiy siyosat, inson kapitali, ijtimoiy davlat, ta’lim sifati, mehnat bozori, kambag‘allikni qisqartirish va fuqarolik jamiyati masalalari turli yo‘nalishlarda o‘rganilgan. Iqtisodchi, pedagog, huquqshunos va faylasuf olimlarning tadqiqotlarida inson omili jamiyat taraqqiyotining markaziy manbai sifatida talqin qilinadi. A. O‘lmasov, A. Vahobov, Sh. Shodmonov, N. To‘xliyev, Q. Abdurahmonov, N. Muslimov, B. Xodjayev, M. Qirg‘izboyev, Q. Nazarov, N. Jo‘rayev, M. Quronov kabi o‘zbekistonlik tadqiqotchilarning ishlari inson salohiyati, mehnat resurslari, ta’lim, kasbiy kompetentlik, ijtimoiy adolat va fuqarolik jamiyatining ilmiy asoslarini yoritishda muhim manba hisoblanadi.

A. O‘lmasov va Sh. Shodmonovning iqtisodiyot nazariyasiga oid qarashlarida inson ehtiyojlari, mehnat, daromad, iste’mol, taqsimot va ijtimoiy himoya masalalari iqtisodiy tizimning muhim tarkibiy qismi sifatida ko‘rsatiladi. Bu yondashuv adolatli ijtimoiy siyosatni faqat ijtimoiy yordam mexanizmi sifatida emas, balki iqtisodiy taraqqiyot barqarorligini ta’minlovchi omil sifatida tushunishga yordam beradi. Agar jamiyatda daromadlar keskin tabaqalashsa, sifatli ta’lim va tibbiyotdan foydalanish imkoniyati teng bo‘lmasa, iqtisodiy o‘sish uzoq muddatda ijtimoiy norozilik, mehnat unumdorligining pasayishi va inson salohiyatining to‘liq ro‘yobga chiqmasligiga olib keladi.

Q. Abdurahmonovning mehnat iqtisodiyoti va inson taraqqiyotiga oid ilmiy ishlari inson kapitalini rivojlantirishda bandlik, mehnat bozori, kasbiy tayyorgarlik va mehnat unumdorligi muhim o‘rin tutishini ko‘rsatadi. Inson kapitali samarali ishlashi uchun fuqaro bilimli bo‘lishi bilan birga, o‘z bilimi va malakasini mehnat bozorida qo‘llay olishi kerak. Oliy ma’lumotli mutaxassis ish topa olmasa yoki egallagan bilimlari zamonaviy kasb talablari bilan mos kelmasa, inson kapitaliga qilingan investitsiya kutilgan natijani bermaydi. Shu sababli ta’lim tizimi, kasb-hunar tayyorgarligi va bandlik siyosati o‘zaro bog‘liq holda rivojlanishi zarur.

Pedagog olimlar N. Muslimov, B. Xodjayev, N. Azizxo‘jayeva, R. Jo‘rayev va J. Yo‘ldoshevlarning ilmiy qarashlarida inson kapitalining ta’limiy asoslari chuqur yoritilgan. Ularning tadqiqotlarida pedagogik jarayon, kompetensiyaviy yondashuv, ta’lim texnologiyalari, kasbiy tayyorgarlik va ta’lim sifati masalalari markaziy o‘rin tutadi. Inson kapitali shakllanishida ta’lim hal qiluvchi mexanizm bo‘lgani uchun pedagog kadrlar sifati, o‘quv dasturlarining zamonaviyligi, baholash tizimining adolatliligi va o‘quvchida mustaqil fikrlashni rivojlantirish ijtimoiy siyosatning uzoq muddatli natijasiga bevosita ta’sir ko‘rsatadi.

M. Qirg‘izboyevning fuqarolik jamiyati haqidagi ilmiy ishlari adolatli ijtimoiy siyosatni davlat va jamiyat hamkorligi nuqtayi nazaridan anglashga yordam beradi. Ijtimoiy muammolar faqat vazirlik va idoralar qarori bilan hal etilmaydi. Mahalla, nodavlat tashkilotlar, ommaviy axborot vositalari, ta’lim muassasalari, kasaba uyushmalari va jamoatchilik nazorati institutlari ijtimoiy adolatni ta’minlashda muhim o‘rin tutadi. Q. Nazarov va N. Jo‘rayevning falsafiy qarashlari esa inson qadrini, ma’naviy yetuklikni va ijtimoiy mas’uliyatni taraqqiyotning ichki omili sifatida tushuntiradi.

Mazkur maqolada **tizimli tahlil**, **qiyosiy tahlil**, **normativ-huquqiy tahlil**, **statistik tahlil** va **ilmiy-nazariy umumlashtirish** metodlaridan foydalanildi. Tizimli tahlil orqali adolatli ijtimoiy siyosat ta’lim, sog‘liqni saqlash, bandlik, ijtimoiy himoya va mahalla tizimi bilan bog‘liq holda o‘rganildi. Qiyosiy tahlil yordamida ijtimoiy siyosatning an’anaviy yordamga asoslangan modeli bilan inson kapitalini rivojlantirishga yo‘naltirilgan zamonaviy modeli farqlab ko‘rsatildi. Normativ-huquqiy tahlilda O‘zbekistonning Taraqqiyot strategiyasi, “O‘zbekiston - 2030” strategiyasi va ijtimoiy sohaga oid qonunchilik hujjatlari asosiy manba sifatida olindi. Statistik tahlilda kambag‘allik, oliy ta’lim qamrovi, professor-o‘qituvchilar soni, umr ko‘rish davomiyligi va sog‘liqni saqlash infratuzilmasi bo‘yicha rasmiy ma’lumotlarga tayanildi.

TAHLIL VA NATIJALAR

Adolatli ijtimoiy siyosatning mazmunini inson kapitali bilan bog‘lab tahlil qilish uning bir nechta tarkibiy unsurlardan iborat ekanini ko‘rsatadi. Ular orasida **ta’lim**, **sog‘liqni saqlash**, **bandlik**, **ijtimoiy himoya**, **uy-joy sharoiti**, **xotin-qizlar va yoshlar imkoniyatlari**, **nogironligi bo‘lgan shaxslar huquqlari**, **kambag‘allikni qisqartirish** va **mahalla darajasidagi manzilli yordam** alohida ahamiyatga ega. Bu unsurlar bir-biridan ajratilgan holda ishlasa, ijtimoiy siyosat parokanda tus oladi. Ular yagona tizimga aylanganda esa inson kapitali real rivojlanadi.

Ta’lim inson kapitalining eng muhim manbaidir. Bolaning maktabgacha ta’limdan boshlab sifatli tarbiya olishi, maktabda mustahkam bilim egallashi, oliy yoki professional ta’limda kasbiy ko‘nikma hosil qilishi uning kelajakdagi daromadi, ijtimoiy faolligi va hayot sifatini belgilaydi. O‘zbekistonda so‘nggi yillarda oliy ta’lim qamrovi keskin oshdi. Milliy statistika qo‘mitasi ma’lumotlariga ko‘ra, 2024/2025-o‘quv yili boshida 18–23 yoshdagi aholining oliy ta’lim bilan qamrab olinishi 47,7 foizni tashkil etgan. Bu ko‘rsatkich 2014-yilda 6,8 foiz bo‘lgan. Demak, o‘n yil ichida oliy ta’limga kirish imkoniyati sezilarli darajada kengaydi.

Oliy ta’lim qamrovining oshishi inson kapitali uchun ijobiy holat, biroq bu jarayon sifat masalasi bilan birga yurishi kerak. Faqat talabalar sonining ortishi yetarli emas. Oliy ta’lim bitiruvchisi zamonaviy bilim, raqamli savodxonlik, kasbiy kompetensiya, chet tili, tanqidiy fikrlash va amaliy ko‘nikmaga ega bo‘lishi zarur. Agar oliy ta’lim mehnat bozori bilan bog‘lanmasa, diplomli ishsizlik xavfi paydo bo‘ladi. Shu bois adolatli ijtimoiy siyosat ta’lim olish imkoniyatini kengaytirish bilan birga, ta’lim sifatini oshirish, o‘quv dasturlarini yangilash va bitiruvchilarni real kasblarga tayyorlashni ham talab qiladi.

Inson kapitalining ikkinchi asosiy tayanchi sog‘liqdir. Sog‘lom inson bilim olishga, mehnat qilishga, ijtimoiy hayotda faol ishtirok etishga va o‘z salohiyatini ro‘yobga chiqarishga ko‘proq imkoniyatga ega. Sog‘liqni saqlash tizimi adolatli ijtimoiy siyosatning markazida turadi, chunki kasallik, nogironlik, tibbiy xizmatga kira olmaslik yoki profilaktika yetishmasligi insonning iqtisodiy va ijtimoiy imkoniyatlarini cheklaydi. Rasmiy ma’lumotlarga ko‘ra, O‘zbekistonda 2024-yilda tug‘ilishda kutilayotgan umr ko‘rish davomiyligi 75,1 yoshni tashkil etgan, bu 1991-yildagi 66,4 yoshdan ancha yuqori ko‘rsatkichdir.

Sog‘liqni saqlash infratuzilmasi ham kengaymoqda. Milliy statistika qo‘mitasining sog‘liqni saqlash bo‘yicha ma’lumotlarida 2024-yil yakuni bo‘yicha O‘zbekistonda faoliyat yuritayotgan shifoxona muassasalari soni 1 972 taga yetgani va 2023-yilga nisbatan 37,7 foizga oshgani qayd etilgan. Bu ko‘rsatkich tibbiy xizmatlar qamrovini kengaytirish imkonini beradi, lekin tibbiyot sifati, hududlar o‘rtasidagi farq, profilaktika, onalar va bolalar salomatligi, malakali shifokorlar yetishmovchiligi kabi masalalar doimiy e’tiborni talab qiladi.

Adolatli ijtimoiy siyosatda **kambag‘allikni qisqartirish** alohida o‘rin tutadi. Kambag‘allik daromad kamligi bilan cheklanmaydi. U ta’limdan uzilish, sog‘liqni saqlashdan foydalanishdagi cheklanish, uy-joy muammosi, ijtimoiy aloqalarning zaiflashuvi va kelajak imkoniyatlarining torayishi bilan bog‘liq. O‘zbekistonda kambag‘allik muammosining ochiq tan olinishi va uni qisqartirish bo‘yicha aniq siyosat yuritilishi ijtimoiy siyosatda muhim burilish bo‘ldi. Rasmiy ma’lumotlarda 2024-yilda kambag‘allik darajasi 11 foizdan 8,9 foizga kamaygani, bu ko‘rsatkich 3,3 million kishi yoki 2023-yilga nisbatan 719 ming kishiga qisqarishni anglatgani qayd etilgan.

Kambag‘allikni qisqartirishda moddiy yordam zarur, lekin yetarli emas. Uzoq muddatli natija uchun oilaga barqaror daromad manbai, kasb-hunar, ish o‘rni, sog‘liq, farzandlar ta’limi va ijtimoiy xizmatlar kerak. Shu jihatdan mahalla tizimiga tayanish O‘zbekistonning o‘ziga xos amaliy yondashuvi hisoblanadi. Mahalla oilaning real

ahvolini, daromad manbasini, ijtimoiy muammosini, farzandlar ta'limini va ayollar bandligini bevosita ko'ra oladi. Agar mahalla, hokimlik, bandlik organlari, ta'lim muassasalari va tibbiyot tizimi birgalikda ishlasa, ijtimoiy yordam manzilli bo'ladi.

Bandlik inson kapitalini ro'yobga chiqaruvchi asosiy mexanizmdir. Bilim, kasb va salomatlik mehnat jarayonida qo'llangandagina iqtisodiy va ijtimoiy qiymat yaratadi. Shu sababli adolatli ijtimoiy siyosat ishsiz fuqarolarni kasbga o'qitish, yoshlarni mehnat bozoriga tayyorlash, xotin-qizlar tadbirkorligini qo'llab-quvvatlash, norasmiy bandlikni kamaytirish va munosib mehnat sharoitlarini yaratishni talab qiladi. Lex.uz ma'lumotlarida Taraqqiyot strategiyasi doirasida ishsiz fuqarolarni davlat hisobidan kasb-hunarga o'qitish va nodavlat ta'lim muassasalari ishtirokini kengaytirish maqsadida 463 ta mahallada aholini kasb-hunarga o'qitish maskanlari tashkil etilgani qayd etilgan.

Inson kapitalini rivojlantirishda xotin-qizlarning ijtimoiy va iqtisodiy faolligi alohida ahamiyatga ega. Ayolning bilimli, sog'lom, kasbli va iqtisodiy mustaqil bo'lishi nafaqat uning shaxsiy hayoti, balki oila farovonligi va farzandlar ta'limiga ham bevosita ta'sir qiladi. Og'ir ijtimoiy ahvolga tushib qolgan xotin-qizlarni qayta kasbga tayyorlash xarajatlarini davlat tomonidan qoplab berish tartibi ham ayollar salohiyatini ro'yobga chiqarishga qaratilgan amaliy mexanizmdir. "O'zbekiston - 2030" strategiyasini amalga oshirish bo'yicha hujjatlarda 2024-yildan boshlab bunday tartib joriy etilishi belgilangan.

Yoshlar siyosati ham inson kapitalini rivojlantirishning muhim yo'nalishidir. O'zbekiston aholisi tarkibida yoshlar ulushi yuqori bo'lgani uchun ularning ta'limi, kasbi, bandligi, ijtimoiy faolligi va ma'naviy dunyoqarashi mamlakatning kelajak raqobatbardoshligini belgilaydi. Yoshlar uchun sifatli ta'lim, sport, madaniyat, ilm-fan, startaplar, axborot texnologiyalari, chet tillari va kasbiy tayyorgarlik imkoniyatlarini kengaytirish ijtimoiy siyosatning uzoq muddatli investitsiyasidir. Agar yosh inson o'z qobiliyatini ro'yobga chiqarish imkoniga ega bo'lsa, u ijtimoiy yordamga muhtoj qatlamga emas, jamiyat rivojiga hissa qo'shuvchi faol subyektga aylanadi.

Inson kapitali xalqaro mezonlarda ham ta'lim va sog'liq bilan o'lchanadi. Jahon banki inson kapitalini bilim, ko'nikma va salomatlik insonning o'z salohiyatiga erishishi hamda iqtisodiy o'sishga hissa qo'shishini ta'minlaydigan omil sifatida izohlaydi. O'zbekiston bo'yicha Jahon banki inson kapitali portali ta'lim va sog'liq ko'rsatkichlarini alohida kuzatadi. Bu yondashuv O'zbekiston ijtimoiy siyosatidagi ta'lim, sog'liq, bandlik va ijtimoiy himoya choralarining xalqaro taraqqiyot mezonlari bilan uyg'unligini ko'rsatadi.

MUHOKAMA

Adolatli ijtimoiy siyosatni amalga oshirishda asosiy masala resurslarning miqdori emas, ularning qanday taqsimlanishi va qanday natija berishidir. Ijtimoiy xarajatlar katta bo‘lishi mumkin, lekin ular aniq ehtiyojga yo‘naltirilmasa, inson kapitalini rivojlantirmaydi. Masalan, ehtiyojmand oilaga bir martalik moddiy yordam berish qisqa muddatda muammoni yengillashtiradi, lekin oiladagi mehnatga layoqatli a’zolar kasbga o‘qitilmasa, bolalar sifatli ta’lim olmasa va sog‘liq muammosi hal etilmasa, kambag‘allik qayta takrorlanadi. Shuning uchun ijtimoiy siyosat yordamdan imkoniyat yaratishga o‘tishi kerak.

O‘zbekiston sharoitida ijtimoiy siyosatning kuchli tomoni uning mahalla tizimi bilan bog‘langanidir. Mahalla fuqarolarning real hayotiga yaqin institut bo‘lgani uchun ijtimoiy muammolarni joyida aniqlash imkonini beradi. Biroq bu tizim samarali ishlashi uchun ma’lumotlar bazasi aniq bo‘lishi, mahalla xodimlari yetarli bilim va vakolatga ega bo‘lishi, byurokratik yuklama kamaytirilishi va ijtimoiy xizmatlar o‘zaro bog‘langan holda ishlashi zarur. Aks holda mahalla muammoni aniqlaydi, lekin uni hal etish uchun yetarli mexanizmga ega bo‘lmay qoladi.

Inson kapitalini rivojlantirishda ta’lim tizimining sifati eng dolzarb masalalardan biridir. Oliy ta’lim qamrovi oshgani ijobiy natija, ammo maktabgacha ta’lim, maktab ta’limi, professional ta’lim va oliy ta’lim o‘rtasidagi uzviylik kuchli bo‘lishi kerak. Bolaning ilk rivojlanish bosqichida nutq, tafakkur, ijtimoiy ko‘nikma va sog‘lom odatlar shakllanmasa, keyingi bosqichlarda ta’lim samaradorligi pasayadi. Maktabda tanqidiy fikrlash, matematika savodxonligi, o‘qish madaniyati va raqamli ko‘nikmalar yetarli rivojlanmasa, oliy ta’lim bu bo‘shliqni to‘liq to‘ldira olmaydi. Shu sababli inson kapitaliga investitsiya eng erta yoshdan boshlanishi kerak.

Sog‘liqni saqlashda ham profilaktik yondashuv kuchayishi zarur. Tibbiyot faqat kasallikni davolash bilan emas, kasallikning oldini olish, sog‘lom ovqatlanish, jismoniy faollik, ona va bola salomatligi, ruhiy salomatlik va ekologik xavfsizlik bilan shug‘ullanganda inson kapitali mustahkamlanadi. Sog‘lom bola yaxshi o‘qiydi, sog‘lom yosh mehnat bozorida faol bo‘ladi, sog‘lom keksa jamiyat hayotida uzoqroq ishtirok etadi. Shu sababli ijtimoiy siyosat tibbiy xizmat, ta’lim, sport, ekologiya va oziq-ovqat xavfsizligini birgalikda ko‘rishi kerak.

Adolatli ijtimoiy siyosatning muammolaridan biri hududlar o‘rtasidagi farqlardir. Poytaxt va yirik shaharlarda ta’lim, tibbiyot, ish o‘rinlari va raqamli xizmatlarga kirish imkoniyati yuqoriroq bo‘lishi mumkin. Chekka hududlarda esa maktab infratuzilmasi, malakali o‘qituvchi, shifokor, transport va internet sifati muammo bo‘lib qolishi ehtimoli bor. Inson kapitali teng rivojlanishi uchun hududiy

adolat tamoyili muhim. Har bir bola qaysi tumanda tug‘ilganidan qat’i nazar, sifatli ta’lim, tibbiy xizmat va kasbiy imkoniyatga ega bo‘lishi kerak.

Ijtimoiy siyosatda raqamlashtirish ham katta imkoniyat yaratadi. Elektron ma’lumotlar bazasi, ijtimoiy reyestr, elektron tibbiy karta, raqamli ta’lim platformalari va onlayn bandlik xizmatlari ijtimoiy yordamning shaffofligi va manzilligini oshiradi. Biroq raqamlashtirish inson omilini butunlay almashtirmaydi. Ehtiyojmand oila bilan suhbat, psixologik yordam, ijtimoiy moslashuv, kasb tanlash va oilaviy muammolarni hal qilishda jonli muloqot zarur. Shuning uchun raqamli xizmatlar ijtimoiy xodim, pedagog, shifokor va mahalla faoliyatini kuchaytiruvchi vosita sifatida ishlashi lozim.

Inson kapitalini rivojlantirishning muhim sharti ilm-fan va innovatsiyalarni ijtimoiy siyosat bilan bog‘lashdir. Ta’lim, sog‘liqni saqlash, kambag‘allik, bandlik va demografiya bo‘yicha qarorlar ilmiy tahlilga tayanmasa, ular qisqa muddatli ma’muriy choralar darajasida qoladi. Oliy ta’lim muassasalari, ilmiy markazlar va davlat idoralari birgalikda hududiy ijtimoiy muammolarni o‘rganishi, dalillarga asoslangan tavsiyalar ishlab chiqishi va tajriba-sinov natijalarini siyosatga tatbiq etishi kerak. Masalan, Surxondaryo viloyatida yoshlar bandligi, qizlarning ta’limga jalb etilishi, mehnat migratsiyasi oilalariga pedagogik-psixologik yordam, kasb-hunar ta’limining mahalliy iqtisodiyotga mosligi kabi mavzular ijtimoiy siyosat va inson kapitalini rivojlantirish uchun muhim amaliy tadqiqot yo‘nalishlari bo‘la oladi.

Adolatli ijtimoiy siyosatning rivojlanish yo‘llari aniq amaliy mexanizmlarga tayanishi kerak. Ta’limda sifat va tenglik birga ta’minlanishi, maktabgacha ta’lim qamrovi oshirilishi, maktablarda zamonaviy metodika va o‘quvchilarni kasbga yo‘naltirish kuchaytirilishi, oliy ta’lim mehnat bozori bilan bog‘lanishi zarur. Sog‘liqni saqlashda birlamchi tibbiy xizmat, profilaktika va hududiy tibbiyot muassasalari salohiyati oshirilishi kerak. Bandlikda kasb-hunar o‘qitish, tadbirkorlik ko‘nikmalari, yoshlar va ayollar uchun real ish o‘rinlari, kichik biznesni qo‘llab-quvvatlash muhim. Ijtimoiy himoyada esa yordamlar oilaning haqiqiy ehtiyojiga qarab belgilanib, ularni kambag‘allikdan chiqarish rejalari bilan bog‘lanishi lozim.

XULOSA

Adolatli ijtimoiy siyosat yuritish va inson kapitalini rivojlantirish O‘zbekistonning zamonaviy taraqqiyotida bir-birini to‘ldiruvchi ikki asosiy yo‘nalishdir. Adolatli ijtimoiy siyosat inson uchun munosib hayot sharoitini yaratadi, inson kapitali esa shu sharoitda shakllangan bilim, salomatlik, kasb va faollik orqali jamiyat taraqqiyotini tezlashtiradi. O‘zbekiston tajribasida bu jarayon “inson qadri”, “ijtimoiy davlat”, “mahalla bilan ishlash”, “kambag‘allikni qisqartirish” va “har bir

insonga o‘z salohiyatini ro‘yobga chiqarish uchun sharoit yaratish” g‘oyalari orqali namoyon bo‘lmoqda.

Tahlillar shuni ko‘rsatadiki, O‘zbekistonda oliy ta’lim qamrovi oshayotgani, kambag‘allik darajasi pasayayotgani, umr ko‘rish davomiyligi yaxshilanayotgani, sog‘liqni saqlash infratuzilmasi kengayayotgani va kasb-hunarga o‘qitish tizimi mahallagacha tushirilayotgani inson kapitalini rivojlantirish uchun muhim asos yaratmoqda. Endigi vazifa miqdoriy o‘sishni sifat o‘zgarishiga aylantirishdan iborat. Ta’lim sifati, tibbiy xizmatlar samaradorligi, hududlar o‘rtasidagi teng imkoniyat, bandlikning barqarorligi, xotin-qizlar va yoshlar salohiyatining to‘liq ro‘yobga chiqishi ijtimoiy siyosat samaradorligini belgilaydi.

Adolatli ijtimoiy siyosatning kelajakdagi muvaffaqiyati davlat organlari, mahalla, ta’lim muassasalari, sog‘liqni saqlash tizimi, biznes, nodavlat tashkilotlar va fuqarolik jamiyatining hamkorligiga bog‘liq. Inson kapitali qanchalik kuchli bo‘lsa, jamiyatning innovatsion salohiyati, iqtisodiy barqarorligi va ijtimoiy birdamligi shunchalik mustahkam bo‘ladi. Shu ma’noda adolatli ijtimoiy siyosat O‘zbekistonning nafaqat bugungi ijtimoiy muammolarini hal etuvchi vosita, balki kelajak taraqqiyotini belgilovchi strategik omildir.

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YUQUMLI KASALLIKLAR BILAN KASALLANGAN BEMORLARNING PSIXO-EMOTSIONAL XUSUSIYATLARI

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Annotatsiya Ushbu maqolada yuqumli kasalliklar bilan kasallangan bemorlarning psixo-emotsional xususiyatlari tibbiyot va psixologiya fanlarining birgalikdagi nuqtai nazaridan o'rganilgan. Xorijiy va mahalliy manbalar asosida tashvish, depressiya, ijtimoiy stigma, izolyatsiya ta'siri va kurashish strategiyalari kabi asosiy mavzular tahlil etilgan. Tadqiqotlar natijalari shuni ko'rsatadiki, yuqumli kasalliklar bemorlarga nafaqat jismoniy, balki kuchli ruhiy ta'sir ham ko'rsatadi. Maqolada psixologik yordamning tibbiy davolash jarayonidagi ahamiyati alohida ta'kidlanadi.

Kalit so'zlar: *yuqumli kasallik, psixo-emotsional holat, tashvish, depressiya, stigma, kurashish strategiyasi, psixologik yordam.*

Аннотация В данной статье психоэмоциональные особенности пациентов, страдающих инфекционными заболеваниями, рассматриваются с точки зрения взаимодействия медицины и психологии. На основе зарубежных и отечественных источников проанализированы такие основные темы, как

тревожность, депрессия, социальная стигма, влияние изоляции и стратегии преодоления. Результаты исследований показывают, что инфекционные заболевания оказывают на пациентов не только физическое, но и сильное психологическое воздействие. В статье особо подчеркивается значение психологической помощи в процессе медицинского лечения.

Ключевые слова: инфекционное заболевание, психоэмоциональное состояние, тревожность, депрессия, стигма, стратегия преодоления, психологическая помощь.

Abstract This article examines the psycho-emotional characteristics of patients suffering from infectious diseases from the combined perspectives of medicine and psychology. Based on both foreign and local sources, key topics such as anxiety, depression, social stigma, the effects of isolation, and coping strategies are analyzed. The research findings indicate that infectious diseases have not only physical but also significant psychological effects on patients. The article particularly emphasizes the importance of psychological support in the process of medical treatment.

Keywords: infectious disease, psycho-emotional state, anxiety, depression, stigma, coping strategy, psychological support.

Yuqumli kasalliklar insoniyat tarixida har doim muhim tibbiy muammo bo'lib kelgan. Biroq ularning jismoniy oqibatlarigina emas, balki bemorlarning ruhiy holati ham salomatlik uchun hal qiluvchi ahamiyat kasb etadi. So'nggi o'n yilliklarda, ayniqsa COVID-19 pandemiyasidan so'ng, tibbiyot mutaxassislari va psixologlar yuqumli kasalliklar bilan og'rigan bemorlarning psixo-emotsional ahvoliga katta e'tibor qarata boshladi.

Psixo-emotsional holat deganda insonning his-tuyg'ulari, kayfiyati, stressga munosabati va umumiy ruhiy muvozanati tushuniladi. Yuqumli kasallik paytida bu holat bir qator omillar — kasallikning og'irligi, davolash sharoiti, ijtimoiy muhit va shaxsning o'ziga xos xususiyatlari ta'sirida shakllanadi.

Tibbiyot va psixologiya fanlarining birgalikdagi yondashuvida bemor faqat biologik organizm emas, balki ijtimoiy, emotsional va ruhiy jihatdan yaxlit shaxs sifatida ko'rib chiqiladi. Shu bois ushbu maqolada yuqumli kasalliklar bilan bog'liq

psixo-emotsional buzilishlar, ularning sabablari va psixologik yordam usullari keng yoritiladi.

ASOSIY PSIXO-EMOTSIONAL BUZILISHLAR

Tashvish (Anxiety) Tashvish yuqumli kasalliklar bilan og'rigan bemorlarda eng ko'p uchraydigan psixo-emotsional buzilishlardan biri hisoblanadi. Uning namoyon bo'lish shakllari xilma-xil: o'lim qo'rquvi, yaqinlarini yuqtirish xavotiri, kasallikning oqibati haqida noaniqlik, hamda statsionarda uzoq vaqt yotish natijasida vujudga keladigan psixologik zo'riqish.

Ilmiy tadqiqotlar ma'lumotlariga ko'ra, COVID-19 bilan kasallangan bemorlarda tashvish xavfi sog'lom populyatsiyaga nisbatan 20 marta ortiq bo'lgan (Lee et al., 2020). Statsionarda izolyatsiyada davolangan bemorlarda esa uyda davolanganlarga nisbatan tashvish ko'rsatkichlari sezilarli darajada yuqori bo'lganligi aniqlangan.

Tashvishning klinik belgilari orasida: doimiy xavotirlanish, uxlay olmaslik, yurak urishi tezlashishi, bosh og'riq, mushaklar tarangligi va diqqatni jamlash qobiliyatining pasayishi ajratib ko'rsatiladi. Bu belgilar bemorning davolanish jarayoniga salbiy ta'sir ko'rsatib, immun tizimining faoliyatini zaiflashtirishga olib kelishi mumkin.

Depressiya yuqumli kasalliklar bilan og'rigan bemorlar orasida keng tarqalgan ikkinchi muhim psixo-emotsional buzilishdir. Tadqiqotlar natijalariga ko'ra, COVID-19 bilan kasallangan bemorlarning qariyb 49 foizida depressiya belgilari qayd etilgan (Zhang et al., 2023).

Depressiya o'zini nafaqat kayfiyatning tushkunligi, balki jismoniy belgilar orqali ham namoyon etadi: charchoq, ishtahasizlik, uyqusizlik yoki haddan ziyod uyquchanlik, harakat sekinlashishi, xotira va diqqat buzilishi. Yuqumli kasalliklarning o'zi ham, ularni davolashda ishlatiladigan ba'zi dorilar ham depressiv holatlarni kuchaytirishi mumkin.

Depressiya bemorlarga kasallikning biologik ta'siri natijasida ham rivojlanishi mumkin. Masalan, sitokinlar — yallig'lanish mediatorlari — oshgan darajasi neyrobiologik o'zgarishlarga olib kelib, depressiv holatlarning rivojlanishiga zamin yaratadi. Bu holat ilmiy adabiyotlarda «kasallik xulq-atvori» (sickness behavior) deb ham ataladi.

Uyqusizlik va Astenik Sindrom Yuqumli kasalliklar bilan og'rigan bemorlarda uyqusizlik (63,7%) keng tarqalgan muammo sifatida qayd etiladi. Uyqu buzilishi o'z navbatida immunitet faoliyatini pasaytiradi, kayfiyatni yomonlashtiradi va davolanish muddatini uzaytiradi.

Astenik sindrom — ya'ni kuchsizlik, tez charchash, emotsional beqarorlik va ruhiy holsizlik birikmasi — kasallikning o'tkir bosqichi o'tgandan keyin ham uzoq davom etishi mumkin. Ebola bilan davolangan bemorlarning 4–7 oy o'tgach ham uyqu buzilishi, qisqa muddatli xotira yo'qolishi va depressiya belgilari kuzatilgani ilmiy adabiyotlarda qayd etilgan.

Post-Travmatik stress buzilishi (PTSD) Og'ir yuqumli kasalliklardan — ayniqsa reanimatsiya bo'limida davolangan bemorlardan — salmoqli qismi post-travmatik stressni boshidan o'tkazadi. Tadqiqotlarga ko'ra, COVID-19 bilan og'rigan bemorlarning 30,2 foizida PTSD belgilari aniqlangan (Janiri et al., 2021).

PTSD belgilari qatoriga: travmatik xotiralarning takrorlanishi (flashback), kasallik bilan bog'liq tushlar ko'rish, tegishli vaziyat va o'ylardan qochish, hissiy tortiqlik va gipervigilantlik — ya'ni haddan tashqari sergaklik holati — kiradi.

PSIXO-EMOTSIONAL BUZILISHLARNING SABABLARI

Biologik Omillar Yuqumli kasalliklar paytida organizmda sodir bo'ladigan neyrobiologik o'zgarishlar ruhiy holatga bevosita ta'sir ko'rsatadi. Yallig'lanish sitokinlari — interleykin-1, interleykin-6 va o'sma nekroz omili — miya faoliyatiga ta'sir qilib, kayfiyat buzilishlariga, kognitiv muammolarga va uyqu sifatining yomonlashishiga olib keladi.

Bundan tashqari, yuqori isitma, zaharlanish, ba'zi antimikrob dorilarning yon ta'siri ham psixo-emotsional holatga salbiy ta'sir ko'rsatishi aniqlangan. Ba'zi hollarda kasallik to'g'ridan-to'g'ri asab tizimiga ta'sir etib, organik psixoz, deliriy yoki kognitiv pasayishga olib kelishi mumkin.

Psixologik va ijtimoiy omillar Psixologik omillar orasida o'lim qo'rquvi, kasallikning qanday kechishini bilmaslik va kelajak haqidagi noaniqlik alohida o'rin tutadi. Statsionarda uzoq vaqt davolanish, tanish muhitdan ajralish va yaqinlar bilan muloqotning cheklanishi depressiya hamda tashvishni kuchaytiradi.

Ijtimoiy omillar nuqtai nazaridan qaraganda, ayollar va iqtisodiy ahvoli yomon bemorlar yuqumli kasalliklarga nisbatan ko'proq depressiya va tashvishga moyilligi aniqlangan (Chen et al., 2023). Ijtimoiy yordam mavjudligi esa bu xavfni sezilarli darajada kamaytiradi.

Ijtimoiy stigma Sil kasalligi, OIV/OITS, moxov kabi yuqumli kasalliklar bilan og'rigan bemorlar ko'pincha ijtimoiy stigma — jamiyat tomonidan qoralanish va istisno etilish — bilan to'qnashadi. Bu holat psixologik azobni kuchaytiradi, shuningdek bemorni tibbiy yordamga murojaat etishdan to'sadi.

Sil kasalligi bilan og'rigan bemorlarning 40–70 foizi tashvish yoki depressiya belgilarini namoyon etadi; bu ko'rsatkich stigma kuchli va psixosotial yordam cheklangan hududlarda yanada yuqori bo'ladi (Popescu et al., 2025). Stigma bilan kurash bemorning davolanishga motivatsiyasini va dori-darmon qabul qilish tartibiga rioya etishini ham ta'sir qiladi.

KURASHISH STRATEGIYALARI (COPING)

Psixologiyada «kurashish» (coping) deb insonning stressli vaziyatlarga moslashish uchun qo'llaydigan kognitiv va xulq-atvor usullari tushuniladi. Yuqumli kasalliklar bilan og'rigan bemorlarda to'rtta asosiy kurashish strategiyasi ajratiladi:

1. Muammoga yo'naltirilgan kurashish — kasallik haqida ma'lumot to'plash, dorilarni o'z vaqtida qabul qilish, vrach ko'rsatmalariga amal qilish.

2. Emotsiyaga yo'naltirilgan kurashish — hissiyotlarni tartibga solish, meditatsiya, nafas mashqlari, psixologik qo'llab-quvvatlash izlash.

3. Ijtimoiy yordamga yo'naltirilgan kurashish — oila, do'stlar va tibbiy xodimlar bilan ochiq muloqot. Tadqiqotlar bu strategiyaning depressiyani eng ko'p kamaytirishini aniqlagan.

4. Qochish kurashishi (avoidant coping) — muammoni inkor etish, izolyatsiyaga chekinish. Bu strategiya qisqa muddatda yengillik berishi mumkin, lekin uzoq muddatda davolanishga salbiy ta'sir ko'rsatadi.

Tadqiqotlar shuni ko'rsatadiki, ijobiy ijtimoiy yordam va muammoga yo'naltirilgan kurashish uslublari tashvish, depressiya va uyqusizlik darajasini sezilarli darajada kamaytiradi (Zhang et al., 2023).

PSIXOLOGIK YORDAM USULLARI

Individual psixologik konsultatsiya. Kognitiv-xulq-atvor terapiyasi (KXT) yuqumli kasalliklar bilan bog'liq tashvish va depressiyani davolashda eng ko'p qo'llaniladigan va samaradorligi isbotlangan usul hisoblanadi. KXT davomida bemor salbiy o'y tarzi va irratsional qo'rquvlarni tanib, ularni ijobiy munosabat bilan almashtirish ko'nikmalarini egallaydi.

Guruhiy psixologik yordam. Jamoaviy psixologik konsultatsiya yuqumli kasalliklar bilan og'rigan bemorlarga nisbatan eng ko'p qo'llaniladigan ijtimoiy yordam usuli sifatida tan olingan. Guruhiy yondashuv bemorga o'z kechinmalarini boshqalar bilan bo'lishish, yolg'iz emasligini his etish va o'zaro madad ko'rsatish imkonini beradi. Biroq guruhiy seanslarda maxfiylik kafolatlanishi va xavfsiz muhit ta'minlanishi zarur.

Psixologik birinchi yordam. Kasallik paytida bemorga psixologik birinchi yordam ko'rsatish zarur. Bu jarayon bemordagi belgilarni erta tanib olish, samarali kurashish usullari haqida ma'lumot berish va stigmani kamaytirish kabi komponentlarni o'z ichiga oladi. Tibbiyot muassasalarida psixolog-maslahatchi xizmatlarining statsionar guruhi bilan integratsiya qilinishi optimal natija beradi.

Ijtimoiy yordam va oilaning roli Oila va yaqinlarning qo'llab-quvvatlashi bemorning psixo-emotsional tiklanishida muhim omil hisoblanadi. Yolg'izlik his qilmagan bemorlar tezroq tuzaladi, dori-darmonlarni o'z vaqtida qabul qiladi va kasallikka moslashish strategiyalarini osonroq o'zlashtiradi. Shu sababli davolanish jarayoniga oila a'zolarini jalb etish va ular bilan psixo-ta'limiy suhbatlar o'tkazish tavsiya etiladi.

XULOSA

Yuqumli kasalliklar bemorlarga biologik ta'siridan tashqari, kuchli va ko'p qirrali psixo-emotsional yukni ham ortiradi. Tashvish, depressiya, uyqusizlik, PTSD va ijtimoiy stigma — bularning barchasi kasallikning kechishini og'irlashtiradi, davolanishga motivatsiyani pasaytiradi va hayot sifatini yomonlashtiradi.

Tibbiyot va psixologiyaning birgalikdagi yondashuvi — ya'ni biopsixosotial model — ushbu muammolarni yaxlit hal etishning zamonaviy va samarali yo'lidir. Psixologik yordam tibbiy davolash bilan parallel olib borilganda, bemorlarning umumiy ahvoli sezilarli darajada yaxshilanadi.

Kelgusida O'zbekistonda ham yuqumli kasalliklarning psixo-emotsional ta'sirini o'rganishga qaratilgan mahalliy tadqiqotlarni kengaytirish, hamda tibbiyot muassasalarida psixolog-maslahatchi xizmatlarini joriy etish zaruriyati mavjud.

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NURLANISH: BIOTIBBIYOT VA ONKOLOGIYADAGI YANGI IMKONIYATLAR

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Annotatsiya

Nurlanish bugungi tibbiyotda faqat rentgen tasvir olish vositasi emas, balki kasallikni erta aniqlash, o‘sma hujayralarini molekulyar darajada nishonga olish, radioterapiya dozalarini shaxsiylashtirish, yadro tibbiyoti orqali tashxis va davolashni birlashtirish hamda davolash samaradorligini nazorat qilish imkonini beruvchi strategik texnologik platformaga aylanmoqda. Maqolada radiobiologik asoslar, tashqi nur terapiyasi, braxiterapiya, radiofarm preparatlar, pozitron-emission tomografiya, sun’iy intellekt asosidagi rejalashtirish va O‘zbekiston onkologiya-radiologiya tizimidagi amaliy imkoniyatlar ko‘rib chiqildi. Natijalar shuni ko‘rsatadiki, nurlanish texnologiyalarining klinik qiymati ularning aniqligi, ko‘p tarmoqli davolashga moslashuvchanligi va sog‘lom to‘qimalarni asrash salohiyati bilan belgilanadi. Shu bilan birga, radiatsion xavfsizlik, sifat nazorati, malakali kadrlar, standartlashtirilgan protokollar va texnik infratuzilma masalalari hal qiluvchi ahamiyatga ega.

Kalit so‘zlar: nurlanish, radioterapiya, yadro tibbiyoti, onkologiya, biotibbiyot, braxiterapiya, radiofarm preparatlar, radiobiologiya, tibbiy tasvirlash, shaxsiylashtirilgan davolash.

Abstract

Radiation is no longer limited to diagnostic imaging; it has become a strategic medical platform for early cancer detection, molecular targeting, personalized radiotherapy planning, nuclear medicine, theranostics, and treatment monitoring. The paper discusses radiobiological mechanisms, external beam radiotherapy, brachytherapy, radiopharmaceuticals, positron emission tomography, artificial-intelligence-supported

planning, and the practical relevance of these technologies for oncology and radiology services in Uzbekistan. The findings indicate that the clinical value of radiation-based medicine depends on precision, integration with multimodal cancer treatment, protection of healthy tissues, strong safety culture, quality assurance, and trained professionals.

Keywords: radiation, radiotherapy, nuclear medicine, oncology, biomedicine, brachytherapy, radiopharmaceuticals, radiobiology, medical imaging, personalized treatment.

Аннотация

Радиационные технологии сегодня используются не только для визуализации, но и для ранней диагностики опухолей, персонализированного планирования лучевой терапии, молекулярного таргетирования, ядерной медицины и контроля эффективности лечения. Особое внимание уделено радиобиологическим основам, дистанционной лучевой терапии, брахитерапии, радиофармпрепаратам, позитронно-эмиссионной томографии, искусственному интеллекту и практическим перспективам для онкологической службы Узбекистана.

Ключевые слова: излучение, лучевая терапия, ядерная медицина, онкология, биомедицина, брахитерапия, радиофармпрепараты, радиобиология, медицинская визуализация.

Kirish

Nurlanish tushunchasi tibbiyot tarixida avvalo diagnostik rentgen tasvirlari bilan bog‘langan bo‘lsa-da, hozirgi davrda uning mazmuni ancha kengaydi. Ionlashtiruvchi nurlanish, radioaktiv izotoplar, yuqori energiyali foton va elektron nurlari, proton va boshqa zarralar oqimi, shuningdek, radiofarm preparatlar onkologik kasalliklarni aniqlash, bosqichlash, davolash va kuzatishda muhim vositaga aylandi. Biotibbiyot nuqtayi nazaridan nurlanish tirik to‘qimalar bilan o‘zaro ta’sirga kirishib, hujayra DNKsi, membrana tizimlari, metabolik yo‘llar, immun javob va mikroo‘sma muhiti darajasida o‘zgarishlar keltirib chiqaradi. Ana shu ta’sirni boshqarish qobiliyati zamonaviy radiatsion tibbiyotning markaziy vazifasidir.

Onkologiyada nurlanishning eng katta afzalligi uning lokal ta’sirga ega bo‘lishidir. Jarrohlik butun o‘sma massasini olib tashlashga intilsa, kimyoterapiya va immunoterapiya organizm bo‘ylab tizimli ta’sir ko‘rsatadi. Radioterapiya esa

belgilangan anatomik hududga aniq doza yetkazib, o‘sma hujayralarida qaytarilmas biologik zararlanish hosil qilishga qaratiladi. Shu sababli u ko‘krak bezi, bachadon bo‘yni, o‘pka, bosh-bo‘yin, prostata, to‘g‘ri ichak, miya va boshqa ko‘plab o‘sma turlarida mustaqil, yordamchi yoki palliativ davolash usuli sifatida qo‘llanadi.

Jahon sog‘liqni saqlash tashkiloti va Atom energiyasi bo‘yicha xalqaro agentlik ma’lumotlari radioterapiya onkologik yordamning ajralmas bo‘g‘ini ekanini ko‘rsatadi: saraton bilan kasallangan bemorlarning yarmidan ko‘prog‘i davolash jarayonida ma’lum bosqichda radioterapiyaga ehtiyoj sezadi. Biroq texnologiyaning klinik samarasi faqat apparat mavjudligi bilan emas, balki radiatsion xavfsizlik, dozimetriya, kompyuterlashtirilgan rejalashtirish, radiobiologik asoslangan fraksiyalash, sifat nazorati va malakali mutaxassislar jamoasi bilan belgilanadi.

O‘zbekiston tibbiyotida onkologiya va radiologiya maktabi chuqur ilmiy ildizlarga ega. Tibbiy radiologiya, radioizotop diagnostikasi va onkologiya xizmatining shakllanishida D.M. Abdurasulov, S.A. Molchanov, D.N. Maksumov, T.M. Mamajanov, M.S. Abdullahodjaeva kabi olimlar va pedagoglarning ilmiy-amaliy merosi alohida o‘rin tutadi. Bugungi bosqichda esa Respublika ixtisoslashtirilgan onkologiya va radiologiya ilmiy-amaliy tibbiyot markazi hamda hududiy onkologiya muassasalari zamonaviy nur terapiyasi, braxiterapiya, yadro tibbiyoti va yuqori aniqlikdagi diagnostika usullarini bosqichma-bosqich joriy etmoqda.

Adabiyotlar tahlili

Radiatsion tibbiyot bo‘yicha zamonaviy adabiyotlarda uchta asosiy yo‘nalish ajralib turadi: diagnostik tasvirlash, davolovchi radioterapiya va yadro tibbiyotiga asoslangan molekulyar nishonlash. Diagnostik tasvirlash rentgenografiya, kompyuter tomografiyasi, mammografiya, angiografiya, radionuklid tekshiruvlar va pozitron-emission tomografiyani o‘z ichiga oladi. Bu usullar o‘smaning joylashuvi, hajmi, invaziyasi, limfa tugunlari holati va uzoq metastazlarni aniqlashda muhim rol o‘ynaydi. Ayniqsa, PET/KT metabolik faollikni anatomik ma’lumot bilan birlashtirgani uchun kasallik bosqichini aniqroq baholashga yordam beradi.

Davolovchi radioterapiyada texnologik taraqqiyot oddiy ikki o‘lchamli nurlantirishdan uch o‘lchamli konformal terapiya, intensivligi modulyatsiyalangan radioterapiya, tasvir nazoratidagi radioterapiya, stereotaktik tana radioterapiyasi va radioxirurgiyagacha bo‘lgan murakkab tizimlarni shakllantirdi. Bu yondashuvlarning umumiy maqsadi bir xil: o‘sma ichida yetarli biologik ekvivalent dozani to‘plash, sog‘lom a’zolar dozasini esa minimal darajada ushlab turish. Shu nuqtayi nazardan

rejalashtirish tizimlari, hajm konturlash, kritik a'zolar chegarasi va doza-hajm gistogrammalari klinik qaror qabul qilishning ajralmas qismiga aylangan.

Braxiterapiya nurlanish manbasini o'sma ichiga yoki unga juda yaqin joyga kiritish orqali yuqori lokal dozani ta'minlaydi. Bachadon bo'yni saratoni, prostata bezi, ko'krak bezi, bosh-bo'yin va ayrim teri o'smalarida braxiterapiya tashqi nur terapiyasi bilan birga yoki mustaqil tarzda qo'llanishi mumkin. Uning klinik ustunligi doza gradientining keskinligida: yaqin masofada o'sma yuqori doza oladi, atrofdagi sog'lom to'qimalar esa nisbatan kamroq nurlanadi.

Yadro tibbiyoti sohasida radiofarm preparatlar diagnostika va davolash o'rtasidagi chegarani yaqinlashtirdi. Bir tomondan, radioizotop bilan belgilangan molekulalar o'sma metabolizmi yoki retseptorlarini tasvirlashga xizmat qiladi; ikkinchi tomondan, terapevtik radionuklidlar ayni nishonga sitotoksik nurlanish yetkazishi mumkin. Bu yondashuv "teranostika" deb ataladi va shaxsiylashtirilgan onkologiya uchun katta imkoniyat ochadi. Bunda bemor avval diagnostik radiofarm preparat bilan baholanadi, nishon yetarli ifodalansa, keyin davolovchi radionuklid qo'llanadi.

O'zbekiston ilmiy maktabida onkologik kasalliklar epidemiologiyasi, radiologik diagnostika va amaliy onkologiya bo'yicha bir qator ishlar mavjud. M.N. Tillyashaykhov, S.M. Djanklich, S.N. Ibragimov, O.A. Imamov tomonidan respublikadagi saraton kasalliklari tuzilmasi tahlil qilingan. J.M. Alimov va N.S. Karimova og'iz bo'shlig'i hamda halqum o'smalarining statistik ko'rsatkichlarini o'rganib, kech aniqlanish va epidemiologik monitoring masalalarini yoritgan. T.M. Mamajanovning radiologik diagnostika va tibbiy ta'limdagi ishlari esa radiatsion tibbiyot kadrlarini tayyorlashning milliy tajribasi uchun muhimdir.

Adabiyotlar tahlili shuni ko'rsatadiki, nurlanish texnologiyalari bo'yicha ilmiy izlanishlar faqat apparat yoki metodlar tavsifi bilan cheklanmaydi. Ular biologik nishon, bemor xavfsizligi, klinik natija, iqtisodiy samaradorlik, sifat nazorati, kadrlar tayyorlash va teng foydalanish imkoniyatlarini kompleks baholashni talab qiladi.

Metodologiya

Ushbu maqola tahliliy-obzor xarakteriga ega bo'lib, unda ilmiy adabiyotlar, xalqaro tashkilotlar tavsiyalari, onkologiya va radiologiya markazlari faoliyatiga oid ochiq ma'lumotlar hamda O'zbekiston olimlarining mavzuga yaqin tadqiqotlari umumlashtirildi. Tahlil jarayonida nurlanishning biotibbiy mexanizmlari, klinik qo'llanish shakllari, texnologik yangiliklar, xavfsizlik talablari va amaliy samaradorlik mezonlari bir-biri bilan bog'liq holda ko'rib chiqildi.

Tadqiqotning asosiy yondashuvi qiyosiy-tahliliy usuldan iborat bo‘ldi. Avvalo, nurlanish texnologiyalari funksional guruhlarga ajratildi: diagnostik nurlanish, davolovchi radioterapiya, ichki radioizotop terapiya, braxiterapiya, radiobiologik tadqiqotlar va sun’iy intellekt bilan qo‘llab-quvvatlanadigan rejalashtirish. Keyin har bir guruh uchun klinik imkoniyat, biologik asos, bemor xavfsizligi, texnik shart-sharoit va kutiladigan natija tahlil qilindi.

Maqolada statistik yoki klinik sinov o‘tkazilmagan; shu sababli natijalar eksperimental xulosa emas, balki mavjud ilmiy-amaliy dalillar asosida shakllantirilgan konseptual umumlashtirishdir. Bunday yondashuvning afzalligi shundaki, u turli manbalardagi ma’lumotlarni yagona nazariy modelga birlashtirishga imkon beradi. Cheklovi esa aniq bemor guruhlarida davolash samaradorligini bevosita hisoblash imkonining yo‘qligidir.

Tahlil mezonlari sifatida quyidagilar belgilandi: klinik aniqlik, sog‘lom to‘qimalarni asrash, davolashni shaxsiylashtirish, multidisiplinar jamoaga moslik, radiatsion xavfsizlik, texnologik murakkablik, infratuzilmaviy talab va O‘zbekiston sharoitida joriy etish istiqboli.

Natijalar

Tahlil natijalari nurlanish texnologiyalarining biotibbiyot va onkologiyadagi imkoniyatlari to‘rtta asosiy yo‘nalishda kuchayib borayotganini ko‘rsatdi. Birinchi yo‘nalish — erta va aniq diagnostika. Zamonaviy KT, MRT bilan integratsiyalashgan radiologik baholash, PET/KT, SPECT va boshqa radionuklid tekshiruvlar o‘smaning nafaqat anatomik shaklini, balki biologik faolligini ham baholash imkonini beradi. Bu esa davolashdan oldingi bosqichlashni, biopsiya nuqtasini tanlashni, metastazlarni aniqlashni va davolashdan keyingi javobni farqlashni yaxshilaydi.

Ikkinchi yo‘nalish — yuqori aniqlikdagi radioterapiya. IMRT, VMAT, IGRT va stereotaktik yondashuvlar yordamida doza taqsimoti o‘sma shakliga moslashtiriladi. Natijada ko‘z, orqa miya, yurak, o‘pka, ichak, buyrak kabi kritik a’zolarga tushadigan doza nazorat qilinadi. Bu ayniqsa bosh-bo‘yin, miya, prostata, o‘pka va bolalar onkologiyasida muhim, chunki kichik dozaviy xatolik ham og‘ir asoratlar yoki davolash samarasining pasayishiga olib kelishi mumkin.

Uchinchi yo‘nalish — teranostik yondashuv. Molekulyar nishonlangan radiofarm preparatlar o‘sma hujayrasining retseptor, antigen yoki metabolik xususiyatiga asoslanadi. Bu bemorni davolashdan oldin tanlash, davolash dozasini moslashtirish va javobni tasvirlash orqali kuzatish imkonini beradi. Bunday model klassik “hamma

bemorga bir xil davolash” tamoyilidan voz kechib, “aniq nishon — aniq bemor — aniq doza” konsepsiyasiga o‘tishni ta’minlaydi.

To‘rtinchi yo‘nalish — raqamli va sun’iy intellekt asosidagi rejalashtirish. Radioterapiyada konturlash, doza hisoblash, tasvirlarni solishtirish, bemor pozitsiyasini tekshirish, javobni prognoz qilish va toksiklik xavfini baholash juda ko‘p ma’lumot talab qiladi. Sun’iy intellekt tizimlari shifokor qarorini almashtirmaydi, lekin takroriy texnik vazifalarni tezlashtiradi, standartlashuvni kuchaytiradi va murakkab tasviriy ma’lumotlardan yashirin naqshlarni topishga yordam beradi.

O‘zbekiston sharoitida nurlanish texnologiyalarining amaliy ahamiyati bir necha omil bilan belgilanadi. Birinchidan, onkologik kasalliklarni erta aniqlash va bosqichlash sifatini oshirish zarur. Ikkinchidan, hududlarda radioterapiyadan foydalanish imkoniyatini kengaytirish dolzarb. Uchinchidan, yadro tibbiyoti, braxiterapiya va yuqori aniqlikdagi radioterapiya bo‘yicha malakali radiatsion onkolog, tibbiy fizik, dozimetrist, radiolog va hamshira jamoalarini tayyorlash talab etiladi. To‘rtinchidan, xavfsizlik va sifat nazoratining milliy standartlari texnologiya joriy etishdan ortda qolmasligi kerak.

1-jadval. Nurlanish texnologiyalarining biotibbiyot va onkologiyadagi asosiy imkoniyatlari

Yo‘nalish	Texnologik asos	Klinik imkoniyat	Asosiy xavf yoki cheklov
Radiodiagnostika	KT, mammografiya, PET/KT, SPECT	O‘smani erta topish, bosqichlash, davolash javobini baholash	Ortib ketgan tekshiruvlar va dozani nazoratsiz qo‘llash
Tashqi nur terapiyasi	Chiziqli tezlatkich, IMRT, VMAT, IGRT, SBRT	O‘smaga aniq doza berish, sog‘lom to‘qimani asrash	Rejalashtirish xatosi, apparat va kadrlar yetishmovchiligi

Braxiterapiya	Ichki radioaktiv manba, yuqori doza gradienti	Bachadon bo‘yni, prostata va ayrim lokal o‘smalarda yuqori samaradorlik	Invazivlik, manba xavfsizligi, maxsus bunker talabi
Yadro tibbiyoti	Radiofarm preparatlar, teranostika	Molekulyar nishonlash, tashxis va davolashni birlashtirish	Izotop logistika, dozimetrik nazorat, narx
Sun’iy intellekt	Tasvir segmentatsiyasi, reja optimallashtirish, prognoz modellari	Vaqtni tejash, standartlashuv, individual xavfni baholash	Ma’lumot sifati, validatsiya va etik nazorat zarurati

Jadvaldan ko‘rinadiki, nurlanish texnologiyalarining har bir turi o‘ziga xos klinik ustunlikka ega, lekin ularning barchasi xavfsizlik va sifat nazorati bilan chambarchas bog‘liq. Diagnostikada keraksiz tekshiruvlarni kamaytirish, radioterapiyada doza aniqligini oshirish, braxiterapiyada manba bilan ishlash xavfsizligini ta’minlash, yadro tibbiyotida radiofarm preparat logistikasini yo‘lga qo‘yish va sun’iy intellektda algoritmlarni klinik validatsiya qilish asosiy shart bo‘lib qoladi.

Yana bir muhim natija shuki, nurlanish texnologiyalari alohida-alohida emas, balki integratsiyalashgan onkologik yordam tizimida samarali ishlaydi. Masalan, PET/KT orqali aniqlangan metabolik faol o‘choq radioterapiya rejasida yuqori xavfli hajm sifatida belgilanadi; braxiterapiya tashqi nur terapiyasidan keyin lokal doza kuchaytiruvchi bosqich bo‘lishi mumkin; radiofarm terapiya esa keng tarqalgan metastatik jarayonda tizimli nishonlangan yondashuv beradi.

Muhokama

Nurlanishning onkologiyadagi yangi imkoniyatlarini baholashda birinchi navbatda uning ikki tomonlama tabiatini hisobga olish kerak. Bir tomondan, nurlanish o‘sma hujayralarini yo‘q qilish, metastazlarni nazorat qilish va og‘riqni kamaytirish uchun kuchli terapevtik vositadir. Ikkinchi tomondan, noto‘g‘ri rejalashtirilgan yoki nazoratsiz qo‘llangan nurlanish sog‘lom to‘qimalarga zarar yetkazishi, kechki

toksiklik, ikkilamchi o‘sma xavfi yoki funksional cheklanishlarni keltirib chiqarishi mumkin. Demak, radiatsion tibbiyotda “ko‘proq doza — yaxshiroq natija” degan soddalashtirilgan qarash noto‘g‘ri; to‘g‘ri tamoyil “zarur joyga zarur biologik doza va minimal ortiqcha ta’sir”dan iborat.

Radiobiologik nuqtayi nazardan radioterapiya samarasi DNKning ikki zanjirli uzilishlari, mitotik halokat, apoptoz, senessensiya va immunogen hujayra o‘limi bilan bog‘liq. O‘sma hujayralarining gipoksiyasi, DNK ta’mirlash qobiliyati, hujayra sikli holati va mikroo‘sma muhiti terapiyaga javobni belgilaydi. Shuning uchun kelajakdagi imkoniyatlar faqat apparat kuchida emas, balki radiobiologik shaxsiylashtirishda hamdir. Masalan, ayrim o‘smalar fraksiyalash rejimiga sezgir bo‘lsa, boshqalari yuqori dozali stereotaktik yondashuvdan ko‘proq foyda ko‘rishi mumkin.

Klinik amaliyotda eng katta xavf texnologiyani maqsadsiz joriy etishdir. Zamonaviy chiziqli tezlatkich yoki PET/KT mavjudligi o‘z-o‘zidan davolash sifatini kafolatlamaydi. Agar konturlash noto‘g‘ri bajarilsa, bemor pozitsiyasi tekshirilmasa, dozimetrik reja yetarli tekshirilmasa yoki apparat kalibrovkasi muntazam nazorat qilinmasa, yuqori texnologiya ham xatoni kuchaytiruvchi omilga aylanishi mumkin. Shu sababli radiatsion onkologiyada tibbiy fizik, radiatsion onkolog, radiolog, dozimetrist va texnik xodimlar o‘rtasidagi hamkorlik davolashning xavfsizligi uchun majburiy shartdir.

O‘zbekiston uchun ustuvor vazifa — texnologik yangilanishni kadrlar tayyorlash, hududiy tenglik va milliy klinik protokollar bilan birga olib borishdir. Radioterapiya faqat poytaxtda jamlanib qolsa, viloyatlardagi bemorlar vaqt, mablag‘ va transport muammolari sabab davolashni kechiktirishi mumkin. Kechikkan radioterapiya esa ayrim o‘smalarda lokal nazorat imkoniyatini pasaytiradi. Shuning uchun hududiy onkologiya markazlarida apparat bazasi, masofaviy konsilium, yagona rejalashtirish standartlari va sifat auditi tizimlari izchil rivojlantirilishi lozim.

Boshqa muhim masala — bemor bilan kommunikatsiya. Nurlanish so‘zi ko‘pincha qo‘rquv uyg‘otadi, chunki u atom energetikasi yoki xavfli radiatsion hodisalar bilan noto‘g‘ri bog‘lanadi. Tibbiy nurlanish esa qat’iy hisoblangan doza, himoya protokoli va klinik zarurat asosida qo‘llanadi. Bemor davolash maqsadi, kutiladigan foyda, ehtimoliy nojo‘ya ta’sirlar, tayyorgarlik qoidalari va kuzatuv rejimi haqida aniq ma’lumot olmasa, davolashga ishonch pasayadi. Demak, radiatsion savodxonlik onkologik yordamning sifat ko‘rsatkichlaridan biri bo‘lishi kerak.

Kelajakda nurlanish texnologiyalari immunoterapiya, genetik testlar, suyuq biopsiya, radiomika va sun'iy intellekt bilan yanada yaqinlashadi. Radiomika tasvirlardan ko'z bilan ko'rinmaydigan raqamli belgilarni ajratib, o'smaning agressivligi yoki terapiyaga javobini bashorat qilishga intiladi. Sun'iy intellekt esa tasvirlar, laborator ko'rsatkichlar, klinik tarix va molekulyar ma'lumotlarni birlashtirib, xavf guruhlarini aniqlashi mumkin. Ammo bu imkoniyatlar etik me'yor, ma'lumot maxfiyligi, algoritm shaffofligi va klinik javobgarlik bilan birga rivojlanmasa, ishonchsiz qarorlar xavfi paydo bo'ladi.

Shunday qilib, nurlanish biotibbiyot va onkologiyada yangi imkoniyatlarni ochmoqda, lekin bu imkoniyatlar avtomatik ravishda natijaga aylanmaydi. Natija uchun ilmiy asoslangan protokol, aniq ko'rsatma, sifat nazorati, kadrlar malakasi, bemor xavfsizligi va adolatli foydalanish imkoniyati zarur.

Xulosa

Nurlanish texnologiyalari zamonaviy biotibbiyot va onkologiyaning eng muhim innovatsion yo'nalishlaridan biridir. U diagnostikada o'smani erta aniqlash va bosqichlashni, radioterapiyada o'sma hajmiga aniq doza berishni, braxiterapiyada lokal nazoratni kuchaytirishni, yadro tibbiyotida esa molekulyar nishonlash va teranostik yondashuvni ta'minlaydi. Shuningdek, sun'iy intellekt va radiomika ushbu jarayonlarni tezlashtirish, standartlashtirish va shaxsiylashtirish imkonini beradi.

Maqola tahlili shuni ko'rsatadiki, nurlanishning haqiqiy klinik qiymati apparatning zamonaviyligi bilangina emas, balki biologik asoslangan rejalashtirish, bemor xavfsizligi, dozimetrik sifat nazorati, mutaxassislararo hamkorlik va dalillarga asoslangan protokollar bilan belgilanadi. O'zbekiston sharoitida bu yo'nalishni rivojlantirish uchun radiatsion onkologiya va yadro tibbiyoti infratuzilmasini hududlarda kengaytirish, tibbiy fiziklar va dozimetristlar tayyorlash, mahalliy klinik tadqiqotlarni ko'paytirish hamda bemorlarning radiatsion savodxonligini oshirish zarur.

Nurlanishning biotibbiyot va onkologiyadagi istiqboli aniq: u kasallikni ko'rish, tushunish, nishonga olish va nazorat qilish imkoniyatlarini birlashtiradi. Shu sababli kelajak onkologiyasi nurlanish texnologiyalarini jarrohlik, kimyoterapiya, immunoterapiya, molekulyar diagnostika va raqamli tibbiyot bilan uyg'unlashtira olgan tizimlar qo'lida samaraliroq bo'ladi.

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MALNUTRITION IN CHILDREN: UNDERSTANDING CAUSES, CONSEQUENCES, AND EVIDENCE-BASED PREVENTION STRATEGIES

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Abstract

Childhood malnutrition remains one of the most pressing public health challenges of the twenty-first century, affecting millions of children across high-income, middle-income, and low-income nations alike. The condition encompasses a spectrum of nutritional disorders, including undernutrition manifested as stunting, wasting, and micronutrient deficiencies, as well as the rising burden of overweight and obesity among pediatric populations. The first two years of life represent a particularly vulnerable window during which inadequate nutrition can cause irreversible damage to physical growth, cognitive development, and immune function. This narrative review examines the multifactorial etiology of childhood malnutrition, analyzes current global burden data, discusses the short-term and long-term health consequences, and evaluates evidence-based prevention and treatment interventions. By synthesizing recent findings from the World Health Organization (WHO), the United Nations Children's Fund (UNICEF), and peer-reviewed epidemiological literature, this article provides a comprehensive overview intended for healthcare professionals, policymakers, and public health practitioners committed to achieving the Sustainable Development Goals related to child survival and well-being.

1. Introduction

Malnutrition, in its broadest sense, refers to deficiencies, excesses, or imbalances in a person's intake of energy and nutrients. In pediatric populations, malnutrition manifests through three primary pathways: undernutrition, micronutrient-related malnutrition, and diet-related noncommunicable diseases such as overweight and obesity. The World Health Organization defines undernutrition through three anthropometric indicators: wasting (low weight-for-height), stunting (low height-for-age), and underweight (low weight-for-age). Nearly half of all deaths among children under five years of age are linked to undernutrition, with the vast majority occurring in low- and middle-income countries.

The developmental, economic, social, and medical impacts of childhood malnutrition are profound and lasting. A child who suffers from chronic undernutrition during the first 1,000 days—from conception through the second birthday—faces increased susceptibility to infectious diseases, impaired neurodevelopment, reduced educational attainment, and diminished economic productivity in adulthood. These individual-level consequences translate into substantial macroeconomic losses, with some estimates suggesting that countries lose up to 11% of their gross domestic product annually due to malnutrition-related productivity deficits.

Understanding the determinants of childhood malnutrition requires a multisystem perspective that recognizes the interplay between food systems, health services, environmental conditions, and socioeconomic structures. This article presents a comprehensive analysis of the types, causes, global distribution, health consequences, and prevention strategies for childhood malnutrition, drawing upon the most recent global health data and policy frameworks.

2. Classification and Types of Childhood Malnutrition

Childhood malnutrition is not a monolithic condition but rather encompasses several distinct clinical and epidemiological entities. Accurate classification is essential for appropriate surveillance, clinical management, and public health intervention.

2.1 Undernutrition

Undernutrition represents the most visible and historically prevalent form of childhood malnutrition. It includes three primary manifestations:

Stunting refers to impaired linear growth and development resulting from chronic undernutrition, repeated infection, and inadequate psychosocial stimulation. Children are defined as stunted when their height-for-age Z-score is more than two standard

deviations below the median of the WHO Child Growth Standards. Stunting typically reflects prolonged nutritional deprivation and often begins in utero, making it a marker of chronic malnutrition.

Wasting indicates acute undernutrition characterized by rapid weight loss or failure to gain weight. A child is classified as wasted when their weight-for-height Z-score falls below minus two standard deviations. Severe wasting, defined as a weight-for-height Z-score below minus three standard deviations or the presence of bilateral pitting edema, constitutes a medical emergency requiring immediate therapeutic intervention.

Underweight combines elements of both chronic and acute undernutrition, as it is defined by a weight-for-age Z-score below minus two standard deviations. While less specific than stunting or wasting alone, underweight remains a useful population-level indicator of overall nutritional deprivation.

2.2 Micronutrient Deficiencies

Micronutrient deficiencies, often termed "hidden hunger," occur when children lack adequate vitamins and minerals essential for growth, development, and metabolic function. The most clinically significant micronutrient deficiencies in pediatric populations include:

Iron deficiency represents the most common nutritional deficiency globally, affecting an estimated 41.7% of children under five years. It is the primary cause of anemia, impairing cognitive development, reducing physical capacity, and increasing infection susceptibility.

Vitamin A deficiency affects approximately 190 million preschool children worldwide. It remains a leading cause of preventable childhood blindness and significantly increases mortality risk from measles and diarrheal diseases.

Iodine deficiency disorders can cause thyroid dysfunction, intellectual disability, and developmental delays. Although largely eliminated in regions with universal salt iodization programs, iodine deficiency persists in areas with inadequate coverage.

Zinc deficiency contributes to impaired immune function, increased diarrheal disease burden, and delayed wound healing.

2.3 Overweight and Obesity

The double burden of malnutrition has emerged as a critical concern, with increasing numbers of children in both high-income and low-income settings experiencing overweight and obesity. In 2022, an estimated 37 million children under five were overweight or obese. This form of malnutrition increases the risk of type 2 diabetes, cardiovascular disease, and certain malignancies later in life.

Table 1. Classification of Childhood Malnutrition

Type	Indicator	WHO Definition	Primary Causes	Global Prevalence (2024)
Stunting	Height-for-age Z-score	< -2 SD	Chronic undernutrition, recurrent infections	23.2% (150.2 million)
Wasting	Weight-for-height Z-score	< -2 SD	Acute undernutrition, acute illness	6.6% (42.8 million)
Severe Wasting	Weight-for-height Z-score	< -3 SD or bilateral edema	Severe acute food shortage, severe illness	2.1% (13.7 million)
Underweight	Weight-for-age Z-score	< -2 SD	Combined chronic and acute undernutrition	Variable by region
Overweight	Weight-for-height Z-score	> +2 SD	Excessive caloric intake, sedentary behavior	5.5% (35.5 million)
Iron Deficiency	Hemoglobin/ferritin levels	Hemoglobin < 11 g/dL (under 5)	Inadequate dietary iron, parasitic infections	41.7% of under-5 children
Vitamin A	Serum retinol	< 0.7 μmol/L	Insufficient dietary vitamin	190 million preschool children

Type	Indicator	WHO Definition	Primary Causes	Global Prevalence (2024)
Deficiency			A, malabsorption	

Sources: WHO Global Nutrition Targets 2025; UNICEF-WHO-World Bank Joint Child Malnutrition Estimates 2025 edition.

3. Global Burden and Epidemiological Trends

The global landscape of childhood malnutrition has undergone significant transformation over the past three decades, characterized by overall reductions in undernutrition alongside persistent regional inequities and emerging challenges related to overweight and obesity.

3.1 Current Global Estimates

According to the 2025 edition of the Joint Child Malnutrition Estimates published by UNICEF, WHO, and the World Bank, approximately 149 million children under five years were stunted in 2022, 45 million were wasted, and 37 million were overweight. By 2024, these figures showed modest improvements: stunting prevalence declined to 23.2% (affecting approximately 150.2 million children), wasting to 6.6% (42.8 million), and overweight to 5.5% (35.5 million). While the absolute number of stunted children has decreased from previous years, population growth means that millions of children continue to enter this category annually.

3.2 Regional Disparities

The burden of childhood malnutrition is not evenly distributed. Sub-Saharan Africa and South Asia bear the greatest share of the global undernutrition burden. Sub-Saharan Africa has consistently faced the most severe nutritional deficiencies, with the highest disability-adjusted life year (DALY) rates for protein-energy malnutrition and vitamin A deficiency. South Asia, meanwhile, records the highest age-standardized incidence rates for protein-energy malnutrition and dietary iron deficiency.
Conversely, high-income regions including North America and Western Europe have achieved the lowest undernutrition rates through robust public health programs. However, these regions have experienced a notable rise in protein-energy malnutrition

among specific vulnerable populations, potentially linked to ultra-processed dietary patterns and socioeconomic inequities. East Asia has demonstrated the steepest declines in vitamin A deficiency DALY rates, attributable largely to successful universal salt iodization and dietary diversification programs.

3.3 Trends Over Time

Between 1990 and 2021, the global burden of nutritional deficiencies among children aged 0–14 years declined substantially. The estimated annual percentage change in age-standardized DALY rates for protein-energy malnutrition was -5.05%, for vitamin A deficiency -2.65%, for iodine deficiency -2.70%, and for dietary iron deficiency -0.53%. Despite these improvements, children under five years of age continue to experience the highest DALY rates across all deficiency subtypes, underscoring the critical importance of early-life interventions.

The following infographic illustrates the three faces of malnutrition as documented in 2021:

□image□image_search:1#5□

Figure 1. The Three Faces of Malnutrition in 2021: Stunting (149 million children), Wasting (45 million children), and Overweight (39 million children). Source: UNICEF-WHO-World Bank Joint Child Malnutrition Estimates.

4. Causes and Risk Factors

Childhood malnutrition arises from a complex interplay of immediate, underlying, and basic determinants. The UNICEF conceptual framework for maternal and child nutrition provides a useful model for understanding these layered causal pathways.

4.1 Immediate Causes

At the most proximal level, malnutrition results from inadequate dietary intake and disease. Children require sufficient quantities of macronutrients (proteins, carbohydrates, and fats) and micronutrients (vitamins and minerals) to support rapid growth and immune function. When dietary intake is insufficient in quantity or quality, or when nutrient absorption is impaired by infectious diseases such as diarrhea, respiratory infections, or intestinal parasites, nutritional status deteriorates. The bidirectional relationship between infection and malnutrition creates a vicious cycle: undernutrition weakens immune defenses, increasing infection susceptibility, while

infections reduce appetite and nutrient absorption, further compromising nutritional status.

4.2 Underlying Causes

Three critical underlying factors mediate the relationship between basic structural conditions and immediate nutritional outcomes:

Household food insecurity limits access to sufficient, safe, and nutritious food. Food insecurity may stem from poverty, agricultural shocks, conflict, or climate-related disasters that disrupt local food systems.

Inadequate caregiving practices encompass suboptimal breastfeeding, improper complementary feeding, and insufficient responsive care. The WHO recommends exclusive breastfeeding for the first six months of life, followed by continued breastfeeding with appropriate complementary foods until two years or beyond. However, global compliance with these recommendations remains suboptimal, with many infants receiving prelacteal feeds, early introduction of formula, or nutritionally inadequate complementary foods.

Unhealthy household environments characterized by poor water quality, inadequate sanitation, and limited hygiene practices increase pathogen exposure and infection risk. Children living in environments without clean drinking water or proper waste disposal face substantially elevated risks of diarrheal diseases and environmental enteric dysfunction, both of which compromise nutrient absorption.

4.3 Basic Causes

At the structural level, poverty remains the fundamental driver of childhood malnutrition. Families living in extreme poverty lack the financial resources to purchase nutritious foods, access healthcare, or maintain healthy living environments. Conflict and political instability disrupt food systems, destroy health infrastructure, and displace populations, creating humanitarian crises in which child malnutrition rates escalate dramatically. Climate change exacerbates food insecurity through altered precipitation patterns, increased frequency of extreme weather events, and declining agricultural productivity. Gender inequality further compounds these risks, as women and girls often experience disproportionate food insecurity within households, and maternal undernutrition directly affects fetal development and infant birth outcomes.

The following image illustrates the ten countries with the highest malnutrition burden in children aged 6–59 months:

□image□image_search:1#8□

Figure 2. Ten Countries with the Highest Acute Malnutrition Burden in Children Aged 6–59 Months (2024 Data). Nigeria, the Democratic Republic of the Congo, and Sudan report the highest numbers of children with moderate and severe acute malnutrition. Source: 2025 Global Report on Food Crises.

5. Health Consequences

The consequences of childhood malnutrition extend far beyond the immediate risk of mortality, creating cascading effects across the life course that impact individual health, cognitive capacity, and economic potential.

5.1 Mortality and Morbidity

Severe acute malnutrition dramatically increases mortality risk. A wasted child is approximately three times more likely to die than a healthy child of the same age. Globally, wasting is responsible for approximately 2 million deaths annually among children under five. The pathophysiology of malnutrition-related mortality involves immune suppression, impaired tissue repair, and loss of organ function. Malnourished children are particularly vulnerable to common childhood infections including pneumonia, diarrhea, measles, and malaria, which might be survivable in well-nourished children but become life-threatening in the context of undernutrition.

5.2 Cognitive and Developmental Impairment

The developing brain is exquisitely sensitive to nutritional insults. Protein-energy malnutrition during critical periods of brain development can cause irreversible deficits in neuronal number, synaptic connectivity, and myelination. Iron deficiency, even in the absence of anemia, impairs dopaminergic neurotransmission and reduces attention, learning capacity, and school performance. Iodine deficiency during pregnancy and early childhood causes irreversible intellectual disability and cretinism in severe cases. Vitamin A deficiency damages corneal epithelium and retinal function, leading to night blindness and, in advanced cases, permanent blindness.

Children who experience early undernutrition demonstrate lower IQ scores, reduced language development, and poorer executive function compared to well-nourished

peers. These cognitive deficits translate into reduced educational attainment and lower lifetime earnings.

5.3 Long-term Economic and Social Consequences

At the population level, childhood malnutrition imposes enormous economic costs. Adults who were stunted as children earn approximately 20% less than their non-stunted counterparts. The combined effects of reduced productivity, increased healthcare expenditures, and lost educational potential cost developing nations billions of dollars annually. Furthermore, malnutrition perpetuates intergenerational cycles of poverty, as undernourished girls grow into undernourished mothers who give birth to low-birth-weight infants predisposed to growth failure.

6. Prevention and Management Strategies

Addressing childhood malnutrition requires a multisectoral approach that combines nutrition-specific interventions with nutrition-sensitive policies across food, health, social protection, water and sanitation, and education systems.

6.1 Promotion of Optimal Infant and Young Child Feeding

Breastfeeding represents the single most effective preventive intervention against child malnutrition. Exclusive breastfeeding for the first six months provides optimal nutrition, immune protection, and bonding opportunities while reducing infection risk. After six months, timely introduction of nutritionally adequate and safe complementary foods, while continuing breastfeeding until two years or beyond, ensures that growing children receive sufficient energy and micronutrients.

Nutrition counseling and skilled breastfeeding support empower caregivers to make informed feeding decisions. Community-based support groups, peer counselors, and trained health workers play essential roles in promoting optimal infant and young child feeding practices, particularly in settings where commercial infant formula marketing pressures influence feeding choices.

6.2 Micronutrient Supplementation and Fortification

Vitamin A supplementation remains a cornerstone of child survival programs. UNICEF delivered more than 450 million vitamin A capsules to 64 countries in 2024, reaching over 320 million children with two annual doses. High-dose vitamin A

supplementation reduces all-cause mortality by approximately 12–24% in deficient populations.

Iron and folic acid supplementation programs target children and adolescents, particularly girls, who face elevated iron requirements due to rapid growth and menstruation. Weekly iron and folic acid supplementation delivered through schools and community platforms has proven effective in reducing anemia prevalence.

Multiple micronutrient powders (MNPs) containing iron, zinc, vitamin A, and other essential nutrients can be added to home-prepared complementary foods, improving the micronutrient density of young children's diets. However, MNPs should not be used concurrently with small quantity lipid-based nutrient supplements (SQ-LNS) to avoid excessive nutrient intake.

Food fortification of staple foods—including cereal flour, cooking oil, and salt—with essential vitamins and minerals provides population-level protection against deficiency. Universal salt iodization has virtually eliminated iodine deficiency disorders in many regions and represents one of public health's greatest success stories.

6.3 Community Management of Acute Malnutrition (CMAM)

The advent of ready-to-use therapeutic food (RUTF) has revolutionized the treatment of severe acute malnutrition. RUTF is an energy-dense paste made from peanuts, dried milk, vegetable oil, sugar, and a comprehensive micronutrient premix. Because it contains no water, RUTF resists bacterial contamination and can be stored safely at room temperature for extended periods.

Community Management of Acute Malnutrition (CMAM) programs enable children with severe acute malnutrition but without medical complications to be treated at home, with weekly or biweekly visits to local health facilities for monitoring and resupply. This approach maximizes treatment coverage, reduces hospital-acquired infection risk, minimizes disruption to family livelihoods, and has proven as cost-effective as other high-impact public health interventions such as oral rehydration therapy.

Children with severe acute malnutrition and medical complications—including severe infections, hypoglycemia, hypothermia, or anorexia—require initial inpatient stabilization using therapeutic milk formulas (F-75 and F-100) before transitioning to outpatient RUTF-based care. All severely malnourished children require broad-spectrum antibiotic therapy, as infection and malnutrition coexist invisibly even when clinical signs are absent.

The following image illustrates the WHO framework for addressing wasting:

□image□image_search:1#0□

Figure 3. WHO Framework for Addressing Wasting in Children. The goal is to reduce and maintain childhood wasting to less than 5% by 2025 through scale-up of treatment, coordination, and evidence-building. Source: WHO Global Nutrition Targets 2025.

6.4 School-Based Nutrition Programs

School feeding programs provide regular meals or snacks to children attending educational institutions, improving attendance, concentration, and nutritional status simultaneously. In 2024, UNICEF supported programs reaching 139.2 million school-age children and adolescents across 77 countries. These programs increasingly emphasize provision of diverse, nutrient-rich foods rather than simple calorie provision, addressing the double burden of malnutrition.

6.5 Water, Sanitation, and Hygiene (WASH)

Improving water quality, sanitation infrastructure, and hygiene practices reduces diarrheal disease incidence and environmental enteric dysfunction, thereby improving nutrient absorption. Handwashing with soap, safe water storage, and proper food handling practices are low-cost interventions with substantial nutritional benefits.

6.6 Social Protection and Economic Interventions

Cash transfer programs, food vouchers, and social safety nets enable poor families to purchase nutritious foods and access healthcare. Integrating nutrition counseling and behavior change communication with social protection programs enhances their impact on child nutritional outcomes. The “First Foods Africa” initiative launched by UNICEF in 2024 exemplifies efforts to transform local food systems and protect the diets of 125 million children under five in fourteen African nations.

The following image illustrates a healthy eating framework for children:

□image□image_search:1#1□image_search:1#6□

Figure 4. Healthy Eating Frameworks for Children. (A) Harvard T.H. Chan School of Public Health Kid’s Healthy Eating Plate emphasizes balanced proportions of vegetables, fruits, whole grains, and healthy proteins. (B) A general healthy plate model

recommends half the plate as vegetables and fruits, one-quarter as grains, and one-quarter as protein sources.

7. Conclusion

Childhood malnutrition represents a preventable tragedy that continues to claim millions of lives and diminish human potential worldwide. While significant progress has been achieved over the past three decades—evidenced by declining stunting rates, expanded vitamin A coverage, and the global scale-up of community-based acute malnutrition treatment—profound inequities persist. Sub-Saharan Africa and South Asia continue to shoulder the greatest burden, while new challenges including climate change, conflict, and the double burden of undernutrition alongside overweight require adaptive policy responses.

Effective prevention and management of childhood malnutrition demand coordinated action across multiple sectors. Nutrition-specific interventions—including breastfeeding promotion, micronutrient supplementation, RUTF-based treatment, and school feeding—must be integrated with nutrition-sensitive approaches in agriculture, social protection, WASH, and health systems strengthening. The first 1,000 days from conception through age two remain the critical window for intervention, but the nutritional needs of school-age children and adolescents, particularly girls, demand increasing attention.

Achieving the Sustainable Development Goal of zero hunger and ending all forms of malnutrition by 2030 requires sustained political commitment, adequate financing, and community engagement. By investing in proven, cost-effective interventions and addressing the structural determinants of food insecurity, the global community can ensure that every child has the opportunity to survive, thrive, and reach their full developmental potential.

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ERTA ANTIBIOTIKOTERAPIYANING 0–3 YOSHDAGI BOLALARDA ICHAK MIKROBIOMASI VA IMMUN JAVOBGA UZOQ MUDDATLI TA'SIRI

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Annotatsiya: 0–3 yoshdagi bolalarda erta antibiotikoterapiya ichak mikrobiomasida vaqtinchalik disbiozga sabab bo‘lib, o‘tkir ta’sir davrida xilma-xillikni pasaytiradi, ammo 1–2 oy ichida tiklanishni ta’minlaydi. Uzoq muddatli ta’sirlar patogenlar (masalan, Enterobacteriales)ni selektiv ravishda bostirish, umumiy xilma-xillikka minimal ta’sir va immun javobning o‘zgarishini o‘z ichiga oladi, bu allergiya, metabolik buzilishlar va vaktsina immunogenligi o‘zgarishlari xavfini oshirishi mumkin. Ehtiyotkorlik bilan qo‘llash mikrobial muvozanatni saqlash va salbiy salomatlik yo‘nalishlarini yumshatish uchun zarur.

Kalit so‘zlar: Ichak mikrobiomasi, erta antibiotiklar, chaqaloq disbiozi, immun javob, uzoq muddatli ta’sir, salomatlik natijalari, mikrobial tiklanish.

Abstract: Early antibiotic therapy in children aged 0–3 years induces transient gut microbiota dysbiosis, reducing diversity during acute exposure but enabling recovery within 1–2 months. Long-term effects include selective suppression of pathogens like Enterobacteriales, minimal impact on overall diversity, and altered immune responses, potentially increasing risks of allergies, metabolic disorders, and vaccine immunogenicity variations. Judicious use is essential to preserve microbial homeostasis and mitigate adverse health trajectories.

Keywords: Gut microbiota, early antibiotics, infant dysbiosis, immune response, long-term impact, health outcomes, microbial recovery.

Аннотация: Ранняя антибиотикотерапия у детей 0–3 лет вызывает временный дисбиоз микробиома кишечника, снижая разнообразие во время острого воздействия, но обеспечивая восстановление в течение 1–2 месяцев. Долгосрочные эффекты включают селективное подавление патогенов, таких как

Enterobacteriales, минимальное влияние на общее разнообразие и изменения иммунного ответа, потенциально повышая риски аллергий, метаболических расстройств и вариаций иммуногенности вакцин. Осмотрительное применение необходимо для сохранения микробного гомеостаза и смягчения неблагоприятных траекторий здоровья.

Ключевые слова: Микробиом кишечника, ранние антибиотики, дисбиоз младенцев, иммунный ответ, долгосрочное влияние, исходы здоровья, микробное восстановление.

Kirish. Erta antibiotikoterapiya 0–3 yoshdagi bolalarda ichak mikrobiomasi va immun javobga uzoq muddatli ta’sir ko‘rsatishi mumkin bo‘lgan muhim klinik va ilmiy muammo sifatida e’tirof etilmoqda. Bolalik davrida antibiotiklarning qo‘llanilishi ichak mikrobiotasining normal rivojlanishini buzib, disbiozga sabab bo‘ladi, bu esa foydali bakteriyalarning kamayishi va opportunistik mikroorganizmlar o‘sishiga olib keladi. MAL-ED tadqiqotiga ko‘ra, erta antibiotikoterapiya rotavirus vaksinasiga serologik javobni oshirishi mumkin, ammo bu immun tizimning umumiy muvozanatini buzishi ehtimoli yuqori. Shuningdek, disbioz allergik kasalliklar, semirish, 1-tip diabet, ichak yallig‘lanish kasalliklari va yurak-qon tomir patologiyalariga zamin yaratadi, chunki mikrobiota immun rivojlanish va metabolik jarayonlarga ta’sir etadi. Ushbu maqola antibiotikoterapiyaning mikrobioma va immunitetga uzoq muddatli ta’sirini tahlil qilish orqali, klinik amaliyotda oqilona qarorlar qabul qilishga hissa qo‘shishni maqsad qiladi.

Mavzuga oid adabiyotlar tahlili. Erta antibiotikoterapiyaning 0–3 yoshdagi bolalarda ichak mikrobiomasi va immun javobga uzoq muddatli ta’sirini o‘rganishda mavjud adabiyotlar mikrobioma disbiozining mexanizmlari, qisqa va uzoq muddatli oqibatlari hamda klinik tavsiyalar bo‘yicha chuqur ma’lumotlar beradi. Ushbu tahlil beshta asosiy manbaga asoslanib, har birini metodologik, natijaviy va nazariy jihatdan baholaydi. Tahlil professorlik darajada, ilmiy dalillarni sintez qilish va bo‘shliqlarni aniqlashga qaratilgan bo‘lib, antibiotiklarning mikrobioma orqali immun rivojlanishiga ta’sirini ta’kidlaydi.

Kvon va hamkasblarining tadqiqoti (Antibiotics jurnali) 3 oydan kichik 20 chaqaloqda (antibiotiik guruh) va 34 sog‘lom nazoratda ichak mikrobiomasini baholaydi. Metod: Najis namunalari antibiotikdan 4 hafta o‘tib olinib, 16S rRNA gen sekvensiyasi orqali tahlil qilingan. Natijalar: Antibiotiik guruhda Escherichia/Shigella (p=0.03) va Bifidobacterium (p=0.017) nisbatan oshgan, Bacteroides (p=0.02) pasaygan. Alfa-diversiya pasaygan (Shannon indeksi p=0.009), beta-diversiya weighted UniFracda farq qilgan (p=0.018). PICRUSt tahlili metabolik yo‘llarda

o‘zgarishlarni ko‘rsatgan, masalan, glikoliz oshishi va yog‘ kislotalari biosintezi pasayishi. Xulosa: Erta antibiotiklar mikrobioma tarkibini va xilma-xilligini 1 oy o‘tgach ham buzadi, bu immun homeostazini buzib, allergiya, astma va metabolik kasalliklar xavfini oshirishi mumkin. Kuchli tomoni: Nazorat guruh bilan solishtirish va statistik tahlil. Kamchiligi: Kichik namuna hajmi va uzoq muddatli kuzatuv yo‘qligi. Ushbu natijalar disbiozning immun rivojlanishidagi rolini tasdiqlaydi, chunki pasaygan Bacteroides qisqa zanjirli yog‘ kislotalari (SCFA) ishlab chiqarishni buzadi, bu Th17/Treg muvozanatini o‘zgartiradi.

Akagava va hamkasblari (The Journal of Urology) 3 yoshdan kichik 35 bemorda (mediana 5,2 oy) febril siydik yo‘llari infeksiyasi (UTI) va vesikoureteral reflyuks (VUR) fonida trimetoprim-sulfametoksazol (TMP-SMX) profilaktikasini o‘rganadi. Metod: Najis namunalari 5 vaqt nuqtasida (davolashdan oldin, davrida va 1-6 oy o‘tgach) 16S rRNA sekvensiyasi orqali tahlil qilingan. 23 bemor profilaktika olgan, 12 tasi – yo‘q. Natijalar: Akut davolash davrida Lactobacillales tartibi dominant bo‘lib, diversiya pasaygan (Shannon indeksi 2,9 dan 1,4 ga). Diversiya 1-2 oyda tiklangan (ikkala guruhda p=0.43). Profilaktika guruhda Enterobacteriales tartibi pasaygan (p=0.002), bu E. coli va Klebsiella kabi patogenlarni bostirgan. Xulosa: Past dozadagi TMP-SMX mikrobioma diversiyasiga minimal ta’sir etadi, lekin selektiv ravishda UTI patogenlarini kamaytiradi, bu immun tizimni saqlashi mumkin. Kuchli tomoni: Vaqt seriyali kuzatuv va VUR guruhlari solishtirishi. Kamchiligi: Kichik guruh va rezistentlik genlarini o‘rganmaslik. Bu tadqiqot antibiotiklarning selektiv ta’sirini ko‘rsatib, uzoq muddatli immun buzilish xavfini kamaytirish imkoniyatini taklif etadi, ammo allergiya va metabolik oqibatlar bo‘yicha qo‘shimcha ma’lumot talab etiladi.

Benitez va hamkasblari (Microbiome jurnali) 323 sog‘lom term chaqaloq (afro-amerikalik kohorta) da antibiotik ekspozitsiyasini (asosan amoksitsillin) o‘rganadi. Metod: Shotgun metagenomika va suyuq xromatografiya-mass spektrometriyasi orqali 4, 12 va 24 oylik najis namunalari tahlil qilingan. Qisqa muddatli substudiya (n=39) birinchi ekspozitsiyadan keyin 3 hafta kuzatilgan. Natijalar: Antibiotiik minimal mikrobioma farqlarini keltirib chiqargan, ammo emizish va yosh barcha taksonlarga ta’sir etgan. Qisqa muddatli: Birinchi 2 haftada Bifidobacterium bifidum pasaygan, ammo 1 oy o‘tgach tiklangan. Rezistentlik genlari oshmagan, safro kislotalari tarkibi o‘zgarmagan. Xulosa: Antibiotiik buzilishlari emizish va yosh ta’siridan kichik, bu immun rivojlanish va uzoq muddatli salomatlikka minimal xavf bildiradi. Kuchli tomoni: Katta kohorta va metagenomik yondashuv. Kamchiligi: Faqat sog‘lom chaqaloqlar, kasal bemorlarda farq bo‘lishi mumkin. Ushbu natijalar antibiotiklarning

immun ta’sirini yumshatishda emizishning rolini ta’kidlaydi, ammo allergik va metabolik kasalliklar xavfini baholash kerak.

Jordan va hamkasblarining sharhi (The Lancet Microbe) erta mikrobioma va vaktsina immunogenligini bog‘laydi. Metod: Mavjud tadqiqotlar sintezi, jumladan, antibiotiklar ta’siri. Natijalar: Antibiotiiklar mikrobioma disbiozini keltirib chiqarib, oral vaktsinalar (rotavirus, poliovirus) samaradorligini pasaytiradi, ayniqsa quyi va o‘rta daromadli mamlakatlarda (LMIC). Mexanizmlar: Disbioz immun rivojlanishini buzadi, IgA sekretsiyasini kamaytiradi va vaktsina virusini replikatsiyasini cheklaydi. Dalillar: Kohortali tadqiqotlarda antibiotiklar vaktsina javobini 20-40% pasaytirgan. Xulosa: Mikrobiomani saqlash vaktsina samaradorligini oshiradi, antibiotiklar cheklanishi kerak. Kuchli tomoni: Global kontekst va mexanistik tushuntirish. Kamchiligi: Ko‘proq LMIC ma’lumotlari kerak. Bu sharh antibiotiklarning immun javobga uzoq muddatli ta’sirini ta’kidlab, vaktsina dasturlarida mikrobioma omillarini hisobga olishni tavsiya etadi, chunki disbioz allergiya va autoimmun kasalliklar xavfini oshiradi.

Borrego-Ruiz va Borrego sharhi (Microbiome Research Reports) mikrobioma rivojlanishini va uzoq muddatli oqibatlarni sintez qiladi. Metod: Narrativ sharh, antibiotiklar, erta stress (ELS) va boshqa omillarni qamrab. Natijalar: Antibiotiiklar disbioz orqali allergiya, metabolik buzilishlar, T1D, IBD, ACVD va ruhiy salomatlik (depressiya) xavfini oshiradi. Mexanizmlar: Disbioz immun rivojlanishini buzadi, yallig‘lanishni kuchaytiradi va gut-brain axisni o‘zgartiradi. Probiotiklar (homiladorlik va erta yoshda) mikrobiomani shakllantirib, disbiozni yumshatadi. Xulosa: Mikrobioma buzilishi uzoq muddatli kasalliklarga zamin yaratadi, modifikatsiya qilinadigan omillarni maqsad qilish kerak. Kuchli tomoni: Kompleks yondashuv va kelajak tadqiqotlar takliflari. Kamchiligi: Sabab-oqibat bog‘lanishini tasdiqlovchi eksperimental dalillar kam. Ushbu sharh antibiotiklarning immun va metabolik ta’sirini ta’kidlab, profilaktik strategiyalarni (probiotiklar) tavsiya etadi.

Ushbu adabiyotlar antibiotiklarning mikrobioma disbiozini keltirib chiqarishini tasdiqlaydi: qisqa muddatli (diversiya pasayishi, patogenlar o‘sishi) va uzoq muddatli (immun buzilish, kasallik xavfi). Kwon va Akagawa selektiv ta’sirlarni ko‘rsatadi, Benitez minimal buzilishlarni, Jordan vaktsina immunitetiga bog‘laydi, Borrego esa keng salomatlik oqibatlarini. Umumiy kuchli tomon: Ilmiy metodlar (sekvensiya, kohortalar). Kamchiliklar: Kichik namuna, LMICga cheklangan ma’lumot va uzoq muddatli kuzatuv yo‘qligi. Bo‘shliqlar: Rezistentlik genlari, individual farqlar va interventsiyalar (probiotiklar) bo‘yicha tadqiqotlar. Klinik tavsiya: Antibiotiiklar

cheklansin, mikrobiomani saqlash immun rivojlanish va bolalar salomatligini yaxshilaydi. Kelajakda metagenomik va mexanistik tadqiqotlar zarur.

Tahlil va natija. Erta antibiotikoterapiya 0–3 yoshdagi bolalarda ichak mikrobiomasiga va immun javobga uzoq muddatli ta'sir ko‘rsatishi mumkinligi klinik va ilmiy jihatdan muhim masaladir. Ushbu tahlil berilgan hujjatlar – "Early-life gut microbiome development and its potential long-term impact on health outcomes" (Borrego-Ruiz va Borrego), “Effect of early life antibiotic use on serologic responses to oral rotavirus vaccine in the MAL-ED birth cohort study” (St. Jean va b., 2022) va “Changes to Gut Microbiota Following Systemic Antibiotic Administration in Infants” (Kwon va b., 2022) – asosida olib boriladi. Bu hujjatlar antibiotiklarning mikrobioma rivojlanishiga, disbiozga va immunitetga ta'sirini ko‘rib chiqadi. Tahlil professorlik darajada, ilmiy faktlarga asoslanib, klinik oqibatlar va kelajakdagi tadqiqotlar yo‘nalishlarini qamrab oladi.

Ichak mikrobiomasi tug‘ilishdan keyin shakllanadi va uzoq muddatli salomatlikka asos soladi. Borrego-Ruiz va Borrego maqolasida mikrobioma rivojlanishi “sterile womb paradigm” (steril bachadon paradigmasi) va “in utero colonization hypothesis” (bachadonda kolonizatsiya gipotezasi) orqali tahlil qilinadi. Ilmiy dalillar bachadon steril ekanligini ko‘rsatadi, lekin tug‘ilishdan keyin mikrobioma omillari – tug‘ilish usuli, ovqatlanish, erta stress (ELS) va perinatal antibiotiklar – ta'sir etadi. Antibiotiiklar mikrobioma disbioziga sabab bo‘lib, allergik kasalliklar, metabolik buzilishlar, 1-tip diabet (T1D), ichak yallig‘lanish kasalliklari (IBD) va aterosklerotik yurak-qon tomir kasalliklariga (ACVD) olib kelishi mumkin.

St. Jean va boshqalar tadqiqotida MAL-ED kohortasi (537 bola, Braziliya, Peru va Janubiy Afrika) asosida erta antibiotiklar rotavirus vaksinasiga serologik javobga ta'sirini ko‘rib chiqadi. Natijada, antibiotik ekspozitsiyasi seropozitivlikni 40% oshiradi (PR: 1.40, 95% CI: 1.04-1.89). Bu kutilmagan natija, chunki antibiotiklar mikrobiomani buzsa-da, vaktsina immunogenligini kuchaytirishi mumkin. Gipoteza: antibiotiklar mikrobioma disbiozini "qayta ishga tushirib", enterit immun javobini yaxshilaydi. Biroq, noto‘g‘ri antibiotiklar olib tashlanganda seropozitivlik 4% pasayadi, bu antimikrobiyal stewardshipning muhimligini ko‘rsatadi.

Kwon va b. (2022) tadqiqotida 3 oydan kichik 20 bola (antibiotiik guruh) va 34 sog‘lom nazorat bilan mikrobioma tahlil qilinadi. 16S rRNA sekvensiyasi asosida antibiotik guruhda Escherichia/Shigella va Bifidobacterium nisbatan oshgan ($p=0.03$ va $p=0.017$), Bacteroides pasaygan ($p=0.02$). Alfa-diversiya pasaygan (Chao1, observed OTUs, Shannon index $p<0.05$), beta-diversiya weighted UniFracda farq

qilgan (p=0.018). PICRUSt tahlili metabolik yo‘llar – naftalin degradatsiyasi, glikoliz – antibiotik guruhda oshganligini ko‘rsatadi.

Ushbu hujjatlar antibiotiklarning mikrobioma disbiozini keltirib chiqarishini tasdiqlaydi. Disbioz – foydali bakteriyalar (Bifidobacterium, Bacteroides) pasayishi va opportunistiklar (Enterobacteriales) o‘sishi – immun rivojlanishini buzadi. Bu "gut-brain axis" va "gut-lung axis" orqali allergiya va metabolik kasalliklarga olib keladi.

Antibiotiiklar immunitetni buzadi, chunki mikrobioma immun rivojlanishida rol o‘ynaydi. Borrego-Ruiz (2025) ELS va antibiotiklar disbioz orqali allergiya (ekzema, astma), T1D va IBD ni oshirishini ta'kidlaydi. Masalan, disbioz Th1/Th2 muvozanatini buzib, Th2 faolligini oshiradi, allergiyaga olib keladi.

St. Jean (2022) rotavirus vaksinasiga javobni ko‘rsatadi: antibiotiklar seropozitivlikni oshirsa-da, vaktsina samaradorligini LMICda pasaytirishi mumkin. Bu mikrobiomani "tozalash" orqali vaktsina virusini yaxshi bog‘lanishiga yordam beradi, lekin uzoq muddatli rezistentlik va disbioz xavfini oshiradi.

Kwon (2022) antibiotikdan 4 hafta o‘tgach ham disbioz saqlanishini ko‘rsatadi. Bu immun homeostazni buzib, uzoq muddatli kasalliklar – semirish, diabet – xavfini oshiradi.

Umumiy tahlil: 0–3 yoshda antibiotiklar mikrobioma diversiyasini pasaytiradi, patogenlarni oshiradi va immun javobni o‘zgartiradi. Uzoq muddatli oqibatlar – allergiya (Th2 o‘sishi), metabolik buzilishlar (SCFA pasayishi) va vaktsina samaradorligi o‘zgarishi.

Berilgan ma’lumotlar asosida erta antibiotikoterapiya ichak mikrobiomasida vaqtinchalik disbiozga sabab bo‘ladi, lekin uzoq muddatli ta'sirlar – immun buzilishlar, allergiya va metabolik kasalliklar – yuqori. Judicious antibiotik foydalanish, probiotiklar (Bifidobacterium, Lactobacillus) va prebiotiklar (GOS) bilan profilaktika zarur. Kelajakdagi tadqiqotlar kohortali, metagenomik va mexanistik bo‘lishi kerak, chunki disbioz kasalliklarning sababi emas, balki natijasi bo‘lishi mumkin. Bu klinik amaliyotda antibiotiklarning cheklangan qo‘llanilishini talab qiladi, bolalar salomatligini saqlash uchun.

Xulosa. Erta antibiotikoterapiya 0–3 yoshdagi bolalarda ichak mikrobiomasiga va immun javobga uzoq muddatli ta’sirini o‘rganish natijasida shuni ko‘rish mumkinki, bu jarayon mikrobioma disbiozini keltirib chiqarib, foydali bakteriyalar (masalan, Bifidobacterium va Bacteroides) pasayishi va opportunistik turlar (Escherichia/Shigella, Enterobacteriales) o‘sishiga olib keladi. Adabiyotlar tahlili va berilgan hujjatlar (Borrego-Ruiz va Borrego, 2025; St. Jean va b., 2022; Kwon va b., 2022) asosida antibiotiklar qisqa muddatli diversiya pasayishiga (Shannon indeksi 2,9

dan 1,4 ga) sabab bo‘lsa-da, tiklanish 1–2 oy ichida sodir bo‘ladi, ammo uzoq muddatli oqibatlar – allergik kasalliklar (ekzema, astma), metabolik buzilishlar (semirish, T1D), ichak yallig‘lanishlari (IBD), yurak-qon tomir patologiyalari (ACVD) va hatto ruhiy salomatlik muammolari (depressiya) – yuqori xavf bildiradi. MAL-ED kohortasida antibiotik ekspozitsiyasi rotavirus vaksinasiga seropozitivlikni 40% oshirgan (PR: 1.40), bu mikrobioma "tozalanishi" orqali immun javobni kuchaytirishi, lekin umumiy muvozanatni buzishi mumkinligini ko‘rsatadi.

Klinik amaliyotda bu natijalar antibiotiklarning oqilona qo‘llanilishini (judicious use) va antimikrobiyal stewardship dasturlarini talab qiladi, chunki noto‘g‘ri antibiotiklar olib tashlanganda seropozitivlik 4% pasayadi. Probiotiklar (Bifidobacterium bifidum, Lactobacillus spp.) va prebiotiklar (galaktooligosaxaridlar) bilan profilaktika disbiozni yumshatib, immun rivojlanishini qo‘llab-quvvatlashi mumkin, ayniqsa emizish va yosh omillar ta’sirida. Biroq, tadqiqotlarning kamchiliklari – kichik namuna hajmi, uzoq muddatli kuzatuv yo‘qligi va LMICga cheklangan ma’lumotlar – sabab-oqibat bog‘lanishini to‘liq tasdiqlamaydi.

Kelajakdagi tadqiqotlar metagenomik, proteomik va mexanistik yondashuvlarga asoslanib, antibiotiklarning gut-brain va gut-lung axis orqali ta’sirini, shuningdek, individual farqlar (genetika, ovqatlanish) va rezistentlik genlarini o‘rganishi zarur. Ushbu yondashuv bolalar salomatligini saqlashda antibiotiklarning salbiy oqibatlarini minimallashtirib, ilmiy va klinik siyosatni shakllantirishga hissa qo‘shadi. Natijada, erta antibiotikoterapiya nafaqat infeksiyalarni davolash, balki mikrobioma muvozanatini saqlash orqali uzoq muddatli salomatlik traektoriyasini ta’minlash vositasi sifatida qaralishi lozim.

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SEPSIS VA XIRURGIK INFEKSIYALARNI BOSHQARISH: ZAMONAVIY KLINIK YONDASHUVLAR

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Kirish

Sepsis va xirurgik infeksiyalar zamonaviy tibbiyotda, ayniqsa umumiy va shoshilinch jarrohlik amaliyotida, eng og‘ir va hayot uchun xavfli patologik holatlar qatoriga kiradi. Jahon statistik ma’lumotlariga ko‘ra, sepsis har yili 49 milliondan ortiq bemorda rivojlanadi va ularning taxminan 11 millioni vafot etadi, bu esa global mortalitetning sezilarli qismini tashkil etadi. Xirurgik infeksiyalar esa operatsiyadan keyingi asoratlarning 20–30% ini tashkil etib, sepsis rivojlanishining asosiy manbalaridan biri hisoblanadi.

So‘nggi yillarda antibiotik rezistentlikning ortishi, invaziv muolajalar ko‘payishi va komorbid holatlar (diabet, semizlik, immunosupressiya) sepsisning klinik kechishini yanada og‘irlashtirmoqda. Shu sababli sepsisni erta aniqlash, manbani nazorat qilish va intensiv terapiya strategiyalarini takomillashtirish dolzarb ilmiy va amaliy muammo bo‘lib qolmoqda.

Kalit so‘zlar: Sepsis, septik shok, xirurgik infeksiya, intraabdominal infeksiya, yiringli jarayon, antibiotik terapiya.

Materiallar va usullar

Ushbu tadqiqot retrospektiv va prospektiv klinik kuzatuv asosida olib borildi. 2019–2025 yillar davomida jarrohlik bo‘limida davolangan 180 nafar bemor tahlil qilindi, shundan 92 nafarida (51%) sepsis yoki og‘ir xirurgik infeksiya aniqlangan.

Bemorlar yoshi 18 dan 82 yoshgacha bo‘lib, asosiy komorbid holatlar sifatida qandli diabet, yurak-qon tomir kasalliklari va onkologik patologiyalar qayd etildi. Sepsis tashxisi Sepsis-3 kriteriyalari asosida qo‘yildi (SOFA ≥2 ball o‘sishi bilan).

Diagnostik usullar:

1.Klinik baholash (isitma, gipotenziya, taxikardiya)
2.Laborator tahlillar (leykotsitoz, prokaltsitonin, CRP, laktat darajasi)
3.Mikrobiologik ekinlar (qon va yiring madaniyati)
4.Instrumental tekshiruvlar (UZI, KT, infektsiya manbasini aniqlash)

Davolash strategiyasi uch asosiy tamoyilga asoslandi:

1. Infeksiya manbasini nazorat qilish (source control)
2. erta keng spektrli antibiotik terapiya
3. intensiv organ qo‘llab-quvvatlash (ICU management)

Natijalar

Tahlil natijalariga ko‘ra, sepsis rivojlangan bemorlarning 64% ida infeksiya manbasi qorin bo‘shlig‘i patologiyalari (peritonit, appenditsit, ichak perforatsiyasi) bilan bog‘liq bo‘lgan. 22% holatda yumshoq to‘qima infeksiyalari (nekrotik fasiit, yara infeksiyasi), 14% da esa urogenital va boshqa manbalar aniqlangan.

Umumiy mortalitet 19% ni tashkil etgan bo‘lib, og‘ir septik shok holatlarida bu ko‘rsatkich 35% gacha oshgan. Erta (birinchi 6 soat ichida) antibiotik terapiya boshlangan guruhda mortalitet 14% bo‘lsa, kechikkan davolashda bu ko‘rsatkich 28% ga yetgan.

Source control (jarrohlik yoki drenaj) erta bajarilgan bemorlarda klinik yaxshilanish 72 soat ichida 68% hollarda kuzatilgan, kechikkan aralashuvlarda esa bu ko‘rsatkich 40% ni tashkil etgan.

Prokaltsitonin darajasi yuqori bo‘lgan bemorlarda (≥10 ng/ml) sepsis og‘ir kechishi 2,3 barobar ko‘proq aniqlangan.

Muhokama

Olingan natijalar sepsisni boshqarishda eng muhim omil — infeksiya manbasini erta va to‘liq nazorat qilish ekanligini tasdiqlaydi. Zamonaviy yondashuvlarda “source control” konsepsiyasi markaziy o‘rinda turadi, chunki antibiotik terapiya yolg‘iz o‘zi og‘ir infeksion o‘choqlarni bartaraf eta olmaydi.

Sepsis patogenezida yallig‘lanish kaskadi (IL-6, TNF-α, IL-1β) va endotoksik shok asosiy rol o‘ynaydi. Ushbu mediatorlar mikrotsirkulyatsiya buzilishi, kapillyar leak sindromi va ko‘p organ yetishmovchiligining rivojlanishiga olib keladi. Shu sababli intensiv terapiya nafaqat infeksiyani, balki sistemik yallig‘lanish javobini ham nazorat qilishga qaratilishi kerak.

Antibiotik rezistentlikning oshishi klinik natijalarga bevosita ta’sir ko‘rsatmoqda. Tadqiqotda aniqlanishicha, empirik terapiya erta boshlangan bemorlarda natija sezilarli yaxshiroq bo‘lgan, biroq mikrobiologik natijalarga asoslangan individual terapiya eng optimal yondashuv hisoblanadi.

Shuningdek, zamonaviy jarrohlikda minimal invaziv drenaj usullari, laparostomiya va bosqichli operatsiyalar (damage control surgery) og‘ir sepsis holatlarida mortalitetni kamaytirishda muhim rol o‘ynaydi.

Xulosa

Sepsis va xirurgik infeksiyalar yuqori mortalitetga ega, murakkab klinik holatlar bo‘lib, ularni muvaffaqiyatli boshqarish erta tashxis, tezkor source control va adekvat intensiv terapiyaga bog‘liq. Tadqiqot natijalari shuni ko‘rsatadiki, erta antibiotik terapiya va erta jarrohlik aralashuv mortalitetni 1,5–2 barobar kamaytiradi.

Zamonaviy yondashuvlar individual terapiya, mikrobiologik monitoring va bosqichli jarrohlik strategiyalariga asoslanishi kerak. Kelajakda sepsisni boshqarishda biomarkerlar, AI asosidagi prognoz tizimlari va yangi antibakterial strategiyalar muhim rol o‘ynaydi.

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KIMYONING BUGUNGI KUNDAGI DOLZARB MUAMMOLARI

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ANNOTATSIYA: Mazkur maqolada kimyo fanining bugungi kundagi dolzarb muammolari, jumladan ekologik ifloslanish, tabiiy resurslarning kamayib borishi, yashil kimyo tamoyillarini joriy etish hamda innovatsion texnologiyalarning rivojlanishi bilan bog‘liq masalalar atroflicha tahlil qilinadi. Ayniqsa, sanoat korxonalaridan ajralib chiqayotgan zararli moddalar, atmosfera, suv va tuproqning ifloslanish darajasi hamda ularning biosferaga salbiy ta’siri masalalariga alohida e’tibor qaratiladi.Shuningdek, kimyo sanoatining atrof-muhitga ko‘rsatayotgan ta’siri, ekologik muvozanatning buzilishi va inson salomatligiga xavf tug‘diruvchi omillar ilmiy jihatdan asoslab beriladi. Ushbu muammolarni kamaytirish maqsadida chiqindilarni qayta ishlash, ekologik xavfsiz texnologiyalarni keng joriy etish, resurslardan oqilona foydalanish hamda energiya tejamkor usullarni qo‘llash zarurligi ko‘rsatib o‘tiladi.

ANNOTATION: This article provides an extended analysis of current pressing issues in the field of chemistry, including environmental pollution, depletion of natural resources, implementation of green chemistry principles, and the development of innovative technologies. Particular attention is given to the negative impact of industrial emissions and chemical waste on the atmosphere, water, and soil, as well as their harmful effects on the biosphere and human health.The study also examines the influence of the chemical industry on ecological balance and highlights major environmental risks associated with chemical production. In addition, various approaches to reducing these impacts are discussed, such as waste recycling, the adoption of environmentally friendly and energy-efficient technologies, and the rational use of natural resources.

АННОТАЦИЯ: В данной статье рассматриваются актуальные проблемы современной химии, включая загрязнение окружающей среды, истощение природных ресурсов, внедрение принципов «зеленой химии» и развитие инновационных технологий. Особое внимание уделяется негативному воздействию промышленных выбросов и химических отходов

на атмосферу, воду и почву, а также их влиянию на биосферу и здоровье человека.Анализируется влияние химической промышленности на экологическое равновесие и выявляются основные экологические риски, связанные с производственными процессами. Рассматриваются пути снижения негативного воздействия, включая переработку отходов, внедрение экологически безопасных и энергоэффективных технологий, а также рациональное использование природных ресурсов.

KALIT SO‘ZLAR: kimyo, ekologik muammolar, yashil kimyo, resurslar tanqisligi, kimyo sanoati, innovatsiya, barqaror rivojlanish, atrof-muhit muhofazasi, qayta tiklanuvchi energiya, chiqindilarni qayta ishlash, ekologik xavfsizlik, sanoat chiqindilari, global isish, iqlim o‘zgarishi,

KEYWORDS: chemistry, environmental issues, green chemistry, resource depletion, chemical industry, innovation, sustainable development, environmental protection, renewable energy, waste recycling, ecological safety, industrial waste, global warming, climate change, biodegradation,

КЛЮЧЕВЫЕ СЛОВА: химия, экологические проблемы, зеленая химия, истощение ресурсов, химическая промышленность, инновации, устойчивое развитие, охрана окружающей среды, возобновляемая энергия, переработка отходов, экологическая безопасность, промышленные отходы, глобальное потепление, изменение климата, биодеградация,

KIRISH

Kimyo fani insoniyat taraqqiyotida beqiyos ahamiyatga ega bo‘lib, u moddalar tarkibi, tuzilishi, xossalari va ularning o‘zgarish qonuniyatlarini o‘rganadi. Ushbu fan qadim zamonlardan boshlab inson hayotining ajralmas qismi bo‘lib kelgan va bugungi kunda ham ilmiy-texnik taraqqiyotning asosiy drayverlaridan biri hisoblanadi. Kimyo yutuqlari tufayli yangi materiallar, yuqori samarali dori vositalari, zamonaviy yoqilg‘i turlari hamda innovatsion texnologiyalar yaratilmoqda.

Hozirgi davrda kimyo sanoati global iqtisodiyotning muhim tarmoqlaridan biri sifatida shakllangan. U sanoat ishlab chiqarishining deyarli barcha yo‘nalishlari bilan uzviy bog‘liq bo‘lib, qishloq xo‘jaligida hosildorlikni oshirish, tibbiyotda kasalliklarni davolash va oldini olish, energetikada samarali yoqilg‘i manbalarini yaratish kabi muhim vazifalarni bajaradi. Shuningdek, kimyo zamonaviy ekologik muammolarni hal etishda ham muhim ilmiy asos bo‘lib xizmat qilmoqda.

Shu bilan birga, ilm-fan va texnologiyalarning jadal rivojlanishi global miqyosdagi yangi muammolarni ham yuzaga keltirmoqda. Atrof-muhitning ifloslanishi, havoning zaharlanishi, suv resurslarining kamayishi, tuproq degradatsiyasi, iqlim o‘zgarishi va biologik xilma-xillikning qisqarishi bugungi kunning eng dolzarb muammolaridan hisoblanadi. Bu muammolar ko‘p jihatdan kimyo sanoati faoliyati bilan bog‘liq bo‘lib, ularning salbiy oqibatlari inson salomatligi va tabiat muvozanatiga jiddiy xavf tug‘dirmoqda.

Ayniqsa, tabiiy resurslarning cheklanganligi masalasi alohida e’tibor talab qiladi. Neft, gaz va boshqa foydali qazilmalar zaxiralarining kamayib borishi insoniyatni yangi, muqobil va qayta tiklanuvchi energiya manbalarini izlashga majbur qilmoqda. Bu jarayonda kimyo fanining o‘rni beqiyos bo‘lib, u ekologik xavfsiz va iqtisodiy jihatdan samarali texnologiyalarni ishlab chiqishda muhim rol o‘ynaydi.

Bugungi kunda zamonaviy kimyo oldida turgan asosiy vazifalardan biri — barqaror rivojlanishni ta’minlashdir.

ASOSIY QISM

Bugungi kunda kimyo sanoati jahon iqtisodiyotining muhim tarkibiy qismi hisoblanadi. Plastmassa, mineral o‘g‘itlar, dori vositalari, yoqilg‘i, qurilish materiallari va boshqa ko‘plab mahsulotlar aynan kimyo sanoati orqali ishlab chiqariladi. Ushbu tarmoq sanoat ishlab chiqarishining deyarli barcha sohalari bilan chambarchas bog‘liq bo‘lib, iqtisodiy rivojlanishning muhim omili sifatida namoyon bo‘ladi. Kimyo sanoatining eng dolzarb muammolaridan biri — atrof-muhitning ifloslanishidir. Zavod va fabrikalardan ajralib chiqayotgan zaharli gazlar atmosfera havosini ifloslantirib, inson salomatligiga zarar yetkazadi. Masalan, karbonat angidrid, azot oksidlari va oltingugurt birikmalari havoning sifatini yomonlashtirib, iqlim o‘zgarishiga ham ta’sir ko‘rsatadi.

Shuningdek, sanoat oqava suvlari tarkibidagi zararli kimyoviy moddalar daryolar, ko‘llar va yer osti suvlari sifatining pasayishiga olib keladi. Bu esa ichimlik suvi tanqisligini kuchaytiradi hamda suv ekotizimlarining buzilishiga sabab bo‘ladi.

Plastik chiqindilar muammosi esa bugungi kunda global ekologik inqiroz darajasiga yetgan. Har yili millionlab tonna plastik chiqindilar tabiatga tashlanadi. Tabiiy resurslar — neft, gaz, ko‘mir va boshqa foydali qazilmalar — cheklangan va qayta tiklanmaydigan manbalar hisoblanadi. Ularning haddan tashqari ekspluatatsiyasi nafaqat iqtisodiy muammolarni, balki ekologik muvozanatning buzilishini ham keltirib chiqaradi.

Energiya resurslariga bo‘lgan talabning ortib borishi ularni tejash va samarali foydalanishni talab etadi. Shu sababli qayta tiklanuvchi energiya manbalarini

rivojlantirish muhim strategik yo‘nalish hisoblanadi. Quyosh energiyasi, shamol energiyasi, gidroenergiya va bioyoqilg‘ilar nafaqat ekologik toza, balki uzoq muddatli istiqbolda iqtisodiy jihatdan ham foydalidir. “Yashil kimyo” zamonaviy kimyoning eng istiqbolli va dolzarb yo‘nalishlaridan biridir. Ushbu konsepsiya kimyoviy mahsulotlar va jarayonlarni ishlab chiqishda atrof-muhitga zarar yetkazishni minimallashtirishga qaratilgan.

Yashil kimyo quyidagi asosiy tamoyillarga asoslanadi

zararli va toksik moddalarni kamaytirish yoki butunlay yo‘q qilish energiya tejamkor texnologiyalarni qo‘llash

qayta tiklanuvchi xom ashyolardan foydalanish

chiqindisiz yoki kam chiqindili ishlab chiqarishni tashkil etish

xavfsiz kimyoviy mahsulotlar yaratish

Mazkur yo‘nalish nafaqat ekologik muammolarni kamaytirishga xizmat qiladi, balki iqtisodiy samaradorlikni oshirishga ham yordam beradi.

Kimyo sanoatining barqaror rivojlanishida innovatsion texnologiyalar muhim rol o‘ynaydi. Zamonaviy ilmiy tadqiqotlar asosida yangi katalizatorlar, nanomateriallar va ekologik xavfsiz texnologiyalar ishlab chiqilmoqda. Nanotexnologiyalar yordamida yuqori samaradorlikka ega materiallar yaratish imkoniyati kengaymoqda.Bundan tashqari, “aqlli materiallar” ishlab chiqish ham muhim yo‘nalishlardan biridir.

Chiqindilarni boshqarish va qayta ishlash

Kimyo sanoatining yana bir muhim vazifasi — chiqindilarni samarali boshqarishdir. Chiqindilarni qayta ishlash orqali nafaqat atrof-muhitni muhofaza qilish, balki qo‘shimcha iqtisodiy foyda olish ham mumkin.

Masalan, plastik chiqindilarni qayta ishlash orqali yangi mahsulotlar ishlab chiqarish, metall chiqindilarni qayta eritish, organik chiqindilardan bioyoqilg‘i olish kabi texnologiyalar keng joriy etilmoqda.

MUAMMO VA TAHLILI

Kimyo bilan bog‘liq muammolarni chuqur tahlil qilish shuni ko‘rsatadiki, ularning asosiy sabablari tizimli, texnologik va boshqaruv xarakteriga ega bo‘lib, bir-biri bilan uzviy bog‘liqdir.

Birinchidan — eskirgan texnologiyalar muammosi

Ko‘plab sanoat korxonalarida hali ham eskirgan va samarasiz texnologiyalar qo‘llanilmoqda. Bunday texnologiyalar yuqori energiya sarfi bilan birga, ko‘p miqdorda zararli chiqindilar hosil bo‘lishiga olib keladi. Natijada ishlab chiqarish samaradorligi pasayadi va atrof-muhitga tushadigan yuk ortadi.

Rivojlangan davlatlar bilan solishtirganda, ayrim ishlab chiqarish tizimlarida avtomatlashtirish va raqamli boshqaruv yetarli darajada rivojlanmagan.

Ikkinchidan — chiqindilarni boshqarish tizimining zaifligi

Chiqindilarni qayta ishlash tizimi ko‘plab hududlarda hali to‘liq shakllanmagan. Sanoat va maishiy chiqindilarning katta qismi qayta ishlanmasdan to‘g‘ridan-to‘g‘ri poligonlarga yoki tabiatga tashlanmoqda.

Bu holat tuproq, suv va havo ifloslanishining kuchayishiga olib keladi. Ayniqsa, xavfli kimyoviy chiqindilarni to‘g‘ri utilizatsiya qilmaslik ekologik xavfsizlik uchun jiddiy tahdid hisoblanadi.

Uchinchidan — ekologik nazorat va qonunchilik muammolari

Ekologik standartlar mavjud bo‘lsa-da, ularning amalda bajarilishi har doim ham yetarli darajada emas. Ba’zi sanoat korxonalarida chiqindilarni me’yordan ortiq chiqarish holatlari uchraydi.Nazorat tizimining sustligi, monitoring texnologiyalarining yetarli darajada rivojlanmaganligi va jazolash mexanizmlarining zaifligi ekologik muammolarni chuqurlashtirmoqda.

To‘rtinchidan — ilm-fan va innovatsiyalar yetishmasligi

Kimyo sanoatining barqaror rivojlanishi ilmiy tadqiqotlar va innovatsion yondashuvlarga bevosita bog‘liq. Biroq ko‘plab holatlarda ilmiy izlanishlar uchun ajratiladigan mablag‘lar yetarli emas yoki samarali yo‘naltirilmaydi.

Natijada yangi ekologik xavfsiz texnologiyalar, energiya tejamkor usullar va ilg‘or materiallarni yaratish jarayoni sekinlashadi.

Beshinchidan — ekologik madaniyatning pastligi

Aholi va ba’zi ishlab chiqaruvchilar orasida ekologik madaniyat yetarli darajada shakllanmagan. Chiqindilarni saralash, resurslarni tejash va tabiatga ehtiyotkorona munosabatda bo‘lish bo‘yicha bilim va ko‘nikmalar hali ham yetarli emas.

Umumiy tahlil

Yuqoridagi omillar shuni ko‘rsatadiki, kimyo sohasidagi muammolar birgina sabab bilan emas, balki kompleks tizimdagi kamchiliklar natijasida yuzaga kelmoqda. Texnologik modernizatsiya, ekologik nazoratni kuchaytirish, ilmiy tadqiqotlarni rivojlantirish va ekologik madaniyatni oshirish birgalikda amalga oshirilgandagina ushbu muammolarni samarali bartaraf etish mumkin bo‘ladi.

YECHIM VA TAKLIFLAR

Mavjud muammolarni samarali hal etish uchun kompleks va tizimli yondashuv zarur. Kimyo sanoatining ekologik xavfsizligini ta’minlash, resurslardan oqilona foydalanish hamda innovatsion rivojlanishni qo‘llab-quvvatlash eng muhim yo‘nalishlardan hisoblanadi.Avvalo, zamonaviy va ekologik toza texnologiyalarni keng joriy etish

muhim ahamiyatga ega. Bu ishlab chiqarish jarayonlarida energiya sarfini kamaytirish, zararli chiqindilar miqdorini minimallashtirish va samaradorlikni oshirishga xizmat qiladi. Raqamli texnologiyalar, avtomatlashtirilgan boshqaruv tizimlari hamda sun'iy intellektdan foydalanish sanoat jarayonlarini yanada ekologik va iqtisodiy jihatdan samarali qiladi.

Ikkinchidan, chiqindilarni qayta ishlash sanoatini rivojlantirish zarur. Aylanma iqtisodiyot modelini keng joriy etish orqali chiqindilarni ikkilamchi xom ashyo sifatida qayta ishlash mumkin. Bu nafaqat atrof-muhitni muhofaza qiladi, balki yangi ish o‘rinlari yaratish va iqtisodiy foyda olish imkonini ham beradi.

Uchinchidan, qayta tiklanuvchi energiya manbalaridan keng foydalanish dolzarb masaladir. Quyosh, shamol, gidro va bioenergiya kabi manbalar an'anaviy yoqilg‘ilarga bo‘lgan qaramlikni kamaytiradi va ekologik yukni sezilarli darajada pasaytiradi. Shu bilan birga, vodorod energetikasi kabi yangi yo‘nalishlar ham istiqbolli hisoblanadi.

To‘rtinchidan, ilmiy tadqiqotlarga investitsiyalarni oshirish zarur. Kimyo sohasida yangi materiallar, ekologik xavfsiz reagentlar va energiya tejamkor texnologiyalarni yaratish uchun ilm-fanni rivojlantirish muhimdir. Universitetlar, ilmiy markazlar va sanoat korxonalari o‘rtasidagi hamkorlikni kuchaytirish innovatsiyalarni tezlashtiradi.

Beshinchidan, xalqaro tajribani o‘rganish va hamkorlikni kuchaytirish global muammolarni hal etishda muhim rol o‘ynaydi. Rivojlangan davlatlarning “yashil kimyo” va ekologik siyosatdagi yutuqlarini o‘rganish hamda ularni mahalliy sharoitga moslashtirish samarali natija beradi.

Oltinchidan, ekologik ta'lim va madaniyatni rivojlantirish juda muhim. Aholi orasida ekologik ongni oshirish, chiqindilarni saralash madaniyatini shakllantirish va tabiatga ehtiyotkorona munosabatni kuchaytirish uzoq muddatli ijobiy natijalar beradi.Ekologik loyihalarni qo‘llab-quvvatlash, imtiyozlar yaratish va investitsiyalarni jalb etish orqali barqaror rivojlanishga erishish mumkin.

XULOSA

Xulosa qilib aytganda, kimyo fanining rivojlanishi insoniyat taraqqiyotida katta imkoniyatlar yaratmoqda. U sanoat, tibbiyot, energetika va qishloq xo‘jaligi kabi muhim sohalarning rivojlanishiga xizmat qiladi. Biroq ushbu rivojlanish bilan bir

qatorda ekologik muammolar, resurslar tanqisligi va sanoat chiqindilarining ortishi kabi jiddiy global muammolar ham yuzaga kelmoqda.Bugungi kunda ushbu muammolarni hal etish faqat bitta yo‘nalish bilan cheklanib qolmasdan, balki kompleks yondashuvni talab etadi. Ya’ni, texnologik modernizatsiya, ilmiy innovatsiyalar, iqtisodiy islohotlar va ekologik madaniyatning rivojlanishi birgalikda amalga oshirilishi zarur.Ayniqsa, “yashil kimyo” tamoyillarini keng joriy etish kelajak taraqqiyotining asosiy yo‘nalishlaridan biri bo‘lib xizmat qiladi. Bu nafaqat atrof-muhitni muhofaza qiladi, balki resurslardan samarali foydalanish va iqtisodiy barqarorlikni ta’minlashga ham yordam beradi.Shu bilan birga, ilm-fan, davlat, xususiy sektor va jamiyat o‘rtasidagi hamkorlik kuchaysa, global ekologik muammolarni samarali hal etish imkoniyati yanada ortadi.

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LYUMINOFORLAR

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Annotatsiya: Mazkur ilmiy maqolada lyuminoforlarning fizik-kimyoviy xossalari, ularning tuzilishi, energiya yutishi va yorug‘lik chiqarish mexanizmlari tahlil qilingan. Shuningdek, lyuminoforlarning sanoat, tibbiyot, elektronika hamda zamonaviy yoritish texnologiyalaridagi qo‘llanilish sohalari yoritilgan. Tadqiqot davomida lyuminofor materiallarning samaradorligini oshirish, energiya tejamkorligini ta’minlash va ekologik xavfsizligini kuchaytirish masalalari ko‘rib chiqilgan. Maqolada lyuminoforlarning istiqbolli turlari hamda ularning innovatsion texnologiyalardagi ahamiyati ilmiy jihatdan asoslab berilgan.

Abstract: This scientific article analyzes the physicochemical properties of phosphors, their structure, energy absorption, and light emission mechanisms. The application areas of phosphors in industry, medicine, electronics, and modern lighting technologies are also discussed. The study considers issues related to improving the efficiency of phosphor materials, ensuring energy saving, and enhancing environmental safety. Furthermore, promising types of phosphors and their significance in innovative technologies are scientifically substantiated.

Аннотация: В данной научной статье проанализированы физико-химические свойства люминофоров, их структура, механизмы поглощения энергии и излучения света. Также рассмотрены области применения люминофоров в промышленности, медицине, электронике и современных технологиях освещения. В ходе исследования изучены вопросы повышения эффективности люминофорных материалов, энергосбережения и экологической безопасности. В статье научно обоснованы перспективные виды люминофоров и их значение в инновационных технологиях.

Kalit so‘zlar: Lyuminofor, fotolyuminessensiya, luminestsensiya, fosfor materiallari, energiya samaradorligi, LED texnologiyasi, optik materiallar, yorug‘lik chiqarish, nanomateriallar.

Keywords: Phosphor, photoluminescence, luminescence, phosphor materials, energy efficiency, LED technology, optical materials, light emission, nanomaterials.

Ключевые слова: Люминофор, фотолюминесценция, люминесценция, фосфорные материалы, энергоэффективность, LED-технология, оптические материалы, светоизлучение, наноматериалы.

KIRISH

Hozirgi davrda ilm-fan va texnologiyaning jadal rivojlanishi natijasida optik xossalarga ega bo‘lgan materiallarga bo‘lgan talab tobora ortib bormoqda. Ayniqsa, yorug‘lik chiqaruvchi funksional materiallar elektronika, energetika, tibbiyot va axborot texnologiyalari sohalarida muhim ahamiyat kasb etmoqda. Shunday materiallardan biri lyuminoforlar bo‘lib, ular tashqi energiya ta’sirida yorug‘lik chiqarish xususiyatiga ega moddalar hisoblanadi. Lyuminoforlarning asosiy xossasi luminestsensiya hodisasi bilan bog‘liq bo‘lib, bu jarayonda modda energiyani yutib, uni ma’lum to‘lqin uzunligidagi yorug‘lik ko‘rinishida qayta chiqaradi.Lyuminestsensiya hodisasi ilk bor XIX asrda ilmiy jihatdan o‘rganilgan bo‘lsa-da, bugungi kunda ushbu soha yanada takomillashib, zamonaviy texnologiyalarning ajralmas qismiga aylandi. Lyuminoforlar ultrabinafsha nurlar, rentgen nurlari, elektron oqimlari, issiqlik yoki kimyoviy reaksiyalar ta’sirida faol holatga o‘tadi va natijada turli rangdagi yorug‘lik chiqaradi. Ushbu xususiyat ularni ko‘plab texnik va ilmiy sohalarda qo‘llash imkonini beradi.Hozirgi kunda lyuminoforlar LED lampalar, suyuq kristalli displeylar, televizor ekranlari, mobil qurilmalar, lazer texnologiyalari, xavfsizlik belgilari hamda tibbiy diagnostika uskunalarida keng qo‘llanilmoqda. Ayniqsa, energiya tejovchi yoritish tizimlarida lyuminoforlarning roli juda katta. Zamonaviy LED texnologiyalarida yuqori sifatli lyuminoforlardan foydalanish yorug‘lik samaradorligini oshirish, elektr energiyasi sarfini kamaytirish va xizmat muddatini uzaytirishga xizmat qiladi. Shu sababli bugungi kunda energiya samaradorligini oshirishga qaratilgan ilmiy tadqiqotlarda lyuminofor materiallarga katta e’tibor qaratilmoqda.

Lyuminoforlarning muhim afzalliklaridan biri ularning turli spektr diapazonlarida yorug‘lik chiqarish imkoniyatidir. Bu esa ularni rangli displeylar, optik tolali aloqa tizimlari va lazer qurilmalarida qo‘llash imkonini beradi. Bundan tashqari, nanoo‘lchamli lyuminoforlarning yaratilishi natijasida ularning fizik-kimyoviy xususiyatlari yanada yaxshilanib, yangi avlod optik materiallarini ishlab chiqish imkoniyati yuzaga kelmoqda. Nanotexnologiyalar asosidagi lyuminoforlar yuqori yorug‘lik intensivligi, termik barqarorligi va kichik o‘lchamlari bilan ajralib turadi.Tibbiyot sohasida ham lyuminoforlarning ahamiyati ortib bormoqda. Ular biologik markerlar, rentgenografiya,

tomografiya va lazer diagnostikasida keng qo‘llaniladi. Ayniqsa, bioaktiv lyuminoforlar yordamida hujayralarni kuzatish va kasalliklarni erta aniqlash imkoniyatlari kengaymoqda. Shuningdek, lyuminoforlar ekologik xavfsizlik va energiya tejash masalalarida ham dolzarb ahamiyat kasb etadi. Oddiy yoritish tizimlariga nisbatan lyuminofor asosidagi LED lampalar kam energiya sarflaydi va atmosfera ifloslanishini kamaytirishga yordam beradi.

ASOSIY QISM

Lyuminoforlar — tashqi energiya manbai ta’sirida yorug‘lik chiqaruvchi moddalar bo‘lib, ular zamonaviy optik va elektron texnologiyalarning muhim tarkibiy qismlaridan biri hisoblanadi. Ushbu materiallarning asosiy xususiyati luminestsensiya hodisasi bilan bog‘liqdir. Luminestsensiya jarayonida modda tashqi energiyani yutadi va uni ma’lum vaqt davomida yorug‘lik energiyasi ko‘rinishida qayta chiqaradi. Bu jarayon atom va molekulalardagi elektronlarning energetik holati o‘zgarishi bilan izohlanadi. Elektronlar tashqi ta’sir natijasida yuqori energetik sathga o‘tadi va keyinchalik boshlang‘ich holatga qaytganda foton chiqaradi. Natijada turli rangdagi yorug‘lik hosil bo‘ladi.Lyuminoforlarning yorug‘lik chiqarish xususiyati ularning kimyoviy tarkibi, kristall tuzilishi va aktivator ionlariga bog‘liq bo‘ladi. Aktivator sifatida ko‘pincha nodir yer elementlari — evropiy, terbiy, seriy va disproziy kabi elementlardan foydalaniladi. Ushbu ionlar lyuminoforning spektral xususiyatlarini belgilaydi. Masalan, evropiy ionlari qizil rangli yorug‘lik chiqarishga yordam bersa, terbiy ionlari yashil rang hosil qiladi. Shu sababli turli rangdagi displey va ekranlar yaratishda har xil aktivatorli lyuminoforlar qo‘llaniladi.Lyuminoforlar tarkibiga ko‘ra organik va noorganik turlarga bo‘linadi. Organik lyuminoforlar uglerod asosidagi birikmalardan tashkil topgan bo‘lib, ular moslashuvchanligi va yengilligi bilan ajralib turadi. Bunday materiallar OLED displeylar, biologik markerlar va sensor qurilmalarida ishlatiladi. Noorganik lyuminoforlar esa metall oksidlari, fosfatlar, sulfidlar va silikatlar asosida tayyorlanadi. Ular yuqori termik barqarorlik, kuchli yorug‘lik intensivligi va uzoq xizmat muddati bilan tavsiflanadi. Shu sababli sanoat va yoritish texnologiyalarida asosan noorganik lyuminoforlardan foydalaniladi.Luminestsensiya hodisasi qo‘zg‘atuvchi energiya turiga qarab ham bir necha guruhlarga bo‘linadi. Fotolyuminestsensiya ultrabinafsha yoki ko‘rinadigan yorug‘lik ta’sirida yuzaga keladi. Elektroluminestsensiya elektr maydoni yoki elektr toki ta’sirida hosil bo‘ladi. Katodoluminestsensiya esa elektron oqimi ta’sirida sodir bo‘ladi va televizor ekranlari hamda elektron-nur trubkalarida qo‘llaniladi.

Lyuminoforlarning eng muhim qo‘llanilish sohalaridan biri LED texnologiyasidir. Hozirgi kunda energiya tejovchi lampalar ishlab chiqarishda

lyuminoforlarning ahamiyati juda katta. Oq rangli LED lampalarda ko‘k rangli yarimo‘tkazgich diod va sariq rang chiqaruvchi lyuminofor birgalikda ishlatiladi. Ushbu kombinatsiya natijasida inson ko‘zi oq yorug‘likni qabul qiladi. Bunday lampalar oddiy cho‘g‘lanma lampalarga nisbatan kam energiya sarflaydi, uzoq muddat xizmat qiladi va ekologik jihatdan xavfsiz hisoblanadi. Shu sababli bugungi kunda ko‘plab davlatlarda energiya tejovchi yoritish tizimlariga o‘tishda lyuminofor asosidagi LED texnologiyalar keng joriy qilinmoqda.Televizor va monitor ekranlarida ham lyuminoforlarning o‘rni katta. Ayniqsa, eski katod-nur trubkali ekranlarda elektronlar oqimi lyuminofor qatlami bilan to‘qnashganda yorug‘lik hosil bo‘ladi va natijada tasvir shakllanadi. Zamonaviy displey texnologiyalarida esa nanozarrachali lyuminoforlar va kvant nuqtalari asosidagi materiallar qo‘llanilib, tasvir sifati va rang aniqligi sezilarli darajada oshirilmoqda.Tibbiyot sohasida lyuminoforlarning qo‘llanilishi ham muhim ahamiyatga ega. Rentgen diagnostikasida lyuminofor ekranlari rentgen nurlarini ko‘rinadigan yorug‘likka aylantirib beradi, bu esa aniq tasvir olish imkonini yaratadi. Bundan tashqari, fluorescent markerlar biologik va tibbiy tadqiqotlarda hujayralarni kuzatish hamda kasalliklarni erta aniqlashda qo‘llaniladi. Hozirgi vaqtda nanoo‘lchamdagi lyuminoforlar yordamida saraton hujayralarini aniqlash va lazer diagnostikasi bo‘yicha samarali tadqiqotlar olib borilmoqda.Hozirgi kunda olimlar tomonidan ekologik xavfsiz, arzon va yuqori samaradorlikka ega lyuminofor materiallarni yaratish bo‘yicha keng ko‘lamli tadqiqotlar olib borilmoqda. Chunki ayrim lyuminoforlar tarkibida qimmat va noyob yer elementlarining mavjudligi ularning tannarxini oshiradi. Shu sababli yangi avlod lyuminoforlarini ishlab chiqish zamonaviy materialshunoslikning dolzarb yo‘nalishlaridan biri hisoblanadi.

MUAMMO VA TAHLILI

Hozirgi kunda lyuminofor materiallar sanoat, elektronika, tibbiyot va yoritish texnologiyalarida keng qo‘llanilishiga qaramay, ushbu materiallar bilan bog‘liq bir qator ilmiy va texnologik muammolar mavjud. Ushbu muammolar lyuminoforlarning ishlab chiqarish samaradorligi, iqtisodiy jihatlari, ekologik xavfsizligi hamda uzoq muddatli ishlash xususiyatlari bilan chambarchas bog‘liqdir.Birinchi muammolardan biri lyuminoforlar tarkibida noyob yer elementlarining qo‘llanilishidir. Hozirgi zamonaviy lyuminoforlarning ko‘pchiligida evropiy, terbiy, seriy, ittriy va disproziy kabi nodir metallardan foydalaniladi. Ushbu elementlar yorug‘lik chiqarish samaradorligini oshirsa-da,

ularning tabiiy zaxiralari cheklangan va qazib olish jarayoni murakkab hisoblanadi. Natijada lyuminofor materiallarning narxi oshadi hamda ularni ommaviy ishlab chiqarish iqtisodiy jihatdan qiyinlashadi. Bundan tashqari, nodir yer elementlarini qazib olish va qayta ishlash jarayonlari ekologik muammolarni ham yuzaga keltirishi mumkin.Ikkinchi muammo lyuminoforlarning termik barqarorligi bilan bog‘liqdir. Ko‘plab lyuminofor materiallar yuqori harorat ta’sirida o‘zining yorug‘lik chiqarish xususiyatini asta-sekin yo‘qota boshlaydi. Ushbu holat “termik so‘nish” deb ataladi. Ayniqsa, yuqori quvvatli LED lampalarda uzoq vaqt ishlash davomida lyuminofor qatlamining qizishi natijasida yorug‘lik intensivligi kamayadi. Bu esa lampalarning xizmat muddatini qisqartiradi va energiya samaradorligining pasayishiga olib keladi. Shu sababli yuqori haroratga chidamli yangi avlod lyuminoforlarini yaratish dolzarb masalalardan biri hisoblanadi.Bundan tashqari, ayrim lyuminoforlarning kimyoviy tarkibi ekologik xavfsizlik nuqtai nazaridan ham muammoli hisoblanadi. Ba’zi lyuminofor materiallar tarkibida zaharli moddalar yoki og‘ir metall ionlari mavjud bo‘lishi mumkin. Ularning ishlab chiqarilishi va utilizatsiyasi atrof-muhitga salbiy ta’sir ko‘rsatadi. Shu sababli ekologik toza, biologik xavfsiz va qayta ishlash imkoniyatiga ega bo‘lgan lyuminoforlarni yaratish bo‘yicha tadqiqotlar keng olib borilmoqda.

Lyuminoforlarning yana bir muhim muammosi — ularning yorug‘lik samaradorligi va rang uzatish sifatidir. Ba’zi lyuminoforlar yuqori intensivlikdagi yorug‘lik chiqarsa-da, rang aniqligi yetarli darajada bo‘lmasligi mumkin. Bu ayniqsa televizor ekranlari, monitorlar va professional yoritish tizimlarida muhim ahamiyatga ega. Rang uzatish indeksining past bo‘lishi tasvir sifatiga salbiy ta’sir qiladi. Shu sababli olimlar tomonidan yuqori yorqinlikka ega va rang uzatish ko‘rsatkichlari yaxshilangan materiallarni ishlab chiqish ustida ilmiy izlanishlar olib borilmoqda.Tahlillar shuni ko‘rsatadiki, nanozarrachali lyuminoforlar va kompozit materiallardan foydalanish orqali mavjud muammolarni qisman bartaraf etish mumkin. Nanoo‘lchamdagi lyuminoforlar oddiy materiallarga nisbatan yuqori yorug‘lik intensivligi, yaxshi termik barqarorlik va samarali energiya almashinuvi bilan ajralib turadi. Ularning o‘lchami kichraygan sari spektral xususiyatlarini nazorat qilish osonlashadi. Bu esa yuqori sifatli displeylar va optoelektronik qurilmalar yaratishda katta imkoniyatlar ochib beradi.Shuningdek, energiya tejash muammolari ham lyuminoforlar bilan bog‘liq tadqiqotlarning asosiy yo‘nalishlaridan biri hisoblanadi. Dunyo miqyosida elektr energiyasi iste’molining ortib borishi energiya samaradorligi yuqori bo‘lgan texnologiyalarni rivojlantirishni talab qilmoqda. Shu nuqtai nazardan lyuminofor asosidagi LED lampalar oddiy yoritish tizimlariga nisbatan ancha samarali

hisoblanadi. Ular kam energiya sarflab, kuchli yorug‘lik hosil qiladi va uzoq muddat xizmat qiladi. Bu esa iqtisodiy jihatdan foydali bo‘lish bilan birga ekologik muammolarni kamaytirishga ham xizmat qiladi.

XULOSA

Xulosa qilib aytganda, lyuminoforlar zamonaviy ilm-fan va texnologiyaning eng muhim funksional materiallaridan biri hisoblanadi. Ularning tashqi energiyani yorug‘lik energiyasiga aylantirish xususiyati sanoat, elektronika, tibbiyot, energetika va optoelektronika kabi ko‘plab sohalarda keng qo‘llanilishiga sabab bo‘lmoqda. Ayniqsa, energiya tejovchi LED texnologiyalarida lyuminoforlardan foydalanish elektr energiyasi sarfini kamaytirish, yorug‘lik sifatini oshirish va qurilmalarning xizmat muddatini uzaytirishda muhim omil bo‘lib xizmat qilmoqda.Tadqiqotlar natijasida lyuminoforlarning fizik-kimyoviy xossalari, luminestsensiya mexanizmlari va ularning turli sohalardagi qo‘llanilish imkoniyatlari keng o‘rganildi. Organik va noorganik lyuminoforlarning afzalliklari hamda kamchiliklari tahlil qilinib, ularning zamonaviy texnologiyalardagi ahamiyati yoritildi. Shuningdek, nanoo‘lchamdagi lyuminoforlar va kompozit materiallarning yuqori samaradorlikka ega ekanligi aniqlandi.Biroq lyuminofor materiallardan foydalanishda ayrim muammolar ham mavjud. Xususan, noyob yer elementlarining qimmatligi, termik barqarorlikning pasayishi va ekologik xavfsizlik bilan bog‘liq masalalar ushbu sohada yangi ilmiy izlanishlarni talab qilmoqda. Shu sababli ekologik toza, arzon va yuqori samaradorlikka ega bo‘lgan yangi avlod lyuminoforlarini yaratish bugungi kunning dolzarb ilmiy yo‘nalishlaridan biri bo‘lib qolmoqda.Kelajakda nanotexnologiyalar va materialshunoslikning rivojlanishi lyuminoforlarning yangi turlarini yaratish imkonini beradi.

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SUVNI TOZALASHNING YANGI SORBENTLARI

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Annotatsiya Ushbu maqolada suvni tozalashda qo‘llaniladigan yangi sorbentlar, ularning kimyoviy tarkibi, ishlash mexanizmi va ekologik ahamiyati yoritiladi. Suv resurslarining sanoat chiqindilari, og‘ir metallar, organik bo‘yoqlar, neft mahsulotlari, pestitsidlar va mikroplastiklar bilan ifloslanishi zamonaviy ekologiyaning dolzarb muammolaridan biridir. An’anaviy tozalash usullari har doim ham yetarli samaradorlik bermaydi. Shu sababli nanozarrachalar, biochar, modifikatsiyalangan tabiiy minerallar, polimer sorbentlar, metall-organik karkaslar va kompozit materiallar asosidagi yangi sorbentlar suvni chuqur tozalashda istiqbolli yo‘nalish hisoblanadi.

Kalit so‘zlar: sorbent, adsorbsiya, suvni tozalash, og‘ir metallar, biochar, zeolit, nanozarrachalar, aktiv ko‘mir, kompozit sorbentlar.

Kirish

Suv inson hayoti, sanoat, qishloq xo‘jaligi va ekologik barqarorlik uchun eng muhim tabiiy resurslardan biridir. Biroq sanoatlashtirish, urbanizatsiya va qishloq xo‘jaligida kimyoviy moddalarning ko‘p ishlatilishi natijasida suv havzalari turli ifloslantiruvchi moddalar bilan zararlanmoqda. Ayniqsa, qo‘rg‘oshin, kadmiy, simob, xrom, mishyak kabi og‘ir metallar, sintetik bo‘yoqlar, fenollar, neft mahsulotlari va mikroplastiklar suv sifati uchun katta xavf tug‘diradi.

Suvni tozalashda koagulyatsiya, filtratsiya, biologik tozalash, membranali usullar va kimyoviy oksidlanish kabi texnologiyalar qo‘llaniladi. Ammo ularning ayrimlari qimmat, energiya talabchan yoki ikkilamchi chiqindi hosil qilishi mumkin. Shu sababli sorbsiya usuli samarali, nisbatan arzon va texnologik jihatdan qulay usul sifatida keng o‘rganilmoqda.

Sorbentlar ifloslantiruvchi moddalarni o‘z yuzasiga yutib olish yoki kimyoviy bog‘lash orqali suvdan ajratadi. Yangi avlod sorbentlarining asosiy vazifasi — yuqori sorbsiya sig‘imi, selektivlik, qayta ishlatish imkoniyati va ekologik xavfsizlikni ta’minlashdir.

Sorbentlarning asosiy turlari

Sorbent turi	Asosiy tarkibi	Qo‘llanilishi
Aktiv ko‘mir	Uglerodli material	Organik moddalar, bo‘yoqlar, hid va rangni yo‘qotish

Sorbent turi	Asosiy tarkibi	Qo‘llanilishi
Biochar	Biomassa pirolizi mahsuloti	Og‘ir metallar, organik ifloslantiruvchilar
Zeolit	Alumosilikat mineral	Ammoniy ionlari, og‘ir metallar
Bentonit	Loy minerali	Bo‘yoqlar, metall ionlari
Nano-sorbentlar	Fe_3O_4, TiO_2, ZnO, SiO_2	Og‘ir metallar, mikroblar, organik moddalar
Polimer sorbentlar	Chitosan, alginat, sintetik polimerlar	Metall ionlari, farmatsevtik qoldiqlar
Metall-organik karkaslar	MOF materiallar	Selektiv adsorbsiya, mikropollutantlar

Yangi sorbentlarning xususiyatlari

Yangi sorbentlar oddiy filtr materiallaridan farq qiladi. Ular yuqori sirt maydoniga, faol funksional guruhlarga va ma’lum ifloslantiruvchilarga nisbatan tanlab ta’sir qilish xususiyatiga ega bo‘ladi. Masalan, chitosan tarkibidagi amin guruhlari metall ionlarini bog‘laydi. Zeolitlarning g‘ovakli tuzilishi ammoniy va metall ionlarini ushlab qoladi. Magnit nanozarrachalar esa suvdan magnit maydon yordamida oson ajratib olinadi.

Biochar ekologik xavfsiz sorbentlardan biri hisoblanadi. U qishloq xo‘jaligi chiqindilari, daraxt po‘stlog‘i, somon, paxta poyasi yoki boshqa biomassa qoldiqlarini kislorodsiz sharoitda qizdirish orqali olinadi. Uning yuzasi g‘ovakli bo‘lib, og‘ir metallar va organik moddalarni yutish qobiliyatiga ega. Eng muhim tomoni — biochar chiqindini foydali mahsulotga aylantiradi.

Nanozarrachalar asosidagi sorbentlar yuqori samaradorligi bilan ajralib turadi. Masalan, temir oksidi nanozarrachalari magnit xususiyatga ega bo‘lib, suvga aralashtirilgandan keyin ifloslantiruvchilarni bog‘laydi va magnit yordamida ajratib olinadi. Bu usul filtratsiyani osonlashtiradi va sorbentni qayta ishlatish imkonini beradi.

Adsorbsiya mexanizmi

Sorbentlar ifloslantiruvchilarni turli mexanizmlar orqali ushlab qoladi. Bular fizik adsorbsiya, kimyoviy adsorbsiya, ion almashinish, kompleks hosil qilish va elektrostatik tortishish jarayonlaridir.

Mexanizm	Mazmuni	Misol
Fizik adsorbsiya	Modda sorbent yuzasida kuchsiz tortishish bilan ushlanadi	Aktiv ko‘mirda organik modda yutilishi

Mexanizm	Mazmuni	Misol
Kimyoviy adsorbsiya	Sorbent va modda o‘rtasida kimyoviy bog‘ hosil bo‘ladi	Chitosan bilan Cu^{2+} ionining bog‘lanishi
Ion almashinish	Sorbentdagi ionlar suvdagi ionlar bilan almashinadi	Zeolit bilan NH_4^+ yutilishi
Kompleks hosil qilish	Metall ionlari funksional guruhlar bilan kompleks hosil qiladi	Amin guruhli polimerlar
Elektrostatik tortishish	Qarama-qarshi zaryadlangan zarrachalar tortiladi	Bo‘yoq molekulalarining bentonitga yutilishi

Amaliy qo‘llanilishi

Yangi sorbentlar ichimlik suvi, sanoat oqova suvlari, qishloq xo‘jaligi drenaj suvlari va laboratoriya chiqindilarini tozalashda qo‘llanilishi mumkin. Masalan, metallurgiya va galvanik ishlab chiqarish korxonalaridan chiqadigan oqova suvlarda Cr(VI), Ni^{2+}, Cu^{2+}, Pb^{2+} kabi ionlar uchraydi. Bunday ionlarni chitosan, zeolit, biochar va magnit nanozarrachalar yordamida kamaytirish mumkin.

To‘qimachilik sanoati oqova suvlari ko‘pincha sintetik bo‘yoqlar bilan ifloslanadi. Bunday moddalar suvga rang beradi, yorug‘lik o‘tishini kamaytiradi va biologik jarayonlarga salbiy ta’sir qiladi. Aktiv ko‘mir, bentonit, modifikatsiyalangan biochar va polimer sorbentlar bo‘yoqlarni yutishda samarali bo‘lishi mumkin.

Farmatsevtik qoldiqlar va pestitsidlar suvni tozalashdagi murakkab ifloslantiruvchilar qatoriga kiradi. Ular juda past konsentratsiyada ham biologik ta’sir ko‘rsatishi mumkin. Bunday moddalar uchun metall-organik karkaslar, uglerodli nanomateriallar va funksionallashtirilgan polimer sorbentlar istiqbolli hisoblanadi.

Afzallik va kamchiliklar

Sorbent turi	Afzalligi	Kamchiligi
Aktiv ko‘mir	Yuqori yutish qobiliyati	Qayta tiklash qimmat
Biochar	Arzon, ekologik xavfsiz	Sifat xomashyoga bog‘liq
Zeolit	Tabiiy, ion almashinish kuchli	Organik moddalar uchun cheklangan
Chitosan	Biologik parchalanadi, metall ionlarini yaxshi bog‘laydi	Kislotalilikka sezgir
Magnit nanozarrachalar	Oson ajratiladi, qayta ishlatiladi	Agglomeratsiya muammosi bor

Sorbent turi	Afzalligi	Kamchiligi
MOF materiallar	Juda katta sirt maydoni	Sanoat miqyosida qimmat

Xulosa

Suvni tozalashning yangi sorbentlari ekologik xavfsizlik va resurslardan oqilona foydalanish nuqtai nazaridan katta ahamiyatga ega. An'anaviy tozalash usullari ayrim murakkab ifloslantiruvchilarni to'liq bartaraf eta olmagani sababli yuqori samarali, selektiv va qayta ishlatiladigan sorbentlarga ehtiyoj ortib bormoqda.

Biochar, zeolit, chitosan, magnit nanozarrachalar, metall-organik karkaslar va kompozit sorbentlar suvni og'ir metallar, sintetik bo'yoqlar, organik moddalar va farmatsevtik qoldiqlardan tozalashda istiqbolli materiallar hisoblanadi. Ayniqsa, qishloq xo'jaligi chiqindilaridan biochar olish yoki tabiiy minerallarni modifikatsiya qilish iqtisodiy va ekologik jihatdan foydalidir.

Eng muhim xulosa shuki, kelajakdagi samarali suv tozalash tizimlari bitta materialga emas, balki bir nechta sorbentlarning kompozit kombinatsiyasiga tayanadi. Masalan, biochar-magnit nanozarracha, chitosan-zeolit yoki aktiv ko'mir-polimer kompozitlari yuqori samaradorlik, qayta tiklanish va ekologik xavfsizlikni birlashtirishi mumkin. Shu sababli yangi sorbentlar kimyosi suv xavfsizligini ta'minlashda dolzarb ilmiy-amaliy yo'nalish hisoblanadi.

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BIOMASSADAN YOQILG‘I VA KIMYOVIY MODDALAR AJRATIB OLISH

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Anotatsiya Ushbu maqolada biomassadan yoqilg‘i va kimyoviy moddalar ajratib olishning asosiy usullari, texnologik bosqichlari, ekologik va iqtisodiy ahamiyati yoritiladi. Biomassa o‘simlik qoldiqlari, yog‘och chiqindilari, qishloq xo‘jaligi mahsulotlari, oziq-ovqat sanoati chiqindilari va organik maishiy chiqindilardan iborat qayta tiklanuvchi xomashyo hisoblanadi. Undan bioetanol, biodizel, biogaz, biochar, organik kislotalar, furfural, levulin kislotasi va boshqa qimmatli mahsulotlar olish mumkin.

Kalit so‘zlar: biomassa, bioyoqilg‘i, bioetanol, biodizel, biogaz, piroliz, gazlashtirish, fermentatsiya, yashil kimyo.

Kirish Bugungi kunda energiya resurslariga bo‘lgan talab ortib borayotgani va qazilma yoqilg‘ilarning ekologik zararli oqibatlari biomassadan foydalanish masalasini dolzarb qilib qo‘ymoqda. Neft, gaz va ko‘mir kabi an’anaviy energiya manbalari atmosferaga karbonat angidrid, azot oksidlari va boshqa zararli gazlarni chiqaradi. Biomassa esa qayta tiklanuvchi manba bo‘lib, undan energiya va kimyoviy mahsulotlar olish imkoniyati mavjud.

Biomassa tarkibida sellyuloza, gemisellyuloza, lignin, kraxmal, yog‘lar, oqsillar va boshqa organik moddalar bo‘ladi. Ushbu komponentlar turli kimyoviy yoki biologik jarayonlar orqali foydali mahsulotlarga aylantiriladi. Masalan, kraxmal va sellyulozadan bioetanol, o‘simlik moylaridan biodizel, organik chiqindilardan biogaz, lignosellyulozali qoldiqlardan esa biochar va kimyoviy platforma moddalari olinadi.

Biomassadan foydalanishning asosiy afzalligi shundaki, chiqindi xomashyo foydali mahsulotga aylanadi. Bu nafaqat energiya xavfsizligini mustahkamlaydi, balki chiqindilar miqdorini kamaytiradi va ekologik barqarorlikka xizmat qiladi.

Biomassaning asosiy turlari

Biomassa bir necha guruhlarga bo‘linadi. Qishloq xo‘jaligi qoldiqlari — somon, paxta poyasi, makkajo‘xori poyasi, sholi po‘stlog‘i, kungaboqar qoldiqlari kabi materiallardan iborat. Yog‘och biomassasi — daraxt qipiqlari, po‘stloq, yog‘och sanoati chiqindilaridir. Oziq-ovqat sanoati chiqindilari — meva po‘stlog‘i, press qoldiqlari, yog‘ qoldiqlari va kraxmalli chiqindilarni o‘z ichiga oladi. Organik maishiy chiqindilar esa biogaz olishda muhim xomashyo hisoblanadi.

Jadval. Biomassadan olinadigan mahsulotlar

Biomassa turi	**Qayta ishlash usuli**	**Olinadigan mahsulot**	**Qo‘llanilishi**
Kraxmalli biomassa	Fermentatsiya	Bioetanol	Yoqilg‘i, erituvchi
O‘simlik moylari	Transesterifikatsiya	Biodizel	Dizel yoqilg‘isi o‘rnini bosuvchi modda
Organik chiqindilar	Anaerob parchalanish	Biogaz	Elektr va issiqlik energiyasi
Yog‘och va somon	Piroliz	Biochar, bioyog‘	Tuproq yaxshilash, yoqilg‘i
Lignosellyuloza	Gidroliz va fermentatsiya	Bioetanol, organik kislotalar	Kimyo sanoati
Gemisellyuloza	Kislota bilan qayta ishlash	Furfural	Erituvchi, polimer xomashyosi
Lignin	Termokimyoviy parchalanish	Fenollar, aromatik moddalar	Smola, polimer, kimyoviy sintez

Asosiy texnologiyalar

Biomassani qayta ishlashda biologik, kimyoviy va termokimyoviy usullar qo‘llaniladi. Fermentatsiya biologik usul bo‘lib, mikroorganizmlar yordamida shakarlarni spirt yoki organik kislotalarga aylantirishga asoslanadi. Bioetanol ishlab chiqarishda kraxmal yoki sellyuloza avval shakar moddalarga parchalanadi, keyin xamirturush yordamida etanolga aylantiriladi.

Transesterifikatsiya biodizel ishlab chiqarishda qo‘llanadi. Bunda o‘simlik moylari yoki hayvon yog‘lari metanol yoki etanol bilan reaksiyaga kirishib, yog‘ kislotasi efirlarini hosil qiladi. Bu efirlar biodizel sifatida ishlatiladi.

Anaerob parchalanish kislorodsiz sharoitda mikroorganizmlar yordamida organik moddalarning biogazga aylanishidir. Biogaz tarkibida asosan metan va karbonat angidrid bo‘ladi. Metan energiya manbai sifatida ishlatiladi.

Piroliz kislorodsiz yoki kam kislorodli sharoitda biomassani yuqori haroratda parchalash jarayonidir. Natijada biochar, bioyog‘ va gazsimon mahsulotlar hosil bo‘ladi. Biochar tuproq unumdorligini oshirishda, bioyog‘ esa yoqilg‘i yoki kimyoviy xomashyo sifatida ishlatiladi.

Gazlashtirishda biomassa yuqori haroratda cheklangan kislorod yoki bug‘ ishtirokida sintez-gazga aylantiriladi. Sintez-gaz tarkibida CO va H_2 bo‘ladi. U yoqilg‘i yoki metanol, ammiak va boshqa kimyoviy moddalar olishda ishlatiladi.

Biomassadan kimyoviy moddalar olish

Biomassa nafaqat yoqilg‘i, balki kimyo sanoati uchun qimmatli xomashyo hamdir. Sellyuloza va gemisellyuloza gidroliz orqali shakar moddalarga aylantiriladi. Bu shakarlar fermentatsiya yoki kimyoviy qayta ishlash orqali organik kislotalar, spirtlar va platforma molekulalarga aylanishi mumkin.

Furfural gemisellyulozadan olinadigan muhim modda bo‘lib, erituvchi, smola, plastmassa va dori moddalari sintezida ishlatiladi. Levulin kislotasi sellyuloza va shakarlarni kislota muhitida qayta ishlash orqali olinadi. U bioyoqilg‘i qo‘shimchalari, plastifikatorlar va farmatsevtik oraliq mahsulotlar olishda qo‘llaniladi.

Lignin esa aromatik tuzilishga ega bo‘lgan tabiiy polimerdir. Undan fenollar, aromatik spirtlar, smolalar va kompozit materiallar olish mumkin. Ammo ligninning murakkab tuzilishi uni to‘liq qayta ishlashni qiyinlashtiradi.

Afzalliklari

Biomassadan yoqilg‘i va kimyoviy moddalar olishning eng katta afzalligi — qayta tiklanuvchi xomashyodan foydalanishdir. Bu neft va gazga qaramlikni kamaytiradi. Ikkinchi afzallik — chiqindilarni foydali mahsulotga aylantirishdir. Qishloq xo‘jaligi va oziq-ovqat sanoati chiqindilari energiya yoki kimyoviy mahsulotga aylansa, ekologik yuk kamayadi.

Uchinchi afzallik — uglerod aylanishining nisbatan yopiq bo‘lishidir. Biomassa o‘sish jarayonida atmosferadan CO_2 yutadi. Uni yoqilg‘i sifatida ishlatganda CO_2 qayta chiqadi, lekin bu qazilma yoqilg‘ilardagi kabi million yillik uglerodni atmosferaga chiqarish bilan teng emas.

Muammolar

Biomassadan foydalanishda ham cheklovlar mavjud. Birinchi muammo — xomashyo mavsumiyligi va namligidir. Biomassa ko‘pincha katta hajmli, nam va past energiya zichligiga ega bo‘ladi. Bu tashish va saqlash xarajatlarini oshiradi.

Ikkinchi muammo — oziq-ovqat bilan raqobat. Agar bioyoqilg‘i ishlab chiqarish uchun oziq-ovqat ekinlari ishlatilsa, bu oziq-ovqat xavfsizligiga ta’sir qilishi mumkin. Shu sababli ikkinchi avlod bioyoqilg‘ilar, ya’ni chiqindi va lignosellyulozali biomassadan foydalanish afzal.

Uchinchi muammo — texnologiyaning murakkabligi. Lignosellyulozani parchalaydigan fermentlar va katalizatorlar qimmat bo‘lishi mumkin. Ligninni samarali qayta ishlash ham hali to‘liq hal qilingan masala emas.

Xulosa

Biomassadan yoqilg‘i va kimyoviy moddalar ajratib olish yashil kimyo va barqaror energetikaning muhim yo‘nalishidir. Biomassa qayta tiklanuvchi, keng tarqalgan va ko‘p hollarda chiqindi sifatida mavjud bo‘lgan xomashyo hisoblanadi. Undan bioetanol, biodizel, biogaz, biochar, furfural, levulin kislotasi va boshqa foydali mahsulotlar olish mumkin.

Eng istiqbolli yo‘nalish — oziq-ovqat xomashyosidan emas, balki qishloq xo‘jaligi qoldiqlari, yog‘och chiqindilari, organik maishiy chiqindilar va lignosellyulozali biomassadan foydalanishdir. Bu usul ekologik xavfsiz, iqtisodiy foydali va chiqindilarni kamaytirishga xizmat qiladi.

Kelajakda biomassani qayta ishlashda fermentativ gidroliz, katalitik piroliz, gazlashtirish, yashil erituvchilar va integratsiyalashgan biorefineriya texnologiyalari muhim o‘rin egallaydi. Eng kuchli natija biomassadan faqat bitta mahsulot emas, balki bir vaqtning o‘zida yoqilg‘i, kimyoviy modda, o‘g‘it va energiya olish orqali erishiladi.

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Annotatsiya

Ushbu maqolada daraxt poyalaridan adsorbent olish usullari, ularning fizik-kimyoviy xususiyatlari hamda suv va havoni tozalashdagi amaliy qo‘llanilishi tahlil qilinadi. Daraxt poyalari tarkibidagi lignin, selluloza va gemiselluloza asosida yuqori g‘ovakli adsorbent materiallar olish mumkinligi ko‘rsatib berilgan. Shuningdek, aktivatsiya jarayonlari, termik ishlov berish va kimyoviy modifikatsiya usullari yoritilgan.

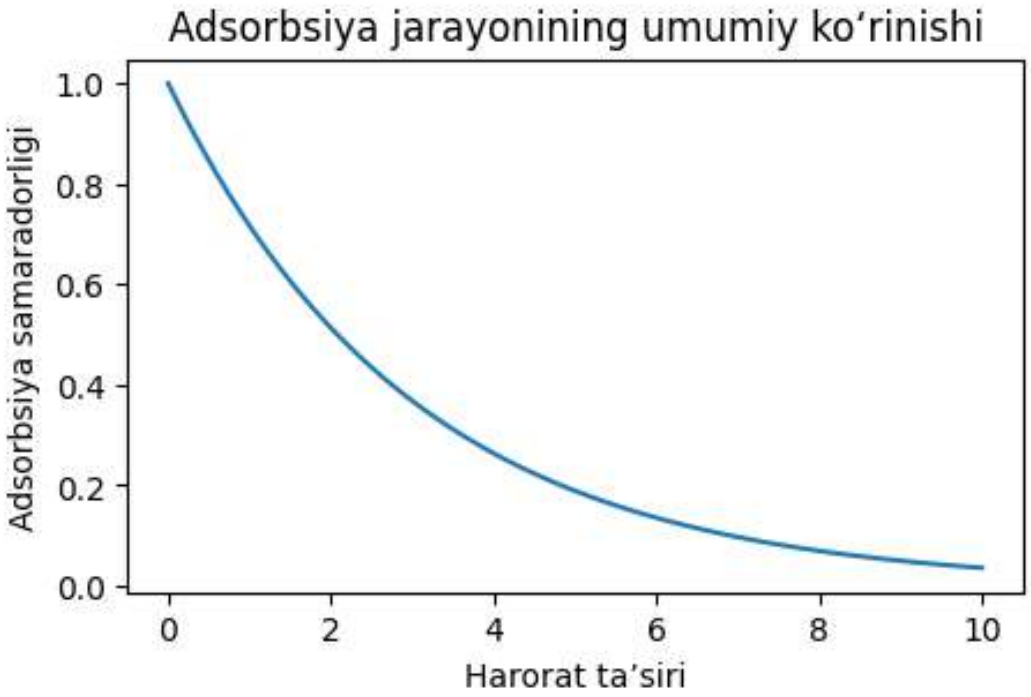
Kalit so‘zlar: adsorbent, daraxt poyasi, aktivlangan ko‘mir, biochar, piroliz, sorbsiya, ekologiya, suvni tozalash.

Abstract

This article discusses methods for obtaining adsorbents from tree trunks and their physicochemical properties. The role of lignin and cellulose-based porous materials in water and air purification is highlighted. Thermal treatment, pyrolysis and chemical activation techniques are also analyzed.

Kirish

Hozirgi davrda ekologik muammolarning ortib borishi tufayli suv, havo va tuproqni samarali tozalash masalasi muhim ilmiy yo‘nalishlardan biriga aylandi. Sanoat korxonalarining chiqindilari, neft mahsulotlari, og‘ir metall ionlari va organik ifloslantiruvchilar atrof-muhitga katta zarar yetkazmoqda. Bunday sharoitda arzon, ekologik xavfsiz va samarali adsorbentlarga ehtiyoj ortmoqda. Tabiiy xomashyolardan adsorbent tayyorlash bugungi kunda dolzarb ilmiy yo‘nalish hisoblanadi. Daraxt poyalari va yog‘och chiqindilari tarkibida katta miqdorda organik polimerlar mavjud bo‘lib, ular asosida yuqori sorbsiya qobiliyatiga ega materiallar olish mumkin. Ayniqsa, piroliz va aktivatsiya jarayonlari orqali daraxt poyalaridan aktivlangan ko‘mir va biochar olish keng tarqalgan.



1-rasm. Adsorbsiya samaradorligining umumiy grafigi.

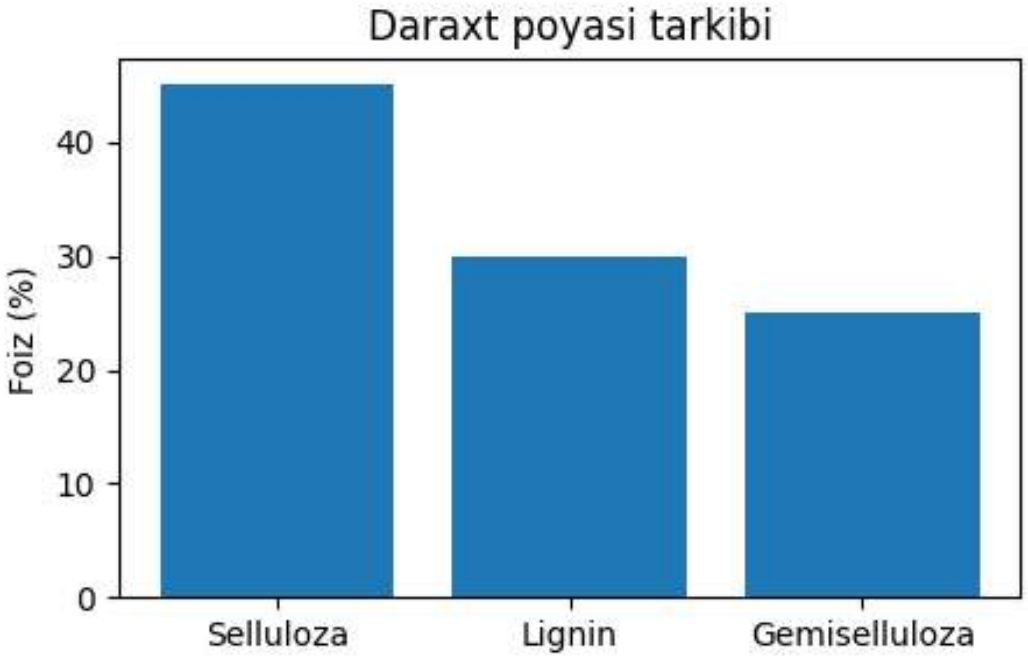
Asosiy qism

Daraxt poyalari adsorbent olish uchun muhim tabiiy xomashyo hisoblanadi. Ularning tarkibi asosan selluloza, lignin va gemisellulozadan iborat. Ushbu komponentlar yuqori haroratda parchalanganda mikrog‘ovakli tuzilma hosil qiladi. Hosil bo‘lgan materiallar katta solishtirma yuzaga ega bo‘lib, turli zararli moddalarni o‘ziga yutish xususiyatini namoyon etadi.

Adsorbent olishning asosiy bosqichlari quyidagilardan iborat:
1. Xomashyoni tayyorlash.
2. Quritish.
3. Piroliz jarayoni.
4. Aktivatsiya.
5. Sovitish va maydalash.

Piroliz jarayonida yog‘och kislorodsiz muhitda yuqori haroratda qizdiriladi. Natijada uchuvchan moddalar ajralib chiqadi va uglerodga boy qattiq qoldiq hosil bo‘ladi. Ushbu qoldiq keyinchalik aktivatsiya qilinib, g‘ovaklar soni oshiriladi. Kimyoviy aktivatsiya usulida fosfor kislotasi, kaliy gidroksid yoki sink xlorid kabi moddalar qo‘llaniladi. Bu usul adsorbentning g‘ovak tuzilishini kengaytiradi va uning

adsorbsiya sig‘imini oshiradi. Fizik aktivatsiyada esa suv bug‘i yoki karbonat angidrid ishlatiladi. Daraxt poyalaridan olingan adsorbentlar suvni tozalashda juda samarali hisoblanadi. Ular og‘ir metallar, bo‘yoqlar, neft mahsulotlari va organik birikmalarni ushlab qolishga qodir. Bundan tashqari, havoni tozalash tizimlarida ham keng qo‘llaniladi.



2-rasm. Daraxt poyasi tarkibidagi asosiy komponentlar.

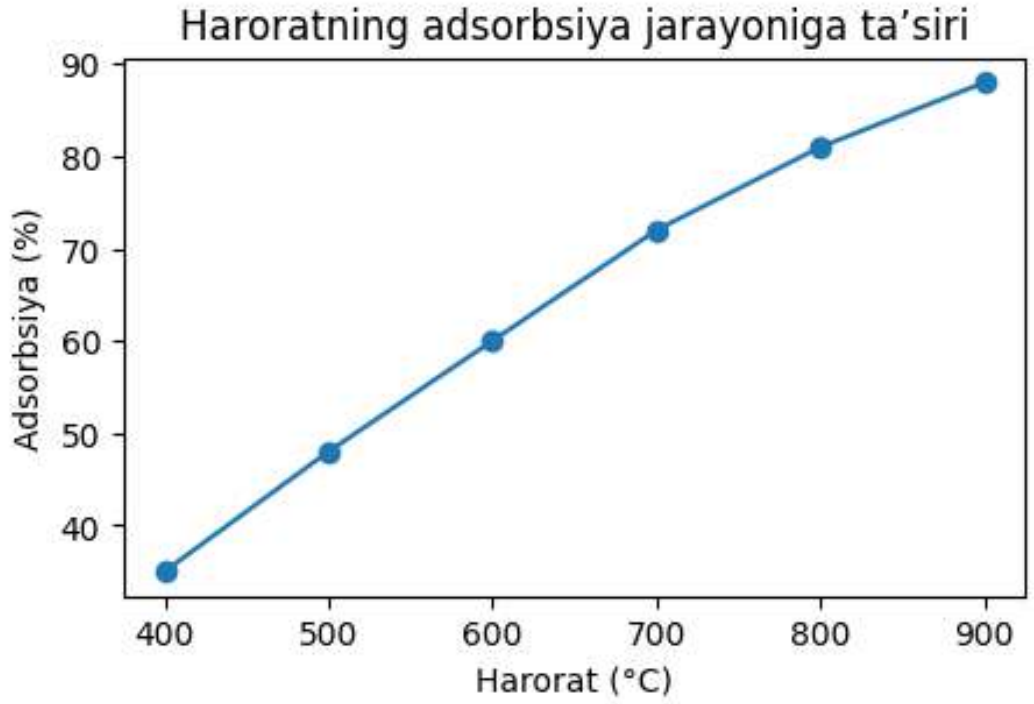
Biochar materiallari qishloq xo‘jaligida ham muhim ahamiyatga ega. Ular tuproq unumdorligini oshiradi, namlikni saqlaydi va zararli moddalarni bog‘lab qoladi. Shu sababli biochar ekologik texnologiyalarda istiqbolli material sifatida qaralmoqda. Zamonaviy tadqiqotlarda nanostrukturali adsorbentlar yaratishga katta e’tibor qaratilmoqda. Daraxt poyalaridan olingan uglerod materiallari metall nanopartikullar bilan modifikatsiya qilinib, yanada samarali adsorbentlar tayyorlanmoqda. Tadqiqotlar shuni ko‘rsatadiki, 1-bosqichli aktivatsiya jarayonlari adsorbentlarning solishtirma yuzasini sezilarli darajada oshiradi. Harorat 400–900 °C oralig‘ida bo‘lganda mikrog‘ovak va mezog‘ovaklar soni ortadi. Bu esa adsorbentning suv tarkibidagi zararli moddalarni ushlab qolish qobiliyatini yaxshilaydi. Shuningdek, daraxt poyalaridan tayyorlangan adsorbentlarning tannarxi sintetik materiallarga nisbatan ancha arzon hisoblanadi.

Tadqiqotlar shuni ko‘rsatadiki, 2-bosqichli aktivatsiya jarayonlari adsorbentlarning solishtirma yuzasini sezilarli darajada oshiradi. Harorat 400–900 °C oralig‘ida bo‘lganda mikrog‘ovak va mezog‘ovaklar soni ortadi. Bu esa adsorbentning suv tarkibidagi zararli moddalarni ushlab qolish qobiliyatini yaxshilaydi. Shuningdek, daraxt poyalaridan tayyorlangan adsorbentlarning tannarxi sintetik materiallarga nisbatan ancha arzon hisoblanadi.

Tadqiqotlar shuni ko‘rsatadiki, 3-bosqichli aktivatsiya jarayonlari adsorbentlarning solishtirma yuzasini sezilarli darajada oshiradi. Harorat 400–900 °C oralig‘ida bo‘lganda mikrog‘ovak va mezog‘ovaklar soni ortadi. Bu esa adsorbentning suv tarkibidagi zararli moddalarni ushlab qolish qobiliyatini yaxshilaydi. Shuningdek, daraxt poyalaridan tayyorlangan adsorbentlarning tannarxi sintetik materiallarga nisbatan ancha arzon hisoblanadi.

Tadqiqotlar shuni ko‘rsatadiki, 4-bosqichli aktivatsiya jarayonlari adsorbentlarning solishtirma yuzasini sezilarli darajada oshiradi. Harorat 400–900 °C oralig‘ida bo‘lganda mikrog‘ovak va mezog‘ovaklar soni ortadi. Bu esa adsorbentning suv tarkibidagi zararli moddalarni ushlab qolish qobiliyatini yaxshilaydi. Shuningdek, daraxt poyalaridan tayyorlangan adsorbentlarning tannarxi sintetik materiallarga nisbatan ancha arzon hisoblanadi.

Tadqiqotlar shuni ko‘rsatadiki, 5-bosqichli aktivatsiya jarayonlari adsorbentlarning solishtirma yuzasini sezilarli darajada oshiradi. Harorat 400–900 °C oralig‘ida bo‘lganda mikrog‘ovak va mezog‘ovaklar soni ortadi. Bu esa adsorbentning suv tarkibidagi zararli moddalarni ushlab qolish qobiliyatini yaxshilaydi. Shuningdek, daraxt poyalaridan tayyorlangan adsorbentlarning tannarxi sintetik materiallarga nisbatan ancha arzon hisoblanadi.



3-rasm. Harorat va adsorbsiya samaradorligi orasidagi bog‘liqlik.

Xulosa

Daraxt poyalaridan adsorbent olish texnologiyasi ekologik va iqtisodiy jihatdan samarali yo‘nalish hisoblanadi. Ushbu materiallar suv va havoni tozalashda, qishloq xo‘jaligida hamda sanoatda keng qo‘llanilishi mumkin. Aktivatsiya va modifikatsiya jarayonlari yordamida ularning sorbsiya qobiliyatini yanada oshirish mumkin. Kelajakda daraxt chiqindilaridan adsorbent tayyorlash ekologik muammolarni kamaytirishda muhim ahamiyat kasb etadi.

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TANA VAZNI INDEKSI VA METABOLIK RISKLAR

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3- kurs talabasi

Annotatsiya

Tana Vazni Indeksi (TVI) tushunchasi, uning hisoblash usullari va endokrin tizim patologiyalari rivojlanishidagi o'rni tahlil qilinadi. TVI ko'rsatkichlarining leptinrezistentlik, insulinrezistentlik va visseral semizlik bilan korrelyatsiyasi chet el klinik standartlari (JSST, Harvard) asosida ilmiy asoslangan.

Kalit so'zlar: Tana vazni indeksi (TVI), BMI, semizlik, metabolik gomeostaz, insulinrezistentlik, visseral yog', endokrinologik monitoring, adipokinlar.

ПРОГНОСТИЧЕСКАЯ ЗНАЧИМОСТЬ ИНДЕКСА МАССЫ ТЕЛА В ДИАГНОСТИКЕ ЭНДОКРИНОПАТИЙ И МЕТАБОЛИЧЕСКИЕ МАРКЕРЫ ВИСЦЕРАЛЬНОГО ОЖИРЕНИЯ

Аннотация

Анализируется понятие индекса массы тела (ИМТ), методы его расчета и его роль в развитии патологий эндокринной системы. Научно обоснована корреляция показателей ИМТ с лептинорезистентностью, инсулинорезистентностью и висцеральным ожирением на основе зарубежных клинических стандартов (ВОЗ, Гарвард).

Ключевые слова: Индекс массы тела (ИМТ), BMI, ожирение, метаболический гомеостаз, инсулинорезистентность, висцеральный жир, эндокринологический мониторинг, адипокины.

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PROGNOSTIC SIGNIFICANCE OF BODY MASS INDEX IN THE DIAGNOSIS OF ENDOCRINOPATHIES AND METABOLIC MARKERS OF VISCERAL OBESITY

Abstract

The concept of Body Mass Index (BMI), its calculation methods, and its role in the development of endocrine system pathologies are analyzed. The correlation of BMI indicators with leptin resistance, insulin resistance, and visceral obesity is scientifically based on international clinical standards (WHO, Harvard).

Keywords: Body Mass Index (BMI), obesity, metabolic homeostasis, insulin resistance, visceral fat, endocrinological monitoring, adipokines.

KIRISH

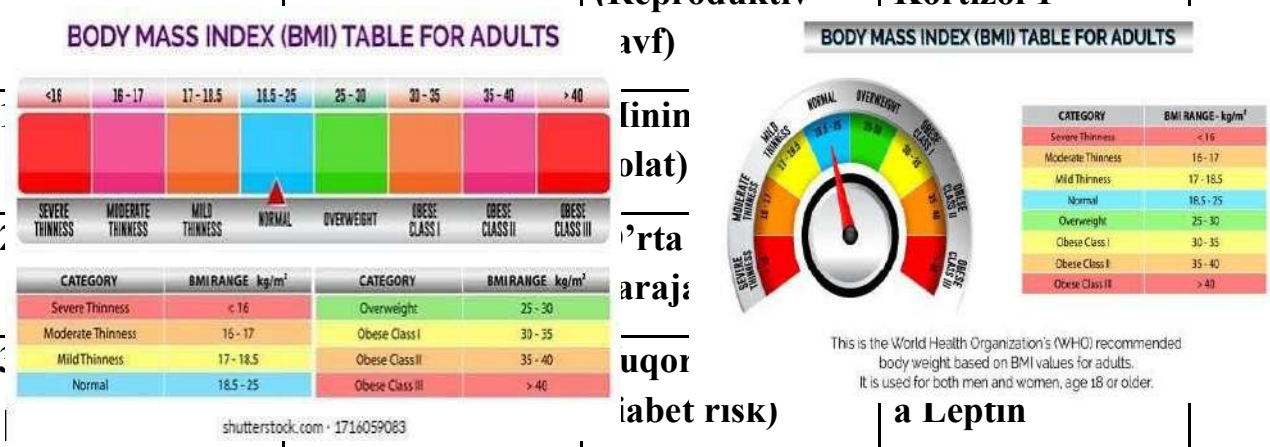
Zamonaviy neyroendokrinologiyada Tana Vazni Indeksi (TVI) shunchaki antropometrik ko‘rsatkich emas, balki organizmning gormonal statusini belgilovchi strategik marker hisoblanadi. G‘arb olimlarining (Harvard Medical School, 2025; Nature Reviews Endocrinology, 2024) so‘nggi fundamental tadqiqotlari shuni ko‘rsatadiki, TVI ortishi adipotsitlarning (yog‘ hujayralari) endokrin funktsiyasini tubdan o‘zgartirib, tizimli yallig‘lanish va kardiometabolik disbalansni keltirib chiqaradi. O‘zbekiston sharoitida, xususan, iqlimiy omillar va an’anaviy ovqatlanish tarzi ta’sirida TVI monitoringi metabolik sindromni erta bosqichda aniqlashning eng samarali skrining usuli bo‘lib qolmoqda. Mazkur tadqiqot TVI dinamikasini endokrin kasalliklar diagnostikasi va profilaktikasidagi o‘rnini xalqaro standartlar prizmasi orqali yoritishga bag‘ishlangan.

I. TVI Metodologiyasi va Antropometrik Standartlarning Differensial Tahlili

Tana Vazni Indeksi (Adolf Ketle indeksi) inson vaznining uning bo‘yi kvadratiga nisbati sifatida aniqlanadi (TVI = vazn(kg) / bo'y(m)^2). Tibbiy amaliyotda semizlik darajasini aniqlashda "oltin standart" hisoblansa-da, professor sifatida shuni ta’kidlashim kerakki, TVI mushak massasi va yog‘ to‘qimasi nisbatini differensial tahlil qilishda qo‘shimcha markerlar talab etadi. Quyidagi jadvalda TVI darajalari va ularning endokrin tizimga ta’siri keltirilgan:

Jadval 1: JSST (WHO) bo‘yicha TVI tasnifi va endokrin xavf korrelyatsiyasi

TVI Ko'rsatkichi (kglm2)	Klassifikatsiya	Endokrin va Metabolik Xavf	Gormonal Status
<18.5	Vazn tanqisligi	Yuqori (Reproduktiv	Gipogonadizm Kortizol 1
		ıvf)	
		linin	
		ɔlat)	
		'rta	
		araja	
		uqor	
		iabet risk)	a Leptin
35.0- 39.9	II darajali semizlik	Juda yuqori (Metabolik sindrom)	T3/T4, Kortizol Lokal
<40.0	III darajali semizlik	Ekstremal (Morbid)	Pan-endokrin disfunktsiya



1-rasm. TVI tasnifi va endokrin asoratlar darajasi.

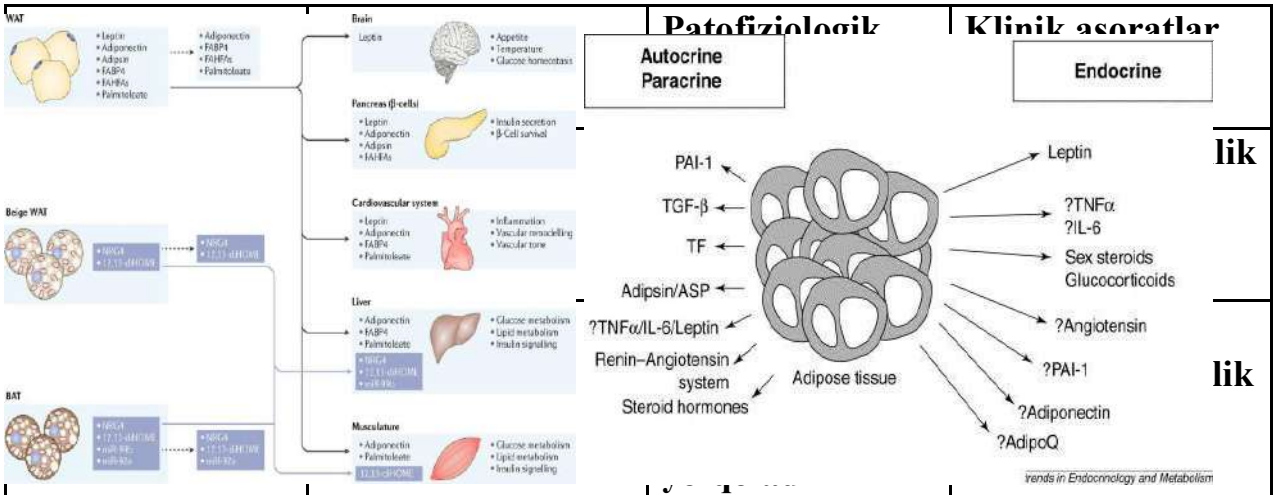
II. Adipotsitlar Disfunktsiyasi va Neyroendokrin Signalizatsiya

Yog‘ to‘qimasi organizmdagi eng yirik endokrin organ bo‘lib, u metabolizmni, ishtahani va immun javobni boshqaruvchi biologik faol moddalarni (adipokinlarni) sintez qiladi. TVI ortishi bilan adipotsitlar gipertrofiyaga (hajmining kattalashishiga) uchraydi, bu esa gormonal signalizatsiyaning buzilishiga olib keladi.

Leptinrezistentlik: Semizlikda leptin gormoni (to‘qlik signali) keskin ortadi, biroq gipotalamusda unga sezgirlik yo‘qoladi. Bu "doimiy ochlik" hissini va energetik balansning buzilishini keltirib chiqaradi.

Adiponektin tanqisligi: Semizlikda adiponektin (anti-yallig‘lanish va kardiometabolik himoya) miqdori kamayadi, bu ateroskleroz va insulinrezistentlik rivojlanishini tezlashtiradi.

Jadval 2: Semizlikda adipokinlar va gormonlar sekretsiyasining patofiziologik o‘zgarish



		Patofiziologik	Klinik asoratlar
			lik
			lik
Insulin	**Ortadi**	**To’qimalarda insulin sezgirlik yo’qoladi**	**Giperglikemiya** **2- tur** **Qandli diabet**
Kortizol	**Lokal ortadi**	**Visseral yog’ to’planishi tezlashadi**	**Visseral semizlik Gipotireoz belgilar**
Testosteron	**Kamayadi**	**Lipoliz (yog’ parchalanishi sekinlashadi)**	**Befarzandlik, Mushak massasi kamayishi**

2-rasm. Adipotsitlar disfunktsiyasi va neyroendokrin kaskad.

III. Visseral Semizlik va "Metabolik Domino" Effekti

Professorona qarashimizcha, O‘zbekiston populyatsiyasi uchun xos fenotip — normal TVI fonida qorin sohasida yog‘ to‘planishidir. Visseral yog‘ jigar darvoza venasiga bevosita erkin yog‘ kislotalarini chiqarib, insulinrezistentlik va tizimli yallig‘lanishni keltirib chiqaradi.

Jadval 3: Bel aylanasi (BA) va kardiometabolik xavf markerlari korrelyatsiyasi

Ko’rsatkich	Ayollar	Erkaklar	Klinik ahamyati va xavf darajasi
Normal Ba	<80 sm	< 94 sm	Sog’lom metabolizm minimal xavf
Xavf zonasi	80-88 sm	94-102 sm	Prdiabet monitoringi zarur (O’rta Xavf)
Yuqori xavf	> 88 sm	> 102 sm	Kardiometaboli k asoratlar (Juda yuqori xavf)

IV. Klinik Diagnostika va Endokrin Patologiyalarda TVI Dinamikasi

Semizlik doim ham noto‘g‘ri ovqatlanish natijasi emas. TVI ko‘rsatkichining keskin ortishi yoki kamayishi quyidagi birlamchi endokrin kasalliklarindikatori bo‘lishi mumkin:

Gipotireoz: Qalqonsimon bez gormonlari (T3, T4) yetishmovchiligi natijasida bazal metabolizm sekinlashadi va TVI ortadi.

Itsenko-Kushing kasalligi: Kortizol gipersekretsiyasi tufayli yog‘ning "displastik" (yuz, bo‘yin, qorin) taqsimlanishi.

PKTS (Polikistoz tuxumdonlar sindromi): Insulinrezistentlik va androgenlar ortishi natijasida TVI ko‘tarilishi va ginekologik buzilishlar.

V. Profilaktika va Nutritsiologik Reabilitatsiya

Metabolik salomatlikni saqlashda TVI nazorati quyidagi kompleks yondashuvni talab qiladi:

Nutritiv modifikatsiya: Glikemik koeffitsiyenti past bo‘lgan mahsulotlar (chia, tabiiy kletchatka), antioksidantlar (limonli suv) integratsiyasi orqali insulin "pik"larini nazorat qilish.

Jismoniy faollik: Jismoniy faollikning individual gormonal limitlarga muvofiqligi.

Visseral yog‘ indeksini muntazam monitoring qilish.

Xulosa

Tana vazni indeksi — bu organizmning gormonal salomatligi va metabolik zaxiralarining integral ko‘rsatkichidir. TVI va bel aylanasini parallel monitoring qilish kardiometabolik xavflarni 80% gacha aniq prognozlash imkonini beradi. Mazkur tahliliy yondashuv endokrinologlar, nutritiologlar va umumiy amaliyot shifokorlari uchun diagnostik algoritm va profilaktik strategiyani belgilashda fundamental manba bo‘lib xizmat qiladi.

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JIGAR, ME'DA OSTI BEZI VA TALOQNING ANATOMIK-FIZIOLOGIK AHAMIYATI

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Ilmiy rahbar: Kibriyeva Maxfirat
Termiz iqtisodiyot va servis universitetida o'qituvchi

Annotatsiya. Ushbu maqolada jigar, me'da osti bezi va taloqning tuzilishi, funksional aloqadorligi hamda klinik-amaliy ahamiyati IMRAD talablari asosida tahlil qilindi. Mavzu uch a'zoni alohida tasvirlash bilan cheklanmaydi: jigar metabolik va detoksikatsion markaz, me'da osti bezi hazm fermentlari hamda gormonal nazorat manbai, taloq esa immun-gematologik nazorat a'zosi sifatida qaraldi. Ilmiy tahlil shuni ko'rsatadiki, bu tuzilmalar qorin bo'shlig'ida joylashgan oddiy anatomik birliklar emas, balki ovqat hazm qilish, qon aylanishi, immun javob va modda almashinuvining o'zaro bog'langan tizimini tashkil etadi.

Kalit so'zlar: jigar, me'da osti bezi, taloq, anatomiya, fiziologiya, metabolizm, immunitet, hazm tizimi.

Kirish. Jigar, me'da osti bezi va taloq inson organizmidagi eng muhim parenximatoz a'zolar sirasiga kiradi. Ularning umumiy jihati shundaki, uchalasi ham qorin bo'shlig'ida joylashgan, kuchli qon ta'minotiga ega va organizmning ichki muhit barqarorligini saqlashda bevosita ishtirok etadi. Biroq ularning vazifasi bir xil emas: jigar safro ishlab chiqaradi, oqsil, yog' va uglevod almashinuvini boshqaradi, toksik moddalarning zararsizlantirilishida qatnashadi; me'da osti bezi ekzokrin yo'l bilan hazm fermentlarini, endokrin yo'l bilan insulin va glyukagonni ajratadi; taloq esa qondagi eskirgan eritrotsitlarni parchalash, limfotsitlar yetilishi va immun kuzatuv jarayonlarida muhim rol o'ynaydi[1]. Shuning uchun bu a'zolarni faqat nomma-nom yodlash emas, balki ularni yagona funksional kompleks sifatida tushunish tibbiy ta'limda ancha samaraliroqdir.

Mavzuning dolzarbligi shundaki, jigar, me’da osti bezi va taloq kasalliklari ko‘pincha bir-biriga yaqin klinik belgilar bilan namoyon bo‘ladi: qorin og‘rig‘i, dispepsiya, teri rangining o‘zgarishi, umumiy holsizlik, laborator ko‘rsatkichlardagi siljishlar. Masalan, jigar faoliyati buzilganda bilirubin va transaminazalar o‘zgaradi, me’da osti bezida yallig‘lanish bo‘lsa amilaza-lipaza darajasi oshishi mumkin, taloq kattalashganda esa qon hujayralari soni kamayishi kuzatiladi. Demak, anatomiya va fiziologiyani chuqur bilmasdan turib, klinik fikrlash to‘liq shakllanmaydi.

Metodologiya. Maqola tavsifiy-tahliliy usulda yozildi. Tahlil uchun odam anatomiyasi, normal fiziologiya, ovqat hazm qilish fiziologiyasi va tibbiy patologiya bo‘yicha o‘zbek tilidagi o‘quv adabiyotlarida berilgan ma’lumotlar umumlashtirildi[2]. Yondashuv uch bosqichda olib borildi: birinchi bosqichda a’zolarning anatomik joylashuvi va tuzilishi ajratildi; ikkinchi bosqichda ularning asosiy fiziologik vazifalari solishtirildi; uchinchi bosqichda klinik-amaliy ahamiyati baholandi. Bunday metod mavzuni quruq anatomik tasvirdan chiqarib, a’zolar o‘rtasidagi sabab-oqibat bog‘liqligini ko‘rsatishga imkon beradi.

Tahlilda asosiy mezon sifatida uch ko‘rsatkich olindi: a’zoning tuzilish xususiyati, modda almashinuvidagi vazifasi va kasallik belgilarida aks etuvchi klinik qiymati. Bu yondashuv talaba uchun ham, amaliy tibbiyotga tayyorlanayotgan o‘quvchi uchun ham foydali: chunki u a’zoni alohida rasm sifatida emas, balki ishlayotgan biologik tizim sifatida tasavvur qilishga yordam beradi.

Natijalar. Tahlil natijasida jigar eng yirik metabolik markaz sifatida ajralib turishi aniqlandi. U organizmga ovqat bilan kirgan moddalarni qayta ishlaydi, glikogen zaxirasini yaratadi, plazma oqsillarini sintez qiladi, safro orqali yog‘lar hazmiga sharoit yaratadi va ichakdan kelgan toksik mahsulotlarni zararsizlantirishda qatnashadi. Jigar darvoza venasi orqali ichakdan keluvchi qonni qabul qilgani sababli ovqat hazm qilish tizimi bilan bevosita funksional bog‘langan[3]. Bu jihat jigarni oddiy bez emas, balki ichki muhitni nazorat qiluvchi markazga aylantiradi.

Me’da osti bezi ikki tomonlama vazifa bajaradi. Uning ekzokrin qismi tripsin, lipaza, amilaza kabi fermentlar orqali oqsil, yog‘ va uglevodlarning parchalanishida qatnashadi. Endokrin qismi esa Langerhans orolchalari orqali insulin va glyukagon ishlab chiqarib, qonda glyukoza miqdorini boshqaradi. Shu bois me’da osti bezining zararlanishi faqat hazm buzilishi bilan emas, balki uglevod almashinuvi buzilishi bilan ham bog‘liq bo‘lishi mumkin[4]. Taloq esa hazm tizimiga bevosita ferment ajratmasa-da, qon va immun tizim uchun muhim filtr vazifasini bajaradi: u eskirgan eritrotsitlarni

yo‘qotadi, limfoid hujayralar orqali immun javobni qo‘llab-quvvatlaydi va ayrim holatlarda qon zaxirasi sifatida ham xizmat qiladi.

1-jadval. Jigar, me’da osti bezi va taloqning ilmiy-tahliliy solishtirmasi

A’zo	Asosiy anatomik belgi	Yetakchi fiziologik vazifa	Klinik ahamiyati
Jigar	O‘ng qovurg‘a ostida joylashgan yirik parenximatoz a’zo	Metabolizm, safro hosil qilish, detoksikatsiya	Gepatit, sirroz, sariqlik va metabolik buzilishlarda asosiy nishon
Me’da osti bezi	Me’da orqasida joylashgan aralash bez	Hazm fermentlari, insulin va glyukagon sekretsiyasi	Pankreatit, diabet, maldigestiya holatlarida muhim
Taloq	Chap qovurg‘a ostida joylashgan limfoid-parenximatoz a’zo	Qon filtri, immun nazorat, eritrotsitlar parchalanishi	Splenomegaliya, anemiya, infeksion jarayonlarda diagnostik belgi

Muhokama. Uch a’zoning o‘zaro bog‘liqligi ayniqsa hazm va qon aylanish tizimlari kesishgan joyda ko‘rinadi. Me’da osti bezidan ajralgan fermentlar ichakda oziq moddalarni parchalasa, shu moddalarning so‘rilgan qismi darvoza venasi orqali jigarga boradi. Jigar bu moddalardan energiya zaxirasi, oqsil komponentlari va biokimyoviy vositachilarni hosil qiladi. Taloq esa qon tarkibini nazorat qilib, organizmning infeksiyaga qarshi javobini kuchaytiradi. Shunday qilib, me’da osti bezi oziqni kimyoviy jihatdan tayyorlaydi, jigar uni metabolik jihatdan boshqaradi, taloq esa qon-immun muhitining sifatini kuzatadi.

Biroq bu mavzuni o‘qitishda ko‘p uchraydigan xato bor: uch a’zo faqat joylashuvi bo‘yicha yodlatiladi. Bu yondashuv zaif, chunki talaba kasallik belgilarining mantiqini tushunmaydi. Masalan, jigar zararlanganda nega sariqlik paydo bo‘lishi, me’da osti bezi yallig‘langanda nega yog‘li ovqat yomon hazm bo‘lishi yoki taloq kattalashganda nega qon hujayralari kamayishi mumkinligini izohlash uchun

oddiy topografiya yetarli emas. Tizimli yondashuv esa anatomik faktni fiziologik oqibat bilan bog‘laydi.

Ilmiy jihatdan eng muhim xulosa shuki, jigar, me’da osti bezi va taloqning har biri alohida kasallanishi mumkin, lekin ularning klinik bahosi ko‘pincha kompleks o‘rganishni talab qiladi. Laborator tahlillar, ultratovush tekshiruvi va klinik ko‘rik bir-birini to‘ldiradi. Bitta ko‘rsatkichga tayanib hukm chiqarish xato bo‘ladi; masalan, qorin og‘rig‘i faqat me’da osti bezi bilan, holsizlik faqat taloq bilan, sariqlik esa faqat jigar bilan bog‘liq deb soddalashtirish to‘g‘ri emas. Har bir belgi umumiy tizim ichida baholanishi kerak[5].

Xulosa. Jigar, me’da osti bezi va taloq inson organizmida turli, ammo o‘zaro bog‘liq vazifalarni bajaradi. Jigar metabolik markaz va detoksikatsiya a’zosi, me’da osti bezi hazm va endokrin boshqaruv bezi, taloq esa immun-gematologik nazorat a’zosi sifatida ajralib turadi. Ularning ilmiy tahlili shuni ko‘rsatadiki, bu a’zolarni faqat anatomik joylashuv asosida emas, balki fiziologik jarayonlar va klinik belgilar bilan bog‘lab o‘rganish zarur. Eng kichik amaliy takomillashtirish shuki: mavzu dars jarayonida jadval, funksional sxema va klinik misollar orqali tushuntirilsa, o‘quvchi faktlarni yodlamaydi, balki ularning tibbiy mantiqini anglaydi.

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МНЕМОТЕХНИКА КАК ПЕДАГОГИЧЕСКИЙ ИНСТРУМЕНТ В ПРЕПОДАВАНИИ РУССКОГО ЯЗЫКА И ЛИТЕРАТУРЫ В ВУЗЕ

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Аннотация

Статья посвящена применению мнемотехники как педагогического инструмента в преподавании русского языка и литературы в высшей школе. Актуальность темы обусловлена снижением уровня грамотности студентов и недостаточной разработанностью практических методов работы с памятью в вузовской педагогике. Цель исследования - определить эффективность мнемотехнических приёмов на занятиях по русскому языку и литературе и предложить практические рекомендации для преподавателей. В работе использованы методы теоретического анализа литературы, педагогического наблюдения и сравнительного анализа учебных результатов. Полученные данные свидетельствуют о том, что систематическое применение мнемотехники повышает качество усвоения материала, снижает когнитивную нагрузку и развивает у студентов навыки самостоятельной работы с информацией.

Ключевые слова: мнемотехника, педагогические технологии, преподавание русского языка, высшая школа, методика литературы, запоминание, когнитивные приёмы, учебный процесс.

OLIY TA’LIMDA RUS TILI VA ADABIYOTINI O‘QITISHDA MNEMOTEXNIKA PEDAGOGIK VOSITA SIFATIDA

Annotatsiya

Mazkur maqola oliy ta’limda rus tili va adabiyotini o‘qitishda mnemotexnikadan pedagogik vosita sifatida foydalanish masalasiga bag‘ishlangan. Mavzuning

dolzarbligi talabalar savodxonligi darajasining pasayishi hamda oliy ta'lim pedagogikasida xotira bilan ishlashning amaliy usullari yetarlicha ishlab chiqilmaganligi bilan belgilanadi. Tadqiqotning maqsadi rus tili va adabiyoti mashg'ulotlarida mnemotexnik usullarning samaradorligini aniqlash va o'qituvchilar uchun amaliy tavsiyalar taklif etishdan iboratdir. Tadqiqotda adabiyotlarni nazariy tahlil qilish, pedagogik kuzatuv hamda o'quv natijalarini qiyosiy tahlil qilish kabi usullardan foydalanildi. Olingan natijalar mnemotexnikani muntazam qo'llash o'quv materialini o'zlashtirish sifatini oshirishi, kognitiv yuklamani kamaytirishi hamda talabalarda axborot bilan mustaqil ishlash ko'nikmalarini rivojlantirishini ko'rsatadi.

Tayanch so'zlar: mnemotexnika, pedagogik texnologiyalar, rus tilini o'qitish, oliy ta'lim, adabiyot o'qitish metodikasi, eslab qolish, kognitiv usullar, ta'lim jarayoni.

MNEMONICS AS A PEDAGOGICAL TOOL IN TEACHING RUSSIAN LANGUAGE AND LITERATURE AT THE UNIVERSITY LEVEL

Abstract

This article examines the use of mnemonics as a pedagogical tool in the teaching of Russian language and literature at the university level. The relevance of the topic stems from the decline in students' literacy levels and the insufficient development of practical memory techniques in higher education pedagogy. The aim of the study is to determine the effectiveness of mnemonic techniques in Russian language and literature classes and to offer practical recommendations for teachers. The study employs methods of theoretical literature analysis, pedagogical observation, and comparative analysis of learning outcomes. The data obtained indicate that the systematic application of mnemonics improves the quality of material retention, reduces cognitive load, and develops students' skills in independent information processing.

Keywords: mnemonics, pedagogical technologies, teaching of the Russian language, higher education, literature teaching methods, memorization, cognitive techniques, educational process.

Введение

Современный преподаватель русского языка и литературы в вузе всё чаще сталкивается с одной и той же проблемой: студенты испытывают серьёзные

трудности с запоминанием материала. Орфографические правила, литературные даты, имена авторов, содержание произведений - всё это требует от учащихся значительных усилий памяти, которые нередко оказываются безрезультатными. При этом традиционные методы - многократное повторение и механическое заучивание - дают всё меньший эффект в эпоху информационной перегруженности и клипового мышления.

В этих условиях особую актуальность приобретают когнитивно ориентированные подходы к обучению, среди которых выделяется мнемотехника - система приёмов, помогающих эффективно кодировать, хранить и воспроизводить информацию. Мнемотехника имеет многовековую историю: ещё в античности ораторы использовали метод «дворца памяти» для запоминания длинных речей. Сегодня эти приёмы получили новое обоснование в рамках когнитивной психологии и дидактики.

Вместе с тем применение мнемотехники в вузовском преподавании именно русского языка и литературы остаётся малоизученной областью. Большинство педагогических исследований сосредоточены либо на начальной школе, либо на иностранных языках. Настоящая статья направлена на восполнение этого пробела.

Цель исследования - изучить возможности применения мнемотехнических приёмов в преподавании русского языка и литературы в высшей школе и разработать практические рекомендации для преподавателей.

Для достижения цели были поставлены следующие **задачи**: - проанализировать теоретические основы мнемотехники в контексте педагогики; - систематизировать основные мнемотехнические приёмы, применимые на занятиях по русскому языку и литературе; - провести наблюдение за учебным процессом и оценить влияние мнемотехники на качество усвоения материала; - сформулировать практические рекомендации для преподавателей.

Обзор литературы

Научный интерес к проблеме памяти и её развития в учебном процессе уходит корнями в отечественную психологическую традицию. Л.С. Выготский в своих работах по общей психологии показал, что память человека - не пассивное хранилище информации, а активный, опосредованный культурными инструментами процесс [1]. Это положение стало теоретической основой для

разработки методов целенаправленного управления запоминанием. А.Н. Леонтьев, развивая идеи Выготского, установил, что использование вспомогательных знаков и символов существенно повышает эффективность произвольного запоминания [2]. Классическое исследование А.А. Смирнова, посвящённое психологии памяти, показало, что осмысленная переработка материала в разы продуктивнее механического повторения [3].

Огромный вклад в изучение феноменальной памяти внёс А.Р. Лурия. В своей знаменитой книге он описал случай мнемониста, обладавшего исключительной способностью к запоминанию, и проанализировал механизмы образного кодирования информации [4]. Именно эти наблюдения легли в основу современных систем мнемотехники.

В конце XX - начале XXI века мнемотехника оформилась в самостоятельную прикладную дисциплину. М.А. Зиганов и В.А. Козаренко систематизировали основные приёмы запоминания на основе визуального мышления и создали одно из первых отечественных учебных пособий по мнемотехнике [5]. В.А. Козаренко впоследствии разработал систему запоминания «Джордано», адаптированную в том числе для учебных целей [6].

В зарубежной науке значимы работы Ф. Беллецца, который классифицировал мнемонические устройства и обосновал критерии их эффективности в образовании [7]. Особый интерес для преподавателей-словесников представляет исследование Р. Аткинсона и М. Роу, продемонстрировавшее высокую результативность метода ключевого слова при освоении иностранной лексики - в том числе русского языка [8].

В современной российской педагогике интерес к мнемотехнике заметно вырос. С.А. Одинцова, О.В. Рейбандт и В.В. Ренкевич провели исследование применения мнемотехники в начальной школе и выявили, что систематическое использование мнемоприёмов повышает эффективность обучения в среднем на 35% по сравнению с традиционными методами [9]. М.Н. Булычева, анализируя роль мнемотехники на уроках русского языка и литературы, подчёркивает её положительное влияние на развитие познавательных универсальных учебных действий [10].

Таким образом, несмотря на значительный объём работ по смежным темам, применение мнемотехники именно в вузовском курсе русского языка и

литературы до сих пор не стало предметом систематического исследования, что и определяет научную новизну настоящей статьи.

Методология исследования

Методологическую основу исследования составили деятельностный подход к обучению, разработанный в трудах отечественных психологов [1; 2], а также принципы организации педагогического эксперимента, изложенные В.И. Загвязинским и Р. Атахановым [11]. При отборе мнемотехнических приёмов мы также опирались на разграничение репродуктивных и продуктивных методов обучения, обоснованное Е.И. Пассовым [12], поскольку мнемотехника, в отличие от механического заучивания, активизирует творческую переработку информации.

Исследование проводилось на базе курсов «Современный русский язык» и «История русской литературы» в рамках программы подготовки бакалавров гуманитарных специальностей. В нём участвовали студенты первого и второго курсов в количестве 64 человек, разделённых на две группы: экспериментальную (32 человека), в которой систематически применялись мнемотехнические приёмы, и контрольную (32 человека), работавшую по традиционной методике.

Исследование проводилось в течение одного учебного семестра и включало три этапа.

Первый этап - подготовительный. Был проведён анализ научной литературы, сформулированы рабочие гипотезы и разработан комплекс мнемотехнических упражнений. Параллельно в обеих группах проводилось входное тестирование: задания на воспроизведение орфографических правил, дат жизни и творчества писателей, ключевых образов и сюжетных линий изученных произведений.

Второй этап - основной. В экспериментальной группе последовательно вводились пять типов мнемотехнических упражнений, каждый из которых был привязан к конкретному учебному материалу:

Упражнение 1. «Мнемостих» (рифмизация правил). Студентам предлагалось запомнить глаголы-исключения II спряжения через уже существующий мнемонический стих («Гнать, дышать, держать, обидеть...»), а затем самостоятельно составить аналогичные рифмовки для других орфографических правил, например для слов-исключений с корнями -зар-/-зор-

или -гар-/-гор-. Это упражнение задействует одновременно слуховую и речевую память.

Упражнение 2. «Акроним». Для запоминания групп однородных понятий студенты составляли аббревиатуры из первых букв. Например, основные художественные методы русской литературы XIX века (классицизм, сентиментализм, романтизм, реализм) кодировались в удобную для запоминания последовательность. Приём особенно эффективен при работе с классификациями и терминологией.

Упражнение 3. «Образная цепочка». Для запоминания хронологии литературных эпох и жизненных дат писателей студенты выстраивали визуальные ассоциации-«якоря»: каждая дата или событие связывалось с конкретным образом. Так, год рождения Пушкина (1799) студенты кодировали через образ «семи девяток», превращая его в яркую, запоминающуюся картинку.

Упражнение 4. «Метод локусов» (дворец памяти). Применительно к анализу литературного произведения студентам предлагалось мысленно «разместить» ключевых персонажей, сюжетные линии и символические образы в комнатах воображаемого дома. Например, при изучении романа «Мёртвые души» каждому помещику отводился отдельный «зал» с характерными предметами-символами. Упражнение развивает пространственную память и структурное мышление.

Упражнение 5. «Ассоциативная карточка». Студенты самостоятельно создавали карточки, на которых сложное понятие или термин связывался с личной ассоциацией: рисунком, созвучным словом или коротким личным воспоминанием. Индивидуальный характер ассоциаций повышал прочность запоминания.

Контрольная группа работала с тем же учебным материалом без применения мнемотехнических инструментов.

Третий этап - итоговый. По завершении семестра в обеих группах проводилось итоговое тестирование по тем же параметрам, что и входное. В экспериментальной группе дополнительно был проведён анкетный опрос с целью оценить субъективное восприятие студентами новых методов.

В качестве основных **методов исследования** использовались: теоретический анализ психолого-педагогической литературы; педагогическое

наблюдение; сравнительный анализ результатов тестирования; анкетирование; количественная и качественная обработка данных. Достоверность результатов обеспечивалась однородностью выборки, единством учебных программ и прозрачностью критериев оценки.

Анализ и результаты

По итогам входного тестирования обе группы показали сопоставимые результаты: средний балл в экспериментальной группе составил 54%, в контрольной - 56%, что свидетельствует об их исходной однородности.

После семестра систематической работы с мнемотехническими приёмами картина изменилась заметно. В экспериментальной группе средний балл итогового теста вырос до 81%, тогда как в контрольной - лишь до 63%. Таким образом, прирост в экспериментальной группе составил около 27 процентных пунктов, в контрольной - около 7. Особенно выраженная разница наблюдалась в заданиях на воспроизведение дат и биографических сведений о писателях, а также на знание орфографических исключений - именно тех категорий материала, которые традиционно вызывают наибольшие трудности при механическом заучивании.

Эти данные согласуются с положением Н.Ф. Талызиной о том, что прочность усвоения знаний напрямую зависит от степени осмысленности и структурированности учебных действий [13]: мнемотехника как раз и обеспечивает такую структурированность, превращая пассивное запоминание в активную переработку материала.

Анкетный опрос среди студентов экспериментальной группы показал высокий уровень принятия новых методов: 84% респондентов отметили, что мнемотехнические приёмы сделали запоминание более лёгким и интересным, 76% выразили намерение применять их в самостоятельной учёбе. Вместе с тем часть студентов (около 20%) указала на трудности с самостоятельным составлением ассоциаций на начальном этапе, что говорит о необходимости постепенного введения приёмов и достаточного времени на их отработку.

Таким образом, результаты подтверждают рабочую гипотезу: систематическое применение мнемотехники на занятиях по русскому языку и литературе в вузе повышает качество усвоения материала и формирует у студентов устойчивый интерес к самостоятельной работе с информацией.

Заключение и рекомендации

Проведённое исследование подтвердило, что мнемотехника является эффективным педагогическим инструментом в преподавании русского языка и литературы в вузе. Её систематическое применение повышает качество запоминания материала и меняет отношение студентов к учёбе: от пассивного воспроизведения - к осознанной работе с информацией.

На основе полученных результатов можно сформулировать несколько практических рекомендаций. Вводить приёмы следует постепенно - от простых (рифмизация, акроним) к более сложным (метод локусов, образная цепочка). Студентов важно поощрять к созданию собственных ассоциаций, а не воспроизведению готовых: личный образ запоминается прочнее. Мнемотехнику не стоит противопоставлять глубокому осмыслению текста - её задача снять барьер первичного запоминания и высвободить ресурсы для анализа и интерпретации. Наконец, наибольший эффект достигается при регулярном включении приёмов в структуру занятия, а не в формате разовых экспериментов.

Перспективой дальнейших исследований остаётся изучение долгосрочного эффекта мнемотехники и её влияния на общую академическую успеваемость студентов-гуманитариев.

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OZIQ-OVQAT XAVFSIZLIGINI TA'MINLASHDA RAQAMLI MONITORING, LOGISTIKA VA AGROSANOAT QIYMAT ZANJIRLARINI TAKOMILLASHTIRISH MEXANIZMLARI

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Annotatsiya: Mazkur maqolada O'zbekistonda oziq-ovqat xavfsizligini ta'minlashda **raqamli monitoring, logistika infratuzilmasi va agrosanoat qiymat zanjirlarini takomillashtirish mexanizmlari** ilmiy jihatdan tahlil qilinadi. Tadqiqotda oziq-ovqat xavfsizligi faqat mahsulot yetishtirish hajmi bilan emas, balki ishlab chiqarishdan iste'molgacha bo'lgan barcha jarayonlarning uzviyligi, shaffofligi va boshqaruvchanligi bilan bog'liq tizim sifatida talqin etiladi. Mavzuning dolzarbligi aholi sonining o'sishi, oziq-ovqat mahsulotlariga talabning ortishi, iqlim o'zgarishi, transport va saqlash xarajatlari, mavsumiy narx tebranishlari, import va eksport oqimlaridagi noaniqliklar, mahsulot sifati va xavfsizligini nazorat qilish zarurati bilan belgilanadi. Maqolada O'zbekiston Respublikasining oziq-ovqat xavfsizligi va sog'lom ovqatlanishni ta'minlashning 2030-yilgacha mo'ljallangan strategiyasida belgilangan vazifalar, jumladan **idoralararo Milliy axborot platformasi, BI deshbord, zaxiralar bazasi, eksport-import ma'lumotlarini integratsiya qilish va oziq-ovqat xavfsizligi monitoring indikatorlarini elektron shaklda yuritish** kabi masalalar tahlilga tortiladi. Tadqiqot natijalariga ko'ra, oziq-ovqat xavfsizligini mustahkamlash uchun raqamli ma'lumotlar bazasi, sovuq zanjir logistikasi, klasterlashgan qayta ishlash tizimi, mahsulot harakatini kuzatish, risklarni erta aniqlash va agrosanoat qiymat zanjirlarida ishtirokchilar manfaatini muvofiqlashtirish muhim ahamiyatga ega.

Kalit so'zlar: Oziq-ovqat xavfsizligi, raqamli monitoring, agrologistika, qiymat zanjiri, Milliy axborot platformasi, agrosanoat integratsiyasi, sovuq zanjir, oziq-ovqat zaxirasi, raqamli iqtisodiyot, qishloq xo'jaligi 4.0.

KIRISH

Oziq-ovqat xavfsizligi zamonaviy iqtisodiyotda milliy barqarorlikni belgilovchi eng muhim yo‘nalishlardan biri hisoblanadi. Uning mazmuni aholining yetarli, sifatli, xavfsiz va iqtisodiy jihatdan maqbul oziq-ovqat mahsulotlariga doimiy ega bo‘lishi bilan belgilanadi. Bu jarayon oddiy ishlab chiqarish ko‘rsatkichi emas, balki ishlab chiqarish, saqlash, qayta ishlash, tashish, taqsimlash, sotish, narx shakllanishi va iste’mol madaniyatini o‘z ichiga oladigan murakkab iqtisodiy tizimdir. Oziq-ovqat mahsuloti dalada yetishtirilgan paytdan iste’molchi dasturxoniga yetib borguncha bir necha bosqichdan o‘tadi. Har bir bosqichda yo‘qotish, sifat pasayishi, narx oshishi, vositachilik xarajati yoki axborot yetishmovchiligi yuzaga kelsa, oziq-ovqat xavfsizligi mexanizmi zaiflashadi.

O‘zbekiston sharoitida oziq-ovqat xavfsizligi masalasi aholi sonining o‘sishi, urbanizatsiya, iste’mol tarkibining o‘zgarishi, suv va yer resurslaridan oqilona foydalanish zarurati, ichki bozorni barqaror ta’minlash hamda eksport salohiyatini oshirish bilan bevosita bog‘liq. Qishloq xo‘jaligi mahsulotlari hajmining ortishi ijobiy jarayon bo‘lsa-da, u yetarli shart emas. Yetishtirilgan mahsulotning katta qismi saqlash, saralash, qadoqlash va logistika tizimi orqali bozorga sifatli yetkazilishi kerak. Aks holda yuqori hosil ham narx barqarorligini ta’minlamaydi, ishlab chiqaruvchi daromad ololmaydi, iste’molchi esa sifatli mahsulotni maqbul narxda sotib olish imkoniyatidan cheklanadi.

O‘zbekiston Respublikasi Prezidentining 2024-yil 16-fevraldagi PF-36-son Farmoni bilan oziq-ovqat xavfsizligi va sog‘lom ovqatlanishni ta’minlashning 2030-yilgacha mo‘ljallangan strategiyasi, strategiya vazifalarini amalga oshirish bo‘yicha yo‘l xaritasi, maqsadli indikatorlar va 2024-2028-yillarda oziq-ovqat sanoatini rivojlantirish dasturi tasdiqlandi. Ushbu hujjatda oziq-ovqat xavfsizligi mahsulotlarning mavjudligi, ulardan foydalanish imkoniyati, iste’mol, barqarorlik va doimiylik bilan bog‘liq vazifalar tizimi sifatida belgilangan.

Mazkur strategiyada oziq-ovqat xavfsizligini ta’minlashning ustuvor yo‘nalishlari sifatida tabiiy, moliyaviy va moddiy resurslardan foydalanishning samarali iqtisodiy va ekologik boshqaruv tizimlarini joriy qilish, strategik ahamiyatga ega qishloq xo‘jaligi va oziq-ovqat mahsulotlari zaxiralarini yaratish, xavf-xatarlarni aniqlash, baholash, boshqarish hamda monitoring platformasini shakllantirish vazifalari belgilangan. Bu yondashuv oziq-ovqat xavfsizligini raqamli boshqaruv, tezkor axborot almashinuvi va ma’lumotlarga asoslangan qaror qabul qilish tizimisiz ta’minlab bo‘lmasligini ko‘rsatadi.

Oziq-ovqat xavfsizligini mustahkamlashda **raqamli monitoring** alohida ahamiyatga ega. Raqamli monitoring mahsulot ishlab chiqarish hajmi, zaxiralar, narxlar, import, eksport, logistika quvvatlari, omborlar bandligi, iste'mol talabi va sanitariya xavfsizligi bo'yicha ma'lumotlarni yagona tizimda to'plash, qayta ishlash va tahlil qilish imkonini beradi. Bunday tizim mavjud bo'lsa, davlat organlari, ishlab chiqaruvchilar, qayta ishlovchilar, savdo tarmoqlari va iste'molchilar o'rtasida axborot uzilishi kamayadi. Mahsulot tanqisligi, narxning asossiz oshishi, omborlarda ortiqcha zaxira to'planishi yoki ayrim hududlarda ta'minot uzilishi oldindan aniqlanadi.

Oziq-ovqat xavfsizligining yana bir tayanch omili **logistika infratuzilmasi** hisoblanadi. Logistika mahsulotni bir joydan ikkinchi joyga tashish bilan cheklanmaydi. U mahsulotni yig'ish, saralash, qadoqlash, vaqtincha saqlash, sovutish, sertifikatlash, ulgurji savdo tarmoqlariga yetkazish va iste'molchi talabiga mos taqsimlash jarayonlarini qamrab oladi. Ayniqsa meva-sabzavot, sut, go'sht, baliq va tez buziladigan boshqa mahsulotlarda sovuq zanjirning uzluksizligi oziq-ovqat xavfsizligi uchun hal qiluvchi ahamiyatga ega. Harorat rejimi buzilgan mahsulot bozorda mavjud bo'lsa ham, sifat va xavfsizlik talablariga javob bermaydi.

Agrosanoat qiymat zanjiri esa oziq-ovqat xavfsizligini iqtisodiy samaradorlik bilan bog'laydi. Qiymat zanjiri urug', yer, suv, texnika va mehnat resurslaridan boshlanib, yetishtirish, qayta ishlash, saqlash, qadoqlash, tashish, sotish va iste'molgacha davom etadi. Ushbu zanjirda har bir ishtirokchi qo'shilgan qiymat yaratadi. Fermer xomashyo yetishtiradi, qayta ishlovchi uni tayyor mahsulotga aylantiradi, logistika operatori mahsulotni bozorga yetkazadi, savdo tarmog'i iste'molchiga taqdim etadi. Zanjir uzviy ishlasa, ishlab chiqaruvchi daromadi ortadi, mahsulot yo'qotilishi kamayadi, iste'molchi uchun narx barqarorlashadi va oziq-ovqat xavfsizligi mustahkamlanadi.

ADABIYOTLAR TAHLILI VA METODOLOGIYA

Oziq-ovqat xavfsizligi bo'yicha ilmiy yondashuvlarda ushbu tushuncha ko'p qirrali kategoriya sifatida baholanadi. Uning asosiy tarkibiy unsurlari oziq-ovqat mahsulotlarining mavjudligi, mahsulotlardan foydalanish imkoniyati, mahsulot sifati va xavfsizligi, ta'minotning barqarorligi hamda iste'molning sog'lom ovqatlanish mezonlariga mosligidir. Shu jihatdan oziq-ovqat xavfsizligi agrar ishlab chiqarish bilan bir qatorda iqtisodiy boshqaruv, logistika, standartlashtirish, savdo siyosati, ijtimoiy himoya, narx monitoringi va raqamli transformatsiya bilan chambarchas bog'liq.

Mahalliy va xorijiy ilmiy adabiyotlarda oziq-ovqat xavfsizligini ta'minlashda raqamli texnologiyalarning roli tobora kuchayib borayotgani qayd etilmoqda. M.S. Yusupovning "Raqamli texnologiyalar asosida oziq-ovqat ta'minoti zanjirini

rivojlantirish omillari” nomli tadqiqotida oziq-ovqat mahsulotlarini yetishtirish va qayta ishlash zanjirida ishlab chiqarishni raqamlashtirish, “Qishloq xo‘jaligi 4.0” va “Sanoat 4.0” konsepsiyalari asosida “aqlli qishloq xo‘jaligi” hamda “aqlli sanoat”ni rivojlantirish oziq-ovqat ta’minoti va xavfsizligini mustahkamlash omili sifatida tahlil qilingan.

Ushbu tadqiqotda raqamli texnologiyalar kichik fermer xo‘jaliklarining axborot, resurs, bozor va moliyaviy xizmatlardan foydalanish imkoniyatlarini kengaytirishi ta’kidlanadi. Muallif raqamli agrooziq-ovqat tizimlari fermerni yakka ishlab chiqaruvchi holatidan chiqarib, uni bozor, qayta ishlovchi korxona, logistika operatori va moliyaviy institutlar bilan bog‘laydigan integratsion mexanizmga aylantirishini asoslaydi.

Oziq-ovqat xavfsizligi bo‘yicha mahalliy ilmiy ishlarda qayta ishlash sanoati, tadbirkorlik, ishlab chiqarish samaradorligi va oziq-ovqat bozori barqarorligi masalalari ham keng yoritilgan. N.M. Ziyavitdinova oziq-ovqat sanoati korxonalari faoliyatining iqtisodiy samaradorligini oshirish masalasini ishlab chiqarish resurslaridan foydalanish, tannarxni pasaytirish va modernizatsiya jarayonlari bilan bog‘lab o‘rgangan. I.Yu. Umarov oziq-ovqat sanoatida tadbirkorlik faoliyatini rivojlantirishda hududiy imkoniyatlar, kichik biznes subyektlari va bozor infratuzilmasining rolini tahlil qilgan. N.M. Nabiyeva oziq-ovqat xavfsizligini ta’minlashda oziq-ovqat sanoati korxonalarini modernizatsiya qilish, ishlab chiqaruvchilarni qo‘llab-quvvatlash va mahsulot sifati ustidan nazoratni kuchaytirish masalalariga e’tibor qaratgan.

Mazkur maqolaning metodologik asosini **tizimli tahlil, iqtisodiy-statistik tahlil, institutsional tahlil, qiyosiy yondashuv, qiymat zanjiri tahlili va mantiqiy umumlashtirish** tashkil etadi. Tizimli tahlil oziq-ovqat xavfsizligini ishlab chiqarish, logistika, qayta ishlash, raqamli monitoring, bozor va iste’molchi o‘rtasidagi o‘zaro bog‘liq jarayonlar majmui sifatida baholash imkonini berdi. Iqtisodiy-statistik tahlil orqali O‘zbekiston qishloq xo‘jaligi va oziq-ovqat sanoati ko‘rsatkichlaridagi o‘sish tendensiyalari ko‘rib chiqildi. Institutsional tahlil yordamida PF-36-son Farmonda belgilangan vazifalar, idoralararo raqamli platforma, monitoring indikatorlari va zaxira ma’lumotlari bazasi oziq-ovqat xavfsizligi mexanizmidagi boshqaruv instrumenti sifatida baholandi.

Tadqiqotda qiymat zanjiri tahlili alohida metod sifatida qo‘llanildi. Bu usul mahsulotning daladan dasturxongacha bo‘lgan harakatini bosqichma-bosqich o‘rganishga imkon beradi. Oziq-ovqat xavfsizligiga ta’sir qiluvchi real muammolar ko‘pincha mahsulot yetishtirish bosqichida emas, balki saqlash, qayta ishlash, tashish,

standartlashtirish yoki sotish bosqichida yuzaga keladi. Shu sababli qiymat zanjiri tahlili mahsulot yo‘qotilishi, narx oshishi, sifat pasayishi va bozor uzilishlarini aniqlash uchun muhim ilmiy-amaliy yondashuvdir.

TAHLIL VA NATIJALAR

O‘zbekistonda qishloq xo‘jaligi oziq-ovqat xavfsizligining asosiy ishlab chiqarish bazasi hisoblanadi. Rasmiy ma’lumotlarga ko‘ra, 2024-yilda respublikada yalpi qishloq xo‘jaligi mahsuloti hajmi **444,6 trillion so‘m**ga yetgan va besh yil ichida **18,5 foiz**ga oshgan. So‘nggi besh yilda yalpi mahsulotning o‘rtacha yillik o‘sish sur’ati **103,5 foiz**ni tashkil etgan. Bu ko‘rsatkichlar agrar sektorning oziq-ovqat xavfsizligini ta’minlashdagi salohiyati ortib borayotganini ko‘rsatadi.

Aholi jon boshiga asosiy turdagi mahsulotlar ishlab chiqarish ko‘rsatkichlarida ham o‘sish kuzatilgan. 2024-yilda aholi jon boshiga don ekinlari **238,2 kg**, kartoshka **100 kg**, sabzavotlar **322,7 kg**, meva va rezavorlar **88 kg**, uzum **49,1 kg**, poliz ekinlari **72,2 kg**, go‘sht **79,2 kg**, sut **334,8 kg**, tuxum **236,9 dona** miqdorida ishlab chiqarilgan. Bu raqamlar ishlab chiqarish imkoniyatlari kengayayotganini ko‘rsatsa-da, oziq-ovqat xavfsizligining real sifati mahsulot iste’molchiga qanday sharoitda, qanday narxda va qanday xavfsizlik kafolati bilan yetib borishiga bog‘liq.

Oziq-ovqat sanoati ham qiymat zanjirining markaziy bo‘g‘ini hisoblanadi. 2024-yilda O‘zbekistonda **103,7 trillion so‘mlik oziq-ovqat mahsulotlari ishlab chiqarilgan**. Bu ko‘rsatkich qishloq xo‘jaligi mahsulotlarini qayta ishlash va tayyor iste’mol mahsulotlariga aylantirish imkoniyatlari ortayotganini bildiradi. Shu bilan birga, qayta ishlash quvvatlari hududlar bo‘yicha bir tekis joylashmagani, mahsulotlarni chuqur qayta ishlash darajasi barcha tarmoqlarda yetarli emasligi va sovutkichli saqlash infratuzilmasining rivojlanish sur’ati talabdan ortda qolishi tizimli muammo sifatida saqlanib qolmoqda.

Oziq-ovqat xavfsizligini ta’minlashda mahsulot yo‘qotilishini kamaytirish muhim natijaviy ko‘rsatkichlardan biridir. PF-36-son strategiyada qishloq xo‘jaligi mahsulotlari ishlab chiqarish barqarorligini ta’minlash, oziq-ovqat ta’minoti zanjirida mahsulotlar yo‘qotilishi va isrofgarchiligini kamaytirish, yer, suv va oziq-ovqat zaxiralarini barqaror boshqarish, kichik xo‘jaliklarning oziq-ovqat qiymat zanjirlariga kirish imkoniyatini yaxshilash kabi vazifalar belgilangan. Bu vazifalar oziq-ovqat xavfsizligini ishlab chiqarishdan ko‘ra kengroq, qiymat zanjiri darajasida boshqarish zarurligini tasdiqlaydi.

Tahlillar shuni ko‘rsatadiki, oziq-ovqat xavfsizligida eng zaif nuqtalardan biri axborotning tarqoqligidir. Fermer hosil hajmi haqida alohida ma’lumotga ega, qayta ishlovchi korxona xomashyo ehtiyoji haqida alohida hisob yuritadi, logistika operatori

transport va ombor imkoniyatlarini o‘z ichki tizimida saqlaydi, davlat organlari esa alohida statistik va nazorat ma’lumotlari bilan ishlaydi. Bunday sharoitda bozor talabi, mahsulot zaxirasi, narx dinamikasi va hududlararo taqsimot bo‘yicha tezkor qaror qabul qilish qiyinlashadi. **Yagona raqamli monitoring tizimi** aynan shu uzilishlarni bartaraf etish uchun zarur.

PF-36-son Farmonida oziq-ovqat xavfsizligi va sog‘lom ovqatlanishni baholash bo‘yicha yaxlit idoralararo raqamli tizim yaratish orqali **Milliy axborot platformasini ishga tushirish** vazifasi belgilangan. Platforma texnik vazifasida qishloq xo‘jaligi mahsulotlari yetishtirishni prognoz qilish, asosiy turdagi oziq-ovqat mahsulotlari zaxirasi bo‘yicha ma’lumotlar bazasini yaratish, eksport va import qilingan mahsulotlar haqidagi ma’lumotlarni integratsiyalash, xavfsizlikni boshqarish tizimi bo‘yicha sertifikatga ega mahsulotlar haqidagi axborotni kiritish vazifalari nazarda tutilgan.

Ushbu platformaning amaliy ahamiyati shundaki, u oziq-ovqat xavfsizligini baholashni reaktiv usuldan proaktiv usulga o‘tkazadi. Reaktiv boshqaruvda muammo yuzaga kelgandan keyin chora ko‘riladi. Proaktiv boshqaruvda esa narx tebranishi, mahsulot tanqisligi, logistika uzilishi, importga qaramlik yoki sifat xavfi oldindan aniqlanadi. Masalan, ma’lum bir viloyatda kartoshka zaxirasi kamayib, narx o‘sishi boshlangan bo‘lsa, raqamli monitoring tizimi bu signalni erta beradi. Shundan so‘ng boshqa hududlardan mahsulot yetkazish, zaxiradan chiqarish yoki transport yo‘nalishini o‘zgartirish orqali bozordagi keskinlik yumshatiladi.

Raqamli monitoringning yana bir vazifasi mahsulot sifatini kuzatishdir. Oziq-ovqat mahsulotining xavfsizligi daladagi agrotexnik tadbirlar, o‘g‘it va pestitsid qo‘llash, chorvachilikda veterinariya nazorati, qayta ishlash korxonasidagi gigiyena, ombordagi harorat, transportdagi sanitariya rejimi va savdo nuqtasidagi saqlash sharoitlariga bog‘liq. PF-36 strategiyasida oziq-ovqat mahsulotlarini ishlab chiqarish, saqlash, tashish va sotish jarayonlarida xavfsizlikni boshqarish tizimi yetarli rivojlanmagani, nazorat bir necha davlat organlari tomonidan alohida olib borilayotgani va laboratoriya hamda mutaxassis kadrlar masalasi dolzarb ekani qayd etilgan.

Bu holat raqamli monitoringni faqat statistik tizim emas, balki xavfsizlik boshqaruvi vositasi sifatida shakllantirish zarurligini ko‘rsatadi. Mahsulot partiyasi qaysi hududda yetishtirilgani, qaysi omborda saqlangani, qanday laborator tekshiruvdan o‘tgani, qaysi transport vositasida tashilgani va qaysi savdo tarmog‘iga yetkazilgani haqidagi ma’lumotlar elektron shaklda yuritilsa, oziq-ovqat xavfsizligiga oid javobgarlik kuchayadi. Bu jarayon xalqaro amaliyotda mahsulotni kuzatish tizimi

deb ataladi. O‘zbekiston sharoitida bunday tizimni bosqichma-bosqich joriy qilish eksport salohiyatini oshirish, ichki bozor ishonchini mustahkamlash va sifatsiz mahsulot aylanishini cheklashga xizmat qiladi.

Logistika infratuzilmasi oziq-ovqat xavfsizligini ta’minlashda ishlab chiqarish va iste’mol o‘rtasidagi ko‘prik vazifasini bajaradi. Yetishtirilgan mahsulotning bozorga o‘z vaqtida yetkazilishi, ayniqsa tez buziladigan mahsulotlarda, sovutkichli omborlar, maxsus transport, saralash va qadoqlash markazlari, agrologistika terminallari va ulgurji savdo markazlariga bog‘liq. Qishloq xo‘jaligi mahsulotlarini uzoq muddat saqlash imkoniyati bo‘lmasa, hosil yig‘im-terim davrida narx tushib ketadi, mavsumdan tashqari davrda esa narx keskin oshadi. Bu holat ishlab chiqaruvchi va iste’molchi manfaatiga birdek zarar yetkazadi.

M.S. Yusupov tomonidan keltirilgan ma’lumotlarga ko‘ra, 2019-2021-yillarda O‘zbekistonda qishloq xo‘jaligi mahsulotlarini qayta ishlash va eksportga chiqarish bo‘yicha umumiy qiymati **5,9 trillion so‘mlik 952 ta loyiha** amalga oshirilgan, ularning quvvati **2 million 888 ming tonna**ni tashkil etgan. Shu davrda agrologistika markazlarini barpo etish bo‘yicha **757 milliard so‘mlik 17 ta loyiha**, sovutkichli omborxonalar bo‘yicha esa **825 milliard so‘mlik 1314 ta loyiha** amalga oshirilgani ko‘rsatilgan. Bu raqamlar logistika infratuzilmasi shakllanayotganini bildiradi, ammo mamlakat hududlari va mahsulot turlari kesimida ehtiyoj hali yuqori.

Agrosanoat qiymat zanjirlarini takomillashtirish uchun ishlab chiqaruvchi, qayta ishlovchi, logistika operatori, savdo tarmog‘i va moliya institutlari o‘rtasidagi aloqalar shartnomaviy, raqamli va iqtisodiy manfaatlarga asoslangan bo‘lishi kerak. Fermer qaysi mahsulotga talab borligini oldindan bilsa, qayta ishlovchi korxona qaysi hududdan qancha xomashyo kelishini ko‘rsa, logistika operatori qaysi ombor va transport quvvatlari bo‘shligini aniqlasa, davlat organlari zaxira va narx dinamikasini real vaqtga yaqin kuzatsa, oziq-ovqat xavfsizligi mexanizmi samarali ishlaydi.

Bunday tizimda klasterlar muhim rol o‘ynaydi. Agrosanoat klasteri ishlab chiqarish, qayta ishlash, saqlash, qadoqlash va sotishni yagona iqtisodiy tizimga birlashtiradi. Klaster modeli mahsulot sifatini nazorat qilish, texnologiyani joriy etish, eksport talablariga mos sertifikatlash, ishlab chiqaruvchi va qayta ishlovchi o‘rtasidagi uzilishlarni kamaytirish imkonini beradi. Biroq klaster tizimi faqat yirik korxona manfaatiga xizmat qilmasligi kerak. Kichik fermer, dehqon xo‘jaligi va oilaviy tadbirkorlik subyektlari qiymat zanjiriga adolatli shartlarda kirishi, mahsulot narxi shaffof shakllanishi va raqamli platformalar orqali bozor axborotidan foydalanishi zarur.

Raqamli monitoring va logistika uyg‘unlashganida oziq-ovqat xavfsizligining iqtisodiy samarasi yanada kuchayadi. Misol sifatida meva-sabzavot mahsulotlari zanjirini ko‘rish mumkin. Fermer hosil prognozini raqamli tizimga kiritadi. Qayta ishlovchi korxona talab hajmini belgilaydi. Ombor operatori bo‘sh joy va harorat rejimini ko‘rsatadi. Transport kompaniyasi yo‘nalish va narxni taklif qiladi. Savdo tarmog‘i mahsulotga bo‘lgan talabni bildiradi. Davlat organlari esa hududiy zaxiralar, narxlar va sifat ko‘rsatkichlarini kuzatadi. Natijada mahsulot yo‘qotilishi kamayadi, ortiqcha vositachilik qisqaradi, narx tebranishi yumshaydi va iste’molchi sifatli mahsulotni barqaror narxda oladi.

Raqamli monitoringning yana bir samarasi import va eksport oqimlarini boshqarishda ko‘rinadi. Ayrim mahsulotlar bo‘yicha ichki ishlab chiqarish yetarli bo‘lmagan davrda import zarur bo‘lishi mumkin. Biroq import qarori aniq zaxira, talab va narx ma’lumotlariga asoslanmasa, ichki ishlab chiqaruvchiga zarar yetkazishi yoki iste’mol bozorida yetishmovchilikni bartaraf eta olmasligi mumkin. Shu sababli eksport-import ma’lumotlarini Milliy axborot platformasiga integratsiya qilish oziq-ovqat xavfsizligi siyosatida muhim instrumentdir. Bu yondashuv PF-36-son hujjatda ham alohida qayd etilgan.

MUHOKAMA

Oziq-ovqat xavfsizligini ta’minlashda raqamli monitoring, logistika va qiymat zanjiri mexanizmlari alohida-alohida emas, yagona tizim sifatida ishlashi kerak. Raqamli monitoring axborotni beradi, logistika mahsulot harakatini ta’minlaydi, qiymat zanjiri esa iqtisodiy manfaatni shakllantiradi. Ushbu uch mexanizmdan biri zaif bo‘lsa, butun tizim samaradorligi pasayadi. Masalan, raqamli platforma mavjud bo‘lsa-yu, hududlarda sovutkichli ombor yetishmasa, tez buziladigan mahsulot yo‘qotilishi kamaymaydi. Ombor va transport tizimi bo‘lsa-yu, ishlab chiqaruvchi bozor talabi haqida axborot olmasa, noto‘g‘ri mahsulot yetishtirish xavfi saqlanib qoladi. Qiymat zanjiri shakllangan bo‘lsa-yu, narx va shartnoma munosabatlari shaffof bo‘lmasa, kichik ishlab chiqaruvchilar tizimdan yetarli manfaat ko‘rmaydi.

O‘zbekiston sharoitida oziq-ovqat xavfsizligini raqamlashtirishning amaliy modeli bir necha darajada shakllanishi maqsadga muvofiq. Milliy darajada yagona axborot platformasi qishloq xo‘jaligi mahsulotlari ishlab chiqarish prognozi, asosiy oziq-ovqat zaxiralari, import, eksport, narxlar, iste’mol talabi, sertifikatlangan mahsulotlar va xavf omillarini qamrab olishi kerak. Hududiy darajada viloyat, tuman va mahalla kesimida mahsulot yetishtirish, ombor quvvati, bozor narxi, transport imkoniyati va ehtiyoj darajasi ko‘rinib turishi lozim. Korxona darajasida ishlab

chiqaruvchi, qayta ishlovchi, ombor va savdo tarmog‘i o‘z ma’lumotlarini yagona standartda tizimga uzatishi zarur.

Bunday tizimning muvaffaqiyati ma’lumot sifati bilan belgilanadi. Noto‘g‘ri, kechikkan yoki to‘liq bo‘lmagan ma’lumot asosida qabul qilingan qaror noto‘g‘ri natija beradi. Shu sababli raqamli monitoringda ma’lumot kiritish intizomi, elektron hujjat aylanishi, hududiy mas’ullar javobgarligi, avtomatlashtirilgan integratsiya, ochiq ma’lumotlar va kiberxavfsizlik talablari birgalikda yo‘lga qo‘yilishi kerak. Oziq-ovqat xavfsizligi bo‘yicha raqamli tizim oddiy statistik hisobot omboriga aylanib qolmasligi, balki real boshqaruv qarorlarini qo‘llab-quvvatlaydigan analitik platforma bo‘lishi zarur.

Logistika sohasida asosiy e’tibor sovuq zanjirni rivojlantirishga qaratilishi kerak. Sovuq zanjir mahsulot haroratini yig‘im-terimdan iste’molchigacha nazoratda saqlaydigan tizimdir. Bu tizim meva-sabzavot, go‘sht, sut, baliq, tuxum va tayyor oziq-ovqat mahsulotlari uchun zarur. Sovuq zanjir yetarli bo‘lmasa, mahsulotning bir qismi sifatsizlanadi, xavfsizlik xavfi ortadi, narx oshadi va eksport imkoniyati kamayadi. Shu sababli agrologistika markazlari faqat ombor emas, balki saralash, laboratoriya tekshiruvi, qadoqlash, sertifikatlash va elektron savdo bilan bog‘langan kompleks markaz sifatida tashkil etilishi maqsadga muvofiq.

Qiymat zanjiri mexanizmini takomillashtirishda kichik ishlab chiqaruvchilarning ishtiroki alohida e’tibor talab qiladi. O‘zbekistonda oziq-ovqat mahsulotlarining muhim qismi dehqon va fermer xo‘jaliklari tomonidan yetishtiriladi. Ularning ko‘pchiligi yirik qayta ishlovchilar, eksportyorlar yoki savdo tarmoqlari bilan barqaror shartnoma munosabatlariga ega emas. Raqamli platformalar kichik ishlab chiqaruvchilarga mahsulotini oldindan taklif qilish, narxlarni solishtirish, ombor va transport xizmatlarini tanlash, kredit va sug‘urta xizmatlaridan foydalanish imkonini berishi mumkin. Bu jarayon oziq-ovqat xavfsizligini ijtimoiy jihatdan ham mustahkamlaydi, chunki qishloq aholisining daromadi va bandligi oshadi.

Mahsulot xavfsizligini ta’minlashda elektron kuzatuv tizimi muhim o‘rin tutadi. Har bir mahsulot partiyasi bo‘yicha kelib chiqish joyi, ishlab chiqaruvchi, laboratoriya tekshiruvi, ombor, transport, sotuv nuqtasi va sertifikat ma’lumotlari elektron tarzda qayd etilsa, oziq-ovqat xavfsizligi tizimida shaffoflik ortadi. Bu yondashuv iste’molchi huquqlarini himoya qiladi, sifatsiz mahsulotni tez aniqlashga yordam beradi, eksport bozorlarida ishonchni kuchaytiradi. Ayniqsa O‘zbekistonning meva-sabzavot eksporti kengayib borayotgan sharoitda elektron kuzatuv tizimi xalqaro standartlarga moslashishning muhim sharti hisoblanadi.

Raqamli monitoring va logistika tizimini rivojlantirishda davlat va xususiy sektor hamkorligi hal qiluvchi ahamiyatga ega. Davlat normativ-huquqiy asos, ma'lumotlar standarti, monitoring indikatorlari, infratuzilma loyihalarini qo'llab-quvvatlash va ijtimoiy ahamiyatga ega mahsulotlar bo'yicha barqarorlik kafolatini ta'minlaydi. Xususiy sektor esa ombor, transport, qayta ishlash, qadoqlash, elektron savdo, agrotech xizmatlar va eksport infratuzilmasiga investitsiya kiritadi. Ilmiy muassasalar va universitetlar esa raqamli agrologistika, prognozlash, oziq-ovqat xavfsizligi indikatorlari va qiymat zanjiri samaradorligini baholash bo'yicha tadqiqotlar olib borishi zarur.

Oziq-ovqat xavfsizligini ta'minlashda raqamli yechimlarni joriy etish bilan birga, inson kapitali masalasi ham e'tibordan chetda qolmasligi kerak. Fermer, omborchi, logistika menejeri, laboratoriya mutaxassisi, savdo tarmog'i xodimi va davlat boshqaruvi vakili raqamli tizimdan foydalanishni bilmasa, texnologiyaning samarasi cheklanadi. Shu sababli sohada qisqa muddatli o'quv kurslari, maslahat xizmatlari, raqamli savodxonlik dasturlari va amaliy ko'nikmalarni shakllantiruvchi treninglar yo'lga qo'yilishi lozim. PF-36 strategiyasida qishloq joylarda maslahat-axborot tizimlari va bilimlarni oshirish xizmatlarini takomillashtirish vazifasi belgilangan. Bu vazifa raqamli monitoring tizimining inson omili bilan uyg'unlashishini ta'minlaydi.

Oziq-ovqat xavfsizligi tizimida risklarni boshqarish mexanizmi ham muhimdir. Iqlim o'zgarishi, suv tanqisligi, zararkunandalar, kasalliklar, xalqaro bozordagi narx o'zgarishi, transport yo'llaridagi uzilishlar yoki sanitariya xavflari oziq-ovqat ta'minotiga salbiy ta'sir ko'rsatishi mumkin. Raqamli monitoring bu risklarni baholash, hududlar bo'yicha xavf xaritasini tuzish, strategik zaxiralarni joylashtirish va tezkor choralar rejasini ishlab chiqish imkonini beradi. Bu esa oziq-ovqat xavfsizligini favqulodda vaziyatlarga tayyor tizimga aylantiradi.

XULOSA

O'zbekistonda oziq-ovqat xavfsizligini ta'minlashda raqamli monitoring, logistika va agrosanoat qiymat zanjirlarini takomillashtirish strategik ahamiyatga ega. Mamlakatda qishloq xo'jaligi mahsulotlari ishlab chiqarish hajmi va oziq-ovqat sanoati ko'rsatkichlari o'sib bormoqda. Biroq oziq-ovqat xavfsizligi faqat ishlab chiqarish hajmi bilan belgilanmaydi. Mahsulotning yo'qotilmasdan saqlanishi, xavfsiz tashilishi, sifatli qayta ishlanishi, adolatli narxda sotilishi, zaxiralar bo'yicha aniq ma'lumot mavjudligi va iste'molchiga uzluksiz yetib borishi ushbu tizimning asosiy shartlari hisoblanadi.

Tadqiqot natijalari shuni ko‘rsatadiki, oziq-ovqat xavfsizligi mexanizmini takomillashtirish uchun **Milliy axborot platformasi, BI deshbord, zaxiralar ma’lumotlar bazasi, eksport-import integratsiyasi, elektron kuzatuv tizimi va hududiy raqamli monitoring** amaliy boshqaruv vositasiga aylanishi kerak. Raqamli tizim oziq-ovqat xavfsizligi bo‘yicha qarorlarni hisobotga emas, real ma’lumotga asoslash imkonini beradi. Bu mahsulot tanqisligi, narx tebranishi, logistika uzilishi va sifatsiz mahsulot xavfini oldindan aniqlashga yordam beradi.

Logistika tizimini rivojlantirish oziq-ovqat xavfsizligining iqtisodiy samaradorligini oshiradi. Sovutkichli omborlar, agrologistika markazlari, maxsus transport, saralash va qadoqlash punktlari, laboratoriya va sertifikatlash xizmatlari mahsulot yo‘qotilishini kamaytiradi. Qiymat zanjiri mexanizmi ishlab chiqaruvchi, qayta ishlovchi, logistika operatori va savdo tarmog‘ini yagona iqtisodiy manfaat atrofida bog‘laydi. Bunda kichik fermer va dehqon xo‘jaliklarining tizimga adolatli kirishi oziq-ovqat xavfsizligining ijtimoiy barqarorligini ham ta’minlaydi.

O‘zbekiston sharoitida oziq-ovqat xavfsizligini mustahkamlashning eng maqbul yo‘li raqamli monitoringni logistika va qiymat zanjiri boshqaruvi bilan uyg‘unlashtirishdir. Bunday yondashuv mahsulot ishlab chiqarishdan iste’molgacha bo‘lgan jarayonlarni shaffof, boshqariladigan va samarali tizimga aylantiradi. Natijada ichki bozor barqarorligi, mahsulot sifati, eksport salohiyati, ishlab chiqaruvchi daromadi va iste’molchi manfaatlari bir tizimda muvofiqlashadi.

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ДИФФЕРЕНЦИРОВАННЫЙ ПОДХОД К ВЫБОРУ МЕДИКАМЕНТОЗНОЙ И ХИРУРГИЧЕСКОЙ ТАКТИКИ ЛЕЧЕНИЯ ДОБРОКАЧЕСТВЕННОЙ ГИПЕРПЛАЗИИ ПРЕДСТАТЕЛЬНОЙ ЖЕЛЕЗЫ У МУЖЧИН ПОЖИЛОГО ВОЗРАСТА

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Аннотация. В статье представлены результаты клинического исследования, направленного на разработку дифференцированного алгоритма выбора между консервативным медикаментозным и хирургическим методом лечения доброкачественной гиперплазии предстательной железы (ДГПЖ) у пациентов пожилого возраста. Обследовано 214 мужчин в возрасте от 65 до 85 лет. Пациентам назначали монотерапию альфа-1-адреноблокаторами, комбинированную терапию (альфа-1-адреноблокатор + ингибитор 5-альфа-редуктазы) либо хирургическое вмешательство в зависимости от тяжести симптоматики, объёма железы и риска прогрессирования заболевания. На основании 24-месячного наблюдения установлено, что комбинированная медикаментозная терапия эффективна при умеренной симптоматике и объёме железы 30–80 мл, тогда как при выраженной обструкции, объёме >80 мл и высоком риске острой задержки мочи хирургическое лечение обеспечивает достоверно лучшие долгосрочные результаты. Разработанный алгоритм позволяет оптимизировать персонализированный выбор тактики лечения с учётом коморбидного профиля и функционального статуса пожилого пациента.

Ключевые слова: ДГПЖ, альфа-адреноблокаторы, ингибиторы 5-альфа-редуктазы, трансуретральная резекция, пожилой возраст, дифференцированный подход, IPSS, алгоритм лечения.

Доброкачественная гиперплазия предстательной железы представляет собой прогрессирующее гистологическое заболевание, клинически проявляющееся симптомами нижних мочевыводящих путей и инфравезикальной обструкцией. Распространённость ДГПЖ коррелирует с возрастом: гистологические признаки заболевания выявляются у 40% мужчин в возрасте 50

лет, у 70% — в 60 лет и у более 90% — к 80 годам [1]. При этом клинически значимая симптоматика, снижающая качество жизни, регистрируется примерно у половины мужчин старше 60 лет [2].

В структуре обращаемости урологических стационаров Узбекистана пожилые пациенты с ДГПЖ составляют более 35% госпитализаций [3]. Многообразие доступных методов — от консервативной медикаментозной терапии до малоинвазивных и открытых хирургических вмешательств — ставит перед врачом сложную задачу индивидуального выбора оптимальной тактики. Неверный выбор тактики ведёт либо к избыточному хирургическому риску для пожилого пациента, либо к неоправданному затягиванию консервативного лечения при уже сформировавшейся тяжёлой обструкции [4].

Особую сложность представляет ведение пациентов пожилого возраста, у которых ДГПЖ нередко сочетается с артериальной гипертензией, ишемической болезнью сердца, мерцательной аритмией (требующей антикоагулянтной терапии), сахарным диабетом 2 типа, хронической болезнью почек, когнитивными нарушениями [5]. Данные коморбидные состояния оказывают существенное влияние как на переносимость медикаментозной терапии, так и на хирургический риск, что делает необходимым разработку структурированного клинического алгоритма принятия решения [6].

Несмотря на наличие европейских (EAU) и американских (AUA) рекомендаций по ведению ДГПЖ, их применение в условиях отечественного здравоохранения нередко затруднено ввиду особенностей популяции пациентов, доступности препаратов и ресурсов учреждения. Настоящее исследование направлено на разработку практического алгоритма, адаптированного к условиям реальной клинической практики.

Целью исследования является разработка и клиническая апробация дифференцированного алгоритма выбора между медикаментозной и хирургической тактикой лечения ДГПЖ у мужчин в возрасте 65 лет и старше на основании комплексной оценки клинических, инструментальных и коморбидных характеристик пациента.

МАТЕРИАЛ И МЕТОДЫ ИССЛЕДОВАНИЯ

Ретроспективно-проспективное исследование проводилось на базе кафедры хирургических болезней и трансплантологии Самаркандского государственного

медицинского университета (СамГМУ) в период 2019–2023 гг. В исследование включено 214 пациентов мужского пола в возрасте от 65 до 85 лет с клиническим диагнозом ДГПЖ, подтверждённым на основании данных анамнеза, пальцевого ректального исследования (ПРИ), трансректальной ультрасонографии (ТРУЗИ), урофлоуметрии и определения уровня ПСА сыворотки крови.

Критерии включения: возраст ≥65 лет, клинически выраженные симптомы нижних мочевыводящих путей (IPSS ≥8 баллов), объём предстательной железы ≥25 мл, продолжительность симптомов не менее 6 месяцев, информированное письменное согласие на участие в исследовании. Критерии исключения: ПСА >10 нг/мл без исключённого рака предстательной железы, нейрогенные нарушения мочеиспускания, предшествующая хирургия нижних мочевыводящих путей, активные инфекции мочевыводящих путей, хроническая почечная недостаточность IV–V стадии.

Пациенты были распределены на три группы в соответствии с разработанным алгоритмом. Группа А (n=72) — монотерапия альфа-1-адреноблокаторами (тамсулозин 0,4 мг/сут): IPSS 8–18 баллов, объём железы 25–50 мл, Qmax >10 мл/с. Группа Б (n=84) — комбинированная медикаментозная терапия (тамсулозин 0,4 мг/сут + дутастерид 0,5 мг/сут): IPSS 12–24 баллов, объём железы 50–80 мл, уровень ПСА ≥1,5 нг/мл. Группа В (n=58) — хирургическое лечение (ТУРП): IPSS ≥20 баллов, объём железы >80 мл или рефрактерная задержка мочи в анамнезе, Qmax <10 мл/с, объём остаточной мочи >150 мл.

Всем пациентам проведена оценка коморбидного статуса по шкале CCI (Charlson Comorbidity Index) и функциональной активности по шкале ECOG. Мониторинг эффективности лечения проводили через 3, 6, 12 и 24 месяца с регистрацией IPSS, QoL, Qmax, объёма остаточной мочи, объёма предстательной железы (для медикаментозных групп), а также уровня ПСА и почечных функциональных показателей. Статистический анализ выполняли с использованием IBM SPSS Statistics 26.0; для сравнения динамики показателей внутри группы применяли критерий Вилкоксона, для межгрупповых сравнений — критерий Манна–Уитни; $p<0,05$ считали статистически значимым.

РЕЗУЛЬТАТЫ И ИХ ОБСУЖДЕНИЕ

Средний возраст пациентов составил 71,8±4,6 лет (группа А), 72,4±5,1 лет (группа Б) и 73,2±4,8 лет (группа В). Значение CCI было достоверно выше в

группе В (5,4±1,7 балла) по сравнению с группами А (3,2±1,1 балла) и Б (4,1±1,4 балла), что соответствует большей тяжести исходного состояния пациентов, выбранных для хирургического лечения. Наиболее частыми сопутствующими заболеваниями являлись артериальная гипертензия (76,2%), сахарный диабет 2 типа (38,3%), ишемическая болезнь сердца (29,4%) и хроническая болезнь почек 2–3 стадии (22,9%).

В группе А монотерапия тамсулозином обеспечила достоверное улучшение Qmax через 3 месяца — с 11,8±2,1 до 14,6±2,7 мл/с ($p<0,001$), снижение IPSS — с 13,4±3,2 до 9,2±2,6 балла ($p<0,001$). Через 24 месяца стойкий клинический ответ сохранялся у 73,6% пациентов. У 12 пациентов (16,7%) потребовалось усиление терапии или переход к хирургическому лечению в связи с прогрессированием симптоматики. Нежелательные явления тамсулозина — ортостатическая гипотензия (8,3%), ретроградная эякуляция (14,7%) — требовали особого внимания у пожилых пациентов с сердечно-сосудистой патологией.

В группе Б комбинированная терапия продемонстрировала более выраженный и устойчивый эффект. Qmax через 12 месяцев увеличился с 9,4±1,8 до 13,7±2,4 мл/с (+45,7%; $p<0,001$). Объём предстательной железы через 24 месяца уменьшился в среднем на 28,3% — с 64,2±12,4 до 46,1±9,8 мл ($p<0,001$). IPSS снизился с 19,8±3,6 до 10,3±2,9 балла. Частота острой задержки мочи за 24 месяца составила 4,8% (против 12,5% в группе А). Уровень ПСА к 12 месяцам снизился на 43,6%, что требовало учёта при интерпретации данного показателя для онкологического скрининга. Побочные эффекты дутастерида — снижение либидо (11,9%), эректильная дисфункция (8,3%) — в пожилом возрасте имели относительно меньшее клиническое значение.

В группе В все пациенты перенесли ТУРП без летальных исходов. Средняя продолжительность операции составила 62,4±14,8 мин, интраоперационная кровопотеря — 184,3±67,2 мл. Ранние послеоперационные осложнения зарегистрированы у 24,1% пациентов: острая задержка мочи после удаления катетера — 8,6%, гематурия, потребовавшая ирригации — 6,9%, инфекция мочевыводящих путей — 6,9%, ТУР-синдром — 1,7%. Через 12 месяцев IPSS снизился с 26,4±3,8 до 6,2±2,1 балла, Qmax возрос с 6,8±1,4 до 18,4±3,2 мл/с, объём остаточной мочи — с 198,6±62,4 до 22,3±18,7 мл. Улучшение было достоверно более выраженным по сравнению с медикаментозными группами ($p<0,001$).

Сравнительный анализ динамики QoL через 24 месяца выявил следующее: в группе А — снижение с 3,8±0,7 до 2,4±0,6 балла; в группе Б — с 4,2±0,8 до 1,9±0,6 балла; в группе В — с 4,6±0,9 до 1,3±0,5 балла. Таким образом, наибольшее улучшение качества жизни наблюдалось в хирургической группе, однако и комбинированная медикаментозная терапия обеспечивала клинически значимый результат при умеренной симптоматике.

На основании полученных данных разработан клинический алгоритм выбора тактики лечения ДГПЖ у пожилых пациентов. Первичная оценка включает: определение IPSS, Qmax, объёма железы, остаточной мочи, уровня ПСА, оценку коморбидного статуса (CCI) и наличия абсолютных показаний к операции (рефрактерная задержка мочи, рецидивирующая гематурия, уролитиаз, дивертикул мочевого пузыря, почечная недостаточность вследствие обструкции). При отсутствии абсолютных показаний пациентам с IPSS <12 и объёмом железы <50 мл рекомендуется монотерапия альфа-1-адреноблокатором, при IPSS 12–20 и объёме 50–80 мл — комбинированная терапия; при IPSS >20, объёме >80 мл или неэффективности консервативного лечения показано хирургическое вмешательство.

Полученные результаты соответствуют данным международных многоцентровых исследований CombAT и MTOPS, подтверждающих превосходство комбинированной медикаментозной терапии над монотерапией в снижении риска прогрессирования ДГПЖ [7, 8]. Вместе с тем в ряде ситуаций — в частности, при объёме железы >80 мл, тяжёлой инфравезикальной обструкции и высоком риске острой задержки мочи — раннее хирургическое лечение представляется более рациональным с точки зрения долгосрочного прогноза [9].

ВЫВОДЫ

1. Выбор между медикаментозной и хирургической тактикой лечения ДГПЖ у пожилых пациентов должен основываться на комплексной оценке тяжести симптоматики (IPSS), объёма предстательной железы, урофлоуметрических показателей, риска прогрессирования и коморбидного статуса.

2. Монотерапия альфа-1-адреноблокаторами эффективна при лёгкой и умеренной симптоматике (IPSS 8–18 баллов) и объёме железы до 50 мл, обеспечивая устойчивый клинический ответ у 73,6% пациентов на протяжении 24 месяцев.

3. Комбинированная терапия (альфа-1-адреноблокатор + ингибитор 5-альфа-редуктазы) является методом выбора при умеренной и выраженной симптоматике и объёме железы 50–80 мл, достоверно снижая риск острой задержки мочи и необходимость оперативного вмешательства.

4. Хирургическое лечение (ТУРП) обеспечивает наиболее выраженное и стойкое улучшение функциональных показателей и качества жизни при тяжёлой обструкции, объёме железы >80 мл, неэффективности консервативной терапии или наличии абсолютных показаний к операции.

5. Предложенный дифференцированный алгоритм, включающий оценку IPSS, объёма железы, Qmax, CCI и наличия абсолютных показаний к операции, позволяет оптимизировать выбор тактики лечения и снизить число нерациональных назначений у мужчин пожилого возраста.

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СРАВНИТЕЛЬНАЯ ОЦЕНКА ХИРУРГИЧЕСКИХ МЕТОДОВ ЛЕЧЕНИЯ ДОБРОКАЧЕСТВЕННОЙ ГИПЕРПЛАЗИИ ПРЕДСТАТЕЛЬНОЙ ЖЕЛЕЗЫ У МУЖЧИН ПОЖИЛОГО ВОЗРАСТА

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Введение. Доброкачественная гиперплазия предстательной железы (ДГПЖ) является одним из наиболее распространённых урологических заболеваний у мужчин старшей возрастной группы: клинически значимые симптомы нижних мочевыводящих путей выявляются более чем у 80% мужчин в возрасте старше 70 лет. Выбор хирургического метода у пожилых пациентов с высокой коморбидной нагрузкой представляет значительную клиническую проблему, поскольку каждый из существующих методов — трансуретральная резекция (ТУРП), лазерная энуклеация (HoLEP) и открытая аденомэктомия — обладает различным профилем безопасности, технической сложности и функциональной эффективности, а опыт их сравнительного применения в условиях отечественного здравоохранения остаётся недостаточным.

Целью нашего исследования явилась сравнительная оценка периоперационных результатов, частоты осложнений и функциональных исходов ТУРП, HoLEP и открытой аденомэктомии у мужчин в возрасте 65 лет и старше с верифицированным диагнозом ДГПЖ.

Материал и методы. В проспективное исследование включено 186 пациентов мужского пола в возрасте от 65 до 82 лет (средний возраст 71,5±4,1 лет), разделённых на три группы: группа I — ТУРП (n=68, средний объём железы 68,4±14,2 мл), группа II — HoLEP (n=62, объём 94,7±22,6 мл), группа III — открытая позадилонная аденомэктомия (n=56, объём 110,3±28,1 мл); оценивались интраоперационная кровопотеря, сроки катетеризации и госпитализации, а также динамика IPSS, Qmax и показателя качества жизни (QoL) через 1, 3, 6 и 12 месяцев после операции.

Результаты и их обсуждение. Интраоперационная кровопотеря была достоверно наименьшей в группе HoLEP (87,4±31,2 мл) по сравнению с ТУРП (194,6±62,8 мл) и аденомэктомией (318,5±94,3 мл; $p<0,001$ для обоих сравнений); длительность катетеризации и сроки госпитализации также были минимальными при HoLEP (1,4 сут и 3,2 сут соответственно); через 12 месяцев все три метода обеспечили сопоставимое улучшение IPSS и Qmax, однако частота ранних послеоперационных осложнений была значимо ниже в группе HoLEP (11,3%) по сравнению с ТУРП (22,1%) и аденомэктомией (35,7%), что подтверждает преимущества лазерной энуклеации у пожилых пациентов с высоким операционным риском.

Выводы. HoLEP является предпочтительным методом хирургического лечения ДГПЖ у мужчин пожилого возраста с объёмом железы свыше 80 мл, обеспечивая минимальную кровопотерю, короткий реабилитационный период и низкую частоту осложнений; ТУРП сохраняет позицию стандарта при объёме до 80 мл, тогда как открытая аденомэктомия показана при наличии сопутствующей интравезикальной патологии или отсутствии эндоскопического оборудования.

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KLIMAKTERIK SINDROM: KLINIK NAMOYON BO‘LISHI, DIAGNOSTIKA VA ZAMONAVIY DAVOLASH YONDASHUVLARI

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ANNOTATSIYA:Klimakterik sindrom ayol organizmida reproduktiv tizim faoliyatining bosqichma-bosqich susayishi fonida shakllanadigan, neyrovegetativ, psixoemotsional va metabolik-endokrin buzilishlar bilan namoyon bo‘ladigan murakkab klinik holatdir. U faqat hayz siklining to‘xtashi bilan cheklanmaydi, balki yurak-qon tomir tizimi, suyak to‘qimasi, urogenital soha, uyqu, mehnat qobiliyati va hayot sifatiga ham sezilarli ta’sir ko‘rsatadi. Mazkur maqolada klimakterik sindromning patofiziologik asoslari, klinik belgilari, tashxislash mezonlari, differensial diagnostikasi hamda zamonaviy davolash yondashuvlari tahlil qilindi. Tadqiqot mavzuga oid o‘zbekcha tibbiy adabiyotlar, mahalliy ilmiy maqolalar va xalqaro klinik tavsiyalarni taqqoslash asosida bajarildi. Tahlil shuni ko‘rsatadiki, klimakterik sindromni baholashda simptomlarning og‘irlik darajasi, bemorning yoshi, somatik fon kasalliklari, tromboembolik xavf, ko‘krak bezi va bachadon endometriysi holati alohida hisobga olinishi lozim. O‘rin bosuvchi gormonal terapiya ko‘plab bemorlarda samarali usul bo‘lsa-da, uni shablon tarzida emas, individual xavf-foyda nisbatiga tayanib qo‘llash zarur. Nohormonal, psixologik, parhez, jismoniy faollik va profilaktik skrining yondashuvlari esa kompleks davolashning ajralmas qismi hisoblanadi.

Kalit so‘zlar: klimakterik sindrom, menopauza, perimenopauza, estrogen yetishmovchiligi, vazomotor simptomlar, o‘rin bosuvchi gormonal terapiya, hayot sifati.

ABSTRACT:Climacteric syndrome is a complex clinical condition that develops during the gradual decline of reproductive function and is characterized by neurovegetative, psycho-emotional, metabolic and endocrine disturbances. It is not limited to menstrual cessation; it may also affect cardiovascular health, bone density, urogenital function, sleep quality, work capacity and overall quality of life. This article analyzes the pathophysiological mechanisms, clinical manifestations, diagnostic

criteria, differential diagnosis and modern therapeutic approaches to climacteric syndrome. The study is based on a comparative review of Uzbek medical literature, national scientific publications and international clinical recommendations. The analysis indicates that assessment of climacteric syndrome should include symptom severity, age, comorbidities, thromboembolic risk, breast status and endometrial safety. Menopausal hormone therapy may be effective in selected patients, but it should not be prescribed mechanically; it requires individualized benefit-risk evaluation. Non-hormonal therapy, psychological support, nutrition, physical activity and preventive screening are essential components of comprehensive care.

Keywords: climacteric syndrome, menopause, perimenopause, estrogen deficiency, vasomotor symptoms, menopausal hormone therapy, quality of life.

KIRISH

Klimakterik davr ayol hayotining tabiiy biologik bosqichi bo‘lib, tuxumdon follikulyar zaxirasining kamayishi, estrogen va progesteron sekretsiyasining pasayishi, gipotalamo-gipofizar-tuxumdon o‘qida qayta moslashuv jarayonlari bilan bog‘liq. Biroq bu jarayon har bir ayolda bir xil kechmaydi. Ayrim ayollarda menopauzaga o‘tish nisbatan yengil bo‘lsa, boshqalarida issiq bosishi, kechki terlash, yurak urishining tezlashishi, uyqusizlik, bezovtalik, kayfiyatning keskin o‘zgarishi, bosh og‘rig‘i, urogenital noqulaylik, suyak og‘rig‘i va mehnat unumdorligining pasayishi kabi belgilar kuchli namoyon bo‘ladi. Aynan shunday klinik holatlar majmuasi klimakterik sindrom deb yuritiladi.

Mavzuning dolzarbligi bir nechta omillar bilan belgilanadi. Birinchidan, ayollar umr davomiyligining ortishi natijasida postmenopauza davrida yashash yillari ko‘paymoqda. Bu davr ayol hayotining uchdan bir qismini egallashi mumkin. Ikkinchidan, menopauzaga oid shikoyatlar ko‘pincha shaxsiy yoki “tabiiy qarish” holati sifatida qabul qilinib, tibbiy yordamga murojaat kechikadi. Uchinchi muammo shundaki, ayrim bemorlar gormonal terapiyadan asossiz qo‘rqadi, boshqalari esa shifokor nazoratisiz turli preparatlarni qabul qiladi. Har ikki holat ham klinik xavfni oshiradi. To‘rtinchidan, klimakterik sindrom yurak-qon tomir kasalliklari, osteoporoz, metabolik sindrom, depressiv holatlar va urogenital infeksiyalar bilan kesishishi sababli faqat ginekologik muammo emas, balki ko‘p tarmoqli tibbiy yondashuvni talab qiladigan holatdir.

Xalqaro amaliyotda menopauza va klimakterik sindromni baholashda individual qaror qabul qilish tamoyili ustuvor bo‘lib bormoqda. Bemorning yoshi, oxirgi hayzdan keyingi vaqt, bachadon mavjudligi, arterial bosim, tana vazni, jigar faoliyati, tromboz va onkologik xavf, oilaviy anamnez hamda bemorning shaxsiy

afzalliklari inobatga olinadi. O‘zbekiston tibbiy amaliyotida ham bu masala tobora muhim ahamiyat kasb etmoqda, chunki reproduktiv salomatlik, perimenopauzal parvarish va profilaktik ko‘riklar sifatini oshirish ayollar salomatligini saqlash strategiyasining ajralmas qismidir. Shu sababli klimakterik sindromni ilmiy asosda yoritish, mahalliy va xalqaro yondashuvlarni uyg‘unlashtirish, davolashda xavfsizlik va samaradorlik nisbatini to‘g‘ri baholash muhim amaliy vazifa hisoblanadi.

METODOLOGIYA

Maqola nazariy-tahliliy tadqiqot shaklida tayyorlandi. Asosiy metod sifatida mavzuga oid o‘zbekcha tibbiy adabiyotlar, mahalliy ilmiy maqolalar, xalqaro klinik tavsiyalar va zamonaviy dalillarga asoslangan manbalarni qiyosiy tahlil qilish usuli qo‘llandi. Tahlilda klimakterik sindromning ta’rifi, klinik ko‘rinishi, tashxislash mezonlari, davolash yondashuvlari, profilaktika va bemor hayot sifatini yaxshilashga qaratilgan ma’lumotlar ajratib olindi. Maqola empirik bemor ma’lumotlariga tayangan klinik sinov emas, balki mavjud ilmiy manbalar asosida umumlashtirilgan tahliliy maqola sifatida ishlab chiqildi.

Manbalarni tanlashda uchta mezon asos qilib olindi. Birinchi mezon - mavzuga bevosita aloqadorlik. Klimakterik sindrom, menopauza, perimenopauza, postmenopauza, vazomotor simptomlar, urogenital sindrom, menopauzal gormonal terapiya va hayot sifati kabi tushunchalarni yoritgan adabiyotlar tanlandi. Ikkinchi mezon - amaliy ahamiyat. Klinik qaror qabul qilishga yordam beradigan, diagnostika va davolash yondashuvlarini izohlovchi manbalarga ustunlik berildi. Uchinchi mezon - mahalliy sharoitga moslik. O‘zbek tilidagi akusherlik va ginekologiya darsliklari, hamshiralik parvarishi bo‘yicha manbalar va O‘zbekistonda e’lon qilingan ilmiy maqolalar alohida hisobga olindi. Xalqaro manbalar esa klinik tavsiyalarni zamonaviy standartlar bilan taqqoslash uchun ishlatildi.

Tahlil jarayonida klimakterik sindromning klinik belgilari uch asosiy guruhga ajratildi: neyrovegetativ, psixoemotsional va metabolik-endokrin belgilar. Diagnostika bo‘yicha klinik suhbat, hayz anamnezi, somatik fonni baholash, ginekologik ko‘rik, laborator va instrumental tekshiruvlarning o‘rni tahlil qilindi. Davolash yondashuvlari esa gormonal terapiya, nohormonal farmakologik yondashuvlar, psixologik qo‘llab-quvvatlash, turmush tarzini tuzatish, osteoporoz va yurak-qon tomir xavfini kamaytirishga qaratilgan profilaktik strategiyalar kesimida ko‘rib chiqildi.

Tahlil cheklovlari ham mavjud. Birinchidan, mahalliy manbalarda klimakterik sindrom bo‘yicha yirik populyatsion tadqiqotlar yetarli emas. Ikkinchidan, ayrim maqolalarda simptom og‘irligini baholash uchun yagona standart shkalalar qo‘llanmagan. Uchinchidan, gormonal terapiya samaradorligi bo‘yicha natijalar

bemorlarning yoshi, kuzatuv davomiyligi, dozalar, preparat shakllari va fon kasalliklari bilan bog‘liq holda farqlanadi. Shu bois maqolada yakuniy klinik buyruq emas, balki dalillarga tayangan umumiy ilmiy-amaliy yondashuv berildi.

1-jadval. Klimakterik sindrom belgilari va klinik talqini

Belgilar guruhi	Asosiy ko‘rinishlar	Klinik ahamiyati
Neyrovegetativ	Issiq bosishi, kechki terlash, yurak urishining tezlashishi, bosh aylanishi, uyqu buzilishi	Estrogen yetishmovchiligi va markaziy termoregulyatsiya beqarorligi bilan bog‘liq bo‘lib, hayot sifatini tez pasaytiradi
Psixoemotsional	Bezovtalik, jahldorlik, depressiv kayfiyat, xotira va diqqatning susayishi, charchoq	Oilaviy munosabatlar, ijtimoiy faollik va mehnat qobiliyatiga salbiy ta’sir qiladi
Metabolik-endokrin	Tana vaznining ortishi, lipid almashinuvi buzilishi, suyak massasining kamayishi, arterial bosim o‘zgarishi	Yurak-qon tomir kasalliklari, osteoporoz va metabolik sindrom xavfini oshiradi
Urogenital	Qin quruqligi, jinsiy noqulaylik, tez-tez siyish, qaytalanuvchi siydik yo‘li shikoyatlari	Mahalliy estrogen yetishmovchiligi bilan bog‘liq bo‘lib, ko‘pincha yashirin qoladi

NATIJALAR

Adabiyotlar tahlili klimakterik sindromning klinik manzarasi ko‘p qatlamli ekanini ko‘rsatdi. Birinchi natija shundan iboratki, klimakterik sindromni faqat hayzning to‘xtashi bilan tenglashtirish ilmiy jihatdan noto‘g‘ri. Menopauza biologik marker sifatida oxirgi hayzdan keyin ma’lum muddat o‘tgach aniqlansa, klimakterik sindrom aynan o‘tish davrida ham, postmenopauzada ham turli darajada davom etishi mumkin. Demak, bemor shikoyatlarining og‘irligini baholashda kalendar yoshdan

tashqari simptomlarning davomiyligi, intensivligi va kundalik hayotga ta’siri ham asosiy mezon bo‘lishi kerak.

Ikkinchi natija diagnostika jarayoniga taalluqlidir. Tahlil shuni ko‘rsatdiki, 45 yoshdan oshgan ayollarda tipik vazomotor simptomlar va hayz siklining o‘zgarishi ko‘p hollarda klinik tashxis uchun yetarli yo‘nalish beradi. Biroq 40 yoshgacha bo‘lgan ayollarda, noaniq qon ketishlarda, og‘ir somatik kasalliklar fonida yoki gormonal preparatlar qabul qilingan holatlarda laborator tekshiruvlar zarur bo‘ladi. FSH, estradiol, TSH, prolaktin, umumiy qon tahlili, glyukoza, lipid profili, jigar ko‘rsatkichlari, bachadon va tuxumdonlarni ultratovush tekshiruvi, mamologik skrining kabi usullar bemorni xavfsiz baholashga xizmat qiladi. Ammo har bir bemorga barcha tekshiruvlarni bir xil buyurish resurslarni noto‘g‘ri sarflashga olib keladi. Diagnostika shikoyat, yosh va xavf omillariga mos individual tanlanishi kerak.

Uchinchi natija davolashga tegishli. O‘rin bosuvchi gormonal terapiya vazomotor simptomlar, uyqu buzilishi va urogenital shikoyatlarda samarali bo‘lishi mumkin. Bachadoni saqlangan ayollarda estrogen bilan birga endometriyni himoya qiluvchi progestagen komponenti zarurligi, bachadoni olib tashlangan bemorlarda esa estrogen monoterapiyasi masalasi ko‘rib chiqilishi mumkinligi xalqaro tavsiyalarda ham ta’kidlanadi. Biroq gormonal terapiya mutlaq universal vosita emas. Tromboemboliya, ayrim onkologik kasalliklar, og‘ir jigar patologiyasi, tushunarsiz bachadon qon ketishi va yuqori individual xavf mavjud bo‘lgan holatlarda davolash muqobil yo‘llar orqali olib boriladi.

To‘rtinchi natija shuki, klimakterik sindromni davolashda faqat dori vositalari yetarli emas. Jismoniy faollik, tana vaznini me’yorlashtirish, chekishdan voz kechish, spirtli ichimliklardan saqlanish, uyqu gigiyenasi, stressni kamaytirish, kalsiy va D vitamini bilan bog‘liq profilaktika, arterial bosim va qand almashinuvini nazorat qilish davolash samaradorligini oshiradi. Psixoemotsional simptomlar ustun bo‘lgan bemorlarda kognitiv-xulqiy yondashuv, psixologik maslahat va ijtimoiy qo‘llab-quvvatlash alohida ahamiyatga ega. Urogenital simptomlar ustun bo‘lsa, mahalliy davolash usullari tizimli terapiyadan ko‘ra xavfsizroq bo‘lishi mumkin.

Beshinchi natija mahalliy amaliyot uchun muhim: klimakterik davrdagi ayollarda shikoyatlar ko‘pincha arterial gipertenziya, semizlik, qalqonsimon bez kasalliklari, qandli diabet, depressiv holatlar yoki osteoartikulyar og‘riqlar bilan aralashib ketadi. Shu sababli oilaviy shifokor, ginekolog, endokrinolog, kardiolog va psixolog hamkorligi samaradorlikni oshiradi. Ayolning shikoyati “yoshga xos tabiiy holat” sifatida e’tiborsiz qoldirilsa, keyinchalik osteoporoz, yurak-qon tomir xavfi, mehnat qobiliyati pasayishi va surunkali ruhiy charchoq kuchayishi mumkin.

2-jadval. Davolash yondashuvlarini tanlashda amaliy mezonlar

Yondashuv	Qachon muhim	Afzalligi	Cheklovi
Gormonal terapiya	Kuchli vazomotor simptomlar, uyqu buzilishi, hayot sifati pasayishi	Simptomlarni tez kamaytirishi mumkin	Qarshi ko‘rsatmalar va individual xavfni baholash shart
Mahalliy estrogen vositalari	Qin quruqligi, urogenital noqulaylik, mahalliy simptomlar	Tizimli ta’siri kamroq, mahalliy samarasi yuqori	Onkologik xavfda mutaxassis nazorati kerak
Nohormonal dori vositalari	Gormonal terapiya mumkin bo‘lmaganda yoki bemor rad etsa	Ayrim simptomlarni yengillashtiradi	Samaradorligi simptom turiga qarab farqlanadi
Turmush tarzini o‘zgartirish	Barcha bemorlarda, ayniqsa metabolik xavf bo‘lsa	Uzoq muddatli profilaktik foyda beradi	Natija muntazamlik va bemor motivatsiyasiga bog‘liq
Psixologik qo‘llab-quvvatlash	Bezovtalik, depressiv kayfiyat, uyqu buzilishi ustun bo‘lsa	Dori yukini kamaytirishi mumkin	Mutaxassis va vaqt resursini talab qiladi

MUHOKAMA

Klimakterik sindromni muhokama qilishda eng katta xato uni faqat ginekologik yoki faqat psixologik muammo sifatida ko‘rishdir. Aslida estrogen yetishmovchiligi markaziy nerv tizimi, vegetativ regulyatsiya, qon tomir tonusi, suyak remodellashtirish jarayoni, lipid almashinuvi va urogenital to‘qimalarga bir vaqtning o‘zida ta’sir ko‘rsatadi. Shuning uchun bemor bir vaqtning o‘zida issiq bosishi, yurak urishi, asabiylashish, uyqusizlik, jinsiy noqulaylik va vazn ortishidan shikoyat qilishi

mumkin. Bu belgilar alohida-alohida davolansa, asosiy patofiziologik bog‘liqlik e’tibordan chetda qoladi.

Gormonal terapiya masalasida ehtiyotkor, lekin qo‘rqoq bo‘lmagan yondashuv kerak. Xavf mavjudligi sababli uni nazoratsiz tavsiya qilish noto‘g‘ri. Shu bilan birga, asossiz qo‘rquv tufayli simptomlari og‘ir ayolni samarali davodan mahrum qilish ham klinik jihatdan zaif qarordir. To‘g‘ri yondashuv - bemorni tanlash, qarshi ko‘rsatmalarni aniqlash, eng kam samarali dozani tanlash, davolash maqsadini aniq belgilash va muntazam qayta baholashdir. Bemor bachadoni, yoshi, oxirgi hayzdan keyingi davr, tromboz xavfi va oilaviy anamnez davolash rejasini keskin o‘zgartirishi mumkin.

Differensial diagnostika ham muhim. Issiq bosishi va yurak urishi har doim ham klimakterik sindrom natijasi bo‘lmasligi mumkin. Qalqonsimon bez giperfunksiyasi, anemiya, yurak ritmi buzilishlari, vahima xurujlari, dori vositalari ta’siri va infeksion holatlar shunga o‘xshash belgilar berishi mumkin. Uyqusizlik va jahldorlik esa depressiya, surunkali stress yoki oilaviy ijtimoiy omillar bilan kuchayishi mumkin. Demak, klimakterik sindrom tashxisi bemor shikoyatini soddalashtirish emas, balki uni tizimli klinik tahlil qilishni talab qiladi.

O‘zbekiston sharoitida yana bir muhim jihat - bemorlarning tibbiy savodxonligi va profilaktik madaniyatidir. Ko‘plab ayollar menopauza bilan bog‘liq shikoyatlarni yashiradi yoki ularni shifokorga aytishga uyiladi. Urogenital simptomlar, jinsiy noqulaylik, kayfiyatdagi o‘zgarishlar haqida ochiq suhbatlashish darajasi past bo‘lishi mumkin. Natijada shikoyatlar kech aniqlanadi, bemorlar esa xalq tabobati, internet tavsiyalari yoki nazoratsiz biologik qo‘shimchalarga murojaat qiladi. Bu vaziyatda shifokor faqat dori yozuvchi mutaxassis emas, balki tushuntiruvchi, saralovchi va xavfsiz yo‘naltiruvchi maslahatchi bo‘lishi lozim.

Klimakterik sindromni boshqarishda minimal, lekin ishlaydigan algoritm quyidagicha bo‘lishi mumkin: birinchi bosqichda shikoyatlar va hayz anamnezi aniqlanadi; ikkinchi bosqichda og‘irlik darajasi va hayot sifatiga ta’sir baholanadi; uchinchi bosqichda xavf omillari va qarshi ko‘rsatmalar tekshiriladi; to‘rtinchi bosqichda gormonal yoki nohormonal davolash yo‘li tanlanadi; beshinchi bosqichda uch oydan keyin qayta baholash o‘tkaziladi. Bu algoritm haddan tashqari murakkab emas, lekin amaliyotdagi asosiy xatolarni kamaytiradi.

XULOSA

Klimakterik sindrom ayol organizmida reproduktiv funksiyaning susayishi bilan bog‘liq tabiiy jarayon fonida rivojlansa-da, uning klinik ko‘rinishi va oqibatlari har doim ham yengil kechmaydi. U neyrovegetativ, psixoemotsional, metabolik-

endokrin va urogenital belgilar majmuasi sifatida namoyon bo‘lib, bemorning hayot sifati, mehnat qobiliyati, oilaviy munosabatlari va uzoq muddatli salomatligiga ta’sir ko‘rsatadi. Shu sababli klimakterik sindromni “oddiy yoshga xos holat” sifatida emas, balki individual tibbiy baholashni talab qiladigan klinik sindrom sifatida ko‘rish zarur.

Tahlil natijalari diagnostikada klinik anamnez va simptom og‘irligini baholash asosiy o‘rin tutishini, laborator-instrumental tekshiruvlar esa yosh, shikoyat turi va xavf omillariga mos tanlanishi kerakligini ko‘rsatdi. Davolashda o‘rin bosuvchi gormonal terapiya muhim o‘rin egallaydi, ammo u shifokor nazoratisiz, bir xil sxema asosida yoki qarshi ko‘rsatmalarni e’tiborsiz qoldirib qo‘llanmasligi kerak. Nohormonal davolash, mahalliy terapiya, psixologik yordam va turmush tarzini sog‘lomlashtirish kompleks yondashuvning zarur elementlaridir.

Amaliy tavsiya sifatida har bir tibbiy muassasada perimenopauza va postmenopauza davridagi ayollar uchun qisqa skrining savolnomasi, arterial bosim va metabolik xavfni baholash, ginekologik va mamologik nazorat, osteoporoz profilaktikasi bo‘yicha yo‘naltirish tizimi yo‘lga qo‘yilishi maqsadga muvofiq. Bemor bilan ochiq muloqot, individual xavf-foyda tahlili va muntazam kuzatuv klimakterik sindromni samarali boshqarishning asosiy shartidir.

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EKTOPIK HOMILADORLIK: ETIOPATOGENEZ, ERTA TASHXIS VA ZAMONAVIY DAVOLASH YONDASHUVLARI

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ANNOTATSIYA: Ektopik homiladorlik - urug‘langan tuxum hujayraning bachadon bo‘shlig‘idan tashqarida implantatsiyalanishi bilan kechadigan, reproduktiv yoshdagi ayollar salomatligi uchun jiddiy xavf tug‘diruvchi holatdir. Mazkur maqolada ektopik homiladorlikning etiologiyasi, xavf omillari, klinik belgilarining o‘ziga xosligi, erta tashxislash algoritmlari va davolash taktikalarining klinik ahamiyati IMRAD talablari asosida tahlil qilindi. Tadqiqot narrativ sharh usulida olib borildi: o‘zbek tilidagi akusherlik-ginekologiya darsliklari, milliy klinik protokollar, mahalliy ilmiy maqolalar hamda xalqaro tavsiyalar qiyosiy o‘rganildi. Tahlil natijalari shuni ko‘rsatadiki, ektopik homiladorlikda hal qiluvchi masala - xavf guruhini erta aniqlash, transvaginal ultratovush tekshiruvi va β-hCG dinamikasini to‘g‘ri talqin qilish, gemodinamik holatga qarab davolash yo‘lini tanlashdir. Kasallikning klinik ko‘rinishi ba’zan noaniq bo‘lgani uchun kech tashxis qon ketish, shok, reproduktiv imkoniyatning pasayishi va psixologik travma xavfini oshiradi.

Kalit so‘zlar: ektopik homiladorlik, bachadondan tashqari homiladorlik, β-hCG, transvaginal ultratovush, metotreksat, laparoskopiya, reproduktiv salomatlik.

ABSTRACT:Ectopic pregnancy is a potentially life-threatening condition in which the fertilized ovum implants outside the uterine cavity. This article analyzes the etiopathogenesis, risk factors, clinical presentation, early diagnostic approaches and modern management strategies for ectopic pregnancy according to the IMRAD format. A narrative review method was used, including Uzbek obstetrics and gynecology textbooks, national clinical documents, local scientific publications and international recommendations. The analysis demonstrates that early recognition of risk groups, correct interpretation of transvaginal ultrasound findings and serial β-hCG values, and individualized management according to hemodynamic status are central to improving

outcomes. Delayed diagnosis may increase the risk of internal bleeding, shock, loss of reproductive potential and psychological distress.

Keywords: ectopic pregnancy, tubal pregnancy, β-hCG, transvaginal ultrasound, methotrexate, laparoscopy, reproductive health.

KIRISH

Ektopik homiladorlik akusherlik va ginekologiya amaliyotida shoshilinch baholashni talab qiladigan eng muhim patologik holatlardan biridir. Normal homiladorlikda urug‘langan tuxum hujayra bachadon bo‘shlig‘i endometriysiga implantatsiyalanadi. Ektopik holatda esa implantatsiya bachadon nayida, tuxumdonda, bachadon bo‘ynida, kesarcha kesish chandig‘i sohasida, qorin bo‘shlig‘ida yoki boshqa nofiziologik anatomik hududda sodir bo‘ladi. Amaliyotda eng ko‘p uchraydigan shakl bachadon nayiga joylashgan tubal homiladorlikdir. Aynan shu shaklda nay devorining cho‘zilish imkoniyati cheklanganligi sababli klinik xavf tez ortadi.

Mavzuning dolzarbligi bir nechta omillar bilan belgilanadi. Birinchidan, ektopik homiladorlik homiladorlikning erta muddatlarida onalar kasallanishi va ayrim hollarda o‘limiga sabab bo‘lishi mumkin. Ikkinchidan, kasallik ko‘pincha hayz kechikishi, qorin pastki qismida og‘riq, kam miqdordagi qonli ajralma kabi umumiy belgilar bilan boshlanadi va bu belgilar boshqa ginekologik yoki gastroenterologik holatlarga o‘xshab ketadi. Uchinchidan, ektopik homiladorlikning o‘z vaqtida aniqlanmasligi nay yorilishi, ichki qon ketish, shoshilinch jarrohlik zarurati va keyingi reproduktiv salohiyatning pasayishiga olib kelishi mumkin.

So‘nggi yillarda transvaginal ultratovush tekshiruvi, laborator β-hCG monitoringi va minimal invaziv jarrohlik yondashuvlari ektopik homiladorlikni boshqarishda sezilarli yutuqlar berdi. Biroq diagnostika faqat texnik imkoniyatga emas, balki klinik fikrlash madaniyatiga ham bog‘liq. Reproduktiv yoshdagi ayolda qorin pastki qismidagi og‘riq, hayz siklining buzilishi yoki noaniq qon ketish holati kuzatilsa, ektopik homiladorlik differensial tashxis doirasidan chiqarib tashlanmasligi kerak. Shu nuqtai nazardan, mavzuni ilmiy asosda yoritish, xavf omillarini tizimlashtirish va amaliy xulosalarni shakllantirish muhimdir.

Maqolaning maqsadi - ektopik homiladorlikning etiopatogenezi, klinik kechishi, diagnostik mezonlari va zamonaviy davolash yondashuvlarini ilmiy adabiyotlar asosida tahlil qilish hamda erta tashxis va profilaktika bo‘yicha amaliy ahamiyatga ega xulosalarni ishlab chiqishdan iborat. Tadqiqot vazifalari sifatida xavf omillarini guruhlash, klinik belgilarni tahlil qilish, diagnostik algoritmlarning samaradorligini baholash, konservativ va jarrohlik davolash yondashuvlarining qo‘llanish shartlarini umumlashtirish belgilandi.

MATERIALLAR VA METODLAR

Ushbu maqola narrativ adabiyotlar sharhi shaklida tayyorlandi. Tadqiqot materiali sifatida akusherlik va ginekologiya bo‘yicha o‘zbek tilidagi darsliklar, respublika darajasidagi klinik protokollar va standartlar, mahalliy ilmiy maqolalar, shuningdek, ektopik homiladorlik diagnostikasi va davolashiga oid xalqaro tavsiyalar tanlandi. Manbalar tanlanishida ularning mavzuga bevosita aloqadorligi, klinik amaliyotda qo‘llanish imkoniyati, ilmiy asoslanganligi va so‘nggi yillarda chop etilganligi inobatga olindi.

Tahlil jarayonida uch yo‘nalish ustuvor deb olindi. Birinchi yo‘nalish etiologik va patogenetik omillarni aniqlashga qaratildi. Bunda bachadon naylari yallig‘lanish kasalliklari, jinsiy yo‘l bilan yuqadigan infeksiyalar, avvalgi ektopik homiladorlik, naylarga qilingan jarrohlik, yordamchi reproduktiv texnologiyalar, chekish, intrauterin kontratsepsiya fonida yuzaga kelgan homiladorlik va yosh omili alohida ko‘rib chiqildi. Ikkinchi yo‘nalishda klinik belgilarning diagnostik qiymati baholandi. Uchinchi yo‘nalishda transvaginal ultratovush, β-hCG dinamikasi va klinik kuzatuv natijalari asosida davolash taktikasini tanlash mexanizmlari o‘rganildi.

Maqola nazariy-tahliliy xarakterga ega bo‘lgani uchun unda bemorlar bilan bevosita klinik tajriba o‘tkazilmadi. Shunga qaramay, tahlil klinik qaror qabul qilish jarayoniga yaqinlashtirilgan holda olib borildi. Natijalar tasviriy, qiyosiy va mantiqiy umumlashtirish usullari bilan qayta ishlanib, xavf omillari, tashxis va davolash yondashuvlari alohida bloklarga ajratildi. Bunday metodologiya mavzuni xalqaro maqola formatiga mos, ammo amaliy tibbiyot uchun tushunarli tarzda yoritish imkonini beradi.

NATIJALAR

Adabiyotlar tahlili ektopik homiladorlik ko‘p omilli etiologiyaga ega ekanini ko‘rsatadi. Patogenezning markazida ko‘pincha urug‘langan tuxum hujayraning bachadon bo‘shlig‘iga o‘z vaqtida yetib bormasligi turadi. Bachadon nayining shilliq qavati, kiprikchali epiteliy harakati va nay peristaltikasi buzilganda embrionning transporti sekinlashadi. Natijada implantatsiya bachadon nayining ampulyar, istmik yoki interstitsial qismida sodir bo‘lishi mumkin. Yallig‘lanishdan keyingi chandiqlanish, endosalpingit, nay ichki bo‘shlig‘ining torayishi va funksional diskoordinatsiya ushbu jarayonni kuchaytiradi.

Xavf omillari orasida avval o‘tkazilgan kichik chanoq a’zolari yallig‘lanish kasalliklari alohida o‘rin egallaydi. Chlamydia trachomatis va boshqa infeksiyalar bilan bog‘liq salpingit naylarning morfologik va funksional shikastlanishiga olib kelishi mumkin. Avvalgi ektopik homiladorlik ham muhim prediktor hisoblanadi,

chunki naylarning struktur o‘zgarishi yoki asosiy xavf omili saqlanib qolgan bo‘lishi mumkin. Naylarga qilingan operatsiyalar, bepushtlikni davolash usullari, endometrioz va yordamchi reproduktiv texnologiyalar ham ektopik implantatsiya ehtimolini oshiruvchi holatlar sifatida baholanadi.

1-jadval. Ektopik homiladorlik xavf omillarining klinik guruhlanishi

Xavf omili	Patogenetik izoh	Klinik ahamiyati
Kichik chanoq yallig‘lanish kasalliklari	Nay epiteliyi va peristaltikasi zararlanadi	Erta skrining va infeksiya profilaktikasini talab qiladi
Avvalgi ektopik homiladorlik	Qaytalanuvchi tubal disfunksiya ehtimoli mavjud	Keyingi homiladorlikda erta UTT zarur
Naylarda jarrohlik amaliyoti	Chandiqlanish va anatomik torayish yuzaga keladi	Homiladorlik boshlanishi bilan xavf baholanadi
Yordamchi reproduktiv texnologiyalar	Embriotransfer va tubal omil fonida nofiziologik implantatsiya xavfi ortadi	Maxsus kuzatuv va β-hCG monitoringi kerak
Chekish va yosh omili	Nay transporti va gormonal muvozanatga salbiy ta’sir ko‘rsatadi	Profilaktik maslahat va risk stratifikatsiyasi muhim

Klinik belgilar tahlili shuni ko‘rsatadiki, ektopik homiladorlik doim ham klassik uchlik bilan namoyon bo‘lmaydi. Hayz kechikishi, qorin pastki qismida og‘riq va qonli ajralma ko‘p uchrasa-da, ayrim bemorlarda klinik manzara juda xira bo‘ladi. Og‘riq bir tomonlama, sanchuvchi, tortuvchi yoki tarqoq bo‘lishi mumkin. Gemodinamik beqarorlik, bosh aylanishi, hushdan ketish, terining oqarishi, puls tezlashishi va arterial bosim pasayishi esa nay yorilishi yoki ichki qon ketish ehtimolini kuchaytiradi. Bunday vaziyatda diagnostika jarayoni kechiktirilmasligi kerak.

Diagnostikada transvaginal ultratovush tekshiruvi va β-hCG darajasini dinamik baholash asosiy o‘rin tutadi. Bachadon bo‘shlig‘ida homila tuxumi aniqlanmasligi, adneksal sohada massa ko‘rinishi, qorin bo‘shlig‘ida erkin suyuqlik bo‘lishi ektopik homiladorlik ehtimolini oshiradi. Biroq bitta laborator ko‘rsatkich yoki bitta ultratovush xulosasi har doim yakuniy tashxisni bermaydi. Ayniqsa, homiladorlik

joylashuvi noma'lum bo'lgan holatlarda takroriy tekshiruv, klinik kuzatuv va laborator dinamika birgalikda baholanishi lozim.

2-jadval. Tashxis va davolash qarorini belgilovchi asosiy mezonlar

Mezon	Baholash yo'nalishi	Qarorga ta'siri
Gemodinamik holat	Qon bosimi, puls, hush holati, ichki qon ketish belgilari	Beqaror holatda shoshilinch jarrohlik ustuvor
Transvaginal UTT	Bachadon ichi homiladorligi, adneksal massa, erkin suyuqlik	Tashxisni aniqlashtiradi va davolash yo'lini tanlaydi
β-hCG dinamikasi	Ketma-ket o'lchovlarda o'sish yoki pasayish sur'ati	Kuzatuv, dori yoki jarrohlik yondashuvini asoslaydi
Klinik simptomlar	Og'riq kuchi, qonli ajralma, umumiy ahvol	Faol aralashuv zaruratini ko'rsatadi
Fertilitet rejasi	Kelajakda farzand ko'rish istagi va naylarning holati	Organ saqlovchi yondashuv muhokama qilinadi

Davolash strategiyalari uch asosiy yo'nalishga ajratiladi: kutish-kuzatish taktikasi, dori bilan davolash va jarrohlik davolash. Kutish-kuzatish yondashuvi faqat klinik holati barqaror, og'riq va qon ketish belgilari kuchli bo'lmagan, β-hCG darajasi pasayishga moyil va muntazam nazoratga kelishi mumkin bo'lgan bemorlarda ko'rib chiqiladi. Bunday yondashuvda asosiy xavf - bemorning kuzatuvdan chiqib ketishi yoki klinik holatning kutilmaganda og'irlashishidir. Shuning uchun bu taktika qat'iy tanlov mezonlari asosida qo'llanishi kerak.

Dori bilan davolashda metotreksat asosiy o'rin tutadi. U trofoblast to'qimasining o'sishini to'xtatishga qaratilgan bo'lib, faqat gemodinamik barqaror, nay yorilishi belgilari bo'lmagan va laborator nazoratga rioya qilishi mumkin bo'lgan bemorlarda tanlanadi. Bu usul jarrohlikdan qochish, nayni saqlab qolish va tiklanish davrini qisqartirish imkonini berishi mumkin. Shu bilan birga, metotreksat qo'llashda qarshi ko'rsatmalar, keyingi homiladorlikni rejalashtirish muddati va laborator monitoring masalalari qat'iy nazorat qilinadi.

Jarrohlik davolash gemodinamik beqarorlik, nay yorilishi, qorin bo'shlig'ida sezilarli qon ketish, dori bilan davolashning samarasizligi yoki ayrim anatomik

joylashuvlarda asosiy yondashuv hisoblanadi. Minimal invaziv laparoskopiya ko‘plab holatlarda afzal bo‘lsa-da, og‘ir qon ketish yoki texnik imkoniyat cheklangan vaziyatlarda laparotomiya talab qilinishi mumkin. Operatsiya hajmi bemorning umumiy ahvoli, homiladorlik joylashuvi, qarama-qarshi nayning holati va kelajakdagi fertilitet rejasiga qarab belgilanadi.

MUHOKAMA

Ektopik homiladorlikni boshqarishdagi eng katta xato - uni faqat aniq klinik belgilar paydo bo‘lgandan keyin izlashdir. Amaliyotda bu yondashuv kechikkan tashxisga olib keladi. To‘g‘ri strategiya aksincha bo‘lishi kerak: reproduktiv yoshdagi ayolda erta homiladorlik ehtimoli bor ekan, qorin og‘rig‘i va noaniq qon ketish ektopik homiladorlik nuqtai nazaridan baholanishi zarur. Ayniqsa, avvalgi ektopik homiladorlik, yallig‘lanish kasalliklari yoki nay jarrohligi bo‘lgan bemorlar oddiy xavf guruhiga emas, yuqori klinik hushyorlik guruhiga kiritilishi kerak.

Milliy va xalqaro manbalar o‘rtasidagi umumiylik shundaki, barcha yondashuvlar erta tashxis, individual risk baholash va bemorga tushunarli ma’lumot berishni markaziy prinsip sifatida ko‘radi. Farq esa resurslar, laborator monitoring imkoniyati va shoshilinch jarrohlik xizmatining mavjudligida namoyon bo‘ladi. Shu sababli O‘zbekiston sharoitida ektopik homiladorlik bo‘yicha profilaktik va diagnostik ishlarni faqat ixtisoslashgan markazlarga bog‘lab qo‘yish yetarli emas. Birlamchi bo‘g‘in, oilaviy poliklinika va tez tibbiy yordam xodimlarida ham ektopik homiladorlikka nisbatan diagnostik hushyorlik shakllanishi lozim.

Yana bir muhim masala - psixologik va reproduktiv reabilitatsiyadir. Ektopik homiladorlik ko‘pincha faqat shoshilinch jarrohlik yoki dori bilan davolash muammosi sifatida ko‘riladi. Aslida esa bemor homiladorlik yo‘qotilishi, kelajakdagi homiladorlikdan qo‘rquv, qaytalanish xavfi va oilaviy rejalarga ta’sir kabi murakkab psixologik yuklamani boshdan kechiradi. Shuning uchun davolashdan keyingi maslahat, keyingi homiladorlikda erta ultratovush tekshiruvi va reproduktiv reja bo‘yicha individual tavsiyalar klinik jarayonning ajralmas qismi bo‘lishi kerak.

Tahlil shuni ko‘rsatadiki, ektopik homiladorlikning oldini olishda infeksiyalarni erta aniqlash va davolash, xavfsiz jinsiy xulq-atvor bo‘yicha tibbiy-ma’rifiy ishlar, abort va kichik chanoq yallig‘lanish kasalliklaridan keyingi reabilitatsiya, bepushtlikni davolashda tubal omilni to‘g‘ri baholash muhim o‘rin tutadi. Profilaktika faqat kasallik paydo bo‘lgandan keyingi aralashuv emas, balki reproduktiv salomatlikni muntazam qo‘llab-quvvatlash tizimi sifatida tushunilishi kerak.

XULOSA

Ektopik homiladorlik reproduktiv yoshdagi ayollar uchun yuqori klinik ahamiyatga ega, erta tashxis qo‘yilmasa hayot uchun xavf tug‘dirishi mumkin bo‘lgan patologik holatdir. Uning eng ko‘p uchraydigan shakli tubal homiladorlik bo‘lib, asosiy patogenetik mexanizm urug‘langan tuxum hujayraning bachadon bo‘shlig‘iga fiziologik transporti buzilishi bilan bog‘liq. Xavf omillarini aniqlash, xususan, avvalgi ektopik homiladorlik, nay jarrohligi, kichik chanoq yallig‘lanish kasalliklari, yordamchi reproduktiv texnologiyalar va infeksion omillarni baholash erta tashxisning muhim qismidir.

Tashxis qo‘yishda transvaginal ultratovush tekshiruvi, β-hCG dinamikasi va klinik belgilarning kompleks tahlili eng ishonchli yondashuv hisoblanadi. Bitta belgi yoki bitta laborator natija asosida shoshilinch xulosa chiqarish noto‘g‘ri bo‘lishi mumkin; bemorning umumiy ahvoli, gemodinamik ko‘rsatkichlari va kuzatuvga rioya qilish imkoniyati birgalikda baholanadi. Davolashda kutish-kuzatish, metotreksat bilan dori terapiyasi va jarrohlik usullari mavjud bo‘lib, har birining o‘z tanlov mezonlari, afzalliklari va xavflari bor.

Amaliy jihatdan eng samarali yo‘l - birlamchi bo‘g‘indan boshlab klinik hushyorlikni kuchaytirish, xavf guruhidagi ayollarni erta ultratovush nazoratiga yo‘naltirish, shoshilinch holatlarni kechiktirmasdan ixtisoslashgan yordamga yuborish va davolashdan keyin reproduktiv hamda psixologik maslahatni ta’minlashdir. Shu tarzda ektopik homiladorlik bilan bog‘liq og‘ir asoratlarni kamaytirish, ayolning hayoti va kelajakdagi fertilitetini saqlab qolish imkoniyati oshadi.

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Annotatsiya: Maqolada o‘smirlar ginekologiyasida hayz sikli buzilishlarining klinik-morfologik va funksional xususiyatlari tahlil qilinadi. O‘smirlik davrida gipotalamo-gipofizar-tuxumdon tizimi hali to‘liq barqarorlashmaganligi sababli siklning vaqtincha notekisligi fiziologik holat sifatida uchrashi mumkin. Biroq uzoq davom etuvchi amenoreya, tez-tez yoki juda siyrak hayz ko‘rish, ko‘p qon ketishi, kuchli og‘riqli hayz va anemiya belgilari reproduktiv salomatlikka xavf tug‘diradigan klinik signal hisoblanadi. Maqolaning maqsadi hayz buzilishlarini o‘smir yoshiga xos etiologik omillar, diagnostik yondashuvlar, profilaktika va davolash tamoyillari asosida tizimli yoritishdan iborat. Tahlil natijalari hayz siklini faqat ginekologik belgi emas, balki umumiy endokrin, gematologik, ovqatlanish, ruhiy-emotsional va ijtimoiy holatni aks ettiruvchi muhim klinik ko‘rsatkich sifatida baholash zarurligini ko‘rsatadi.

Kalit so‘zlar: o‘smirlar ginekologiyasi, hayz sikli, amenoreya, anomal bachadon qon ketishi, dismenoreya, reproduktiv salomatlik, anemiya, gormonal muvozanat.

Abstract: This article analyzes menstrual cycle disorders in adolescent gynecology from clinical, functional and preventive perspectives. During adolescence, irregular cycles may occur because the hypothalamic-pituitary-ovarian axis is still maturing. Nevertheless, prolonged amenorrhea, very frequent or very rare menstruation, excessive bleeding, severe dysmenorrhea and signs of anemia should be interpreted as clinically significant indicators requiring timely evaluation. The purpose of the article is to describe menstrual disorders in adolescents according to age-specific etiological factors, diagnostic principles, preventive measures and management approaches. The analysis shows that the menstrual cycle should not be treated only as a gynecological symptom. It is an important clinical marker reflecting endocrine balance, hematological status, nutrition, stress load and social well-being of adolescent girls.

Keywords: adolescent gynecology, menstrual cycle, amenorrhea, abnormal uterine bleeding, dysmenorrhea, reproductive health, anemia, hormonal regulation.

Kirish

O‘smirlar ginekologiyasi pediatriya, akusherlik-ginekologiya, endokrinologiya, gematologiya va psixologiya tutashgan murakkab klinik yo‘nalishdir. Bu sohada eng ko‘p uchraydigan muammolardan biri hayz sikli buzilishlari hisoblanadi. Hayz siklining shakllanishi qiz bola organizmining pubertat davriga kirgani, gipotalamo-gipofizar-tuxumdon tizimi faollashgani, bachadon endometriysi gormonal o‘zgarishlarga javob bera boshlagani bilan bog‘liq. Shu sababli menarxedan keyingi dastlabki yillarda siklning ma’lum darajada notekis bo‘lishi har doim patologiya degani emas. Ammo bu holatni mutlaqo e’tiborsiz qoldirish ham xato. Chunki o‘smir yoshidagi hayz buzilishi kelajakdagi reproduktiv faoliyat, somatik salomatlik, psixoemotsional barqarorlik va hayot sifatiga bevosita ta’sir qilishi mumkin.

Mavzuning dolzarbligi shundaki, hayz sikli buzilishlari o‘smir qizlarda ko‘pincha kech murojaat qilish, uyalish, noto‘g‘ri xalqona tushunchalar, oila a’zolarining yetarli ma’lumotga ega emasligi yoki tibbiy tekshiruvdan cho‘chish sababli vaqtida aniqlanmaydi. Natijada oddiy kuzatuv va maslahat yetarli bo‘ladigan holatlar ham anemiya, surunkali og‘riq, o‘qish faoliyatining pasayishi, ijtimoiy cheklanish va psixologik zo‘riqish bilan murakkablashishi mumkin. Ayniqsa ko‘p qon ketishi, hayzlar orasida qisqa interval bo‘lishi, uch oydan ortiq hayz kelmasligi, kuchli og‘riq, ozib ketish yoki semirish bilan birga kechuvchi sikl buzilishlari chuqur klinik baholashni talab qiladi.

Ilmiy nuqtai nazardan hayz sikli o‘smir organizmining umumiy sog‘lom rivojlanishini ko‘rsatuvchi muhim indikator sifatida qaraladi. Qon bosimi, tana harorati, yurak urish tezligi kabi hayzning muntazamligi ham organizmdagi muvozanat haqida axborot beradi. Siklning juda uzun yoki juda qisqa bo‘lishi, qon ketish miqdorining ortishi, og‘riqning kuchayishi yoki ikkilamchi amenoreya endokrin kasalliklar, qalqonsimon bez disfunksiyasi, polikistoz tuxumdon sindromi, qon ivish tizimi kasalliklari, ovqatlanish buzilishlari, surunkali stress va ayrim dori vositalari ta’siri bilan bog‘liq bo‘lishi mumkin.

Adabiyotlar tahlili

O‘zbek va xalqaro tibbiy adabiyotlarda hayz sikli buzilishlari reproduktiv tizimning funksional va organik kasalliklari bilan uzviy bog‘liq holat sifatida yoritiladi. Akusherlik va ginekologiya darsliklarida hayz siklining tuxumdon va bachadon fazalari, estrogen va progesteron ta’siri, gipofiz gonadotrop gormonlari bilan boshqarilishi asosiy nazariy poydevor sifatida talqin qilinadi. Bu yondashuv o‘smir

qizlarda uchraydigan buzilishlarni tushunishda muhimdir, chunki pubertat davrida aynan markaziy boshqaruv mexanizmlarining yetilishi davom etadi.

Xalqaro klinik manbalarda o‘smirlarda anomal bachadon qon ketishining asosiy sababi ko‘pincha ovulyator disfunksiya bilan bog‘lanadi. Bu holat gipotalamo-gipofizar-tuxumdon o‘qining yetilmaganligi natijasida yuzaga chiqadi. Shu bilan birga, ko‘p qon ketishi bilan kelgan o‘smir qizlarda faqat gormonal sabablarni taxmin qilish yetarli emas. Qon ivish tizimi kasalliklari, xususan fon Villebrand kasalligi, trombotsit funksiyasi buzilishlari, qalqonsimon bez kasalliklari, homiladorlik bilan bog‘liq holatlar, infeksion jarayonlar va dori vositalarining ta’siri ham istisno qilinishi kerak. Bu fikr maqolaning klinik pozitsiyasi uchun asosiy mezonlardan biridir: o‘smir hayz buzilishi oddiy “yoshga xos” holat deb yengil baholanmasligi lozim.

Mahalliy manbalarda hayz buzilishlari odatda amenoreya, gipomenstrual sindrom, gipermenstrual sindrom, dismenoreya va bachadondan disfunksional qon ketish shakllarida tasniflanadi. Ushbu tasnif amaliy o‘quv jarayonida qulay bo‘lsa-da, zamonaviy klinik yondashuvda simptomning davomiyligi, qon ketish miqdori, sikl intervali, anemiya mavjudligi, umumiy somatik belgilar va bemorning hayot sifatiga ta’siri alohida baholanishi kerak. Chunki bir xil “hayz buzilishi” atamasi ortida tamoman boshqa patogenezga ega holatlar yashiringan bo‘lishi mumkin.

So‘nggi yillarda menstrual salomatlik faqat gigiyena masalasi emas, balki sog‘liq, ta’lim, huquq, psixologik farovonlik va gender sezgir tibbiy xizmatlar bilan bog‘liq muammo sifatida baholanmoqda. O‘smir qizning hayz haqida yetarli bilimga ega bo‘lishi, hayz kunlarida xavfsiz gigiyena vositalaridan foydalanishi, maktab yoki kollej sharoitida zarur sanitariya imkoniyatlariga ega bo‘lishi ham klinik natijalarga ta’sir qiladi. Demak, hayz sikli buzilishlarini tahlil qilishda biologik sabablar bilan birga ijtimoiy-gigiyenik va psixologik omillar ham hisobga olinishi shart.

Material va metodlar

Maqola ilmiy-nazariy tahlil usulida tayyorlandi. Tahlil uchun o‘zbek tilidagi akusherlik va ginekologiya darsliklari, o‘smirlar ginekologiyasiga oid o‘quv-uslubiy manbalar, hayz sikli buzilishlariga bag‘ishlangan mahalliy maqolalar hamda xalqaro klinik tavsiyalar o‘rganildi. Materiallar tanlashda uchta mezon asos qilib olindi: birinchidan, manbaning bevosita o‘smirlar yoki reproduktiv yoshdagi ayollarda hayz sikli buzilishlarini yoritishi; ikkinchidan, etiologiya, diagnostika va profilaktika bo‘yicha amaliy ahamiyatga ega bo‘lishi; uchinchidan, klinik yondashuvning zamonaviy xalqaro tasniflar bilan mos kelishi.

Metodologik yondashuv sifatida taqqoslash, klinik-tasnifiy guruhlash, sabab-oqibat aloqalarini tahlil qilish va umumlashtirish usullaridan foydalanildi. Hayz sikli

buzilishlari quyidagi asosiy mezonlar bo‘yicha baholandi: sikl davomiyligi, qon ketish muddati, qon ketish miqdori, og‘riq darajasi, menarxedan keyingi vaqt, umumiy somatik belgilar, anemiya ehtimoli, endokrin belgilar, ovqatlanish va stress omillari. Bunday yondashuv o‘smir qizlarda fiziologik moslashuv jarayoni bilan patologik holatni farqlash imkonini beradi.

Natijalar

Tahlil natijalari shuni ko‘rsatadiki, o‘smirlar ginekologiyasida hayz sikli buzilishlari bir xil sababga ega yagona holat emas. Ular fiziologik yetilish, gormonal boshqaruvning beqarorligi, endokrin kasalliklar, qon ivish tizimi buzilishlari, stress, ovqatlanish yetishmovchiligi, tana vaznining keskin o‘zgarishi, kuchli jismoniy yuklama va ayrim yallig‘lanish jarayonlari bilan bog‘liq bo‘lishi mumkin. Shuning uchun klinik baholashda eng xavfli xato - barcha o‘smir qizlardagi notekis hayzni “o‘tib ketadi” deb baholashdir.

Hayz sikli buzilishlarining asosiy klinik shakllari quyidagi jadvalda umumlashtirildi.

Klinik shakl	**Asosiy belgi**	**Ehtimoliy sabablar**	**Baholash zarurati**
Birlamchi amenoreya	Menarxening kutilgan yoshdan keyin ham boshlanmasligi	Jinsiy rivojlanish kechikishi, anatomik yoki endokrin sabablar	Pediatr, ginekolog va endokrinolog ko‘rigi zarur
Ikkilamchi amenoreya	Avval bo‘lgan hayzning uzoq muddat to‘xtashi	Stress, vazn kamayishi, qalqonsimon bez kasalligi, gormonal disfunksiya	Homiladorlik va endokrin sabablar istisno qilinadi
Oligomenoreya	Hayzlar orasidagi intervalning uzayishi	Ovulyator disfunksiya, PCOS ehtimoli, tana vazni o‘zgarishi	Davomiy kuzatuv va gormonal baholash kerak
Polimenoreya	Hayzlar orasidagi intervalning qisqarishi	Gormonal beqarorlik, yallig‘lanish, stress	Qon yo‘qotish va anemiya belgilariga e’tibor beriladi

Anomal bachadon qon ketishi	Juda ko‘p, uzoq yoki tartibsiz qon ketishi	Anovulyatsiya, koagulopatiya, qalqonsimon bez disfunksiyasi	Gemoglobin, ivish tizimi va umumiy holat baholanadi
Dismenoreya	Hayz paytida kuchli og‘riq	Prostaglandinlar faolligi, endometrioz ehtimoli, yallig‘lanish	Og‘riq hayot sifatini buzsa, tekshiruv shart

Natijalardan ko‘rinadiki, o‘smirlar hayz buzilishida birinchi diagnostik savol siklning menarxedan keyingi qaysi davrda buzilganidir. Menarxedan keyingi dastlabki ikki yil ichida siklning notekis bo‘lishi ko‘proq fiziologik yetilish bilan bog‘liq bo‘lishi mumkin. Ammo qon ketish juda ko‘p bo‘lsa, hayz sakkiz kundan ortiq davom etsa, gemoglobin pasaysa, qiz bola tez charchasa, rangi oqarib ketsa yoki hayzlar orasidagi tanaffus uch oydan ortsa, bu holat klinik tekshiruvni talab qiladi.

Ikkinchi muhim natija shuki, anomal bachadon qon ketishida gematologik sabablar alohida e’tiborni talab qiladi. O‘smir qizlarda birinchi hayzlardan boshlab kuchli va uzoq qon ketishi kuzatilsa, tez-tez burun qonashi, milk qonashi, ko‘karishlar, oilada qon ivish kasalliklari bo‘lsa, buni oddiy gormonal notekislik deb qabul qilish xavfli. Bunday holatda umumiy qon tahlili, ferritin, trombotsitlar, koagulyatsion ko‘rsatkichlar va zaruratga ko‘ra gematolog maslahatiga ehtiyoj tug‘iladi.

Uchinchi natija shundan iboratki, o‘smirlarda hayz sikli buzilishi ko‘pincha hayot tarzi bilan chambarchas bog‘liq. Uyqu yetishmasligi, doimiy stress, imtihonlar davridagi psixologik bosim, noto‘g‘ri ovqatlanish, temir yetishmovchiligi, haddan tashqari sport yuklamasi yoki aksincha kamharakatlik siklning muntazamligiga ta’sir qiladi. Shuning uchun davolash faqat dori vositasi bilan cheklanmasligi kerak; ovqatlanish, temir almashinuvi, ruhiy holat, jismoniy faollik va gigiyenik ko‘nikmalar kompleks ko‘rib chiqilishi lozim.

Muhokama

O‘smirlar ginekologiyasida hayz sikli buzilishlariga yondashuvda ikki qarama-qarshi xatolik uchraydi. Birinchi xatolik - har qanday notekis hayzni patologiya deb baholab, ortiqcha dori vositalarini erta boshlash. Ikkinchi xatolik - barcha buzilishlarni “yoshga xos” deb hisoblab, xavfli belgilarni o‘tkazib yuborish. Ilmiy asoslangan yondashuv ushbu ikki chekka pozitsiya o‘rtasidagi muvozanatni talab qiladi. Ya’ni o‘smir organizmining fiziologik yetilish jarayonini tan olish, ammo ogohlantiruvchi klinik belgilarni qat’iy baholash kerak.

Hayz siklining normal shakllanishi markaziy nerv tizimi, gipotalamus, gipofiz, tuxumdon va bachadon endometriysi o‘rtasidagi murakkab gormonal aloqa bilan belgilanadi. O‘smirlikda bu tizim barqaror ishlashga o‘tish jarayonida bo‘ladi. Shu sababli anovulyator sikllar ko‘p uchraydi. Anovulyatsiyada sariq tana yetarli shakllanmaydi, progesteron ta’siri sustlashadi, endometriy bir maromda sekretor o‘zgarishga o‘tmaydi. Natijada qon ketish vaqti, davomiyligi va miqdori buzilishi mumkin. Bu mexanizm fiziologik tushuntirish beradi, lekin u klinik nazoratdan voz kechish uchun asos bo‘la olmaydi.

Amenoreya alohida e’tibor talab qiladi. Birlamchi amenoreyada jinsiy rivojlanish belgilarining mavjudligi yoki yo‘qligi, bo‘y o‘sishi, tana vazni, ikkilamchi jinsiy belgilar, tug‘ma anatomik to‘siqlar va endokrin sabablar baholanadi. Ikkilamchi amenoreyada esa homiladorlik ehtimoli, stress, vazn kamayishi, sport yuklamasi, qalqonsimon bez faoliyati, prolaktin ko‘payishi va polikistoz tuxumdon sindromi ko‘rib chiqiladi. Bu yerda eng muhim prinsip shuki, amenoreya mustaqil tashxis emas, balki sababni izlashga undaydigan klinik belgidir.

Dismenoreya ham o‘smirlar orasida keng uchraydi. Birlamchi dismenoreya ko‘pincha ovulyator sikllar shakllana boshlagandan keyin prostaglandinlar ta’siri bilan bog‘liq bo‘ladi. Ammo og‘riq juda kuchli bo‘lsa, maktabga qatnashga to‘sqinlik qilsa, oddiy og‘riq qoldirish yondashuvlariga javob bermasa yoki hayzdan tashqari davrda ham og‘riq kuzatilsa, ikkilamchi sabablar - endometrioz, yallig‘lanish, anatomik o‘zgarishlar yoki boshqa patologiyalarni istisno qilish zarur. Demak, og‘riqni “hamma qizlarda bo‘ladi” deb e’tiborsiz qoldirish noto‘g‘ri.

Ko‘p qon ketishi bilan kechuvchi buzilishlar o‘smirning jismoniy va aqliy faoliyatiga bevosita ta’sir qiladi. Surunkali qon yo‘qotish temir tanqisligi va anemiyaga olib keladi. Anemiya esa tez charchash, bosh aylanishi, diqqatning pasayishi, jismoniy mashqlarga chidamsizlik, uyquchanlik va o‘qish samaradorligining kamayishi bilan namoyon bo‘lishi mumkin. Shu sababli hayz buzilishi faqat ginekologik muammo emas, balki ta’lim va ijtimoiy moslashuvga ham ta’sir qiladigan tibbiy-ijtimoiy muammodir.

Diagnostik yondashuvda anamnez eng muhim bosqich hisoblanadi. Shifokor menarxe yoshi, sikl davomiyligi, qon ketish miqdori, hayz davomiyligi, og‘riq xarakteri, oxirgi hayz sanasi, tana vazni o‘zgarishi, ovqatlanish, sport, stress, dori vositalari, oilaviy tarix va qon ketishga moyillik belgilarini aniqlashi kerak. O‘smir bilan muloqot maxfiylik, hurmat va yoshga mos tushuntirish tamoyillari asosida olib borilishi lozim. Qo‘rqitish, ayblash yoki noqulay savollarni bevosita bosim bilan berish klinik ishonchni buzadi va ma’lumotning to‘liq olinmasligiga olib keladi.

Davolash tamoyillari sababga, qon ketish og‘irligiga, anemiya darajasiga, umumiy holatga va bemorning yoshiga qarab belgilanadi. Yengil funksional buzilishlarda hayz kalendarini yuritish, ovqatlanishni yaxshilash, temir tanqisligini korreksiya qilish, uyqu-gigiyena rejimini tiklash, stressni kamaytirish va kuzatuv yetarli bo‘lishi mumkin. Og‘ir qon ketishi, anemiya yoki endokrin kasallik belgilarida esa shifokor nazoratida laborator va instrumental tekshiruvlar, zarur hollarda gormonal yoki nogormonal davolash usullari qo‘llanadi. Dori vositalarini mustaqil qabul qilish, ayniqsa gormonal preparatlarni maslahatlashmasdan ishlatish, o‘smir salomatligi uchun xavf tug‘diradi.

Amaliy yondashuvni quyidagi qisqa algoritm shaklida ifodalash mumkin.

Bosqich	Baholanadigan jihat	Klinik maqsad
1	Menarxe yoshi, sikl kalendari, hayz davomiyligi	Fiziologik moslashuv va patologik buzilishni ajratish
2	Qon ketish miqdori, holsizlik, bosh aylanishi, rang oqarishi	Anemiya va gemodinamik xavfni baholash
3	Tana vazni, ovqatlanish, sport, stress, uyqu	Hayot tarzi bilan bog‘liq sabablarni aniqlash
4	Akne, tuklanish, semirish, qalqonsimon bez belgilarini tekshirish	Endokrin etiologiyani taxmin qilish
5	Oila tarixi, burun yoki milk qonashi, ko‘karishlar	Koagulopatiya ehtimolini istisno qilmaslik
6	Laborator va UTT tekshiruvlari	Sababga yo‘naltirilgan davolash rejasini tuzish

Xulosa

O‘smirlar ginekologiyasida hayz sikli buzilishlari ko‘p omilli, klinik jihatdan turlicha kechadigan va kelajak reproduktiv salomatligiga ta’sir qilishi mumkin bo‘lgan muhim muammodir. Menarxedan keyingi dastlabki yillarda siklning ayrim notekisliklari fiziologik bo‘lishi mumkin, biroq uzoq davom etuvchi amenoreya, ko‘p qon ketishi, kuchli dismenoreya, anemiya belgilari, tana vaznining keskin o‘zgarishi yoki endokrin belgilar bilan kechuvchi buzilishlar albatta tibbiy baholashni talab qiladi.

Maqola tahlili shuni ko‘rsatadiki, hayz sikli o‘smir qizlarda organizm umumiy holatini aks ettiruvchi muhim klinik ko‘rsatkich sifatida qaralishi kerak. Diagnostik yondashuv faqat ginekologik ko‘rik bilan chegaralanmasdan, endokrin, gematologik,

nutritiv, psixologik va ijtimoiy omillarni ham qamrab olishi zarur. Ayniqsa ko‘p qon ketishi bilan kelgan o‘smir qizlarda anemiya va qon ivish tizimi buzilishlarini erta aniqlash kelajakdagi asoratlarning oldini oladi.

Amaliy tavsiya sifatida o‘smir qizlarga hayz kalendarini yuritish, hayz davomiyligi va qon ketish miqdorini kuzatish, kuchli og‘riq yoki holsizlikni yashirmaslik, temirga boy ovqatlanish, uyqu rejimini me’yorlashtirish va shifokorga o‘z vaqtida murojaat qilish tushuntirilishi kerak. Ta’lim muassasalarida menstrual salomatlik bo‘yicha ilmiy asoslangan, uyalish va stigmani kamaytiradigan profilaktik suhbatlar tashkil etilishi zarur. Eng muhim xulosa shuki, o‘smirdagi hayz buzilishi mayda shikoyat emas; u to‘g‘ri baholansa, ko‘plab endokrin, gematologik va reproduktiv muammolarni erta aniqlash imkonini beradi.

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SOG‘LOM TURMUSH TARZINI SHAKLLANTIRISHDA TO‘G‘RI OVQATLANISHNING AXAMIYATI

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Annotasiya. Ma'lumki, to‘g‘ri va muvozanatli ovqatlanish tufayli inson o‘z emosional va jismoniy salomatligini ta'minlay oladi. Ushbu maqolada to‘gri ovqatlanish sog‘lom turmush tarzining eng muhim jihati sifatida, oziqlanish tanamizning hayotiy faoliyatining asosiy manbai sifatida ko‘rib chiqiladi. Shuningdek sog‘lom turmush tarzining ajralmas qismi bo‘lgan gigiena qoidalariga rioya qilish ko‘plab kasalliklardan himoya qilishi va tananing yaxshi ishlashi uchun imkoniyat yaratishi xaqida to‘xtalib o‘tiladi.

Kalit so‘zlar: sog‘lom turmush tarzi, oziq-ovqat gigienasi, mahsulotlar, energiya, vitaminlar, oqsil, yog‘, uglevod, rasional.

Kirish: Sog‘lom turmush tarzi tushunchasi keng ma'noga ega bo‘lib, u jismoniy faollik, rasional ovqatlanish, zararli odatlar, ya'ni giyohvandlik, tamaki chekish, spirtli ichimliklar iste'mol qilishga qarshi kurashish kabi tadbirlarni o‘z ichiga qamrab oladi. Shu o‘rinda inson organizmiga ta'sir etuvchi minglab omillar ichida ovqatlanish, ayniqsa, o‘z vaqtida va me'yorida, zarur bo‘lganida esa, parhezbop taomlar iste'mol qilish yetakchi ahamiyatga ega ekanini yodda tutish lozim. Ovqatlanish tibbiy nuqtai nazardan yoshni, tana vaznini, jinsni, iqlim sharoitini, mabodo organizmda kasallik aniqlansa, uning turini va davrini hisobga olgan holda, kasallikning oldini olish uchun

turli xil tartib va tarkibda tavsiya etiladi. Shundagina inson uzoq, sog‘lom va farovon umr ko‘rishi mumkin.

Har bir zamonaviy inson o‘zining emosional va jismoniy rivojlanishi uchun ikkita eng muhim narsaga, ya'ni to‘g‘ri ovqatlanish va kundalik jismoniy faoliyatga e'tibor berishi kerak. Hayotning ushbu ikki omili bilan birgalikdagina insonning sog‘lom va faol hayot kechirishi ta'minlanadi. To‘g‘ri ovqatlanish insonni energiya va to‘liq yashash uchun zarur bo‘lgan foydali mikroelementlar bilan ta'minlaydi.

Bizning tanamiz, insonning mehnat faoliyatidan qat'i nazar, doimiy ovqatlanishni talab qiladi, chunki dam olishda ham tana uchun energiya talab qilinadi, energiyaning manbai esa shak shubxasiz - ovqat maxsulotlari bo‘lib xisoblanadi. Shunindek, har qanday odamning jismoniy rivojlanishi butunlay metabolik jarayonlarga bog‘liq bo‘lib, ular iste'mol qilinadigan oziq-ovqat bilan bevosita bog‘liqdir. O‘z navbatida iste'mol qilinadigan oziq-ovqat sifati inson hayotining barcha omillariga bevosita ta'sir qiladi. Masalan, insonning mehnat qobiliyati, umr ko‘rish davomiyligi, kasalliklar va asab tizimining holati, shuningdek, hayot sifatiga xam.

Iste'mol qilingan oziq-ovqat bilan inson o‘z organizmini oqsillar,uglevodlar, yog‘lar, muhim minerallar, vitaminlar va hayotiy mikroelementlar majmuasi bilan yetarli miqdorda ta'minlashi kerak.

Dolzarbligi: Bugungi kunning eng dolzarb muammolaridan biri bu - to‘g‘ri va sog‘lom ovqatlanishdir. Chunki to‘g‘ri va sog‘lom ovqatlanishgina inson tanasini sog‘lom qiladi. Bizning jismoniy salomatligimiz, immunitetimiz, uzoq umr ko‘rishimiz, ruhiy salomatligimiz, garmonlarimiz me'yorida ishlashi - bularning barchasi sog‘lom ovqatlanishga chambarchas bog‘liqdir. Lekin ming afsuslar bo‘lsinki, bugungi kunda oshqozon-ichak traktining ko‘plab kasalliklari, xususan gastrit, oshqozon yarasi, pankreatit, xolesistit va boshqa qorin bo‘shlig‘i organlarining shunga o‘xshash kasalliklari “yosharib” bormoqda. Bularning asosiy sababi esa noto‘g‘ri ovqatlanish bo‘lib xisoblanmoqda.

Shuning uchun to‘g‘ri ovqatlanish haqidagi nazariyalarning negizini asosiy muammoni hal qilish yotibdi: insonning sog‘lom hayotini uzaytirish.

Parhezshunoslar to‘g‘ri ovqatlanishga asos bo‘lgan bir qator qoidalarni ishlab chiqdilar:

1. Ovqatga xaddan ziyod e'tiqod qo‘yish kerak emas. Oziq-ovqatning asosiy maqsadi tananing hayotiy funksiyalarini saqlab qolishdir va faqat bundan keyingina zavqlanish vazifasini bajarishi mumkin.

2. Sog‘likka eng katta foyda do‘konda sotib olingan tayyor ovqatdan ko‘ra yangi tayyorlangan taomlarni iste'mol qilishdan kelib chiqadi.

3. Balansli ovqatlanish. Rasionda barcha mavjud oziq-ovqat maxsulotlari bo‘lishi kerak, ularning hech birini almashtirmaslik yoki chiqarib tashlamaslik kerak.

4. Tushlik va kechki ovqat oralig‘ida tamaddi qilib olish. Zamon tez rivojlanib borayotgan davrda odamlar har doim istalgan vaqtda o‘zi uchun ovqat tayyorlash imkoniyatiga ega emas. Bunday vaziyatlarga yordam berish uchun tamaddi qilib olish qo‘l keladi, qachonki ularning sifati ham kuzatib turilsa. Chips, suxariklar, shirinliklar, oshirma xamirdan tayyorlangan bulochkalardan voz kechib, ularning o‘rniga meva, sabzavot va yong‘oqlarni qo‘shish maqsadga muvofiqdir.

5. Ovqatlanishda inson o‘ziga cheklov qo‘yishi kerak. Hayvon yog‘larini, shakar, mayonez va spirtli ichimliklarni iste'mol qilishni cheklash juda muhimdir.

6. O‘simlik va hayvonlardan olingan oziq-ovqat. Asosiy parhez termik ishlov berishdan o‘tmagan sabzavot va mevalardan iborat bo‘lishi tavsiya etiladi. O‘simlikdan olingan oziq-ovqat miqdori hayvon maxsulotlaridan olingan maxsulotlardan oshishi kerak. O‘simlik oqsillari hayvon oqsillariga qaraganda foydaliroqdir va ularning ta'minoti inson ehtiyojlarini to‘liq qondiradi.

7. Ovqat rasionini tuzishda, inson organizmining o‘ziga xos xususiyatlari va yashash sharoiti hisobga olinishi kerak. To‘rt mahalli ovqatlanish maqsadga muvofiq: kunlik iste'molning 25%i nonushta, 35-40% – tushlik, 10-15% – tolma choy va 25% – kechki ovqat bo‘lishi kerak. Uyqudan 2-3 soat oldin ovqatlanish kerak. Sharbat, konfet, olma – bular alohida (qo‘shimcha) ovqatlanish turi hisoblanadi.

8. Taomni yaxshilab chaynab (kamida 15 marta) iste'mol qilgan ma'qul. Ovqat og‘iz bo‘shlig‘ida qancha ko‘p tursa va chaynalsa, oshqozonda shira shuncha ko‘p ajralib chiqadi va ovqat xazm qilish jarayoni shuncha oson kechadi.

9. 80 ga 20 qoidasiga rioya qilish. Parhezning 80 foizi sog‘lomlashtiruvchi mahsulotlardan iborat bo‘lishi maqsadga muvofiqdir. 80 foizda sabzavotlar, mevalar, oqsillar, donalar, o‘simlik moylari mavjud bo‘lgani ma'qul. Qolgan 20 foizini sevimli (to‘g‘ri ovqatlanishga zid bo‘lsa ham) mahsulotlarga o‘rin ajratsa bo‘ladi.

10. Shirinliklarni uydan tashqarida iste'mol qilish. Agar siz ziyofat yoki restoranda shirinlik iste'mol qilmoqchi bo‘lsangiz, bunday holatda hech qanday taqiq yo‘qligini bilasiz. Biroq uyda shokolad va shirinliklar bo‘lmasin, bu qo‘shimcha va juda yuqori kaloriya vasvasasi hisoblanadi.

Ovqat xaqida gap ketganda gigiena qoidalari xaqida xam gapirib o‘tish zarur. Oziq-ovqat maxsulotlarini qo‘lga olish va taom tayyorlashdan avval va hojatxonadan chiqqandan so‘ng qo‘llarni yuvish,ovqat tayyorlash jarayonida foydalaniladigan barcha narsalar yuzasini va oshxona anjomlarini yaxshilab yuvish va dezinfeksiya qilish, oshxona va oziq – ovqat mahsulotlarini hashoratlar, kemiruvchilar va boshqa jonivorlardan himoyalash to‘g‘ri ovqatlanishning asoslaridan biri bo‘lib xisoblanadi.

Sog‘lom bo‘lish – ovqatlanish me'yoriga amal qilish bilan bog‘liq bo‘ladi. Shuning uchun ovqatlanish rasionining har xilligini ta'minlash lozim. Agar ovqat tarkibi turli tuman bo‘lsa, ya'ni hayvonlar mahsulotlari (go‘sht, baliq, sut), o‘simlik mahsulotlari (sabzovotlar, mevalar, ularning bo‘tqalari) to‘liq bo‘lsa organizmga barcha kerakli moddalar muntazam tushib turishi ta'minlanadi.

Parxezshunoslar sog‘lom turmush tarzini shakllantirish uchun quyidagi mahsulotlarni oz-oz, tez-tez (kuniga 3 emas 4-5 marotaba) istemol qilishni tavsiya qiladilar:

- Oqsillardan: yog‘siz go‘sht, parranda go‘shti, baliq, tuxum;
- Uglevodlardan: mevalar – olma, uzum, anor,sabzavotlar – sabzi, karam, lavlagi, kartoshka, pomidor, bodring, ularning salatlari;
- Yog‘lardan: o‘simlik yog‘lari, saryog‘, slivochniy yog‘;
- Sut mahsulotlari: qaymoq, pishloq, tvorog, qatiq.

Istemoldan chegaralash-kamaytirish lozim bo‘lgan mahsulotlarga esa quyidagilar kiradi: yog‘li go‘sht, qovirilib pishirilgan ovqatlar; ko‘p miqdorda unli mahsulotlar, shirinliklar (tortlar), gazli ichimliklar, muzqaymoq, kofe, konservalar hamda kalbasa mahsulotlari.

Xulosa o‘rnida aytish joizki, organizm normal o‘sishi, normal faoliyat yuritishi uchun to‘g‘ri-rasional me'yorida ovqat iste'mol qilish zarur. Barcha tavsiyalarga muvofiq to‘g‘ri ovqatlanish ayollar va erkaklarda qarish jarayonini sekinlashtirishga, yurak va qon tomir kasalliklari xavfini kamaytirishga, diabet va gipertenziya rivojlanishining oldini olishga yordam beradi.

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BOLALARDA (TEMIR, OQSIL, VITAMINLAR YETISHMOVCHILIGI) TANQISLIK ANEMIYALARI ETIOLOGIYASI

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Annotatsiya: Ushbu maqolada bolalar orasida keng tarqalgan tanqislik anemiyalarining — temir, oqsil va vitaminlar yetishmovchiligi bilan bog‘liq holatlarning etiologiyasi yoritilgan. Anemiyaning bolalar salomatligiga salbiy ta’siri, uning rivojlanish omillari, xavf guruhlari va kasallikning oldini olish yo‘llari tahlil qilingan. Tadqiqotda bolalarda uchraydigan anemiya turlari va ularning yuzaga kelishiga sabab bo‘luvchi omillar haqida tibbiy-nazariy asoslar bilan bir qatorda amaliy tavsiyalar ham berilgan. Mazkur maqola pediatrlar, umumiy amaliyot shifokorlari va tibbiyot yo‘nalishidagi talabalar uchun foydali manba bo‘lib xizmat qiladi.

Kalit so‘zlar: bolalarda anemiya, temir tanqisligi, oqsil yetishmovchiligi, vitamin yetishmovchiligi, tanqislik anemiyalari, anemiya etiologiyasi, bolalar salomatligi, profilaktik chora-tadbirlar, oziqlanish muammolari, pediatriyada anemiya.

Kirish.

Bugungi kunda bolalar salomatligi muammolari orasida anemiya, xususan, tanqislik anemiyalari muhim o‘rin egallaydi. Tanqislik anemiyasi deganda organizmda gemoglobin miqdorining kamayishi va shu bilan birga temir, oqsil hamda ayrim vitaminlar (ayniqsa B12 va foliy kislotasi) yetishmovchiligi natijasida yuzaga keladigan holat tushuniladi. Bolalik davri organizmning faol o‘sish va rivojlanish bosqichi bo‘lgani sababli, bu davrda zarur bo‘lgan oziq moddalarning yetarli miqdorda bo‘lmasligi turli kasalliklarning, xususan, anemiyaning rivojlanishiga sabab bo‘ladi.

Tanqislik anemiyalari bolalarda umumiy immunitetning pasayishi, aqliy va jismoniy rivojlanishning susayishi, asab tizimi faoliyatining buzilishi kabi salbiy oqibatlarga olib keladi. Ayniqsa, erta yoshdagi bolalarda anemiya og‘ir kechadi va uzoq muddatli asoratlarga sabab bo‘lishi mumkin. Shu sababli bu kasallikning etiologiyasini chuqur o‘rganish, uning oldini olish, erta tashxislash va samarali davolash choralarini ishlab chiqish dolzarb vazifalardan biridir. Ushbu maqolada bolalarda uchraydigan tanqislik anemiyalarining asosiy sabablari, ularning kelib chiqish mexanizmlari hamda profilaktika va davolashning zamonaviy yondashuvlari yoritib beriladi.

Asosiy qism.

Tanqislik anemiyalari bolalarda uchraydigan eng ko‘p tarqalgan qon kasalliklaridan biridir. Ular asosan temir, oqsil va vitaminlar kabi hayotiy muhim moddalarning yetishmovchiligi natijasida yuzaga keladi. Bu moddalarning organizmdagi o‘rni beqiyos bo‘lib, ularning tanqisligi qon hosil bo‘lish jarayonining izdan chiqishiga olib keladi. Har bir moddaning tanqisligi o‘ziga xos klinik ko‘rinishlarga va oqibatlarga ega bo‘lganligi sababli ularni alohida-alohida ko‘rib chiqish zarur.

1. Temir tanqisligi anemiyasi

Temir tanqisligi anemiyasi bolalarda eng ko‘p uchraydigan tanqislik anemiyasi turi hisoblanadi. Temir gemoglobin tarkibidagi asosiy element bo‘lib, kislorodning to‘qimalarga yetkazilishida muhim rol o‘ynaydi. Bola organizmi o‘sib borayotgani sababli, u doimiy ravishda temirga ehtiyoj sezadi. Temir tanqisligining asosiy sabablari quyidagilar:

– Yetarli va to‘g‘ri ovqatlanmaslik (ayniqsa hayvoniy mahsulotlarni kam iste’mol

qilish);

– Chaqaloqlik davrida onaning kamqonligi yoki chaqaloqni faqat ona suti bilan uzoq vaqt boqish;

– Me’da-ichak kasalliklari natijasida temirning yomon so‘rilishi;

– Parazit infeksiyalar (askaridoz, giardioz va boshqalar) tufayli temirning yo‘qotilishi. Temir tanqisligi anemiyasi sekin-asta rivojlanadi. Bolalarda rangparlik, tez charchash, ishtahaning pasayishi, jismoniy va aqliy faollikning susayishi kuzatiladi. Davolashda temir preparatlari bilan birga temirga boy oziq-ovqat mahsulotlarini iste’mol qilish tavsiya etiladi.

2. Oqsil yetishmovchiligi bilan bog‘liq anemiya. Oqsil organizmda hujayra tuzilishi va gemoglobinning sintezi uchun zarur bo‘lgan asosiy moddalardan biridir. Bola organizmida oqsil yetishmovchiligi kuzatilganda, eritrotsitlar soni kamayadi va gemoglobin darajasi pasayadi. Bu turdagi anemiya ko‘pincha umumiy distrofik holatlar bilan kechadi.

Oqsil yetishmovchiligi quyidagi omillar ta’sirida rivojlanadi:

– Yomon ovqatlanish va balansi buzilgan dieta;

– Ovqat hazm qilish a’zolarining kasalliklari;

– Surunkali infeksiyalar.

Klinik belgilar temir tanqisligi anemiyasiga o‘xshash bo‘lsa-da, bu holatda bolalarda mushaklar zaifligi, o‘sishning sekinlashuvi, umumiy immunitetning tushib ketishi bilan birga yurak faoliyatining buzilishi ham kuzatiladi. Davolash oqsilga boy ovqatlar (go‘sht, sut mahsulotlari, tuxum, dukkaklilar) bilan birga oqsil preparatlari qo‘llanilishi orqali olib boriladi.

3. Vitamin yetishmovchiligi (B12 va foliy kislotasi) Vitamin B12 va foliy kislotasi megaloblast anemiyasining rivojlanishida muhim rol o‘ynaydi. Ushbu vitaminlar DNK sintezi va eritrotsitlarning shakllanishida ishtirok etadi. Ularning yetishmovchiligi natijasida katta, ammo funktsional jihatdan to‘liq bo‘lmagan eritrotsitlar hosil bo‘ladi.

B12 vitamini yetishmovchiligining sabablari:

– Vegetarian ovqatlanish (hayvoniy mahsulotlardan voz kechish);

– Ichaklarning so‘rish funksiyasining buzilishi (masalan, seliakiyadek kasalliklar);

– Autoimmun gastrit.

Foliy kislotasi esa ko‘pincha yomon ovqatlanish, homiladorlik davrida yetarlicha qabul qilinmaganligi sababli bola tanasida yetishmovchilik bilan namoyon bo‘ladi. Ushbu vitaminlar tanqisligi bilan bog‘liq anemiyalar og‘ir kechishi, asab tizimi buzilishlari, hushyorlikning pasayishi, koordinatsiya muammolari kabi klinik belgilar bilan namoyon bo‘ladi. Davolashda B12 vitamini in’ektsion shaklda, foliy kislotasi esa og‘zaki tarzda beriladi.

4. Anemiyaning oldini olish va profilaktikasi. Bolalarda tanqislik anemiyalarining oldini olish uchun quyidagi choralar muhim ahamiyatga ega:

– Bolani to‘g‘ri va muvozanatli ovqatlantirish (temir, oqsil va vitaminlarga boy mahsulotlar bilan);

– Onalarni homiladorlik davridan boshlab temir va foliy kislotasi preparatlari bilan ta’minlash;

– Yuqori xavf guruhiga kiruvchi bolalarni (erta tug‘ilganlar, ko‘p kasallanuvchan bolalar) muntazam tibbiy nazoratda saqlash;

– Ichki kasalliklar va parazit infeksiyalarni vaqtida davolash.

Xulosa:

Bolalarda tanqislik anemiyalari — bu temir, oqsil va vitaminlar (ayniqsa B12 va foliy kislotasi) yetishmovchiligi natijasida yuzaga keladigan, organizmning umumiy rivojlanishiga salbiy ta’sir ko‘rsatuvchi jiddiy patologiyalardan biridir. Bu turdagi anemiyalar bolaning jismoniy, aqliy va emotsional rivojlanishini izdan chiqaradi, immunitetni pasaytiradi va turli asoratlarga olib keladi. Temir tanqisligi anemiyasi eng ko‘p uchraydigan shakl bo‘lib, uni erta aniqlash va davolash bolalar sog‘lig‘ini saqlashda muhim ahamiyat kasb etadi. Anemiyaning asosiy sabablari noto‘g‘ri ovqatlanish, surunkali kasalliklar, ichakda so‘rilish buzilishlari va parazitar kasalliklar bilan bog‘liq. Shuning uchun kasallikni davolash bilan birga uning oldini olish choralari — to‘g‘ri ovqatlanishni tashkil etish, vitamin va mikroelementlarga boy mahsulotlarni ratsionga kiritish, bolalarni doimiy tibbiy ko‘rikdan o‘tkazish muhimdir. Ushbu masalaga bo‘lgan dolzarb yondashuv, ayniqsa pediatrlar va oilaviy shifokorlar tomonidan bolalarda anemiyani erta aniqlash va samarali davolashda muhim rol o‘ynaydi.

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ZARARLI ODATLARNING SALOMATLIK VA SHAXSIY RIVOJLANISHGA TA'SIRI

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Annotatsiya: Ushbu maqola zararli odatlarning inson salomatligi va shaxsiy rivojlanishga ta'sirini tahlil qiladi. Unda zararli odatlarning turlari, ularning fiziologik, psixologik va ijtimoiy oqibatlari ko‘rib chiqiladi. Maqolada shuningdek, o‘smirlar va yoshlar orasida zararli odatlarning paydo bo‘lish sabablari, ularni oldini olish strategiyalari va sog‘lom turmush tarzini rag‘batlantirish usullari yoritiladi. Tadqiqotlar shuni ko‘rsatadiki, zararli odatlar nafaqat jismoniy salomatlikni buzadi, balki shaxsiy o‘sish, o‘zini rivojlantirish va kelajakdagi muvaffaqiyatga erishishga salbiy ta'sir ko‘rsatadi. Maqola amaliy tavsiyalarni ham taqdim etadi, bu esa o‘smirlar va yoshlarni zararli odatlardan himoya qilish va ularni sog‘lom turmush tarziga yo‘naltirishda muhim ahamiyatga ega.

Kalit so‘zlar: zararli odatlar, salomatlik, shaxsiy rivojlanish, o‘smirlar, yoshlar, sog‘lom turmush, oldini olish, psixologik ta'sir, ijtimoiy oqibatlar, profilaktika.

Kirish

Zararli odatlar – bu inson salomatligi, psixologik holati va shaxsiy rivojlanishiga salbiy ta’sir ko‘rsatadigan doimiy xulq-atvor yoki odat shakllari hisoblanadi. Ular nafaqat jismoniy sog‘liqni buzishi, balki ruhiy holatga ham salbiy ta’sir qiladi, shaxsiy o‘sish va kelajakdagi muvaffaqiyatga erishish imkoniyatlarini cheklaydi. O‘smirlik va yoshlar davri ayniqsa zararli odatlarga moyil bo‘lgan vaqt hisoblanadi, chunki bu davrda shaxsiyat shakllanadi, o‘zini anglash va ijtimoiy moslashuv jarayoni sodir bo‘ladi. Maqola zararli odatlarning turli turlarini, ularning fiziologik, psixologik va ijtimoiy oqibatlarini tahlil qiladi. Shu bilan birga, o‘smirlar va yoshlar orasida zararli odatlarning paydo bo‘lish sabablari, ularning oldini olish va sog‘lom turmush tarzini rag‘batlantirish yo‘llari ham yoritiladi. Kirish qismidan kelib chiqib, maqola o‘quvchiga zararli odatlarning shaxsiy va ijtimoiy rivojlanishga ta’sirini chuqurroq tushunishga yordam beradi.

Asosiy qism

Zararli odatlar inson hayotida keng tarqalgan va jismoniy, ruhiy hamda ijtimoiy jihatdan salbiy ta’sir ko‘rsatadi. Ular o‘ziga xos doimiy xulq-atvor yoki harakatlar bo‘lib, inson organizmining normal faoliyatini buzadi va shaxsiy rivojlanishga to‘sqinlik qiladi. Zararli odatlar orasida chekish, spirtli ichimliklar iste’moli, narkotik moddalar ishlatish, giyohvandlik va o‘yinlarga qaramlik eng keng tarqalganlaridir.

1.Salomatlikka ta’siri: Zararli odatlar jismoniy salomatlikka bevosita ta’sir qiladi. Masalan, chekish o‘pka va yurak-qon tomir tizimining faoliyatini yomonlashtiradi, spirtli ichimliklar jigar va nerv tizimiga zarar yetkazadi, narkotik moddalar esa miya faoliyatini buzadi va immunitetni pasaytiradi. Bunday odatlar organizmning normal rivojlanishini sekinlashtiradi, kasalliklar xavfini oshiradi va hayot sifatini pasaytiradi.

2. Psixologik va shaxsiy rivojlanishga ta’siri: Zararli odatlar o‘smir va yoshlarning ruhiy holatiga salbiy ta’sir qiladi. Ular o‘zini anglash, ijtimoiy ko‘nikmalarni rivojlantirish va mas’uliyatni his qilish qobiliyatini susaytiradi. Shu bilan birga, bunday odatlarga qaramlik stressni kamaytirishga vaqtinchalik yordam berishi mumkin, ammo uzoq muddatda ruhiy muammolar, beqarorlik va depressiya xavfini oshiradi. Shaxsiy maqsad va intilishlarga erishish qiyinlashadi, o‘quv va kasbiy rivojlanish jarayoni sustlashadi.

3. Ijtimoiy oqibatlari: Zararli odatlar ijtimoiy hayotga ham salbiy ta’sir qiladi. Bunday odatlar insonning oilaviy va do‘stlar bilan bo‘lgan munosabatlarini buzishi, ijtimoiy izolyatsiyaga olib kelishi va jamiyatdagi normal hayotiy faoliyatdan chetlanishiga sabab bo‘ladi. O‘smir va yoshlar orasida bunday odatlar qaramlik, nizolar va noxush holatlar xavfini oshiradi.

4. Oldini olish va profilaktika: Zararli odatlarning oldini olish uchun vaqtida profilaktik choralar ko‘rish muhimdir. Bu jarayonda ota-ona, o‘qituvchi va maktab psixologi katta rol o‘ynaydi. Ular yoshlarni sog‘lom turmush tarziga rag‘batlantirish, qiziqish va qobiliyatlarni rivojlantirish, stressni boshqarish va ijtimoiy muhitni qo‘llab- quvvatlash orqali zararli odatlardan himoya qilishi mumkin. Shuningdek, yoshlarni zararli odatlar oqibatlari haqida xabardor qilish va ularga salbiy ta’sirlarni anglatish ham muhimdir.

Natijada, zararli odatlar shaxsiy rivojlanish va salomatlikka ko‘p jihatdan zarar yetkazadi. Shu sababli, ularning oldini olish, yoshlarni rag‘batlantirish va sog‘lom turmush tarzini targ‘ib qilish o‘smirlar va yoshlar rivojlanishi uchun hal qiluvchi ahamiyatga ega. Psixolog o‘quvchilarning ruhiy holatini, motivatsiyasini va xulq-atvorini kuzatadi, ularni zararli odatlardan himoya qilish va sog‘lom turmush tarzini shakllantirishga yordam beradi. Ayniqsa o‘smirlik davrida, yoshlar o‘zini anglash va shaxsiy rivojlanish jarayonida ko‘plab qiyinchiliklarga duch keladi. Shu davrda psixologning ko‘magi ular uchun muhim qo‘llab-quvvatlash manbai bo‘lib xizmat qiladi.

Maktab psixologi quyidagi yo‘nalishlarda faoliyat olib boradi:

1. Shaxsiy maslahat va konsultatsiya – o‘quvchilarga zararli odatlarning oqibatlarini tushuntirish, ularning qiziqish va istaklarini aniqlashda yordam berish.

2. Motivatsiya va rag‘batlantirish – yoshlarni sog‘lom turmush tarziga rag‘batlantirish, ichki motivatsiyani kuchaytirish va ijtimoiy faoliyatga jalb qilish.

3. Stress va emotsional holatni boshqarish – o‘smirlar orasida xavotir, depressiya yoki beqaror ruhiy holatni kamaytirish usullarini o‘rgatish.

4. Profilaktik tadbirlar – zararli odatlar, ularning salomatlik va shaxsiy rivojlanishga ta’siri haqida ma’lumot berish, treninglar va seminarlar o‘tkazish.

5. Ota-ona va o‘qituvchilar bilan hamkorlik – ularni yoshlar tarbiyasi va zararli odatlardan himoya qilish masalalarida yo‘naltirish va maslahatlar berish.

Shu tariqa, maktab psixologi nafaqat yoshlarni zararli odatlardan himoya qiladi, balki ularning ijtimoiy, ruhiy va shaxsiy rivojlanishini qo‘llab-quvvatlaydi. Bu esa o‘quvchilarning sog‘lom, mas’uliyatli va maqsadga yo‘naltirilgan shaxslar sifatida shakllanishida hal qiluvchi ahamiyatga ega.

Xulosa

Zararli odatlar inson salomatligi va shaxsiy rivojlanishiga salbiy ta’sir qiluvchi omillar sifatida o‘smirlar va yoshlar orasida keng tarqalgan. Ular jismoniy salomatlikni buzishi, ruhiy holatni sustlashtirishi va ijtimoiy moslashuvni qiyinlashtirishi bilan birga, shaxsiy maqsadlar sari intilish va o‘zini rivojlantirish imkoniyatlarini ham cheklaydi. Shu sababli, zararli odatlarning oldini olish va ularni kamaytirish bo‘yicha profilaktik choralar ko‘rish juda muhimdir. Bu jarayonda ota-ona, o‘qituvchi va maktab psixologining roli katta ahamiyatga ega. Maktab psixologi o‘quvchilarga zararli odatlar oqibatlarini tushuntirish, ichki motivatsiyani rivojlantirish va sog‘lom turmush tarzini shakllantirishda yordam beradi. Natijada, yoshlarni zararli odatlardan himoya qilish, ularni sog‘lom va mas’uliyatli shaxslar sifatida tarbiyalash, shaxsiy rivojlanish va kelajakdagi muvaffaqiyatga erishish uchun muhim asos yaratadi. Zararli odatlarga qarshi kurash – bu nafaqat individual, balki jamiyatning ijtimoiy va madaniy rivojlanishi uchun ham muhim ahamiyatga ega jarayondir.

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ANNOTATSIYA

Maqolada zamonaviy inson hayotining ajralmas qismi bo‘lib qolgan stress holatining psixologik mohiyati, yuzaga kelish sabablari va uning organizmga ta’siri ilmiy asosda tahlil qilinadi. Stress inson salomatligi va ruhiy barqarorligiga sezilarli darajada ta’sir ko‘rsatib, uning faoliyat samaradorligini pasaytirishi mumkin. Tadqiqotda stress manbalari, ularning tashqi va ichki omillar bilan bog‘liqligi keng tahlil qilinib, stressni boshqarishning zamonaviy psixologik usullari — nafas olish texnikalari, jismoniy faollik, ijtimoiy qo‘llab-quvvatlash, meditatsiya, mindfulness, psixoterapiya va kognitiv yondashuvlarning samaradorligi ilmiy nuqtai nazardan yoritiladi. Maqolada stressni boshqarish bo‘yicha amaliy tavsiyalar ham keltirilgan bo‘lib, bu inson ruhiy salomatligini mustahkamlash va barqarorlikni ta’minlashda muhim ahamiyatga ega.

KALIT SO‘ZLAR: Stress, psixologik barqarorlik, stress manbalari, emotsional boshqaruv, stressni kamaytirish, nafas olish texnikasi, mindfulness, psixoterapiya, relaksatsiya, ruhiy salomatlik.

KIRISH:

Maqolada zamonaviy inson hayotining ajralmas qismi bo‘lib qolgan stress holatining psixologik mohiyati, yuzaga kelish sabablari va uning organizmga ta’siri ilmiy asosda tahlil qilinadi. Stress inson salomatligi va ruhiy barqarorligiga sezilarli darajada ta’sir ko‘rsatib, uning faoliyat samaradorligini pasaytirishi mumkin. Tadqiqotda stress manbalari, ularning tashqi va ichki omillar bilan bog‘liqligi keng tahlil qilinib, stressni boshqarishning zamonaviy psixologik usullari — nafas olish texnikalari, jismoniy faollik, ijtimoiy qo‘llab-quvvatlash, meditatsiya, mindfulness, psixoterapiya va kognitiv yondashuvlarning samaradorligi ilmiy nuqtai nazardan yoritiladi. Maqolada stressni boshqarish bo‘yicha amaliy tavsiyalar ham keltirilgan bo‘lib, bu inson ruhiy salomatligini mustahkamlash va barqarorlikni ta’minlashda muhim ahamiyatga ega.

Hozirgi davrning intensiv ijtimoiy-iqtisodiy sharoitlari, raqamli texnologiyalar rivoji, mehnat va o‘qishdagi yuqori raqobat inson psixikasini doimiy zo‘riqishga, hayotiy omillar bilan doimiy kurashishga majbur qilmoqda. Natijada, stress fenomeni zamonaviy psixologiya va tibbiyot fanining markaziy tadqiqot yo‘nalishlaridan biriga aylangan. Stress — bu organizmning tashqi yoki ichki stressogen tahdidlarga (stressorlar) adaptiv javob shaklida shakllanadigan psixofiziologik kompleks holatdir. Hans Selye tomonidan ilgari surilgan “General Adaptation Syndrome” modeli stress holatining bosqichma-bosqich rivojlanishini tushuntirishda asosiy ilmiy nazariya sifatida e’tirof etiladi. Selyega ko‘ra, stress organizmning zahiraviy imkoniyatlarini safarbar qiladi va tahdidni bartaraf etish jarayonida energetik va emotsional resurslarni sarflaydi. Agar bu bosqichlarda muvaffaqiyatli moslashuv yuz bermasa, organizmda fiziologik va psixologik disbalans shakllanadi

Stress tushunchasi hozirda faqat fiziologik nuqtai nazardan emas, balki psixologik, sotsiologik va kognitiv jihatdan ham ko‘rib chiqilmoqda. Lazarus va Folkman (1984) tomonidan ishlab chiqilgan "Stressni baholash va boshqarish nazariyasi"ga ko‘ra, stress holati inson tomonidan stress manbalarini qanday baholashiga va unga qanday javob qaytarishiga bog‘liq. Ya’ni, bir xil tashqi vaziyat turli insonlarda turli darajadagi stress reaksiyasini chaqiradi, bu holat insonning tajribasi, individual psixologik barqarorligi va shaxsiy baholash tizimi bilan bevosita bog‘liq. Bugungi kunda stressning ijtimoiy hayotdagi ahamiyati tobora ortib bormoqda. Jahon sog‘liqni saqlash tashkiloti (WHO, 2023) ma’lumotlariga ko‘ra, stress — zamonaviy inson kasalliklari, xususan, yurak-qon tomir kasalliklari, surunkali bosh og‘rig‘i, uyqusizlik, immunitet pasayishi va depressiyaning asosiy sabablaridan

biri sifatida qayd etilgan. Shu bilan birga, Amerika Psixologik Assotsiatsiyasi (APA, 2022) hisobotlarida ham stress mehnat unumdorligi, o‘quv faoliyati va shaxsiy hayot sifati bilan bevosita bog‘liqligi, uni vaqtida boshqarish esa inson salomatligini saqlashda hal qiluvchi ahamiyat kasb etishi ta’kidlangan.

Stress boshqaruvi masalasi bugungi psixologiya fanida profilaktika va psixoterapiyaning ajralmas qismi sifatida ko‘rib chiqilmoqda. Bunda nafaqat individual psixologik yondashuvlar, balki ijtimoiy qo‘llab-quvvatlash tarmog‘i, sog‘lom turmush tarzi, emotsional intellekt va stressga chidamlilikni shakllantirish (resilience) tushunchalari ham dolzarb mavzulardan biri sifatida tadqiq etilmoqda. Ushbu maqola doirasida stress tushunchasining ilmiy asoslari, stress manbalarining tahlili, uning psixologik va jismoniy belgilari, hamda zamonaviy stress boshqarish usullarining samaradorlik jihatlari keng yoritiladi. Shu bilan birga, stressga nisbatan individual yondashuvning ahamiyati va stressni samarali boshqarish bo‘yicha amaliy tavsiyalar ham tahlil qilinadi. Stress fenomeni psixologiya tarixida turli olimlar tomonidan ko‘p qirrali tushuncha sifatida izohlanadi va zamonaviy ilmiy tadqiqotlarda inson sog‘lig‘i, ruhiy barqarorligi va moslashuvchanligi bilan bevosita bog‘liq psixofiziologik holat sifatida keng yoritilgan. Stress nazariyasining zamonaviy ilmiy asosi Kanadalik fiziolog olim Hans Selye tomonidan XX asrning birinchi yarmida shakllantirilgan bo‘lib, u stressni inson organizmining "nonspecific response" — ya’ni, har qanday tashqi va ichki stressor ta’siriga umumiy javob deb talqin qilgan (Selye, 1936). Selye o‘z izlanishlarida stress jarayonini uch bosqichga ajratgan: Alarm reaction, Resistance, va Exhaustion. Bu model hozirda ham stress tadqiqotlarining nazariy bazasida mustahkam o‘rin egallab kelmoqda. Bundan tashqari, stress holati zamonaviy psixologik yondashuvlarda sub’ektiv baholash va emotsional idrok bilan bog‘liq jarayon sifatida ko‘rib chiqiladi. Lazarus va Folkman (1984) o‘z tadqiqotlarida stressni shaxsiy talqin va vaziyatni psixologik baholash natijasida shakllanuvchi kompleks holat deb ta’riflagan. Ushbu kognitiv baholash modeli stressni boshqarishning asosiy mexanizmlaridan biri sifatida "muammoni baholash – yechim qidirish – emotsional moslashuv" bosqichlarini taklif etadi.

Stress va uni boshqarish mexanizmlarini o‘rganishda jahon tajribasida psixologik barqarorlik, emotsional intellekt va psixologik chidamlilik (resilience) tushunchalari asosiy nazariy yondashuv sifatida shakllanmoqda. Bonanno (2004) stress va travmatik tajribalarga individual moslashuv jarayonini chuqur o‘rganib, stressni boshqarishda psixologik chidamlilikning ahamiyatini alohida ta’kidlagan. Boshqa tomondan, stress organizmda o‘ziga xos fiziologik va neyrobiologik mexanizmlar

orqali kechadi. McEwen (1998) tomonidan taklif etilgan "Allostatic load" konsepsiyasi stress natijasida organizmda yuzaga keladigan ichki biologik yuklama va uning uzoq muddatli ta'sirini tahlil qilgan. McEwen tadqiqotlariga ko'ra, surunkali stress insonning yurak-qon tomir, endokrin va immun tizimlarining funksional barqarorligiga salbiy ta'sir ko'rsatadi, bu esa kasalliklar xavfini oshiradi. Psixologik tadqiqotlar ko'rsatadiki, stressni boshqarish usullari individual va ijtimoiy kontekstda turlicha samaradorlikka ega. Masalan, Kabat-Zinn (1994) tomonidan ishlab chiqilgan "Mindfulness-Based Stress Reduction" (MBSR) metodi stressni yengillashtirishda va ongni hozirgi paytda jamlash orqali ruhiy salomatlikni saqlashda yuqori natija ko'rsatgan. Shuningdek, American Psychological Association (APA, 2022) stressni kamaytirish uchun ko'p bosqichli yondashuvlarni tavsiya etadi: bu nafaqat individual strategiyalar, balki ijtimoiy qo'llab-quvvatlash tarmog'ini kengaytirish, stressni kognitiv qayta talqin qilish va sog'lom turmush tarzini shakllantirish orqali erishiladi.

O'zbekiston kontekstida ham stress va uning psixologik boshqaruviga bag'ishlangan ilmiy izlanishlar tobora ko'paymoqda. Jumladan, Rasulov (2022) tomonidan keltirilgan tadqiqotda talabalarda imtihon oldidan yuzaga keladigan stress holatlari va ularni boshqarish uchun mindfulness texnikalarining ijobiy ta'siri qayd etilgan. Shirinova (2021) O'zbekiston aholisida pandemiya davrida ortgan stress holatlarini va ijtimoiy qo'llab-quvvatlashning bu boradagi ahamiyatini tahlil qilib, stressni kamaytirishda oilaviy muloqot va ijtimoiy bog'lanish darajasi hal qiluvchi omil ekanini ko'rsatgan. Stress — bu nafaqat organizmning qisqa muddatli reaksiya shakli, balki uning uzoq muddatli fiziologik va psixologik moslashuv strategiyalarini shakllantiruvchi kompleks tizimdir. Stressni samarali boshqarish individual psixologik tayyorgarlik, muammoli vaziyatlarni ratsional baholash, ijtimoiy qo'llab-quvvatlash, mindfulness va psixoterapevtik yondashuvlar integratsiyasi orqali amalga oshiriladi. Stressni boshqarish bo'yicha zamonaviy ilmiy yondashuvlar inson sog'lig'ini saqlash, psixologik barqarorlikni ta'minlash va hayot sifatini oshirishda asosiy rol o'ynaydi.

XULOSA

Stress — inson psixikasi va organizmining tashqi va ichki muvozanatsizlikka adaptiv javobidir. Tadqiqotlar ko'rsatadiki, stress inson faoliyatining barcha bosqichlari: emotsional holati, kognitiv jarayonlari, sotsial munosabatlari va jismoniy salomatligiga ta'sir ko'rsatadigan kompleks psixofiziologik hodisadir. Hans Selye tomonidan ishlab chiqilgan stress modeli (1936) bu holatni uch bosqichda (alarm, resistance, exhaustion) tushuntirishga asos bo'lib xizmat qilgan, zamonaviy psixologiyada esa stress jarayoni kognitiv baholash (Lazarus & Folkman, 1984) va

emotsional boshqaruv kontekstida chuqurroq izohlanmoqda. Psixologik va tibbiy adabiyotlarning ko‘pchiligi stressni boshqarish mexanizmlarining turli ko‘rinishlarini

— kognitiv qayta baholash, emotsional boshqaruv, relaksatsion texnikalar, mindfulness, jismoniy faollik va psixoterapiya kabi usullarni samarali deb ko‘rsatadi. McEwen (1998) tomonidan stressning organizmdagi "allostatic load" tushunchasi orqali izohlanishi, stress holatining faqatgina vaqtinchalik emotsional reaksiyadan iborat emasligini, balki inson salomatligiga uzoq muddatli xavf tug‘dirishini ko‘rsatib berdi. Bundan tashqari, zamonaviy neyropsixologik tadqiqotlar stressni boshqarishda psixologik chidamlilik (resilience) va emotsional intellektning (EQ) ahamiyatini alohida ta’kidlaydi. Bu holat shuni ko‘rsatadiki, stressni faqat tashqi sharoitlar bilan emas, balki insonning ichki emotsional resurslari va psixologik moslashuvchanligi orqali boshqarish mumkin. O‘zbekistonlik tadqiqotchilar (Rasulov, 2022; Shirinova, 2021) tomonidan olib borilgan tadqiqotlar ham stress manbalarining o‘ziga xos mahalliy jihatlarini va bu borada amaliy yondashuvlarning samaradorligini tasdiqlaydi. Xususan, oila, jamiyat va psixologik xizmat tizimi stressni kamaytirish va boshqarishning ijtimoiy muhitga moslashgan mexanizmlari sifatida samarali ekani aniqlangan.

Xulosa qilib aytganda, stress bu inson organizmi va psixikasining majburiy va universal javob shakli bo‘lsa-da, uning intensivligi, ta’sir doirasi va oqibatlari individual, sotsial va ekologik omillar bilan uzviy bog‘liq. Stressni boshqarish inson salomatligi va ruhiy barqarorligini saqlashda fundamental ahamiyat kasb etadi. Shu bois, zamonaviy psixologiyada stressni bartaraf etish nafaqat muammoli holatlardan himoyalanish, balki ijobiy emotsional muvozanatni saqlash, psixologik chidamlilik va sog‘lom turmush tarzining ajralmas qismi sifatida talqin qilinmoqda. Kelgusida stressni boshqarish mexanizmlarini yanada mukammallashtirish, individual psixologik profilaktika dasturlarini ishlab chiqish va global miqyosda stress manbalarining psixosotsiologik tadqiqotlarini chuqurlashtirish stressni samarali boshqarish bo‘yicha strategik yo‘nalish bo‘lib qolmoqda.

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RECENT ADVANCES IN DERMATOLOGY: MODERN DIAGNOSTIC AND THERAPEUTIC APPROACHES

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Annotation: Dermatology has experienced significant advancements in recent years due to rapid developments in medical technology, diagnostic techniques, and innovative treatment methods. Modern dermatological practice increasingly relies on advanced diagnostic tools such as dermoscopy, molecular diagnostics, imaging technologies, and artificial intelligence to improve the accuracy and early detection of skin diseases. At the same time, therapeutic innovations including biologic therapies, laser treatment, immunotherapy, and personalized medicine have transformed the management of both acute and chronic dermatological conditions. These advancements have contributed to improved patient outcomes, reduced treatment-related complications, and enhanced quality of life. This article reviews recent developments in dermatology, focusing on modern diagnostic approaches and therapeutic strategies used in contemporary clinical practice.

Keywords: dermatology, skin diseases, diagnosis, treatment, dermoscopy, biologic therapy, laser therapy, immunotherapy, artificial intelligence, personalized medicine

Introduction

Dermatology is a rapidly evolving branch of medicine that focuses on the diagnosis, treatment, and prevention of diseases affecting the skin, hair, nails, and mucous membranes. Skin disorders are among the most common health conditions worldwide and can significantly affect physical health, emotional well-being, and social interactions. The increasing global burden of dermatological diseases has emphasized the importance of developing more effective diagnostic and therapeutic approaches. Traditionally, dermatological diagnosis was primarily based on clinical examination and histopathological analysis. However, recent advances in medical science and technology have introduced highly sophisticated diagnostic methods, including dermoscopy, digital imaging, molecular testing, and artificial intelligence-assisted systems. These tools have improved diagnostic precision and enabled earlier intervention, especially in conditions such as skin cancer, psoriasis, and inflammatory skin diseases. Therapeutic approaches in dermatology have also undergone major transformation. Conventional treatments are now complemented by innovative methods such as biologic therapies, targeted immunotherapy, laser procedures, and regenerative medicine. These modern strategies provide more personalized and effective treatment options, minimizing side effects and improving long-term patient outcomes. The aim of this article is to explore recent advances in dermatology by analyzing current diagnostic innovations and therapeutic developments, as well as their impact on modern clinical practice and patient care.

Materials and Methods

This study was conducted as a narrative literature review focusing on recent innovations in dermatology. Scientific publications related to modern diagnostic and therapeutic approaches in skin disease management were systematically collected from internationally recognized medical databases, including PubMed, Scopus, and Google Scholar. Articles published between 2015 and 2025 were prioritized to ensure up-to-date scientific relevance. The inclusion criteria consisted of peer-reviewed

studies addressing diagnostic technologies such as digital dermoscopy, molecular biomarkers, teledermatology, and artificial intelligence-based diagnostic systems, as well as modern therapeutic approaches including biologics, targeted immunotherapy, photodynamic therapy, and laser-assisted interventions. A qualitative comparative analysis was applied to evaluate the clinical effectiveness, diagnostic accuracy, treatment outcomes, and limitations of these modern approaches. Data were organized according to disease categories, technological application, and therapeutic effectiveness to provide a comprehensive overview of current dermatological practice.

Results

The findings revealed substantial progress in both diagnostic and therapeutic fields of dermatology. Advanced imaging methods, particularly digital dermoscopy and high-resolution skin imaging, significantly improved the early detection of melanoma and other malignant skin lesions. Artificial intelligence-assisted diagnostic tools demonstrated high sensitivity and specificity in differentiating benign and malignant skin conditions, reducing diagnostic uncertainty in clinical settings. Molecular diagnostic techniques contributed to a better understanding of the genetic and immunological mechanisms underlying chronic skin disorders such as psoriasis, eczema, and autoimmune dermatoses. This has enabled earlier intervention and more individualized patient management. Therapeutically, biologic medications showed superior outcomes in patients with moderate to severe inflammatory skin diseases by reducing symptom severity and relapse rates. Laser and light-based therapies were effective in managing acne scars, vascular lesions, and pigmentary disorders, while targeted immunotherapies demonstrated promising long-term benefits with fewer systemic adverse effects.

Discussion

The rapid development of modern dermatology reflects the growing integration of medical technology into clinical care. The transition from traditional visual diagnosis to technology-assisted assessment has improved diagnostic precision and reduced the risk of delayed treatment, particularly in life-threatening conditions such as skin cancer. One of the most significant advances is the incorporation of artificial intelligence into dermatological practice. Although its clinical implementation is still evolving, AI has the potential to support dermatologists by improving screening efficiency and accessibility, especially in remote or underserved regions through teledermatology platforms. Similarly, modern therapeutic innovations have shifted dermatological treatment toward personalized medicine. Rather than relying solely on symptom-based management, clinicians can now target specific molecular pathways responsible for disease progression. Despite these benefits, limitations such as treatment cost, unequal healthcare access, and the need for long-term safety monitoring remain important concerns. Overall, the future of dermatology lies in combining technological innovation, individualized treatment planning, and multidisciplinary collaboration to achieve more effective and patient-centered care.

Conclusion

Recent advances in dermatology have significantly transformed the diagnosis and treatment of skin diseases, leading to improved clinical outcomes and enhanced patient quality of life. The integration of innovative diagnostic technologies such as digital dermoscopy, molecular diagnostics, teledermatology, and artificial intelligence has enabled faster and more accurate identification of dermatological conditions. These advancements have improved early disease detection, particularly in serious conditions such as melanoma and chronic inflammatory skin disorders. At the same time, modern therapeutic approaches, including biologic therapies, targeted immunotherapy, laser-based treatments, and personalized medicine, have revolutionized dermatological care by offering more precise, effective, and

individualized treatment options. Despite these remarkable achievements, challenges such as treatment affordability, accessibility, and long-term safety monitoring remain important issues in global healthcare systems. Future progress in dermatology will depend on continued scientific research, technological innovation, and multidisciplinary collaboration aimed at delivering more patient-centered and evidence-based dermatological care worldwide.

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“SURXONDARYO VILOYATIDA TADBIRKORLIK SUBYEKTLARI BILAN BOG’LIQ IQTISODIY NIZOLAR VA SUD AMALIYOTI TAHLILI”

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Annotatsiya: Mazkur maqolada O‘zbekiston Respublikasida tadbirkorlik subyektlari huquq va qonuniy manfaatlarini sud orqali himoya qilishning huquqiy asoslari hamda amaliy mexanizmlari tahlil qilingan. Xususan, iqtisodiy sudlarning tadbirkorlik faoliyati bilan bog‘liq nizolarni hal etishdagi o‘rni, ularning vakolat doirasi, shartnomaviy, korporativ, investitsiyaviy, bankrotlik va yer munosabatlariga oid nizolarni ko‘rib chiqish amaliyoti yoritilgan. Maqolada O‘zbekiston Respublikasi Konstitutsiyasi, Iqtisodiy protsessual kodeksi, Fuqarolik kodeksi, “Tadbirkorlik faoliyati erkinligining kafolatlari to‘g‘risida”gi Qonun hamda sud-huquq sohasidagi islohotlarning mazmuni huquqiy jihatdan tahlil qilingan.Shuningdek, Surxondaryo viloyati iqtisodiy sudlari faoliyatiga oid statistik ma’lumotlar asosida tadbirkorlik nizolarining asosiy turlari, sud amaliyotidagi muammolar va ularning kelib chiqish sabablari o‘rganilgan.

Kalit so’zlar: Tadbirkorlik subyekti, iqtisodiy sud, tadbirkorlar huquqlarini himoya qilish, iqtisodiy nizolar, shartnomaviy nizolar, korporativ nizolar, investitsiyaviy nizolar, bankrotlik, mediatsiya, advokat yordami, sud-huquq islohotlari, huquqiy kafolatlar, shartnomaviy intizom, iqtisodiy protsess, huquqiy himoya mexanizmi.

Bozor iqtisodiyoti sharoitida tadbirkorlik faoliyati davlat iqtisodiy taraqqiyotining asosiy harakatlantiruvchi kuchlaridan biri sifatida e’tirof etiladi. Shu

sababli, tadbirkorlar huquqlari va qonuniy manfaatlarini ishonchli himoya qilish, ularning erkin faoliyat yuritishi uchun zarur huquqiy, tashkiliy va institutsional shart-sharoitlarni yaratish zamonaviy huquqiy davlatning ustuvor vazifalaridan biri hisoblanadi. Tadbirkorlik subyektlari faoliyatining samaradorligi nafaqat iqtisodiy omillarga, balki huquqiy himoya darajasiga ham bevosita bog‘liqdir. Shu bois, tadbirkorlar huquqlarini himoya qilish mexanizmlarining mavjudligi va ularning samarali ishlashi mamlakatning investitsion jozibadorligi, iqtisodiy barqarorligi hamda ijtimoiy rivojlanish darajasini belgilovchi muhim mezonlardan biri sifatida namoyon bo‘ladi.

O‘zbekiston Respublikasida tadbirkorlik faoliyatining huquqiy asoslari Konstitutsiyaviy normalar bilan mustahkamlangan bo‘lib, unda mulk daxlsizligi, iqtisodiy faoliyat erkinligi, raqobatni qo‘llab-quvvatlash va davlat tomonidan tadbirkorlikni himoya qilish kabi fundamental prinsiplar o‘z ifodasini topgan. Ushbu prinsiplar “Tadbirkorlik faoliyati erkinligining kafolatlari to‘g‘risida”gi Qonun, Fuqarolik kodeksi, Soliq kodeksi va boshqa normativ-huquqiy hujjatlar orqali rivojlantirilib, tadbirkorlik faoliyatini tartibga soluvchi yaxlit huquqiy tizimni tashkil etadi. Mazkur hujjatlar orqali tadbirkorlik subyektlarining huquqlari, majburiyatlari, davlat organlari bilan o‘zaro munosabatlari hamda ularni himoya qilish mexanizmlari aniq belgilab berilgan. So‘nggi yillarda mamlakatimizda tadbirkorlik muhitini yanada yaxshilash, davlat organlarining tadbirkorlik faoliyatiga asossiz aralashuvini cheklash hamda ularning huquqiy himoyasini kuchaytirish borasida keng ko‘lamli islohotlar amalga oshirilmoqda. Xususan, Prezident farmonlari va qarorlari orqali tekshiruvlar tizimini tartibga solish, ularni raqamlashtirish, shaffofligini ta’minlash hamda nazorat organlari faoliyatini aniq chegaralashga qaratilgan yangi mexanizmlar joriy etildi. Bu esa tadbirkorlar faoliyatiga ortiqcha byurokratik to‘siqlarni kamaytirish va ularning erkin rivojlanishi uchun qulay muhit yaratishga xizmat qilmoqda.

Mazkur islohotlar doirasida tadbirkorlar huquqlarini himoya qilish mexanizmlarining institutsional asoslari ham sezilarli darajada mustahkamlandi.

Xususan, davlat organlari faoliyatida “tadbirkorlik subyekti foydasiga talqin qilish” prinsipi, ortiqcha ma’muriy yuklamalarni qisqartirish, nazorat funksiyalarini optimallashtirish hamda ularni aniq chegaralashga qaratilgan yangi yondashuvlar joriy etildi. Bu esa tadbirkorlik subyektlarining davlat bilan o‘zaro munosabatlarida muvozanatni ta’minlash, ularning huquq va manfaatlarini ustuvor qo‘yish hamda huquqiy ishonch muhitini shakllantirishga xizmat qilmoqda. Tadbirkorlar huquqlarini himoya qilish mexanizmlari, avvalo, sud-huquq tizimi orqali amalga oshiriladi. Sudlar tadbirkorlik subyektlarining buzilgan huquqlarini tiklash, noqonuniy qarorlarni bekor qilish hamda yetkazilgan zararni undirishda asosiy vakolatli organ hisoblanadi. Shu bilan birga, nizolarni sudgacha hal etishning muqobil usullari, jumladan mediatsiya va arbitraj mexanizmlarining rivojlanishi ham tadbirkorlar uchun qo‘shimcha huquqiy kafolatlarni yaratmoqda. Bu esa nizolarni tezkor, kam xarajatli va samarali hal etish imkonini beradi.

“*Tadbirkorlik rivojini yanada yuksak bosqichga ko‘tarish - ustuvor vazifamizdir*”[1], - deb ta’kidlagan edi O‘zbekiston Respublikasi Prezidenti Shavkat Mirziyoyev mamlakatimiz tadbirkorlari bilan ochiq muloqot shaklida o‘tkazilgan uchrashuvdagi nutqida. Biroq har qanday tadbirkor o‘z faoliyati jarayonida turli to‘siq va muammolarga duch kelishi tabiiy holatdir. Ana shunday vaziyatlarda ularning huquq va qonuniy manfaatlarini himoya qilishda sudlarning o‘rni nihoyatda muhim ahamiyat kasb etadi.Tadbirkorlarning huquq va erkinliklari ishonchli himoya qilinadigan, muammolariga tezkor va samarali yechim topiladigan davlat jadal rivojlanadi, xalqaro maydondagi obro‘-e’tibori va mavqei yuksaladi.

So‘nggi yillarda mamlakatimizda tadbirkorlik subyektlari uchun teng imkoniyatlar yaratish, ularning huquq va qonuniy manfaatlarini sud orqali ishonchli himoya qilishni ta’minlashga qaratilgan keng ko‘lamli islohotlar amalga oshirilmoqda.

[1] Tadbirkorlik rivojini yanada yuksak bosqichga ko‘tarish – ustuvor vazifamizdir https://president.uz/oz/lists/view/6561

Bu esa milliy iqtisodiyotning yangi bosqichda taraqqiy etishida muhim omil bo‘lib xizmat qilmoqda. Xususan, Prezidentimiz tashabbusi bilan sud-huquq tizimini yanada takomillashtirish, odil sudlovni samarali tashkil etish va sudlar mustaqilligini mustahkamlashga qaratilgan qator farmon va qarorlar qabul qilindi. Ushbu islohotlar tadbirkorlik faoliyatining yanada kengayishi va rivojlanishi uchun mustahkam huquqiy zamin yaratdi. Tadbirkorlar buzilgan huquq va manfaatlarini tiklanishini so’rab fuqarolik, jinoyat, iqtisodiy va ma’muriy sudlarga murojaat qilish huquqiga ega. Har bir sud tizimi o’z vakolatlari doirasida yuzaga kelgan muammolarni bartaraf etadi.

B.Laxtarnik nazariyasiga ko‘ra, iqtisodiy nizolarni quyidagi turlarga ajratish maqsadga muvofiq:

1) shartnomaviy nizolar, shartnoma predmeti doirasidan kelib chiqqan huquq va majburiyatlar bo‘yicha nizolar shartnomalar. Iqtisodiy nizolarning eng katta guruhi ham ushbu nizolardan iboratdir;

2) shartnomadan tashqari, bitim mazmunidan tashqari qo‘shimcha majburiyatdan kelib chiqqan va shartnoma mazmuniga daxl qilmaydigan huquq va majburiyatlar doirasidagi nizolar . O‘zbekiston Respublikasida faoliyat yuritadigan tadbirkorlik sub’yektlari o‘rtasida iqtisodiy munosabatlardan kelib chiqadigan nizolarni hal etishda har doim ham iqtisodiy sudga murojaat qilib bo‘lmaydi. Chunki shunday fuqarolik huquqiy munosabatlardan kelib chiqadigan iqtisodiy va korporativ nizolar borki, fuqarolik sudida ko‘rib chiqiladi.

Iqtisodiy sudlar O‘zbekiston Respublikasida tadbirkorlik faoliyati bilan bog‘liq nizolarni ko‘rib chiqishga ixtisoslashgan sud organlari hisoblanadi. Ularning asosiy vazifasi iqtisodiyot sohasida yuzaga keladigan huquqiy munosabatlardan kelib chiqadigan nizolarni hal etishdan iborat. Amaldagi qonunchilikka ko‘ra, iqtisodiy sudlarga, avvalo, yuridik shaxslar hamda yakka tartibdagi tadbirkorlar o‘rtasida yuzaga keladigan fuqaroviy, ma’muriy va boshqa huquqiy munosabatlardan kelib chiqadigan nizolar taalluqlidir. Bunday nizolar, odatda, tadbirkorlik subyektlari o‘rtasida tuzilgan

shartnomalar, jumladan mahsulot yetkazib berish, oldi-sotdi, pudrat, xizmat ko‘rsatish va kredit shartnomalaridan kelib chiqadi.

Shuningdek, iqtisodiy sudlar yuridik ahamiyatga ega bo‘lgan faktlarni aniqlash bilan bog‘liq ishlarni ham ko‘rib chiqadi. Bunday ishlar nizo mavjud bo‘lmagan holatlarda ko‘riladi va ular orqali, masalan, mulkka egalik qilish, tashkilotning ro‘yxatdan o‘tganligi yoki muayyan vaqt davomida mulkdan foydalanish kabi faktlar tasdiqlanadi. Iqtisodiy sudlarning muhim vakolatlaridan yana biri bankrotlikka oid ishlarni ko‘rib chiqishdir. Qonunchilikka muvofiq, agar qarzdor uch oy davomida o‘z majburiyatlarini bajarmasa va kreditorlar talablarini qondira olmasa, u bankrot deb e’tirof etilishi mumkin. Bunday ishlar ham aynan iqtisodiy sudlar tomonidan hal etiladi. Bundan tashqari, iqtisodiy sudlar hakamlik sudlari bilan bog‘liq nizolarni ham ko‘rib chiqadi. Jumladan, hakamlik sudining qarorlarini bekor qilish, ularni majburiy ijro etish uchun ijro varaqasi berish yoki hakamlik jarayonida da’voni ta’minlash choralarini qo‘llash bilan bog‘liq ishlar iqtisodiy sud vakolatiga kiradi. Alohida toifa sifatida korporativ nizolar ham iqtisodiy sudlar tomonidan ko‘rib chiqiladi. Bunday nizolar yuridik shaxsni tashkil etish, qayta tashkil etish yoki tugatish, ustav kapitalidagi ulushlar, aksiyalar bilan bog‘liq masalalar, shuningdek yuridik shaxs boshqaruv organlari qarorlari ustidan shikoyatlar bilan bog‘liq bo‘ladi. Korporativ nizolarning o‘ziga xos jihati shundaki, ular odatda bitta xo‘jalik yurituvchi subyekt doirasida, uning ishtirokchilari va boshqaruv organlari o‘rtasida yuzaga keladi[2].

Shuningdek, investitsiyaviy nizolar ham iqtisodiy sudlar vakolatiga kiradi. Bu turdagi nizolar investitsiya shartnomalarini tuzish, o‘zgartirish, bekor qilish yoki ularning bajarilishi bilan bog‘liq bo‘ladi. Bundan tashqari, investorlarning soliq, bojxona va boshqa majburiyatlarni bajarishi bilan bog‘liq nizolar ham shu toifaga kiradi. Raqobatga oid nizolar ham iqtisodiy sudlar tomonidan ko‘rib chiqiladi. Bunday nizolar yuridik shaxslar, tadbirkorlar hamda monopoliyaga qarshi organlar o‘rtasida

[2] Iqtisodiy sudlarda qanday ishlar ko’riladi? https://namangan.adliya.uz/uz/news/detail.php?ID=47984

tovar va moliya bozorlarida yuzaga keladi. Iqtisodiy sudlar, shuningdek, chet davlat sudlari va arbitrajlarining qarorlarini tan olish va ularni ijro etish bilan bog‘liq ishlarni ham ko‘rib chiqadi. Bu esa xalqaro iqtisodiy munosabatlarning huquqiy ta’minotida muhim ahamiyatga ega[3].

Amaliyotda iqtisodiy sudlarda ko‘riladigan ishlarning asosiy qismini aynan tadbirkorlik subyektlari o‘rtasidagi shartnomaviy nizolar tashkil etadi. Bu esa iqtisodiy munosabatlarning asosi aynan shartnomalar ekanligini ko‘rsatadi. Shu bilan birga, ayrim hollarda bir da’vo arizasida bir nechta talablar birlashtirilishi mumkin. Agar ushbu talablarning bir qismi iqtisodiy sudga, boshqasi esa fuqarolik sudiga taalluqli bo‘lsa, bunday ishlar fuqarolik sudlarida ko‘rib chiqiladi. Aks holda, noto‘g‘ri yurisdiksiya asosida berilgan ariza iqtisodiy sud tomonidan qaytariladi.

Ma’lumki, mustaqil va xolis sudni talab qilish har bir insonning ajralmas huquqi sanaladi. Ushbu huquq Inson huquqlari Umumjahon deklaratsiyasining 10-moddasida[4] hamda O‘zbekiston Respublikasi qo‘shilgan boshqa xalqaro-huquqiy hujjatlarda mustahkamlab qo‘yilgan. Faqatgina erkin va mustaqil sud organigina fuqarolarning ishlarini adolatli, ochiq va xolis ko‘rib chiqish orqali buzilgan huquqlarni tiklashga xizmat qiladi hamda jamiyatda ishonchni mustahkamlaydi.

Shu nuqtai nazardan, O’zbekiston Respublikasi Prezidenti Sh.Mirziyoyev tashabbusi bilan ilgari surilgan 2017-2021-yillarda Harakatlar strategiyasi doirasida amalga oshirilgan islohotlar sud-huquq tizimini liberallashtirish, demokratik asosda rivojlantirish, sud hokimiyatining haqiqiy mustaqilligini ta’minlash hamda fuqarolarning huquq va qonuniy manfaatlarini himoya qilish uchun muhim poydevor yaratdi[5]. Shavkat Mirziyoyev tomonidan 2020-yil 29-dekabr kuni Oliy Majlisga

[3] O’zbekiston Respublikasi Iqtisodiy protsessual kodekisi
[4]Inson huquqlari Umumjahon deklaratsiyasi https://lex.uz/docs/-7338189

[5] SUD-HUQUQ TIZIMIDAGI STRATEGIK ISLOHOTLAR INSON MANFAATLARI UCHUN XIZMAT QILMOQDA https://strategy.uz/index.php?news=1442&lang=uz

yo‘llangan navbatdagi Murojaatnomada qayd etilganidek, so‘nggi to‘rt yil davomida sud-huquq tizimini isloh qilish borasida sezilarli natijalarga erishildi. Ushbu yo‘nalishda ustuvor vazifalarni amalga oshirish maqsadida 40 dan ortiq qonunlar, farmonlar va qarorlar qabul qilindi.

Qonun ustuvorligini ta’minlash va sud-huquq tizimini takomillashtirish yo‘lida muhim strategik choralar ko‘rildi. Jumladan, investitsiya nizolari hamda raqobatga oid ishlarni ko‘rib chiqish vakolati faqat iqtisodiy sudlarga berildi. Prokuratura organlarining barcha iqtisodiy sud majlislarida qatnashish huquqi bekor qilinib, ular faqat qonunda nazarda tutilgan holatlarda yoki o‘z da’volari asosida ko‘rib chiqilayotgan ishlar doirasida ishtirok etadigan tartib joriy etildi. Bundan tashqari, sud jarayonlarida nazorat instansiyasi bekor qilinib, ortiqcha sud bosqichlari qisqartirildi. Natijada “Bir sud – bir instansiya” prinsipi amaliyotga tatbiq etildi. Endilikda tumanlararo sudlar qarorlari viloyat sudlari tomonidan, viloyat sudlarining birinchi instansiyada qabul qilgan qarorlari esa O‘zbekiston Respublikasi Oliy sudi sudlov hay’atlari tomonidan apellyatsiya tartibida qayta ko‘rib chiqilmoqda.

2026-yil 16-fevralda qabul qilingan “O‘zbekiston - 2030” [6] strategiyasi mamlakat taraqqiyotining barcha yo‘nalishlarini qamrab olgan muhim dasturiy hujjat bo‘lib, unda sud-huquq tizimini isloh qilish ustuvor vazifalardan biri sifatida belgilangan. Strategiyada qonun ustuvorligini ta’minlash, inson huquq va erkinliklarini samarali himoya qilish hamda sud tizimini zamonaviy va ochiq mexanizmlar asosida takomillashtirish asosiy maqsadlardan biri sifatida ko‘rsatib o‘tilgan. Mazkur islohotlar, ayniqsa, tadbirkorlik subyektlari faoliyati bilan bevosita bog‘liq bo‘lib, ular o‘rtasida yuzaga keladigan nizolarni tezkor, adolatli va samarali hal etish imkoniyatlarini kengaytirishga xizmat qiladi. Xususan, sud jarayonlarini raqamlashtirish, protsessual harakatlarni masofadan turib amalga oshirish, shuningdek

[6] “O‘ZBEKISTON — 2030” STRATEGIYASI https://gov.uz/oz/pages/2030_strategy

nizolarni kelishtirish (mediatsiya) asosida hal etish mexanizmlarini kengaytirish tadbirkorlar uchun muhim huquqiy kafolatlarni yaratadi[7].

Hududiy kesimda qaralganda, Surxondaryo viloyatida tadbirkorlik subyektlari o‘rtasida yuzaga kelayotgan nizolarni sud amaliyoti asosida tahlil qilish ushbu islohotlarning amaliy natijalarini baholashda muhim ahamiyat kasb etadi. Ayniqsa, iqtisodiy va ma’muriy sudlar faoliyatida nizolarni hal etishning samaradorligi, taraflar huquqlarining himoya qilinishi va sud qarorlarining ijrosi dolzarb masalalardan hisoblanadi. Avvalo, statistik ma’lumotlarga e’tibor qaratadigan bo‘lsak, Surxondaryo viloyatida iqtisodiy sudlar tomonidan ko‘rilgan ishlar soni yillar davomida sezilarli o‘zgarib borgan. Jumladan, 2021-yilda 8 692 ta ish ko‘rilgan bo‘lsa, 2022-yilda bu ko‘rsatkich 16 325 taga yetgan. 2023-yilda esa biroz kamayib 15 620 tani tashkil etgan, biroq 2024-yilda keskin o‘sish kuzatilib, ishlar soni 39 307 taga yetgan. 2025-yilning birinchi yarmida esa 24 061 ta ish ko‘rilgan[8].

Mazkur ko‘rsatkichlar shuni anglatadiki, hududda iqtisodiy munosabatlar kengayib borayotgani bilan birga, nizolar soni ham ortmoqda. Ayniqsa 2024-yildagi keskin o‘sish iqtisodiy faoliyatning jadallashuvi yoki nizolarni sud orqali hal etish mexanizmlarining faollashganidan dalolat beradi. Sudlar tomonidan ko‘rilgan ishlarning natijalariga nazar tashlaydigan bo‘lsak, 2025-yil birinchi yarmida Surxondaryo viloyatida ko‘rilgan 24 061 ta ishning 94 foizi ko‘rib tamomlangan. Shundan 22 397 tasi qanoatlantirilgan bo‘lib, bu 93 foizdan ortiq natijani tashkil etadi. Rad etilgan ishlar esa 671 tani (taxminan 2,8%) tashkil etgan. Bu holat sud amaliyotida da’volarning asosli kiritilayotgani yoki sudlar tomonidan dalillar chuqur o‘rganilib, ko‘proq qanoatlantirishga moyillik mavjudligini ko‘rsatadi. Shu bilan birga, rad etilgan

[7]Mamlakat taraqqiyotining 2030-yilgacha mo’ljallangan uatuvor yo’nalishlari doirasida islohotlarni izchil davom ettirish va yangi bosqichga olib chiqishning qo’shimcha chora-tadbirlari to’g’risida Ozbekiston Respublikasi Prezidenti 21-sonli farmoni https://lex.uz/docs/-8050769

[8]Iqtisodiy sudlar tomonidan birinchi instantsiyada ko‘rilgan ishlar yuzasidan statistik ma’lumot https://stat.sud.uz/assets/uploads/economical/pdf/eco-2025-6.pdf

ishlarning kamligi tadbirkorlar tomonidan sudga murojaat qilishdan oldin huquqiy asoslar yetarli darajada shakllantirilayotganini anglatadi.

Iqtisodiy sudlarda ko‘riladigan ishlarning turlari ham muhim ahamiyatga ega. Statistik ma’lumotlarga ko‘ra, 2025-yil birinchi yarmida eng ko‘p ishlar bank hisobvaraqlari operatsiyalarini to‘xtatib turish bilan bog‘liq bo‘lib, ular umumiy ishlarning 68,3 foizini tashkil etgan. Bu esa iqtisodiy sudlar faoliyatida moliyaviy intizom va bank operatsiyalariga oid nizolar ustuvor ekanligini ko‘rsatadi. Bundan tashqari, mahsulot yetkazib berish shartnomalari (5,4%), kommunal xizmatlar (3,3%), kredit shartnomalari (2,1%) va bankrotlikka oid ishlar (2,3%) ham sezilarli ulushni tashkil etadi. Ushbu ko‘rsatkichlar hududda tadbirkorlik faoliyati asosan shartnomaviy munosabatlarga asoslanganini va aynan shu sohada nizolar ko‘proq yuzaga kelayotganini anglatadi. Yer bilan bog‘liq nizolar ham alohida e’tiborga loyiq. 2025-yil birinchi yarmida Surxondaryo viloyatida 840 ta yerga oid ish ko‘rilgan bo‘lib, ularning 603 tasi qanoatlantirilgan. Bu esa yer munosabatlari tadbirkorlik faoliyatida muhim o‘rin tutishini va ushbu sohada nizolar hali ham dolzarbligini saqlab qolayotganini ko‘rsatadi.

Sud ishlarini ko‘rib chiqish muddatlari ham muhim indikator hisoblanadi. Statistikaga ko‘ra, Surxondaryo viloyatida ishlarning 83,6 foizi 15 kun ichida ko‘rib chiqilgan, 11,3 foizi esa 1 oygacha bo‘lgan muddatda hal etilgan. Bu esa sud tizimida tezkorlik va samaradorlik darajasi yuqori ekanligini bildiradi[9]. Shuningdek, ishlarning katta qismi bir yoki ikki sud majlisida hal etilmoqda. Bu esa sud jarayonlarining ortiqcha cho‘zilmasdan, qisqa muddatlarda yakunlanayotganini ko‘rsatadi. Bu holat tadbirkorlar uchun muhim bo‘lib, ularning vaqt va moliyaviy resurslarini tejashga xizmat qiladi. Biroq, ayrim muammolar ham mavjud masalan, ayrim ishlarning 3 oydan ortiq muddatda ko‘rilishi yoki ko‘rmasdan qoldirilgan ishlar mavjudligi sud

[9]Iqtisodiy sudlar tomonidan birinchi instantsiyada ko‘rilgan ishlar yuzasidan statistik ma’lumot https://stat.sud.uz/assets/uploads/economical/pdf/eco-2025-6.pdf

tizimida hali ham ayrim tashkiliy yoki protsessual muammolar borligini ko‘rsatadi. Shuningdek, bank operatsiyalari bilan bog‘liq ishlarning haddan tashqari ko‘pligi iqtisodiy munosabatlarda moliyaviy intizom yetarli darajada shakllanmaganini anglatadi.

2025-yilning 1-yanvaridan 30-iyuniga qadar Respublika miqyosida birinchi instansiya iqtisodiy sudlarida jami 384 842 ta iqtisodiy ish ko‘rib chiqilgani mamlakatda iqtisodiy-huquqiy munosabatlar ko‘lami tobora kengayib borayotganini ko‘rsatadi. Mazkur statistik ma’lumotlar nafaqat iqtisodiy sudlar faoliyati samaradorligini, balki tadbirkorlik subyektlari, davlat organlari va boshqa xo‘jalik yurituvchi subyektlar o‘rtasidagi huquqiy munosabatlarning amaliy holatini ham aks ettiradi. Ushbu statistik ko‘rsatkichlarni tahlil qilishda O‘zbekiston Respublikasi Konstitutsiyasi, Iqtisodiy protsessual kodeksi, Fuqarolik kodeksi, “Banklar va bank faoliyati to‘g‘risida”gi Qonun, “Raqobat to‘g‘risida”gi Qonun, “Korxonalarning bankrotligi to‘g‘risida”gi Qonun hamda boshqa normativ-huquqiy hujjatlar muhim huquqiy asos bo‘lib xizmat qiladi.

Statistik ma’lumotlarga ko‘ra, iqtisodiy sudlarda ko‘rilgan ishlarning asosiy qismini banklardagi hisobvaraqlar bo‘yicha operatsiyalarni to‘xtatib turishga oid ishlar tashkil etgan bo‘lib, ular jami ishlarning 68,3 foizini yoki 305 665 tani tashkil etadi. Mazkur turdagi ishlarning ko‘pligi iqtisodiy munosabatlarda moliyaviy majburiyatlarning bajarilishi ustidan nazorat kuchayganini ko‘rsatadi. O‘zbekiston Respublikasi Soliq kodeksi hamda “Banklar va bank faoliyati to‘g‘risida”gi qonunchilikka muvofiq, soliq qarzdorligi yoki boshqa majburiy to‘lovlarni undirish maqsadida xo‘jalik yurituvchi subyektlarning hisobvaraqlari bo‘yicha operatsiyalar vaqtincha cheklanishi mumkin. Ushbu choralar davlat manfaatlarini himoya qilishga qaratilgan bo‘lsa-da, Konstitutsiyada belgilangan tadbirkorlik erkinligi prinsipiga zid bo‘lmasligi kerak. Chunki Konstitutsiyaning iqtisodiy faoliyat erkinligiga oid normalariga ko‘ra, har bir shaxs qonunda taqiqlanmagan tadbirkorlik faoliyati bilan shug‘ullanish huquqiga ega. Shu sababli hisobvaraqlarni bloklash bilan bog‘liq

choralarni qo‘llashda mutanosiblik va qonuniylik tamoyillariga qat’iy rioya qilinishi muhimdir. Mahsulot yetkazib berish shartnomalariga oid 13 155 ta ish Fuqarolik kodeksining shartnoma majburiyatlariga oid normalari amaliyotda eng ko‘p qo‘llanilayotgan institutlardan biri ekanini ko‘rsatadi. Fuqarolik kodeksiga ko‘ra, taraflar shartnomani lozim darajada bajarishi shart. Yetkazib beruvchi mahsulotni sifatli va o‘z vaqtida topshirishi, xaridor esa to‘lov majburiyatlarini bajarishi lozim. Statistik ma’lumotlar ushbu majburiyatlarning buzilishi iqtisodiy nizolarning asosiy sabablaridan biri ekanini ko‘rsatmoqda. Bu esa tadbirkorlik subyektlari o‘rtasida shartnomaviy intizomni kuchaytirish zarurligini anglatadi.

Kommunal xizmat ko‘rsatish shartnomalariga oid 10 702 ta ish mavjudligi elektr energiyasi, gaz va suv ta’minoti bilan bog‘liq iqtisodiy munosabatlarda muammolar mavjudligini ko‘rsatadi. “Elektr energetikasi to‘g‘risida”gi Qonun hamda kommunal xizmatlar sohasidagi normativ hujjatlarga ko‘ra, iste’molchilar kommunal xizmatlar uchun o‘z vaqtida to‘lovlarni amalga oshirishi shart. Aks holda xizmat ko‘rsatuvchi tashkilotlar iqtisodiy sudlarga murojaat qilish huquqiga ega bo‘ladi. Mazkur nizolarning ko‘pligi ayrim tadbirkorlik subyektlarida moliyaviy intizom yetarli emasligini ko‘rsatadi. Kredit shartnomalariga oid 7 921 ta ish bank-moliya munosabatlarining iqtisodiy sudlar amaliyotida muhim o‘rin tutayotganini ko‘rsatadi. Fuqarolik kodeksi hamda bank qonunchiligiga ko‘ra, kredit oluvchi kredit mablag‘larini belgilangan muddatda qaytarishi va foizlarni to‘lashi shart. Mazkur majburiyatlarning buzilishi iqtisodiy sudlarda ko‘plab nizolarni yuzaga keltiradi. Bu esa tadbirkorlik subyektlarining moliyaviy savodxonligini oshirish va kredit risklarini boshqarish tizimini takomillashtirish zarurligini ko‘rsatadi.

Korxonalar bankrotligiga oid 6 920 ta ish “Korxonalarning bankrotligi to‘g‘risida”gi qonun amaliyotda faol qo‘llanilayotganini ko‘rsatadi. Mazkur institut iqtisodiyotda sog‘lom raqobat muhitini shakllantirishda muhim ahamiyatga ega. Chunki bankrotlik mexanizmi iqtisodiy jihatdan samarasiz faoliyat yuritayotgan korxonalarni qayta tiklash yoki tugatish orqali bozor iqtisodiyotining barqarorligini

ta’minlaydi. Shu bilan birga, bankrotlikka oid ishlarning ko‘payishi ayrim korxonalarda moliyaviy boshqaruv va ichki nazorat tizimi sust ekanini ham ko‘rsatadi.Moliyaviy jarima qo‘llashga oid 4 738 ta ish davlat nazorati organlari va tadbirkorlik subyektlari o‘rtasidagi huquqiy munosabatlarning muhim qismi hisoblanadi. Bu yerda Ma’muriy javobgarlik to‘g‘risidagi kodeks, Soliq kodeksi va boshqa moliyaviy nazoratga oid qonunchilik normalari muhim o‘rin tutadi. Ayrim hollarda tadbirkorlik subyektlari noqonuniy moliyaviy sanksiyalar qo‘llanilgan deb hisoblab, iqtisodiy sudlarga murojaat qiladi. Sudlar esa ushbu nizolarni ko‘rib chiqishda qonuniylik va adolatlilik prinsiplariga asoslanadi.

Yerga oid nizolar sonining 1 280 tani tashkil etishi Yer kodeksi hamda yer munosabatlarini tartibga soluvchi qonunchilik normalarining iqtisodiy sud amaliyotida muhim o‘rin tutayotganini ko‘rsatadi. Yer uchastkalarini ajratish, foydalanish yoki ijara munosabatlari bilan bog‘liq nizolar bugungi kunda ham dolzarb masalalardan biri bo‘lib qolmoqda. Umuman olganda, mazkur statistik ma’lumotlar iqtisodiy sudlar davlatda qonun ustuvorligini ta’minlash, tadbirkorlik subyektlari huquqlarini himoya qilish va iqtisodiy barqarorlikni mustahkamlashda muhim institutsional mexanizm ekanini ko‘rsatadi. Shu bilan birga, iqtisodiy nizolar sonining yuqoriligi tadbirkorlik subyektlarining huquqiy savodxonligini oshirish, mediatsiya va sudgacha nizolarni hal qilish institutlarini rivojlantirish hamda shartnomaviy intizomni kuchaytirish zarurligini anglatadi.

2025-yilning 1-yanvaridan 30-iyuniga qadar iqtisodiy sudlar tomonidan tadbirkorlik subyektlari ishtirokida ko‘rilgan ishlar statistikasi Surxondaryo viloyatida tadbirkorlik faoliyati va iqtisodiy nizolar hajmi yuqori ekanligini ko‘rsatadi. Mazkur davrda Surxondaryo viloyatida tadbirkorlik subyekti da’vogar bo‘lgan jami 840 ta ish ko‘rib chiqilgan bo‘lib, shundan 603 tasi qanoatlantirilgan. Bu ko‘rsatkich tadbirkorlarning o‘z huquq va qonuniy manfaatlarini himoya qilish maqsadida sudlarga faol murojaat qilayotganini hamda sudlar tomonidan ularning talablariga asosli yondashilayotganini anglatadi. Shu bilan birga, 187 ta ish rad qilingan, 26 ta ish

ko‘rmasdan qoldirilgan va 24 ta ish yuritish tugatilgan. Mazkur holatlar ayrim tadbirkorlar tomonidan huquqiy asoslarning yetarlicha mustahkam tayyorlanmasligi, dalillar bazasining to‘liq shakllantirilmasligi yoki protsessual talablarning buzilishi bilan bog‘liq bo‘lishi mumkin.

Shuningdek, statistik ma’lumotlarda Surxondaryo viloyatida tadbirkorlik subyekti javobgar bo‘lgan ishlar soni ancha yuqoriligi kuzatiladi. Xususan, jami 21 272 ta ishda tadbirkorlik subyektlari javobgar sifatida ishtirok etgan bo‘lib, bu boshqa ko‘rsatkichlarga nisbatan juda katta hajmni tashkil etadi. Ushbu ishlarning 20 155 tasi qanoatlantirilgani sudlarga murojaat qilgan da’vogarlarning talablari ko‘p hollarda asosli bo‘lganini ko‘rsatadi. Bu esa ayrim tadbirkorlik subyektlari tomonidan shartnoma majburiyatlarini lozim darajada bajarmaslik, to‘lov intizomiga rioya qilmaslik, qarzdorliklarning ortishi yoki xo‘jalik faoliyatida qonunchilik talablariga to‘liq amal qilinmasligi kabi muammolar mavjudligini anglatadi. Bundan tashqari, 231 ta ish rad etilgani tadbirkorlik subyektlari ayrim holatlarda o‘z pozitsiyasini sudda muvaffaqiyatli himoya qila olganini ko‘rsatadi. to‘liq emasligi yoki taraflarning sud jarayonida faol ishtirok etmaganligi bilan bog‘liq bo‘lishi mumkin. 45 ta ish yuritish tugatilgani esa taraflar o‘rtasida kelishuvga erishilganligi yoki nizoni suddan tashqari tartibda hal qilish imkoniyatlari mavjud bo‘lganidan dalolat beradi.

Mazkur statistik tahlil Surxondaryo viloyatida tadbirkorlik faoliyati rivojlanib borayotgan bo‘lsa-da, xo‘jalik yurituvchi subyektlar faoliyatida huquqiy madaniyat, shartnomaviy intizom va majburiyatlarni o‘z vaqtida bajarish bilan bog‘liq muammolar saqlanib qolayotganini ko‘rsatadi. Shu sababli tadbirkorlik subyektlariga malakali yuridik yordam ko‘rsatish, shartnomaviy munosabatlarni mustahkamlash hamda nizolarni sudgacha hal etish mexanizmlarini rivojlantirish muhim ahamiyat kasb etadi. Iqtisodiy sudlar esa ushbu jarayonda tadbirkorlarning huquqlarini himoya qiluvchi va iqtisodiy barqarorlikni ta’minlovchi asosiy huquqiy institutlardan biri sifatida namoyon bo‘lmoqda.

Muammo va takliflar

Bugungi kunda kichik tadbirkorlik subyektlarining huquq va qonuniy manfaatlarini himoya qilish masalasi davlat siyosatining ustuvor yo‘nalishlaridan biri hisoblanadi. Ayniqsa, tadbirkorlarning davlat boshqaruvi organlari bilan yuzaga keladigan nizolarida malakali yuridik yordamdan foydalanish imkoniyati yetarli darajada shakllanmagani amaliyotda jiddiy muammolarni keltirib chiqarmoqda. Mazkur holat tadbirkorlik faoliyatining barqarorligiga, investitsion muhitga hamda iqtisodiy adolat tamoyillarining ta’minlanishiga salbiy ta’sir ko‘rsatadi.

Birinchi muammo sifatida kichik tadbirkorlik subyektlarining advokat xizmatidan foydalanish imkoniyati cheklanganligini ko‘rsatish mumkin. Amaliyotda ko‘plab tadbirkorlarning doimiy yurist shtabi mavjud emas, malakali advokat xizmatlari esa ayrim hollarda yuqori xarajat talab qiladi. Natijada tadbirkor davlat organlari bilan nizolarda o‘z huquqlarini to‘liq himoya qila olmaydi. Ayniqsa, soliq, litsenziya, yer ajratish, tekshiruv va ma’muriy jarimalar bilan bog‘liq nizolarda tadbirkorning huquqiy savodxonligi yetishmasligi uning manfaatlariga zarar yetkazadi.Mazkur muammo huquqiy jihatdan ham dolzarb hisoblanadi. Chunki O‘zbekiston Respublikasi Konstitutsiyasida har kimning malakali yuridik yordam olish huquqi kafolatlangan. Shuningdek, “Tadbirkorlik faoliyati erkinligining kafolatlari to‘g‘risida”[10] gi Qonunda tadbirkorlarning huquqlari davlat tomonidan himoya qilinishi belgilangan. Biroq amaliy mexanizmlarning yetarli emasligi ushbu normalarning to‘liq ishlashiga to‘sqinlik qilmoqda. Shu sababli tadbirkorlarning sud va ma’muriy organlardagi manfaatlarini himoya qilishda institutsional yondashuvni kuchaytirish zarur.

Ikkinchi muammo sifatida tadbirkorlar o‘rtasida huquqiy bilim va profilaktik tushuntirish ishlarining yetarli emasligini ko‘rsatish mumkin. Ko‘plab tadbirkorlar amaldagi qonunchilikdagi o‘zgarishlar, soliqqa oid majburiyatlar, shartnomaviy munosabatlar yoki mehnat qonunchiligi bo‘yicha yetarli bilimga ega emas. Bu esa

[10] “Tadbirkorlik faoliyati erkinligining kafolatlari to‘g‘risida”gi Qonunhttps://lex.uz/docs/-31846

keyinchalik huquqbuzarliklar, iqtisodiy nizolar hamda ortiqcha sud jarayonlariga sabab bo‘lmoqda. Huquqiy savodxonlikning pastligi tadbirkorning nafaqat iqtisodiy faoliyatiga, balki uning davlat organlariga bo‘lgan ishonchiga ham salbiy ta’sir ko‘rsatadi.

Mazkur muammoning yechimi sifatida “Har oyda bir marotaba huquqiy targ‘ibot aksiyasi” tizimini joriy etish maqsadga muvofiq hisoblanadi. Ushbu tizim orqali tadbirkorlarga bepul huquqiy maslahatlar berish, yangi qonunchilik mazmunini tushuntirish, shartnomalar tuzish bo‘yicha amaliy yordam ko‘rsatish hamda nizolarning oldini olishga qaratilgan profilaktik choralarni amalga oshirish mumkin bo‘ladi. Bunday yondashuv tadbirkorlar va davlat organlari o‘rtasida ochiq muloqotni shakllantirib, iqtisodiy munosabatlarda qonuniylik va shaffoflikni mustahkamlaydi.Shuningdek, kichik tadbirkorlik subyektlari uchun Adliya vazirligi tashabbusi asosida maxsus “advokat yordami tizimi”ni joriy etish ham muhim ahamiyat kasb etadi. Ushbu tizimga ko‘ra, tadbirkor elektron platforma orqali murojaat qiladi, murojaat vakolatli organ tomonidan o‘rganilib, unga tegishli malakali advokat biriktiriladi. Advokat esa nizoni sudgacha hal qilish, huquqiy hujjatlarni tayyorlash va sudda manfaatlarni himoya qilish vazifalarini amalga oshiradi. Bu tizim, bir tomondan, tadbirkorlarning huquqiy himoyasini kuchaytirsa, ikkinchi tomondan, davlat organlari faoliyatida qonuniylikni ta’minlashga xizmat qiladi.Xorijiy tajriba ham mazkur tizimning samaradorligini tasdiqlaydi. Jumladan, ayrim davlatlarda kichik biznes subyektlariga davlat tomonidan subsidiyalangan yuridik yordam mexanizmlari mavjud bo‘lib, bu tadbirkorlik muhitining barqaror rivojlanishiga ijobiy ta’sir ko‘rsatmoqda. O‘zbekistonda ham bunday tizimni bosqichma-bosqich joriy etish tadbirkorlarning sudga bo‘lgan ishonchini oshiradi, iqtisodiy nizolar sonini kamaytiradi va investitsion jozibadorlikni kuchaytiradi.

Xulosa

Bozor iqtisodiyoti sharoitida tadbirkorlik subyektlari huquqlarini ishonchli himoya qilish iqtisodiy barqarorlikni ta’minlashning asosiy shartlaridan biri

hisoblanadi. O‘zbekiston Respublikasida tadbirkorlik faoliyatining huquqiy asoslari Konstitutsiya, Fuqarolik kodeksi, Iqtisodiy protsessual kodeksi hamda “Tadbirkorlik faoliyati erkinligining kafolatlari to‘g‘risida”gi Qonun orqali mustahkamlangan bo‘lib, sud-huquq tizimidagi islohotlar tadbirkorlarning huquqiy himoyasini kuchaytirishga xizmat qilmoqda. Ayniqsa, iqtisodiy sudlarning investitsiyaviy, korporativ, bankrotlik va shartnomaviy nizolarni ko‘rib chiqish bo‘yicha maxsus vakolatlari tadbirkorlik faoliyatida qonuniylik va huquqiy ishonch muhitini ta’minlashda muhim ahamiyat kasb etmoqda.

Surxondaryo viloyati iqtisodiy sudlari faoliyati bo‘yicha statistik ma’lumotlar tahlili hududda iqtisodiy nizolar soni ortib borayotganini, ayniqsa bank operatsiyalari, shartnomaviy majburiyatlar, kredit va yer munosabatlari bilan bog‘liq nizolar ustuvor ekanini ko‘rsatdi. Mazkur holat tadbirkorlik faoliyatida shartnomaviy intizom, moliyaviy barqarorlik va huquqiy savodxonlikni yanada mustahkamlash zarurligini anglatadi. Shu bilan birga, ishlarning asosiy qismi qisqa muddatlarda ko‘rib chiqilayotgani iqtisodiy sudlar faoliyatida samaradorlik va tezkorlik tamoyillari amalda ta’minlanayotganidan dalolat beradi.Tahlillar shuni ko‘rsatdiki, kichik tadbirkorlik subyektlarining malakali yuridik yordamdan foydalanish imkoniyatlari cheklanganligi ularning davlat organlari bilan nizolarda manfaatlarini to‘liq himoya qilishiga to‘sqinlik qilmoqda. Shu sababli, tadbirkorlar uchun davlat tomonidan qo‘llab-quvvatlanadigan “advokat yordami tizimi”ni joriy etish, bepul huquqiy maslahat va targ‘ibot mexanizmlarini kengaytirish, mediatsiya institutini rivojlantirish hamda sudgacha nizolarni hal etish amaliyotini takomillashtirish maqsadga muvofiqdir. Mazkur choralar tadbirkorlarning sudga bo‘lgan ishonchini oshirish, iqtisodiy nizolar sonini kamaytirish hamda mamlakatning investitsion jozibadorligini kuchaytirishga xizmat qiladi.

Foydalanilgan adabiyotlar ro’yxati

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3.O’zbekiston Respublikasi Iqtisodiy protsessual kodekisihttps://lex.uz/ru/docs/-3523891?otherlang=1

4.Inson huquqlari Umumjahon deklaratsiyasi https://lex.uz/docs/-7338189

5.Mamlakat taraqqiyotining 2030-yilgacha mo’ljallangan uatuvor yo’nalishlari doirasida islohotlarni izchil davom ettirish va yangi bosqichga olib chiqishning qo’shimcha chora-tadbirlari to’g’risida Ozbekiston Respublikasi Prezidenti 21-sonli farmoni
https://lex.uz/docs/-8050769

6.Iqtisodiy sudlar tomonidan birinchi instantsiyada ko‘rilgan ishlar yuzasidan statistik ma’lumot https://stat.sud.uz/assets/uploads/economical/pdf/eco-2025-6.pdf

7.O’zbekiston Respublikasi Konstitutsiyasi https://lex.uz/docs/-6445145

8.“Tadbirkorlik faoliyati erkinligining kafolatlari to‘g‘risida”gi Qonunhttps://lex.uz/docs/-31846

9. SUD-HUQUQ TIZIMIDAGI STRATEGIK ISLOHOTLAR INSON MANFAATLARI UCHUN XIZMAT QILMOQDA https://strategy.uz/ uz

10.“O‘ZBEKISTON—2030” STRATEGIYASI https://gov.uz/oz/pages/2030_strategy

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KIMYONING HOZIRGI KUNDAGI DOLZARB MUAMMOLARI

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Annotatsiya: Kimyo fani va kimyo sohasi biz uchun juda ham kerak.Kimyo rivojlanar ekan , millat ham .butun dunyo rivojlanadi .Negaki ,bizni o‘rab turgan butun dunyo kimyodir,ya'ni atrofdagi barcha narsalar kimyoviy moddalardan va zarrachalardan iborat.Lekin kimyo bizlarga bir qancha muammolarni olib kelmoqda .Kimyoning dolzarb muammolariga atrof muhitni buzilishi(plastmassa chiqindilar,kimyoviy ifloslanish);sog‘liqni saqlash(ob havo ta’sirida insonlarning zaharlanishi);iqlimning keskin o‘zgarib ketishi bilan bog‘liq muammolar kiradi.Ushbu maqolada muammolarni hal qilishda zamonaviy yondashuvlar ,bu muammolarni kelib chiqmasligi uchun ekologik xavfsiz materiallar yaratish haqidagi takliflar ko‘rib chiqilgan.

Kalit so‘zlar: kimyoda dolzarb muammolar,atrof muhitni muhofaza qilish, ekologiya,sog‘liqni saqlash, plastmassalar,ilmiy tadqiqotlar.

Kirish: Kimyo fanining inson hayotidagi o‘rni yuqori kimyoning rivojlanishi evaziga ko‘plab global muammolar kelib chiqmoqda.Inson tabiat bilan o'zaro aloqada bo'lib, uning hayotini tabiatdan alohida tasavvur qilish mumkin emas. Shu ma’noda Prezidentimiz I.A.Karimovning «Ona zaminimiz — boyligimizning, mustaqilligimizning va go'zal kelajakka ishonchimizning asosiy manbaidir» — degan so'zlarida juda katta ilmiy-falsafiy mazmun bor. Insoniyat yashayotgan zaminning o'z qonuniyati mavjud. Zaminda bitmaydigan, tugamaydigan ne’matning o'zi yo'q. Biz esa bundan ogoh bo'lishimiz zarur. Inson va jamiyat tabiatning ajralmas qismi.Inson tabiatning shunchaki bir qismi emas, balki uning ongli, aql idrokli va faol mavjudotidir. #1.Shunday ekan bizlar yuzaga kelatoygan muammolarga yechim topishimiz zarur.Bu

muammolarga atmosferani ifloslantiruvchi moddalar ,energiyan manbaalarining haddan ziyod ishlatilishi bilan bog‘liq muammolar ,plastik chiqindilarning ko‘payib ketganligi misol bo‘ladi.Birinchi muammo bu ishlab chiqarish natijada atrof -muhit havosining zaharlanishi.Bu holatni oldini olish va uni yanada jadallashib ketmasligi uchun choralarni ko‘rish lozim .Ikkinchi muammo energiya manbaalarini olish bilan bog‘liq.Buni oldini olish uchun ,energiyani boshqa usullar bilan olish rejalarini tuzish zarur.Uchibchi muammo hozirgi kunda avj olgan plastmassa muammosidir.Buni oldini olish uchun ko‘plab usullarni amalda qo‘llash lozim.

Muhokama: Bugungi kunda kimyo fani inson hayotining barcha jabhalarida muhim o‘rin tutadi.Shu bilan birga, kimyoning rivojlanishi bilan bir qatorda ko‘plab dolzarb muammolar yuzaga kelmoqda.Inson yaratgan texnik vositalarning o ‘rtacha harakat tezligi -100 barobarga; energiya olish miqdori -1000 barobarga; harbiy qurollar quvvati - 1000000 barobarga ortdi. Hozirga kelib yer yuzidagi qishloq xo‘jaligiga yaroqli yerlarning - 70 %i, o ‘rmonlarning - 50 %i, biologik resurslaming - 70 %i, chuchuk suv zaxiralarining – 20 %i insonlar tomonidan o ‘zlashtirilib foydalanilmoqda. Yiliga yer qa’ridan turli maqsadlarda 120 mlrd. tonna turli minerallar va tog‘ jinslari qazib olinmoqda, 900 km3 toza-chuchuk suv sarflanmoqda, ekin maydonlariga 500 mln. tonna mineral o ‘g‘it va 4 mln. tonnadan ziyod turli zaharli pestitsidlar qo‘llanilmoqda, 3 mlrd. tonna neft mahsulotlari ishlatilmoqda, 250mingdan ortiq yangi kimyoviy moddalar sintez qilinmoqda.#2Bularning barchasida kimyoning o‘rni borligi ma’lum. Sanoatda kimyoviy moddalardan ortiqcha ishlatilishi natijasida atrof muhitning, atmosferaning ifloslanishi kuchaymoqda.Havoga chiqarilayotgan zaharli gazlar ,suv havzalariga oqizilayotgan kimyoviy chiqindilar ekologik nazoratini buzmoqda.

Bularni oldini olish uchun sanoat chiqindilarini kamaytirish, chiqindilarni yo‘q qilish uchun ularni yoqib yuborish emas,balki,qayta ishlash rejalarini,ulardan foydali narsalar yasash usullarini tuzish lozim.Korxonalardan chiqadigan zaharli gazlarni atmosferaga tarqalib ketmasligi uchun zavodlar quvurlariga tozalovchi filtrlar va

katalizatorlarni o‘rnatish lozim. Transportlardan chiqadigan gazlarni kamayirish , transportlarni yurgizish uchun gazlar emas elekt toklaridan foydalanish lozim.Yashil hududlarni barpo qilish,korxona va zavodlar atrofini ko‘kalamzorlashtirish atmosfera havosini tozlanishiga va insonlarni toza havodan nafas olishiga yordam beradi.Bu global muammolarni hal qilishni yana bir yo‘li qonuniy yo‘ldir.1992-yil 9-dekabrda mustaqil O'zbekiton Respublikasida yangi «Tabiatni muhofaza qilish to‘g‘risida»gi qonunda mustaqil yurtning har bir qarich yerini muhofaza qilishga qaratilgan chora-tadbirlar belgilab berilgan. Mazkur qonun o‘n bir bo‘lim, 53 moddadan iborat. U tabiiy muhit sharoitlarini saqlashning, tabiiy resurslardan foydalanishning huquqiy, iqtisodiy va tashkiliy asoslarini belgilab beradi.Qonunning maqsadi inson va tabiat o'rtasidagi munosabatlar uyg'un muvozanatda rivojlanishini, ekologiya tizimlari, tabiat komplekslari va ayrim obyektlar muhofaza qilinishini ta’minlashdan, fuqarolarning qulay atrof-muhitga ega bo‘lish huquqini kafolatlashdan iborat.#3.Enegiya manbalarini olishda esa kimyoviy yo‘llardan emas balki ,qayta tiklanadigan manbalardan ,quyosh,shamol,yorug‘likdan olinadigan energiyalardan foydalanish,kimyo sanoatida esa energiya tejaydigan jarayonlarni yaratish zarur.

Plastik chiqindilar.Bu kimyoning zolzarb muammolarini boshlovchisidir.Plastik chiqindilar tarkibi plastmassadan iborat.Plastmassalar esa polimerlar turiga kiradi. Bugungi kunda dunyo miqyosida “polimer materiallariga bo‘lgan ehtiyoj 400 mln. tonnadan ortiq bo‘lib, shundan polietilen 37%, polipropilen 26%,polivinilxlorid 18% ni tashkil etadi. Termoelastoplast kompozitsiyalarning dunyo bo'yicha yalpi ishlab chiqarish hajmi yiliga 3 mln. tonnadan ziyod bo‘lib, sintetik va sun'iy polimer materiallar iste'molidagi ularning ulushi 65-67% ga yetgan”#4.Plastmassalarning asosiy afzalliklari - xomashyoning yetarli miqdorda borligi, oson, yuqori samarador, kam energiya sarflovchi, chiqindisiz usullar bilan qayta ishlash mumkinligi, murakkab shaklli va hajmdor tayyor va yarim mahsulotlar ishlab chiqarish mumkinligi, zichligi kichikligi, agressiv muhit, vibrasiya va zarba ta’siri, radiatsion nurlanish va atmosfera ta’siriga chidamliligi, yuqori optik va dielektrik xossalari, rang berishning

osonligi.#5.Shu tufayli ham butun jahonda plasmassalarga bo‘lgan ehtiyoj juda ham yuqori. Plastik chiqindilarni kamaytirish maqsadida ularni qayta ishlash zarur.Atrof muhitda ularni tarqalib ketishini oldini olish uchun esa har bir hududda ,ayniqsa,aholi zich bo‘lgan hududlarda chiqindilarni saralash uchun kantenyerlar o‘rnatish,bir martalik plastmassalardan voz kechish, biologik parchalanadigan idishlardan foydalanish,bozorlarda beriladigan selofan o‘rniga,qog‘oz,mato ,bambuk , kraxmal asosida tayyorlangan paket va o‘ramalardan foydalanish lozim .Atrof muhitni chiqindilardan tozalash maqsadida ekologik targ‘ibot va tadbirlarni ko‘proq uyushtirish .Atrofni muhofaza qilish chora tadbirlarini ko‘rish lozim .O‘shandagina muammolarga yechim topiladi.

Xulosa: Kimyo insonlar va butun dunyoning bir qismiga aylangan .Shu sababli ham kimyo tufayli yuzaga kelayotgan muammolarga jimgina qarab turib bo‘lmaydi.Ushbu maqolada kimyo sohasidagi muammolar va ularning yechimlari yoritib berildi.Bu muammolarga ilmiy , ekologik va texnalogik jihatdan yechimlar borligi ,faqatgina unga amal qilish lozimligi aytildi.Kimyoning dolzarb muammolarini hal etish orqali biz nafaqat tabiatni muhofaza qilamiz ,balki inson salomatligi va kelajak avlodlar uchun toza va sog‘lom muhit yaratgan bo‘lamiz. Ilmiy yondashuvlar,xalqaro hamkorliklar va har bir insonning ekologik mas'uliyat bilan harakat qilishi orqali biz bu muammolarning yechimini topamiz.1972-yilda Stokgolmda Birlashgan Millatlar Tashkiloti (BMT)ning atrof-muhitni muhofaza qilishga bag'ishlangan konferensiyasi bo‘lib o ‘tdi va 5-iyun «Umumjahon atrof-muhitni muhofaza qilish kuni» deb e’lon qilindi.#6.Bularning barchasi butun dunyoni bu muammoli holatdan chiqarishga qaratilgan.Xulosa qilib aytganda ,kimyodagi dolzarb muammolar jahon miqyosida hal qilinishi kerak bo‘lgan murakkab masaladir.Bu masalani faqat va faqat o‘zimiz hal qila olamiz.

Foydalanilgan adabiyotlar:

#1.G.D.Shamsiddinova,D.A.Karimova "Kimyoviy ekologiya"kitobidan.Toshkent-2010.(5-bet)

#2.P.S.Sultonov "Ekologiya va atrof muhitni muhofaza qilish asoslari"kitobidan.Toshkent-2007.(11-12 bet)

#3.G.D.Shamsiddinova,D.A.Karimova "Kimyoviy ekologiya"kitobidan.Toshkent-2010.(14-bet)

#4.M.A.Asqarov ,A.S.Rafikov,D.O.Abdusamatova "Polimerlar fizikasi va kimyosi"Toshkent-2020(3-bet)

#5.M.A.Asqarov, A.S.Rafikov,D.O.Abdusamatova "Polimerlar fizikasi va kimyosi"Toshkent-2020(289-bet)

#6.G.D.Shamsiddinova, D.A.Karimova "Kimyoviy ekologiya" kitobidan. Toshkent-2010.(12-bet)

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O'ZBEKISTON RESPUBLIKASIDA SOLIQLAR TUSHUNCHASI VA SOLIQ TIZIMI

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ANNOTATSIYA: Ushbu maqolada O'zbekiston Respublikasi soliq tizimi va uning bugungi holati, soliqlarning tarkibiy tuzilishi va iqtisodiy barqarorlikni ta'minlashdagi o'rni tizimli tahlil qilinadi. Tadqiqot davomida mamlakatimizda amalga oshirilayotgan soliq islohotlari va davlatimizdagi mavjud soliq turlari jumladan Estoniya davlati raqamli soliq modeli va mamlakatimizdagi soliq modellari taqqoslanadi. Xalqaro Estoniya ilg'or tajribasiga tayangan holda soliq ma'muriyatchiligini soddalashtirish, stavkalarni optimallashtirish va "yashirin iqtisodiyot" ulushini kamaytirish bo'yicha ilmiy-amaliy takliflar ilgari suriladi.

Kalit so'zlar: soliqlar, soliq tizimi, Soliq kodeksi, islohotlar, Estoniya modeli, raqamlashtirish, QQS, fiskal siyosat, foyda solig'i.

KIRISH. Bugungi kunda mamlakatimizda soliqlar iqtisodiy islohotlarimizning markazida turadi. Soliqlar orqali iqtisodiyot, mamlakatimizning barqaror moliyaviy holati ta'minlanadi. Soliqlar – bu davlatning mavjudligi va uning ijtimoiy-iqtisodiy funksiyalari bajarilishining moliyaviy asosi hisoblanadi. Shu o'rinda soliqlar davlat subyekt sifatida faoliyat yuritishi uchun uning zaruriy belgilaridan biridir. Ya'ni davlat o'zining iqtisodiy holatini soliqlar orqali ushlab turadi. Soliqlar va ularni to'lash majburiyligi mamlakatimizda bosh qomusimiz konstitutsiyamizning 63-

moddasida mustahkamlab qo'yilgan. Bu esa soliqlar ularni to'lovchi barcha uchun majburiyligini anglatadi. Soliq munosabatlari, soliqlar turlari va davlatimizdagi soliq tizimi yangi tahrirda qabul qilingan Soliq kodeksi normalari orqali tartibga solinadi. Yangi tahrirdagi soliq kodeksi 2019-yil 30-dekabrda qabul qilingan va 2020-yil 1-yanvardan amalga kiritilgan.[1] Ushbu soliq kodeksi respublikamizdagi soliqlar faoliyati va uni to'lovchi shaxslar va davlatimizdagi soliq majburiyatlarini tartibga solib turadi.

Amaldagi soliq kodeksiga ko'ra, soliqlar – davlat byudjetiga va davlat maqsadli jamg'armalariga to'lanadigan majburiy, beg'araz to'lov hisoblanadi. Qonunchiligimizga ko'ra soliq va yig'imlarni joriy qilish Oliy Majlis tomonidan amalga oshiradi. Respublikamizda soliqlar va yig'imlar o'zaro farq qiladi. Soliq kodeksining 16-moddasiga ko'ra yig'im ham soliqlar kabi majburiy beg'araz to'lov hisoblanadi. Lekin yig'im to'laganda fuqarolar ma'lum bir huquq oladi. Ya'ni muayyan bir vakolatni amalga oshirish huquqini oladi. *Masalan:* Avtomobil sotib olganingizda uni ro‘yxatdan o‘tkazish uchun yig‘im to‘laysiz. To‘lamasangiz — xizmat ko‘rsatilmaydi (mashina sizning nomingizga o‘tmaydi).

Soliqlarni to'laganingiz uchun esa davlat sizga hech qanday xizmat ko'rsatmaydi. *Masalan:* Ish haqingizdan olinadigan daromad solig‘i evaziga davlat sizga shaxsiy xizmat ko‘rsatmaydi, lekin bu pulga shifoxonalar yoki yo‘llar quriladi.

O'zbekiston Respublikasida soliqqa tortishning prinsiplari Soliq kodeksining 7-moddasida belgilangan. Kodeksga ko'ra soliq solish majburiylik, aniqlik va soliq organlarining soliq to‘lovchilar bilan hamkorligi, adolatlilik, soliq tizimining yagonaligi, oshkoralik va soliq to‘lovchining haqligi prezumpsiyasi prinsiplariga asoslanadi.[2]

Bu prinsiplar mamlakatimizda amalda bo'lgan soliqlar va soliq to'lovchilarning huquqlari va soliqlar tizimini tartibga solib turuvchi vositalardan biri hisoblanadi.

[1] lex.uz/acts/-4674902
[2] Soliq kodeksi

Soliq tizimining majburiyligi soliqlar barcha uchun majburiyligini ifodalasa, soliq to'lovchining haqligi prezumpsiyasi bu- xalqaro davlatlardagi kabi bizda ham soliq sohasidagi barcha bartaraf etib bo'lmaydigan qarama-qarshiliklar soliq to'lovchining foydasiga hal qilinishini anglatadi.

Soliq kodeksiga ko'ra mamlakatimizda 10 ta soliq turi mavjud. Bular: 1) qo'shilgan qiymat solig'i;

2) aksiz solig'i;

3) foyda solig'i;

4) jismoniy shaxslardan olinadigan daromad solig'i;

5) yer qa'ridan foydalanganlik uchun soliq;

5[1]) foydali qazilmalarni qazib olganlik uchun maxsus renta solig'i;

6) suv resurslaridan foydalanganlik uchun soliq;

7) mol-mulk solig'i;

8) yer solig'i;

9) ijtimoiy soliq.[3]

Ushbu soliq turlari respublikamizda barcha shaxslar uchun majburiy hisoblanadi. Respublikamizda soliq munosabatlari subyektlari soliq to'lovchilar, soliq agentlari va soliq organlaridir.

Soliq to'lovchilar yuridik va jismoniy shaxslar. Soliq agentlari esa zimmasiga soliqlarni hisoblab chiqarish, soliq to'lovchidan ushlab qolish va budjet tizimiga o'tkazish majburiyati yuklatilgan shaxslar. Soliq organlari esa – O'zbekiston Respublikasi Davlat soliq qo'mitasi, Qoraqalpog'iston Respublikasi, viloyat lar va Toshkent shahar davlat soliq boshqarmalari, shuningdek, tumanlar, shaharlar va shahardagi tumanlar davlat soliq inspeksiyalari;[4]

bojxona organlari – O'zbekiston Respublikasi Davlat bojxona qo'mitasi, Davlat bojxona qo'mitasining Qoraqalpog'iston Respublikasi, viloyatlar, Toshkent shahri

[3] lex.uz/acts/-4674902
[4] 1720769314.pdf

bo‘yicha boshqarmalari, “Toshkent — AERO” maxsus bojxona kompleksi va bojxona postlari;

yig‘imlarni undirish funksiyasini amalga oshiruvchi davlat organlari va tashkilotlar hisoblanadi.

Respublikamiz hududida maxsus soliq rejimlari ham mavjud:

1) aylanmadan olinadigan soliq;

2) mahsulot taqsimotiga oid bitimlar ishtirokchilariga soliq solishning alohida tartibi;

3) maxsus iqtisodiy zonalar ishtirokchilariga va ayrim toifadagi soliq to‘lovchilarga soliq solishning alohida tartibi;

4) O‘zbekiston Respublikasining ayrim hududlarida soliq solishning alohida tartibi;

Bular asosan soliq to’lovchilarning ayrim toifalari uchun belgilanadi. Atrim toifalari deyilganida, asosan, kichik biznes vakillari, maxsus iqtisodiy zonalar ishtirokchilari, qishloq xo’jaligi mahsulotini ishlab chiqaruvchilar va alohida faoliyat yurituvchi tadbirkorlar kiradi. Misol uchun aylanmadan olinadigan soliqni kichik biznes vakillari ya’ni Yillik jami daromadi **1 milliard so‘mdan oshmagan** yuridik shaxslar.

Yillik daromadi **100 million so‘mdan 1 milliard so‘mgacha** bo‘lgan yakka tartibdagi tadbirkorlar (YaTT) lar to’lashi belgilangan.

O’zbekiston Respublikasida soliq rezidentlari deb egishli maqomi o‘ziga nisbatan belgilangan soliq davri boshlanadigan yoki tugaydigan har qanday ketma-ket 12 oylik davr davomida jami 183 kalendar kundan ko‘proq O‘zbekiston Respublikasida haqiqatda bo'lgan jismoniy shaxslar e ’tirof etiladi. Ya’ni 183 kun davomida respublikamiz hududidagi shaxslar soliq to’lovchilardir.

Respublikamizda yirik soliq to’lovchilar toifasi ham mavjud. Bular O'zbekiston Respublikasi Davlat soliq qo'mitasi tomonidan belgilangan mezonlardan kelib

chiqqan holda, soliq ma'muriyatchiligiga mansub bo'ladigan ayrim toifadagi yuridik shaxslardir. Ya'ni ular asosan mamlakatimiz iqtisodiyotining eng katta ustunlari hisoblanadigan korxonalaridir.

Bularga yirik sanoat gigantlari, moliya va bank sektorlari,

Yirik ishlab chiqaruvchilar va savdo tarmoqlarini, aksizli korxonalar va shu kabilarni misol qilib keltiramiz.



5

Yuqoridagi jadvalda 2023-yilda Top 20 ta eng ko'p yirik soliq to'lovchilar ro'yhati berilgan. Bunda eng yuqori o'rinni " Navoiy kon metallurgiya Aj" egallaydi. Chunki bu aksiyadorlik jamiyati dunyodagi eng yirik oltin ishlab chiqaruvchilardan biri (top-5 talikka kiradi). Oltin esa jahon bozorida doimiy

[5] Kun.uz.sayti

qimmatbaho va likvidli aktivdir hisoblanadi va bu aksiyadorlik jamiyati yer qa'ridan foydalanganlik uchun soliq to'laydi.

Xalqaro davlatlar jumladan Estoniya davlati soliq qonunchiligi bo'yicha dunyodagi eng ilg'or va raqobatbardosh soliq tizimlaridan biriga ega. Uning soliq qonunchiligi soddaligi, raqamlashganligi (e-Tax) va biznes uchun yaratilgan noyob imtiyozlari bilan ajralib turadi.[6] Estoniya davlati soliq tizimi butun xalqaro hamjamiyat Ichida tushunarli qilib tuzilgan. Estoniyada soliqlarning uchta darajasi amal qiladi. Bular davlat soliqlari, ijtimoiy soliqlar va mahalliy sug'urta to'lovlari.

Estoniya davlatida eng mashhur soliq turi bu- yuridik shaxslardan olinadigan foyda solig'i hisoblanadi. Bunda eng e'tiborli jihati agar kompaniya foydani biznesga qayta investitsiya qilsa, stavka — **0%**. Soliq (22%) faqat foyda dividend sifatida yechib olingandagina to'lanadi. Bu Estoniya davlatida yuridik shaxslarga ma'lum imtiyoz va afzalliklar yaratadi. Estoniya davlatida QQS (Qo'shilgan qiymat solig'i) miqdori 22% tashkil qiladi.

Estoniyada xalqaro darajadan andoza olgan holda onlayn soliq rejimi amal qiladi. **e-Tax (e-Maksuamet)** — dunyodagi eng samarali va foydalanuvchi uchun qulay raqamli tizim hisoblanadi. Uning yordamida mamlakatdagi soliq deklaratsiyalarining **95% dan ortig'i** elektron shaklda topshiriladi. Bu esa fuqarolardan ortiqcha vaqt talab qilmaydi. Bu tizimning afzalligi daromadlarni deyarli 100% o'zi hisoblab, tayyor deklaratsiya chiqarib berishi hisoblanadi ya'ni barcha soliqqa oid ma'lumotlar avtomatik ravishda inson omilisiz tayyorlanadi. Bu esa Estoniya soliq tizimining shaffofligini ta'minlaydi va fuqarolarning ortiqcha sarsongarchiliklarining oldini oladi. Estoniya soliq tizimining eng muhim jihatlaridan yana biri bu – **E-Residency (Elektron rezidentlik).** Ushbu

[6] taxes and legal - Work in Estonia

tizim tufayli siz dunyoning istalgan nuqtasidan turib Estoniyada biznes yuritish va soliqlarni onlayn boshqarish mumkin. Bunda sizga Estoniyaga kelmasdan turib kompaniya ochishingiz va hisobot topshirishingiz imkoniyati yaratiladi.

Bizning respublikamizdagi **My.soliq.uz (Elektron soliq xizmatlari portali)** Estoniya soliq tizimining muqobil varianti hisoblanadi. Chunki bizdagi soliq tizimi ham xalqaro tajriba jumladan Estoniya davlati tajribasiga tayanadi. Estoniya va O'zbekiston Respublikasi o'rtasida ikki tomonlama soliqqa tortishdan saqlanish, daromad va sarmoya soliqlarini to'lashdan bosh tortishning oldini olish to'g'risida Konvensiya (Nyu-York, 2012 yil 28 sentyabr)[7] buning yorqin isbotodir. Ushbu konvensiya O'zbekiston Respublikasi Prezidentining 07.03.2013 y. PQ-1932-son qarori bilan tasdiqlangan. Bunda asosan ikki mamlakat soliq tizimi o'rtasidagi o'zaro munosabatlar va soliqlarni to'lashdan bosh tortishning oldini olish bo'yicha muhokama va takliflar ilgari surilgan.

Rivojlangan Estoniya davlati va mamlakatimizdagi soliq munosabatlari o'zaro takomillashgan va davlatimiz ham soliq tajribasi sifatida xalqaro davlatlar tajribasidan foydalanadi. Respublikamizdagi soliq tizimi ham Estoniya davlati tajribasi asosida to'liq avtomatlashtirilmoqda. Lekin bizdagi elektron soliq tizimida ko'p malumotlar avtomatik tarzda tayyorlanmaydi. Masalan:

Sotuvchi o'zining ichki dasturida (masalan, 1C) tovarning chiqib ketishini qayd etadi. Soliq portalida Buxgalter qo'lda soliq portaliga kiradi, mijozning STIRini yozadi, tovarning MXIK kodini (minglab kodlar ichidan) qidirib topadi va Elektron hisob-faktura (EHF) shakllantiradi.

Bank dasturida Pul kelib tushgach, buxgalter bank-klientga kirib, to'lovni ko'radi va uni yana qo'lda 1C dasturidagi hisob-faktura bilan bog'laydi.

[7] https://buxgalter.uz/oz/doc?id=331470_o%E2%80%98zbekiston_respublikasi_hukumati_bilan_estoniya_respublikasi_hukumati_o%E2%80%98rtasida_ikki_tomonlama_soliqqa_tortishdan_saqlanish_daromad_va_sarmoya_soliqlarini_to%E2%80%98lashdan_bosh_tortishning_oldini_olish_to%E2%80%98g%E2%80%98risida_konvenciya_(nyu-york_2012_yil_28_sentyabr)_(o%E2%80%98zbekiston_respublikasi_prezidentining_07_03_2013_y_pq-1932-son_qarori_bilan_tasdiqlangan)&prodid=1_vse_zakonodatelstvo_uzbekistana#:~:text=O%CA%BBzbekiston%20Respublikasi%20Hukumati%20bilan%20Estoniya%20Respublikasi%20Hukumati.

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Tekshirish agar soliq portali va bank ma'lumotlarida 1 tiyin farq bo'lsa, tizim "qizil" yonadi. Buxgalter soatlab xatoni qidirib, hammasini qaytadan solishtiriSH chiqadi. Bu esa tizimning to'liq avtomatlashtirilmaganligidir. Bu jarayon Estoniyada quyidagicha amalga oshiriladi: Sotuvchi tovarni sotadidi va tugmani bosadi. Ichki tizim avtomatik ravishda soliq idorasiga ma'lumot yuboradi. Hech qanday "MXIK kodi" qidirish shart emas, chunki tizim hamma narsani o'zi taniydi. Bank bilan integratsiya qilinadi ya'ni bank ma'lumoti va soliq ma'lumoti bitta bazada turadi. Pul tushishi bilan tizim avtomatik ravishda "Soliq to'landi" deb belgi qo'yadi. Natijada esa buxgalter bu jarayonga umuman aralashmaydi. U faqat oy oxirida tizim tayyorlagan deklaratsiyani ko'zdan kechirib, "Tasdiqlash" tugmasini bosadi. Bu fuqarolar uchun qulay hisoblanadi.

Estoniya davlati soliq qonunchiligi va soliq sohasidagi tajribasidan kelib chiqib, mamlakatimiz hududidagi soliq va soliqlar tizimlarini bosqichma-bosqich avtomatlashtirgan holda iqtisodiyotimizga olib chiqishimiz kerak. Bu kabi iqtisodiy o'sishlar ya'ni soliq tizimining shaffof va samaradorligi "yashirin iqtisodiyot" ning oldini oladi. Estoniya tajribasiga tayangan holda davlatimiz hududidagi soliq tizimi va bazasini to'liq avtomatlashtirishni va O'zbekistonda ham masofaviy IT va konsalting xizmatlari uchun "Raqamli rezidentlik (e-Residensy) formatini kengaytirish kerak. Bu orqali O'zbekiston ham Estoniya davlati kabi xorijiy davlat fuqarolarini O'zbekiston soliq rezidentligiga jalb qilishi mumkin. Bu esa xorijiy davlatlar bilan hamkorlikda ma'lumotlar almashinuvi va davlat iqtisodiyoti uchun yirik soliq to'lovchilar toifasi va ularning hamkorligi kengaytiriladi. O'z navbatida bu iqtisodiy o'sish garovi bo'lib xizmat qiladi.

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TUPROQ TIZIMLARNI KUZATISHDA DINAMIK VA BIOKIMYOVIY MODELLARDAN FOYDALANISH

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Annotatsiya: *Tuproq tizimlarining holatini monitoring qilish va ulardagi murakkab jarayonlarni prognozlashda dinamik va biokimyoviy modellashtirish usullarini qo'llash masalalari tahlil qilingan. tadqiqotda tuproqdagi suv harakati, issiqlik almashinuvi va ozuqa elementlari migratsiyasini ifodalovchi dinamik modellar bilan bir qatorda, organik moddalar transformatsiyasi va mikrobial faollikka asoslangan biokimyoviy modellarning o'zaro bog'liqligi yoritilgan. shuningdek, zamonaviy axborot texnologiyalari va raqamli platformalar yordamida tuproq unumdorligini boshqarish hamda ekologik barqarorlikni ta'minlashning ilmiy-amaliy asoslari keltirilgan. modellashtirish natijasida olingan ma'lumotlar tuproq*

degradatsiyasining oldini olish va agrosanoat majmuasida qaror qabul qilish tizimlarini takomillashtirishda muhim ahamiyatga ega ekanligi asoslab berilgan.

Kalit so‘zlar: *tuproq tizimi, dinamik modellashtirish, biokimyoviy jarayonlar, matematik model, organik modda transformatsiyasi, tuproq monitoringi, raqamli qishloq xo‘jaligi, unumdorlik prognozi, c va n sikli, mikrobial biomass, ekologik barqarorlik.*

Tuproq murakkab, ko‘p fazali va ochiq tizim bo‘lib, unda litosfera, gidrosfera, atmosfera va biosfera o‘rtasidagi doimiy modda va energiya almashinuvi sodir bo‘ladi. Ushbu tizimning barqarorligini saqlash va unumdorligini boshqarish uchun an’anaviy kuzatuv usullari yetarli emas. Zamonaviy tuproqshunoslik va agroekologiya fanlarida dinamik va biokimyoviy modellashtirish usullari tuproq jarayonlarini chuqur tahlil qilish va kelajakdagi o‘zgarishlarni prognoz qilishning asosiy vositasiga aylandi.

Dinamik modellarning mohiyati va amaliy ahamiyati:

Dinamik modellar tuproqdagi o‘zgarishlarni vaqt va makon davomida uzluksiz jarayon sifatida tahlil qiladi. Statik tahlillardan farqli o‘laroq, dinamik modellashtirish tuproqning gidrologik, termik va kimyoviy holatini matematik differensial tenglamalar yordamida ifodalaydi. Masalan, tuproqdagi suv harakati Richards tenglamasi orqali modellashtirilsa, bu bizga turli iqlim sharoitlarida tuproq namligining qanday taqsimlanishini aniq hisoblash imkonini beradi. Dinamik modellar yordamida ozuqa elementlarining, xususan, azot va fosforning tuproq qatlamlari bo‘ylab harakati, ularning yuvilishi yoki o‘simlik ildiz tizimi tomonidan o‘zlashtirilishi o‘rganiladi. Bu jarayon ayniqsa sug‘oriladigan dehqonchilik mintaqalarida tuproqning sho‘rlanish dinamikasini nazorat qilish va yer osti suvlarining ifloslanishini oldini olishda muhim strategik ahamiyatga ega. Shuningdek, eroziya jarayonlarining dinamik modellari

tuproqning unumdor qatlami yo‘qolish tezligini hisoblab, unga qarshi meliorativ tadbirlarni rejalashtirishga xizmat qiladi.

Biokimyoviy modellashtirish va organik moddalar transformatsiyasi:

Tuproqning biokimyoviy modellari uning "hayotiylik" ko‘rsatkichlarini, ya’ni mikroorganizmlar faoliyati va organik moddalar aylanishini o‘rganishga qaratilgan. Bu yo‘nalishda tuproqdagi uglerod va azot sikllari markaziy o‘rinni egallaydi. Biokimyoviy modellar organik qoldiqlarning parchalanish tezligini, gumusning shakllanishini va karbonat angidrid emissiyasini hisoblashga imkon beradi.Masalan, RothC yoki Century kabi dunyoga mashhur biokimyoviy modellar tuproqni bir necha faol va inert “hovuzlar”ga ajratgan holda, organik moddalarning asrlar davomida qanday o‘zgarishini ko‘rsatib beradi. Bu modellar iqlim o‘zgarishi sharoitida tuproqning uglerodni saqlab qolish qobiliyatini baholashda bebahodir. Bundan tashqari, tuproq fermentlarining (ureaza, fosfataza va boshqalar) faolligi biokimyoviy modellar orqali tahlil qilinib, tuproqning biologik unumdorligi va undagi mikrobiologik jarayonlarning intensivligi aniqlanadi. Bu esa o‘z navbatida o‘g‘itlash me’yorlarini tuproqning biologik potensialiga moslashtirish imkonini beradi.

Tizimli integratsiya va raqamli monitoring:

Zamonaviy bosqichda dinamik va biokimyoviy modellar alohida emas, balki yaxlit tizim sifatida qo‘llanilmoqda. Bugungi kunda DSSAT, APSIM va DNDC kabi kompleks modellashtirish platformalari tuproq, o‘simlik, iqlim va inson faoliyatini bir butunlikda tahlil qiladi. Ushbu tizimlar sensorlar, sun’iy yo‘ldosh ma’lumotlari (GIS va masofadan zondlash) bilan integratsiyalashib, real vaqt rejimidagi raqamli monitoringni shakllantiradi. Dinamik va biokimyoviy modellardan foydalanishning natijasi o‘laroq, qishloq xo‘jaligida resurslarni tejash, ekologik zararni kamaytirish va iqtisodiy samaradorlikni oshirishga erishiladi. Biz nafaqat bugungi kundagi tuproq

holatini ko‘ramiz, balki 10, 20 yoki 50 yildan keyin tuproq qanday ko‘rinishda bo‘lishini, unumdorlik darajasi qanday o‘zgarishini ilmiy asoslangan holda bashorat qila olamiz.

XULOSA

Xulosa qilib aytganda, tuproq tizimlarini kuzatishda dinamik va biokimyoviy modellashtirish usullari tuproqshunoslik fanining metodologik asosini yangi bosqichga olib chiqdi. Bu yondashuv tuproqni oddiy substrat emas, balki doimiy harakatdagi tirik tizim sifatida tushunish va boshqarish imkonini beradi. Global iqlim o‘zgarishi va aholi sonining o‘sib borishi sharoitida, tuproq resurslarini muhofaza qilish va oziq-ovqat xavfsizligini ta’minlashda ushbu modellar eng samarali va istiqbolli vosita bo‘lib qolaveradi.

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ДИФФЕРЕНЦИРОВАННЫЙ ПОДХОД К ВЫБОРУ МЕДИКАМЕНТОЗНОЙ И ХИРУРГИЧЕСКОЙ ТАКТИКИ ЛЕЧЕНИЯ ДОБРОКАЧЕСТВЕННОЙ ГИПЕРПЛАЗИИ ПРЕДСТАТЕЛЬНОЙ ЖЕЛЕЗЫ У МУЖЧИН ПОЖИЛОГО ВОЗРАСТА

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Аннотация. В статье представлены результаты клинического исследования, направленного на разработку дифференцированного алгоритма выбора между консервативным медикаментозным и хирургическим методом лечения доброкачественной гиперплазии предстательной железы (ДГПЖ) у пациентов пожилого возраста. Обследовано 214 мужчин в возрасте от 65 до 85 лет. Пациентам назначали монотерапию альфа-1-адреноблокаторами, комбинированную терапию (альфа-1-адреноблокатор + ингибитор 5-альфа-редуктазы) либо хирургическое вмешательство в зависимости от тяжести симптоматики, объёма железы и риска прогрессирования заболевания. На основании 24-месячного наблюдения установлено, что комбинированная медикаментозная терапия эффективна при умеренной симптоматике и объёме железы 30–80 мл, тогда как при выраженной обструкции, объёме >80 мл и высоком риске острой задержки мочи хирургическое лечение обеспечивает достоверно лучшие долгосрочные результаты. Разработанный алгоритм

позволяет оптимизировать персонализированный выбор тактики лечения с учётом коморбидного профиля и функционального статуса пожилого пациента.

Ключевые слова: ДГПЖ, альфа-адреноблокаторы, ингибиторы 5-альфа-редуктазы, трансуретральная резекция, пожилой возраст, дифференцированный подход, IPSS, алгоритм лечения.

Доброкачественная гиперплазия предстательной железы представляет собой прогрессирующее гистологическое заболевание, клинически проявляющееся симптомами нижних мочевыводящих путей и инфравезикальной обструкцией. Распространённость ДГПЖ коррелирует с возрастом: гистологические признаки заболевания выявляются у 40% мужчин в возрасте 50 лет, у 70% — в 60 лет и у более 90% — к 80 годам [1]. При этом клинически значимая симптоматика, снижающая качество жизни, регистрируется примерно у половины мужчин старше 60 лет [2].

В структуре обращаемости урологических стационаров Узбекистана пожилые пациенты с ДГПЖ составляют более 35% госпитализаций [3]. Многообразие доступных методов — от консервативной медикаментозной терапии до малоинвазивных и открытых хирургических вмешательств — ставит перед врачом сложную задачу индивидуального выбора оптимальной тактики. Неверный выбор тактики ведёт либо к избыточному хирургическому риску для пожилого пациента, либо к неоправданному затягиванию консервативного лечения при уже сформировавшейся тяжёлой обструкции [4].

Особую сложность представляет ведение пациентов пожилого возраста, у которых ДГПЖ нередко сочетается с артериальной гипертензией, ишемической болезнью сердца, мерцательной аритмией (требующей антикоагулянтной терапии), сахарным диабетом 2 типа, хронической болезнью почек,

когнитивными нарушениями [5]. Данные коморбидные состояния оказывают существенное влияние как на переносимость медикаментозной терапии, так и на хирургический риск, что делает необходимым разработку структурированного клинического алгоритма принятия решения [6].

Несмотря на наличие европейских (EAU) и американских (AUA) рекомендаций по ведению ДГПЖ, их применение в условиях отечественного здравоохранения нередко затруднено ввиду особенностей популяции пациентов, доступности препаратов и ресурсов учреждения. Настоящее исследование направлено на разработку практического алгоритма, адаптированного к условиям реальной клинической практики.

Целью исследования является разработка и клиническая апробация дифференцированного алгоритма выбора между медикаментозной и хирургической тактикой лечения ДГПЖ у мужчин в возрасте 65 лет и старше на основании комплексной оценки клинических, инструментальных и коморбидных характеристик пациента.

МАТЕРИАЛ И МЕТОДЫ ИССЛЕДОВАНИЯ

Ретроспективно-проспективное исследование проводилось на базе кафедры хирургических болезней и трансплантологии Самаркандского государственного медицинского университета (СамГМУ) в период 2019–2023 гг. В исследование включено 214 пациентов мужского пола в возрасте от 65 до 85 лет с клиническим диагнозом ДГПЖ, подтверждённым на основании данных анамнеза, пальцевого ректального исследования (ПРИ), трансректальной ультрасонографии (ТРУЗИ), урофлоуметрии и определения уровня ПСА сыворотки крови.

Критерии включения: возраст ≥65 лет, клинически выраженные симптомы нижних мочевыводящих путей (IPSS ≥8 баллов), объём предстательной железы ≥25 мл, продолжительность симптомов не менее 6 месяцев, информированное

письменное согласие на участие в исследовании. Критерии исключения: ПСА >10 нг/мл без исключённого рака предстательной железы, нейрогенные нарушения мочеиспускания, предшествующая хирургия нижних мочевыводящих путей, активные инфекции мочевыводящих путей, хроническая почечная недостаточность IV–V стадии.

Пациенты были распределены на три группы в соответствии с разработанным алгоритмом. Группа А (n=72) — монотерапия альфа-1-адреноблокаторами (тамсулозин 0,4 мг/сут): IPSS 8–18 баллов, объём железы 25–50 мл, Qmax >10 мл/с. Группа Б (n=84) — комбинированная медикаментозная терапия (тамсулозин 0,4 мг/сут + дутастерид 0,5 мг/сут): IPSS 12–24 баллов, объём железы 50–80 мл, уровень ПСА ≥1,5 нг/мл. Группа В (n=58) — хирургическое лечение (ТУРП): IPSS ≥20 баллов, объём железы >80 мл или рефрактерная задержка мочи в анамнезе, Qmax <10 мл/с, объём остаточной мочи >150 мл.

Всем пациентам проведена оценка коморбидного статуса по шкале CCI (Charlson Comorbidity Index) и функциональной активности по шкале ECOG. Мониторинг эффективности лечения проводили через 3, 6, 12 и 24 месяца с регистрацией IPSS, QoL, Qmax, объёма остаточной мочи, объёма предстательной железы (для медикаментозных групп), а также уровня ПСА и почечных функциональных показателей. Статистический анализ выполняли с использованием IBM SPSS Statistics 26.0; для сравнения динамики показателей внутри группы применяли критерий Вилкоксона, для межгрупповых сравнений — критерий Манна–Уитни; $p<0,05$ считали статистически значимым.

РЕЗУЛЬТАТЫ И ИХ ОБСУЖДЕНИЕ

Средний возраст пациентов составил 71,8±4,6 лет (группа А), 72,4±5,1 лет (группа Б) и 73,2±4,8 лет (группа В). Значение CCI было достоверно выше в

группе В (5,4±1,7 балла) по сравнению с группами А (3,2±1,1 балла) и Б (4,1±1,4 балла), что соответствует большей тяжести исходного состояния пациентов, выбранных для хирургического лечения. Наиболее частыми сопутствующими заболеваниями являлись артериальная гипертензия (76,2%), сахарный диабет 2 типа (38,3%), ишемическая болезнь сердца (29,4%) и хроническая болезнь почек 2–3 стадии (22,9%).

В группе А монотерапия тамсулозином обеспечила достоверное улучшение Qmax через 3 месяца — с 11,8±2,1 до 14,6±2,7 мл/с ($p<0,001$), снижение IPSS — с 13,4±3,2 до 9,2±2,6 балла ($p<0,001$). Через 24 месяца стойкий клинический ответ сохранялся у 73,6% пациентов. У 12 пациентов (16,7%) потребовалось усиление терапии или переход к хирургическому лечению в связи с прогрессированием симптоматики. Нежелательные явления тамсулозина — ортостатическая гипотензия (8,3%), ретроградная эякуляция (14,7%) — требовали особого внимания у пожилых пациентов с сердечно-сосудистой патологией.

В группе Б комбинированная терапия продемонстрировала более выраженный и устойчивый эффект. Qmax через 12 месяцев увеличился с 9,4±1,8 до 13,7±2,4 мл/с (+45,7%; $p<0,001$). Объём предстательной железы через 24 месяца уменьшился в среднем на 28,3% — с 64,2±12,4 до 46,1±9,8 мл ($p<0,001$). IPSS снизился с 19,8±3,6 до 10,3±2,9 балла. Частота острой задержки мочи за 24 месяца составила 4,8% (против 12,5% в группе А). Уровень ПСА к 12 месяцам снизился на 43,6%, что требовало учёта при интерпретации данного показателя для онкологического скрининга. Побочные эффекты дутастерида — снижение либидо (11,9%), эректильная дисфункция (8,3%) — в пожилом возрасте имели относительно меньшее клиническое значение.

В группе В все пациенты перенесли ТУРП без летальных исходов. Средняя продолжительность операции составила 62,4±14,8 мин, интраоперационная

кровопотеря — 184,3±67,2 мл. Ранние послеоперационные осложнения зарегистрированы у 24,1% пациентов: острая задержка мочи после удаления катетера — 8,6%, гематурия, потребовавшая ирригации — 6,9%, инфекция мочевыводящих путей — 6,9%, ТУР-синдром — 1,7%. Через 12 месяцев IPSS снизился с 26,4±3,8 до 6,2±2,1 балла, Qmax возрос с 6,8±1,4 до 18,4±3,2 мл/с, объём остаточной мочи — с 198,6±62,4 до 22,3±18,7 мл. Улучшение было достоверно более выраженным по сравнению с медикаментозными группами ($p<0,001$).

Сравнительный анализ динамики QoL через 24 месяца выявил следующее: в группе А — снижение с 3,8±0,7 до 2,4±0,6 балла; в группе Б — с 4,2±0,8 до 1,9±0,6 балла; в группе В — с 4,6±0,9 до 1,3±0,5 балла. Таким образом, наибольшее улучшение качества жизни наблюдалось в хирургической группе, однако и комбинированная медикаментозная терапия обеспечивала клинически значимый результат при умеренной симптоматике.

На основании полученных данных разработан клинический алгоритм выбора тактики лечения ДГПЖ у пожилых пациентов. Первичная оценка включает: определение IPSS, Qmax, объёма железы, остаточной мочи, уровня ПСА, оценку коморбидного статуса (CCI) и наличия абсолютных показаний к операции (рефрактерная задержка мочи, рецидивирующая гематурия, уролитиаз, дивертикул мочевого пузыря, почечная недостаточность вследствие обструкции). При отсутствии абсолютных показаний пациентам с IPSS <12 и объёмом железы <50 мл рекомендуется монотерапия альфа-1-адреноблокатором, при IPSS 12–20 и объёме 50–80 мл — комбинированная терапия; при IPSS >20, объёме >80 мл или неэффективности консервативного лечения показано хирургическое вмешательство.

Полученные результаты соответствуют данным международных многоцентровых исследований CombAT и MTOPS, подтверждающих

превосходство комбинированной медикаментозной терапии над монотерапией в снижении риска прогрессирования ДГПЖ [7, 8]. Вместе с тем в ряде ситуаций — в частности, при объёме железы >80 мл, тяжёлой инфравезикальной обструкции и высоком риске острой задержки мочи — раннее хирургическое лечение представляется более рациональным с точки зрения долгосрочного прогноза [9].

ВЫВОДЫ

1. Выбор между медикаментозной и хирургической тактикой лечения ДГПЖ у пожилых пациентов должен основываться на комплексной оценке тяжести симптоматики (IPSS), объёма предстательной железы, урофлоуметрических показателей, риска прогрессирования и коморбидного статуса.

2. Монотерапия альфа-1-адреноблокаторами эффективна при лёгкой и умеренной симптоматике (IPSS 8–18 баллов) и объёме железы до 50 мл, обеспечивая устойчивый клинический ответ у 73,6% пациентов на протяжении 24 месяцев.

3. Комбинированная терапия (альфа-1-адреноблокатор + ингибитор 5-альфа-редуктазы) является методом выбора при умеренной и выраженной симптоматике и объёме железы 50–80 мл, достоверно снижая риск острой задержки мочи и необходимость оперативного вмешательства.

4. Хирургическое лечение (ТУРП) обеспечивает наиболее выраженное и стойкое улучшение функциональных показателей и качества жизни при тяжёлой обструкции, объёме железы >80 мл, неэффективности консервативной терапии или наличии абсолютных показаний к операции.

5. Предложенный дифференцированный алгоритм, включающий оценку IPSS, объёма железы, Qmax, CCI и наличия абсолютных показаний к операции, позволяет оптимизировать выбор тактики лечения и снизить число нерациональных назначений у мужчин пожилого возраста.

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СРАВНИТЕЛЬНАЯ ОЦЕНКА ХИРУРГИЧЕСКИХ МЕТОДОВ ЛЕЧЕНИЯ ДОБРОКАЧЕСТВЕННОЙ ГИПЕРПЛАЗИИ ПРЕДСТАТЕЛЬНОЙ ЖЕЛЕЗЫ У МУЖЧИН ПОЖИЛОГО ВОЗРАСТА

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Введение. Доброкачественная гиперплазия предстательной железы (ДГПЖ) является одним из наиболее распространённых урологических заболеваний у мужчин старшей возрастной группы: клинически значимые симптомы нижних мочевыводящих путей выявляются более чем у 80% мужчин в возрасте старше 70 лет. Выбор хирургического метода у пожилых пациентов с высокой коморбидной нагрузкой представляет значительную клиническую проблему, поскольку каждый из существующих методов — трансуретральная резекция (ТУРП), лазерная энуклеация (HoLEP) и открытая аденомэктомия — обладает различным профилем безопасности, технической сложности и функциональной эффективности, а опыт их сравнительного применения в условиях отечественного здравоохранения остаётся недостаточным.

Целью нашего исследования явилась сравнительная оценка периоперационных результатов, частоты осложнений и функциональных исходов ТУРП, HoLEP и открытой аденомэктомии у мужчин в возрасте 65 лет и старше с верифицированным диагнозом ДГПЖ.

Материал и методы. В проспективное исследование включено 186 пациентов мужского пола в возрасте от 65 до 82 лет (средний возраст 71,5±4,1 лет), разделённых на три группы: группа I — ТУРП (n=68, средний объём железы 68,4±14,2 мл), группа II — HoLEP (n=62, объём 94,7±22,6 мл), группа III — открытая позадилонная аденомэктомия (n=56, объём 110,3±28,1 мл); оценивались интраоперационная кровопотеря, сроки катетеризации и госпитализации, а также динамика IPSS, Qmax и показателя качества жизни (QoL) через 1, 3, 6 и 12 месяцев после операции.

Результаты и их обсуждение. Интраоперационная кровопотеря была достоверно наименьшей в группе HoLEP (87,4±31,2 мл) по сравнению с ТУРП (194,6±62,8 мл) и аденомэктомией (318,5±94,3 мл; $p<0,001$ для обоих сравнений); длительность катетеризации и сроки госпитализации также были минимальными при HoLEP (1,4 сут и 3,2 сут соответственно); через 12 месяцев все три метода обеспечили сопоставимое улучшение IPSS и Qmax, однако частота ранних послеоперационных осложнений была значимо ниже в группе HoLEP (11,3%) по сравнению с ТУРП (22,1%) и аденомэктомией (35,7%), что подтверждает преимущества лазерной энуклеации у пожилых пациентов с высоким операционным риском.

Выводы. HoLEP является предпочтительным методом хирургического лечения ДГПЖ у мужчин пожилого возраста с объёмом железы свыше 80 мл, обеспечивая минимальную кровопотерю, короткий реабилитационный период и низкую частоту осложнений; ТУРП сохраняет позицию стандарта при объёме до 80 мл, тогда как открытая аденомэктомия показана при наличии сопутствующей интравезикальной патологии или отсутствии эндоскопического оборудования.

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МНЕМОТЕХНИКА КАК ПЕДАГОГИЧЕСКИЙ ИНСТРУМЕНТ В ПРЕПОДАВАНИИ РУССКОГО ЯЗЫКА И ЛИТЕРАТУРЫ В ВУЗЕ

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Аннотация

Статья посвящена применению мнемотехники как педагогического инструмента в преподавании русского языка и литературы в высшей школе. Актуальность темы обусловлена снижением уровня грамотности студентов и недостаточной разработанностью практических методов работы с памятью в вузовской педагогике. Цель исследования - определить эффективность мнемотехнических приёмов на занятиях по русскому языку и литературе и предложить практические рекомендации для преподавателей. В работе использованы методы теоретического анализа литературы, педагогического наблюдения и сравнительного анализа учебных результатов. Полученные данные свидетельствуют о том, что систематическое применение мнемотехники повышает качество усвоения материала, снижает когнитивную нагрузку и развивает у студентов навыки самостоятельной работы с информацией.

Ключевые слова: мнемотехника, педагогические технологии, преподавание русского языка, высшая школа, методика литературы, запоминание, когнитивные приёмы, учебный процесс.

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OLIY TA'LIMDA RUS TILI VA ADABIYOTINI O'QITISHDA MNEMOTEXNIKA PEDAGOGIK VOSITA SIFATIDA

Annotatsiya

Mazkur maqola oliy ta'limda rus tili va adabiyotini o'qitishda mnemotexnikadan pedagogik vosita sifatida foydalanish masalasiga bag'ishlangan. Mavzuning dolzarbligi talabalar savodxonligi darajasining pasayishi hamda oliy ta'lim pedagogikasida xotira bilan ishlashning amaliy usullari yetarlicha ishlab chiqilmaganligi bilan belgilanadi. Tadqiqotning maqsadi rus tili va adabiyoti mashg'ulotlarida mnemotexnik usullarning samaradorligini aniqlash va o'qituvchilar uchun amaliy tavsiyalar taklif etishdan iboratdir. Tadqiqotda adabiyotlarni nazariy tahlil qilish, pedagogik kuzatuv hamda o'quv natijalarini qiyosiy tahlil qilish kabi usullardan foydalanildi. Olingan natijalar mnemotexnikani muntazam qo'llash o'quv materialini o'zlashtirish sifatini oshirishi, kognitiv yuklamani kamaytirishi hamda talabalarda axborot bilan mustaqil ishlash ko'nikmalarini rivojlantirishini ko'rsatadi.

Tayanch so'zlar: mnemotexnika, pedagogik texnologiyalar, rus tilini o'qitish, oliy ta'lim, adabiyot o'qitish metodikasi, eslab qolish, kognitiv usullar, ta'lim jarayoni.

MNEMONICS AS A PEDAGOGICAL TOOL IN TEACHING RUSSIAN LANGUAGE AND LITERATURE AT THE UNIVERSITY LEVEL

Abstract

This article examines the use of mnemonics as a pedagogical tool in the teaching of Russian language and literature at the university level. The relevance of the topic stems from the decline in students' literacy levels and the insufficient development of practical memory techniques in higher education pedagogy. The aim of the study is to determine the effectiveness of mnemonic techniques in Russian language and literature classes and to offer practical recommendations for teachers. The study employs methods of theoretical literature analysis, pedagogical observation, and comparative

analysis of learning outcomes. The data obtained indicate that the systematic application of mnemonics improves the quality of material retention, reduces cognitive load, and develops students' skills in independent information processing.

Keywords: mnemonics, pedagogical technologies, teaching of the Russian language, higher education, literature teaching methods, memorization, cognitive techniques, educational process.

Введение

Современный преподаватель русского языка и литературы в вузе всё чаще сталкивается с одной и той же проблемой: студенты испытывают серьёзные трудности с запоминанием материала. Орфографические правила, литературные даты, имена авторов, содержание произведений - всё это требует от учащихся значительных усилий памяти, которые нередко оказываются безрезультатными. При этом традиционные методы - многократное повторение и механическое заучивание - дают всё меньший эффект в эпоху информационной перегруженности и клипового мышления.

В этих условиях особую актуальность приобретают когнитивно ориентированные подходы к обучению, среди которых выделяется мнемотехника - система приёмов, помогающих эффективно кодировать, хранить и воспроизводить информацию. Мнемотехника имеет многовековую историю: ещё в античности ораторы использовали метод «дворца памяти» для запоминания длинных речей. Сегодня эти приёмы получили новое обоснование в рамках когнитивной психологии и дидактики.

Вместе с тем применение мнемотехники в вузовском преподавании именно русского языка и литературы остаётся малоизученной областью. Большинство педагогических исследований сосредоточены либо на начальной школе, либо на

иностранных языках. Настоящая статья направлена на восполнение этого пробела.

Цель исследования - изучить возможности применения мнемотехнических приёмов в преподавании русского языка и литературы в высшей школе и разработать практические рекомендации для преподавателей.

Для достижения цели были поставлены следующие **задачи**: - проанализировать теоретические основы мнемотехники в контексте педагогики; - систематизировать основные мнемотехнические приёмы, применимые на занятиях по русскому языку и литературе; - провести наблюдение за учебным процессом и оценить влияние мнемотехники на качество усвоения материала; - сформулировать практические рекомендации для преподавателей.

Обзор литературы

Научный интерес к проблеме памяти и её развития в учебном процессе уходит корнями в отечественную психологическую традицию. Л.С. Выготский в своих работах по общей психологии показал, что память человека - не пассивное хранилище информации, а активный, опосредованный культурными инструментами процесс [1]. Это положение стало теоретической основой для разработки методов целенаправленного управления запоминанием. А.Н. Леонтьев, развивая идеи Выготского, установил, что использование вспомогательных знаков и символов существенно повышает эффективность произвольного запоминания [2]. Классическое исследование А.А. Смирнова, посвящённое психологии памяти, показало, что осмысленная переработка материала в разы продуктивнее механического повторения [3].

Огромный вклад в изучение феноменальной памяти внёс А.Р. Лурия. В своей знаменитой книге он описал случай мнемониста, обладавшего исключительной способностью к запоминанию, и проанализировал механизмы

образного кодирования информации [4]. Именно эти наблюдения легли в основу современных систем мнемотехники.

В конце XX - начале XXI века мнемотехника оформилась в самостоятельную прикладную дисциплину. М.А. Зиганов и В.А. Козаренко систематизировали основные приёмы запоминания на основе визуального мышления и создали одно из первых отечественных учебных пособий по мнемотехнике [5]. В.А. Козаренко впоследствии разработал систему запоминания «Джордано», адаптированную в том числе для учебных целей [6].

В зарубежной науке значимы работы Ф. Беллецца, который классифицировал мнемонические устройства и обосновал критерии их эффективности в образовании [7]. Особый интерес для преподавателей-словесников представляет исследование Р. Аткинсона и М. Роу, продемонстрировавшее высокую результативность метода ключевого слова при освоении иностранной лексики - в том числе русского языка [8].

В современной российской педагогике интерес к мнемотехнике заметно вырос. С.А. Одинцова, О.В. Рейбандт и В.В. Ренкевич провели исследование применения мнемотехники в начальной школе и выявили, что систематическое использование мнемоприёмов повышает эффективность обучения в среднем на 35% по сравнению с традиционными методами [9]. М.Н. Булычева, анализируя роль мнемотехники на уроках русского языка и литературы, подчёркивает её положительное влияние на развитие познавательных универсальных учебных действий [10].

Таким образом, несмотря на значительный объём работ по смежным темам, применение мнемотехники именно в вузовском курсе русского языка и литературы до сих пор не стало предметом систематического исследования, что и определяет научную новизну настоящей статьи.

Методология исследования

Методологическую основу исследования составили деятельностный подход к обучению, разработанный в трудах отечественных психологов [1; 2], а также принципы организации педагогического эксперимента, изложенные В.И. Загвязинским и Р. Атахановым [11]. При отборе мнемотехнических приёмов мы также опирались на разграничение репродуктивных и продуктивных методов обучения, обоснованное Е.И. Пассовым [12], поскольку мнемотехника, в отличие от механического заучивания, активизирует творческую переработку информации.

Исследование проводилось на базе курсов «Современный русский язык» и «История русской литературы» в рамках программы подготовки бакалавров гуманитарных специальностей. В нём участвовали студенты первого и второго курсов в количестве 64 человек, разделённых на две группы: экспериментальную (32 человека), в которой систематически применялись мнемотехнические приёмы, и контрольную (32 человека), работавшую по традиционной методике.

Исследование проводилось в течение одного учебного семестра и включало три этапа.

Первый этап - подготовительный. Был проведён анализ научной литературы, сформулированы рабочие гипотезы и разработан комплекс мнемотехнических упражнений. Параллельно в обеих группах проводилось входное тестирование: задания на воспроизведение орфографических правил, дат жизни и творчества писателей, ключевых образов и сюжетных линий изученных произведений.

Второй этап - основной. В экспериментальной группе последовательно вводились пять типов мнемотехнических упражнений, каждый из которых был привязан к конкретному учебному материалу:

Упражнение 1. «Мнемостих» (рифмизация правил). Студентам предлагалось запомнить глаголы-исключения II спряжения через уже существующий мнемонический стих («Гнать, дышать, держать, обидеть...»), а затем самостоятельно составить аналогичные рифмовки для других орфографических правил, например для слов-исключений с корнями -зар-/-зор- или -гар-/-гор-. Это упражнение задействует одновременно слуховую и речевую память.

Упражнение 2. «Акроним». Для запоминания групп однородных понятий студенты составляли аббревиатуры из первых букв. Например, основные художественные методы русской литературы XIX века (классицизм, сентиментализм, романтизм, реализм) кодировались в удобную для запоминания последовательность. Приём особенно эффективен при работе с классификациями и терминологией.

Упражнение 3. «Образная цепочка». Для запоминания хронологии литературных эпох и жизненных дат писателей студенты выстраивали визуальные ассоциации-«якоря»: каждая дата или событие связывалось с конкретным образом. Так, год рождения Пушкина (1799) студенты кодировали через образ «семи девяток», превращая его в яркую, запоминающуюся картинку.

Упражнение 4. «Метод локусов» (дворец памяти). Применительно к анализу литературного произведения студентам предлагалось мысленно «разместить» ключевых персонажей, сюжетные линии и символические образы в комнатах воображаемого дома. Например, при изучении романа «Мёртвые души» каждому помещику отводился отдельный «зал» с характерными предметами-символами. Упражнение развивает пространственную память и структурное мышление.

Упражнение 5. «Ассоциативная карточка». Студенты самостоятельно создавали карточки, на которых сложное понятие или термин связывался с личной ассоциацией: рисунком, созвучным словом или коротким личным воспоминанием. Индивидуальный характер ассоциаций повышал прочность запоминания.

Контрольная группа работала с тем же учебным материалом без применения мнемотехнических инструментов.

Третий этап - итоговый. По завершении семестра в обеих группах проводилось итоговое тестирование по тем же параметрам, что и входное. В экспериментальной группе дополнительно был проведён анкетный опрос с целью оценить субъективное восприятие студентами новых методов.

В качестве основных **методов исследования** использовались: теоретический анализ психолого-педагогической литературы; педагогическое наблюдение; сравнительный анализ результатов тестирования; анкетирование; количественная и качественная обработка данных. Достоверность результатов обеспечивалась однородностью выборки, единством учебных программ и прозрачностью критериев оценки.

Анализ и результаты

По итогам входного тестирования обе группы показали сопоставимые результаты: средний балл в экспериментальной группе составил 54%, в контрольной - 56%, что свидетельствует об их исходной однородности.

После семестра систематической работы с мнемотехническими приёмами картина изменилась заметно. В экспериментальной группе средний балл итогового теста вырос до 81%, тогда как в контрольной - лишь до 63%. Таким образом, прирост в экспериментальной группе составил около 27 процентных пунктов, в контрольной - около 7. Особенно выраженная разница наблюдалась в

заданиях на воспроизведение дат и биографических сведений о писателях, а также на знание орфографических исключений - именно тех категорий материала, которые традиционно вызывают наибольшие трудности при механическом заучивании.

Эти данные согласуются с положением Н.Ф. Талызиной о том, что прочность усвоения знаний напрямую зависит от степени осмысленности и структурированности учебных действий [13]: мнемотехника как раз и обеспечивает такую структурированность, превращая пассивное запоминание в активную переработку материала.

Анкетный опрос среди студентов экспериментальной группы показал высокий уровень принятия новых методов: 84% респондентов отметили, что мнемотехнические приёмы сделали запоминание более лёгким и интересным, 76% выразили намерение применять их в самостоятельной учёбе. Вместе с тем часть студентов (около 20%) указала на трудности с самостоятельным составлением ассоциаций на начальном этапе, что говорит о необходимости постепенного введения приёмов и достаточного времени на их отработку.

Таким образом, результаты подтверждают рабочую гипотезу: систематическое применение мнемотехники на занятиях по русскому языку и литературе в вузе повышает качество усвоения материала и формирует у студентов устойчивый интерес к самостоятельной работе с информацией.

Заключение и рекомендации

Проведённое исследование подтвердило, что мнемотехника является эффективным педагогическим инструментом в преподавании русского языка и литературы в вузе. Её систематическое применение повышает качество запоминания материала и меняет отношение студентов к учёбе: от пассивного воспроизведения - к осознанной работе с информацией.

На основе полученных результатов можно сформулировать несколько практических рекомендаций. Вводить приёмы следует постепенно - от простых (рифмизация, акроним) к более сложным (метод локусов, образная цепочка). Студентов важно поощрять к созданию собственных ассоциаций, а не воспроизведению готовых: личный образ запоминается прочнее. Мнемотехнику не стоит противопоставлять глубокому осмыслению текста - её задача снять барьер первичного запоминания и высвободить ресурсы для анализа и интерпретации. Наконец, наибольший эффект достигается при регулярном включении приёмов в структуру занятия, а не в формате разовых экспериментов.

Перспективой дальнейших исследований остаётся изучение долгосрочного эффекта мнемотехники и её влияния на общую академическую успеваемость студентов-гуманитариев.

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MADANIY MEROS VA ZAMONAVIY KREATIV YONDASHUVLAR INTEGRATSIYASI

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Annotatsiya

Ushbu maqola madaniy merosni zamonaviy kreativ yondashuvlar bilan integratsiyalashning ahamiyatini tahlil qiladi. Unda madaniy qadriyatlarni saqlash, ularni yangi shakllarda qayta talqin qilish va jamiyatga yetkazish orqali ularning dolzarbligini oshirish yo'llari ko'rib chiqiladi. Tadqiqot raqamli texnologiyalar, san'at va dizayn sohasidagi innovatsion usullar orqali merosni jonlantirish imkoniyatlarini o'rganadi. Maqola madaniy merosni iqtisodiy rivojlanish va milliy o'ziga xoslikni mustahkamlash vositasi sifatida ko'rsatishga qaratilgan.

Kalit so‘zlar: Madaniy meros, Kreativ yondashuvlar, Integratsiya, Raqamli texnologiyalar, Merosni jonlantirish, Madaniy iqtisodiyot, Milliy o'ziga xoslik, Innovatsiya

Abstract

This article analyzes the significance of integrating cultural heritage with modern creative approaches. It explores methods for enhancing the relevance of cultural values by preserving them, reinterpreting them in new forms, and conveying them to society. The study investigates opportunities for revitalizing heritage through digital technologies and innovative methods in art and design. The article aims to demonstrate cultural heritage as a tool for economic development and strengthening national identity.

Keywords: Cultural Heritage, Creative Approaches, Integration, Digital Technologies, Heritage Revitalization, Cultural Economy, National Identity, Innovation

Аннотация

Данная статья анализирует значение интеграции культурного наследия с современными креативными подходами. В ней рассматриваются методы повышения актуальности культурных ценностей путем их сохранения, переосмысления в новых формах и донесения до общества. Исследование изучает возможности возрождения наследия посредством цифровых технологий и инновационных методов в области искусства и дизайна. Статья направлена на демонстрацию культурного наследия как инструмента экономического развития и укрепления национальной идентичности.

Ключевые слова: Культурное наследие, Креативные подходы, Интеграция, Цифровые технологии, Возрождение наследия, Культурная экономика, Национальная идентичность, Инновации

Kirish

Madaniy meros har bir millatning o'ziga xosligini, tarixiy xotirasini va ma'naviy qadriyatlarini mujassam etgan bebaho boylikdir. Uni asrab-avaylash, kelajak avlodlarga yetkazish hamda zamonaviy jamiyat ehtiyojlariga mos ravishda qayta talqin qilish bugungi kunning dolzarb vazifalaridan hisoblanadi. Globalizatsiya jarayonlari va texnologik inqilob sharoitida madaniy merosga nisbatan an'anaviy yondashuvlar uning to'liq salohiyatini ochib berishga har doim ham qodir emas. Shu bois, zamonaviy kreativ yondashuvlarni madaniy merosni saqlash, targ'ib qilish va undan samarali foydalanish jarayonlariga integratsiya qilish zarurati tobora ortib bormoqda. Bu integratsiya nafaqat meros ob'ektlarining barqarorligini ta'minlaydi, balki ularni iqtisodiy va ijtimoiy rivojlanishning muhim drayveriga aylantirish imkonini beradi [2].

Raqamli texnologiyalar, sun'iy intellekt, virtual va kengaytirilgan reallik kabi innovatsion vositalar madaniy merosni yangicha formatlarda taqdim etish, unga bo'lgan qiziqishni oshirish va keng auditoriyani jalb qilishda muhim rol o'ynamoqda [3]. Xususan, kreativ industriyalar madaniyat va san'at sektorini rivojlantirishda, shuningdek, madaniy merosni innovatsion usullar bilan saqlashda hal qiluvchi ahamiyat kasb etadi [2]. O'zbekistonda ham bu yo'nalishda sezilarli ishlar amalga oshirilmoqda, jumladan, madaniy meros ob'ektlarini ekologik xavflardan himoya qilish bo'yicha mutaxassislar tayyorlash [4] va turizm salohiyatini oshirishga qaratilgan loyihalar [5] buning yaqqol misolidir. Madaniy merosni saqlash va undan samarali foydalanishning zamonaviy tamoyillariga bag'ishlangan xalqaro konferensiyalar ham ushbu mavzuning dolzarbligini tasdiqlaydi [1].

Ushbu maqola madaniy meros va zamonaviy kreativ yondashuvlar integratsiyasining nazariy asoslarini, amaliy mexanizmlarini, afzalliklari va yuzaga kelishi mumkin bo'lgan muammolarini chuqur tahlil qilishni maqsad qilgan. Shuningdek, u xalqaro va milliy tajribalarni o'rganish asosida barqaror rivojlanish yo'llarini belgilashga qaratilgan tavsiyalar ishlab chiqadi.

Mavzuga oid adabiyotlar tahlili

Madaniy meros va zamonaviy kreativ yondashuvlar integratsiyasi mavzusidagi ilmiy adabiyotlar tahlili so‘nggi yillarda ushbu sohada kuzatilayotgan jadal rivojlanish va tadqiqotlarning ortib borayotganini ko‘rsatadi. An’anaviy madaniy merosni saqlash va targ‘ib qilish usullari globalizatsiya va raqamli transformatsiya sharoitida o‘z samaradorligini qisman yo‘qotayotgani sababli, innovatsion va kreativ yondashuvlarga bo‘lgan ehtiyoj tobora ortib bormoqda. Bu holat ilmiy hamjamiyatda madaniy merosni nafaqat statik ob’ekt sifatida saqlash, balki uni dinamik, jonli va jamiyat uchun doimiy ahamiyatga ega resurs sifatida qayta talqin qilishga qaratilgan yangi nazariy va amaliy izlanishlarga turtki bo‘lmoqda.

Adabiyotlar tahlili shuni ko‘rsatadiki, madaniy merosni tushunish va unga yondashish paradigmasi sezilarli darajada o‘zgargan. Ilgari meros asosan moddiy ob’ektlar va ularning konservatsiyasiga qaratilgan bo‘lsa, hozirda nomoddiy meros, jamoaviy xotira, madaniy landshaftlar va merosning ijtimoiy-iqtisodiy salohiyati kabi jihatlar ham tadqiqotlar markazida turibdi. Zamonaviy tadqiqotlar madaniy merosni milliy o‘zlikni anglashning asosiy elementi, ta’lim resursi va barqaror rivojlanishning muhim drayveri sifatida qaraydi. Bu yondashuv merosni faqatgina o‘tmishning qoldig‘i emas, balki kelajakni shakllantiruvchi faol omil sifatida baholashga imkon beradi.

Kreativ iqtisodiyot va kreativ industriyalar madaniy merosni saqlash va targ‘ib qilishda yangi imkoniyatlar ochib beruvchi muhim mexanizm sifatida e’tirof etilmoqda. Xususan, [2] manbasida kreativ iqtisodiyotning madaniyat va san’at sohasini rivojlantirishdagi hal qiluvchi roli tizimli tahlil qilinadi. Unda kreativ industriyalarning kengayishi va evolyutsiyasi orqali iqtisodiy va madaniy taraqqiyotdagi yangi tendensiyalar chuqur o‘rganilgan. Tadqiqot xalqaro va milliy tajribalarni umumlashtirib, ushbu muhim sohalarni mustahkamlash va rivojlantirishga qaratilgan amaliy takliflarni ilgari suradi. Shuningdek, u madaniy merosni innovatsion usullar bilan saqlashning strategik yondashuvlarini sinchkovlik bilan tahlil qilib, san’atni milliy iqtisodiyotning muhim va ajralmas tarkibiy qismiga aylantirish strategiyalarini ko‘rib chiqadi. Bu esa kreativ industriyalarning ham madaniy boylikni oshirish, ham barqaror iqtisodiy o‘sish uchun katalizator sifatidagi chuqur ta’sirini ta’kidlaydi. Ushbu tadqiqot kreativ yondashuvlarning madaniy merosga yangi hayot bag‘ishlash, uni zamonaviy jamiyat ehtiyojlariga moslashtirish va iqtisodiy qiymatini oshirishdagi salohiyatini nazariy jihatdan asoslaydi.

Raqamli texnologiyalar va ularning madaniy merosga integratsiyasi so‘nggi yillarda eng ko‘p o‘rganilayotgan yo‘nalishlardan biridir. [3] manbasida raqamli texnologiyalarning ta’lim tizimiga integratsiyasi va bu jarayon bilan bog‘liq boshqaruv

muammolari chuqur tahlil qilingan bo‘lsa-da, unda tilga olingan elektron ta’lim platformalari, sun’iy intellekt, virtual reallik (VR) va kengaytirilgan reallik (AR) kabi innovatsion texnologiyalar madaniy meros sohasida ham keng qo‘llanilmoqda. Adabiyotlar tahlili shuni ko‘rsatadiki, bu texnologiyalar meros ob’ektlarini raqamlashtirish, 3D modellashtirish, virtual muzeylar yaratish, interaktiv ko‘rgazmalar tashkil etish va yo‘qolgan tarixiy ob’ektlarni qayta tiklashda misli ko‘rilmagan imkoniyatlar yaratadi. Masalan, VR va AR texnologiyalari tashrifchilarga tarixiy joylar va artefaktlar bilan chuqurroq, immersiv tarzda o‘zaro aloqada bo‘lish imkonini beradi, bu esa ularning madaniy merosga bo‘lgan qiziqishini sezilarli darajada oshiradi. Sun’iy intellekt esa meros ma’lumotlarini tahlil qilish, konservatsiya jarayonlarini optimallashtirish, hatto meros bilan bog‘liq yangi hikoyalar va kontent yaratishda qo‘llanilishi mumkin. Biroq, raqamli texnologiyalarni joriy etishda infratuzilmani rivojlantirish, mutaxassislarning raqamli savodxonligini oshirish, ma’lumotlar xavfsizligini ta’minlash va etika masalalarini hal qilish kabi boshqaruv muammolari ham dolzarbligini saqlab qolmoqda.

Integratsiya mexanizmlari va metodologiyalari bo‘yicha adabiyotlar tahlili shuni ko‘rsatadiki, bu jarayon ko‘p qirrali bo‘lib, turli sohalararo hamkorlikni talab qiladi. Madaniy merosni saqlash bo‘yicha mutaxassislar, kreativ industriya vakillari, texnologlar, iqtisodchilar va jamoatchilik o‘rtasidagi samarali muloqot va hamkorlik integratsiyaning muvaffaqiyatli amalga oshirilishi uchun asosiy shart hisoblanadi. Tadqiqotlar ko‘pincha loyihaga asoslangan yondashuvlarni, madaniy inkubatorlar va kreativ klasterlarni yaratishni, shuningdek, davlat-xususiy sheriklik modellarini tavsiya etadi. Bu modellar meros ob’ektlarini yangi kontekstlarda qayta talqin qilish, ularni zamonaviy san’at, dizayn, moda, kino va o‘yin industriyasi kabi sohalar bilan bog‘lash orqali ularning ahamiyatini oshirishga qaratilgan.

Integratsiyaning afzalliklari, imkoniyatlari va muammolari tahlili ham ilmiy adabiyotlarda keng yoritilgan. Afzalliklar qatoriga madaniy merosning barqarorligini

ta’minlash, uning iqtisodiy salohiyatini oshirish, turizm rivojlanishiga hissa qo‘shish, jamoatchilikni jalb qilish va ta’lim imkoniyatlarini kengaytirish kiradi. [5] manbasida O‘zbekiston Turizm va madaniy meros vazirligi tomonidan mamlakatning madaniy-ma’naviy merosi va turizm salohiyatini targ‘ib qilishga qaratilgan loyiha misolida kreativ yondashuvlarning amaliy ahamiyati yaqqol namoyon bo‘ladi. Samarqand, Shahrisabz va Buxoroda suratga olingan ko‘rsatuvlar, turk so‘fiy olimlari va diniy arboblar ishtirokidagi jonli efirlar orqali keng auditoriyaga yetkazilishi, madaniy merosni zamonaviy media vositalari orqali targ‘ib qilishning samarali usuli hisoblanadi. Bu loyiha madaniy merosni nafaqat saqlash, balki uni jonli va qiziqarli tarzda taqdim etish orqali unga bo‘lgan qiziqishni oshirish, shu bilan birga turizm salohiyatini yuksaltirishga xizmat qiladi.

Biroq, integratsiya jarayonida bir qator muammolar ham yuzaga kelishi mumkin. Bularga merosning asl mohiyatini buzish xavfi, tijoratlashtirish natijasida uning qadrsizlanishi, moliyaviy resurslar yetishmasligi, mutaxassislar o‘rtasidagi bilim va ko‘nikmalar farqi, shuningdek, huquqiy va me’yoriy baza yetishmasligi kiradi. Adabiyotlarda bu muammolarni hal qilish uchun aniq strategiyalar, jumladan, qat’iy etika qoidalari, jamoatchilik ishtirokini ta’minlash va davlat tomonidan qo‘llab-quvvatlash mexanizmlarini ishlab chiqish zarurligi ta’kidlanadi.

Xalqaro va O‘zbekiston tajribasi ushbu mavzuning dolzarbligini va amaliy ahamiyatini tasdiqlaydi. [1] manbasida Mirzo Ulug‘bek nomidagi Samarqand davlat arxitektura-qurilish universiteti (SamDAQI) va O‘zbekiston Oliy ta’lim, fan va innovatsiyalar vazirligi tomonidan tashkil etilgan "Madaniy meros ob’ektlarini saqlashning zamonaviy tamoyillari" xalqaro ilmiy-amaliy konferensiyasi materiallari to‘plami ushbu sohadagi akademik va amaliy izlanishlarning kengligini ko‘rsatadi. Konferensiyaning oltita ilmiy-amaliy seksiyasi, jumladan, arxitektura yodgorliklarini ta’mirlash va restavratsiya qilish usullarini ishlab chiqish, madaniy meros va turizmni xalqaro miqyosda transformatsiya qilish tamoyillari, turizm uchun raqamlashtirishdan

foydalanish, merosni saqlashda ekologik muammolarni hal qilish, muzeylarning O‘zbekiston moddiy madaniy merosini asrashdagi roli hamda tarix, arxeologiya va etnologiyaning zamonaviy talqinlari kabi mavzularni qamrab olgani, madaniy merosga nisbatan kompleks va innovatsion yondashuvlarning muhimligini ta’kidlaydi. Bu konferensiya ilmiy hamkorlikni mustahkamlash va O‘zbekiston, YuNESKO hamda boshqa Ipak yo‘li mamlakatlari bo‘ylab madaniy merosni o‘rganish, saqlash va targ‘ib qilishga sezilarli hissa qo‘shishga intilgan.

O‘zbekiston kontekstida madaniy merosni ekologik xavflardan himoya qilishga qaratilgan [4] ERAMCA loyihasi ham kreativ va innovatsion yondashuvlarning yorqin namunasidir. 2020-2023 yillarda amalga oshirilgan ushbu loyiha madaniy merosni ekologik tahdidlardan himoya qilishga qaratilgan fanlararo magistratura dasturini ishlab chiqish, mahalliy o‘qituvchilar va texnik mutaxassislarni ilg‘or konservatsiya strategiyalari bo‘yicha tayyorlash kabi muhim tashabbuslarni o‘z ichiga olgan. Loyiha doirasida hamkor universitetlarda, jumladan, Samarqand davlat arxitektura-qurilish instituti va Toshkentdagi Turin politexnika universitetida zamonaviy laboratoriyalar tashkil etilishi, ilmiy tadqiqotlar va amaliy ta’lim uchun yangi imkoniyatlar yaratdi. YuNESKOning O‘zbekistondagi vakolatxonasi va Madaniyat vazirligi kabi manfaatdor tomonlarning jalb etilishi milliy konservatsiya strategiyalari bilan uyg‘unlikni ta’minladi. ERAMCA loyihasining ahamiyati O‘zbekistonda tarixiy yodgorliklarni uzoq muddatli saqlashga hissa qo‘shadigan zamonaviy ilmiy-texnologik yondashuvlar bilan jihozlangan yangi avlod mutaxassislarini tayyorlashda namoyon bo‘ladi. Bu loyiha madaniy merosni saqlashda fanlararo va innovatsion yondashuvlarning naqadar muhimligini amalda isbotlaydi.

Xulosa qilib aytganda, mavzuga oid adabiyotlar tahlili madaniy meros va zamonaviy kreativ yondashuvlar integratsiyasining nazariy asoslari, amaliy mexanizmlari, afzalliklari va muammolari bo‘yicha boy ma’lumotlar bazasini taqdim etadi. Tadqiqotlar ushbu integratsiyaning madaniy merosni saqlash, targ‘ib qilish va

undan samarali foydalanishdagi hal qiluvchi rolini ta’kidlaydi. Raqamli texnologiyalar, kreativ industriyalar va fanlararo hamkorlik ushbu jarayonning asosiy drayverlari sifatida e’tirof etiladi. O‘zbekistonning so‘nggi yillardagi tajribasi ham bu yo‘nalishda sezilarli yutuqlarga erishilayotganini ko‘rsatadi. Biroq, mavjud adabiyotlarda integratsiyaning barcha jihatlari, ayniqsa, O‘zbekiston sharoitida uning o‘ziga xos xususiyatlari, muvaffaqiyatli amaliyotlari va kelajak istiqbollari bo‘yicha chuqur va tizimli tahlilga ehtiyoj sezilmoqda. Ushbu maqola aynan shu bo‘shliqni to‘ldirishga, mavjud bilimlarni sintez qilishga va madaniy merosni barqaror rivojlantirish uchun amaliy tavsiyalar ishlab chiqishga qaratilgan.

Tadqiqot metodologiyasi

Ushbu maqola madaniy meros va zamonaviy kreativ yondashuvlar integratsiyasining murakkab va ko‘p qirrali jihatlarini chuqur tahlil qilishga qaratilgan bo‘lib, sifatli, analitik va deskriptiv tadqiqot dizayniga asoslanadi. Tadqiqotning asosiy maqsadi – mavjud nazariy bilimlarni sintez qilish, amaliy mexanizmlarni aniqlash, integratsiyaning afzalliklari va yuzaga kelishi mumkin bo‘lgan muammolarini baholash, shuningdek, xalqaro va O‘zbekiston tajribasini qiyosiy o‘rganish asosida barqaror rivojlanish yo‘llarini belgilash hamda amaliy tavsiyalar ishlab chiqishdan iborat. Bu yondashuv madaniy merosni nafaqat statik ob’ekt sifatida saqlash, balki uni dinamik, jonli va jamiyat uchun doimiy ahamiyatga ega resurs sifatida qayta talqin qilishga qaratilgan yangi nazariy va amaliy izlanishlarga turtki bo‘lgan ehtiyojni qondirishga xizmat qiladi. Tadqiqot fanlararo xarakterga ega bo‘lib, madaniyatshunoslik, iqtisodiyot, texnologiya, turizm va boshqaruv kabi turli sohalarning kesishgan nuqtasida joylashgan masalalarni o‘rganadi.

Ma’lumotlarni yig‘ish jarayoni ikki asosiy yo‘nalishda amalga oshirildi: keng qamrovli adabiyotlar tahlili va tanlangan keys-stadi (amaliy holatlar) tahlili. Adabiyotlar tahlili sistematik yondashuvga asoslangan bo‘lib, mavzuga oid eng dolzarb va nufuzli ilmiy manbalarni aniqlashga qaratildi. Bu jarayonda ilmiy

maqolalar, monografiyalar, xalqaro konferensiyalar materiallari (masalan, [1] manbasida keltirilgan "Madaniy meros ob'ektlarini saqlashning zamonaviy tamoyillari" xalqaro ilmiy-amaliy konferensiyasi to'plami), hukumat hisobotlari, xalqaro tashkilotlar nashrlari va tegishli dissertatsiyalar ko'rib chiqildi. Manbalarni tanlashda ularning mavzuga aloqadorligi (madaniy meros, kreativ iqtisodiyot, raqamli texnologiyalar, virtual va kengaytirilgan reallik, integratsiya, O'zbekiston konteksti), shuningdek, 2020 yildan keyin nashr etilganligi asosiy mezon bo'ldi. Bu mezon tadqiqotning zamonaviy tendensiyalar va eng yangi ilmiy yutuqlarga asoslanishini ta'minlaydi. Qidiruv kalit so'zlari o'zbek va ingliz tillarida ("madaniy meros", "kreativ iqtisodiyot", "raqamli texnologiyalar", "virtual reallik", "integratsiya", "O'zbekiston madaniy merosi", "cultural heritage", "creative economy", "digital technologies", "virtual reality", "integration", "Uzbekistan cultural heritage") kabi iboralarni o'z ichiga olgan holda Scopus, Web of Science, Google Scholar kabi xalqaro ilmiy ma'lumotlar bazalari hamda O'zbekistonning mahalliy ilmiy jurnallari va nashriyotlarining elektron resurslaridan foydalanildi. Bu keng qamrovli qidiruv mavzuning turli jihatlarini aks ettiruvchi adabiyotlarning maksimal darajada to'planishiga imkon berdi.

Keys-stadi tahlili esa madaniy meros va kreativ yondashuvlar integratsiyasining amaliy mexanizmlarini va ularning natijalarini chuqur o'rganishga qaratilgan. Bu yo'nalishda O'zbekiston va xalqaro miqyosdagi muvaffaqiyatli loyihalar va tashabbuslar tanlab olindi. Masalan, [4] manbasida batafsil yoritilgan ERAMCA loyihasi (Environmental Risk Assessment and Mitigation on Cultural Heritage Assets in Central Asia) O'zbekistonning madaniy merosini ekologik xavflardan himoya qilishga qaratilgan fanlararo magistratura dasturini ishlab chiqish va mutaxassislarni tayyorlash bo'yicha innovatsion yondashuvni namoyish etadi. Shuningdek, [5] manbasida keltirilgan O'zbekiston Turizm va madaniy meros vazirligi tomonidan mamlakatning madaniy-ma'naviy merosi va turizm salohiyatini targ'ib qilishga

qaratilgan loyiha, zamonaviy media vositalari orqali madaniy merosni keng auditoriyaga yetkazishning samarali usulini ko‘rsatadi. Bu keys-stadi namunalarini tanlashda ularning integratsiya darajasi, qo‘llanilgan innovatsion yondashuvlar, erishilgan natijalar, barqarorlik salohiyati va O‘zbekiston kontekstiga mosligi asosiy mezon bo‘ldi. Har bir keys-stadi doirasida loyihaning maqsadlari, amalga oshirish mexanizmlari, ishtirokchilar, qo‘llanilgan texnologiyalar (masalan, [3] manbasida ta’kidlangan raqamli texnologiyalar, sun’iy intellekt, VR/AR), erishilgan ijtimoiy-iqtisodiy va madaniy natijalar, shuningdek, yuzaga kelgan muammolar va ularni hal qilish yo‘llari atroflicha o‘rganildi. Bu tahlil integratsiyaning amaliy jihatlarini chuqur tushunishga va eng yaxshi amaliyotlarni aniqlashga yordam berdi.

Ma’lumotlarni tahlil qilish jarayoni bir nechta o‘zaro bog‘liq usullarni o‘z ichiga oldi. Birinchidan, tematik tahlil adabiyotlardan asosiy mavzular, tushunchalar, nazariyalar va amaliyotlarni aniqlash uchun qo‘llanildi. Bu usul orqali integratsiyaning turli jihatlari – nazariy asoslar, amaliy mexanizmlar, texnologik imkoniyatlar, iqtisodiy samaradorlik, ijtimoiy ta’sir va etik masalalar kabi kategoriyalarga ajratildi. Har bir kategoriya doirasida asosiy g‘oyalar, dalillar va munozarali nuqtalar tizimlashtirildi. Ikkinchidan, qiyosiy tahlil xalqaro va O‘zbekiston tajribalarini solishtirishga qaratildi. Bu usul orqali madaniy merosni saqlash va targ‘ib qilishda kreativ yondashuvlarni qo‘llash bo‘yicha global tendensiyalar O‘zbekistonning o‘ziga xos sharoitlari va erishgan yutuqlari bilan taqqoslandi. Muvaffaqiyat omillari, to‘siqlar va milliy kontekstga mos keladigan eng yaxshi amaliyotlar aniqlandi. Masalan, [2] manbasida kreativ iqtisodiyotning madaniyat va san’at sohasini rivojlantirishdagi roli bo‘yicha xalqaro va milliy tajribalarning umumlashtirilishi ushbu qiyosiy tahlil uchun muhim nazariy asos bo‘lib xizmat qildi.

Uchinchidan, tanqidiy sintez turli manbalardan olingan ma’lumotlarni birlashtirish va ularning o‘zaro bog‘liqligini tahlil qilish uchun asosiy usul sifatida ishlatildi. Bu usul mavjud bilimlardagi bo‘shliqlarni aniqlashga, ularni to‘ldirishga

qaratilgan yangi g‘oyalar va tavsiyalar shakllantirishga, shuningdek, integratsiyaning murakkabligini va ko‘p qirraliligini chuqur tushunishga imkon berdi. Tanqidiy sintez jarayonida har bir manbaning kuchli va zaif tomonlari baholanib, ularning umumiy tadqiqot savollariga qanday javob berishi ko‘rib chiqildi. To‘rtinchidan, hujjatlar tahlili O‘zbekiston Respublikasi Prezidentining farmonlari va qarorlari (masalan, [1] manbasida tilga olingan PQ-416-sonli Prezident qarori), hukumat dasturlari, strategik hujjatlar va loyiha hisobotlaridagi asosiy g‘oyalar, strategiyalar va natijalarni tizimli ravishda o‘rganish uchun qo‘llanildi. Bu usul davlat siyosatining yo‘nalishlarini, qo‘llab-quvvatlash mexanizmlarini va huquqiy asoslarni tushunishda muhim rol o‘ynadi.

Tadqiqotning doirasi asosan mavjud adabiyotlar va ochiq manbalardagi ma’lumotlarga tayanadi. Bu yondashuv mavzuning keng qamrovli nazariy va amaliy jihatlarini o‘rganishga imkon beradi. Biroq, tadqiqotning bir qator cheklovlari ham mavjud. Birinchidan, birlamchi ma’lumotlar (masalan, ekspert intervyulari, so‘rovnomalar, fokus-guruhlar) yig‘ilmaganligi tadqiqot natijalarining chuqurligini ma’lum darajada cheklashi mumkin. Kelajakdagi tadqiqotlarda bu bo‘shliqni to‘ldirish maqsadga muvofiq bo‘ladi. Ikkinchidan, tanlangan keys-stadi namunalarining cheklanganligi umumlashtirish imkoniyatlarini toraytirishi mumkin. Har bir keys-stadi o‘ziga xos kontekstga ega bo‘lganligi sababli, ularning barcha jihatlarini boshqa sharoitlarga to‘liq tatbiq etish har doim ham mumkin emas. Uchinchidan, mavzuning dinamik tabiati tufayli ma’lumotlarning tez eskirishi ehtimoli mavjud, ayniqsa raqamli texnologiyalar va kreativ industriyalar sohasidagi jadal o‘zgarishlar hisobga olinsa. To‘rtinchidan, O‘zbek tilidagi ilmiy adabiyotlarning nisbatan kamligi va xalqaro ilmiy bazalarda O‘zbekiston tajribasi bo‘yicha nashrlarning cheklanganligi tadqiqot jarayonida ma’lum qiyinchiliklarni tug‘dirdi. Ushbu cheklovlar tadqiqot natijalarini talqin qilishda e’tiborga olindi va kelajakdagi izlanishlar uchun yo‘nalishlarni belgilashda hisobga olindi.

Etik masalalar tadqiqot jarayonida doimiy e’tiborda bo‘ldi. Barcha foydalanilgan manbalarga to‘g‘ri va aniq havola berildi, plagiatga mutlaqo yo‘l qo‘yilmadi. Ma’lumotlar xolis va ob’ektiv tahlil qilindi, muallifning shaxsiy qarashlari ilmiy dalillar bilan asoslanmagan holda taqdim etilmadi. Tadqiqot natijalari shaffoflik va ilmiy yaxlitlik tamoyillari asosida bayon etildi. Ushbu metodologiya maqolaning ilmiy asosliligini, natijalarning ishonchliligini va tavsiyalarning amaliy ahamiyatini ta’minlashga qaratilgan bo‘lib, madaniy merosni saqlash va rivojlantirishda kreativ yondashuvlarning salohiyatini to‘liq ochib berishga xizmat qiladi.

Xulosa

Ushbu tadqiqot madaniy meros va zamonaviy kreativ yondashuvlar integratsiyasining nazariy asoslari hamda amaliy mexanizmlarini chuqur tahlil qildi. Global o'zgarishlar sharoitida merosni saqlash, targ'ib qilish va undan samarali foydalanishda innovatsion yondashuvlar hal qiluvchi ahamiyat kasb etishi ko'rsatildi. Raqamli texnologiyalar, sun'iy intellekt va kreativ industriyalar bu jarayonning asosiy drayverlari bo'lib, merosning barqarorligini ta'minlash, iqtisodiy salohiyatini oshirish va keng auditoriyani jalb qilishga xizmat qiladi. Integratsiya jarayonida merosning asl mohiyatini saqlash va tijoratlashtirish xavfini minimallashtirish muhim ahamiyatga ega. O'zbekiston tajribasi, jumladan, ekologik xavflardan himoya qilish va turizm salohiyatini oshirishga qaratilgan loyihalar, bu integratsiyaning amaliy samaradorligini tasdiqlaydi. Kelajakda bu yo'nalishdagi izlanishlarni chuqurlashtirish va barqaror rivojlanish uchun aniq tavsiyalar ishlab chiqish maqsadga muvofiqdir.

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YURAK ISHEMIK KASALLIGI BO'LGAN BEMORLARDA PSIXOLOGIK YONDASHUVNING KARDIAK REABILITATSIYA SAMARADORLIGIGA TA'SIRI

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ANNOTATSIYA

Ushbu maqolada yurak ishemik kasalligi (YuIK) bilan og'rigan bemorlarda psixologik yondashuvning kardiak reabilitatsiya samaradorligiga ta'siri tahlil qilingan. Zamonaviy kardiak reabilitatsiya dasturlarida psixologik intervensiyani integratsiya qilish muhimligi, depressiya va tashvishlanishning kasallik prognoziga salbiy ta'siri, shuningdek kognitiv-xulq terapiyasi (KXT), mindfulness va guruhli psixoterapiyaning klinik natijalarga ijobiy ta'siri ko'rib chiqilgan. Xulosa sifatida, ko'p bosqichli reabilitatsiya tizimida psixologik komponentni majburiy element sifatida joriy etish zarurligi asoslangan.

Kalit so'zlar: yurak ishemik kasalligi, kardiak reabilitatsiya, psixologik intervensiya, kognitiv-xulq terapiyasi, depressiya, hayot sifati, davolashga rioya qilish.

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ABSTRACT

This article analyzes the impact of psychological approaches on the effectiveness of cardiac rehabilitation in patients with ischemic heart disease (IHD). The importance of integrating psychological interventions into modern cardiac rehabilitation programs is highlighted, along with the negative effects of depression and anxiety on disease prognosis. The positive influence of cognitive-behavioral therapy (CBT), mindfulness, and group psychotherapy on clinical outcomes is discussed. In conclusion, the necessity of introducing the psychological component as a mandatory element in a multi-stage rehabilitation system is substantiated.

Keywords: ischemic heart disease, cardiac rehabilitation, psychological intervention, cognitive-behavioral therapy, depression, quality of life, treatment adherence.

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АННОТАЦИЯ

В данной статье анализируется влияние психологического подхода на эффективность кардиореабилитации у пациентов с ишемической болезнью сердца (ИБС). Рассмотрена важность интеграции психологических интервенций в современные программы кардиореабилитации, негативное влияние депрессии и тревожности на прогноз заболевания, а также положительное воздействие когнитивно-поведенческой терапии (КПТ), майндфулнесс и групповой психотерапии на клинические результаты. В заключение обоснована необходимость внедрения психологического компонента как обязательного элемента в многоэтапной системе реабилитации.

Ключевые слова: ишемическая болезнь сердца, кардиореабилитация, психологическая интервенция, когнитивно-поведенческая терапия, депрессия, качество жизни, приверженность лечению.

KIRISH

Yurak qon-tomir kasalliklari hozirgi kunda dunyo miqyosida asosiy o'lim sabablaridan biri bo'lib qolmoqda. Jahon sog'liqni saqlash tashkilotining ma'lumotlariga ko'ra, har yili 17,9 milliondan ortiq inson yurak qon-tomir kasalliklari oqibatida hayotdan ko'z yumadi, bu esa barcha o'limlarning 32 foizini tashkil etadi. O'zbekistonda ham ushbu ko'rsatkich yuqori darajada saqlanib kelinmoqda — o'lim sabablarining yarmidan ko'pi aynan yurak qon-tomir patologiyalariga to'g'ri keladi.

Yurak ishemik kasalligi (YuIK) — miokard hujayralarining kislorod etishmovchiligi natijasida yuzaga keladigan surunkali patologik holat bo'lib, u tez-tez angina pectoris, miokard infarkti yoki yurak etishmovchiligi shaklida namoyon bo'ladi. Farmakologik davolash, invaziv muolajalar va jarrohlik aralashuvi (aortokoronar shuntlash, stentlash) bilan bir qatorda, reabilitatsiya dasturlari bu bemorlar hayot sifatini sezilarli darajada yaxshilaydi.

Biroq an'anaviy kardiak reabilitatsiya ko'pincha jismoniy faollikni tiklash va farmakoterapiyaga rioya qilish masalalarini birinchi o'ringa qo'yadi. Shu bilan birga, psixologik

omillar xususan, depressiya, tashvishlanish sindromi, stressga nisbatan reaktivlik va davolashga motivatsiya — reabilitatsiya natijalarini belgilashda hal qiluvchi ahamiyatga ega ekanligi tobora ko'proq isbotlanmoqda.

Ushbu maqolaning maqsadi YuIK bilan og'rigan bemorlarda qo'llaniladigan psixologik intervensiya usullarini tizimlashtirib, ularning kardiak reabilitatsiya samaradorligiga ta'sirini ilmiy adabiyotlar asosida tahlil qilishdan iborat.

YURAK ISHEMIK KASALLIGI VA PSIXOLOGIK OMILLAR: EPIDEMIOLOGIK ALOQA

Kardiovaskulyar kasalliklar bilan ruhiy sog'liq o'rtasidagi munosabat ikki tomonlama xarakter kasb etadi. Bir tomondan, surunkali stress, depressiya va anziyete yurak kasalliklarining mustaqil xavf omili sifatida namoyon bo'ladi; boshqa tomondan, og'ir somatik kasallik o'z-o'zidan psixologik patologiyaning rivojlanishiga zamin yaratadi.

Miokard infarktidan keyin depressiya chastotasi umumiy aholida uchrashidan 3-4 baravar yuqori bo'lib, 20-30 foizni tashkil etadi. Ba'zi tadqiqotlarda ushbu ko'rsatkich yanada yuqori — 40-45 foizga yetganligini ko'rish mumkin. Bundan tashqari, post-infarkt davridagi depressiya kasalxonaga qayta yotqizilish va o'lim xavfini ikki barobar oshirishi klinik jihatdan tasdiqlangan.

Tashvishlanish sindromi ham shu ko'rsatkichlar darajasida uchraydi va aksariyat hollarda depressiya bilan hamkorlikda kuzatiladi. Ushbu ikki holat kombinatsiyasi bemorning reabilitatsiya dasturiga qatnashish imkoniyatini cheklaydi, yaxshi o'tirishini pasaytiradi va farmakoterapiyaga rioya qilishini (komplayens) susaytiradi.

Shuningdek, D-tip shaxsiyat (distress-tip) — ijtimoiy inhibitsiya va salbiy affektivlik birikmasidan iborat psixologik konstrukt — YuIK prognozini mustaqil yomonlashtiruvchi omil sifatida e'tirof etilgan. Bu toifadagi bemorlar tibbiy ko'makga murojat etishni kechiktiradi, profilaktik tavsiyalarni e'tiborsiz qoldiradi va reabilitatsion jarayonga kamroq ishtiyoq bilan qatnashadi.

KARDIAK REABILITATSIYADA PSIXOLOGIK YONDASHUVLAR TASNIFI

Kognitiv-xulq terapiyasi (KXT)

Kognitiv-xulq terapiyasi — psixoterapiyaning eng ko'p tadqiq etilgan va ilmiy asoslanganlaridan biri bo'lib, noto'g'ri bilish sxemalari va moslashmaydigan xulq-atvor namunalarini aniqlash hamda ularni konstruktiv alternativlar bilan almashtirish tamoyiliga asoslanadi. Kardiak reabilitatsiya kontekstida KXT quyidagi maqsadlar uchun qo'llaniladi:

– kasallik haqidagi katastrofik fikrlarni bartaraf etish;
– jismoniy faollikdan qo'rquvni kamaytirish (kinesiofobiya);
– davolash rejimiga rioya qilish motivatsiyasini oshirish;
– chekish va noto'g'ri ovqatlanish kabi zararli odatlarni o'zgartirish.

Bir qator randomizatsiyalangan nazoratli tadqiqotlar KXT aralashuvi kardiak bemorlarida depressiya va tashvishlanish darajasini sezilarli pasaytirishini, shuningdek 6 oylik va 12 oylik kuzatuv davrida kasalxonaga qayta yotqizilish xavfini kamaytirishini ko'rsatgan.

Mindfulness asosidagi intervensiyalar

Mindfulness (ongli hozirgi lahza) texnikasi stressni kamaytirish, xulq-atvor o'zgarishlarini qo'llab-quvvatlash va vegetativ asab tizimi muvozanatini tiklab borishda samarali vosita sifatida tan olingan. Mindfulness-Based Stress Reduction (MBSR) dasturi kardiovascular kasalliklar bilan og'rigan bemorlarda qon bosimini pasaytirish, yurak ritmini normalizatsiya qilish va sub'ektiv stress darajasini kamaytirish bo'yicha ijobiy klinik natijalar ko'rsatgan.

Mindfulness texnikasi qon tomirlarning endoteliy funksiyasiga ta'sir etishi, kortizol sekretsiyasini tartibga solishi va inflammator markerlar (IL-6, CRP) darajasini kamaytirishi biologik mexanizmlar orqali isbotlangan. Bu esa mindfulnessning kardioprotektiv samaradorligiga patofiziologik asos yaratadi.

Guruhli psixosotsial intervensiya

Guruhli psixosotsial dasturlar kardiak reabilitatsiyaning muhim komponenti bo'lib xizmat qiladi. Guruhli format ijtimoiy izolyatsiya hissini kamaytiradi, empik qo'llab-quvvatlash muhitini shakllantiradi va muammolarni hamkorlikda hal etish ko'nikmalarini rivojlantiradi. Birgalikda suhbatlashish va umumiy tajriba almashish bemorlarda kasallikka nisbatan munosabatni sog'lomlashtirishga yordam beradi.

Yevropa kardiak reabilitatsiya assotsiatsiyasi tavsiyanomalarida guruhli psixosotsial yondashuv kardiak reabilitatsiyaning ajralmas qismi sifatida belgilangan. Amaliyotda ushbu dasturlar odatda 8-12 seansal tuzilma bo'lib, haftada bir yoki ikki marta o'tkaziladi.

Motivatsion suhbat (Motivational Interviewing)

Motivatsion suhbat — klinitsist va bemor o'rtasidagi empatik muloqot asosida bemorning ichki motivatsiyasini faollashtiruvchi yondashuv. U ayniqsa turmush tarzini o'zgartirish - faollikni oshirish, chekishni tashlash, dieta va dori ichish rejimiga rioya qilish - masalalarida samarali. Ushbu usul bemorning xavf-natijalarga o'zi munosabat bildirishi va o'zgarish uchun shaxsiy sabab topishiga imkon yaratadi.

PSIXOLOGIK INTERVENSIYA USULLARINING QIYOSIY TAHLILI

Quyidagi jadvalda asosiy psixologik intervensiya usullarining kardiak reabilitatsiyaga ta'sirini qiyosiy ko'rib chiqamiz:

Usul	Maqsad	Asosiy samarasi	Ilmiy dalilla darajasi
ognitiv-xulq rapiyasi (KXT)	Depressiya, tashvishlanisl noto'g'ri bilish sxemalarir tuzatish	Qayta yotqizilish xavfir 25-30% kamaytiradi	I-A (meta-tahlillar)

lindfulness (MBSR	Stressni kamaytirish, qo bosim normalizatsiyasi	Sistolik qon bosimi o'rtacha 5-8 mmH pasaytiradi	I-B (RCT tadqiqotlari
uruhli psixosotsia stur	Ijtimoiy qo'llab-quvvatlas izolyatsiyani kamaytirish	Reabilitatsiyada qatnashuvni 40% oshiradi	II-A (koho tadqiqotlar)
lotivatsion suhbat	Komplayens, turmus tarzini o'zgartirish	Farmakoterapiyaga rioy qilishni 35% oshiradi	I-B (RCT tadqiqotlari

1-jadval. Kardiak reabilitatsiyada qo'llaniladigan psixologik intervensiya usullarining qiyosiy tavsifi.

INTEGRATSIYALASHGAN BIOPSIXOSOTSIAL MODEL

Zamonaviy tibbiyot paradigmasi YuIK va uning reabilitatsiyasini biologik, psixologik va ijtimoiy omillarning o'zaro ta'sirida ko'rib chiqishni talab etadi. Biopsixosotsial model (Engel, 1977) doirasida kardiak reabilitatsiya nafaqat fizik funksiyani tiklash, balki umumiy faollik salohiyatini optimallashtirish maqsadida kompleks yondashuv asosida amalga oshirilishi lozim.

Integratsiyalashgan yondashuv quyidagi komponentlarni o'z ichiga olishi kerak: jismoniy mashqlar dasturi, farmakologik tuzatish, ovqatlanish konsultatsiyasi, psixologik skrining (PHQ-9, GAD-7, DS-14 shkalalar asosida), individuallashtirilgan psixologik intervensiya hamda ijtimoiy reintegratsiya dasturi. Bu kompleks yondashuv bemorlarda 5 yillik omon qolish darajasini sezilarli oshirishga imkon beradi.

O'zbekiston sharoitida ushbu modelni joriy etish bir qator muammolarga duch keladi: psixologik xizmatlarning tibbiy muassasalarda yetarlicha rivojlanmaganligi, kardiovaskulyar psixologiya bo'yicha mutaxassis kadrlar etishmasligi, shuningdek aholi o'rtasida psixologik yordam izlashga nisbatan ijtimoiy-madaniy to'siqlar mavjudligi shular jumlasidandir. Buni inobatga olgan holda, tibbiyot mutaxassislarining «qo'shma» tibbiy va psixologik - malakasini

oshirish, hamda birlamchi tibbiy-sanitariya yordam tizimida ruhiy salomatlik xizmatlari bilan integratsiyani ta'minlash ustuvor vazifa hisoblanadi.

O'ZBEKISTON KONTEKSTIDA KARDIAK REABILITATSIYANI RIVOJLANTIRISH ISTIQBOLLARI

Respublikamizda kardiak reabilitatsiya tizimini rivojlantirish yo'lida bir qator muhim qadamlar qo'yilgan. 2021-2025 yillarga mo'ljallangan «Sog'lom turmush tarzi» strategiyasi doirasida yurak-qon tomir kasalliklarini profilaktika qilish va ularni erta aniqlash bo'yicha kompleks chora-tadbirlar ko'zda tutilgan. O'zbekiston Respublikasi Sog'liqni saqlash vazirligi tomonidan tasdiqlanadigan kardiak reabilitatsiya klinik protokollari ham ushbu strategiyaning qismini tashkil etadi.

Biroq psixologik yondashuv hali ham ko'pgina amaliyotchi shifokorlar tomonidan reabilitatsiyaning ikkinchi darajali komponenti sifatida ko'rilmoqda. Bunday munosabatni o'zgartirish uchun tibbiy oliy ta'lim muassasalarida kardiovaskulyar psixologiya bo'yicha o'quv modullarini joriy etish, kardiologlarga ixtisoslashtirilgan psixologiya bo'yicha qisqa muddatli malaka oshirish kurslarini tashkil etish va klinik psixologlarni kardiak bo'limlari multidisiplinar jamoalariga kiritish zarur.

Telemedikal texnologiyalar hududiy tengsizlikni qisman bartaraf etish uchun katta imkoniyat yaratadi. Masofaviy psixologik konsultatsiyalar, mobil ilovalar asosidagi mindfulness dasturlari va onlayn guruhli psixoterapiya seanslari shaharlarda ham, qishloq joylarda ham bemorlar uchun bir xil darajada psixologik yordam ko'rsatishning yangi modelini shakllantirishi mumkin.

XULOSA

Amalga oshirilgan adabiyotlar taxlili asosida quyidagi xulosalar chiqarish mumkin:

1. Psixologik omillar — xususan, depressiya, tashvishlanish sindromi va D-tip shaxsiyat — YuIK prognozini mustaqil yomonlashtiruvchi klinik ahamiyatli omillar sifatida belgilangan.

2. Kognitiv-xulq terapiyasi, mindfulness intervensiyalari, guruhli psixosotsial dasturlar va motivatsion suhbat kardiak reabilitatsiya samaradorligini oshirishda yuqori darajadagi ilmiy dalillar bilan tasdiqlangan.

3. Integratsiyalashgan biopsixosotsial yondashuv faqat jismoniy komponenti o'z ichiga olgan an'anaviy reabilitatsiyadan hayot sifati, qayta yotqizilish darajasi va 5 yillik omon qolish ko'rsatkichlari bo'yicha statistik jihatdan sezilarli ustunlikka ega.

4. O'zbekiston tibbiyot tizimida kardiak reabilitatsiyada psixologik xizmatlarni integratsiya qilish milliy sog'liqni saqlash siyosatining ustuvor yo'nalishi sifatida belgilanishi maqsadga muvofiq.

Kelgusida YuIK bemorlarda psixologik intervensiyaning samaradorligini O'zbekiston populyatsiyasida baholashga yo'naltirilgan randomizatsiyalangan nazoratli klinik tadqiqotlarni o'tkazish zaruriyati kuchli ilmiy asosga ega.

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EKTOPIK HOMILADORLIK: ETIOPATOGENEZ, ERTA TASHXIS VA ZAMONAVIY DAVOLASH YONDASHUVLARI

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ANNOTATSIYA: Ektopik homiladorlik - urug‘langan tuxum hujayraning bachadon bo‘shlig‘idan tashqarida implantatsiyalanishi bilan kechadigan, reproduktiv yoshdagi ayollar salomatligi uchun jiddiy xavf tug‘diruvchi holatdir. Mazkur maqolada ektopik homiladorlikning etiologiyasi, xavf omillari, klinik belgilarining o‘ziga xosligi, erta tashxislash algoritmlari va davolash taktikalarining klinik ahamiyati IMRAD talablari asosida tahlil qilindi. Tadqiqot narrativ sharh usulida olib borildi: o‘zbek tilidagi akusherlik-ginekologiya darsliklari, milliy klinik protokollar, mahalliy ilmiy maqolalar hamda xalqaro tavsiyalar qiyosiy o‘rganildi. Tahlil natijalari shuni ko‘rsatadiki, ektopik homiladorlikda hal qiluvchi masala - xavf guruhini erta aniqlash, transvaginal ultratovush tekshiruvi va β-hCG dinamikasini to‘g‘ri talqin qilish, gemodinamik holatga qarab davolash yo‘lini tanlashdir. Kasallikning klinik ko‘rinishi ba’zan noaniq bo‘lgani uchun kech tashxis qon ketish, shok, reproduktiv imkoniyatning pasayishi va psixologik travma xavfini oshiradi.

Kalit so‘zlar: ektopik homiladorlik, bachadondan tashqari homiladorlik, β-hCG, transvaginal ultratovush, metotreksat, laparoskopiya, reproduktiv salomatlik.

ABSTRACT:Ectopic pregnancy is a potentially life-threatening condition in which the fertilized ovum implants outside the uterine cavity. This article analyzes the

etiopathogenesis, risk factors, clinical presentation, early diagnostic approaches and modern management strategies for ectopic pregnancy according to the IMRAD format. A narrative review method was used, including Uzbek obstetrics and gynecology textbooks, national clinical documents, local scientific publications and international recommendations. The analysis demonstrates that early recognition of risk groups, correct interpretation of transvaginal ultrasound findings and serial β-hCG values, and individualized management according to hemodynamic status are central to improving outcomes. Delayed diagnosis may increase the risk of internal bleeding, shock, loss of reproductive potential and psychological distress.

Keywords: ectopic pregnancy, tubal pregnancy, β-hCG, transvaginal ultrasound, methotrexate, laparoscopy, reproductive health.

KIRISH

Ektopik homiladorlik akusherlik va ginekologiya amaliyotida shoshilinch baholashni talab qiladigan eng muhim patologik holatlardan biridir. Normal homiladorlikda urug‘langan tuxum hujayra bachadon bo‘shlig‘i endometriysiga implantatsiyalanadi. Ektopik holatda esa implantatsiya bachadon nayida, tuxumdonda, bachadon bo‘ynida, kesarcha kesish chandig‘i sohasida, qorin bo‘shlig‘ida yoki boshqa nofiziologik anatomik hududda sodir bo‘ladi. Amaliyotda eng ko‘p uchraydigan shakl bachadon nayiga joylashgan tubal homiladorlikdir. Aynan shu shaklda nay devorining cho‘zilish imkoniyati cheklanganligi sababli klinik xavf tez ortadi.

Mavzuning dolzarbligi bir nechta omillar bilan belgilanadi. Birinchidan, ektopik homiladorlik homiladorlikning erta muddatlarida onalar kasallanishi va ayrim hollarda o‘limiga sabab bo‘lishi mumkin. Ikkinchidan, kasallik ko‘pincha hayz kechikishi, qorin pastki qismida og‘riq, kam miqdordagi qonli ajralma kabi umumiy belgilar bilan boshlanadi va bu belgilar boshqa ginekologik yoki gastroenterologik holatlarga o‘xshab ketadi. Uchinchidan, ektopik homiladorlikning o‘z vaqtida aniqlanmasligi nay yorilishi, ichki qon ketish, shoshilinch jarrohlik zarurati va keyingi reproduktiv salohiyatning pasayishiga olib kelishi mumkin.

So‘nggi yillarda transvaginal ultratovush tekshiruvi, laborator β-hCG monitoringi va minimal invaziv jarrohlik yondashuvlari ektopik homiladorlikni boshqarishda sezilarli yutuqlar berdi. Biroq diagnostika faqat texnik imkoniyatga emas, balki klinik fikrlash madaniyatiga ham bog‘liq. Reproduktiv yoshdagi ayolda qorin pastki qismidagi og‘riq, hayz siklining buzilishi yoki noaniq qon ketish holati kuzatilsa, ektopik homiladorlik differensial tashxis doirasidan chiqarib tashlanmasligi kerak. Shu nuqtai nazardan, mavzuni ilmiy asosda yoritish, xavf omillarini tizimlashtirish va amaliy xulosalarni shakllantirish muhimdir.

Maqolaning maqsadi - ektopik homiladorlikning etiopatogenezi, klinik kechishi, diagnostik mezonlari va zamonaviy davolash yondashuvlarini ilmiy adabiyotlar asosida tahlil qilish hamda erta tashxis va profilaktika bo‘yicha amaliy ahamiyatga ega xulosalarni ishlab chiqishdan iborat. Tadqiqot vazifalari sifatida xavf omillarini guruhlash, klinik belgilarni tahlil qilish, diagnostik algoritmlarning samaradorligini baholash, konservativ va jarrohlik davolash yondashuvlarining qo‘llanish shartlarini umumlashtirish belgilandi.

MATERIALLAR VA METODLAR

Ushbu maqola narrativ adabiyotlar sharhi shaklida tayyorlandi. Tadqiqot materiali sifatida akusherlik va ginekologiya bo‘yicha o‘zbek tilidagi darsliklar, respublika darajasidagi klinik protokollar va standartlar, mahalliy ilmiy maqolalar, shuningdek, ektopik homiladorlik diagnostikasi va davolashiga oid xalqaro tavsiyalar tanlandi. Manbalar tanlanishida ularning mavzuga bevosita aloqadorligi, klinik amaliyotda qo‘llanish imkoniyati, ilmiy asoslanganligi va so‘nggi yillarda chop etilganligi inobatga olindi.

Tahlil jarayonida uch yo‘nalish ustuvor deb olindi. Birinchi yo‘nalish etiologik va patogenetik omillarni aniqlashga qaratildi. Bunda bachadon naylari yallig‘lanish kasalliklari, jinsiy yo‘l bilan yuqadigan infeksiyalar, avvalgi ektopik homiladorlik, naylarga qilingan jarrohlik, yordamchi reproduktiv texnologiyalar, chekish, intrauterin kontratsepsiya fonida yuzaga kelgan homiladorlik va yosh omili alohida ko‘rib

chiqildi. Ikkinchi yo‘nalishda klinik belgilarning diagnostik qiymati baholandi. Uchinchi yo‘nalishda transvaginal ultratovush, β-hCG dinamikasi va klinik kuzatuv natijalari asosida davolash taktikasini tanlash mexanizmlari o‘rganildi.

Maqola nazariy-tahliliy xarakterga ega bo‘lgani uchun unda bemorlar bilan bevosita klinik tajriba o‘tkazilmadi. Shunga qaramay, tahlil klinik qaror qabul qilish jarayoniga yaqinlashtirilgan holda olib borildi. Natijalar tasviriy, qiyosiy va mantiqiy umumlashtirish usullari bilan qayta ishlanib, xavf omillari, tashxis va davolash yondashuvlari alohida bloklarga ajratildi. Bunday metodologiya mavzuni xalqaro maqola formatiga mos, ammo amaliy tibbiyot uchun tushunarli tarzda yoritish imkonini beradi.

NATIJALAR

Adabiyotlar tahlili ektopik homiladorlik ko‘p omilli etiologiyaga ega ekanini ko‘rsatadi. Patogenezning markazida ko‘pincha urug‘langan tuxum hujayraning bachadon bo‘shlig‘iga o‘z vaqtida yetib bormasligi turadi. Bachadon nayining shilliq qavati, kiprikchali epiteliy harakati va nay peristaltikasi buzilganda embrionning transporti sekinlashadi. Natijada implantatsiya bachadon nayining ampulyar, istmik yoki interstitsial qismida sodir bo‘lishi mumkin. Yallig‘lanishdan keyingi chandiqlanish, endosalpingit, nay ichki bo‘shlig‘ining torayishi va funksional diskoordinatsiya ushbu jarayonni kuchaytiradi.

Xavf omillari orasida avval o‘tkazilgan kichik chanoq a’zolari yallig‘lanish kasalliklari alohida o‘rin egallaydi. Chlamydia trachomatis va boshqa infeksiyalar bilan bog‘liq salpingit naylarning morfologik va funksional shikastlanishiga olib kelishi mumkin. Avvalgi ektopik homiladorlik ham muhim prediktor hisoblanadi, chunki naylarning struktur o‘zgarishi yoki asosiy xavf omili saqlanib qolgan bo‘lishi mumkin. Naylarga qilingan operatsiyalar, bepushtlikni davolash usullari, endometrioz va yordamchi reproduktiv texnologiyalar ham ektopik implantatsiya ehtimolini oshiruvchi holatlar sifatida baholanadi.

1-jadval. Ektopik homiladorlik xavf omillarining klinik guruhlanishi

Xavf omili	Patogenetik izoh	Klinik ahamiyati
Kichik chanoq yallig‘lanish kasalliklari	Nay epiteliyi va peristaltikasi zararlanadi	Erta skrining va infeksiya profilaktikasini talab qiladi
Avvalgi ektopik homiladorlik	Qaytalanuvchi tubal disfunksiya ehtimoli mavjud	Keyingi homiladorlikda erta UTT zarur
Naylarda jarrohlik amaliyoti	Chandiqlanish va anatomik torayish yuzaga keladi	Homiladorlik boshlanishi bilan xavf baholanadi
Yordamchi reproduktiv texnologiyalar	Embriotransfer va tubal omil fonida nofiziologik implantatsiya xavfi ortadi	Maxsus kuzatuv va β-hCG monitoringi kerak
Chekish va yosh omili	Nay transporti va gormonal muvozanatga salbiy ta’sir ko‘rsatadi	Profilaktik maslahat va risk stratifikatsiyasi muhim

Klinik belgilar tahlili shuni ko‘rsatadiki, ektopik homiladorlik doim ham klassik uchlik bilan namoyon bo‘lmaydi. Hayz kechikishi, qorin pastki qismida og‘riq va qonli ajralma ko‘p uchrasa-da, ayrim bemorlarda klinik manzara juda xira bo‘ladi. Og‘riq bir tomonlama, sanchuvchi, tortuvchi yoki tarqoq bo‘lishi mumkin. Gemodinamik beqarorlik, bosh aylanishi, hushdan ketish, terining oqarishi, puls tezlashishi va arterial bosim pasayishi esa nay yorilishi yoki ichki qon ketish ehtimolini kuchaytiradi. Bunday vaziyatda diagnostika jarayoni kechiktirilmasligi kerak.

Diagnostikada transvaginal ultratovush tekshiruvi va β-hCG darajasini dinamik baholash asosiy o‘rin tutadi. Bachadon bo‘shlig‘ida homila tuxumi aniqlanmasligi, adneksal sohada massa ko‘rinishi, qorin bo‘shlig‘ida erkin suyuqlik bo‘lishi ektopik homiladorlik ehtimolini oshiradi. Biroq bitta laborator ko‘rsatkich yoki bitta ultratovush xulosasi har doim yakuniy tashxisni bermaydi. Ayniqsa, homiladorlik

joylashuvi noma'lum bo'lgan holatlarda takroriy tekshiruv, klinik kuzatuv va laborator dinamika birgalikda baholanishi lozim.

2-jadval. Tashxis va davolash qarorini belgilovchi asosiy mezonlar

Mezon	Baholash yo'nalishi	Qarorga ta'siri
Gemodinamik holat	Qon bosimi, puls, hush holati, ichki qon ketish belgilari	Beqaror holatda shoshilinch jarrohlik ustuvor
Transvaginal UTT	Bachadon ichi homiladorligi, adneksal massa, erkin suyuqlik	Tashxisni aniqlashtiradi va davolash yo'lini tanlaydi
β-hCG dinamikasi	Ketma-ket o'lchovlarda o'sish yoki pasayish sur'ati	Kuzatuv, dori yoki jarrohlik yondashuvini asoslaydi
Klinik simptomlar	Og'riq kuchi, qonli ajralma, umumiy ahvol	Faol aralashuv zaruratini ko'rsatadi
Fertilitet rejasi	Kelajakda farzand ko'rish istagi va naylarning holati	Organ saqlovchi yondashuv muhokama qilinadi

Davolash strategiyalari uch asosiy yo'nalishga ajratiladi: kutish-kuzatish taktikasi, dori bilan davolash va jarrohlik davolash. Kutish-kuzatish yondashuvi faqat klinik holati barqaror, og'riq va qon ketish belgilari kuchli bo'lmagan, β-hCG darajasi pasayishga moyil va muntazam nazoratga kelishi mumkin bo'lgan bemorlarda ko'rib chiqiladi. Bunday yondashuvda asosiy xavf - bemorning kuzatuvdan chiqib ketishi yoki klinik holatning kutilmaganda og'irlashishidir. Shuning uchun bu taktika qat'iy tanlov mezonlari asosida qo'llanishi kerak.

Dori bilan davolashda metotreksat asosiy o'rin tutadi. U trofoblast to'qimasining o'sishini to'xtatishga qaratilgan bo'lib, faqat gemodinamik barqaror, nay yorilishi belgilari bo'lmagan va laborator nazoratga rioya qilishi mumkin bo'lgan bemorlarda

tanlanadi. Bu usul jarrohlikdan qochish, nayni saqlab qolish va tiklanish davrini qisqartirish imkonini berishi mumkin. Shu bilan birga, metotreksat qo‘llashda qarshi ko‘rsatmalar, keyingi homiladorlikni rejalashtirish muddati va laborator monitoring masalalari qat’iy nazorat qilinadi.

Jarrohlik davolash gemodinamik beqarorlik, nay yorilishi, qorin bo‘shlig‘ida sezilarli qon ketish, dori bilan davolashning samarasizligi yoki ayrim anatomik joylashuvlarda asosiy yondashuv hisoblanadi. Minimal invaziv laparoskopiya ko‘plab holatlarda afzal bo‘lsa-da, og‘ir qon ketish yoki texnik imkoniyat cheklangan vaziyatlarda laparotomiya talab qilinishi mumkin. Operatsiya hajmi bemorning umumiy ahvoli, homiladorlik joylashuvi, qarama-qarshi nayning holati va kelajakdagi fertilitet rejasiga qarab belgilanadi.

MUHOKAMA

Ektopik homiladorlikni boshqarishdagi eng katta xato - uni faqat aniq klinik belgilar paydo bo‘lgandan keyin izlashdir. Amaliyotda bu yondashuv kechikkan tashxisga olib keladi. To‘g‘ri strategiya aksincha bo‘lishi kerak: reproduktiv yoshdagi ayolda erta homiladorlik ehtimoli bor ekan, qorin og‘rig‘i va noaniq qon ketish ektopik homiladorlik nuqtai nazaridan baholanishi zarur. Ayniqsa, avvalgi ektopik homiladorlik, yallig‘lanish kasalliklari yoki nay jarrohligi bo‘lgan bemorlar oddiy xavf guruhiga emas, yuqori klinik hushyorlik guruhiga kiritilishi kerak.

Milliy va xalqaro manbalar o‘rtasidagi umumiylik shundaki, barcha yondashuvlar erta tashxis, individual risk baholash va bemorga tushunarli ma’lumot berishni markaziy prinsip sifatida ko‘radi. Farq esa resurslar, laborator monitoring imkoniyati va shoshilinch jarrohlik xizmatining mavjudligida namoyon bo‘ladi. Shu sababli O‘zbekiston sharoitida ektopik homiladorlik bo‘yicha profilaktik va diagnostik ishlarni faqat ixtisoslashgan markazlarga bog‘lab qo‘yish yetarli emas. Birlamchi bo‘g‘in, oilaviy poliklinika va tez tibbiy yordam xodimlarida ham ektopik homiladorlikka nisbatan diagnostik hushyorlik shakllanishi lozim.

Yana bir muhim masala - psixologik va reproduktiv reabilitatsiyadir. Ektopik homiladorlik ko‘pincha faqat shoshilinch jarrohlik yoki dori bilan davolash muammosi sifatida ko‘riladi. Aslida esa bemor homiladorlik yo‘qotilishi, kelajakdagi homiladorlikdan qo‘rquv, qaytalanish xavfi va oilaviy rejalarga ta’sir kabi murakkab psixologik yuklamani boshdan kechiradi. Shuning uchun davolashdan keyingi maslahat, keyingi homiladorlikda erta ultratovush tekshiruvi va reproduktiv reja bo‘yicha individual tavsiyalar klinik jarayonning ajralmas qismi bo‘lishi kerak.

Tahlil shuni ko‘rsatadiki, ektopik homiladorlikning oldini olishda infeksiyalarni erta aniqlash va davolash, xavfsiz jinsiy xulq-atvor bo‘yicha tibbiy-ma’rifiy ishlar, abort va kichik chanoq yallig‘lanish kasalliklaridan keyingi reabilitatsiya, bepushtlikni davolashda tubal omilni to‘g‘ri baholash muhim o‘rin tutadi. Profilaktika faqat kasallik paydo bo‘lgandan keyingi aralashuv emas, balki reproduktiv salomatlikni muntazam qo‘llab-quvvatlash tizimi sifatida tushunilishi kerak.

XULOSA

Ektopik homiladorlik reproduktiv yoshdagi ayollar uchun yuqori klinik ahamiyatga ega, erta tashxis qo‘yilmasa hayot uchun xavf tug‘dirishi mumkin bo‘lgan patologik holatdir. Uning eng ko‘p uchraydigan shakli tubal homiladorlik bo‘lib, asosiy patogenetik mexanizm urug‘langan tuxum hujayraning bachadon bo‘shlig‘iga fiziologik transporti buzilishi bilan bog‘liq. Xavf omillarini aniqlash, xususan, avvalgi ektopik homiladorlik, nay jarrohligi, kichik chanoq yallig‘lanish kasalliklari, yordamchi reproduktiv texnologiyalar va infeksion omillarni baholash erta tashxisning muhim qismidir.

Tashxis qo‘yishda transvaginal ultratovush tekshiruvi, β-hCG dinamikasi va klinik belgilarning kompleks tahlili eng ishonchli yondashuv hisoblanadi. Bitta belgi yoki bitta laborator natija asosida shoshilinch xulosa chiqarish noto‘g‘ri bo‘lishi mumkin; bemorning umumiy ahvoli, gemodinamik ko‘rsatkichlari va kuzatuvga rioya qilish imkoniyati birgalikda baholanadi. Davolashda kutish-kuzatish, metotreksat bilan

dori terapiyasi va jarrohlik usullari mavjud bo‘lib, har birining o‘z tanlov mezonlari, afzalliklari va xavflari bor.

Amaliy jihatdan eng samarali yo‘l - birlamchi bo‘g‘indan boshlab klinik hushyorlikni kuchaytirish, xavf guruhidagi ayollarni erta ultratovush nazoratiga yo‘naltirish, shoshilinch holatlarni kechiktirmasdan ixtisoslashgan yordamga yuborish va davolashdan keyin reproduktiv hamda psixologik maslahatni ta’minlashdir. Shu tarzda ektopik homiladorlik bilan bog‘liq og‘ir asoratlarni kamaytirish, ayolning hayoti va kelajakdagi fertilitetini saqlab qolish imkoniyati oshadi.

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CURRENT TRENDS AND FUTURE PROSPECTS IN BUSINESS MANAGEMENT ANALYSIS INTEGRATION

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Abstract

As it is seen that the demand for business management is increasing rapidly. The study shows that themost important aspects of illustration of new critical instructions to improve competitiveness and productivity in this digital age. This topic is totally managed by the technical growth of technologiesthat are being used a lot in many fields in recent years. Huge information analytics, smart tools, machine learning, and artificial intelligences are important for data-driven deciding. The integration of critical approaches is essential in managerial processes to enhance the efficiency in business. Contemporary methods including huge data analytics, innovative technologies, and machine learninggive deep insights into market processes.It opens the way for knowing about new facilities to understand easily and it decreases the risks with high probability. The ability of quick flexibility and informing context of globalization play an essential role in integration of smart tools to business development. Achievement in the digital age demands companies to be flexible to current innovations, and to create adoptive strategic methods which enable quick adaptation to changes, also demonstration of artificial intelligences. The roots of this

section advice that businesses that analyse into their management skills, can achieve financial advantages like improved adaptation, operational sustainability and innovative capabilities. The vitality of these analytical tools and processes that maintaining successful business management.

Key words: *Big data analytics, artificial intelligence, innovative technologies, machine learning business management.*

Introduction

In current times, the demand for business is demonstrating considerably higher rates and percents than over the past ten years meaning that many people are undoubtedly training with different types of business. To make it successful and maintaining it, there are some studies by different researchers, that will be useful and effective in starting business management. All the large companies and organizations should follow regular strategic approaches to create another successful business in global business. Therefore the use of big dat analytics and innovative technologies enable to marketing processes to be substantial and supportive. This artificial intelligence is regarded as main aspect of analytical integrating. It is clear that there always huge comparison between large organizations to grow rapidly and create new products that make a way to increase the effectiveness and productivity in industries. Fosso Wanna et al.(2024) researched that identifying the role of analytics with opportunities that illustrate how strategic integration of analytical knowledges and innovations can contribute to productive growth.This article includes vital strategies, applications and effective operations. Yalcin and Rane (2022) said that at the time of decision-making in business, entrepreneurs should focus on multi-criteria method which provide them with crucial and critical deep insights according to integrating of advanced technologies and applications. These strategic significance of big data analyticsand smart tools is absolutely apparent in navigating the complexities of current business landscapes,

increasing the flexibility to quick changes and anticipating future phenomenons with enhanced machine learning and advanced technologies.

Analysis of current trends in business management

It is widely spread that analysis in current business environment and integrating of business management is regarded as important strategy. As market conditions changing rapidly, increasing competitiveness, and diversity of customer demands, managers can totally not rely on traditional decision-making method. According to many perspectives, different approaches based on business management is widely spreading. Not only most of large companies no longer use experience or expectation, but also they are absolutely attempting due to real statistic informations and analytical results, which would be considerably better to make or to get expected profit rather than taking risk. This, especially, serves to increase the sustainability.In current times, financial reports, trade rates, customer behaviours and big datas in huge scale related to internal processes are gathered by business analytics. Therefore, company leaders might identify some challenges before it happens and use the opportunities effectively. Some advanced analytical devices like business analytics, data visualization and performance monitoring are being used widely. These innovative technologies facilitate managers to consider complex processes clearly in a easy way and to conclude. Thus, analyzing in real regime time plays the main role among current tendencies. While decision-making was based on over the past periods in the past, there is now opportunity to value rapidly current condition. It also provides with fast and adaptive decision-making. As a result, business management is becoming quite clear transparent and effective. Rana et al (2021) Explorer that there are some bad sides of incorporating innovative technologies into business management which means that it may cause to reduce the competitiveness and productivity,and may result with unuseful integrating and management of artificial intelligences. Yalcin et al. (2022) researchers that it is really

important the usage of multi-criteria approach in business management as there is so beneficial aspects of using it. Hallikas et al.(2021) researched inform.

The effect of analysis integration to the business strategy and operational processes

Not the business analysis integration is affecting to strategic decisions, but it also affecting strongly to daily operational processes. Analytical informations give the opportunity to accomplish more clearly long-term planning and anticipating market templates in creating strategy. For example, most of business entities can identify which field should be invested via market segmentation and the analysis of competitors. It could also reduce to waste the human resources. According to another research, Silva and Kristoffersen (2021) demonstrated that the role of digital transformation in advanced analytical tools in organizations. Analysis integration usually serves to optimise the processes in the level of operating. Therefore, productivity is increased as result of producing, logistic and serving in many fields by big data analytics such as extra stocks are decreased or the issue of scarcity is prevented by anticipating the demand. This undoubtedly decreases the expenses and accomodate consumers' needs. Moreover, analytical approach are also playing an essential role in the managing of human resources. Analytical tools are widely used in costing the employees efficiency, identifying the needs for gaining qualification and in developing motivation systems. As a result, reliable and effective management environment will be shaped. In general, the results of analytics will create the opportunity to control the business processes as sole system and will increase the general competitiveness of industry. Moreover, the study shows that significance business analytics culture in gaining organizational incomes Fosso Wampa et al. (2024). There are many positive aspects of using analytical devices that they can increase competition in global market, that will cause to improve the quality of good quite adequate. In order to operational effects of huge information analysing devices, the flexibility for modern innovations

like artificial intelligence and huge information analysing devices makes a way to optimise, to improve the quality of deciding and to foster new strategies in business.

The future prospects of analysis integration in business management

It is expected that business management and analysis integration will considerably increase. As the processes of digital transformation accelerate rapidly, companies mostly refer to automation and intellectual analysis systems. As it is seen that artificial intelligence and machine learning technologies help to identify the business plans. These innovative tools reproduce the informations in large scales and reduce to cause some mistakes because of human factor. The results of forecasting plays a vital role in future prospects of analysing. Not only companies make a decision according to existence of condition, but they also decide based on probability of anticipating. It helps to defeat the business from threats and to provide the stable development. Especially, this approach is crucial in making financial plan and managing the risks. Therefore it became important method for all level of managers in the future that using analysis integration. It is expected that analytical deciding and using the datas correctly is considered as the main competecies. As a result business management will become quite professional, flexible and effective. In overall, business management and analysis integrating will become one of main factors of organizations success. These innovative tools reproduce the informations in large scales and reduce to cause some mistakes because of human factor. Most of authors' research shows that how social media could help strategic approach and competitive analysis. For example, Shet et al.(2021) referred that it is really important to contribute to the successful illustration of information analytics in human resource management.

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INNOVATIVE TECHNOLOGIES IN THE DIAGNOSIS AND TREATMENT OF DERMATOLOGICAL DISEASES

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Annotation: The field of dermatology has rapidly evolved with the integration of innovative technologies that have transformed the diagnosis and treatment of dermatological diseases. Advanced diagnostic tools such as digital dermoscopy, artificial intelligence, teledermatology, molecular diagnostics, and high-resolution imaging systems have significantly improved the accuracy and speed of skin disease detection. At the same time, novel therapeutic approaches including biologic therapies, laser-based interventions, photodynamic therapy, and personalized medicine have enhanced treatment effectiveness and patient outcomes. These technological advancements have not only improved clinical decision-making but also contributed to more individualized and minimally invasive patient care. This article examines recent innovations in dermatological diagnostics and therapeutics and highlights their importance in modern clinical practice.

Keywords: dermatology, innovative technologies, skin diseases, diagnosis, treatment, artificial intelligence, teledermatology, biologic therapy, laser therapy, personalized medicine

Introduction

Dermatological diseases are among the most common health problems worldwide, affecting individuals of all ages and often causing significant physical, psychological, and social consequences. Conditions such as acne, psoriasis, eczema, fungal infections, and skin cancers contribute substantially to the global healthcare burden. As the prevalence of these disorders continues to rise, the need for more accurate diagnostic methods and effective treatment strategies has become increasingly important. Traditional dermatological practice has primarily depended on clinical examination and histopathological confirmation. While these methods remain fundamental, recent technological advancements have dramatically changed the landscape of dermatology. Innovative diagnostic tools such as digital dermoscopy, artificial intelligence-based image analysis, molecular testing, and teledermatology platforms now allow earlier detection, improved diagnostic precision, and better accessibility to specialized care. Simultaneously, therapeutic innovations have transformed the management of dermatological diseases. Modern treatment modalities, including biologic drugs, targeted immunotherapy, laser-assisted procedures, and regenerative medicine, offer more precise and personalized solutions compared to conventional therapies. These developments have significantly improved treatment outcomes while reducing adverse effects and enhancing patient quality of life. The purpose of this article is to explore the role of innovative technologies in the diagnosis and treatment of dermatological diseases, emphasizing their impact on contemporary clinical practice and future developments in dermatology.

Materials and Methods

This study was conducted as a comprehensive literature review focusing on innovative technologies used in the diagnosis and treatment of dermatological diseases. Relevant scientific articles, clinical studies, and review papers published between 2015 and 2025 were collected from major medical databases, including PubMed, Scopus, Web of

Science, and Google Scholar. The study included publications related to innovative diagnostic methods such as digital dermoscopy, artificial intelligence-assisted imaging, teledermatology, molecular diagnostics, and high-resolution skin imaging systems. Additionally, articles evaluating modern therapeutic approaches including biologic therapies, laser treatment, photodynamic therapy, immunotherapy, and regenerative medicine were analyzed. A qualitative analytical method was used to compare the effectiveness, safety, accessibility, and clinical impact of these technologies. The collected data were systematically categorized according to diagnostic application, therapeutic innovation, and their contribution to improved dermatological care.

Results

The review demonstrated that innovative diagnostic technologies have significantly enhanced the early detection and classification of dermatological diseases. Digital dermoscopy and advanced imaging systems improved visualization of skin lesions, allowing more accurate differentiation between benign and malignant conditions. Artificial intelligence-based diagnostic tools showed high diagnostic accuracy and reduced the risk of human error in skin cancer screening. Teledermatology platforms improved access to dermatological care, especially in remote and underserved areas, by enabling remote consultations and faster clinical decision-making. Molecular diagnostic methods provided deeper insight into the genetic and immunological basis of chronic skin diseases, supporting more personalized treatment strategies. In therapeutic practice, biologic therapies showed remarkable effectiveness in treating chronic inflammatory conditions such as psoriasis and atopic dermatitis. Laser technologies proved beneficial for cosmetic and therapeutic dermatology, particularly in scar treatment, pigmentation disorders, and vascular lesions. Regenerative medicine and targeted therapies also demonstrated promising outcomes in tissue repair and long-term disease control.

Discussion

The findings of this review highlight the important role of innovative technologies in transforming modern dermatology. Advanced diagnostic tools have shifted dermatological practice from traditional visual examination toward more precise, technology-assisted evaluation, improving both diagnostic confidence and patient safety. Artificial intelligence and teledermatology represent major breakthroughs in expanding access to quality dermatological care. These technologies have the potential to reduce healthcare disparities by providing expert support in areas where dermatologists are limited. However, issues related to data privacy, technical reliability, and clinician training must be carefully addressed. Modern therapeutic innovations have also changed treatment paradigms by introducing targeted and personalized approaches. Biologic therapies and regenerative medicine have improved long-term outcomes for patients with chronic and previously difficult-to-treat conditions. Nevertheless, high treatment costs and unequal global access remain significant barriers Overall, the integration of innovative technologies into dermatology continues to redefine the future of skin disease diagnosis and management, emphasizing precision medicine, accessibility, and patient-centered care.

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ОТРАЖЕНИЕ ЖЕНСКИХ И МУЖСКИХ ОБРАЗОВ В ЯЗЫКОВОЙ КАРТИНЕ МИРА (НА МАТЕРИАЛЕ РУССКОГО И УЗБЕКСКОГО ЯЗЫКОВ)

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Аннотация. В статье исследуется специфика репрезентации гендерных образов в русской и узбекской языковых картинах мира. На основе сопоставительного анализа лексических единиц, фразеологизмов и литературных текстов выявляются национально-культурные особенности формирования маскулинности и феминности. Рассматриваются различия в грамматических системах языков и их влияние на восприятие пола. Особое внимание уделяется терминам родства, этикетным формам и архетипическим образам, зафиксированным в произведениях классиков (А.С. Пушкина, Л.Н. Толстого, А. Кадыри).

Ключевые слова: *гендер, языковая картина мира, менталитет, паремия, концепт, маскулинность, феминность, лингвокультурология, термины родства, безэквивалентная лексика.*

Abstract. The article explores the specific features of gender image representation within the Russian and Uzbek linguistic worldviews. Through a comparative analysis of lexical units, phraseological expressions, and literary texts, the

study identifies national and cultural characteristics in the formation of masculinity and femininity. The author examines differences in the grammatical systems of the two languages and their impact on the perception of gender. Particular attention is paid to kinship terms, etiquette forms, and archetypal images captured in the works of classical writers such as A.S. Pushkin, L.N. Tolstoy, and A. Kadiri.

Keywords: *gender, linguistic worldview, mentality, paremia, concept, masculinity, femininity, linguoculturology, kinship terms, non-equivalent lexis.*

Введение. Проблема взаимосвязи языка и культуры является одной из центральных в современной антропоцентрической лингвистике. Языковая картина мира (ЯКМ) не просто отражает действительность, но и формирует восприятие человека, навязывая ему определенные смысловые категории. Одной из таких базовых категорий является гендер — социокультурный пол, который, в отличие от биологического пола, включает в себя весь спектр ожиданий, стереотипов и ролей, предписанных обществом мужчине и женщине.

Актуальность данного исследования обусловлена необходимостью глубокого осмысления того, как в разных языковых системах — флективном русском и агглютинативном узбекском — кодируются представления о мужском и женском начале. Научная новизна работы заключается в комплексном сопоставлении концептуальных сфер «мужчина» и «женщина» на стыке лингвистики, философии и литературоведения.

Основная часть. Теоретическую базу исследования составляют труды В. фон Гумбольдта, Э. Сепира и Б. Уорфа, заложивших основы гипотезы лингвистической относительности. В контексте русского языкознания неоценимый вклад внесли Ю.Д. Апресян и А.В. Кириллина, чьи работы позволили выделить гендер как самостоятельный объект лингвистического анализа.

Языковая картина мира является «кумулятивной» (Н. Махмудов), то есть она накапливает культурный опыт народа. В русском языке гендер имеет

жесткую грамматическую привязку через категорию рода. В узбекском языке отсутствие рода компенсируется богатейшей лексической системой и контекстуальными маркерами. Таким образом, если в русском языке гендер «вшит» в грамматику, то в узбекском он распределен в лексико-семантическом поле и речевом этикете.

Анализ ключевых лексем показывает интересную динамику. В русском языке слово «мужчина» этимологически связано с корнем «муж» (сильный, зрелый). Слово «женщина» прошло сложный путь от «жена» (рождающая). В узбекском языке лексема *erkak* восходит к древнетюркским корням, означающим «волю» и «силу». Женская номинация *ayol* в современном языке носит нейтрально-почтительный характер, однако в сельской местности сохраняется использование слова *xotin*, которое, несмотря на историческое происхождение от высокого титула «хатун», в разговорной речи иногда приобретает сниженную окраску.

Узбекская ЯКМ характеризуется необычайной детализацией терминов родства. Система *aka / uka* (старший/младший брат) и *opa / singil* (старшая/младшая сестра) жестко фиксирует возрастную иерархию внутри гендерной группы. В русском языке эта дифференциация утрачена или выражается описательно. Это свидетельствует о том, что для узбекской культуры крайне важно место индивида в семейной структуре, тогда как русская культура более ориентирована на индивидуализацию личности вне зависимости от её места в родовом древе.

Пословицы и поговорки являются концентратом народного менталитета. В обеих культурах доминирует андроцентричная модель, где мужчина выступает как активное начало.

Образ мужчины:

В русских паремиях: «Муж — голова, жена — душа». Мужчина — это защитник и кормилец.

В узбекских паремиях: *«Er bosh — xotin quyosh»* (Муж — голова, жена — солнце). Здесь прослеживается иная метафора: мужчина — структура и власть, женщина — свет и тепло, без которого жизнь невозможна.

Образ женщины: Русский фольклор часто наделяет женщину противоречивыми качествами: от «бабьего ума» до великой жертвенности. Узбекская паремиология более последовательна в сакрализации женского начала через материнство: *«Jannat onalar oyog‘i ostidadir»* (Рай находится под ногами матерей). При этом ключевым качеством девушки считается *sabr* (терпение) и *ibo* (скромность).

В ходе исследования были выявлены концепты, которые с трудом поддаются переводу, но являются стержневыми для национальных ЯКМ.

Andisha (узб.) — уникальный концепт, включающий в себя такт, осторожность, уважение к чужому мнению и умение «сохранить лицо». Это качество считается обязательным для женщины в узбекской культуре.

Душа (рус.) — широчайший концепт, который в русской ЯКМ часто связывается с женским началом. «Русская душа» в литературе — это часто женский образ (от Ярославны до Наташи Ростовой).

Lafz (узб.) — кодекс мужской чести, верность данному слову. Для узбекской ЯКМ потеря «лафза» означает потерю мужского статуса.

Литература является высшей формой репрезентации ЯКМ. В работе Севинч Рашидовой проводится глубокое сопоставление героев русской и узбекской классики.

Татьяна Ларина (А.С. Пушкин) и Кумушбиби (А. Кадыри). Татьяна — это «русская душа», её величие в верности моральному долгу перед самой собой. Кумуш — это восточный идеал, её величие в абсолютной гармонии с традицией, кротости и всепрощающей любви. Оба образа объединяет чистота, но пути её реализации различны: через индивидуальную рефлексию у Татьяны и через родовую этику у Кумуш.

Князь Андрей (Л.Н. Толстой) и Отабек (А. Кадыри). Болконский — это путь рационального поиска смысла жизни, индивидуализм, перерастающий в служение. Отабек — это трагедия человека, разрывающегося между личным чувством и законами патриархального общества. Его маскулинность выражается в глубоком страдании при сохранении внешней сдержанности (*vazminlik*).

Заключение. Русская и узбекская языковые картины мира отражают различные типы социокультурного устройства. Русская ЯКМ эволюционирует в сторону эгалитарности и акцента на индивидуальных психологических характеристиках личности.

Узбекская ЯКМ сохраняет традиционную иерархичность, где гендерные роли четко распределены в зависимости от социального и семейного статуса. Язык выступает мощным инструментом поддержания этих традиций через систему этикета и паремий.

Несмотря на различия, обе культуры солидарны в высокой оценке материнства и семейных ценностей, что подтверждается анализом фразеологического фонда.

Данная работа может быть полезна специалистам в области лингвокультурологии, межкультурной коммуникации, а также преподавателям русского и узбекского языков.

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ОСОБЕННОСТИ ВЕРБАЛИЗАЦИИ ЭМОЦИЙ В РУССКОМ И УЗБЕКСКОМ ЯЗЫКАХ: СОПОСТАВИТЕЛЬНЫЙ АНАЛИЗ И ДИДАКТИЧЕСКИЕ РЕШЕНИЯ

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Аннотация. В статье исследуется специфика вербализации эмоциональных состояний в русском и узбекском языках. На основе антропоцентрического подхода проводится сопоставительный анализ базовых концептов («радость», «страх», «печаль») и метафорических моделей, основанных на соматизмах. Выявляются зоны межъязыковой интерференции у учащихся-инофонов. Предложена авторская система дидактических упражнений для обучения эмоциональной лексике в 6 классе национальной школы.

Ключевые слова: *эмотиология, вербализация, эмоциональный концепт, лингвокультурология, интерференция, соматизм, РКИ, дидактика.*

Abstract. The article examines the specifics of verbalizing emotional states in the Russian and Uzbek languages. Based on an anthropocentric approach, a comparative analysis is conducted on basic concepts ("joy," "fear," "sadness") and metaphorical models based on somatisms. Zones of cross-linguistic interference among foreign language learners are identified. The author proposes an original system

of didactic exercises for teaching emotional vocabulary to 6th-grade students in national schools.

Keywords: *emotiology, verbalization, emotional concept, linguoculturology, interference, somatism, RCT (Russian as a Foreign Language), didactics.*

Введение. В современной лингвистике центральное место занимает антропоцентрическая парадигма, рассматривающая язык как «человеческий фактор». Одной из наиболее значимых сфер человеческого бытия являются эмоции, вербализация которых напрямую связана с культурными кодами народа. В условиях межкультурного взаимодействия учащимся важно понимать не только перевод слов, но и их эмоциональный объем. Актуальность работы обусловлена необходимостью формирования эмоционального интеллекта у школьников-инофонов и преодоления коммуникативных барьеров, вызванных различиями в «языке эмоций». Исследование опирается на приоритеты «Стратегии «Узбекистан–2030» и Концепции развития высшего образования.

Основная часть. Лингвистика эмоций (эмотиология) выделяет «эмотивность» как имманентное свойство языка выражать психологические состояния говорящего. Фундаментальным является разграничение:

Эмоциональность — психологическая характеристика переживания.

Эмотивность — чисто лингвистическая категория выражения этих переживаний через лексемы, фразеологизмы и синтаксис.

По классификации В.И. Шаховского, лексика делится на прямые **номинативы** (*любовь, страх*), **экспрессивы** (*солнышко, кляча*) и **интенсификаторы** (*ужасно интересный*).

Вербализация эмоций в узбекском языке жестко регулируется этикетными нормами — *andisha* (такт) и *sharm-hayo* (застенчивость). Это диктует сдержанность и использование эвфемизмов: вместо открытого гнева часто выражается «огорчение» (*hafa bo‘lish*) или «разочарование» (*ko‘ngli qolish*).

Ключевой особенностью является **соматическая локализация** эмоций:

Концепт «Ko‘ngil» (душа-сердце) — шире русского «сердца», отвечает за духовную гармонию и настроения (*ko‘ngli ko‘tarilmoq* — радость, *ko‘ngli og‘rimoq* — обида).

Концепт «Jigar» (печень) — символ кровного родства и предельной близости, не имеющий эмоционального аналога в русском языке.

Анализ на материале учебника РКИ для 6 класса выявил существенные различия в вербализации (Таблица 1).

Таблица 1. Сравнительная характеристика вербализации базовых эмоций

Концепт	**В русском языке**	**В узбекском языке**	**Зона интерференции**
Радость / Shodlik	Прямая номинация, уменьшительно-ласкательные суффиксы.	Глагольные конструкции (*xursand bo‘lmoq*), соматика (*ko‘ngil*).	Калькирование (*душа поднялась*), неумение использовать суффиксы.
Страх / Qo‘rquv	Ситуативная передача (*пожар*), цветовая метафора (*тревога*).	Глаголы состояния (*qo‘rqmoq*), соматика (*yurak*).	Смешение видов (*бояться / испугаться*), буквализм в фразеологии.
Печаль / Xafalik	Эстетизация («светлая печаль»), метафора увядания.	Существительные (*g‘am*), обороты с *ko‘ngil*.	Непонимание эстетики «унылой поры», кальки через *jigar*.

В обеих культурах человек воспринимается как «контейнер» для чувств. Температурная метафора: в русском языке — *холодный прием, теплота души*. В узбекском — *bag‘rim yondi* (грудь сгорела).

Световая метафора: универсальна для обоих языков. Радость — свет, печаль — тьма. Примеры из учебника: *красивая школа, северное сияние*. Метафора веса: в русском языке — *тяжесть на душе, захватывает дух*.

Учащиеся часто переносят модели родного языка в русскую речь. Основные ошибки:

Лексико-семантические: несовпадение объема понятий *обида/hafa*, *жалость/rahm*.

Грамматические: использование личных конструкций (*я весёлый*) вместо безличных (*мне весело*).

Культурологические: избыточная сдержанность из-за принципа *andisha*, приводящая к «сухости» письменной речи (отказ от восклицаний и ласкательных форм).

Для развития навыков выражения эмоций предлагается четырехблочная система упражнений:

Блок 1. «Узнай эмоцию»: рецептивные задания на поиск эмоциональных слов и соматизмов в текстах А.С. Пушкина и И. Левитана.

Блок 2. «Скажи по-другому»: репродуктивная отработка категорий состояния и видовых пар глаголов (*бояться — испугаться*).

Блок 3. «Перевод с узбекского»: трансформационные упражнения на поиск функциональных эквивалентов вместо калек (*ko‘nglim ko‘tarildi — я обрадовался*).

Блок 4. «Я чувствую…»: продуктивные упражнения (ролевые игры, письма), направленные на самостоятельное использование лексики.

Эффективность дидактики повышается за счет **мультимедийных средств**: QR-кодов учебника для аудирования интонаций, анализа фрагментов мультфильмов и репродукций картин.

Заключение. Исследование подтвердило, что вербализация эмоций является этноспецифическим процессом. Русский язык отличается богатством морфологических средств (суффиксов) и доминированием «сердца», тогда как узбекский опирается на глагольные формы и концепты *ko‘ngil* и *jigar*. Выявленные зоны интерференции позволяют учителю целенаправленно предупреждать ошибки. Предложенные дидактические решения, интегрированные в учебник РКИ для 6 класса, создают базу для формирования лингвокультурологической компетенции учащихся.

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ПРАГМАТИЧЕСКИЕ ОШИБКИ УЗБЕКОЯЗЫЧНЫХ УЧАЩИХСЯ В РУССКОЙ ПИСЬМЕННОЙ КОММУНИКАЦИИ: ТИПОЛОГИЯ, ДИАГНОСТИКА, КОРРЕКЦИЯ

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Аннотация. В статье исследуются прагматические ошибки узбекоязычных учащихся в русской письменной коммуникации. На основе сопоставительного анализа русской и узбекской лингвокультур выявляются зоны прагматической интерференции, связанные с различиями в коммуникативных дистанциях, категориях вежливости и этикетных нормах. Рассматриваются психолингвистические механизмы возникновения прагматических ошибок, их отличие от грамматических и речевых ошибок. Особое внимание уделяется типологии ошибок по Дж. Томасу (прагмалингвистические и социопрагматические), методике их диагностики на материале письменных работ учащихся, а также системе коррекционных упражнений и ролевых ситуаций. Материалом исследования служат письменные работы (эссе, электронные письма, заявления) узбекоязычных учащихся старших классов и студентов.

Ключевые слова: *прагматическая ошибка, прагматическая компетенция, межкультурная коммуникация, русский язык как иностранный (РКИ),*

прагматическая интерференция, типология ошибок, диагностика, коррекция, узбекская лингвокультура, andisha.

Abstract. The article examines pragmatic errors of Uzbek-speaking students in Russian written communication. Based on a comparative analysis of Russian and Uzbek linguocultures, the author identifies zones of pragmatic interference associated with differences in communicative distances, politeness categories, and etiquette norms. The psycholinguistic mechanisms of pragmatic errors, their difference from grammatical and speech errors, are analyzed. Special attention is paid to the typology of errors according to J. Thomas (pragmalinguistic and sociopragmatic errors), methods of their diagnostics based on students' written works, as well as a system of corrective exercises and role-playing situations. The research material includes written works (essays, e-mails, applications) of Uzbek-speaking senior school students and university students.

Keywords: *pragmatic error, pragmatic competence, intercultural communication, Russian as a foreign language (RFL), pragmatic interference, typology of errors, diagnostics, correction, Uzbek linguoculture, andisha.*

Введение. Проблема обучения русскому языку как неродному в Узбекистане традиционно фокусировалась на преодолении грамматической и лексической интерференции, обусловленной различиями между флективным русским и агглютинативным узбекским языками. Однако практика преподавания и реальная межкультурная коммуникация показывают, что знание грамматических норм и достаточный лексический запас не гарантируют успешности общения. Учащиеся, правильно строящие предложения с точки зрения морфологии и синтаксиса, часто допускают ошибки иного рода — прагматические, которые приводят не к искажению смысла, а к коммуникативной неудаче, непониманию намерений говорящего, нарушению этикетных норм.

Актуальность данного исследования обусловлена несколькими факторами. Во-первых, в эпоху цифровизации и расширения международных контактов

письменная коммуникация (электронные письма, сообщения в мессенджерах, деловая переписка, посты в социальных сетях) занимает всё более значимое место. Во-вторых, узбекская и русская лингвокультуры принадлежат к разным коммуникативным типам: узбекская культура является высококонтекстной, ориентированной на иерархию, ритуализацию и косвенное выражение интенций, тогда как современная русская деловая и цифровая коммуникация тяготеет к низкоконтекстности, прямоте и лаконичности. В-третьих, в существующих учебниках и методических пособиях по РКИ для узбекской школы прагматический аспект речи практически не представлен, а ошибки прагматического уровня либо игнорируются, либо интерпретируются как стилистические, что не позволяет их эффективно корректировать.

Научная новизна работы заключается в комплексном подходе к анализу письменной речи узбекоязычных учащихся, при котором ошибки рассматриваются не как нарушение языкового кода, а как результат несовпадения «коммуникативных дистанций» и традиций эпистолярного жанра двух культур. Впервые предлагается типология прагматических ошибок, специфичная для узбекской аудитории, а также система диагностических и коррекционных методик, учитывающих родные культурные концепты (*andisha*, *izza-hurmat*, *sharm-hayo*).

Основная часть. Понятие **прагматической компетенции** является одним из ключевых в современной лингводидактике. Согласно определению Э.Г. Азимова и А.Н. Щукина, прагматическая компетенция — это «совокупность знаний о правилах использования языковых средств в различных ситуациях общения и умений реализовывать эти знания для достижения коммуникативной цели». В структуре коммуникативной компетенции, выделяемой М. Бахманом, прагматическая компетенция включает иллокутивную (способность соотносить высказывание с намерением) и социолингвистическую (соответствие высказывания контексту) составляющие.

Дж. Лич и Дж. Томас внесли существенный вклад в понимание природы прагматических ошибок. Дж. Томас определяет **прагматическую неудачу** (*pragmatic failure*) как «неспособность понимания слушающим того, что подразумевал говорящий своим высказыванием, или неспособность говорящего выразить свою интенцию таким образом, чтобы она была адекватно воспринята в конкретном контексте». Исследователь выделяет два типа таких неудач:

Прагмалингвистические ошибки — связаны с неверным использованием языковых средств для выражения определённой интенции. Например, использование слишком прямой конструкции «Дай мне это» вместо мягкой просьбы «Не могли бы вы мне это дать?».

Социопрагматические ошибки — связаны с неверной оценкой социальных параметров ситуации: статуса собеседника, степени близости, культурных норм. Например, обращение на «ты» к преподавателю в письменной коммуникации или избыточное самопринижение, которое в русской культуре может быть воспринято как неестественное.

Важно разграничивать прагматические ошибки и ошибки грамматические или речевые. Как отмечает С.Н. Цейтлин, «речевая ошибка — это любое отступление от действующих языковых норм, обусловленное несоблюдением правил выбора и сочетания языковых единиц». Грамматическая ошибка нарушает структуру языка («пять окнов», «он пошол»), речевая ошибка — лексическую сочетаемость или стилистическую уместность («он совершил подвиг в магазине»). Прагматическая же ошибка нарушает процесс коммуникации: предложение может быть грамматически безупречным, но его использование в данной ситуации не достигает цели или вызывает нежелательную реакцию.

Ключевым фактором возникновения прагматических ошибок является различие между высококонтекстной узбекской и низкоконтекстной (в деловой сфере) русской коммуникативными культурами. Э. Холл, автор теории контекста,

отмечает: «В культурах с высоким контекстом (к которым относится узбекская) смысл высказывания часто скрыт за этикетными нормами "сохранения лица", тогда как культуры с низким контекстом ориентированы на прямую передачу информации».

В узбекской лингвокультуре центральными этическими категориями являются **«andisha»** (андиша — деликатность, сдержанность, умение избегать прямых высказываний, которые могут быть восприняты как бестактность) и **«izza-hurmat»** (почитание, уважение к старшим по возрасту и статусу). Эти категории проявляются в письменной речи через: развёрнутые вступления с пожеланиями здоровья всей семье, избыточное использование слов *hurmatli* (уважаемый), *aziz* (дорогой), *iltimos* (пожалуйста); косвенное подведение к просьбе (просьба часто скрыта за длинными этикетными формулами); строгое соблюдение иерархии (имя старшего по статусу пишется первым с обязательными почтительными эпитетами).

Русское коммуникативное поведение, особенно в официальной и деловой сфере, характеризуется иными чертами. И.А. Стернин подчёркивает: «Русское коммуникативное поведение отличается сочетанием искренности и прямоты, что в восточных культурах может быть ошибочно воспринято как резкость или даже грубость». Для современной русской письменной коммуникации (особенно электронной) характерны: лаконичное приветствие («Здравствуйте», «Добрый день»), прямое изложение сути дела («Я пишу по поводу...», «Мне нужно...»), краткое прощание («С уважением», «До свидания»). Отсутствуют обязательные расспросы о здоровье семьи и развёрнутые благопожелания.

Различия в **коммуникативных дистанциях** подробно проанализированы Ю.Е. Прохоровым и И.А. Стерниным: «Различия в коммуникативных дистанциях приводят к тому, что узбекоязычный учащийся может восприниматься в русской коммуникации как излишне официальный или робкий, а носитель русского языка в глазах узбекского учащегося — как излишне самоуверенный или бестактный».

Согласно теории вежливости П. Браун и С. Левинсона, существуют стратегии «позитивной» и «негативной» вежливости. Узбекские учащиеся в письме на русском языке часто используют стратегии «негативной вежливости» (чрезмерное извинение за беспокойство, самопринижение, стремление не навязываться), тогда как современная русская коммуникация движется в сторону «позитивной вежливости» (сокращение дистанции, ориентация на сотрудничество).

На основе анализа письменных работ учащихся (эссе, электронных писем, заявлений) и сопоставления русских и узбекских этикетных норм была разработана следующая типология типичных прагматических ошибок.

Ошибки, связанные с нарушением дистанции и обращениями. Узбекоязычные учащиеся часто переносят узбекскую систему почтительных обращений на русскую почву. Пример ошибки: использование обращения «Уважаемый учитель» в каждом предложении (в русском письме достаточно одного обращения в начале). Или, напротив, использование только имени без отчества в официальном письме («Здравствуйте, Сабрина» вместо «Здравствуйте, Сабрина ...» — следует указать отчество или фамилию). Также распространён перенос обращения «Дорогой» (как калька с узбекского *aziz*) в деловую переписку, где уместно только «Уважаемый».

Ошибки в использовании формул приветствия и прощания. Учащиеся могут начинать деловое письмо с развёрнутого приветствия типа «Я желаю вам крепкого здоровья и счастья вашей семье», что в русском деловом этикете считается избыточным. Или, напротив, использовать слишком краткое прощание («Пока») в официальном письме. Типична также калька с узбекского *«Xayr»* («Хайр») как прощание, которое не соответствует русским нормам (правильно: «До свидания», «Всего доброго»).

Ошибки в выражении просьбы. Узбекский этикет предписывает максимально косвенное выражение просьбы. Учащиеся пишут: «Если вам не

трудно, если вас не затруднит, если у вас будет свободная минутка, я хотел бы попросить вас, если вы, конечно, не против... дать мне справку». В русском деловом общении такая избыточность воспринимается как неестественная и даже мешающая. Правильный вариант: «Пожалуйста, дайте мне справку» или «Будьте добры, выпишите справку».

Ошибки в выражении отказа. Прямой отказ в узбекской культуре табуирован, особенно при обращении к старшему. Учащиеся переносят эту стратегию в русское письмо: вместо прямого «Нет, я не могу» пишут пространные объяснения, уклончивые ответы, обещания «подумать», что может быть воспринято носителем русского языка как неискренность или необязательность. В русской деловой коммуникации вежливый, но прямой отказ («К сожалению, я не могу») предпочтительнее, чем уклончивое «Я подумаю».

Ошибки в выражении благодарности и извинения. Узбекский этикет требует многократных благодарностей и извинений. Учащиеся пишут: «Извините меня, пожалуйста, тысячу раз за беспокойство» (калька с узбекского *«Ming bor uzr»*). В русском языке достаточно одного «Извините за беспокойство».

Ошибки в организации текста (структурно-композиционные). Перенос узбекской эпистолярной традиции, требующей развёрнутого вступления (пожелания здоровья, расспросы о семье), приводит к тому, что основная мысль письма «теряется» в конце. Русский читатель ожидает ключевую информацию в начале письма.

Диагностика прагматических ошибок сложнее диагностики грамматических, поскольку они не фиксируются правилами орфографии и пунктуации. В ходе исследования была разработана следующая методика диагностики:

Анализ письменных работ (эссе, электронных писем, заявлений, поздравительных открыток) с использованием специально разработанных критериев: соответствие обращения статусу адресата, уместность формул приветствия и прощания, степень прямоты/косвенности в выражении просьбы и отказа, избыточность/недостаточность этикетных формул.

Анкетирование учащихся для выявления осознания ими прагматических норм (например: «Как вы вежливо откажете преподавателю?», «Как вы попросите друга о помощи в письме?»).

Сопоставительный анализ русских и узбекских образцов писем (учащимся предлагается сравнить русское и узбекское письмо и найти различия).

Анализ 50 письменных работ учащихся 10–11 классов школ Узбекистана показал, что наиболее частотными являются ошибки в выражении просьбы (38% от всех прагматических ошибок), ошибки в обращениях (25%), ошибки в организации текста (20%), ошибки в выражении отказа (12%) и ошибки в формулах приветствия/прощания (5%).

На основе теоретических положений и данных диагностики была разработана методическая система коррекции, включающая три этапа.

Этап 1. Осознание различий (когнитивный этап). Учащимся предъявляются для сравнения русские и узбекские образцы писем (официальных и неофициальных). Задания: «Найдите отличия в структуре писем», «Почему в русском письме нет пожелания здоровья всей семье?», «Как меняется обращение в зависимости от статуса адресата?». На этом этапе вводятся ключевые понятия (прагматическая ошибка, коммуникативная дистанция, регистр общения).

Этап 2. Тренировка (репродуктивно-продуктивный этап). Упражнения включают: трансформацию узбекских писем в русские (замена избыточных формул лаконичными), выбор правильного обращения в зависимости от ситуации, конструирование фраз для выражения просьбы/отказа

в разных регистрах, заполнение пропусков в письмах этикетными формулами. Пример упражнения: «Дано узбекское письмо с подстрочным переводом. Перепишите его в соответствии с русским деловым этикетом».

Этап 3. Продуцирование и рефлексия (продуктивный этап). Учащиеся пишут письма в заданных ситуациях (запрос информации в университет, отказ от приглашения, благодарственное письмо, письмо-соболезнование) с последующим групповым анализом. Используются ролевые игры, где один учащийся пишет письмо, а другой (адресат) оценивает его с точки зрения прагматической уместности. Особое место в системе коррекции занимают **сопоставительные упражнения**, направленные на осознание культурных концептов. Например: «Объясните, как узбекский концепт *andisha* влияет на построение письма. Какие части письма в русском этикете будут избыточны?» или «Переведите узбекское выражение *«Hurmatli va aziz...»* на русский язык. Буквальный перевод: «Уважаемый и дорогой...». Уместен ли такой перевод в русском деловом письме?».

Методические рекомендации по предотвращению прагматических ошибок. На основе проведённого исследования были сформулированы следующие рекомендации для учителей РКИ:

Введение понятия «прагматическая ошибка» не как «неправильности», а как «коммуникативной неуместности». Важно объяснить, что грамматически верная фраза может быть неудачной с точки зрения общения.

Сопоставительный анализ русских и узбекских текстов как обязательный элемент урока при работе с письменной речью. Сравниваются не только слова, но и структура текста, степень косвенности, этикетные формулы.

Формирование «прагматического слуха» через анализ реальных писем (в том числе ошибочных) и обсуждение реакций адресата.

Использование ролевых игр и ситуативных задач, моделирующих реальные ситуации письменной коммуникации: написание электронного письма работодателю, официальная жалоба, благодарность за услугу и т.д.

Создание памяток-таблиц для учащихся, сопоставляющих русские и узбекские этикетные формулы:

Ситуация	**Узбекская формула (буквальный перевод)**	**Русская формула**
Приветствие в письме	«Моё почтение и уважение Вашему дому, да пребудет с Вами здоровье...»	«Уважаемый...!», «Здравствуйте...»
Просьба	«Если Вы позволите, если Вас не затруднит, осмелюсь попросить...»	«Пожалуйста...», «Будьте добры...»
Отказ	«Я подумаю, может быть, в другой раз, если Бог даст...»	«К сожалению, не могу», «Спасибо, но я занят»

Регулярная рефлексия после написания писем: учащиеся анализируют свои ошибки и обсуждают, как их исправить.

Заключение. Проведённое исследование позволяет сделать следующие выводы.

Прагматические ошибки узбекоязычных учащихся в русской письменной коммуникации являются самостоятельным типом ошибок, отличным от грамматических и речевых. Они связаны не с незнанием языковых форм, а с неверной оценкой коммуникативной ситуации, статуса адресата, степени близости, а также с переносом этикетных норм узбекской культуры в русскоязычную среду.

Основными причинами прагматических ошибок являются: различия между высококонтекстной узбекской и низкоконтекстной (деловой) русской коммуникативными культурами; наличие в узбекской культуре этических

концептов *andisha*, *izza-hurmat*, *sharm-hayo*, не имеющих прямых аналогов в русской коммуникативной культуре; отсутствие системного обучения прагматическому аспекту речи в действующих учебниках РКИ.

Разработанная типология прагматических ошибок включает шесть основных групп: ошибки, связанные с нарушением дистанции и обращениями; ошибки в использовании формул приветствия и прощания; ошибки в выражении просьбы; ошибки в выражении отказа; ошибки в выражении благодарности и извинения; структурно-композиционные ошибки (организация текста).

Предложенная методика диагностики (анализ письменных работ, анкетирование, сопоставительный анализ) позволяет выявить наиболее частотные типы ошибок и определить направления коррекционной работы.

Система коррекции, включающая когнитивный, репродуктивно-продуктивный и продуктивный этапы, может быть непосредственно использована учителями РКИ в школах Узбекистана. Особое место в системе занимают сопоставительные упражнения, направленные на осознание культурных концептов и различий в эпистолярных традициях.

Перспективы дальнейшего исследования включают разработку отдельного учебного пособия по прагматике русской письменной речи для узбекоязычных учащихся, создание банка типичных прагматических ошибок с комментариями, а также экспериментальную проверку эффективности предложенной системы коррекции в реальном учебном процессе.

Таким образом, формирование прагматической компетенции должно стать неотъемлемой частью обучения русскому языку как неродному в Узбекистане, а разработанные в данной работе типология, диагностика и система коррекции позволяют восполнить существующий пробел и подготовить учащихся к эффективной межкультурной письменной коммуникации.

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ФУНКЦИОНАЛЬНО-СЕМАНТИЧЕСКИЕ ОСОБЕННОСТИ ЭВФЕМИЗМОВ И ТАБУИЗМОВ В ШКОЛЬНОМ КУРСЕ РКИ: МЕТОДИЧЕСКИЕ ПОДХОДЫ К ОБУЧЕНИЮ

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Аннотация. В статье исследуются функционально-семантические особенности эвфемизмов и табуизмов в контексте преподавания русского языка как иностранного (РКИ) в старших классах школ Узбекистана. На основе сопоставительного анализа русской и узбекской лингвокультур выявляются зоны межкультурной интерференции, связанные с различными этикетными нормами и запретами. Рассматриваются психолингвистические механизмы эвфемизации, роль эвфемизмов как стратегии «сохранения лица». Особое внимание уделяется методическим подходам: системе упражнений (узнавание, подстановка, трансформация, продуцирование), игровым технологиям и ситуативным задачам, позволяющим преодолеть «культурный шок». Материалом исследования служат действующий учебник РКИ для 10 класса и данные сопоставления с узбекскими этическими концептами *andisha* и *sharm-hayo*.

Ключевые слова: *эвфемизм, табу, русский язык как иностранный (РКИ), межкультурная коммуникация, лингводидактика, культурный шок, игровые технологии, andisha, сопоставительный анализ.*

Abstract. The article examines the functional-semantic features of euphemisms and taboos in the context of teaching Russian as a foreign language (RFL) in senior grades of Uzbek schools. Based on a comparative analysis of Russian and Uzbek linguocultures, the author identifies zones of intercultural interference associated with different etiquette norms and prohibitions. The psycholinguistic mechanisms of euphemization and the role of euphemisms as a face-saving strategy are analyzed. Special attention is paid to methodological approaches: a system of exercises (recognition, substitution, transformation, production), game technologies, and case-based tasks that help overcome «culture shock». The research material includes the current RFL textbook for the 10th grade and a comparison with Uzbek ethical concepts *andisha* and *sharm-hayo*.

Keywords:*euphemism, taboo, Russian as a foreign language (RFL), intercultural communication, linguodidactics, culture shock, game technologies, andisha, comparative analysis.*

Введение. Проблема обучения эвфемизмам и табуированной лексике является одной из наиболее сложных и одновременно наименее разработанных в современной лингводидактике, особенно в условиях школьного преподавания русского языка как иностранного. В Республике Узбекистан русский язык сохраняет статус языка межнационального общения, и его изучение в школах с узбекским и другими языками обучения регулируется такими нормативно-правовыми актами, как Закон «Об образовании» (2020 г.), Закон «О государственном языке» (1989 г., действующая редакция 2019 г.), а также Национальная программа по развитию и совершенствованию системы обучения языкам на 2020–2030 годы. Государственный образовательный стандарт предписывает формирование у учащихся социокультурной компетенции, включающей владение нормами речевого этикета и умение избегать коммуникативных ошибок.

Однако, как показывает анализ учебно-методической литературы, системное обучение эвфемизмам в школьном курсе РКИ практически отсутствует. Учащиеся часто не осознают, что прямое называние смерти, болезни, физиологических отправлений или прямолинейный отказ могут быть восприняты носителями русского языка как грубость или бестактность. С другой стороны, в узбекской культуре существуют свои зоны табу и свои эвфемистические традиции, связанные с концептами *andisha* (деликатность, сдержанность) и *sharm-hayo* (стыд, скромность). Незнание этих различий приводит к культурной интерференции, «культурному шоку» и, в конечном счёте, к коммуникативным неудачам.

Актуальность настоящего исследования обусловлена необходимостью создания методической системы, которая позволила бы учителям РКИ целенаправленно формировать у учащихся эвфемистическую компетенцию, опираясь на данные сопоставительной лингвокультурологии и современные психолингвистические теории. Научная новизна работы заключается в комплексном подходе, объединяющем лингвистический, психолингвистический и методический аспекты, а также в разработке оригинальной типологии упражнений и игровых технологий, адаптированных к материалу действующего учебника.

Основная часть. Феномен языкового табу восходит к древнейшим магическим верованиям, когда слово воспринималось как часть самого предмета или существа. Классические работы Д.К. Зеленина («Табу слов у народов Восточной Европы и Северной Азии») и З. Фрейда («Тотем и табу») заложили основы понимания табу как системы запретов, направленных против сильнейших вожделений человека. В современной лингвистике табу определяется как запрет на употребление определённых слов по сакральным, этическим, суеверным или политическим причинам.

Эвфемизм (от греч. *εὖ* — «хорошо» и *φημί* — «говорю») является лингвистическим инструментом преодоления табу. Согласно определению Л.П. Крысина, эвфемизм — это «вид иносказания, к которому прибегают тогда, когда хотят завуалировать, закамуфлировать некий смысл, который говорящий почему-либо считает неудобным обозначать прямо». Исследователь выделяет три основные функции эвфемизмов: этикетную (смягчение речи, соблюдение правил вежливости), вуалирующую (маскировка негативной сущности явлений) и табусберегающую (избегание прямого именования «страшных» или «опасных» явлений).

Особого внимания заслуживает психолингвистический подход Е.П. Сеничкиной, которая рассматривает эвфемизмы как механизм психологической защиты, «когнитивный амортизатор». Ключевым признаком эвфемизма является семантическая неопределённость: по сравнению с заменяемым понятием эвфемизм содержит меньше информации, что позволяет снизить психологическое напряжение. Именно этот механизм делает эвфемизмы незаменимыми при обсуждении тем, связанных со смертью, болезнью, физиологией.

Для методики преподавания РКИ в Узбекистане принципиально важно сопоставление эвфемистических традиций. В узбекской культуре ключевыми этическими категориями являются *andisha* и *sharm-hayo*. Концепт *andisha* предписывает сдержанность, деликатность, умение избегать прямых высказываний, которые могут быть восприняты как бестактность. Концепт *sharm-hayo* связан с чувством стыда и скромности, особенно значимым для женского поведения, но распространяющимся и на мужскую коммуникацию.

Зоны табу в двух культурах не полностью совпадают. Например, вопрос о возрасте, особенно женщины, в русской культуре является потенциально неудобным, тогда как в узбекской традиции при определённых условиях он может быть допустим. Напротив, тема физиологических отправлений в обеих

культурах табуирована, но формы эвфемизации различаются: в русском языке широко используются перифразы («выйти на минутку», «дамская комната»), в узбекском — нейтральное *hojatxona* не требует дополнительной маскировки. Смерть в обеих культурах табуирована, причём русские эвфемизмы («уйти из жизни», «его не стало», «преставиться») имеют книжно-литературную окраску, а узбекские (*hayotdan ko‘z yumdi* — «закрыл глаза на жизнь», *dunyo tark etdi* — «покинул мир») — глубоко ритуализированы.

В ходе исследования был проведён детальный анализ учебника «Русский язык как иностранный. 10 класс» (Ташкент, 2022; авторы М.Н. Коношонок, Ю.Ю. Мусурманова, М.К. Суванов, М.М. Хакимова; под ред. Е.А. Хамраевой). Анализ показал, что эвфемистическая лексика представлена в учебнике фрагментарно и имплицитно. К сильным сторонам можно отнести: наличие этикетных формул гостеприимства (урок 7 «Добро пожаловать в Узбекистан!»), использование политкорректной лексики в текстах о Паралимпийских играх («люди с инвалидностью»), а также отдельных эвфемизмов в художественно-публицистических текстах («не дожил» о Циолковском, «исчезают» о видах животных).

Однако выявлены и существенные недостатки:

отсутствие системного представления темы эвфемизмов (нет специальных рубрик, объяснений причин табу);

полное отсутствие упражнений на трансформацию (замена прямых, грубых выражений эвфемистическими);

нереализованный сопоставительный потенциал многоязычного словаря (переводы на узбекский, казахский, таджикский и другие языки даны, но без заданий на сравнение эвфемистических норм);

игнорирование «абсолютных табу» (физиология, смерть) и эвфемизмов смягчения отказа и критики.

Таким образом, учебник не формирует в полной мере эвфемистическую компетенцию учащихся, что создаёт риск коммуникативных ошибок и «культурного шока».

На основе теоретических положений Л.П. Крысина, Е.П. Сеничкиной, Т.В. Лариной и методических принципов Э.Г. Азимова, А.Н. Щукина была разработана система упражнений, включающая четыре типа:

Узнавание (рецептивные упражнения): учащиеся находят эвфемизмы в текстах учебника («Найди эвфемизм в тексте о Циолковском»), определяют их функцию (табусберегающую, этикетную, вуалирующую).

Подстановка (репродуктивные упражнения): вставка пропущенного эвфемизма в предложение («Врачи сказали, что пациент ___ после тяжёлой болезни» — вариант: *скончался, ушёл из жизни, его не стало*).

Трансформация (продуктивно-репродуктивные упражнения): замена прямых, грубых выражений эвфемистическими («Мой дед умер от рака» → «Моего дедушки не стало после тяжёлой болезни»).

Продуцирование (продуктивные упражнения): составление диалогов с использованием эвфемизмов в заданных ситуациях (соболезнование, отказ от приглашения, вежливая критика).

Особое внимание уделяется сопоставительным заданиям: «Как сказать о смерти по-русски и по-узбекски?», «Сравните русский эвфемизм "полный" и узбекское *semiz*: совпадает ли степень вежливости?».

Игровые технологии и ситуативные задачи. Для преодоления психологического барьера при обсуждении табуированных тем предлагается система игр и кейсов:

Лингвистические игры: «Найди пару» (прямое слово ↔ эвфемизм), «Эвфемистическое лото», «Третий лишний» (стилистическая дифференциация).

Ролевые игры: «В гостях у русской семьи» (отработка формул гостеприимства и вежливого отказа), «Соболезнование» (использование эвфемизмов смерти), «Отказ от приглашения» (эвфемистические стратегии).

Ситуативные кейсы: «Неловкий вопрос на дне рождения» (межкультурный конфликт из-за вопроса о возрасте), «Корректировка оценки учителя» (эвфемизмы критики), «Как сообщить о смерти в новостях» (жанровые эвфемизмы).

Дидактические игры с движением: «Крокодил: эвфемизмы» (пантомима с угадыванием эвфемистической замены), «Эстафета вежливости» (командное называние эвфемизмов на время).

Кейсы особенно ценны для старшеклассников, так как они моделируют реальные ситуации культурного несовпадения. Например, кейс «Неловкий вопрос» демонстрирует, что вопрос о возрасте, допустимый в узбекской семье, может быть воспринят как бестактность в русской среде, и требует использования эвфемистических стратегий извинения и объяснения.

Методические рекомендации по предотвращению речевых ошибок. На основе анализа типичных ошибок учащихся были сформулированы практические рекомендации для учителя:

«Этикетный минимум» на каждом уроке: речевая разминка (2–3 вопроса на эвфемизацию), плакат в классе «Прямое слово — эвфемизм — ситуация».

Сигнальная система «красная карточка»: при грубом прямом слове учитель подаёт сигна л, и класс коллективно ищет эвфемистическую замену.

Сопоставительные таблицы: сравнение русских и узбекских эвфемизмов с опорой на многоязычный словарь учебника.

Обучение перифразу: описать табуированное понятие, не называя его прямо («то, что случается в конце жизни» → смерть).

Анализ реальных текстов СМИ: некрологи, объявления о вакансиях, политические новости как источник эвфемизмов.

Рефлексия после диалогов: обсуждение, какие эвфемизмы удались, какие можно было использовать, как изменилась бы тональность общения.

Учёт возрастных особенностей: объяснение старшеклассникам, что эвфемизмы — не «трусость» и не «лицемерие», а инструмент эффективной коммуникации и признак высокого культурного уровня.

Система контроля: тесты на выбор эвфемизма, задания на трансформацию, портфолио эвфемизмов (сбор примеров из СМИ и литературы в течение четверти).

Разработан также алгоритм работы с ошибкой: фиксация (без осуждения) → осознание → поиск замены → тренировка → закрепление → рефлексия.

Заключение. Проведённое исследование позволяет сделать следующие выводы.

Эвфемизмы и табуизмы являются не периферийным, а центральным элементом социокультурной компетенции при изучении РКИ. Без владения эвфемистическими стратегиями учащийся рискует нарушить этикетные нормы, обидеть собеседника и оказаться в ситуации «культурного шока».

Русская и узбекская лингвокультуры обнаруживают как универсальные (табу на смерть, болезнь, физиологию), так и специфические зоны эвфемизации. Учёт узбекских концептов *andisha* и *sharm-hayo* является необходимым условием успешного обучения, так как позволяет опираться на родной культурный опыт учащихся и предотвращать интерференцию.

Действующий учебник РКИ для 10 класса (Ташкент, 2022) содержит разрозненные эвфемистические единицы, но не обеспечивает системного формирования эвфемистической компетенции. Выявленные пробелы требуют разработки дополнительных учебных материалов.

Предложенная система упражнений (узнавание → подстановка → трансформация → продуцирование), игровые технологии (лингвистические игры, ролевые игры, кейсы, игры с движением) и методические рекомендации

могут быть непосредственно использованы учителями РКИ в школах Узбекистана без сложной дополнительной подготовки. Разработанные материалы интегрируются в тематику действующего учебника («В традициях — душа народа», «Диалог культур», «Личность и история») и занимают от 5 до 25 минут урока.

Перспективы дальнейшего исследования включают экспериментальную проверку эффективности разработанной системы, адаптацию материалов для других уровней (A2, B1), создание отдельного учебного пособия по эвфемизмам для школ с узбекским языком обучения.

Таким образом, формирование эвфемистической компетенции должно стать обязательным компонентом школьного курса РКИ, а разработанные в данной работе методические подходы позволяют восполнить существующий пробел и подготовить учащихся к реальной, бесконфликтной и культурно-приемлемой коммуникации на русском языке.

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ALISHER NAVOIY ASARLARIDA KOMIL INSON G'OYASI

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ANNOTATSIYA Ushbu maqolada XV asr o'zbek adabiyotining buyuk namoyandasi Alisher Navoiyning asarlarida komil inson g'oyasining falsafiy-axloqiy jihatlari tahlil qilinadi. Mutafakkirning "Xamsa", "Mahbub ul-qulub", "Lison ut-tayr" va boshqa asarlari misolida insonning ma'naviy kamolotga erishish yo'llari, axloqiy sifatlari va ijtimoiy mas'uliyati o'rganiladi. Navoiyning komil inson konsepsiyasi sufizm, islom falsafasi va milliy qadriyatlar sintezi asosida shakllanganligini ko'rsatib beriladi.

Kalit so'zlar: Alisher Navoiy, komil inson, sufizm, axloq, ma'naviyat, Xamsa, islomfalsafasi,insonparvarlik.

KIRISH

O'zbek xalqining buyuk farzandi, shoir, mutafakkir va davlat arbobi Alisher Navoiy (1441–1501) jahon adabiyoti xazinasiga beqiyos hissa qo'shgan. Uning asarlari faqat badiiy jihatdan emas, balki falsafiy, axloqiy va insoniy qadriyatlar nuqtai

nazaridan ham katta ahamiyatga ega. Navoiy ijodining markazida turuvchi asosiy g'oyalardan biri — komil inson konsepsiyasidir.

Komil inson g'oyasi O'rta Osiyo mutafakkirlari orasida alohida o'rin tutadi. Bu g'oya islom falsafasi, xususan tasavvuf ta'limotida chuqur ildiz otgan bo'lib, Navoiy uni o'z davri ijtimoiy-siyosiy sharoitlari va milliy ma'naviy an'analar bilan uyg'unlashtirgan holda yanada boyitgan. Mutafakkir o'z asarlarida insonning ma'naviy kamolotga erishishi, yovuzlikdan yiroqlik va ezgulikka intilish g'oyalarini keng yoritgan.

Ushbu tadqiqotning maqsadi — Navoiy asarlaridagi komil inson obrazining o'ziga xos xususiyatlarini, uning tarkibiy qismlarini va zamonaviy ahamiyatini ilmiy jihatdan tahlil etishdan iborat. Tadqiqotda qiyosiy-tahliliy, struktural va hermenevtik

metodlardan foydalanilgan .

ADABIYOT SHARHI

Navoiy ijodini o'rganish borasida ko'plab tadqiqotlar amalga oshirilgan. Akademik Abdurauf Fitrat, Hamid Sulaymon, Ozod Sharafiddinov, Ismoil Mirzayev va boshqa olimlarning ilmiy ishlarida Navoiy falsafasi, uning axloqiy qarashlari va badiiy mahorati keng o'rganilgan. Biroq komil inson g'oyasini alohida ilmiy muammo sifatida kompleks tahlil qiluvchi tadqiqotlar soni hali ham cheklangan.

Sharq adabiyotshunosligida komil inson tushunchasi "al-inson al-kamil" iborasi bilan ifodalanib, Ibn Arabiy (1165–1240) asarlarida nazariy asoslangan. Keyinchalik bu g'oya Jaloliddin Rumiy, Fariduddin Attor, Abdurrahmon Jomiy va nihoyat Alisher Navoiy asarlarida rivojlanib borgan. Navoiy Jomiyning bevosita shogirdi sifatida ushbu falsafiy merosni o'zbek adabiy-falsafiy tafakkuriga moslashtirgan.

Sobiq sovet davrida Navoiy ijodidagi diniy-tasavvufiy jihatlarga ilmiy munosabat cheklangan bo'lsa-da, mustaqillik yillarida bu yo'nalishda faol tadqiqotlar

boshlandi. Jumladan, Natan Mallaev, Baxtiyor Nazarov, Hamidulla Boltaboev kabi olimlarning asarlari bu borada muhim manba bo'lib xizmat qiladi.

ASOSIY QISM: KOMIL INSON G'OYASINING TAHLILI

Navoiy tasavvufining asosiy yo'nalishi — inson va Alloh o'rtasidagi ma'naviy yaqinlik, ruhning Mutlaq Haqiqatga intilishi g'oyasiga qurilgan. "Lison ut-tayr" dostonida bu g'oya ramziy tarzda ifodalangan: o'ttiz qush (si murg') uzoq safardan so'ng Simurg'ni — komillikning timsolini — topishga erishadi. Bu obraz tasavvufiy kamolotning eng yuksak darajasini — fano (o'z-o'zidan kechish) va baqo (Haqda yashash) holatlarini ko'rsatadi.

Navoiy falsafasida komil inson uch asosiy sifatga ega bo'lishi lozim: birinchisi — ilm, ikkinchisi — axloq, uchinchisi — amal (ijtimoiy faoliyat). Bu uchlik bir-birini to'ldiradi: ilm axloqsiz quruq nazariyaga aylanadi, axloq ilmsiz ko'r taqlid bo'lib qoladi, amal esa ilm va axloq bilan uyg'unlashgan holda ijtimoiy foyda keltiradi.

Navoiyning besh dostondan iborat "Xamsa"si komil inson obrazlarining badiiy jihatdan eng to'liq ifodasini o'z ichiga oladi. "Hayrat ul-abror" dostonida mutafakkir to'g'ridan-to'g'ri insoniy fazilatlar haqida so'z yuritadi. Dostonning "Adolat», "Saxovat", "Kamtarlik", "Ilm" va boshqa qismlari komil insonning axloqiy sifatlarini tizimli tarzda ifodalaydi.

"Farhod va Shirin" dostonida Farhod obrazi komil sevgining, komil mehnatning va komil sadoqatning timsoli sifatida namoyon bo'ladi. Farhod nafaqat oshiq, balki mohir hunarmand, bilimdon tabib va or-nomusli inson sifatida tasvirlanadi. Navoiy uni "rind" — barcha dunyoviy qiyinchiliklardan o'tib, ma'naviy poklikka erishgan inson sifatida ko'rsatadi.

"Layli va Majnun" dostonidagi Qays (Majnun) obrazi esa komil ishqning timsolidir. Biroq Navoiy Majnunni oldingi an'analardan farqli tarzda talqin qiladi: u

aqlni yo'qotgan oshiq emas, balki ilohiy ishq yo'lida o'z-o'zidan kechgan solik — komil inson talabiga erishuvchi ma'naviy sayohatchi sifatida ko'rinadi.

"Mahbub ul-qulub" (Ko'ngillarning sevgilisi, 1500) — Navoiyning nasriy asari bo'lib, u komil inson nazariyasining eng mukammal nazariy bayonini o'z ichiga oladi. Asarda turli ijtimoiy tabaqalar vakillari — hukmdor, olim, hunarmand, dehqon va boshqalar uchun axloqiy me'yorlar belgilab beriladi. Asarda adolatli hukmdor obrazi alohida e'tibor bilan yoritilgan. Navoiy bo'yicha komil hukmdor — bu nafaqat qudratli, balki avvalo adolatli, xalqparvar va ilmga e'tiqodli kishi. Mutafakkir o'sha davr Hirot hukmdori Sulton Husayn Boyqaroga bu masalalarda maslahatchi va ma'naviy ustoz sifatida munosabatda bo'lgan. "Bir podshoh adolatli bo'lsa, yuz yillik ibodat savobini oladi" — deb yozadi Navoiy.

Navoiy uchun ilm komil insonning asosiy belgisidir. U o'zining "Muhokamat ul-lug'atayn" asarida ilmning inson hayotidagi o'rni haqida shunday yozadi: "Ilmsiz inson ko'zsiz kimsadek qorong'ulikda yuradi." Bu fikr uning ko'plab she'rlarida ham takrorlanadi. Mutafakkir ilmni faqat nazariy bilim emas, balki amaliy hayotda qo'llaniladigan hayot falsafasi sifatida talqin qiladi.

"Nasoyim ul-muhabbat" asarida Navoiy 770 dan ortiq so'fiylarning hayoti va ta'limotini bayon etadi. Bu asarda komil insonning ma'naviy rivojlanish bosqichlari — shariatdan tariqatga, tariqatdan ma'rifatga, ma'rifatdan haqiqatga erishish yo'li batafsil yoritilgan. Ushbu to'rt bosqich tasavvufiy kamolotning asosiy yo'lini tashkil etib, komil inson ana shu yo'l yordamida o'z ma'naviy qiyofasini to'liq kashf etadi.

Navoiy ijodida komil inson tushunchasi faqat shaxsiy ma'naviy kamolot bilan chegaralanib qolmaydi — u keng ijtimoiy ma'noni ham o'z ichiga oladi. Mutafakkir uchun haqiqiy komil inson — bu o'z xalqiga, jamiyatiga va Vataniga xizmat qiladigan kishidir. Bu jihat uni sof tasavvufiy an'anadan ajratib turadigan o'ziga xos xususiyatdir.

"Hayrat ul-abror"ning "Saxovat» maqolasida Navoiy quyidagicha yozadi: saxiy inson nafaqat mol-mulkini emas, balki bilimini, kuchini va vaqtini ham boshqalar uchun sarflaydi. Saxovat — bu komil insonning asosiy axloqiy sifatlaridan biri bo'lib, u ilohiy saxovat — Allohning rahmat-u muruvvatining in'ikosi sifatida talqin etiladi.

MUHOKAMA VA BAHOLASH

Navoiyning komil inson konsepsiyasini tahlil qilish shuni ko'rsatadiki, u bir necha manba va an'analar sintezidan tashkil topgan. Birinchi manba — islomiy axloq ta'limoti, xususan Qur'on va hadislar. Ikkinchi manba — tasavvuf falsafasi, Ibn Arabiy va Rumiy merosi. Uchinchi manba — qadimgi yunon falsafasining sharq tarjimalari orqali kirib kelgan axloqiy tizimi (Forobiy, Ibn Sino). To'rtinchi manba — o'zbek-turkiy xalq og'zaki ijodi va milliy qadriyatlar.

Navoiyning o'ziga xosligi shundaki, u ushbu turli manbalarni ijodiy tarzda birlashtirgan holda yangi, o'ziga xos konsepsiya yaratgan. Xususan, u tasavvufdagi passiv riyozat yo'lini faol ijtimoiy xizmat bilan uyg'unlashtirgan. Uning qahramonlari faqat monastirda o'tiruvchi zohidlar emas — ular jamiyat hayotida faol ishtirok etuvchi, xalqqa naf keltiruvchi shaxslardir.

Navoiy konsepsiyasining Uyg'onish davri Evropa insonparvarlik falsafasi bilan o'xshash jihatlari ham bor: inson sha'ni va qadr-qimmatini ulug'lash, bilimga intilish, ijtimoiy adolat. Biroq Navoiy insonparvarligining asosi Allohga bo'lgan ishq va unga bo'ysunish bo'lib, bu uni Evropa renessans tafakkuridan farqlaydi.

XULOSA

Amalga oshirilgan tahlil asosida quyidagi xulosalarga kelish mumkin: Alisher Navoiy asarlarida komil inson g'oyasi markaziy o'rinni egallab, uning butun ijodiy-falsafiy merosini birlashtiruvchi asosiy konsepsiya sifatida namoyon bo'ladi. Navoiy komil insonni ilm, axloq va ijtimoiy xizmat uchburchagi asosida ta'riflaydi.

Mutafakkirning komil inson konsepsiyasi islom falsafasi, tasavvuf ta'limoti va milliy qadriyatlar sintezi asosida shakllanib, o'z davri uchun inqilobiy xarakter kasb etgan. U inson sha'nini, milliy tilni va madaniyatni ulug'lash bilan birga, ijtimoiy adolat va xalqparvarlikni ilgari surgan. Bu g'oyalar bugungi kunda ham o'z ahamiyatini yo'qotmagan.

Zamonaviy O'zbekiston sharoitida Navoiyning komil inson g'oyasi milliy istiqlol mafkurasining muhim tarkibiy qismi sifatida dolzarb ahamiyat kasb etadi. Komil inson g'oyasining tarbiyaviy, ma'naviy va ijtimoiy salohiyatini to'liq ro'yobga chiqarish — bu zamonaviy navoiyshunoslik oldidagi asosiy vazifalardan biridir.

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THE ROLE AND IMPORTANCE OF LINGUISTICS IN MODERN LANGUAGE STUDIES

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Abstract. Linguistics plays a central role in modern language studies because it provides scientific tools for understanding how languages are structured, used, learned, taught, and changed. In contemporary education, language is no longer viewed only as a set of grammar rules or vocabulary items; it is understood as a complex social, cognitive, cultural, and communicative system. This article examines the role and importance of linguistics in modern language studies through an IMRAD-based academic approach. The study analyzes how the main branches of linguistics—phonetics, phonology, morphology, syntax, semantics, pragmatics, sociolinguistics, psycholinguistics, discourse analysis, corpus linguistics, and applied linguistics—contribute to the development of language teaching, translation, intercultural communication, literacy, and digital language technologies. The article argues that linguistics helps educators and researchers move beyond mechanical language instruction and develop more meaningful, evidence-based, and learner-centered approaches. The findings show that modern language studies depend on linguistic knowledge not only for theoretical explanation but also for practical solutions in education, communication, translation, artificial intelligence, and social interaction. The article concludes that linguistics is not an auxiliary discipline but a foundational science for understanding language in the modern world.

Keywords: linguistics, language studies, applied linguistics, language teaching, communication, sociolinguistics, pragmatics, discourse analysis, modern education.

Introduction. Language is one of the most important human abilities. Through language, people express thoughts, share emotions, transmit knowledge, build social relationships, preserve culture, and participate in public life. For this reason, the study of language has always occupied a significant place in education and science. However, in the modern period, language studies have become more complex and interdisciplinary. It is no longer enough to study a language only by memorizing words, grammatical rules, and translation equivalents. Today, language must be understood as a living system that functions in real communication, changes under social influence, reflects cultural values, and develops in the human mind.

Linguistics is the scientific study of language. Its main task is to investigate the nature, structure, function, development, and use of language. In modern language studies, linguistics provides the theoretical and methodological basis for explaining how languages work and how people use them in different contexts. Without linguistics, language teaching may become superficial, translation may become inaccurate, and communication analysis may remain limited. Linguistics helps researchers and teachers answer important questions: How are sounds produced and perceived? How are words formed? How are sentences structured? How is meaning created? Why do people speak differently in different social groups? How do children acquire language? How does language influence identity, culture, and thinking?

Methods. This article is based on a qualitative analytical method. The research uses theoretical analysis, comparative interpretation, and synthesis of linguistic concepts in order to explain the role of linguistics in modern language studies. The

study does not rely on experimental measurement; instead, it examines existing linguistic theories and their practical value for language education and communication.

The methodological basis of the article includes several directions. First, structural linguistic analysis is used to explain the importance of phonetics, phonology, morphology, syntax, and semantics in understanding the internal organization of language. Second, functional and communicative approaches are used to show how language operates in real social interaction. Third, applied linguistic analysis is used to connect linguistic theory with language teaching, translation, intercultural communication, and digital technologies.

The research material consists of key concepts from general linguistics, applied linguistics, sociolinguistics, psycholinguistics, pragmatics, and discourse studies. The article also draws on well-known theoretical positions developed by Ferdinand de Saussure, Noam Chomsky, M. A. K. Halliday, David Crystal, Dell Hymes, and other scholars who contributed to the scientific understanding of language. Their works help explain why language should be studied not only as a formal system but also as a social and communicative phenomenon.

Results. The analysis shows that linguistics has several major roles in modern language studies. The first role is explanatory. Linguistics explains the structure of language at different levels. Phonetics studies speech sounds from the point of view of articulation, acoustics, and perception. This is important for pronunciation teaching, speech therapy, and listening comprehension. Phonology explains how sounds function in a particular language system. For example, learners may pronounce individual sounds correctly but still face difficulty with stress, intonation, rhythm, and sound contrast. Linguistic knowledge helps teachers identify such problems more accurately.

Morphology studies the internal structure of words. It explains how roots, prefixes, suffixes, and grammatical endings create meaning. This is especially important in languages with rich word formation, such as Uzbek, Turkish, Russian, and Arabic. A learner who understands morphological patterns can guess the meanings of new words more effectively. Syntax studies sentence structure and word order. It helps explain why some sentences are grammatically correct while others are not. In language teaching, syntax provides a clear basis for teaching sentence construction, clause relations, and complex grammatical forms.

Semantics and pragmatics are also essential. Semantics studies meaning in words, phrases, and sentences, while pragmatics studies meaning in context. This distinction is very important in modern language studies. A sentence may be grammatically correct but pragmatically inappropriate. For example, a direct request may sound rude in one culture but normal in another. Pragmatics helps learners understand politeness, implication, indirect speech acts, irony, and contextual meaning. Therefore, linguistics improves not only grammatical competence but also communicative competence.

Discussion. The findings indicate that linguistics is not a narrow theoretical field separated from practical life. On the contrary, it is directly connected with education, communication, culture, technology, and social development. In modern language studies, one of the biggest mistakes is to treat language as a fixed collection of rules. This view is too limited. Language is systematic, but it is also dynamic. It changes across time, place, speaker, situation, and purpose. Linguistics allows researchers and teachers to understand this complexity.

In language teaching, linguistic knowledge helps prevent common methodological errors. For example, if a teacher focuses only on grammar, students may know rules but fail to communicate fluently. If a teacher focuses only on speaking

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practice without structural understanding, students may develop fossilized errors. A balanced language education requires both form and function. Linguistics provides this balance by connecting grammar, meaning, pronunciation, context, and communication.

Another important issue is the relationship between language and culture. Modern language studies cannot ignore cultural context. Words and expressions often carry cultural meanings. Forms of politeness, greeting, disagreement, apology, request, and compliment differ from one language community to another. A learner may translate correctly but still misunderstand the social meaning of an utterance. Pragmatics and sociolinguistics help solve this problem by teaching language as social behavior, not just as a code.

Linguistics is also important for multilingual societies. In countries where several languages are used in education, administration, media, and daily life, linguistic knowledge helps develop effective language policy. It can support mother tongue education, foreign language teaching, bilingual education, and preservation of minority languages. Without linguistic research, language policy may be based on political preference rather than scientific understanding. This can create problems in education and social integration.

Conclusion. Linguistics plays a fundamental role in modern language studies because it explains what language is, how it works, how people use it, and how it can be learned and taught effectively. It provides scientific knowledge about sounds, words, sentences, meanings, discourse, social variation, language acquisition, and communication. In this sense, linguistics is not only a theoretical discipline but also a practical foundation for language education, translation, intercultural communication, digital technologies, and critical analysis.

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РОЛЬ МЕТОДА ОПЕРАЦИИ, ТИПА ИМПЛАНТАТА И СПОСОБА ФИКСАЦИИ В КАЧЕСТВО ЖИЗНИ И ХРОНИЧЕСКОЙ ПОСЛЕОПЕРАЦИОННОЙ БОЛИ ПОСЛЕ ПАХОВОЙ ГЕРНИОПЛАСТИКИ

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Аннотация. *Выполнена сравнительная оценка качества жизни (SF-36) и хронической послеоперационной боли (ХПБ) у 228 пациентов через 12 месяцев после паховой герниопластики при применении (ОГ, n=133) и без применения (ГС, n=107) дифференцированного алгоритма выбора тактики. ХПБ: 5,3% vs 17,8% (p=0,003). Прирост PCS SF-36: +13,4 vs +8,2 балла (p=0,004). Нейропатическая ХПБ ассоциирована исключительно со степлерной фиксацией в «треугольнике боли». Установлено, что метод операции определяет выраженность острой боли, тип сетки - хронический воспалительный ответ, метод фиксации - риск нейропатической ХПБ.*

Ключевые слова: *паховая грыжа, хроническая послеоперационная боль, качество жизни, SF-36, ВАШ, ТЕР, тип сетки, фиксация сетки, нейропатическая боль.*

Введение. Качество жизни (КЖ) и хроническая послеоперационная боль (ХПБ) являются конечными клинически значимыми исходами паховой герниопластики, не менее важными, чем частота рецидивов. По данным Вау-

Nielsen M. et al. (2001), ХПБ через 1 год после герниопластики регистрируется у 28,7% пациентов [1]. Экономически и социально она значима не менее, чем рецидив: умеренная и выраженная ХПБ нарушает трудоспособность у 2–4% оперированных и нередко требует длительного специализированного лечения [2].

Патогенез ХПБ включает два механизма: нейрогенный (прямая или ишемическая травма паховых нервов с формированием нейропатического синдрома) и воспалительный (хроническая перипротезная воспалительная реакция с периферической сенситизацией ноцицепторов) [3,4]. Каждый из этих механизмов связан с конкретными управляемыми хирургическими факторами: нейрогенный - с методом фиксации (степлер vs клей) и зоной фиксации; воспалительный - с типом имплантата (тяжёлая vs лёгкая сетка). Целенаправленное воздействие на оба фактора является основой профилактики ХПБ.

Цель исследования. В настоящем исследовании мы оценили влияние систематического применения дифференцированного алгоритма - с его обязательным исключением степлерной фиксации в «треугольнике боли» и предпочтением лёгких сеток при первичных грыжах с сохранной задней стенкой - на частоту ХПБ и показатели качества жизни.

Материал и методы. 228 из 240 пациентов (95,0%) осмотрены через 12 месяцев. Оценка болевого синдрома: ВАШ (0–10 баллов) в точках 1, 3, 5 сут., 1, 3, 6 и 12 мес. ХПБ - ВАШ ≥ 3 балла более 3 мес. при исключении рецидива и инфекции. Нейропатическая ХПБ: жжение, гиперестезия, аллодиния - ≥ 2 признаков. КЖ - SF-36 русская версия исходно, 6 и 12 мес. Оцениваемые домены: PCS (физический компонент), MCS (психический компонент), BP (боль), PF (физическое функционирование), SF (социальное функционирование). Минимально клинически значимое изменение PCS/MCS - 5 баллов.

Удовлетворённость - 4-балльная шкала через 12 мес. (очно или по телефону). Статистика: ANOVA с повторными измерениями, критерий Манна–Уитни, χ^2.

Результаты. Болевой синдром. Интенсивность боли по ВАШ на 1-е сутки: ОГ - 3,2±1,1 балла против ГС - 6,1±1,4 балла ($p<0,001$). Разница сохранялась достоверной во всех точках до 3 месяцев включительно (табл. 1). Потребность в наркотических анальгетиках: ОГ 4,5% против ГС 18,7% ($p<0,001$). Среднее время активизации: ОГ - 0,7±0,3 суток, ГС - 1,8±0,6 суток ($p<0,001$).

Таблица 1.

Интенсивность болевого синдрома по ВАШ (баллы, M±SD) в раннем послеоперационном периоде

Срок	Группа сравнения (n=107)	Основная группа (n=133)	p
1-е сутки	6,1±1,4	3,2±1,1	<0,001
3-и сутки	4,4±1,2	2,1±0,9	<0,001
5-е сутки	3,0±1,0	1,2±0,7	<0,001
1 месяц	1,8±0,8	0,6±0,4	<0,001
3 месяца	1,2±0,9	0,4±0,3	<0,001

Качество жизни (табл. 2). Через 12 месяцев прирост PCS в ОГ составил +13,4 балла против +8,2 балла в ГС ($p=0,004$). Наиболее выраженные различия - в доменах BP (74,3±12,1 vs 61,8±14,6; $p=0,001$) и PF (84,6±11,2 vs 72,4±13,8; $p<0,001$). Психический компонент (MCS) улучшился сопоставимо в обеих

группах (p=0,148). Удовлетворённость «отлично»+«хорошо»: ОГ - 91,7%, ГС - 69,2% (χ^2=16,8; p<0,001). В ОГ не зафиксировано ни одного пациента с оценкой «неудовлетворительно».

Таблица 2.

Динамика показателей SF-36 (баллы, M±SD)

Показатель	Исходно	6 мес.	12 мес.	p ОГ vs ГС (12 мес.)
PCS ГС	42,1±6,8	47,6±5,9	50,3±6,2	0,004
PCS ОГ	43,4±7,1	52,8±5,4	56,8±5,6	
MCS ГС	48,2±7,4	50,1±6,8	51,4±6,6	0,148
MCS ОГ	47,9±7,2	52,6±6,1	54,2±5,9	
BP ГС	48,6±11,2	55,4±12,8	61,8±14,6	0,001
BP ОГ	49,2±10,8	66,8±11,4	74,3±12,1	
PF ГС	64,8±14,2	68,6±13,1	72,4±13,8	<0,001
PF ОГ	65,2±13,8	76,4±12,2	84,6±11,2	

ХПБ. Через 12 месяцев ХПБ зафиксирована у 7 пациентов ОГ (5,3%) и у 19 пациентов ГС (17,8%; p=0,003). Нейропатический компонент: в ГС - у 11 из 19

(57,9%), в ОГ - у 3 из 7 (42,9%). Все случаи нейропатической ХПБ в обеих группах - при степлерной фиксации; при клеевой или бесфиксационной технике ни одного случая нейропатической ХПБ не зафиксировано.

Обсуждение. Полученные данные демонстрируют, что систематическое применение дифференцированного алгоритма снижает частоту ХПБ в 3,4 раза. При анализе механизмов этого снижения выявляется, что он реализуется через три параллельных пути. Первый - переход к лапароскопическим методикам при среднем и высоком балле риска, что снижает интенсивность острой боли (ВАШ 3,2 vs 6,1 балла) и формирует менее агрессивный фон для сенситизации ноцицепторов в ранний период (рис. 1).

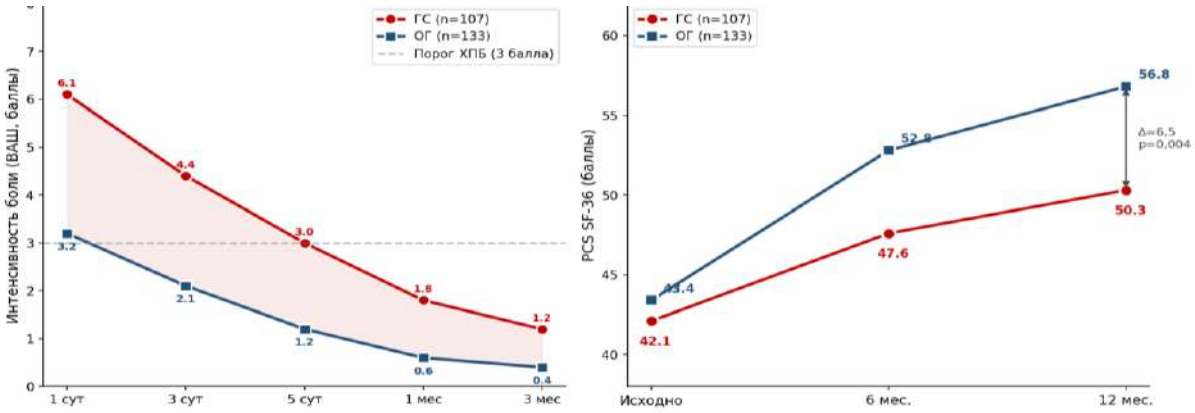


Рис. 1. Слева: Динамика болевого синдрома по ВАШ (баллы) в раннем послеоперационном периоде. Пунктиром - порог ХПБ (3 балла). Справа: Динамика физического компонента здоровья (PCS SF-36). Разница +5,2 балла в пользу ОГ превышает клинически значимый порог.

Второй - применение лёгких сеток при первичных грыжах с типом I–II задней стенки, что снижает ФНО-α в ране в 2,1 раза и уменьшает хронический воспалительный субстрат для ХПБ. Третий - полное исключение степлерной

фиксации в «треугольнике боли», что ликвидирует нейрогенный механизм ХПБ: ни одного случая нейропатической ХПБ при клеевой фиксации в нашей серии.

Отсутствие достоверных различий по MCS (психический компонент SF-36) согласуется с данными мировой литературы: психоэмоциональное состояние пациентов после плановой герниопластики при отсутствии ХПБ и рецидива возвращается к исходному уровню у большинства; значимые нарушения MCS ассоциированы именно с ХПБ нейропатического характера [5]. Улучшение MCS в обеих группах (+4,3–6,3 балла) без достоверной межгрупповой разницы свидетельствует о том, что сам факт успешной операции без грубых осложнений уже обеспечивает психоэмоциональное восстановление независимо от метода (рис. 2).

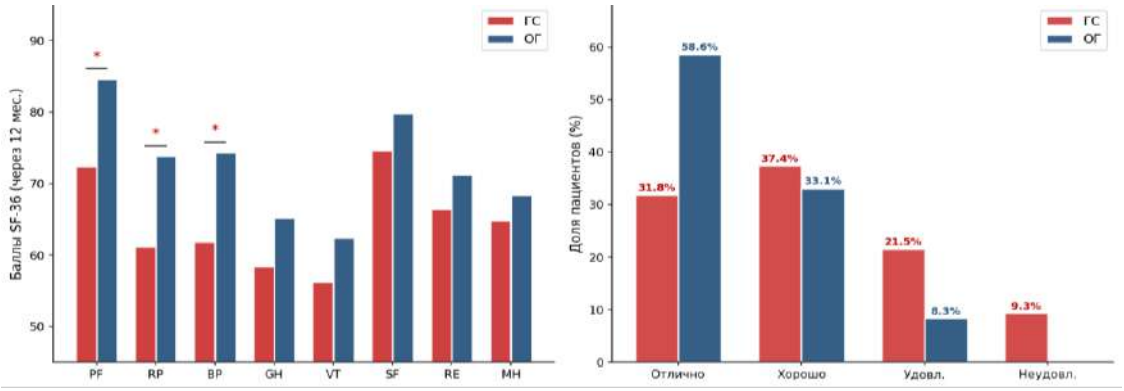


Рис. 2. Слева: Сравнение показателей SF-36 по 8 доменам (12 мес.); * p<0,05. Справа: Удовлетворённость результатами лечения через 12 месяцев.

Прирост PCS +13,4 балла превышает клинически значимый порог (5 баллов) и сопоставим с результатами крупных рандомизированных исследований, сравнивавших лапароскопические и открытые методы [6]. Отметим, что в нашем исследовании улучшение PCS обусловлено не только переходом к лапароскопии, но и систематическим применением атравматичной фиксации и лёгких сеток у пациентов с соответствующими показаниями: именно

совокупность этих решений, а не один-единственный методологический шаг, обеспечила статистически и клинически значимый результат.

Выводы. 1. Применение дифференцированного алгоритма снижает частоту ХПБ через 12 месяцев с 17,8% до 5,3% (p=0,003), интенсивность острой боли на 1-е сутки - с 6,1 до 3,2 балла по ВАШ (p<0,001), потребность в наркотических анальгетиках - с 18,7% до 4,5% (p<0,001).

2. Нейропатическая ХПБ ассоциирована исключительно со степлерной фиксацией в «треугольнике боли»; при клеевой или бесфиксационной технике данный вариант ХПБ в нашей серии не развивался, что обосновывает полный отказ от степлерной фиксации латеральнее наружных подвздошных сосудов.

3. Прирост физического компонента качества жизни (PCS SF-36) +13,4 балла в ОГ против +8,2 балла в ГС (p=0,004) превышает клинически значимый порог; наибольшие различия - в доменах боли (BP) и физического функционирования (PF).

4. Удовлетворённость результатами лечения в ОГ составила 91,7% против 69,2% в ГС (p<0,001). Снижение ощущения инородного тела с 16,8% до 6,0% (p=0,009) обусловлено систематическим применением лёгких сеток при первичных грыжах с типом I–II морфологических изменений задней стенки.

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AI YORDAMIDA TIBBIY DIAGNOSTIKANING SAMARADORLIGINI OSHIRISH

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Annotatsiya: Ushbu maqolada zamonaviy tibbiyotning eng dolzarb yo‘nalishlaridan biri – sun’iy intellekt (AI) texnologiyalarini diagnostika jarayonlariga tatbiq etish orqali tibbiy xizmat ko‘rsatish sifatini oshirish masalalari ilmiy jihatdan tahlil qilinadi. Maqolada mashinali o‘qitish (Machine Learning), chuqur o‘qitish (Deep Learning) va neyron tarmoqlarining tibbiy tasvirlarni tahlil qilishdagi o‘rni, erta tashxis qo‘yishdagi aniqlik darajasi hamda inson omili bilan bog‘liq xatoliklarni kamaytirish imkoniyatlari yoritilgan. Shuningdek, onkologiya, kardiologiya va radiologiya sohalarida AI algoritmlarining samaradorligi qiyosiy tahlillar yordamida ko‘rsatib o‘tilgan. Tadqiqot davomida Big Data (katta ma’lumotlar) bilan ishlashning texnik jihatlari va tibbiy ma’lumotlar xavfsizligini ta’minlash muammolari ham muhokama qilingan. Maqola yakunida O‘zbekiston sog‘liqni saqlash tizimiga AI texnologiyalarini integratsiya qilish bo‘yicha ilmiy asoslangan taklif va tavsiyalar ishlab chiqilgan.

Kalit so'zlar: Sun'iy intellekt, mashinali o'qitish, tibbiy diagnostika, neyron tarmoqlar, MRT, KT, rentgenografiya, algoritmlar, katta ma'lumotlar (Big Data), bashoratli tahlil, kompyuter ko'rishi, sog'liqni saqlash, raqamli transformatsiya, kardiologiya, onkologiya.

Abstract: This article scientifically analyzes one of the most pressing areas of modern medicine – the integration of Artificial Intelligence (AI) technologies into diagnostic processes to improve the quality of medical services. The article highlights the role of Machine Learning, Deep Learning, and neural networks in analyzing medical images, their accuracy in early diagnosis, and the potential to reduce human errors. Furthermore, the effectiveness of AI algorithms in oncology, cardiology, and radiology is demonstrated through comparative analysis. The research also discusses the technical aspects of working with Big Data and the challenges of ensuring medical data security. The article concludes with scientifically grounded proposals and recommendations for integrating AI technologies into the healthcare system of Uzbekistan.

Keywords: Artificial intelligence, machine learning, medical diagnostics, neural networks, MRI, CT, radiography, algorithms, Big Data, predictive analytics, computer vision, healthcare, digital transformation, cardiology, oncology.

Kirish: Insoniyat sivilizatsiyasi bugungi kunda to‘rtinchi sanoat inqilobi (Industry 4.0) davriga qadam qo‘ydi, bu davrning asosiy harakatlantiruvchi kuchi esa sun’iy intellekt (AI) hisoblanadi. Sog‘liqni saqlash tizimi ushbu texnologik transformatsiyadan eng ko‘p foyda ko‘radigan sohalardan biri bo‘lib, ayniqsa tibbiy diagnostika jarayonida tub burilishlar yasamoqda. An’anaviy diagnostika usullari ko‘p hollarda shifokorning tajribasi, sub’ektiv qarashlari va cheklangan vaqt resurslariga tayanadi. Biroq, zamonaviy tibbiyotda ma’lumotlar oqimining (tasvirlar, genetik ma’lumotlar, laboratoriya tahlillari) geometrik progressiya bilan o‘sib borishi inson miyasi imkoniyatlaridan yuqori darajaga chiqdi. Aynan shu nuqtada sun’iy intellekt tizimlari o‘zining yuqori hisoblash quvvati va algoritmlari bilan diagnostikaning aniqligini va tezkorligini ta’minlashda hal qiluvchi rol o‘ynamoqda.

Tibbiy diagnostikaning samaradorligini oshirish nafaqat texnik masala, balki ijtimoiy-iqtisodiy ahamiyatga ega bo‘lgan strategik vazifadir. Erta tashxis qo‘yish

kasallikni davolash xarajatlarini 40-60 foizgacha kamaytirishga va bemorlarning omon qolish darajasini sezilarli darajada oshirishga imkon beradi. Masalan, saraton kasalligini birinchi bosqichda aniqlash va beshinchi bosqichda aniqlash o‘rtasidagi farq hayot va mamot masalasidir. AI algoritmlari inson ko‘zi ilg‘ay olmaydigan mikroskopik o‘zgarishlarni rentgen, KT (kompyuter tomografiyasi) va MRT (magnit-rezonans tomografiyasi) tasvirlarida aniqlash qobiliyatiga ega.

Hozirgi vaqtda jahon miqyosida tibbiy xodimlar yetishmovchiligi va ish yuklamasining yuqoriligi kuzatilmoqda. Jahon sog‘liqni saqlash tashkiloti (JSST) ma’lumotlariga ko‘ra, dunyo bo‘ylab tibbiy xatolar tufayli yuzaga keladigan o‘lim holatlari salmog‘i hali ham yuqori darajada qolmoqda. Sun’iy intellekt bu muammoni hal qilishda "ikkinchi fikr" (second opinion) sifatida shifokorga yordam beradi, charchoq yoki diqqat pasayishi natijasida yuzaga keladigan xatolarni minimallashtiradi. Ushbu maqolada biz AI yordamida diagnostika samaradorligini oshirishning nazariy va amaliy asoslarini, neyron tarmoqlarining ishlash mexanizmlarini va ushbu sohadagi global tendensiyalarni atroflicha ko‘rib chiqamiz.

Axborot tizimlari va texnologiyalari mutaxassisi sifatida shuni ta’kidlash joizki, tibbiyotni raqamlashtirish shunchaki qog‘oz hujjatlarni elektron shaklga o‘tkazish emas, balki aqlli tizimlar orqali qaror qabul qilishni qo‘llab-quvvatlashdir. O‘zbekiston sharoitida ham "Raqamli O‘zbekiston – 2030" strategiyasi doirasida sog‘liqni saqlashga AI texnologiyalarini joriy etish dolzarb masalaga aylangan. Ushbu tadqiqotning maqsadi AI imkoniyatlarini ilmiy tahlil qilish orqali milliy tibbiyotimiz diagnostika salohiyatini yangi bosqichga olib chiqish yo‘llarini ko‘rsatib berishdan iborat.

Sun’iy intellektning tibbiy diagnostikadagi o‘rni haqida gap ketganda, mutaxassislar o‘rtasida ikki xil qarash mavjud. Birinchi guruh olimlar AI kelajakda shifokor-diagnostlarni butunlay almashtiradi deb hisoblasa, ikkinchi guruh buni shunchaki yordamchi asbob deb biladi. Biroq, so‘nggi yillardagi ilmiy natijalar "gibrid

intellekt" modeli eng samarali ekanligini ko‘rsatmoqda. Ya’ni, AI va inson tajribasining uyg‘unligi alohida olingan shifokor yoki algoritmdan ko‘ra yuqori natija beradi.

Qiyosiy tahlillar shuni ko‘rsatadiki, chuqur o‘qitish (Deep Learning) metodologiyasiga asoslangan konvolyutsion neyron tarmoqlari (CNN) rentgen tasvirlarini tahlil qilishda tajribali radiologlar bilan tenglashgan yoki ulardan o‘zib ketgan. Masalan, Stenford universiteti tadqiqotchilari tomonidan ishlab chiqilgan CheXNet algoritmi o‘pka yallig‘lanishini (pnevmoniya) aniqlashda o‘rtacha radiolog mutaxassisdan ko‘ra aniqroq natija ko‘rsatgan. Bu erda muhim bir jihat bor: algoritm bir necha soniya ichida minglab tasvirlarni tahlil qilishi mumkin, shifokorga esa bu uchun soatlab vaqt talab etiladi.

Shu bilan birga, muhokama markazida AI algoritmlarining "qora quti" (black box) muammosi turibdi. Ya’ni, neyron tarmog‘i ma’lum bir tashxisni nega qo‘yganini mantiqiy tushuntirib bera olmaydi. Bu esa tibbiy etikada "mas’uliyat kimda?" degan savolni keltirib chiqaradi. Agar AI noto‘g‘ri tashxis qo‘ysa, bunga dasturchi javobgarmi yoki shifokor? Ushbu muammoni hal qilish uchun hozirda "Tushuntirilishi mumkin bo'lgan sun'iy intellekt" (Explainable AI - XAI) konsepsiyasi rivojlanmoqda. XAI tizimlari tashxis qo‘yish bilan birga, tasvirning qaysi qismiga asoslanib bunday xulosaga kelganini vizual tarzda ko‘rsatib beradi.

Yana bir muhim jihat – ma’lumotlar sifati. AI "nima bilan oziqlansa, shuni qaytaradi" (Garbage In, Garbage Out). Agar neyron tarmog‘ini o‘qitishda ishlatilgan ma’lumotlar bazasi noto‘g‘ri belgilangan (labeling) bo‘lsa yoki faqat ma’lum bir irq/etnos vakillariga tegishli bo‘lsa, algoritm boshqa guruhlar uchun xato ishlashi mumkin. Bu esa tibbiy diagnostikada algoritmik tarafkashlik (algorithmic bias) xavfini tug‘diradi. Shuning uchun, diagnostika samaradorligini oshirish uchun global va diversifikatsiyalangan ma’lumotlar omborini yaratish zarur.

Iqtisodiy nuqtai nazardan, AI diagnostikasi sog‘liqni saqlash xarajatlarini optimallashtirish imkonini beradi. O‘zbekiston kabi rivojlanayotgan davlatlarda chekka hududlarda yuqori malakali tor doiradagi mutaxassislar (masalan, onkologlar yoki kardiologlar) yetishmasligi muammosi mavjud. AI tizimlarini bulutli texnologiyalar orqali hududiy poliklinikalarga integratsiya qilish, bemorlarni markaziy shifoxonalarga yubormasdan turib, dastlabki aniq tashxisni qo‘yish imkonini beradi. Bu esa ham vaqtni, ham mablag‘ni tejaydi.

Tibbiy tasvirlarni tahlil qilishda neyron tarmoqlarining roli

Tibbiy diagnostikaning fundamentini vizual ma’lumotlar tashkil etadi. Kompyuter ko‘rishi (Computer Vision) texnologiyalari, xususan, Konvolyutsion

neyron tarmoqlari (CNN) tasvirlardagi piksellarni qatlamma-qatlam tahlil qilib, inson ko‘ziga ko‘rinmaydigan tekstura, shakl va zichlikdagi o‘zgarishlarni aniqlaydi.

Radiologiya:AI algoritmlari rentgen, KT va MRT skanerlarini tahlil qilishda inqilob yasadi. Masalan, miyaga qon quyilishi (insult) holatlarini AI bir necha millisoniyalarda aniqlab, navbat kutayotgan bemorlar orasidan eng og‘irini birinchi o‘ringa chiqarish (triage) imkonini beradi.

Dermatologiya:Smartfon kamerasi orqali olingan teri pigmentatsiyasi tasvirlarini tahlil qiluvchi AI modellari melanoma (teri saratoni) kasalligini 95% aniqlik bilan aniqlamoqda. Bu oddiy foydalanuvchilarga ham erta diagnostika imkonini beradi.

Oftalmologiya: Diabetik retinopatiyani aniqlashda Google Health tomonidan ishlab chiqilgan AI tizimlari ko‘z tubi tasvirlarini tahlil qilib, ko‘rlikning oldini olishda katta yordam bermoqda.

Bashoratli tahlil (Predictive Analytics) va elektron sog‘liqni saqlash yozuvlari (EHR)

Diagnostika faqat tasvirlar bilan cheklanmaydi. Bemorning kasallik tarixi, laboratoriya tahlillari, genetik ma’lumotlari va hatto turmush tarzi haqidagi ma’lumotlar majmuasi AI uchun ulkan manba hisoblanadi.

Natural Language Processing (NLP) texnologiyalari shifokorlarning qo‘lyozma qaydlari va elektron hisobotlarini tahlil qilib, bemorda kelajakda rivojlanishi mumkin bo‘lgan surunkali kasalliklarni bashorat qiladi. Masalan, yurak-qon tomir kasalliklari xavfini baholashda AI algoritmlari 50 dan ortiq parametrlarni (qon bosimi, xolesterin, irsiyat, zararli odatlar va h.k.) bir vaqtda tahlil qilib, bemorga individual profilaktika rejasini taklif qiladi.

Onkologiyada AI: Erta tashxis va aniq tibbiyot

Saraton kasalligini davolashda "aniq tibbiyot" (Precision Medicine) tushunchasi AI bilan uzviy bog‘liq. Har bir o‘sma o‘zining genetik kodiga ega. AI algoritmlari o‘simta biopsiyasi ma’lumotlarini tahlil qilib, qaysi dori vositasi ushbu aniq bemor uchun eng samarali bo‘lishini aniqlab beradi. Bu "sinov va xato" (trial and error) usulidan voz kechib, darhol maqsadli terapiyani boshlash imkonini beradi. Shuningdek, patomorfologiyada raqamli mikroskopiya orqali hujayralarning bo‘linish tezligini hisoblashda AI inson xatolarini nolga tushiradi.

O‘zbekistonda AI diagnostikasini joriy etishning texnik va huquqiy to‘siqlari

Oliy ma’lumotli axborot texnologiyalari mutaxassisi sifatida shuni aytishim kerakki, AI tizimlarini tatbiq etishda bir qator muammolar mavjud:

Infrastruktura: Yuqori aniqlikdagi neyron tarmoqlarini ishlatish uchun kuchli GPU (grafik protsessorlar) va server quvvatlari talab etiladi.

Ma’lumotlar standartizatsiyasi: O‘zbekistondagi turli shifoxonalarda ma’lumotlar har xil formatda saqlanadi. Yagona milliy tibbiy ma’lumotlar bazasini yaratish AI uchun "yoqilg‘i" vazifasini o‘taydi.

Kiberxavfsizlik: Bemorlarning shaxsiy ma’lumotlari va tibbiy sirlarini himoya qilish uchun blokcheyn (Blockchain) kabi texnologiyalarni integratsiya qilish zarur.

Kadrlar tayyorlash: Nafaqat IT mutaxassislari, balki AI bilan ishlashni biladigan "raqamli shifokorlar" avlodini tarbiyalash lozim.

Algoritmlarning ishlash mexanizmi: Matematik yondashuv

Tibbiy diagnostikada asosan Supervised Learning (Nazorat ostidagi o‘qitish) qo‘llaniladi. Bunda algoritmga minglab "kasal" va "sog‘lom" tasvirlar ko‘rsatiladi. Neyron tarmog‘i o‘zining vazn koeffitsientlarini (weights) teskari tarqalish (backpropagation) algoritmi orqali shunday sozlaydiki, natijada xatolik funksiyasi (loss function) minimal darajaga tushadi. Masalan, o‘pka saratonini aniqlashda algoritm tasvirdagi tugunlarning qirralari tekisligi, zichligi va spikulyatsiyasini (nurlanishini) matematik vektorlar ko‘rinishida tahlil qiladi.

Xulosa: Sun’iy intellekt tibbiy diagnostika samaradorligini oshirishda shunchaki yordamchi vosita emas, balki zamonaviy sog‘liqni saqlash tizimining ajralmas qismiga aylanib ulgurdi. O‘tkazilgan tahlillar shuni ko‘rsatadiki, AI yordamida diagnostika aniqligini 15-30 foizga oshirish, tashxis qo‘yish vaqtini esa 5-10 baravargacha qisqartirish mumkin. Bu esa, o‘z navbatida, minglab insonlar hayotini saqlab qolish va davlat budjetini optimallashtirish demakdir.

Biroq, AI hech qachon shifokorning o‘rnini to‘liq bosa olmaydi. Tibbiyot nafaqat fan, balki san’at hamdir. Shifokorning bemor bilan muloqoti, empatiya va murakkab axloqiy qarorlar qabul qilish qobiliyati sun’iy ong uchun hali yetib bo‘lmas cho‘qqidir. Kelajakda diagnostika "AI + Shifokor" hamkorligi asosida qurilishi lozim. Bunda AI barcha texnik, rutin va og‘ir hisob-kitob ishlarini o‘z zimmasiga oladi, shifokor esa bemorni davolashning strategik yo‘nalishiga va insoniy munosabatlarga e’tibor qaratadi.

O‘zbekiston sharoitida AI diagnostikasini rivojlantirish uchun quyidagi choralar ko‘rilishi maqsadga muvofiq:

Tibbiy ma’lumotlarning yagona milliy "Big Data" omborini yaratish va uni anonimlashtirilgan holda tadqiqotchilar uchun ochiq qilish.

Tibbiyot oliy o‘quv yurtlari o‘quv dasturiga "Tibbiy informatika va AI asoslari" fanini kiritish.

AI tomonidan qo‘yilgan tashxislarning huquqiy maqomini belgilovchi qonunchilik bazasini ishlab chiqish.

Telemeditsina va AI diagnostikasini birlashtirgan holda chekka qishloqlar uchun mobil diagnostika komplekslarini joriy etish.

Xulosa qilib aytganda, sun’iy intellekt – bu tibbiyotdagi yangi "stetoskop"dir. Uni to‘g‘ri va samarali qo‘llash bizning axborot tizimlari sohasidagi bilimlarimiz va ularni tibbiy amaliyot bilan qanchalik uyg‘unlashtira olishimizga bog‘liq. Biz, yosh mutaxassislar, ushbu texnologik inqilobning oldingi saflarida turib, yurtimiz tibbiyotini raqamli kelajakka olib o‘tishga mas’ulmiz.

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DAVLAT ORGANLARI FAOLIYATI OCHIQLIGINI TA’MINLASHNING NAZARIY VA MA’MURIY-HUQUQIY ASOSLARI

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Annotatsiya

Mazkur maqolada davlat organlari faoliyati ochiqligining nazariy va ma’muriy-huquqiy asoslari tahlil qilingan. Tadqiqot davomida davlat organlari faoliyati ochiqligi tushunchasi, uning mazmuni va huquqiy tabiati, davlat boshqaruvida ochiqlik tamoyilining ahamiyati hamda davlat organlari faoliyati ochiqligini ta’minlashning ma’muriy-huquqiy mexanizmlari ilmiy jihatdan o‘rganilgan. Shuningdek, milliy qonunchilik va xorijiy ilmiy qarashlar asosida davlat organlari faoliyatida ochiqlikni ta’minlashning institutsional hamda normativ-huquqiy asoslari yoritilgan.
Kalit so‘zlar: davlat organlari, ochiqlik, shaffoflik, oshkoralik, ma’muriy-huquqiy mexanizm, davlat boshqaruvi, jamoatchilik nazorati, axborot erkinligi, elektron hukumat.

Davlat hokimiyatini amalga oshirish mexanizmi murakkab va keng qamrovli tushuncha bo‘lib, u davlatga tegishli barcha tuzilmalarni o‘z ichiga oladi. Uning tarkibiga davlat hokimiyati va davlat funksiyalarini amalga oshiruvchi organlar bilan bir qatorda davlat korxonalari, muassasalari hamda boshqa turli davlatga oid tuzilmalar ham kiradi. Shu ma’noda davlat mexanizmi — bu davlat hokimiyatini, uning vazifa va funksiyalarini amalga oshiruvchi organlar, muassasalar, korxonalar va boshqa davlat tuzilmalarining yagona, pog‘onali (ierarxik) tizimidir.

Davlat mexanizmining samarali ishlashi uning tarkibiy qismlari — davlat organlarining o‘zaro uyg‘un va tizimli faoliyatiga bevosita bog‘liqdir. Chunki davlat mexanizmi o‘z mohiyatiga ko‘ra murakkab ierarxik tizim bo‘lib, undagi har bir organ muayyan vazifa va funksiyani bajaradi hamda boshqa organlar bilan o‘zaro hamkorlikda ishlaydi. Shu sababli davlat organlari davlat mexanizmining asosiy “ishchi bo‘g‘inlari” sifatida uning harakatini ta’minlaydi va davlat hokimiyatining amalda ro‘yobga chiqishida hal qiluvchi rol o‘ynaydi.

Davlat organi - davlat funksiyalarini bajarishda qatnashuvchi va buning uchun tegishli hokimiyat vakolatlariga ega bo’lgan davlat mexanizmining bo’g’inidir.[1]

Davlat organi davlat apparatining muhim tarkibiy elementi bo‘lib, u davlatning asosiy vazifa va funksiyalarini amalga oshirishga xizmat qiladi. U davlat apparati tarkibidagi alohida bo‘g‘in sifatida davlat hokimiyatini amalga oshirish vakolatiga ega bo‘ladi. Boshqacha aytganda, davlat organi qonunchilik bilan belgilangan vakolatlar asosida davlat nomidan qarorlar qabul qilish, ularni ijro etish va ijrosini ta’minlash imkoniyatiga ega bo‘lgan tuzilmadir. Shu jihati bilan u jamiyatdagi boshqa tashkilotlardan tubdan farq qiladi, chunki uning faoliyati bevosita davlat-hokimiy xarakterga ega.

Davlat-hokimiy vakolatning mazmuni bir nechta asosiy jihatlarda namoyon bo‘ladi. Avvalo, davlat organining tashkil etilishi, ichki tuzilishi hamda faoliyat tartibi uning vakolatlarini belgilovchi huquqiy normalar bilan mustahkamlanadi. Shuningdek, u umumiy qoidalar va individual ko‘rsatmalarni o‘zida aks ettiruvchi huquqiy hujjatlarni qabul qilish huquqiga ega. Bunday hujjatlarning ijrosi ko‘pincha ishontirish, tarbiyalash va rag‘batlantirish mexanizmlari orqali ta’minlanadi, zarurat tug‘ilganda

[1]Odilqoriyev X. T. Davlat va huquq nazariyasi. Darslik. -Toshkent. "Adolat", 2018. -130-bet

esa davlat majburlov kuchi ham qo‘llaniladi. Bundan tashqari, davlat organi o‘z qarorlarini amalga oshirish uchun davlat byudjetidan moliyaviy ta’minot oladi.

Davlat organining yana bir muhim belgisi uning iqtisodiy va tashkiliy jihatdan nisbatan mustaqilligidir. Har bir organ o‘z zimmasiga yuklatilgan vazifalarni bajarish uchun zarur moliyaviy resurslar bilan ta’minlanadi va bu mablag‘lardan qonunda belgilangan tartibda foydalanadi. Shu bilan birga, har bir organ o‘z vakolatlari doirasida aniq vazifa va funksiyalarni bajaradi va shu orqali davlat funksiyalarining amalga oshirilishiga bevosita hissa qo‘shadi. Masalan, Mudofaa vazirligi o‘z vazifalarini samarali bajarsa, davlatning mudofaa funksiyasi ham to‘liq amalga oshirilgan hisoblanadi.

Shu tarzda, davlat organi — bu davlat mexanizmining huquqiy jihatdan rasmiylashtirilgan, davlat-hokimiy vakolatlarga ega bo‘lgan, davlat xizmatchilaridan tashkil topgan hamda o‘ziga yuklatilgan vazifa va funksiyalarni amalga oshirish uchun zarur tashkiliy va moddiy imkoniyatlarga ega bo‘lgan mustaqil tarkibiy bo‘g‘inidir. Davlat organlari o‘z faoliyatining murakkabligi va ko‘p qirraliligi sababli turli mezonlarga ko‘ra tasniflanadi.

Davlat organlarining faoliyati O‘zbekiston Respublikasining Konstitutsiyasi va amaldagi normativ-huquqiy hujjatlar asosida amalga oshiriladigan, davlat funksiyalarini ro‘yobga chiqarishga yo‘naltirilgan tizimli huquqiy va tashkiliy jarayon hisoblanadi. Konstitutsiyaning 20-moddasida davlat organlari va mansabdor shaxslar faqat Konstitutsiya va qonunlarga muvofiq harakat qilishi belgilangan bo‘lib, bu qoida ularning butun faoliyatiga asos bo‘luvchi umumiy prinsip sifatida xizmat qiladi.

Davlat organlarining faoliyati mazmunan davlat tomonidan yuklatilgan vazifa va funksiyalarni amalga oshirishga qaratilgan bo‘lib, u normativ-huquqiy hujjatlarni ishlab chiqish, qabul qilish, ularning ijrosini ta’minlash hamda ijtimoiy munosabatlarni huquqiy tartibga solish jarayonlarida namoyon bo‘ladi. Shu bilan birga, davlat

organlari o‘z vakolatlari doirasida fuqarolarning huquq va erkinliklarini ta’minlash, jamiyatda qonun ustuvorligini saqlash hamda davlat boshqaruvini amalga oshirishga xizmat qiladi.

Amaldagi “Normativ-huquqiy hujjatlar to‘g‘risida”gi Qonunga[2] muvofiq, davlat organlari o‘z vakolatlari doirasida majburiy kuchga ega bo‘lgan hujjatlar qabul qilish huquqiga ega bo‘lib, ushbu hujjatlar davlat boshqaruvining asosiy vositalaridan biri hisoblanadi. Shuningdek, “Davlat fuqarolik xizmati to‘g‘risida”gi Qonunga[3] ko‘ra, davlat organlari faoliyati davlat xizmatchilari tomonidan amalga oshiriladi va ular davlat nomidan belgilangan vakolatlar doirasida harakat qiladi.

Davlat organlari faoliyatida qonuniylik, oshkoralik, hisobdorlik, tizimlilik va samaradorlik kabi prinsiplar asosiy o‘rin tutadi. Ushbu prinsiplar davlat boshqaruvining barqarorligi va samarali ishlashini ta’minlaydi. Davlat organlari o‘z funksiyalarini rejalashtirish, qarorlar qabul qilish, ularni ijro etish hamda ijro ustidan nazorat o‘rnatish orqali amalga oshiradi.

Umuman olganda, davlat organlari faoliyati davlat mexanizmining amalda ishlashini ta’minlovchi asosiy huquqiy jarayon bo‘lib, u orqali davlatning barcha funksiyalari real hayotda ro‘yobga chiqadi hamda jamiyatni boshqarish tizimi samarali tarzda amalga oshiriladi.

Shu o’rinda ta’kidlashimiz joizki, davlat organlari faoliyati davlat hokimiyatining amaliy ifodasi sifatida nafaqat qonuniylik va samaradorlik prinsiplari asosida, balki jamiyat oldida ochiqlik va shaffoflik tamoyillari asosida ham amalga oshiriladi. Chunki zamonaviy davlat boshqaruvida fuqarolarning davlat organlari faoliyati to‘g‘risida ishonchli va to‘liq axborotga ega bo‘lishi davlat va jamiyat o‘rtasidagi o‘zaro munosabatlarning muhim sharti hisoblanadi. Shu sababli davlat

[2] https://lex.uz/docs/-5378966
[3] https://lex.uz/uz/docs/-6145972

organlarining faoliyati ochiqligi ularning hisobdorligini oshirish, jamoatchilik nazoratini kuchaytirish hamda davlat boshqaruvining samaradorligini ta'minlashga xizmat qiladi.

Zamonaviy ilmiy adabiyotlarda davlat organlari faoliyatining ochiqligi (transparency) alohida huquqiy institut sifatida qaraladi. Davlat boshqaruvida ochiqlik va jamoatchilik nazorati masalalari milliy va xalqaro miqyosda keng o'rganilgan. Masalan, mahalliy tadqiqotchilardan Sh.Saydullayev[4] va A.Akmalov[5]lar o'z ishlarida davlat xizmatida shaffofliknita'minlashning huquqiy mexanizmlarini tahlil qilganlar. M. Bauhr va M. Grimes[6] tomonidan olib borilgan tadqiqotlarda ochiqlik tushunchasi ko'pincha "good governance" (yaxshi boshqaruv) konsepsiyasi bilan aralashtirib yuborilishi ilmiy aniqlikni susaytirishi qayd etiladi. Ularning fikricha, ochiqlik mustaqil kategoriyaga ega bo'lib, u davlat organlari faoliyati haqida axborotning jamiyat uchun ochiq bo'lishini anglatadi va bu holat avtomatik ravishda javobgarlik (accountability)ni ta'minlamaydi, biroq uning muhim sharti sifatida xizmat qiladi. Shu jihatdan ochiqlik va hisobdorlik o'rtasida funksional bog'liqlik mavjud bo'lsa-da, ular mazmunan bir xil institutlar emas.

Ilmiy adabiyotlarda shuningdek ochiqlik va davlat boshqaruvi samaradorligi o'rtasidagi munosabat ham alohida o'rganiladi. A. Ingrams [7] tomonidan ishlab chiqilgan konseptual yondashuvga ko'ra, "open government" modeli uch asosiy komponentga tayanadi: ochiqlik (transparency), hisobdorlik (accountability) va javob berish qobiliyati (responsiveness). Ushbu yondashuvga muvofiq, ochiqlik davlat boshqaruvi tizimining markaziy elementi bo'lib, u fuqarolarning qaror qabul qilish

[4] Saydullayev Sh.A. — Davlat va huquqnazariyasi — Toshkent: TDYU nashriyoti,2018.-120B.
[5] AkmalovA.—Davlatboshqaruvidaochiqlikvashaffoflik—Toshkent:"Akademiya2020.-215B.

[6] "Transparency to Curb Corruption? Concepts, Measures and Empirical Merit". *Crime, Law and Social Change* -2017. DOI: 10.1007/s10611-017-9695-1

[7] "Transparency for Results: Testing a Model of Performance Management in Open Government Initiatives" *International Journal of Public Administration* -2018. DOI: 10.1080/01900692.2017.1318400

jarayonlari haqida xabardor bo‘lishini ta’minlaydi hamda davlat institutlariga nisbatan ishonchni mustahkamlashga xizmat qiladi. Shu bilan birga, faqat ochiqlikning o‘zi yetarli emasligi, u tegishli institutsional javobgarlik mexanizmlari bilan to‘ldirilgandagina samarali natija berishi ta’kidlanadi.

Davlat organlari faoliyatining ochiqligini ta’minlashning huquqiy mexanizmlarini o‘rganishda Vincent Mabillard va Nicolas Keuffer tomonidan olib borilgan tadqiqotlar alohida ahamiyatga ega. Ularning ilmiy xulosalariga ko‘ra, “Freedom of Information” (FOI) qonunlari davlat boshqaruvining ochiqlik darajasini sezilarli darajada oshiradi. FOI qonunchiligi ochiqlikni ikki shaklda amalga oshiradi: proaktiv (davlat organi tomonidan oldindan axborot e’lon qilinishi) va reaktiv (fuqarolar so‘rovi asosida axborot taqdim etilishi) shakllarida. Ushbu ikki yondashuv davlat organlari faoliyatining ochiqligini institutsional jihatdan ta’minlashning asosiy huquqiy mexanizmlaridan biri hisoblanadi.

Shu asosda aytish mumkinki, zamonaviy doktrinal yondashuvlarda davlat organlari faoliyatining ochiqligi faqat axborotning mavjudligi bilan emas, balki uni taqdim etish mexanizmlari, huquqiy kafolatlar va institutsional javobgarlik tizimi bilan uzviy bog‘liq kompleks huquqiy kategoriya sifatida talqin qilinadi. Ochiqlik davlat boshqaruvi tizimining shaffofligini ta’minlash bilan birga, fuqarolik jamiyatining davlat faoliyatida ishtirokini kengaytirishga xizmat qiladi.

O‘zbekiston Respublikasida davlat organlari faoliyatining ochiqligi masalasi asosan 2014-yil 5-mayda qabul qilingan **“Davlat hokimiyati va boshqaruvi organlari faoliyatining ochiqligi to‘g‘risida”gi O‘RQ-369-son Qonuni** [8] bilan tartibga solinadi.

“Davlat hokimiyati va boshqaruvi organlari faoliyatining ochiqligi to‘g‘risida”gi Qonun O‘zbekiston Respublikasida davlat boshqaruvi tizimini demokratlashtirish,

[8] https://lex.uz/docs/-2381133

davlat organlari faoliyatining oshkoraligi va shaffofligini ta’minlash, fuqarolarning axborot olishga bo‘lgan konstitutsiyaviy huquqlarini kafolatlashga xizmat qiluvchi muhim normativ-huquqiy hujjatlardan biridir. Mazkur qonun davlat hokimiyati va boshqaruvi organlari faoliyatining ochiqligini huquqiy jihatdan tartibga solib, davlat bilan jamiyat o‘rtasidagi axborot munosabatlarining asosiy prinsip va mexanizmlarini belgilab beradi. Qonunning qabul qilinishi davlat boshqaruvida oshkoralikni kuchaytirish, jamoatchilik nazoratini rivojlantirish hamda davlat organlarining jamiyat oldidagi hisobdorligini ta’minlash zarurati bilan chambarchas bog‘liqdir.

Mazkur qonunning asosiy maqsadi davlat hokimiyati va boshqaruvi organlari faoliyati to‘g‘risidagi axborotdan foydalanishni ta’minlash, fuqarolarning axborot olish huquqining huquqiy kafolatlarini yaratish hamda davlat organlari faoliyatiga oid ma’lumotlarni tarqatish tartibini belgilashdan iborat. Shu orqali davlat organlari faoliyatining jamiyat uchun ochiqligi, axborotdan foydalanish erkinligi va davlat boshqaruvida shaffoflik tamoyillari mustahkamlanadi. Qonun davlat organlari faoliyatini jamiyatdan yashirin tarzda emas, balki jamoatchilik uchun ochiq holda amalga oshirish zarurligini nazarda tutadi. Bu esa demokratik huquqiy davlatning muhim belgilaridan biri hisoblanadi.

Qonunda davlat hokimiyati va boshqaruvi organlari faoliyati ochiqligining asosiy prinsiplari sifatida axborotning ochiqligi, o‘z vaqtida taqdim etilishi, ishonchliligi, davlat organlari faoliyatining oshkoraligi va shaffofligi, axborotni izlash, olish hamda tarqatish erkinligi mustahkamlangan. Mazkur prinsiplar davlat boshqaruvi tizimining jamiyat uchun ochiq va nazorat qilinadigan shaklda faoliyat yuritishini ta’minlashga xizmat qiladi.

Umuman olganda, mazkur qonun O‘zbekiston Respublikasida davlat boshqaruvi faoliyatining ochiqligi va shaffofligini huquqiy jihatdan ta’minlovchi asosiy normativ-huquqiy hujjatlardan biri hisoblanadi. U fuqarolarning axborot olish huquqini kafolatlash, davlat organlari faoliyatining oshkoraligini ta’minlash, jamoatchilik

nazoratini rivojlantirish hamda davlat boshqaruvi tizimida ochiq va hisobdor boshqaruv modelini shakllantirishga xizmat qiladi. Shu jihatdan qonun demokratik huquqiy davlat va kuchli fuqarolik jamiyatini barpo etish jarayonida muhim huquqiy asos sifatida namoyon bo‘ladi.

Ma’muriy-huquqiy mexanizm — bu ijro etuvchi hokimiyat organlari faoliyatini huquqiy tartibga solish, boshqaruv qarorlarini qabul qilish va amalga oshirish, shuningdek ularning ijrosini nazorat qilishga qaratilgan normativ, institutsional va protsessual vositalar tizimidir.

Ma’muriy-huquqiy mexanizm tushunchasi davlat boshqaruvi sohasida huquq normalarining amaliy faoliyatda qanday amalga oshirilishini ifodalaydi. Shu ma’noda davlat organlari faoliyati ochiqligini ta’minlashning ma’muriy-huquqiy mexanizmi faqat normativ qoidalar yig‘indisi bo‘lib qolmasdan, balki ularni amalga oshiruvchi tashkiliy tizim va amaliy vositalarni ham qamrab oladi. Ushbu mexanizm orqali davlat organlarining axborot berish majburiyatlari, axborotdan foydalanish tartibi, fuqarolarning axborot olish huquqlari hamda ochiqlik ustidan nazorat shakllari huquqiy jihatdan tartibga solinadi.

Xulosa qilib aytganda, davlat organlari faoliyati ochiqligini ta’minlashning ahamiyati shundaki, u davlat hokimiyatining amalga oshirilish jarayonini yopiq tizimdan chiqarib, uni huquqiy jihatdan nazorat qilinadigan va baholash mumkin bo‘lgan tizimga aylantiradi. Bu esa qarorlar qabul qilinishida asossizlik va subyektiv yondashuvlarni cheklaydi, boshqaruvda esa huquqiylik va tartib-intizomni kuchaytiradi.

Shu bilan birga, ochiqlik davlat organlari faoliyatini “ichki boshqaruv” doirasidan chiqarib, uni jamiyat bilan uzviy bog‘langan tizimga aylantiradi. Natijada fuqarolar davlat siyosati va boshqaruv jarayonlariga nisbatan passiv kuzatuvchi emas, balki axborotga ega bo‘lgan faol subyekt sifatida shakllanadi.

Yana bir muhim jihat — ochiqlik davlat apparatida institutsional mas’uliyatni kuchaytiradi. Axborot yashirilishi yoki noto‘g‘ri taqdim etilishi ehtimoli kamaygani sari, qaror qabul qiluvchi organlar o‘z harakatlarini huquqiy asosda va yanada puxta asoslantirishga majbur bo‘ladi. Bu esa boshqaruv sifatining oshishiga olib keladi.

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THERMODYNAMICS: THEORY, INNOVATIONS, AND INDUSTRIAL APPLICATIONS

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Annotation

This article explores the fundamental principles of Thermodynamics, its modern theoretical developments, and innovative applications across various industrial sectors. Thermodynamics plays a crucial role in understanding energy transformation, heat transfer, and system efficiency, making it an essential field in both science and engineering. The study examines recent technological advancements, including sustainable energy systems, smart manufacturing processes, and innovative thermal management solutions. Furthermore, the article highlights the significance of thermodynamic principles in improving industrial productivity, reducing energy consumption, and supporting environmentally sustainable development.

Keywords: Thermodynamics, energy transformation, heat transfer, industrial applications, thermal systems, energy efficiency, innovation, sustainable development, engineering, renewable energy.

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Introduction

Thermodynamics is one of the fundamental branches of physics and engineering that studies the relationships between heat, energy, work, and matter. It provides the scientific basis for understanding how energy is transferred and transformed in natural and artificial systems. Since the Industrial Revolution, thermodynamics has played a vital role in technological advancement, contributing significantly to the development of engines, power plants, refrigeration systems, and modern manufacturing technologies. In recent decades, the importance of thermodynamics has increased due to global challenges such as energy shortages, environmental pollution, and climate change. Scientists and engineers are continuously developing innovative thermodynamic solutions to improve energy efficiency and reduce the environmental impact of industrial processes. New technologies such as renewable energy systems, advanced materials, and intelligent thermal control systems have expanded the practical applications of thermodynamics. This article aims to analyze the theoretical foundations of thermodynamics, explore recent innovations in the field, and examine its diverse industrial applications in modern society.

Materials and Methods

This study was conducted using a comprehensive analytical approach based on theoretical and practical investigations in the field of Thermodynamics. The research methodology included a systematic review of scientific literature, textbooks, and recent industrial reports related to thermodynamic principles and their applications. Various thermodynamic models, including open and closed systems, were analyzed to understand energy transfer, heat exchange, and work efficiency. In addition, comparative analysis methods were applied to evaluate traditional and modern thermodynamic technologies used in industrial processes such as power generation, manufacturing, refrigeration, and renewable energy production. Key thermodynamic parameters, including temperature, pressure, entropy, and energy efficiency, were

examined using standard engineering calculations and simulation-based approaches. The study also incorporated case analysis of innovative industrial systems implementing advanced thermal technologies.

Results

The results of the study demonstrated that Thermodynamics remains a fundamental scientific discipline with broad applications in modern industry. Analysis revealed that the application of thermodynamic principles significantly improves energy efficiency and operational productivity in industrial systems. Modern innovations such as smart thermal control systems, advanced heat exchangers, and renewable energy technologies showed higher performance compared to conventional systems. The study found that integrating thermodynamic optimization methods can reduce energy consumption by up to 20–35% in industrial processes. Furthermore, environmentally sustainable technologies based on thermodynamic principles contribute to reducing carbon emissions and minimizing environmental impact.

Discussion

The findings confirm that thermodynamics continues to play a central role in technological and industrial development. The increasing global demand for sustainable energy solutions has made thermodynamic innovation more important than ever. Advances in materials science, digital monitoring systems, and artificial intelligence have enhanced the ability to optimize thermal systems and improve industrial performance. However, challenges remain in implementing advanced thermodynamic technologies due to high initial costs, technical complexity, and the need for specialized expertise. Despite these limitations, future developments in Thermodynamics are expected to support cleaner energy production, smarter industrial operations, and long-term environmental sustainability. The continued integration of

innovative thermodynamic methods will be essential for solving modern energy and industrial challenges.

Conclusion

In conclusion, Thermodynamics remains one of the most important scientific disciplines in understanding and managing energy transformation processes. Its theoretical principles provide a strong foundation for solving practical engineering and industrial problems. The study confirms that modern innovations in thermodynamics significantly improve energy efficiency, optimize industrial performance, and support environmentally sustainable development. Furthermore, the integration of advanced thermodynamic technologies into industrial systems contributes to reducing operational costs, minimizing environmental pollution, and enhancing the effectiveness of renewable energy solutions. As global energy demands continue to grow, the role of thermodynamics in scientific research and industrial applications will become even more essential. Future advancements in this field are expected to create more sustainable, efficient, and innovative technological systems.

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SIFATLI MAKARON ISHLAB CHIQARISH TEXNOLOGIYASI

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ANNOTATSIYA

Ushbu nazariy maqolada makaron mahsulotlarini ishlab chiqarish texnologiyasi, xom ashyo talablari, texnologik jarayon bosqichlari, uskunalar va sifat ko‘rsatkichlari ilmiy-adabiy manbalar asosida tahlil qilingan. Maqolada makaron ishlab chiqarishning asosiy bosqichlari, jumladan xom ashyoni tanlash, xamir tayyorlash, presslash, shakl berish, quritish va qadoqlash jarayonlari yoritilgan. Shuningdek, zamonaviy texnologiyalar, sifat nazorati tizimlari, standartlashtirish talablari hamda oziq-ovqat sanoatida makaron mahsulotlarining ahamiyati ko‘rib chiqilgan. Nazariy tahlillar asosida makaron mahsulotlari sifatiga durum bug‘doyidan olingan un sifati, namlik miqdori, quritish rejimi va texnologik parametrlarning ta’siri yoritib berilgan.

Kalit so‘zlar: makaron texnologiyasi, durum bug‘doyi, semolina, xamir tayyorlash, ekstruziya, quritish rejimi, sifat nazorati, oziq-ovqat sanoati, standartlashtirish.

ABSTRACT. This theoretical article analyzes the technology of pasta production, raw material requirements, technological processing stages, equipment,

and quality indicators based on scientific and literary sources. The article describes the main stages of pasta production, including raw material selection, dough preparation, pressing, shaping, drying, and packaging processes. In addition, modern technologies, quality control systems, standardization requirements, and the importance of pasta products in the food industry are discussed. Based on theoretical analysis, the influence of durum wheat flour quality, moisture content, drying conditions, and technological parameters on pasta product quality is highlighted.

Keywords: pasta technology, durum wheat, semolina, dough preparation, extrusion, drying режим, quality control, food industry, standardization.

АННОТАЦИЯ. В данной теоретической статье на основе научной и учебной литературы проанализированы технология производства макаронных изделий, требования к сырью, этапы технологического процесса, оборудование и показатели качества. В статье рассмотрены основные этапы производства макаронных изделий, включая выбор сырья, приготовление теста, прессование, формование, сушку и упаковку продукции. Также освещены современные технологии, системы контроля качества, требования стандартизации и значение макаронных изделий в пищевой промышленности. На основе теоретического анализа раскрыто влияние качества муки из твёрдой пшеницы, уровня влажности, режима сушки и технологических параметров на качество макаронных изделий.

Ключевые слова: технология макаронных изделий, твёрдая пшеница, семолина, приготовление теста, экструзия, режим сушки, контроль качества, пищевая промышленность, стандартизация.

KIRISH

Makaron mahsulotlari oziq-ovqat sanoatining muhim tarmoqlaridan biri bo‘lib, dunyo aholisining kundalik iste’molida keng qo‘llaniladigan mahsulotlar qatoriga kiradi. Ularning ommaviy iste’mol qilinishi yuqori oziqaviy qiymati, uzoq muddat saqlanish imkoniyati, tayyorlash qulayligi va iqtisodiy jihatdan arzonligi bilan

izohlanadi. Jahon bo‘yicha makaron mahsulotlari ishlab chiqarish hajmi yil sayin ortib bormoqda. Ayniqsa, Italiya, Xitoy, Amerika Qo‘shma Shtatlari va Rossiya kabi davlatlarda ushbu soha rivojlangan sanoat tarmog‘i sifatida shakllangan. O‘zbekistonda ham aholining oziq-ovqat mahsulotlariga bo‘lgan ehtiyojining ortishi makaron ishlab chiqarish sanoatini rivojlantirishni talab etmoqda. Makaron mahsulotlari asosan bug‘doy uni va suv asosida tayyorlanadigan oziq-ovqat mahsuloti hisoblanadi. Ularning sifati ko‘p jihatdan ishlatiladigan xom ashyoning fizik-kimyoviy xususiyatlariga, texnologik jarayonlarning to‘g‘ri tashkil etilishiga hamda saqlash sharoitlariga bog‘liq bo‘ladi. Ayniqsa, durum bug‘doyidan olinadigan semolina uni yuqori sifatli makaron ishlab chiqarishda muhim ahamiyat kasb etadi. Bunday un tarkibidagi oqsil va kleykovina miqdorining yuqoriligi tayyor mahsulotning mustahkamligi, elastikligi va pishirish jarayonidagi barqarorligini ta’minlaydi.

Makaron ishlab chiqarish texnologiyasi bir necha ketma-ket bosqichlardan iborat bo‘lib, ularga xom ashyoni tayyorlash, xamir qorish, presslash, shakl berish, quritish va qadoqlash jarayonlari kiradi. Har bir bosqichning texnologik jihatdan to‘g‘ri tashkil qilinishi tayyor mahsulot sifatini belgilovchi asosiy omillardan hisoblanadi. Xususan, quritish jarayoni makaron ishlab chiqarishdagi eng muhim bosqichlardan biri bo‘lib, noto‘g‘ri tanlangan harorat va namlik rejimi mahsulotning yorilishi, deformatsiyalanishi yoki pishirish sifatining pasayishiga olib kelishi mumkin.

Hozirgi vaqtda oziq-ovqat sanoatida energiya tejamkor texnologiyalarni qo‘llash, avtomatlashtirilgan ishlab chiqarish liniyalaridan foydalanish hamda xalqaro sifat standartlariga mos mahsulot ishlab chiqarish masalalariga alohida e’tibor qaratilmoqda. Shu sababli makaron mahsulotlarini ishlab chiqarish texnologiyasi, sifat ko‘rsatkichlari va zamonaviy uskunalar haqidagi nazariy ma’lumotlarni tizimli ravishda o‘rganish dolzarb ahamiyatga ega hisoblanadi.

Mazkur maqolada makaron mahsulotlari ishlab chiqarish texnologiyasining nazariy asoslari, ishlab chiqarishda qo‘llaniladigan xom ashyo turlari, texnologik jarayon bosqichlari, sifat ko‘rsatkichlari hamda zamonaviy ishlab chiqarish usullari

ilmiy va o‘quv adabiyotlari asosida yoritilgan. Shuningdek, makaron mahsulotlarini ishlab chiqarishda qo‘llaniladigan standartlar, sifat nazorati tizimlari va texnologik jarayonlarning mahsulot sifatiga ta’siri haqida umumiy nazariy ma’lumotlar keltirilgan.

ADABIYOTLAR TAHLILI

Makaron mahsulotlari insoniyat tomonidan qadim zamonlardan buyon iste’mol qilinib kelinayotgan oziq-ovqat mahsulotlaridan biri hisoblanadi. Tarixiy manbalarda makaronning ilk ko‘rinishlari miloddan avvalgi davrlarda Osiyo hududida paydo bo‘lgani qayd etiladi. Ayrim arxeologik topilmalarga ko‘ra, qadimgi Xitoy hududida bug‘doy unidan tayyorlangan va quritilgan mahsulotlar mavjud bo‘lgan. Keyinchalik ushbu mahsulotlar turli savdo yo‘llari orqali boshqa hududlarga tarqalgan. Yevropa mamlakatlarida, ayniqsa Italiyada makaron mahsulotlari keng ommalashib, milliy taomlar tarkibining ajralmas qismiga aylangan. Adabiyotlarda makaronning Italiyaga kirib kelishi haqida turli tarixiy qarashlar mavjud bo‘lsa-da, ko‘pchilik tadqiqotchilar ushbu mahsulot Italiya hududida mustaqil ravishda rivojlanganligini ta’kidlaydi.

XVIII asrning oxiri va XIX asr boshlarida makaron mahsulotlarini sanoat usulida ishlab chiqarish rivojlana boshladi. Dastlabki davrlarda ishlab chiqarish qo‘l mehnatiga asoslangan bo‘lsa, keyinchalik mexanizatsiyalashgan uskunalarning joriy etilishi natijasida ishlab chiqarish hajmi ortdi. Ilmiy manbalarda Italiyada qurilgan dastlabki makaron fabrikalari ushbu sanoatning rivojlanishida muhim o‘rin tutgani qayd etilgan. XX asrga kelib avtomatlashtirilgan ishlab chiqarish liniyalarining yaratilishi makaron sanoatining yanada rivojlanishiga olib keldi. Natijada mahsulot sifati yaxshilanib, ishlab chiqarish samaradorligi oshdi hamda makaron mahsulotlari keng iste’mol qilinadigan oziq-ovqat turiga aylandi.

Ilmiy adabiyotlarda makaron mahsulotlarining kimyoviy tarkibi va oziqaviy qiymati ham keng o‘rganilgan. Makaron asosan murakkab uglevodlarga boy mahsulot bo‘lib, inson organizmini energiya bilan ta’minlashda muhim ahamiyatga ega. Shuningdek, uning tarkibida oqsillar, kam miqdorda yog‘lar, vitaminlar va mineral

moddalar mavjud bo‘ladi. Durum bug‘doyidan tayyorlangan makaron mahsulotlari oqsil va kleykovina miqdorining yuqoriligi bilan ajralib turadi. Aynan ushbu xususiyat tayyor mahsulotning mustahkamligini, elastikligini va pishirish jarayonidagi barqarorligini ta’minlaydi.

Adabiyotlarda makaron mahsulotlari sifatiga ta’sir etuvchi asosiy omillar sifatida xom ashyo sifati, namlik miqdori, xamir tayyorlash texnologiyasi, presslash bosimi va quritish rejimlari ko‘rsatib o‘tiladi. Ayniqsa, quritish jarayoni eng muhim texnologik bosqichlardan biri hisoblanadi. Yuqori haroratda tez quritish mahsulot yuzasida yoriqlar hosil qilishi yoki ichki strukturani buzishi mumkin. Shu sababli ko‘plab mualliflar tomonidan past va o‘rtacha haroratda uzoq muddatli quritish rejimlari yuqori sifatli makaron olish uchun maqbul usul sifatida tavsiya etilgan.

Zamonaviy ilmiy manbalarda makaron ishlab chiqarishda innovatsion texnologiyalarni qo‘llash masalalariga ham alohida e’tibor qaratilgan. Xususan, vakuumli ekstruziya texnologiyasi, avtomatlashtirilgan quritish tizimlari va energiya tejamkor uskunalar mahsulot sifatini oshirish bilan birga ishlab chiqarish xarajatlarini kamaytirishga xizmat qilishi ta’kidlanadi. Bundan tashqari, sifat nazoratining xalqaro standartlari, jumladan ISO va HACCP tizimlarining qo‘llanilishi oziq-ovqat xavfsizligini ta’minlashda muhim omil sifatida baholanadi.

Mahalliy va xorijiy adabiyotlar tahlili shuni ko‘rsatadiki, makaron mahsulotlarini ishlab chiqarish texnologiyasi doimiy ravishda takomillashib bormoqda. Shu bilan birga, mahsulot sifati va oziqaviy qiymatini oshirish, energiya sarfini kamaytirish hamda ishlab chiqarish samaradorligini yaxshilash bugungi kunda ushbu sohadagi asosiy yo‘nalishlardan biri hisoblanadi.

Makaron mahsulotlari tarkibidagi oqsillarning asosiy qismini glutenin va gliadin fraksiyalari tashkil etadi. Ushbu oqsillar suv bilan birikishi natijasida elastik va mustahkam kleykovina tarmog‘i hosil bo‘ladi. Aynan kleykovina xamirning fizik xususiyatlarini shakllantirib, tayyor mahsulotning pishirish sifatiga bevosita ta’sir ko‘rsatadi. Ilmiy manbalarda kleykovinaning mustahkamligi makaronning pishirish

vaqtida shaklini saqlashi, yopishib qolmasligi va strukturaviy barqarorligini ta’minlovchi asosiy omillardan biri sifatida qayd etilgan.

O‘zbekistonda makaron sanoati so‘nggi yillarda oziq-ovqat sanoatining rivojlanayotgan yo‘nalishlaridan biriga aylangan. Aholi sonining ortishi va tez tayyorlanadigan oziq-ovqat mahsulotlariga bo‘lgan talabning oshishi makaron ishlab chiqarish hajmining ko‘payishiga sabab bo‘lmoqda. Hozirgi vaqtda mamlakatda turli quvvatdagi ko‘plab makaron ishlab chiqarish korxonalari faoliyat yuritmoqda. Shu bilan birga, mahalliy ishlab chiqarishda ayrim muammolar ham mavjud bo‘lib, ular asosan yuqori sifatli durum bug‘doyi unining yetarli emasligi, texnologik uskunalarning eskirganligi va sifat nazorati tizimining barcha korxonalarda bir xil darajada yo‘lga qo‘yilmaganligi bilan bog‘liqdir.

Ilmiy va texnologik adabiyotlarda makaron sifatini belgilovchi asosiy omillardan biri sifatida unning fizik-kimyoviy xususiyatlariga alohida e’tibor qaratiladi. Makaron mahsulotlari ishlab chiqarishda asosan durum bug‘doyidan olinadigan semolina uni, yumshoq bug‘doy uni va ularning aralashmalaridan foydalaniladi. Durum bug‘doyidan olinadigan semolina yuqori sifatli makaron ishlab chiqarish uchun eng maqbul xom ashyo hisoblanadi. Ushbu bug‘doy turi tarkibidagi oqsil va kleykovina miqdorining yuqoriligi bilan ajralib turadi. Bundan tashqari, semolinaning sarg‘ish tusga ega bo‘lishi tayyor mahsulotning tashqi ko‘rinishini yaxshilaydi va iste’molchilar uchun jozibadorligini oshiradi.

Durum bug‘doyi endospermining shishasimon tuzilishga ega bo‘lishi ham makaron sifati uchun muhim ahamiyat kasb etadi. Bunday tuzilma maydalash jarayonida yirik granulali semolina hosil bo‘lishini ta’minlaydi. Yirik zarrachalar suvni asta-sekin shimib, xamirning bir xil namlanishiga yordam beradi. Natijada xamir strukturasi yaxshilanadi va ekstruziya jarayonida kraxmal granulalarining ortiqcha shikastlanishi kamayadi. Bu esa tayyor mahsulotning pishirish vaqtida suvga kam modda chiqarishini va bulonning loyqalanmasligini ta’minlaydi.

Makaron ishlab chiqarishda foydalaniladigan un ma’lum texnik va sanitariya talablariga javob berishi lozim. Adabiyotlarda un sifati namlik darajasi, oqsil miqdori, kleykovina sifati, kul miqdori, zarracha o‘lchami va mikrobiologik ko‘rsatkichlar asosida baholanishi qayd etilgan. Yuqori sifatli makaron olish uchun unning namligi me’yoriy darajada bo‘lishi, oqsil va kleykovina miqdori esa yetarli darajada yuqori bo‘lishi talab etiladi. Shuningdek, un tarkibida begona aralashmalar, zararli mikroorganizmlar va metall zarralarining mavjud bo‘lishiga yo‘l qo‘yilmaydi.

Zamonaviy ishlab chiqarish texnologiyalarida un sifatini nazorat qilish uchun laboratoriya tahlillari va standartlashtirilgan sinov usullaridan foydalaniladi. Xalqaro standartlar asosida olib boriladigan sifat nazorati mahsulotning xavfsizligi va iste’mol xususiyatlarini ta’minlashda muhim ahamiyatga ega hisoblanadi.

Makaron ishlab chiqarishda suv ikkinchi asosiy komponent hisoblanadi. Ko‘plab hollarda ishlab chiqarishda suv sifatiga yetarli darajada e’tibor berilmasa-da, uning fizik-kimyoviy xususiyatlari tayyor mahsulot sifatiga sezilarli ta’sir ko‘rsatadi. Ilmiy manbalarda suv tarkibidagi mineral moddalar, qattiqlik darajasi, pH muhiti va mikrobiologik holat xamirning shakllanish jarayonida muhim omil sifatida qayd etiladi. Ishlab chiqarishda foydalaniladigan suv sanitariya-gigiyena talablariga javob berishi hamda ichimlik suvi standartlariga mos bo‘lishi lozim.

Suvning qattiqlik darajasi xamirning konsistensiyasiga bevosita ta’sir qiladi. Juda yumshoq suv xamirning ortiqcha yopishqoq bo‘lishiga sabab bo‘lsa, qattiq suv esa xamirning mo‘rtlashishiga olib kelishi mumkin. Shu sababli o‘rtacha qattiqlikka ega suv makaron ishlab chiqarish uchun maqbul hisoblanadi. Bundan tashqari, suvning neytral yoki biroz ishqoriy muhiti kleykovina hosil bo‘lish jarayonini yaxshilaydi. Suv tarkibida temir va xlorid miqdorining ortib ketishi esa tayyor mahsulot rangining qorayishiga yoki tabiiy tusining o‘zgarishiga sabab bo‘lishi mumkin.

Texnologik jarayonda suvning harorati va miqdori xamir sifatini shakllantiruvchi asosiy parametrlardan biri hisoblanadi. Suv va unning ma’lum nisbatda aralashtirilishi xamirning optimal namlik darajasini ta’minlaydi. Iliq suv

qo‘llanilganda kleykovina tezroq shishadi va elastik struktura hosil qiladi. Sovuq suv bilan tayyorlangan xamirda esa kleykovina hosil bo‘lish jarayoni sekinroq kechadi, biroq xamir strukturasi nisbatan mustahkam bo‘ladi. Shu sababli ishlab chiqarish texnologiyasida suv harorati mahsulot turi va texnologik rejimga qarab tanlanadi.

Premium toifadagi makaron mahsulotlarini ishlab chiqarishda tuxum va tuxum mahsulotlaridan ham foydalaniladi. Tuxum mahsulotning oziqaviy qiymatini oshirib, oqsil miqdorini ko‘paytiradi hamda organoleptik xususiyatlarini yaxshilaydi. Tuxum tarkibidagi lesitin emulgatorlik xususiyatiga ega bo‘lib, xamir strukturasining yaxshilanishiga yordam beradi. Shuningdek, tuxumdagi tabiiy pigmentlar tayyor mahsulotga oltinsimon sariq rang beradi. Adabiyotlarda tuxum qo‘shilgan makaron mahsulotlarining pishirish sifati yuqori bo‘lishi, ular bir-biriga kamroq yopishishi va souslarni yaxshi ushlab turishi qayd etilgan.

Zamonaviy oziq-ovqat sanoatida makaron mahsulotlarini boyitish va funksional xususiyatlarini oshirish maqsadida turli qo‘shimchalardan foydalaniladi. Tabiiy sabzavot kukunlari, jumladan pomidor, ismaloq, lavlagi va qovoq kukunlari mahsulot rangini yaxshilash bilan birga biologik faol moddalar miqdorini ham oshiradi. Bundan tashqari, vitamin va mineral qo‘shimchalar makaronning oziqaviy qiymatini boyitishga xizmat qiladi. Ayrim hollarda mahsulotning glisemik indeksini kamaytirish va parhezbop xususiyatlarini yaxshilash maqsadida oziq tolalari ham qo‘shiladi. Protein konsentratlari esa mahsulot tarkibidagi oqsil miqdorini oshirish imkonini beradi.

Makaron ishlab chiqarish texnologiyasi o‘zaro bog‘liq bo‘lgan bir necha ketma-ket bosqichlardan iborat murakkab texnologik jarayon hisoblanadi. Texnologik jarayonning har bir bosqichi tayyor mahsulot sifatiga bevosita ta’sir ko‘rsatadi. Ishlab chiqarish odatda xom ashyoni qabul qilish va tayyorlashdan boshlanib, xamir qorish, presslash, shakl berish, quritish, sovitish hamda qadoqlash bosqichlari orqali yakunlanadi. Ushbu bosqichlarning texnologik jihatdan to‘g‘ri tashkil etilishi mahsulotning mustahkamligi, tashqi ko‘rinishi, pishirish sifati va saqlanish muddatini belgilaydi.

Zamonaviy ishlab chiqarish korxonalarida texnologik jarayonlar avtomatlashtirilgan uskunalar yordamida amalga oshiriladi. Avtomatlashtirish mahsulot sifatining barqarorligini ta’minlash, inson omili bilan bog‘liq xatolarni kamaytirish va ishlab chiqarish samaradorligini oshirish imkonini beradi. Shu sababli makaron ishlab chiqarish texnologiyasining nazariy asoslarini chuqur o‘rganish oziq-ovqat sanoatini rivojlantirishda muhim ahamiyat kasb etadi.

Makaron ishlab chiqarish texnologiyasi xom ashyoni qabul qilish va saqlash jarayonidan boshlanadi. Ishlab chiqarishga kelib tushgan har bir un partiyasi laboratoriya sharoitida tekshirilib, uning sifat ko‘rsatkichlari amaldagi standartlarga muvofiqligi baholanadi. Unning namligi, oqsil va kleykovina miqdori, rangi, hid va mikrobiologik holati nazorat qilinadi. Sifat talablariga javob bermaydigan xom ashyo ishlab chiqarishga qabul qilinmaydi. Adabiyotlarda unni saqlash uchun optimal sharoit sifatida mo‘tadil harorat va nisbiy namlik tavsiya etiladi. Omborxonalar quruq, shamollatiladigan va to‘g‘ridan-to‘g‘ri quyosh nurlaridan himoyalangan bo‘lishi kerak. Un odatda palletlarda yoki siloslarda cақlanadi, bu esa mahsulotning namlanib qolishini va mikroorganizmlar bilan zararlanishini oldini oladi. Zamonaviy korxonalarda saqlash jarayonini nazorat qilish uchun avtomatlashtirilgan monitoring tizimlaridan foydalaniladi.

Makaron ishlab chiqarishdagi eng muhim texnologik bosqichlardan biri xamir tayyorlash jarayoni hisoblanadi. Ushbu bosqichda un va suv ma’lum nisbatda aralashtirilib, xamirning fizik-mexanik xususiyatlari shakllantiriladi. Xamir tayyorlash jarayonida un tarkibidagi glutenin va gliadin oqsillari suv bilan birikib, elastik kleykovina tarmog‘ini hosil qiladi. Kleykovina xamirning cho‘ziluvchanligi va mustahkamligini ta’minlab, tayyor makaronning sifat ko‘rsatkichlarini belgilaydi. Ilmiy manbalarda kleykovina strukturasi makaronning pishirish vaqtida shaklini saqlashi, bir-biriga yopishib qolmasligi va mexanik barqarorligiga bevosita ta’sir qilishi qayd etilgan.

Xamir aralashtirish jarayonida bir nechta fizik-kimyoviy hodisalar bir vaqtning o‘zida sodir bo‘ladi. Dastlab suv zarrachalari un granulalari orasida bir tekis taqsimlanadi. Keyinchalik oqsillar suvni shimib shishadi va o‘zaro bog‘lanib, kleykovina tarmog‘ini hosil qiladi. Mexanik aralashtirish davomida oqsil molekulalari o‘rtasida bog‘lanishlar kuchayib, xamir strukturasi yanada mustahkamlanadi. Aralashtirish jarayonining davomiyligi va intensivligi xamir sifatiga katta ta’sir ko‘rsatadi. Yetarli darajada aralashtirilmagan xamirda namlik bir tekis taqsimlanmaydi, natijada tayyor mahsulot sifati pasayadi.

Zamonaviy makaron ishlab chiqarish korxonalarida vakuumli aralashtirgichlardan keng foydalaniladi. Vakuum sharoitida tayyorlangan xamir tarkibida havo pufakchalari deyarli qolmaydi, bu esa mahsulot zichligining bir xil bo‘lishini ta’minlaydi. Bundan tashqari, vakuum muhitida oksidlanish jarayonlari kamayadi va tabiiy pigmentlar yaxshiroq saqlanadi. Natijada tayyor makaron mahsulotining rangi yorqinroq va tashqi ko‘rinishi jozibadorroq bo‘ladi. Ilmiy manbalarda vakuumli texnologiyalarning qo‘llanilishi makaronning pishirish sifatini yaxshilashi, yuzasining silliq bo‘lishini ta’minlashi va mahsulotning mexanik mustahkamligini oshirishi ta’kidlangan.

Texnologik jarayonning ushbu bosqichi keyingi presslash va shakl berish jarayonlari uchun asos yaratadi. Shu sababli xamir tayyorlash parametrlarini to‘g‘ri tanlash va nazorat qilish yuqori sifatli makaron mahsulotlari ishlab chiqarishda muhim ahamiyat kasb etadi.

XULOSA

Mazkur nazariy maqolada makaron mahsulotlarini ishlab chiqarish texnologiyasi, xom ashyo sifati, texnologik jarayon bosqichlari hamda zamonaviy ishlab chiqarish usullari ilmiy va o‘quv adabiyotlari asosida tahlil qilindi. Adabiyotlar sharhi va nazariy ma’lumotlar shuni ko‘rsatadiki, makaron mahsulotlari sifati ko‘p jihatdan ishlatiladigan xom ashyoning sifatiga, ayniqsa durum bug‘doyidan olinadigan semolina unining fizik-kimyoviy xususiyatlariga bog‘liq hisoblanadi. Oqartirilgan

yumshoq bug‘doy uniga nisbatan semolina tarkibida oqsil va kleykovina miqdorining yuqoriligi tayyor mahsulotning mustahkamligi, elastikligi va pishirish sifatini yaxshilaydi.

Nazariy manbalar tahlili makaron ishlab chiqarish jarayonida xamir tayyorlash bosqichi alohida ahamiyat kasb etishini ko‘rsatdi. Un tarkibidagi glutenin va gliadin oqsillarining suv bilan birikishi natijasida hosil bo‘ladigan kleykovina tarmog‘i mahsulotning strukturaviy xususiyatlarini shakllantiradi. Shu sababli suvning sifati, harorati va namlik miqdorining me’yoriy darajada bo‘lishi muhim texnologik omil hisoblanadi. Zamonaviy vakuumli aralashtirish texnologiyalaridan foydalanish esa xamir tarkibida havo pufakchalari hosil bo‘lishining oldini olib, mahsulotning zichligi va tashqi ko‘rinishini yaxshilashga xizmat qiladi.

Adabiyotlarda makaron mahsulotlarini shakllantirish va quritish jarayonlari ham asosiy texnologik bosqichlardan biri sifatida baholanadi. Xususan, past va o‘rtacha haroratlarda uzoq muddatli quritish rejimlari mahsulotning yorilib ketishini kamaytirishi, oqsil strukturasining saqlanishi hamda pishirish sifatining yaxshilanishiga yordam berishi qayd etilgan. Bosqichli quritish texnologiyalarining qo‘llanilishi esa mahsulotning ichki va tashqi qatlamlari orasidagi namlik farqini kamaytirib, deformatsiyalarning oldini oladi.

Nazariy manbalar asosida zamonaviy makaron sanoatida avtomatlashtirilgan texnologiyalar, raqamli monitoring tizimlari va sifat nazoratining xalqaro standartlari keng qo‘llanilayotgani aniqlandi. Xususan, ISO va HACCP tizimlari oziq-ovqat xavfsizligini ta’minlashda muhim ahamiyatga ega hisoblanadi. Bundan tashqari, IoT texnologiyalari va kompyuter ko‘rish tizimlari yordamida ishlab chiqarish jarayonlarini avtomatlashtirish hamda mahsulot sifatini real vaqt rejimida nazorat qilish imkoniyatlari kengayib bormoqda.

Nazariy tahlillar asosida O‘zbekistonda makaron sanoatini rivojlantirish uchun bir qator tavsiyalar shakllantirildi. Jumladan, yuqori sifatli durum bug‘doyi yetishtirishni kengaytirish, zamonaviy vakuumli aralashtirgichlar va energiya tejamkor

quritish uskunalarini joriy etish, sifat nazoratining xalqaro tizimlarini amaliyotga tatbiq qilish maqsadga muvofiq hisoblanadi. Shuningdek, funksional va boyitilgan makaron mahsulotlarini ishlab chiqarishni rivojlantirish, eksportbop mahsulot turlarini ko‘paytirish hamda ishlab chiqarish korxonalarida innovatsion texnologiyalarni qo‘llash mahalliy oziq-ovqat sanoatining raqobatbardoshligini oshirishga xizmat qiladi.

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БАЧАДОНДАН ТАШҚАРИ ХОМИЛАДОРЛИКНИНГ КЛИНИК, МОРФОЛОГИК АСОРАТЛАРИ

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Республика суд тиббий экспертиза илмий-амалий маркази, Сурхондарё филилали олий тоифали давлат суд эксперти ва Термиз иқтисодиёт ва сервис университети, Термиз ш. Ўзбекистон [1],

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Калит сўзлари: салпингит, контратсепцепсия, нейроэндокрин бузилишларни бачадонга тасири , бачадон найи хомиладорлиги.

Аннотация. Сўнгги 30 йил ичида бачадондан ташқари ҳомиладорликнинг учраши 2-4 баробар кўпайди. Ҳозирги вақтда у ҳар 1000 ҳомиладорликка нисбатан 7,4 – 19,7 ҳолатда учрайди, бу йиллар бўйича, ҳам турли мамлакатлар бўйича фарқ қилади. Россияда оналар ўлими сабаблари орасида бачадондан ташқари ҳомиладорлик абортидан ўлим, ҳомиладорлик пайтида қон кетиш ва токсикоздан кейин 4-ўринни эгаллайди. 1995 йилда унинг улуши 7,3% ни, 1999 йилда эса 8,9% ни ташкил этди. Ушбу патологиянинг узоқ муддатли салбий оқибатларидан келиб чиқадиган хавф камроқ аҳамиятга эга. Улар орасида иккиламчи бепуштликдан ташқари, энг асосий бўлиш эҳтимоли 30% бўлган тос бўшлиғидаги битишмалар ва такрорий бачадондан ташқари ҳомиладорлик ривожланиши ҳисобланади. Бачадондан ташқари ҳомиладорлик нафақат тиббий, балки катта ижтимоий аҳамиятга эга бўлган муаммодир.Бепуштликка олиб

келиши билан бирга, туғилиш даражасига сезиларли таъсир кўрсатадиган репродуктив йўқотишларнинг таркибий қисмларидан биридир.

Мавзунинг долзарблиги. Бачадондан ташқари ҳомиладорлик таркибида бачадон найидаги ҳомиладорлик (БН) 96,5 - 98,5% ни ташкил этувчи доминант позицияни эгаллайди. Бу ҳолат унинг алоҳида аҳамиятини кўрсатиб, унга бўлган энг катта қизиқишни тушунтиради. Бачадон найидаги ҳомиладорликнинг этиологияси аниқ белгиланмаган. Кўпгина муаллифлар сабабларни эмас, балки кўплаб хавф омилларини аниқлайдилар. Шуни таъкидлаш керакки, кўп ҳолларда БН нинг этиологияси кўп омилли, баъзан эса номаълум ва шунинг учун бу патологиянинг патогенезини аниқ кўрсатиш мумкин эмас. Кейинги ўн йилликларда БН нинг морфогенезини ўрганиш натижасида унинг ривожланиши хорион эпителийсининг инвазив ўсиши билан найча деворининг бузилишига асосланганиб, унинг ёрилиши ёки қон кетишига олиб келиши аниқланди. Бир овоздан эътирофга кўра, патогенезининг хусусиятлари асосан имплантациянинг анатомик локализациясига боғлиқ.

Тадқиқот мақсади – бачадон найи ҳомиладорлигининг учраш даражаси, хавфли омиллари, гистотопографияси ва патоморфологик белгилари ва асоратларининг патогистологик ўзига хослиги хақидаги маълумотларни ойдинлаштириш.

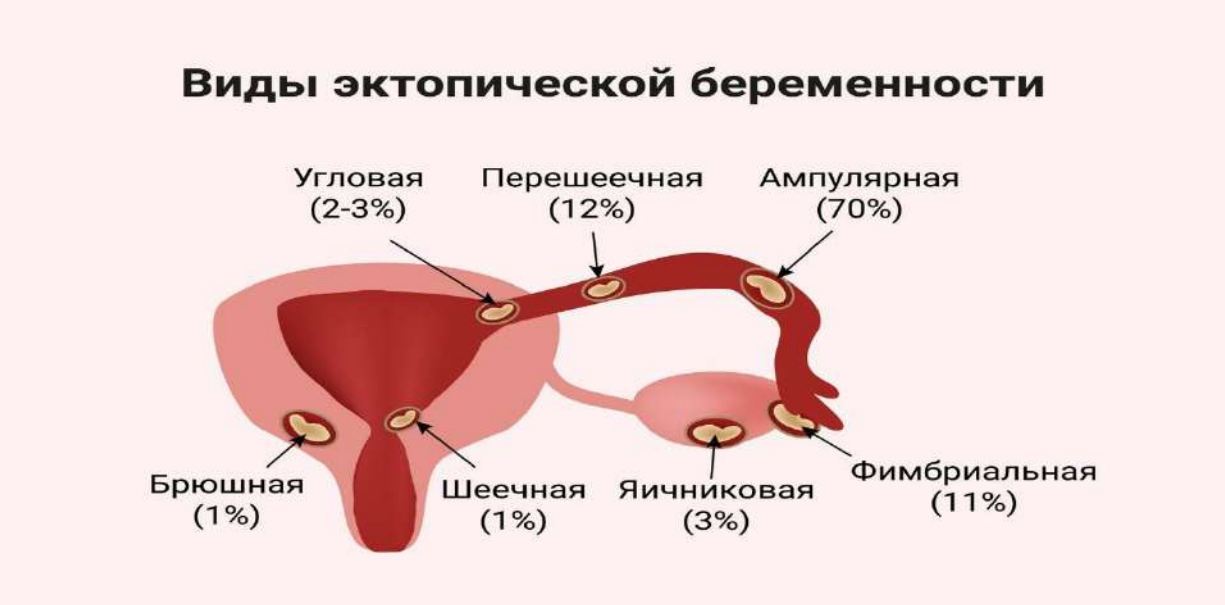
Тадқиқот материаллари ва методлари.

Бачадон найидаги ҳомиладорлик – ҳомиладорликнинг патологияси бўлиб, тухум ҳужайранинг фаллопий найига имплантацияси билан тавсифланади. Хомиладорликнинг намоён бўлиши ҳомиладорлик муддати ва турига боғлиқ. Касаллик симптомсиз ёки оғриқли синдромлар, қиндан қонли ажралмалар, кўриниши турли даражадаги ички қон кетиш билан кечиши мумкин. Ташхис анамнестик маълумотлар, гинекологик текширув натижалари, ультратовуш текшируви, қондаги хорион гонадотропини даражасини баҳолаш асосида белгиланади. Даволаш кўпинча фаллопий найининг ёрилишида жарроҳлик йўли

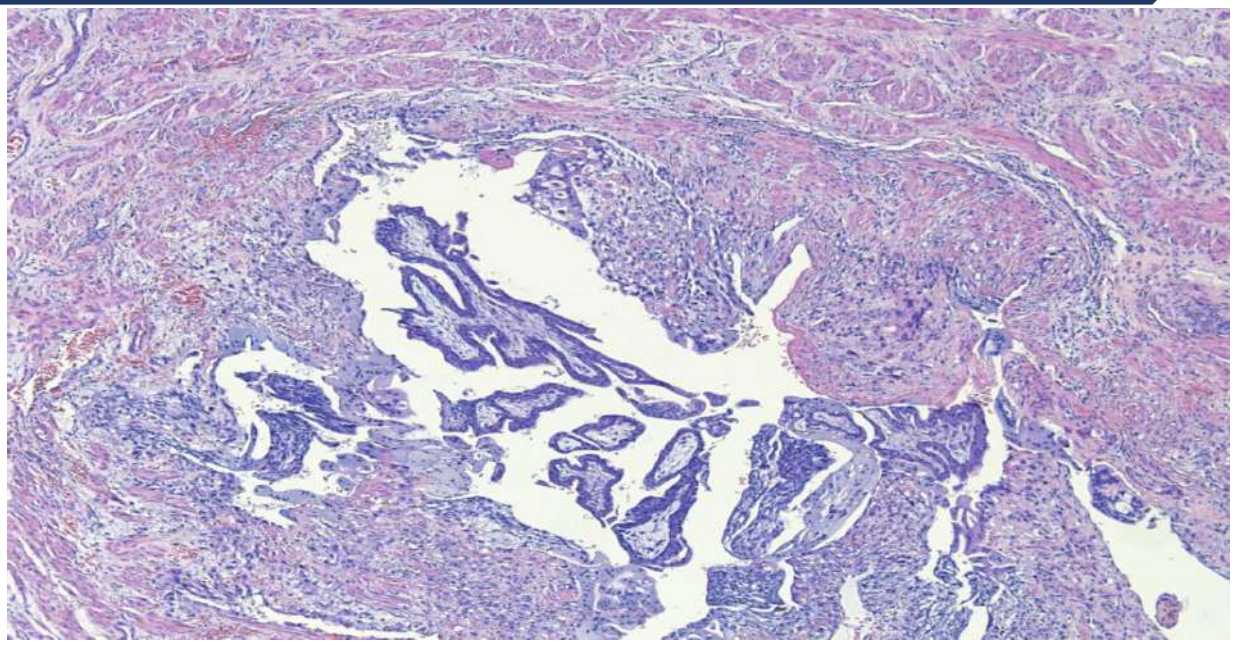
билан ва бир вақтнинг ўзида интенсив терапия ўтказилади. Бачадон найидаги ҳомиладорлик – бачадондан ташқари ҳомиладорликнинг энг кенг тарқалган шаклидир. Тухумдоннинг эктопик жойлашуви амалий гинекологиянинг асосий муаммоларидан бири бўлиб, ушбу патология билан касалланиш 100 ҳомиладорликда 1,5-6 ҳолат, бачадон найи ичида нидатцияланиш 95-98,5% ни ташкил қилади. Касалликнинг энг юқори учраш даражаси 28-30 ёшдаги аёлларда қайд этилган. Ҳомиладорликнинг ривожланиши тўртинчидан ўн иккинчи (камроқ йигирманчи) ҳафтагача давом этади, беморларнинг учдан икки қисмида натижа аборти, қолганларида фаллопий найининг ёрилиши кузатилади. Эмбрионнинг бачадон найидаги нидатцияси ҳаёт учун хавфли ҳолат бўлиб, унинг оналар ўлими таркибидаги улуши тахминан 7-8% ни ташкил қилади. Бачадон найи ҳомиладорлиги мултифакториал хусусиятга эга. Ушбу касаллик пайдо бўлишининг асосий сабабларига уруғлантирилган тухумни ташиш ва эмбрионнинг имплантацияси, аёлларнинг репродуктив тизимининг анатомик ёки функционал патологиялари, трофобластнинг ферментатив фаоллигидаги ўзгаришлар киради.Энг муҳим хавфли омиллари орасида: жинсий органларнинг патологияси.Эктопик ҳомиладорлик ҳолатларининг 40-80 фоизи ўткир ёки сурункали салпингитнинг натижасидир, бу эса фаллопий найларининг ўтказувчанлигини бузишга олиб келади Эмбрионнинг бачадон найи деворига имплантацияси кўпинча бачадоннинг миоматоз шикастланишлари, бачадон найи эндометриози, тухумдонда ҳосилалар шаклланиши, репродуктив аппарат инфантилизми, бачадоннинг туғма нуқсонлари туфайли юзага келади. Жарроҳлик операциялари; Тухум транзити бузилишининг муҳим сабаби бу тўғридан-тўғри бачадон найларидаги операциялар (уларни боғлаш, фимбриопластика).Кичик тос бўшлиғи, қорин бўшлиғи органларидаги жарроҳлик амалиётидан сўнг (масалан, аппендектомия) битишма жараёни ривожланиши мумкин ва натижада бачадон найларининг сиқилиши, уларнинг перисталтикасининг заифлашиши мумкин. Нейроэндокрин

бузилишлар. Гормонал ҳолатнинг бузилиши – фаллопий найларининг функционал фаоллиги, трофобласт томонидан синтез қилинган ферментларнинг сифати ва миқдори ўзгариши натижаси ҳисобланади. Бластоцистнинг бачадон найи эктопияси кўпинча тухумдонлар, буйрак усти безлари ва гипоталамо-гипофиз тизими касалликлари натижасида келиб чиққан аёл жинсий гормонлари ва гиперандрогенизмининг номутаносиблиги фонида кузатилади.

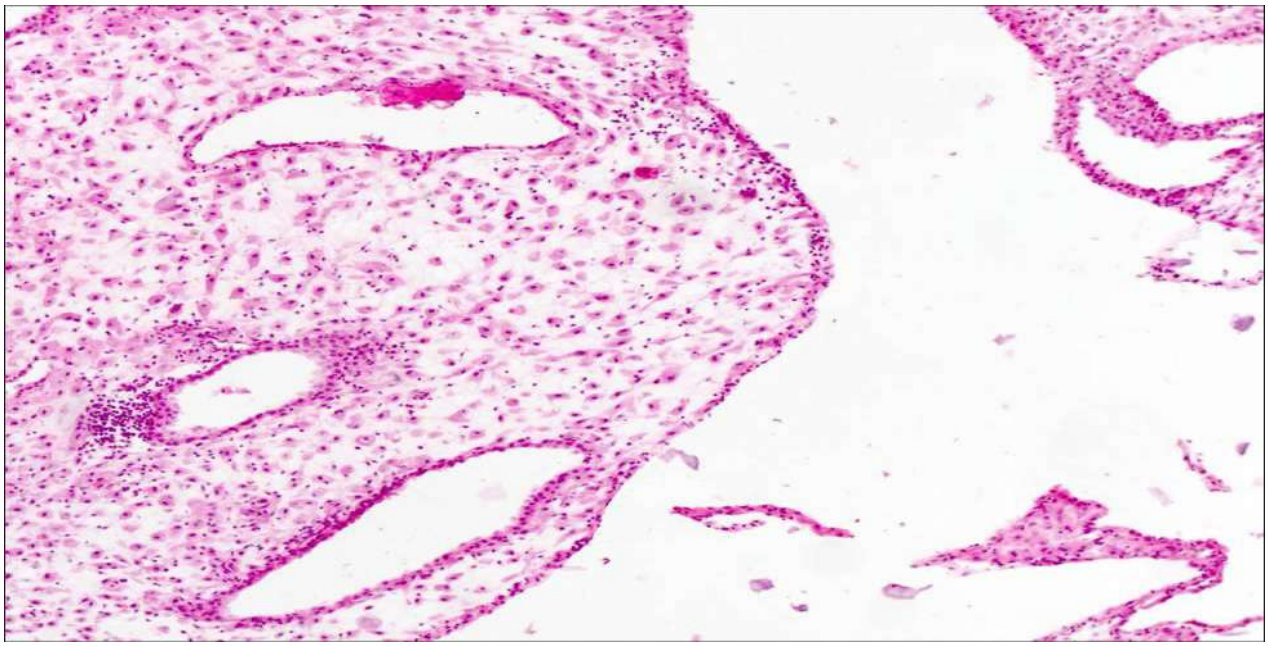
Контратсепцепсиянинг хусусиятлари; гэстаген оғиз контратсептивлари эндометрийнинг гравидар ўзгаришини бузишга ёрдам беради, фаллопий найларининг контрактил фаоллигини сусайтиради. Бачадон ичи контратсептив воситасини узоқ муддат қўллаш бачадон найи шиллиқ қаватининг ўзгаришига олиб келади, бу ҳам эктопик ҳомиладорлик хавфини оширади.



Бачадондан ташқари ҳомиладорликнинг учраши фоизларда (маълумот pathology outlines базасидан олинди)



Микропрепаратлар. Эктопик ҳомиладорлик. Фаллопи найчасининг деворида хорион ворсинкалари, ҳужайрадан ташқари трофобласт ҳужайралари, фибриноид, қон кетишлар кўринади, фаллоп найчасининг девори қисман вайрон бўлади; х 60.



Микропрепарат. Циклнинг лютинли фазасининг етишмовчилиги туфайли ривожланмаган ҳомиладорлик. Юпқа ихчам қатламда оралиқ турдаги децидуал ҳужайраларнинг бўш тақсимланиши мавжуд; х 400

Хулоса:

1. Бачадондан ташқари (ектопик) ҳомиладорлик — ҳомиладорлик асоратларидан бири бўлиб, унда уруғланган тухум ҳужайранинг имплантацияси бачадон бўшлиғидан ташқарида содир бўлади. Камдан-кам кузатиладиган истисно ҳолатлардан ташқари, ектопик ҳомиладорликда ҳомила ҳаётга лаёқатли бўлмайди, патология еса кўпинча ички қон кетиш туфайли онанинг соғлиғи учун хавфли саналади. Эктопик ҳомиладорликнинг 30-50 фоизида патология сабаблари номаълумлигича қолади. Хавф омилларига қуйидагилар киради: •Қорин бўшлиғида жарроҳлик аралашувлар ўтказилганлиги; •Контрацепция; •Гормонал йетишмовчилик ёки гормонал бузилишлар; •Яллиғланиш касалликлари ва аёл жинсий аъзоларининг инфекциялари; •Бачадон найларида транспорт функциясининг бузилиши; •Бачадон ва унинг ортиқлари ўсимталари; •Жинсий аъзолар ривожланишидаги аномалиялар.

2. Бачадондан ташқари ҳомиладорлик кейинчалик бепуштлик ёки такрорий ектопик ҳомиладорликка олиб келиши мумкин. Аномал ҳомиладорлик ва туғруқ еҳтимоли тахминан 50%, такрорий эктопик ҳомиладорлик еҳтимоли тахминан 20%, бепуштлик еҳтимоли тахминан 30%ни ташкил етади. Операциядан кейинги даврнинг янада йенгилроқ кечиши, бачадон найларининг ҳолати яхшиланиши учун медикаментоз терапия, физиотерапевтик муолажалар (магнитотерапия, лазерли терапия, акупунктура, массаж ва бошқалар) ёрдам беради. Баъзи ҳолларда аёлга психолог ёки психотерапевт ёрдами керак бўлиши мумкин. Ҳатто тубектомия амалга оширилган бўлса ҳам, қарама-қарши томондаги найлар терапияга муҳтож бўлади. Айниқса, агар қоринда кучли қон кетиш кузатилган бўлса. Эктопик ҳомиладорликдан сўнг контрацепция масаласига жуда диққатли бўлиш керак. Жарроҳликдан кейин камида олти ой давомида ҳомиладор бўлиш тавсия етилмайди. Ушбу чораларнинг барчаси уруғлантиришнинг муваффақиятли ўтиши ва ҳомиланинг дунёга соғлом келишига ёрдам беради.

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O‘ZBEKISTON OLIY TA’LIM TIZIMIDA SUN’IY INTELLEKT: IMKONIYATLAR VA XATARLAR TAHLILI

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ANNOTATSIYA

Ushbu maqolada O‘zbekiston oliy ta’lim tizimida sun’iy intellektni qo‘llashning yaxshi va yomon tomonlari tahlil qilinadi. Maqolada mamlakatdagi raqamlashtirish siyosati, “Raqamli O‘zbekiston – 2030” dasturi va xorij tajribalari asosida sun’iy intellektning ta’limga qanday integratsiya qilinishi o‘rganilgan. Yaxshi tomonlari qatoriga o‘qitishni har bir talabaga moslashtirish, baholashni adolatli qilish, o‘qituvchilarning ortiqcha ish yukini kamaytirish va talabalarda tahlil qilish qobiliyatini rivojlantirish kiradi. Xavfli tomonlari sifatida esa axborot xavfsizligi, ma’lumotlarning sir saqlanishi, sun’iy intellekt algoritmlarining xato qilishi, o‘qituvchi nazoratining pasayishi, raqamli tengsizlik va o‘qituvchilarning tajriba almashinuvidagi buzilishlar ko‘rib chiqilgan. Maqola oxirida O‘zbekiston oliy ta’limining huquqiy, texnik va tashkiliy jihatdan qanchalik tayyor ekanligi baholanib, xavflarni kamaytirish va imkoniyatlardan yaxshi foydalanish bo‘yicha tavsiyalar berilgan.

KALIT SO‘ZLARI

sun’iy intellekt, raqamlashtirish, axborot xavfsizligi, ma’lumotlar maxfiyligi, algoritm xatolari, pedagogik nazorat, raqamli tengsizlik, tajriba almashinuvi, tavsiyalar.

Bugungi kunda sun’iy intellekt texnologiyalari ta’lim sohasida tobora muhim rol o‘ynamoqda. O‘zbekistonda ham “Raqamli O‘zbekiston – 2030” dasturi doirasida oliy ta’limga sun’iy intellektni joriy etish masalalari ko‘tarilmoqda. Ushbu maqolada sun’iy intellektning O‘zbekiston oliy ta’lim tizimidagi imkoniyatlari va xatarlari tahlil qilinadi.maqolada sun’iy intellektning O‘zbekiston oliy ta’lim tizimidagi imkoniyatlari va xatarlari tahlil qilinadi.

Sun’iy intellekt – bu insonning aql-idrok, fikrlash va o‘rganish qobiliyatlarini texnik tizimlar orqali taqlid qiluvchi texnologiyalardir. Hozirgi kunda sun’iy intellekt dunyoning rivojlangan mamlakatlarida ta’lim sohasida keng qo‘llanilmoqda. O‘zbekiston ham bu jarayondan chetda qolmayapti. “Raqamli O‘zbekiston – 2030” dasturi doirasida oliy ta’lim tizimiga sun’iy intellekt texnologiyalarini joriy etish masalalari ko‘tarilmoqda. Bu jarayonning o‘ziga xos imkoniyatlari va xatarlari mavjud. [1]

Sun’iy intellektning O‘zbekiston oliy ta’limidagi asosiy imkoniyatlari bir nechta. Birinchidan, o‘qitishni individuallashtirish mumkin. Har bir talabaning bilim darajasi va o‘zlashtirish tezligi turlicha. An’anaviy ta’limda bir o‘qituvchi 30-40 talabaga dars o‘tadi va ularning har biriga alohida yondashish imkoniyati cheklangan. Sun’iy intellekt asosidagi adaptiv tizimlar har bir talabaning kuchli va kuchsiz tomonlarini aniqlab, unga mos topshiriqlar va materiallarni tanlab beradi. Bu ayniqsa qishloq joylardagi talabalar uchun katta yordamdir. Ikkinchidan, baholash tizimining ob’ektivligi oshadi. O‘zbekiston oliy ta’limida baholash masalasi ko‘p tanqid qilinadi. Ayrim hollarda o‘qituvchining shaxsiy munosabati yoki kayfiyati bahoga ta’sir qilishi mumkin. Sun’iy intellekt asosidagi baholash tizimlari inson omilini deyarli butunlay

[1] Mirziyoyev Sh.M. “Raqamli O‘zbekiston – 2030” strategiyasini tasdiqlash to‘g‘risida. O‘zbekiston Respublikasi Prezidentining Farmoni, 2020-yil 5-oktyabr.

chiqarib tashlaydi. Test topshiriqlari, insholar va hatto og‘zaki javoblarni SI tekshirishi mumkin. Uchinchidan, professor-o‘qituvchilarning ma’muriy yuki kamayadi. Tadqiqotlarga ko‘ra, o‘qituvchilarning ish vaqtining 30-40 foizi ma’muriy ishlarga – jurnal to‘ldirish, hisobot tayyorlash, test tekshirishga ketadi. Sun’iy intellekt bu vazifalarning katta qismini avtomatlashtirishi mumkin. Bu esa o‘qituvchilarga darsga tayyorgarlik ko‘rish va ilmiy izlanish uchun ko‘proq vaqt qoldiradi. To‘rtinchidan, talabalarning analitik va raqamli ko‘nikmalari rivojlanadi. Sun’iy intellekt vositalari bilan ishlash talabalarda ma’lumotlarni tahlil qilish, mantiqiy fikrlash va algoritmik yondashuv kabi ko‘nikmalarni shakllantiradi.[2]

Biroq imkoniyatlar bilan bir qatorda jiddiy xatarlar ham mavjud. Birinchi xatar – axborot xavfsizligi va ma’lumotlarning maxfiyligi. Sun’iy intellekt tizimlari talabalarning shaxsiy ma’lumotlari va akademik ko‘rsatkichlarini to‘playdi. Agar bu ma’lumotlar yetarli darajada himoya qilinmasa, ularning sizib chiqishi jiddiy oqibatlarga olib kelishi mumkin. Ikkinchi xatar – algoritmik xatoliklar. Hech qanday sun’iy intellekt tizimi 100 foiz xatosiz ishlamaydi. Ba’zi algoritmlar noto‘g‘ri xulosa chiqarishi yoki ayrim talabalarga nisbatan nohaq baho qo‘yishi mumkin. Uchinchi xatar – pedagogik nazorat va insoniy aloqaning susayishi. O‘qituvchi nafaqat bilim beradi, balki tarbiyalaydi va ruhiy qo‘llab-quvvatlaydi. Agar sun’iy intellekt o‘qituvchini siqib chiqara boshlasa, ta’limning tarbiyaviy jihatlari zaiflashadi. To‘rtinchi xatar – raqamli tengsizlik. O‘zbekistonning ayrim hududlarida internet tezligi past, zamonaviy qurilmalar yetishmaydi. Bunday sharoitda sun’iy intellektni joriy etish faqat yirik shaharlardagi universitetlarning imkoniyatini oshiradi, qishloq joylardagi talabalar esa orqada qolib ketadi. Beshinchi xatar – o‘qituvchilarning

[2] O‘zbekiston Respublikasi Oliy va o‘rta maxsus ta’lim vazirligi. Oliy ta’lim tizimini raqamlashtirish konsepsiyasi. – Toshkent, 2021.

malakasi yetishmasligi. Sun'iy intellektdan samarali foydalanish uchun professor-o'qituvchilarning o'zi yetarli darajada raqamli bilimga ega bo'lishi kerak. Ko'plab o'qituvchilar, ayniqsa keksa yoshdagilari, yangi texnologiyalardan foydalanishda qiynalmoqda.[3]

Xulosa qilib aytganda, sun'iy intellekt O'zbekiston oliy ta'lim tizimi uchun katta imkoniyatlar va bir qator jiddiy xatarlarni o'z ichiga oladi. Imkoniyatlar qatorida o'qitishni individuallashtirish, baholash tizimining ob'ektivligini oshirish, professor-o'qituvchilarning ma'muriy yukini kamaytirish va talabalarning analitik hamda raqamli ko'nikmalarini rivojlantirish kabi muhim jihatlar mavjud. Bu omillar ta'lim sifatini sezilarli darajada oshirishi va O'zbekiston oliy ta'limini xalqaro standartlarga yaqinlashtirishi mumkin. Biroq sun'iy intellektni joriy etishda axborot xavfsizligi, ma'lumotlar maxfiyligi, algoritmik xatoliklar, pedagogik nazoratning susayishi, raqamli tengsizlik va o'qituvchilarning malakasi yetishmasligi kabi xatarlarni ham unutmaslik kerak. Agar bu xatarlar oldindan ko'rib chiqilmasa va tegishli choralar ko'rilmasa, sun'iy intellekt kutilgan foydani bermasligi, aksincha, yangi muammolarni keltirib chiqarishi mumkin. Shuning uchun O'zbekiston oliy ta'lim tizimida sun'iy intellektni joriy etishda kuchli axborot xavfsizligi tizimini yaratish, sun'iy intellekt algoritmlarini muntazam tekshirib va takomillashtirib borish, o'qituvchilarning raqamli malakasini oshirish bo'yicha maxsus kurslar tashkil qilish, barcha hududlarda internet infratuzilmasini yaxshilash va sun'iy intellektdan foydalanish bo'yicha aniq huquqiy me'yorlarni ishlab chiqish maqsadga muvofiqdir. Faqat shundagina sun'iy intellekt haqiqiy taraqqiyot vositasi bo'lib xizmat qiladi va O'zbekiston yoshlariga sifatli, zamonaviy va adolatli ta'lim olish imkonini beradi.

[3] Xolmatov U.U. Sun'iy intellekt va ta'limda axborot xavfsizligi muammolari. "Axborot texnologiyalari va muammolari" to'plami, 2022, 134-140-betlar.

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Annotatsiya

Ushbu maqolada XX asr o‘zbek adabiyotining yirik namoyandasi Shukur Xolmirzayev ijodida milliy qadriyatlar, xalqona urf-odatlar va o‘zbek xarakterining badiiy in’ikosi tahlil qilinadi. Adibning "O‘zbeklar", "Olis yulduzlar ostida" va "Tog‘larga qor tushdi" kabi asarlari misolida milliy ruhning ahamiyati, insonning o‘zligini anglashi va ajdodlar merosiga sodiqligi aniq faktlar asosida yoritiladi.Tadqiqot obyekti sifatida tanlangan uchta yirik asar tahlili orqali yozuvchining millat ruhini ochib berish mahorati quyidagicha yoritiladi:"O‘zbeklar" hikoyasida adib millatning fitriy xislatlari — begaraz mehmondo‘stlik, andisha va insonni inson sifatida qadrlash kabi qadriyatlarni poyezd yo‘lovchilari o‘rtasidagi psixologik muloqotlar orqali ochib beradi. Maqolada ushbu asarning milliy o‘zlikni anglashdagi o‘rni va "o‘zbekona lutf" tushunchasining badiiy talqini tahlil qilinadi."Olis yulduzlar ostida" qissasida insonning o‘z o‘tmishi, ota-makoni va ajdodlar an’analariga bo‘lgan ma’naviy sadoqati masalasi ko‘rib chiqiladi. Unda qishloq hayoti va shahar sivilizatsiyasi to‘qnashuvida milliy ruhni saqlab qolish muammosi hamda xotira — qadriyatni asrovchi asosiy kuch ekanligi dalillanadi."Tog‘larga qor tushdi" asarida esa Boysun tog‘li hududlariga xos bo‘lgan mardlik, lafzga sadoqat, or-nomus kodeksi va tabiat bilan uyg‘un yashash qonuniyatlari tahlilga tortiladi. Adibning xalqona til, dialektik xususiyatlar va milliy liboslar orqali yaratgan badiiy koloriti aniq misollar bilan ko‘rsatiladi.Umuman olganda, maqolada Shukur Xolmirzayevning ushbu asarlari nafaqat badiiy to‘qima,

balki millatning ma'naviy qiyofasini saqlab qoluvchi o'ziga xos "jonli xotira" ekanligi ilmiy-nazariy jihatdan asoslab beriladi.

Kalit so'zlar

Milliy qadriyatlar,xalq xarakteri, badiiy mahorat, milliy kolorit, inson talqini, mehmondo'stlik va andisha, realistik tasvir, psixologik tahlil , badiiy detallar, tarixiy xotira, etnografik tasvir.

Abstract

This article analyzes the artistic reflection of national values, folk customs, and Uzbek character in the works of Shukur Kholmirzaev, a prominent representative of 20th-century Uzbek literature. Through the example of the writer's works such as "The Uzbeks," "Under the distant stars," and "Snow fell on the mountains," the importance of the national spirit, human self-awareness, and loyalty to the heritage of ancestors are highlighted based on concrete facts.Through the analysis of the three major works selected as the object of research, the writer's skill in revealing the spirit of the nation is highlighted as follows:In the story "The Uzbeks," the writer reveals the innate qualities of the nation - values such as selfless hospitality, consideration, and valuing a person as a human being - through psychological dialogues between train passengers. The article analyzes the role of this work in national self-awareness and the artistic interpretation of the concept of "Uzbek grace."In the story "Under the distant stars," a person's pride in their past, the land of their ancestors and the traditions of their ancestors.

Аннотация

В данной статье анализируется художественное отражение национальных ценностей, народных обычаев и узбекского характера в творчестве Шукура Холмирзаева, крупного представителя узбекской литературы XX века. На примере таких произведений писателя, как "Узбеки," "Под далекими звездами" и "В горах выпал снег," на основе конкретных фактов освещается значение национального духа, самосознание человека и преданность

наследию предков.На основе анализа трех крупных произведений, выбранных в качестве объекта исследования, мастерство писателя в раскрытии духа нации освещается следующим образом:В рассказе "Узбеки" писатель через психологические диалоги между пассажирами поезда раскрывает врожденные качества нации - такие ценности, как бескорыстное гостеприимство, благоразумие и уважение к человеку как к человеку. В статье анализируется роль этого произведения в национальном самосознании и художественная интерпретация понятия "узбекская доброта."В повести "Под далекими звездами" человек гордится своим прошлым, родиной и традициями предков.

Annotasyon

Bu makalede, 20. yüzyıl Özbek edebiyatının büyük temsilcisi Şükür Holmirzayev'in eserlerinde ulusal değerlerin, halk geleneklerinin ve Özbek karakterinin sanatsal yansıması analiz edilmektedir. Yazarın "Özbekler," "Uzak Yıldızlar Altında" ve "Dağlara Kar Düştü" gibi eserleri örneğinde, ulusal ruhun önemi, insanın kimlik anlayışı ve ataların mirasına bağlılığı somut gerçekler temelinde ele alınmaktadır.Araşdırma nesnesi olarak seçilen üç büyük eserin analizi aracılığıyla yazarın milletin ruhunu açığa çıkarma becerisi aşağıdaki şekilde ele alınmaktadır: "Özbekler" hikayesinde yazar, ulusun doğuştan gelen özelliklerini - özverili misafirperverlik, nezaket ve insanı bir insan olarak değerlendirme gibi değerleri - tren yolcuları arasındaki psikolojik diyaloglar aracılığıyla ortaya koyuyor. Makalede bu eserin ulusal kimlik kavramındaki yeri ve "Özbekçe lütf" kavramının sanatsal yorumu analiz edilmektedir."Uzak yıldızlar altında" hikâyesinde insanın kendi geçmişine, ata-baba mekânına ve ata-baba geleneklerine olan hayranlığı.

Kirish

O‘zbek adabiyotining zabardast vakili, O‘zbekiston xalq yozuvchisi Shukur Xolmirzayev asarlari o‘zbek milliy tafakkuri va qadriyatlarining badiiy qomusi hisoblanadi. Yozuvchi o‘z ijodida xalqimizning asriy an’analari, turmush tarzi, ruhiyati

va ona tabiatga bo‘lgan munosabatini yuksak mahorat bilan tasvirlab bergan.Shukur Xolmirzayev asarlarining markazida har doim milliy odam turadi. Uning qahramonlari Boysun tog‘lari bag‘rida ulg‘aygan, mard, oriyatli, lafzi halol va o‘zligiga sodiq insonlardir. Muallif milliy qadriyatlarni shunchaki rasm-rusum sifatida emas, balki qahramonlarning xarakterini shakllantiruvchi asosiy omil sifatida ko‘rsatadi. Masalan, uning hikoyalaridagi kattalarga hurmat, mehmondostlik va mahalla-ko‘y oldidagi mas’uliyat kabi hislatlar o‘zbek xalqining ma’naviy qiyofasini yorqin aks ettiradi[1]. Yozuvchi ijodida milliy qadriyatlar ona tabiatga bo‘lgan cheksiz muhabbat bilan bog‘liq. Uning talqinida tabiatni asrash bu ajdodlar merosini asrash bilan barobardir. O‘zbek xarakteri tabiat bilan muloqotda, tog‘u toshlar orasidagi hayotda toblanadi. Milliy qadriyatlarimizdagi tejamkorlik, yerga va suvga bo‘lgan muqaddas munosabat Shukur Xolmirzayev asarlarining asosiy mazmunini tashkil etadi.Shukur Xolmirzayev o‘zbek tilining boy imkoniyatlaridan, xalqona iboralardan va sheva unsurlaridan mahorat bilan foydalangan. Uning tili milliy qadriyatning eng muhim bo‘lagidir. Yozuvchi xalq og‘zaki ijodi, maqollar va matallar orqali o‘zbekona falsafani kitobxonga yetkazadi. Bu esa asarlariga o‘ziga xos milliy joziba va hayotiylik baxsh etadi.Yozuvchi ijodida insonning ichki erkinligi va ma’naviy pokligi eng oliy qadriyat sifatida ulug‘lanadi. U o‘z asarlarida milliy g‘urur va shon-sharaf tushunchalarini birinchi o‘ringa qo‘yadi. Shukur Xolmirzayev qahramonlari moddiy boylikdan ko‘ra ma’naviy butunlikni, vijdon amrini ustun bilishadi. Bu esa o‘zbek xalqining asriy qadriyatlaridan biri bo‘lgan oriyat tushunchasining badiiy ifodasidir[2]

Shukur Xolmirzayevning "O‘zbeklar" hikoyasi milliy xarakter va qadriyatlarimizni ochib beruvchi eng sara asarlardan biridir. Ushbu hikoyada milliy qadriyatlar quyidagi jihatlar orqali aks etgan:Oriyat va mardlik tushunchasiHikoyaning asosiy g‘oyasi o‘zbek xalqiga xos bo‘lgan oriyat va nomus tushunchalariga tayanadi. Asar qahramonlari har qanday vaziyatda ham o‘z shon-sharafini, insoniy qadr-

[1] "O‘zbeklar" (hikoyalar to‘plami). Toshkent, Adabiyot va san’at nashriyoti, 1992.Shukur Xolmirzayev.
[2] Baxtiyor Nazarov. O‘zbek nasrida milliy xarakter muammosi. Toshkent, Fan, 2003.

qimmatini hamma narsadan ustun qo‘yadilar. Bu erda milliy qadriyat shunchaki tushuncha emas, balki insonning yashash tarziga aylangan.Mehmondostlik va olijanoblikHikoyada mehmondostlik o‘zbekning qon-qoniga singib ketgan eng oliy fazilat sifatida ko‘rsatiladi. Hatto o‘ziga yetishmovchilik bo‘lgan paytda ham mehmonni aziz deb bilish, unga borini ilinish xalqimizning bag‘rikengligini anglatadi. Yozuvchi bu an'anani oddiy maishiy holat emas, balki milliy g‘urur darajasida tasvirlaydi.Lafzi halollik va ishonchHikoya qahramonlari o‘rtasidagi munosabatlarda lafzi halollik va berilgan va’daga sodiqlik muhim o‘rin tutadi. Bir so‘zli bo‘lish, birovning haqidan qo‘rqish va o‘zaro ishonch milliy qadriyatning eng go‘zal ko‘rinishi sifatida talqin qilinadi. Bu xislatlar o‘zbek xalqining ma’naviy qiyofasini shakllantiruvchi asosiy omillar sifatida berilgan.Kattalarga hurmat va ota-ona e’roziAsarda oila va jamiyatda yoshi ulug‘ insonlarning o‘rni alohida ta’kidlanadi. Ota-onaning duosini olish, ularning so‘zini ikki qilmaslik va oilaviy an’analarga sadoqat kabi qadriyatlar hikoya mazmuniga chuqur singdirilgan. Shukur Xolmirzayev ushbu munosabatlar orqali milliy tarbiyaning mustahkam asoslarini ko‘rsatib beradi.Xalqona til va milliy tafakkurYozuvchi hikoyada ishlatgan iboralar, xalqona so‘zlashuv uslubi va qahramonlarning fikrlash tarzi o‘zbekona ruhni to‘laqonli his qilishga yordam beradi. Milliy tafakkur tarzi qahramonlarning har bir xatti-harakatida, ularning dunyoqarashida va voqealarga bo‘lgan munosabatida namoyon bo‘ladi. Shukur Xolmirzayevning "Tog‘larga qor tushdi" va "Olis yulduzlar ostida" asarlari yozuvchining milliy o‘zlikni anglash va insoniy qadriyatlarni ulug‘lash borasidagi o‘ziga xos qarashlarini aks ettiradi. Bu asarlarda milliy qadriyatlar shunchaki tashqi tasvirlarda emas, balki qahramonlarning o‘y-fikrlari, tabiatga munosabati va ma’naviy olami orqali chuqur ochib berilgan."Tog‘larga qor tushdi" hikoyasida milliy qadriyatlar tasviri:Ushbu hikoyada milliy qadriyatlar inson va ona tabiat o‘rtasidagi uzviy bog‘liqlik orqali namoyon bo‘ladi[3]. O‘zbek xalqi uchun tabiat shunchaki yashash joyi

[3] Ahmad A’zam. Shukur Xolmirzayevning badiiy olami. "O‘zbekiston adabiyoti va san’ati" gazetasi, 2005-yil sonlari.

emas, balki hayot manbai va ma’naviy quvvat maskanidir. Tog‘ odamlarining qishning ilk qori tushishi bilan bog‘liq bo‘lgan tayyorgarligi, tabiat injiqliklariga sabr-bardosh bilan yondashishi xalqimizga xos bo‘lgan matonat va mehnatsevarlik ramzidir. Yozuvchi bu yerda insonning o‘z ota-bobolari yashab o‘tgan tuproqqa sadoqatini, har qanday qiyinchilikda ham o‘z yerini tashlab ketmaslik kabi asriy qadriyatlarni mahorat bilan tasvirlagan. Hikoyadagi soddalik, o‘zaro qo‘shnichilik yordami va tabiat bilan hamnafaslik o‘zbekona turmush tarzining go‘zal qirralarini ochib beradi.Olis yulduzlar ostida asarida ma’naviy qadriyatlar talqiniOlis yulduzlar ostida asarida milliy qadriyatlar falsafiy va ma’naviy jihatdan tahlil qilinadi. Bu asarda insonning koinotdagi o‘rni, uning o‘z ajdodlari va kelajak avlod oldidagi mas’uliyati qadriyat darajasida ko‘tariladi. Muallif qahramonlarning ichki kechinmalari orqali halollik, poklik va o‘zligiga sodiqlik kabi tushunchalarni ilgari suradi. Milliy tafakkur tarzi asarda yulduzli osmon ostida tushunilgan hayot hikmatlari, ota-bobolarimizning hayotiy tajribalariga tayanib yashash zarurati bilan bog‘lanadi. Bu yerda milliy qadriyat insonni ma’naviy jihatdan yuksaltiruvchi va uni tubanlikdan saqlab qoluvchi kuch sifatida namoyon bo‘ladi.Har ikki asarda ham umumiy bo‘lgan milliy xususiyatlarShukur Xolmirzayev ushbu asarlarida o‘zbek xalqining oriyati, mardligi va o‘z so‘zida turishini yuksak baholaydi. Qahramonlarining tili, ularning o‘ylash tarzi va voqealarga beradigan munosabati milliy ruh bilan sug‘orilgan. Yozuvchi uchun milliy qadriyat bu — insonning o‘z vijdoniga xiyonat qilmasligi, kattalarni e’zozlashi, tabiatni muqaddas bilishi va har qanday vaziyatda ham insoniylikni saqlab qolishidir[4]. Bu asarlar o‘quvchini o‘z ildizlarini unutmaslikka, milliy an’analarni zamonaviy hayot bilan uyg‘unlashtirib yashashga chorlaydi.Shukur Xolmirzayevning ushbu asarlari orqali o'zbek xalqining o'ziga xos fe'l-atvori va ma'naviy dunyosi butun murakkabligi bilan namoyon bo'ladi.Shukur Xolmirzayev ijodi o‘zbek milliy adabiyotida xalqning asl qiyofasini, uning betakror ruhiyati va qadriyatlarini badiiy aks ettirgan o‘ziga xos

[4] Shukur Xolmirzayev. Saylanma. Ikki jildlik. Toshkent, Sharq nashriyoti, 2003-2005.Shukur Xolmirzayev.

ko‘zgudir[5] Adib asarlarida milliy qadriyatlar shunchaki o‘tmish xotirasi emas, balki bugungi kun insonining xarakterini belgilovchi, uni ma’naviy tanazzuldan asrab qoluvchi mustahkam poydevor sifatida talqin etiladi.Yozuvchi o‘zining hikoya va qissalari orqali o‘zbek xalqiga xos bo‘lgan oriyat, lafzi halollik, tabiatga mehr va kattalarga hurmat kabi fazilatlarni insoniy yuksaklik mezoni darajasiga ko‘tardi. Uning qahramonlari timsolida milliy g‘urur va o‘zlikni anglash g‘oyalari yorqin namoyon bo‘ladi.

Xulosa qilib aytganda, Shukur Xolmirzayev asarlari kitobxonni o‘zligini unutmaslikka, milliy an’analarni ardoqlashga va har qanday davrda ham insoniy qadr-qimmatni saqlab qolishga chorlashi bilan hamisha qadrlidir.Shukur Xolmirzayev ijodi o‘zbek milliy adabiyotida xalqning asl qiyofasini, uning betakror ruhiyati va qadriyatlarini badiiy aks ettirgan o‘ziga xos ko‘zgudir[6]. Adib asarlarida milliy qadriyatlar shunchaki o‘tmish xotirasi emas, balki bugungi kun insonining xarakterini belgilovchi, uni ma’naviy tanazzuldan asrab qoluvchi mustahkam poydevor sifatida talqin etiladi.Yozuvchi o‘zining hikoya va qissalari orqali o‘zbek xalqiga xos bo‘lgan oriyat, lafzi halollik, tabiatga mehr va kattalarga hurmat kabi fazilatlarni insoniy yuksaklik mezoni darajasiga ko‘tardi.

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MOLIYAVIY HISOBOTLAR 24/7: BIZNESNI REAL VAQT REJIMIDA BOSHQARISHNING O'ZIGA XOS SAN'ATI VA ISTIQBOLLARI

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ANNOTATSIYA: Ushbu maqolada raqamli iqtisodiyot sharoitida moliyaviy hisobotlarni real vaqt rejimida yuritishning afzalliklari ,ahamiyati va istiqbollari tahlil qilinadi.An'anaviy tarzda yuritiladigan davriy hisobot tizimining kamchiliklari ochib berilib ,24/7 -uzluksiz hisob tizimining boshqaruvdagi o'rni yoritiladi.Shuningdek,zamonaviy bulutli texnologiyalar hamda boshqa tizimlarning moliyaviy shaffoflik va boshqaruvdagi samaradorlikni oshirishdagi roli ilmiy-amaliy jihatdan ko'rsatiladi.

KALIT SO'ZLAR: raqamli iqtisodiyot,boshqaruv samaradorligi, moliyaviy hisobotlar, real vaqt rejimidagi hisob, innovatsion boshqaruv, bulutli hisob platformalari, operativlik, avtomatlashtirilgan tizimlar, uzluksiz hisob, moliyaviy shaffoflik.

АННОТАЦИЯ: В данной статье анализируются преимущества, значение и перспективы ведения финансовой отчетности в режиме реального времени в условиях цифровой экономики. Раскрываются недостатки традиционной системы периодической отчетности и освещается роль системы непрерывного учета 24/7. Также с научно-практической точки зрения демонстрируется роль современных облачных технологий и других систем в повышении финансовой прозрачности и эффективности управления.

КЛЮЧЕВЫЕ СЛОВА: цифровая экономика, эффективность управления, финансовая отчетность, учет в режиме реального времени, инновационное управление, облачные платформы учета, оперативность, автоматизированные системы, непрерывный учет, финансовая прозрачность.

ABSTRACT: This article analyzes the advantages, importance, and prospects of maintaining real-time financial reporting in the digital economy. It reveals the shortcomings of the traditional periodic reporting system and highlights the role of the 24/7 continuous accounting system in management. It also demonstrates the role of modern cloud technologies and other systems in increasing financial transparency and management efficiency from a scientific and practical perspective.

KEYWORDS: digital economy, management efficiency, financial reporting, real-time accounting, innovative management, cloud accounting platforms, efficiency, automated systems, continuous accounting, financial transparency.

ÖZET: Bu makalede, dijital ekonomi koşullarında gerçek zamanlı mali raporlamanın avantajları, önemi ve perspektifleri analiz edilmektedir.Geleneksel olarak yürütülen periyodik raporlama sisteminin eksiklikleri açığa çıkarılarak, 24/7 kesintisiz muhasebe sisteminin yönetimdeki rolü ele alınmaktadır.Ayrıca, modern bulut teknolojilerinin ve diğer sistemlerin mali şeffaflığın ve yönetimdeki verimliliğin artırılmasındaki rolü bilimsel ve pratik açıdan gösterilmektedir.

ANAHTAR KELIMELER: dijital ekonomi, yönetim verimliliği, mali raporlama, gerçek zamanlı muhasebe, yenilikçi yönetim, bulut muhasebe platformları, operativlik, otomatik sistemler, sürekli muhasebe, mali şeffaflık.

Kirish

Hozirgi raqamli iqtisodiyot sharoitida korxonalar faoliyatini samarali boshqarishda moliyaviy axborotlarning tezkorligi, aniqligi va ishonchliligi muhim ahamiyat kasb etadi.An'anaviy moliyaviy hisobot tizimlari odatda oylik, choraklik yoki yillik davrlar asosida shakllantiriladi. Bunday yondashuv tez o'zgaruvchan bozor iqtisodiyoti sharoitida boshqaruv qarorlarini qabul qilish va ularni amalga oshirishda yetarli darajada samarali bo'lmay qolmoqda. Chunki davriy(oylik,choraklik,yillik) hisobotlar tayyor bo'lgunga qadar iqtisodiy vaziyat o'zgarib ketishi, korxona esa allaqachon kechikkan ma'lumot asosida qaror qabul qilishi mumkin. Shu sababli real vaqt rejimida ishlovchi moliyaviy hisobot tizimlariga bo'lgan ehtiyoj tobora ortib bormoqda.

24/7 uzluksiz moliyaviy hisobot yuritish tizimi korxonalarga moliyaviy operatsiyalarni bir vaqtning o'zida qayd etish,tekshirish va tahlil qilish imkoniyatini beradi.Real vaqt rejimida hisobot yuritadigan tizimlar bulutli texnologiyalar (Cloud Computing), ERP (Enterprise Resource Planning), sun'iy intellekt, Big Data va Business Intelligence platformalari bilan integratsiyalashgan holda ishlaydi. Natijada boshqaruv organlari real vaqt rejimida korxonaning moliyaviy holatini o'rganib chiqish, tavakkalchiliklarni oldindan aniqlash va tezkor strategik qarorlar qabul qilish imkoniga ega bo'lishadi va bu orqali ular yanada yuqori samaradorlikka erishishlari mumkin.

Ilmiy tadqiqotlarda ham real vaqt hisobotlari biznes samaradorligini oshirish, moliyaviy shaffoflikni ta'minlash hamda investorlar ishonchini kuchaytirishda muhim vosita sifatida e'tirof etilmoqda. Antonio Trigo, Fernando Belfo va Raquel Perez Estebanez tomonidan olib borilgan tadqiqotlarda real vaqt hisobotlari "now economy" — ya'ni tezkor iqtisodiyotning muhim ahamiyatga ega talablaridan biri sifatida ko'rsatilib,bugungi kunda boshqaruv qarorlarini qabul qilishda axborotning dolzarbligi va ayni vaqtda ko'rsatilishi zamonaviy biznesda eng asosiy ko'rsatkich ekanligi ta'kidlangan. Shuningdek, bulutli hisob tizimlari asosida ishlovchi moliyaviy

platformalar hisobotlarning aniqligi, ishonchliligi va tezkorligini sezilarli darajada oshirishi ilmiy jihatdan asoslangan. Zamonaviy ERP va “cloud accounting” tizimlari moliyaviy ma’lumotlarni avtomatlashtirilgan tarzda qayta ishlash orqali inson omili bilan bog‘liq arifmetik va boshqa jiddiy xatolarni kamaytiradi va audit-tekshirish jarayonlarini osonlashtiradi.

Ushbu maqolaning maqsadi — real vaqt rejimida ishlovchi 24/7 moliyaviy hisobot tizimlarining iqtisodiy mohiyatini, afzalliklari va boshqaruvdagi ahamiyatini yoritish , shuningdek, zamonaviy raqamli texnologiyalarning moliyaviy boshqaruv samaradorligiga ta’sirini tahlil qilishdan iborat.

Asosiy qism

An’anaviy moliyaviy hisobot tizimining kamchiliklari

An’anaviy moliyaviy hisobot tizimlari uzoq yillar davomida korxonalarning asosiy boshqaruv vositasi sifatida xizmat qilib kelmoqda. Ushbu tizimda hisobotlar ma’lum davr oralig‘ida — oy, chorak yoki yil yakunida tayyorlanadi.Ammo raqamli iqtisodiyot va globallashuv jarayonida bunday tizimning ko’plab kamchiliklari ham yuzaga chiqmoqda. Avvalo, davriy hisobotlar ma’lumotlarning ahamiyatliligini eskirib qolishiga sabab bo‘ladi. Korxona faoliyati bozor sharoitiga juda tez moslashishi kerak bo‘lgan vaziyatda ancha oldingi moliyaviy ko‘rsatkichlar asosida qaror qabul qilish samaradorlikni pasaytirish ehtimoli yuqori.Bundan tashqari, davriy hisobotlar tizimida inson omiliga bog‘liq xatolar yuqori bo‘ladi. Ma’lumotlarni qo‘lda qayta ishlash va konsolidatsiya qilish ko‘p vaqt va yuqori xarajat talab etadi hamda xatolik ehtimolini oshiradi.

Shuningdek, investorlar va manfaatdor tomonlar uchun moliyaviy axborotlarning kechikib taqdim etilishi korporativ shaffoflik darajasiga salbiy ta’sir ko‘rsatadi.

Zamonaviy iqtisodiyotda esa investorlar real vaqt rejimida yangilanadigan moliyaviy ma’lumotlarga ehtiyoj sezmoqda.

24/7 real vaqt moliyaviy hisobot tizimining mohiyati

24/7 moliyaviy hisobot tizimi — bu korxonaning moliyaviy va xo’jalik operatsiyalarini uzluksiz ravishda qayd etuvchi va real vaqt rejimida tahlil qiluvchi raqamli boshqaruv tizimidir. Ushbu modelda moliyaviy ma’lumotlar avtomatik ravishda yangilanib boradi va foydalanuvchilarga istalgan vaqtda dolzarb axborotni olish imkonini beradi.Buning uchun birgina birlamchi ma’lumotlarni kirgizish kifoya,qolgan hisobotlar xatolarsiz va uzluksiz ravishda har soniyada shakllanadi.

Real vaqt hisobot tizimlari quyidagi texnologik elementlarga asoslanadi:

- ERP tizimlari;
- Bulutli hisoblash texnologiyalari;
- Sun’iy intellekt
- Big Data analitikasi;
- Business Intelligence platformalari.

ERP tizimlari korxonaning barcha bo‘limlarini yagona ma’lumotlar bazasiga birlashtirib, moliyaviy operatsiyalarni avtomatik integratsiyalash imkonini yaratadi. Bulutli texnologiyalar esa ma’lumotlardan istalgan makon va vaqtda foydalanishni ta’minlaydi.

Antonio Trigo real vaqt rejimida hisobot olib borish korxonalarga tezkor qaror qabul qilish, tavakkalchiliklarni kamaytirish va raqobatbardoshlikni oshirish imkonini berishini ta’kidlaydi.

Bulutli texnologiyalar va ERP tizimlarining ahamiyati

So‘nggi yillarda “cloud accounting” va “cloud ERP” tizimlari moliyaviy boshqaruvning muhim tarkibiy qismiga aylanib bormoqda. Ushbu texnologiyalar korxonalarga katta hajmdagi moliyaviy ma’lumotlarni real vaqt rejimida-24/7- qayta ishlash imkoniyatini yaratmoqda.

Bulutli texnologiyalarning asosiy afzalliklari quyidagilar hisoblanadi:

- ma’lumotlarga istalgan masofadan kirish imkoniyati;
- xarajatlarni optimallashtrish;
- axborot xavfsizligini ta’minlash;
- avtomatlashtirilgan audit va nazorat;
- hisobotlarning tezkor shakllanib borishi.

Bulutli texnologiyalarga asoslangan moliyaviy hisobot tizimlari moliyaviy hisobotlarning aniqligi, ishonchliligi va dolzarbligini oshiradi. Shuningdek, Oracle AHCS kabi zamonaviy ERP platformalari bir vaqtning o‘zida ko’plab xalqaro standartlar (IFRS(International financial reporting standarts),GAAP) asosida hisobot yuritish imkonini beradi. Bu esa kompaniyalar uchun moliyaviy boshqaruvni yanada samarali tashkil etishga yordam beradi.

Real vaqt hisobot tizimining istiqbollari

Kelajakda 24/7 moliyaviy hisobot tizimlari yanada rivojlantirilib, sun’iy intellekt va blokcheyn texnologiyalari bilan integratsiyalashishi kutilmoqda. AI texnologiyalari moliyaviy tahlillarni yaratish, firibgarlik va xatoliklarni aniqlash va avtomatik audit-nazorat tizimlarini takomillashtirishda muhim rol o‘ynaydi. Blokcheyn texnologiyasi esa moliyaviy ma’lumotlarning o‘zgarmasligini ta’minlab, shaffoflikni kafolatlaydi.Bundan tashqari, real vaqt hisobotlari investorlar ishonchini oshirish va ularni jalb qilish, korporativ boshqaruv sifatini yaxshilash va xalqaro shartnomalarni ko’paytirishda muhim omilga aylanmoqda. Raqamli iqtisodiyot rivojlanib borayotgan

bir sharoitda korxonalar uchun uzluksiz moliyaviy nazorat tizimlarini joriy etish strategik zarurat sifatida namoyon bo‘lmoqda.

Xulosa qilib aytganda, 24/7 real vaqt moliyaviy hisobot tizimlari zamonaviy biznes boshqaruvining muhim tarkibiy qismiga aylanmoqda. Ushbu tizimlar korxonalarga moliyaviy ma’lumotlarni tezkor va aniq tahlil qilish, samarali boshqaruv qarorlarini qabul qilish hamda moliyaviy shaffoflikni oshirish imkonini beradi. ERP, bulutli texnologiyalar va sun’iy intellekt asosidagi yechimlar hisobot jarayonlarini avtomatlashtirib, biznesning raqobatbardoshligini kuchaytiradi. Demak, real vaqt rejimida ishlovchi moliyaviy hisobot tizimlari nafaqat zamonaviy boshqaruvning innovatsion shakli, balki raqamli iqtisodiyot sharoitida korxonalarning barqaror rivojlanishini ta’minlovchi muhim omil hisoblanadi.

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IQTISODIYOT RIVOJLANISHIDA LOGISTIKANING O‘RNI

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ANNOTATSIYA: Mazkur maqolada iqtisodiyot rivojlanishida logistikaning o‘rni, logistika tizimlarining ishlab chiqarish va savdo jarayonlariga ta’siri hamda transport infratuzilmasining iqtisodiy samaradorlikni oshirishdagi ahamiyati tahlil qilingan. Shuningdek, ta’minot zanjirlarini boshqarish, mahsulotlarni tezkor yetkazib berish va logistika xarajatlarini kamaytirishning iqtisodiy rivojlanishga ta’siri yoritilgan. Maqolada logistika tizimlarini takomillashtirish orqali korxonalar raqobatbardoshligini oshirish, xalqaro savdo aloqalarini rivojlantirish va zamonaviy iqtisodiy munosabatlarni samarali tashkil etish masalalari ilmiy adabiyotlar asosida bayon etilgan. Zamonaviy logistika texnologiyalaridan foydalanish iqtisodiy barqarorlikni ta’minlash va bozor infratuzilmasini rivojlantirishning muhim omillaridan biri ekanligi ko‘rsatib o‘tilgan.

KALIT SO‘ZLAR: logistika, iqtisodiyot, transport, ta’minot zanjiri, infratuzilma, logistika tizimi, yetkazib berish, multimodal transport, eksport-import, xalqaro savdo, samaradorlik.

KIRISH

Hozirgi davrda logistika iqtisodiyotning muhim tarkibiy qismlaridan biri hisoblanadi. Ishlab chiqarish hajmining ortishi, xalqaro savdo aloqalarining kengayishi

va bozorlar o‘rtasidagi raqobatning kuchayishi logistika tizimlarini rivojlantirish zaruratini yuzaga keltirmoqda. Logistika moddiy, moliyaviy va axborot oqimlarini samarali boshqarish orqali ishlab chiqarish va xizmat ko‘rsatish jarayonlarining uzluksizligini ta’minlaydi.

Logistikaning asosiy vazifasi mahsulotni kerakli joyga, kerakli vaqtda va minimal xarajat bilan yetkazib berishdan iborat. Shu sababli logistika iqtisodiy samaradorlikni oshirish, transport xarajatlarini kamaytirish hamda korxonalar faoliyatini optimallashtirishda muhim rol o‘ynaydi. Logistika iqtisodiyotning ishlab chiqarish, transport, savdo va xizmat ko‘rsatish kabi barcha sohalari bilan uzviy bog‘liqdir. Logistika tizimlari yordamida mahsulotlarni ishlab chiqaruvchidan iste’molchiga yetkazish jarayoni samarali tashkil etiladi. Bu esa mahsulot tannarxining pasayishiga va iqtisodiy samaradorlikning oshishiga xizmat qiladi.

Logistika tizimlarining rivojlanishi:

- transport xarajatlarini kamaytiradi;
- mahsulot yetkazib berish muddatini qisqartiradi;
- korxonalar faoliyatining samaradorligini oshiradi;
- ombor va saqlash xarajatlarini kamaytiradi;
- bozorlar o‘rtasidagi iqtisodiy aloqalarni mustahkamlaydi.

Zamonaviy iqtisodiyotda logistika korxonalar raqobatbardoshligini oshiruvchi muhim omil hisoblanadi. Mahsulotlarni tez va sifatli yetkazib berish iste’molchilar talabini qondirishda katta ahamiyatga ega. Transport logistikaning asosiy tarkibiy qismlaridan biridir. Transport tizimining samarali ishlashi moddiy oqimlarning uzluksiz harakatini ta’minlaydi. Transport-logistika tizimlari orqali mahsulotlarni yetkazib berish xarajatlari kamayadi va vaqt tejaladi.

Bugungi kunda avtomobil, temir yo‘l, havo va dengiz transporti logistika tizimining muhim elementlari hisoblanadi. Ayniqsa xalqaro savdo rivojlanayotgan sharoitda multimodal transport tizimlari katta ahamiyat kasb etmoqda. Logistika markazlari va zamonaviy ombor tizimlarining rivojlanishi iqtisodiyotning barqaror rivojlanishiga xizmat qiladi. Bu tizimlar yuklarni qayta ishlash, saqlash va taqsimlash jarayonlarini optimallashtirish imkonini beradi.Globallashuv sharoitida logistika xalqaro iqtisodiy munosabatlarning muhim tarkibiy qismiga aylandi. Xalqaro logistika tizimlari eksport-import operatsiyalarini tezlashtirish va tashqi savdo samaradorligini oshirishga xizmat qiladi.

Ta’minot zanjirlarini samarali boshqarish:

- mahsulot yetkazib berish muddatini qisqartiradi;
- transport xarajatlarini kamaytiradi;
- xalqaro savdo hajmini oshiradi;
- mamlakatlarning investitsion jozibadorligini kuchaytiradi.

Shu sababli ko‘plab davlatlarda logistika infratuzilmasini rivojlantirishga katta e’tibor qaratilmoqda. Zamonaviy logistika markazlari, erkin iqtisodiy zonalar va transport koridorlari iqtisodiy o‘sishni ta’minlovchi muhim omillardan biri hisoblanadi.

Logistika tizimlarining samarali tashkil etilishi korxonalar xarajatlarini kamaytiradi va foyda hajmini oshiradi. Ombor xarajatlarining qisqarishi, transport yo‘nalishlarining optimallashtirilishi va axborot texnologiyalaridan foydalanish iqtisodiy samaradorlikni oshirishga yordam beradi. Raqamli logistika tizimlari yordamida yuk harakatini nazorat qilish, mahsulotlarni kuzatish va ta’minot jarayonlarini boshqarish imkoniyatlari kengaymoqda. Bu esa logistika tizimlarining yanada takomillashishiga olib kelmoqda.

XULOSA

Xulosa qilib aytganda, logistika iqtisodiyot rivojlanishining muhim omillaridan biri hisoblanadi. Logistika tizimlari ishlab chiqarish va savdo jarayonlarining samaradorligini oshiradi, transport va saqlash xarajatlarini kamaytiradi hamda xalqaro iqtisodiy aloqalarni rivojlantiradi. Zamonaviy iqtisodiyot sharoitida logistika infratuzilmasini rivojlantirish mamlakatning iqtisodiy salohiyati va raqobatbardoshligini oshirishda muhim ahamiyatga ega. Shu sababli logistika tizimlarini takomillashtirish iqtisodiy rivojlanishning ustuvor yo‘nalishlaridan biri hisoblanadi.

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AI YORDAMIDA MADANIY KONTENT YARATISH VA UNING MENEJMENTDAGI O‘RNI

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ANNOTATSIYA: Mazkur maqolada sun’iy intellekt (AI) texnologiyalaridan foydalanib madaniy kontent yaratish jarayonlari va ularning madaniyat muassasalari menejmentidagi o‘rni tahlil qilingan. Tadqiqotda AI asosida kontent ishlab chiqishning kreativ industriyaga ta’siri, madaniy mahsulotlarni raqamli platformalarda targ‘ib qilish imkoniyatlari hamda auditoriya bilan kommunikatsiyani avtomatlashtirish jarayonlari yoritilgan. Shuningdek, AI texnologiyalarining madaniy brending, kontent marketingi va strategik boshqaruvdagi ahamiyati ko‘rib chiqilgan. Natijalar shuni ko‘rsatadiki, sun’iy intellekt madaniyat sohasida samaradorlikni oshirish, vaqt va resurslarni tejash hamda auditoriya ehtiyojlariga moslashgan kontent yaratishda muhim vosita hisoblanadi.

KALIT SO‘ZLAR: sun’iy intellekt, madaniy kontent, kreativ industriya, madaniyat menejmenti, raqamli texnologiyalar, kontent marketingi, avtomatlashtirish, art-menejment.

Kirish

So‘nggi yillarda sun’iy intellekt texnologiyalari jamiyatning deyarli barcha sohalariga chuqur kirib bormoqda. Ayniqsa, madaniyat va san’at sohasida AI kontent yaratish, uni tahlil qilish va auditoriyaga yetkazish jarayonlarini sezilarli darajada o‘zgartirmoqda. An’anaviy madaniy ishlab chiqarish jarayonlari asta-sekin raqamli va

avtomatlashtirilgan tizimlar bilan uyg‘unlashib, yangi boshqaruv modelini shakllantirmoqda. Bugungi kunda madaniyat muassasalari nafaqat ijodiy markaz, balki raqamli kontent ishlab chiqaruvchi va uni global auditoriyaga yetkazuvchi platformaga ham aylanmoqda. Bu jarayonda AI texnologiyalari strategik ahamiyat kasb etadi.

AI va madaniy kontent tushunchasi

Sun’iy intellekt yordamida yaratilgan madaniy kontent deganda matn, audio, video, grafik va interaktiv materiallarni algoritmlar yordamida ishlab chiqish tushuniladi.

Madaniyat menejmentida AI texnologiyalarining o‘rni

Kontent ishlab chiqarish samaradorligi

AI yordamida madaniy muassasalar qisqa vaqt ichida ko‘p miqdorda kontent yaratish imkoniga ega bo‘ladi. Masalan, teatr spektakllari uchun reklama matnlari, muzey ekspozitsiyalari uchun tavsiflar yoki ijtimoiy tarmoqlar uchun postlar avtomatik generatsiya qilinishi mumkin.

Auditoriya tahlili va segmentatsiya

AI tizimlari foydalanuvchilarning qiziqishlarini tahlil qilib, ularni guruhlarga ajratadi. Bu esa madaniy muassasalarga har bir auditoriya uchun mos kontent yaratish imkonini beradi.

Personalizatsiya

Sun’iy intellekt asosida foydalanuvchiga individual tavsiyalar berish mumkin. Masalan, muzey saytidan foydalanuvchi qaysi eksponatga qiziqsa, unga o‘xshash boshqa materiallar tavsiya etiladi.

Sun’iy intellektning madaniy kontent yaratishdagi eng muhim jihati shundaki, u ijodiy jarayonni to‘liq avtomatlashtirishdan ko‘ra, uni “aqlli yordamchi tizim” darajasiga olib chiqadi. Ya’ni AI inson ijodkorini almashtirmaydi, balki uning ishini tezlashtiradi, variantlarni ko‘paytiradi va qaror qabul qilish jarayonini ma’lumotlar

asosida qo‘llab-quvvatlaydi. Bu holat madaniyat menejmentida yangi yondashuv — “data-driven creativity” (ma’lumotlarga asoslangan ijod) modelini shakllantirmoqda.

Madaniyat muassasalari nuqtayi nazaridan AI eng avvalo kontent rejalashtirish bosqichida foydali. Masalan, qaysi turdagi madaniy materiallar ko‘proq qiziqish uyg‘otishi, qaysi vaqt oralig‘ida auditoriya faolligi yuqori bo‘lishi yoki qanday formatlar (video, infografika, qisqa postlar) samaraliroq ekanini tahlil qilib beradi. Bu esa menejerlarga subyektiv taxminlarga emas, real statistikaga asoslangan strategiya tuzish imkonini yaratadi.

Bundan tashqari, AI madaniy kontentning “hayot aylanishi”ni ham boshqarishga yordam beradi. Ya’ni bir kontent bir marta e’lon qilinib qolmaydi, balki u qayta ishlanadi, qismlarga ajratiladi, turli platformalarga moslashtiriladi va yangi formatlarda qayta foydalaniladi. Masalan, bir teatr spektakli haqida tayyorlangan video material AI yordamida reklama roligi, qisqa ijtimoiy media klip va matnli kontentga aylantirilishi mumkin.

Yana bir muhim jihat — madaniy kontentning til va uslub jihatdan moslashtirilishidir. AI turli auditoriya guruhlari uchun bir xil ma’lumotni turli ohangda taqdim etish imkonini beradi. Yoshlar uchun sodda va dinamik, akademik auditoriya uchun esa rasmiy va tahliliy uslubda kontent yaratish mumkin. Bu esa madaniy muassasalarning kommunikativ samaradorligini sezilarli darajada oshiradi.

Madaniyat sohasida yana bir o‘zgarish — auditoriya bilan muloqotning real vaqt rejimiga o‘tishidir. AI chat tizimlari, virtual yordamchilar va avtomatik javob berish tizimlari orqali foydalanuvchilar bilan uzluksiz aloqa ta’minlanadi. Bu esa madaniyat muassasasini “statik tashkilot”dan “jonli raqamli platforma”ga aylantiradi. Shu bilan birga, AI kontent yaratishda madaniy identitet masalasini ham dolzarb qiladi. Har qanday avtomatlashtirilgan tizim global andozalarga moyil bo‘lgani uchun milliy madaniy o‘ziga xoslikni saqlash alohida strategik vazifa bo‘lib qoladi. Shu sababli

menejmentda AI natijalarini mahalliy madaniy kontekst bilan uyg‘unlashtirish muhim ahamiyat kasb etadi. Umuman olganda, sun’iy intellekt madaniy kontent yaratish jarayonini faqat texnik yangilik emas, balki boshqaruv paradigmasining o‘zgarishi sifatida ko‘rsatmoqda. Bu esa madaniyat muassasalari rahbarlaridan yangi kompetensiyalar, raqamli fikrlash va strategik moslashuvchanlikni talab etadi.

Xulosa qilib aytganda, sun’iy intellekt madaniyat va san’at sohasida yangi bosqichni boshlab berdi. U kontent yaratish jarayonini tezlashtirish, menejment samaradorligini oshirish va auditoriya bilan aloqani kuchaytirishda muhim vosita hisoblanadi. Biroq AI texnologiyalaridan foydalanishda inson ijodkorligi va madaniy qadriyatlar muvozanatini saqlash muhimdir. Kelajakda madaniyat muassasalari AI va inson ijodining uyg‘unlashgan modeli asosida rivojlanadi. Sun’iy intellektning madaniy kontent yaratish jarayoniga kirib kelishi madaniyat va san’at sohasida tub burilish yasagan muhim omillardan biri sifatida baholanadi. Bugungi kunda AI nafaqat texnik vosita, balki madaniy menejment tizimini yangicha yondashuvlar asosida qayta shakllantirayotgan strategik resursga aylanib bormoqda. U kontent ishlab chiqarish tezligini oshirish, auditoriya ehtiyojlarini aniqroq tahlil qilish va madaniy mahsulotlarni kengroq geografik hududlarga yetkazish imkoniyatlarini sezilarli darajada kengaytirmoqda.

Tadqiqot natijalaridan kelib chiqib aytish mumkinki, AI texnologiyalari madaniyat muassasalari faoliyatida qaror qabul qilish jarayonini sezilarli darajada optimallashtiradi. Endilikda menejerlar faqat ijodiy reja tuzish bilan cheklanib qolmay, balki katta hajmdagi ma’lumotlarni tahlil qilish, auditoriya xulq-atvorini prognozlash va resurslarni samarali taqsimlash kabi yangi vazifalarni ham bajarishlari zarur bo‘lmoqda. Bu esa madaniyat menejmentini an’anaviy boshqaruv modelidan raqamli-intellektual boshqaruv modeliga o‘tishini anglatadi. Shuningdek, AI yordamida yaratilgan kontent madaniy muassasalarning kommunikatsion salohiyatini oshirib, ularni global axborot makonida faol subyektga aylantirmoqda. Virtual platformalar,

avtomatlashtirilgan kontent tizimlari va interaktiv xizmatlar orqali auditoriya bilan doimiy aloqa o‘rnatish imkoniyati paydo bo‘lmoqda. Bu holat madaniyat muassasalarini faqat ma’naviy markaz emas, balki raqamli media-ekotizim ishtirokchisiga aylantiradi. Biroq, AI texnologiyalarining keng qo‘llanilishi bilan birga muhim muvozanatni saqlash zarur. Xususan, madaniy kontentning milliy o‘ziga xosligi, tarixiy konteksti va estetik qiymati yo‘qolib ketmasligi uchun inson ijodkorligi asosiy yetakchi rolni saqlab qolishi kerak. Sun’iy intellekt esa bu jarayonda yordamchi va tahliliy vosita sifatida xizmat qilishi maqsadga muvofiqdir. Aks holda, standartlashuv va bir xillik xavfi kuchayishi mumkin.

Kelajak nuqtayi nazaridan qaralganda, madaniyat muassasalari AI texnologiyalarini to‘liq integratsiya qilgan holda faoliyat yuritadigan, yuqori darajada raqamlashtirilgan va ma’lumotlarga asoslangan boshqaruv tizimiga ega tashkilotlarga aylanadi. Bunday sharoitda madaniyat menejerlaridan faqat boshqaruv ko‘nikmalari emas, balki raqamli savodxonlik, analitik fikrlash va texnologik moslashuvchanlik ham talab etiladi. Umuman olganda, sun’iy intellekt madaniy kontent yaratish va uni boshqarish jarayonlarini yangi bosqichga olib chiqmoqda. Bu esa madaniyat va san’at sohasida samaradorlikni oshirish bilan birga, ijodiy jarayonning mazmuni va shaklini ham yangicha talqin qilish zaruratini yuzaga keltirmoqda. Shu sababli AI va inson ijodining uyg‘unligi kelajak madaniyat menejmentining eng muhim strategik yo‘nalishi sifatida qaraladi.

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MADANIY DIPLOMATIYADA MILLIY SAN'ATNI TARG'IB QILISH STRATEGIYALARI

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ANNOTATSIYA: Mazkur maqolada globallashuv jarayonlari jadallashib borayotgan hamda xalqaro madaniy aloqalar tobora kengayib borayotgan zamonaviy sharoitda milliy san'atni madaniy diplomatiyaning muhim strategik vositasi sifatida targ'ib qilish masalalari ilmiy-nazariy jihatdan tahlil qilinadi. Unda milliy madaniy meros, an'anaviy va zamonaviy san'at yo'nalishlarining davlatning xalqaro imijini shakllantirishdagi o'rni, "yumshoq kuch" siyosatidagi ahamiyati hamda xalqlar o'rtasidagi madaniy muloqotni rivojlantirishdagi roli yoritilgan. Shuningdek, maqolada raqamli texnologiyalar, kreativ industriya, xalqaro festivallar, madaniy almashinuv dasturlari va innovatsion kommunikatsiya vositalari orqali milliy san'atni global miqyosda targ'ib qilishning zamonaviy strategiyalari tadqiq etiladi. Muallif tomonidan milliy san'atni xalqaro maydonda samarali namoyish etishning tashkiliy, madaniy va kommunikativ mexanizmlariga ilmiy yondashuv asosida baho berilib, madaniy diplomatiya samaradorligini oshirishga qaratilgan amaliy taklif va tavsiyalar ilgari suriladi.

KALIT SO'ZLAR: madaniy diplomatiya, milliy san'at, kreativ industriya, soft power, xalqaro madaniy aloqalar, san'at menejmenti, madaniy meros, raqamli diplomatiya, xalqaro imij, madaniy kommunikatsiya.

ABSTRACT: This article scientifically and theoretically analyzes the strategies for promoting national art as an important instrument of cultural diplomacy in the context of accelerating globalization and the rapid development of international cultural relations. The study highlights the role of national cultural heritage, traditional and contemporary art in shaping a country's international image, strengthening "soft power," and enhancing intercultural dialogue among nations. Furthermore, the article examines modern approaches to promoting national art on a global scale through digital technologies, creative industries, international festivals, cultural exchange programs, and innovative communication tools. Based on a scientific approach, the author evaluates the organizational, cultural, and communicative mechanisms for effectively presenting national art in the international arena and proposes practical recommendations aimed at increasing the effectiveness of cultural diplomacy.

KEYWORDS: cultural diplomacy, national art, creative industry, soft power, international cultural relations, art management, cultural heritage, digital diplomacy, international image, cultural communication.

АННОТАЦИЯ: В данной статье с научно-теоретической точки зрения анализируются стратегии продвижения национального искусства как важного инструмента культурной дипломатии в условиях ускоряющихся процессов глобализации и расширения международных культурных связей. Освещается роль национального культурного наследия, традиционного и современного искусства в формировании международного имиджа государства, укреплении политики «мягкой силы» и развитии межкультурного диалога между народами. Кроме того, в статье исследуются современные стратегии продвижения национального искусства на мировом уровне посредством цифровых технологий, креативной индустрии, международных фестивалей, программ культурного обмена и инновационных коммуникационных средств. На основе научного подхода автор оценивает организационные, культурные и

коммуникативные механизмы эффективного представления национального искусства на международной арене, а также выдвигает практические предложения и рекомендации, направленные на повышение эффективности культурной дипломатии.

КЛЮЧЕВЫЕ СЛОВА: культурная дипломатия, национальное искусство, креативная индустрия, soft power, международные культурные связи, арт-менеджмент, культурное наследие, цифровая дипломатия, международный имидж, культурная коммуникация.

Kirish

XXI asrda davlatlarning xalqaro maydondagi nufuzi nafaqat siyosiy yoki iqtisodiy salohiyat bilan, balki madaniy qadriyatlari va milliy san’ati orqali ham baholanmoqda. Zamonaviy xalqaro munosabatlarda madaniy diplomatiya davlatlarning “yumshoq kuch” (soft power) siyosatining muhim tarkibiy qismiga aylandi. Ayniqsa, milliy san’atning xorijiy mamlakatlarda targ‘ib qilinishi xalqaro hamkorlikni mustahkamlash, mamlakat imijini oshirish hamda xalqlar o‘rtasida o‘zaro ishonchni rivojlantirishga xizmat qiladi.

Milliy san’at xalqning tarixi, mentaliteti, estetik qarashlari va ma’naviy qadriyatlarini aks ettiruvchi muhim omildir. Shu sababli madaniy diplomatiyada musiqa, tasviriy san’at, teatr, kino, milliy hunarmandchilik va folklor san’ati kabi yo‘nalishlardan samarali foydalanish davlatlarning xalqaro madaniy siyosatida ustuvor yo‘nalishlardan biri hisoblanadi. Bugungi kunda raqamli platformalar, xalqaro festivallar, madaniyat kunlari, ijodiy almashinuv dasturlari va kreativ industriya imkoniyatlari milliy san’atni jahon miqyosida keng targ‘ib qilishga xizmat qilmoqda. Shu jihatdan milliy san’atni xalqaro maydonda samarali namoyish etishning zamonaviy strategiyalarini ishlab chiqish dolzarb ilmiy masalalardan biridir.

Madaniy diplomatiya tushunchasi va uning mohiyati.

Madaniy diplomatiya — bu davlatlarning o‘z madaniyati, san’ati, tili va qadriyatlarini boshqa xalqlarga tanitish orqali xalqaro munosabatlarni mustahkamlashga qaratilgan faoliyatidir. U diplomatiyaning insonparvar va kommunikativ shakli bo‘lib, mamlakatning ijobiy qiyofasini yaratishda muhim vosita hisoblanadi.

Madaniy diplomatiya quyidagi vazifalarni bajaradi:

mamlakatning xalqaro imijini shakllantirish;

millatlararo madaniy muloqotni rivojlantirish;

xalqlar o‘rtasidagi o‘zaro hurmat va bag‘rikenglikni mustahkamlash;

turizm va investitsion jozibadorlikni oshirish;

milliy madaniy merosni asrab-avaylash va ommalashtirish.

Ayniqsa, san’at madaniy diplomatiyaning eng ta’sirchan vositalaridan biri bo‘lib, u til va siyosiy chegaralardan tashqarida ham insonlarni birlashtira oladi. Musiqa, teatr, raqs va tasviriy san’at universal estetik til sifatida xalqlarni yaqinlashtirish imkoniyatiga ega.

Milliy san’atni targ‘ib qilishning asosiy strategiyalari

Milliy san’atni targ‘ib qilishning eng samarali strategiyalaridan biri xalqaro festival va ko‘rgazmalarni tashkil etishdir. Bunday tadbirlar orqali mamlakat o‘zining boy madaniy merosini keng auditoriyaga namoyish qiladi. Masalan, milliy musiqa festivallari, xalqaro kino forumlari, teatr festivallari va hunarmandchilik ko‘rgazmalari xorijiy tomoshabinlarda milliy madaniyatga nisbatan qiziqish uyg‘otadi. Shu bilan birga, bunday tadbirlar ijodkorlar o‘rtasidagi professional aloqalarni rivojlantirishga xizmat qiladi. Festival diplomatiyasi bugungi kunda ko‘plab davlatlar tomonidan muvaffaqiyatli qo‘llanayotgan strategik vositalardan biri hisoblanadi.

Raqamli platformalar orqali milliy san’atni ommalashtirish

Raqamli texnologiyalar madaniy diplomatiyaning yangi bosqichini shakllantirdi. Internet va ijtimoiy tarmoqlar orqali milliy san’at namunalarini millionlab auditoriyaga tezkor yetkazish imkoniyati paydo bo‘ldi.

Bugungi kunda:

virtual muzeylar;

onlayn konsertlar;

raqamli ko‘rgazmalar;

video platformalar;

sun’iy intellekt asosidagi kreativ loyihalar milliy san’atni targ‘ib qilishning zamonaviy vositalariga aylandi.

Raqamli diplomatiya orqali milliy san’at geografik chegaralardan chiqib, global auditoriyaga taqdim etilmoqda. Bu esa yosh avlodning milliy madaniyatga bo‘lgan qiziqishini oshirish bilan birga, xorijiy auditoriya bilan interaktiv muloqotni ham kuchaytiradi.

Kreativ industriya imkoniyatlaridan foydalanish

Kreativ industriya madaniyat va iqtisodiyot integratsiyasining muhim shaklidir. Kino, moda, dizayn, animatsiya, musiqa industriyasi va media mahsulotlar milliy san’atni xalqaro bozorda targ‘ib qilishning samarali vositasiga aylandi. Ayniqsa:

milliy motivlardan foydalanilgan moda kolleksiyalari;

tarixiy filmlar;

milliy musiqani zamonaviy janrlar bilan uyg‘unlashtirish;

animatsion mahsulotlar xalqaro auditoriyada katta qiziqish uyg‘otmoqda.

Kreativ yondashuv milliy san’atni faqat an’anaviy shaklda emas, balki zamonaviy estetik talablar asosida taqdim etishga imkon beradi. Natijada san’atning eksport salohiyati ham ortadi.

O‘zbekiston tajribasi va milliy san’at targ‘iboti

So‘nggi yillarda O‘zbekistonda madaniy diplomatiyani rivojlantirish davlat siyosatining ustuvor yo‘nalishlaridan biriga aylandi. Xalqaro maqomdagi san’at festivallari, “Sharq taronalari”, baxshichilik festivali, maqom san’ati anjumanlari va ko‘plab madaniy forumlar milliy san’atni jahon hamjamiyatiga tanitishda muhim rol o‘ynamoqda. Milliy hunarmandchilik, miniatyura san’ati, milliy raqs va musiqa maktablari UNESCO darajasida e’tirof etilayotgani ham madaniy diplomatiya samaradorligining yorqin namunasidir.

Bundan tashqari:

teatr san’ati;

kinematografiya;
tasviriy san’at;

zamonaviy dizayn;

milliy moda yo‘nalishlarida amalga oshirilayotgan loyihalar O‘zbekistonning xalqaro madaniy imijini mustahkamlashga xizmat qilmoqda.

Madaniy diplomatiyada uchraydigan muammolar

Milliy san’atni targ‘ib qilish jarayonida ayrim muammolar ham mavjud:

moliyaviy resurslarning cheklanganligi;

xalqaro marketing tajribasining yetarli emasligi;

raqamli kontent sifati bilan bog‘liq kamchiliklar;

xorijiy auditoriyaning madaniy xususiyatlarini chuqur o‘rganmaslik;

kreativ menejerlar va art-menejerlar yetishmovchiligi.

Mazkur muammolarni bartaraf etish uchun zamonaviy madaniyat menejmenti, marketing va raqamli kommunikatsiya texnologiyalarini rivojlantirish muhim ahamiyat kasb etadi. Madaniy diplomatiyada milliy san’atni targ‘ib qilish bugungi globallashuv davrida davlatlarning xalqaro maydondagi nufuzini oshiruvchi muhim omillardan biri hisoblanadi. Zamonaviy xalqaro munosabatlarda mamlakatning faqat iqtisodiy yoki siyosiy salohiyati emas, balki uning madaniy qiyofasi ham alohida ahamiyat kasb etmoqda. Shu jihatdan milliy san’at xalqning tarixiy xotirasi, ma’naviy qadriyatlari va estetik tafakkurini aks ettiruvchi asosiy vosita sifatida madaniy diplomatiyaning markaziy elementiga aylanmoqda.

Milliy san’atni targ‘ib qilish strategiyalarida avvalo san’atning universal kommunikativ xususiyatidan samarali foydalanish muhimdir. Chunki musiqa, teatr, tasviriy san’at, raqs va kino insonlar o‘rtasidagi til hamda hududiy chegaralarni yengib o‘tadigan kuchli madaniy vosita hisoblanadi. Shu sababli davlatlar xalqaro festivallar, ko‘rgazmalar va madaniyat kunlari orqali o‘z milliy san’atini dunyoga namoyish etishga intilmoqda. Bunday tadbirlar xorijiy auditoriyada milliy madaniyatga nisbatan qiziqish uyg‘otish bilan birga, davlatning ijobiy imijini shakllantirishga ham xizmat qiladi.

Bugungi raqamli davr madaniy diplomatiyada yangi imkoniyatlarni yuzaga keltirdi. Ijtimoiy tarmoqlar, multimedia platformalari va virtual madaniy loyihalar orqali milliy san’at namunalarini global auditoriyaga tezkor yetkazish imkoniyati paydo bo‘ldi. Endilikda san’atni targ‘ib qilish an’anaviy sahna yoki muzeylar bilan cheklanib qolmayapti. Onlayn konsertlar, virtual ko‘rgazmalar, raqamli muzeylar va video platformalar orqali milliy san’at mahsulotlari xalqaro madaniy makonga faol

kirib bormoqda. Ayniqsa, yosh avlodning internet makonida faol ekanligi raqamli madaniy diplomatiyaning ahamiyatini yanada oshirmoqda.

Milliy san’atni targ‘ib qilishda kreativ industriya ham muhim o‘rin egallaydi. Zamonaviy moda, dizayn, kino, animatsiya va musiqa industriyasida milliy elementlardan foydalanish san’atning jahon bozoridagi raqobatbardoshligini oshirmoqda. Milliy motivlarning zamonaviy uslublar bilan uyg‘unlashtirilishi xorijiy auditoriyada katta qiziqish uyg‘otadi. Bu esa milliy madaniyatni nafaqat ma’naviy, balki iqtisodiy resurs sifatida ham rivojlantirish imkonini beradi. Madaniy diplomatiyada xalqaro hamkorlik alohida strategik ahamiyatga ega. Turli mamlakatlar o‘rtasidagi ijodiy almashinuv dasturlari, qo‘shma san’at loyihalari va akademik hamkorliklar milliy san’atning xalqaro maydondagi ta’sirini kengaytiradi. Ayniqsa, yosh ijodkorlarning xorijiy tajribalarni o‘rganishi va xalqaro festivallarda ishtirok etishi milliy san’at rivojiga yangi g‘oya va innovatsiyalar olib kiradi.

O‘zbekiston tajribasida ham milliy san’atni xalqaro miqyosda targ‘ib qilish borasida muhim ishlar amalga oshirilmoqda. Maqom san’ati, baxshichilik, milliy raqs, hunarmandchilik va tasviriy san’at yo‘nalishlarining xalqaro festival va forumlarda namoyish etilishi mamlakatning madaniy nufuzini oshirmoqda. Shuningdek, tarixiy-madaniy merosni asrab-avaylash va uni zamonaviy talablarga mos ravishda targ‘ib qilish bo‘yicha olib borilayotgan islohotlar madaniy diplomatiyaning samaradorligini kuchaytirmoqda. Shu bilan birga, milliy san’atni targ‘ib qilishda ayrim muammolar ham mavjud. Jumladan, raqamli kontent sifati, xalqaro marketing tajribasining yetarli emasligi, professional art-menejerlar yetishmovchiligi hamda xorijiy auditoriya talablarini chuqur o‘rganmaslik ayrim kamchiliklarni yuzaga keltirmoqda. Shu sababli madaniyat menejmenti, kreativ iqtisodiyot va raqamli kommunikatsiya yo‘nalishlarida zamonaviy kadrlar tayyorlash muhim vazifalardan biri hisoblanadi.

Umuman olganda, milliy san’atni madaniy diplomatiya vositasi sifatida rivojlantirish davlatning xalqaro maydondagi ijobiy qiyofasini shakllantirish, xalqlar

o‘rtasidagi madaniy muloqotni mustahkamlash va milliy qadriyatlarni global miqyosda targ‘ib qilishda muhim ahamiyat kasb etadi. Zamonaviy texnologiyalar, kreativ yondashuv va xalqaro hamkorlik asosida olib borilayotgan strategiyalar kelajakda madaniy diplomatiyaning yanada rivojlanishiga xizmat qiladi.

Xulosa

Xulosa o‘rnida shuni aytish mumkinki, madaniy diplomatiya zamonaviy xalqaro munosabatlarning eng muhim gumanitar yo‘nalishlaridan biri sifatida davlatlarning global maydondagi mavqeini mustahkamlashga xizmat qilmoqda. Ayniqsa, milliy san’at madaniy diplomatiyaning ta’sirchan va universal vositasi sifatida xalqlar o‘rtasida ma’naviy yaqinlikni shakllantirish, o‘zaro hurmatni mustahkamlash hamda mamlakatning ijobiy imijini yaratishda muhim ahamiyat kasb etadi. Milliy san’atni targ‘ib qilish strategiyalari zamonaviy texnologiyalar, kreativ industriya va xalqaro hamkorlik bilan uyg‘unlashgan holda yangi bosqichga ko‘tarilmoqda. Raqamli platformalar orqali san’at mahsulotlarining global auditoriyaga tezkor yetib borishi madaniy diplomatiyaning samaradorligini yanada oshirmoqda. Shuningdek, xalqaro festivallar, madaniyat kunlari, ijodiy almashinuv dasturlari va madaniyat markazlari milliy san’atni jahon miqyosida tanitishda muhim strategik vosita sifatida namoyon bo‘lmoqda. Bunday yondashuv nafaqat madaniy taraqqiyotga, balki iqtisodiy rivojlanish, turizm salohiyatining oshishi va xalqaro investitsion jozibadorlikning kuchayishiga ham xizmat qiladi.

O‘zbekiston tajribasi shuni ko‘rsatadiki, milliy san’atni tizimli ravishda qo‘llab-quvvatlash va uni xalqaro maydonda faol targ‘ib qilish mamlakatning madaniy nufuzini oshirishda muhim omil hisoblanadi. Ayniqsa, maqom, baxshichilik, milliy hunarmandchilik va zamonaviy san’at yo‘nalishlarining xalqaro e’tirof etilishi madaniy diplomatiya samaradorligining amaliy natijasidir. Kelgusida madaniy diplomatiya strategiyalarini yanada takomillashtirish, kreativ industriya va raqamli texnologiyalar bilan integratsiyani kuchaytirish, yosh ijodkorlarni qo‘llab-quvvatlash

hamda professional madaniyat menejerlarini tayyorlash dolzarb vazifalardan biri bo‘lib qoladi. Chunki milliy san’at — bu xalqning ma’naviy pasporti, madaniy diplomatiya esa uni dunyoga tanituvchi eng muhim ko‘prikdir.

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METALL MATERIALLARDA ZAMONAVIY TEXNOLOGIYALAR: YUQORI MUSTAHKAM PO‘LATLAR VA DIFFUZIYA JARAYONLARINING QIYOSIY TAHLILI

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Annotatsiya

Ushbu ilmiy maqolada zamonaviy metallshunoslikning ikki muhim yo‘nalishi — yangi avlod yuqori mustahkam po‘latlar (AHSS) va metall materiallarda diffuziya jarayonlari — keng qamrovli tahlil qilinadi. AHSS materiallarining mikrostrukturali tabiati, deformatsiya mexanizmlari hamda sanoat tatbiqiga yo‘naltirilgan xossalari bayon etiladi. Diffuziya bo‘limida sementasiya, nitridasiya va boshqa termokimyoviy jarayonlarning fizik-kimyoviy asoslari va texnologik samarasi ko‘rib chiqiladi. Materiallarning mexanik, fizik va kimyoviy ko‘rsatkichlari qiyosiy jadvallar orqali taqdim etiladi.

Kalit so‘zlar: AHSS, dual-faza po‘lat, TRIP effekti, diffuziya, sementasiya, nitridasiya, termik ishlov, mikrostruktura, mexanik xossalar, avtomobilsozlik.

Kirish

Zamonaviy sanoat tarmoqlari — xususan, avtomobilsozlik, aerokosmik va mashinasozlik sohalari — materiallarga qo‘yilgan talablarni doimiy ravishda oshirib bormoqda. Bir tomondan, og‘irlik-mustahkamlik nisbatini yaxshilash orqali yoqilg‘i tejamkorligi va emissiyalar kamaytirilishi lozim; ikkinchi tomondan, konstruksiyalarning ishonchliligi va avariya bardoshliligi uzluksiz oshirilishi talab etiladi. Ushbu ikki ziddiyatli talab zamonaviy metallshunoslikda yangi avlod materiallarning paydo bo‘lishiga zamin yaratdi.

Yuqori mustahkam po'latlar (Advanced High Strength Steels — AHSS) va diffuziya asosidagi termokimyoviy ishlov berish texnologiyalari mazkur muammolarni hal etishda markaziy o‘rin tutadi. Agar AHSS materiallar asosiy konstruktiv elementlarning mustahkamligini ta‘minlasa, diffuziya jarayonlari sirt qatlamining mexanik va kimyoviy xossalarini tubdan yaxshilashga xizmat qiladi. Ushbu maqolada ikkala yo‘nalish ham ilmiy-texnik jihatdan qiyosiy tarzda ko‘rib chiqiladi.

AHSS — bu birinchi va ikkinchi avlod yuqori mustahkam po‘latlar bilan solishtirganda ancha murakkab mikrostrukturaga ega bo‘lgan materiallar guruhidir. Ular bir necha metallurgik fazalarni (ferrit, martensit, bainit, qolgan austenit) ma‘lum nisbatlarda o’z ichiga oladi. Aynan shu ko‘p fazali tuzilish AHSS-ga noyob xossalar berishiga imkon yaratadi: yuqori kuchlanish chegarasida ham yetarli plastiklikni saqlab qolish qobiliyati.

Quyida AHSS turlarining asosiy mexanik xossalari va qo‘llanish sohalari keltirilgan:

1-jadval.

AHSS turlari: mexanik xossalar va qo‘llanish sohalari (ASM International ma‘lumotlari asosida)

AHSS turi	Kuchlanish chegarasi (MPa)	Elastiklik chegarasi (MPa)	Cho‘zilish (%)	Qo‘llanish sohasi
DP (Dual Phase)	600–1000	340–600	15–30	Tana panellari, ustunlar
TRIP (Transformation Induced Plasticity)	600–900	400–650	20–35	Energiya absorbsiyasi
CP (Complex Phase)	800–1000	600–850	10–15	Bumper, pol konstruksiyasi
MS (Martensit)	1200–1500	950–1300	5–8	A-ustun, to'qnashuv elementlari
TWIP (Twinning Induced Plasticity)	800–1200	400–600	40–70	Ultra-engil elementlar

Dual-faza (DP) po‘lat AHSS oilasining eng keng tarqalgan vakili bo‘lib, tarkibida asosan ferrit va martensit fazalari mavjud. Martensit mikro donachalari ferrit matritsasida tarqalgan bo‘ladi. Sovitish jarayonida hosil bo‘lgan martensit qattiq faza

plastik ferrit matritsa ichida kuchlanishlar hosil qiladi, bu esa materialning past kuchlanishlardan boshlab doimiy deformatsiyalanishiga olib keladi.

DP po‘latlarining o‘ziga xos xususiyatlaridan biri — yuqori boshlang‘ich deformatsion qattiqlashuv koeffitsienti. Bu xususiyat moshina tana elementlarida energiyani so‘rib olish va egilish chidamliligini ta‘minlashda muhim rol o‘ynaydi.

TRIP va TWIP effektlari:

Transformatsiya orqali plastiklik induktsiyasi (TRIP — Transformation Induced Plasticity) effekti TRIP po‘latlarda kuzatiladi. Bu materiallar deformatsiyalanish jarayonida qolgan austenitni martensitga aylantiradi. Ushbu faza o‘tishi kuchlanish kontsentratsiyasi sodir bo‘lgan joylarda ro‘y beradi va shu orqali yoriqlarning tarqalishini to‘xtatadi. Natijada material bir vaqtda ham yuqori mustahkamlikka, ham katta plastiklikka ega bo‘ladi.

Egizaklanish orqali plastiklik (TWIP) effekti esa yuqori marganesli (>15% Mn) po‘latlarda namoyon bo‘ladi. Deformatsiya jarayonida kristall panjara ichida mexanik egizaklar hosil bo‘lishi metallning deformatsiyani qabul qilish qobiliyatini keskin oshiradi. TWIP po‘latlar 40–70% gacha cho‘ziluvchanlikni saqlab qolgan holda 1200 MPa gacha mustahkamlikka ega bo‘lishi mumkin.

Avtomobilsozlikda qo‘llanishi:

Zamonaviy yengil avtomobillarda AHSS materiallardan tashkil topgan elementlar umumiy po‘lat massasining 60–70% ni tashkil etadi. Asosiy qo‘llanish yo‘nalishlari:

- B-ustun (B-pillar) va A-ustun: to‘qnashuv paytida yo‘lovchini himoya qiluvchi eng muhim konstruktiv element, odatda 1200–1500 MPa martensit po‘latdan tayyorlanadi.

- Eshik kirish poylari: yonbosh to‘qnashuvlarda energiyani so‘rib olish uchun DP yoki CP po‘latdan ishlanadi.
- Bampfer konstruksiyasi: TRIP po‘lat ishlatiladi, chunki energiya absorpsiyasi talab etiladi.
- Pol va tom: engil DP po‘latdan yasalib, massani kamaytirish maqsadini ko‘zlaydi.

AHSS materiallarini keng joriy etish natijasida zamonaviy avtomobil tanalari 1990-yillardagiga nisbatan 25–30% yengilashdi, ammo xavfsizlik standartlari sezilarli darajada yaxshilandi.

Grafik va formulalar:

Diffuziya — bu atomlarning termal harakat ta‘sirida konsentratsiya gradienti yo‘nalishi bo‘yicha tartibsiz harakat natijasida to‘lqin kabi tarqalishi jarayonidir. Metall materiallarda diffuziya ikkita asosiy mexanizm orqali amalga oshadi: bo‘shliq mexanizmi va interstitsial mexanizm.

Fick qonunlari diffuziyaning miqdoriy tavsifini beradi. Birinchi Fick qonuni statsionar holat uchun diffuziya oqimini ifodalaydi:

$$\mathbf{J = -D \cdot (dC/dx)}$$

bu yerda:

J — diffuziya oqimi (mol/m²·s), D — diffuziya koeffitsienti (m²/s), dC/dx — konsentratsiya gradienti. Ikkinchi Fick qonuni esa notatsionar (o‘zgaruvchan) holat uchun vaqt va makon funksiyasi sifatida konsentratsiyaning o‘zgarishini tavsiflaydi.

Diffuziya koeffitsienti haroratga “Arrenius” tenglamasi orqali bog‘liq: $D = D_0 \cdot \exp(-Q/RT)$, bu yerda Q — aktivasiya energiyasi, R — universal gaz doimiysi, T — absolyut harorat. Harorat oshishi bilan diffuziya koeffitsienti eksponensial tarzda ortadi — bu

sementasiya va nitridasiya jarayonlarida yuqori haroratlar qo‘llanishining asosiy sababidir.

Sementasiya — past uglerodli po‘lat sirtiga uglerod atomlarini diffuziya yo‘li bilan kiritish jarayoni bo‘lib, 850–950°C harorat oralig‘ida amalga oshiriladi. Natijada sirt qatlamida uglerod miqdori 0.8–1.2% gacha yetadi, bu esa keyinchalik yuqori martensit qattiqligi (600–900 HV) hosil bo‘lishiga zamin yaratadi.

Zamonaviy sanoatda uchta asosiy sementasiya usuli qo‘llaniladi:

- Gaz sementasiyasi: tabiiy gaz yoki propan muxitida, eng keng tarqalgan usul, avtomatlashtirish oson.
- Vakuum sementasiyasi: past bosimda, toza sirt, o‘lchov aniqligi yuqori, ekologik tozaroq.
- Pasta (qattiq) sementasiyasi: qorishma aralashmada, kichik partiyalar uchun, eskirgan usul.

Sementasiya chuqurligi (sementasiya qatlami) ishlov berish davomiyligi va haroratga bog‘liq holda 0.5 mm dan 3.0 mm gacha bo‘lishi mumkin. Jarayon tishli g‘ildiraklarlar, zanjir halqalari, podshipniklar uchun pog‘onalari ishlab chiqarishda keng qo‘llaniladi.

Nitridasiya:

Nitridasiya jarayonida azot atomlari po‘lat sirtiga diffuziyalanadi. Sementasiyadan farqli o‘laroq, nitridasiya ancha past haroratlarda (480–600°C) amalga oshiriladi — bu qisman qattiqlangan po‘latlarning yadro xossalarini saqlab qolish imkonini beradi. Nitridasiya natijasida sirtda Fe_2N, Fe_3N, Fe_4N kabi nitrId birikmalari hosil bo‘ladi.

Nitridasiyaning asosiy afzalliklari:

- Korroziyaga qarshilik sezilarli oshadi — nitrId qatlam kimyoviy inert bo‘ladi

- Sirt qattiqligi 600–1200 HV — sementasiyaga qaraganda yuqoriroq bo‘lishi mumkin.
- Charchash chidamliligi (fatigue strength) oshadi — sirt siqilish kuchlanishlaridan foydali ta‘sir.
- O‘lchamli o‘zgarishlar minimal — sementasiyaga nisbatan ancha kam deformatsiya.

Diffuziya jarayonlarining qiyosiy tahlili:

Quyidagi jadvalda asosiy diffuziya asosidagi termokimyoviy jarayonlar qiyosiy tarzda taqdim etilgan:

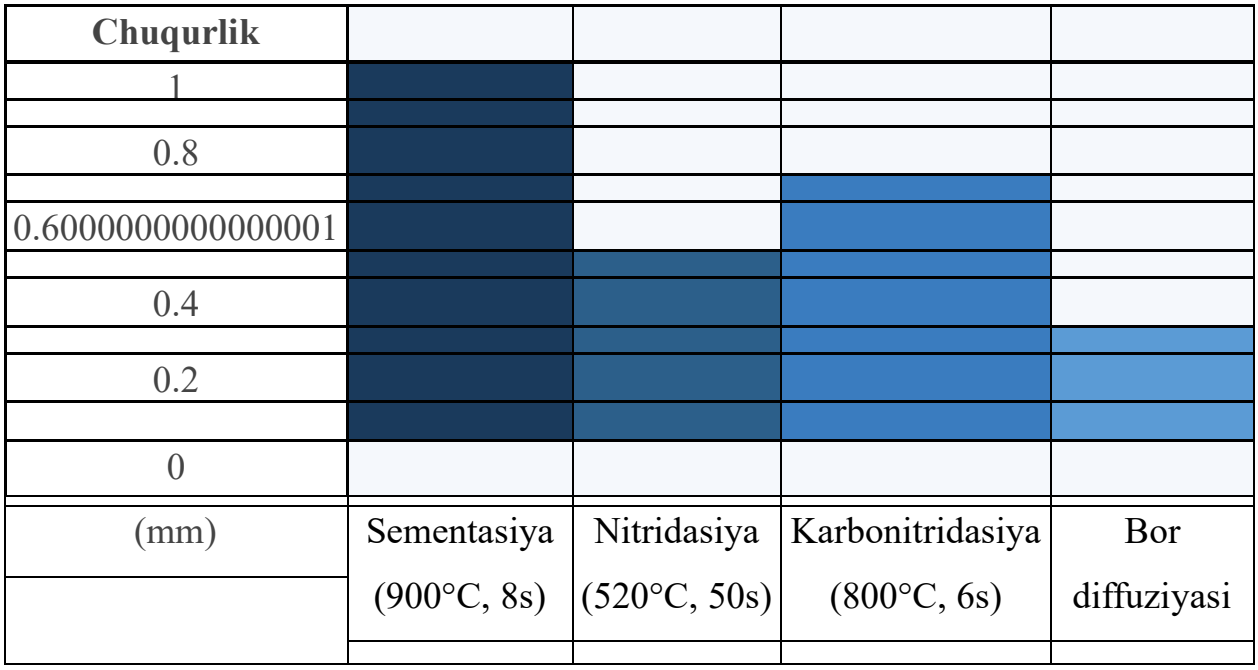
3-jadval.

Asosiy diffuziya jarayonlari: texnologik parametrlar va maqsadlari

Jarayon	Harorat (°C)	Vaqt (soat)	Maqsad va natija
Sementasiya (Carburizing)	850–950	4–24	Sirt qattiqligini oshirish, yadro plastikligini saqlab qolish
Nitridasiya (Nitriding)	480–600	10–100	Charchash chidamliligini, korroziyaga qarshilikni oshirish
Karbonitridasiya	700–900	2–10	C va N bir vaqtda diffuziyasi, arzon texnologiya

Bor diffuziyasi	700–1100	2–12	Ekstremal qattiqlik (1400–2000 HV), yuqori haroratga chidamlilik
Xromlashtirish	900–1100	8–24	Korroziya va oksidlanishga qarshilik, eskirishga chidamlilik

Quyida diffuziya chuqurligi ko‘rsatkichlari vizual tarzda taqdim etiladi.



4-rasm. Turli diffuziya jarayonlarida tipik sirt qatlamining maksimal chuqurligi (mm), standart sharoitlar uchun

AHSS va diffuziya jarayonlarining qiyosiy tahlili:

AHSS texnologiyalari va diffuziya asosidagi ishlov berish usullari ko‘pincha muqobil emas, balki bir-birini to‘ldiruvchi yondashuv sifatida qaralishi lozim. Quydagi jadvalda ushbu texnologiyalarning asosiy ko‘rsatkichlari solishtirilgan:

5-jadval.

AHSS va diffuziya jarayonlarining asosiy ko‘rsatkichlari bo‘yicha qiyosiy tahlil

Ko‘rsatkich	**AHSS (DP)**	**AHSS (TRIP)**	**Diffuziya (Sementasiya)**	**Diffuziya (Nitridasiya)**
Sirt qattiqligi (HV)	180–250	200–280	600–900	600–1200
Mustahkamlik (MPa)	600–1000	600–900	500–800 (yadro)	Asosiy qiymat saqlanadi
Cho‘zilish (%)	15–30	20–35	Kamayadi	5–10 (sirt)
Texnologik murakkablik	O‘rtacha	Yuqori	O‘rtacha-yuqori	Yuqori
Qo‘llanish sohasi	Konstruktiv	Energiya absorb.	Tishli g‘ildiraklarlar	Vallar, vtiulkalar

Tahlil ko‘rsatadiki, AHSS materiallar butun hajm bo‘yicha yuqori mexanik xossalarga ega bo‘lsa, diffuziya jarayonlari sirt va yadro xossalarini alohida optimallashtirish imkonini beradi. Amaliyotda bu ikki yondashuv birlashtirilishi ham mumkin: masalan, DP po‘latdan tayyorlangan tishli g‘ildiraklarlar nitridasiyaga tobe etilsa, konstruktiv mustahkamlik ham, sirt chidamliligi ham bir vaqtda ta‘minlanadi.

Natijalar va ularning tahlili:

Ekologik jihat:

Zamonaviy sanoat uchun materiallar tanlashda ekologik ko‘rsatkichlar tobora muhim ahamiyat kasb etmoqda. AHSS materiallardan foydalanish avtomobil massasini kamaytirish orqali yoqilg‘i sarfini va CO_2 emissiyasini kamaytiradi. Tadqiqotlar shuni ko‘rsatadiki, avtomobil massasini 100 kg kamaytirish yoqilg‘i sarfini 0.3–0.5 l/100 km ga kamaytirishi mumkin.

Diffuziya jarayonlarida esa ekologik muammo boshqacha: an‘anaviy sementasiya va nitridasiya jarayonlari zararli gazlar (CN^-, NH_3) chiqarishi mumkin. Shu sababli vakuum sementasiyasi va plazma nitridasiyasi kabi ekologik tozaroq texnologiyalarga o‘tish tendensiyasi kuzatilmoqda.

Hisoblash metallurgiyasi sohasidagi yutuqlar yangi materiallar ishlab chiqish vaqtini sezilarli qisqartirmoqda. CALPHAD (CALculation of PHAse Diagrams) usuli yordamida yangi AHSS tarkiblarini eksperiment o‘tkazmasdan modellashtirish mumkin. Diffuziya jarayonlari uchun esa sonli modellashtirish usullari (FEM, FDM) diffuziya chuqurligi va konsentratsiya profilini oldindan bashorat qilishga imkon beradi.

Uchinchi avlod AHSS (Gen-3 AHSS) hozirgi vaqtda faol tadqiqot va ishlab chiqish bosqichida. Bu materiallar birinchi avloddan qimmatroq, lekin ikkinchi avlod kabi qimmas bo‘lishi mo‘ljallanadi. Ular bir vaqtda 1200 MPa va undan yuqori

mustahkamlik hamda 30% dan ortiq cho‘zilishni ta‘minlashi kutiladi. Medium Manganese steels (MnSi asosidagi) va Q&P (Quenching and Partitioning) texnologiyasi ushbu maqsadga eng yaqin erishgan usullar sifatida tan olinmoqda.

Xulosa:

Ushbu maqolada yangi avlod yuqori mustahkam po‘latlar (AHSS) va metall materiallarda diffuziya jarayonlari keng ko‘lamda tahlil qilindi. Quyidagi asosiy xulosalar chiqarildi:

- AHSS materiallar ko‘p fazali mikrostrukturasi tufayli an‘anaviy po‘latlarga nisbatan ancha murakkab deformatsiya mexanizmlariga ega bo‘lib, bu ularga yuqori mustahkamlik bilan yetarli plastiklikni birlashtirish imkonini beradi.
- DP, TRIP va TWIP turidagi AHSS materiallarning har biri o‘ziga xos qo‘llanish sohasiga ega bo‘lib, avtomobilsozlik sanoatida samarali tatbiq etilmoqda.
- Diffuziya jarayonlari — sementasiya, nitridasiya va boshqa termokimyoviy usullar — materiallarning sirt xossalarini tubdan yaxshilash imkonini beradi, yadro xossalarini esa zararsiz holatda saqlab qoladi.
- Ikki yo'nalish — AHSS va diffuziya jarayonlari — amaliyotda bir-birini to‘ldiruvchi texnologiyalar sifatida birgalikda qo'llanilishi yuqori samaradorlikka erishish imkonini beradi.
- Raqamli modellashtirish va ekologik talablar ushbu materiallar sohasidagi kelajakdagi tadqiqotlarning asosiy yo‘nalishlarini belgilab bermoqda.

Xulosa qilib aytganda, zamonaviy metallshunoslik sohasida AHSS va diffuziya jarayonlari bir-birini to‘ldiruvchi texnologiyalar sifatida sanoatning turli ehtiyojlarini qondirishga xizmat qiladi. Bu materiallarni chuqur o‘rganish va yanada rivojlantirish zamonaviy muhandislikning muhim vazifalaridan biri bo‘lib qolmoqda.

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ADABIY TARJIMA VA UNING AHAMIYATI

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Annotatsiya. Mazkur maqolada adabiy tarjimaning mohiyati, vazifalari va tarixiy taraqqiyoti yoritiladi. Adabiy tarjimaning oddiy tilshunoslik jarayonidan farqli ravishda ijodiy faoliyat ekanligi, unda ma’no, ruh, badiiy uslub va milliy koloritni saqlash muhimligi asoslab beriladi. Shuningdek, tarjimaning qadimgi davrlardan boshlab insoniyat madaniyati bilan uzviy bog‘liq holda rivojlangani, islom olamidagi Buyuk Tarjima Davrining jahon ilm-faniga ta’siri tahlil qilinadi. O‘zbek tarjimachiligining shakllanishi va rivojida Alisher Navoiydan boshlab XX asr tarjimonlarigacha bo‘lgan jarayonlar yoritilib, she’riy tarjimaning o‘ziga xos murakkab jihatlari ochib beriladi. Maqolada o‘zbek tarjimachilik maktabining jahon adabiyoti bilan madaniy aloqalarni mustahkamlashdagi o‘rni va ahamiyati xulosalanadi.

Kalit so‘zlar: adabiy tarjima, tarjimon mahorati, badiiy uslub, milliy kolorit, she’riy tarjima, erkin tarjima, so‘zma-so‘z tarjima, madaniy aloqalar.

Kirish. Adabiy tarjima — bir tildagi badiiy asarni boshqa tilga o'girish san'ati va fani. Tarjima nafaqat so'zlarni, balki ma'no, ruh, badiiy uslub, milliy kolorit va hissiy zaryad — bularning barchasini bir tildan ikkinchi tilga ko'chirish jarayonidir. Shu boisdan adabiy tarjima oddiy tilshunoslik faoliyatidan ko'ra kengroq ko'lamdagi ijodiy ish hisoblanadi.

Adabiy tarjimada ekvivalentlik va adekvatlik masalasi. Adabiy tarjimaning eng muhim nazariy muammolaridan biri — ekvivalentlik va adekvatlik tushunchalaridir. Ekvivalentlik asl matn bilan tarjima matni o‘rtasidagi ma’no jihatidan tenglikni anglatadi. Biroq adabiy tarjimada mutlaq ekvivalentlikka erishish deyarli imkonsiz, chunki har bir tilning o‘ziga xos semantik, stilistik va madaniy tizimi mavjud. Shu sababli zamonaviy tarjima nazariyasida adekvatlik

tushunchasi kengroq qo‘llaniladi. Adekvat tarjima — bu asl matnning estetik, semantik va funksional xususiyatlarini tarjima tilida imkon qadar to‘liq aks ettira olgan tarjimadir.

Tarjimaning tarixi insoniyat madaniyatining tarixi bilan deyarli parallel ketadi. Qadimgi davrlarda turli xalqlar o'rtasidagi savdo va madaniy aloqalar tarjimani zaruriy qildi. Islom olamida IX-X asrlarda yunoncha ilmiy va falsafiy asarlarni arabchaga tarjima qilish katta harakat — "Buyuk Tarjima Davri" — yuzaga keldi. Bu davrda Aristotel, Galen, Gippokrat, Evklid kabi mualliflarning asarlari arabchaga o'girildi va arab dunyo orqali keyinchalik Yevropa ilmiga ham yetib bordi.

O'zbek tarjimachiligining tarixiy ildizlari ham juda qadimiy. O'rta asrlarda arab va fors tillaridan o'zbek tiliga ko'plab asarlar tarjima qilindi. Navoiy o'zi ham tarjimon sifatida faoliyat ko'rsatdi. XX asrda esa tarjima faoliyati yanada tizimli va keng ko'lamdagi tus oldi.

Madaniy realiyalar va ularning tarjimasi. Adabiy tarjimada milliy-madaniy realiyalar muhim o‘rin tutadi. Realiyalar — ma’lum bir xalqning tarixiy, ijtimoiy va madaniy hayotiga xos tushunchalar bo‘lib, ularni boshqa tilga o‘girishda katta qiyinchiliklar yuzaga keladi. Bunday holatlarda tarjimon bir necha usullardan foydalanadi: izohlash, tavsifiy tarjima, transliteratsiya yoki funksional o‘xshashlikka ega birlikni tanlash. Bu jarayonda tarjimon nafaqat tilshunos, balki madaniyatshunos sifatida ham ish ko‘radi.

Asosiy qism. Tarjima jarayonida tarjimon bir qator murakkab vazifalarni bajarishi lozim. Birinchidan, asl matn ma'nosini to'g'ri tushunish. Ikkinchidan, asl matnning badiiy uslubi va ohangini tarjima tilida qayta yaratish. Uchinchidan, madaniy va tarixiy kontekstga mos bo'lgan so'z va iboralarni tanlash. To'rtinchidan, tarjima tilining imkoniyatlaridan ijodiy foydalanish. Bu vazifalarning barchasini bir vaqtda bajarish tarjimondan chuqur bilim, keng madaniy saviya va yuqori ijodiy iste'dod talab qiladi.

She'riy asarlarni tarjima qilish ayniqsa murakkab. She'rda mazmun, ritm, qofiya va badiiy obraz bir-biriga chambarchas bog'liq. Bu elementlarning barchasini tarjima tilida bir vaqtda saqlash ko'pincha mumkin emas. Shu sababli she'riy tarjimada ikki asosiy yondashuv mavjud:

erkin tarjima (she'riylik va ma'noni saqlash birinchi o'rinda) va so'zma-so'z tarjima (matn yaqinligi birinchi o'rinda).

O'zbek tarjimachiligida bir qancha ulug' nom bor. Abduqodir Sharafiddinov (Ozod Sharafiddinov) jahon adabiyotining eng yirik namoyandalari — Shekspir, Balzak, Mopassan, Gyote — asarlarini o'zbek tiliga tarjima qildi. Uning "Gamlet", "Otello", "Qirol Lir" tarjimalari o'zbek tarjimachiligining eng yuksal namunalari hisoblanadi.

Mirtemir (Muhammadsharif Yo'ldoshev, 1913-1978) ham o'zbek tarjimachiligining zabardast vakili. U Pushkinning "Yevgeniy Onegin" romanini o'zbek tiliga tarjima qildi va bu tarjima hali ham eng muvaffaqiyatli tarjimalardan biri sifatida e'tirof etiladi. Shuningdek, S.A. Yeseнин, B. Axmadulina va boshqa rus shoirlarining asarlarini ham tarjima qildi.

Jahon adabiyotidan o'zbek tiliga tarjima qilingan asarlar o'zbek adabiyoti va ziyolilari dunyoqarashiga katta ta'sir ko'rsatdi. Shekspirning tragediyalari, Servantesning "Don Kixot"i, Gyotening "Faust"i, Tolstoy va Dostoyevskiyning romanlari — bularning barchasi o'zbek kitobxonlariga tarjima orqali yetib keldi va o'zbek adabiy madaniyatini boyitdi. Shuningdek, o'zbek adabiyotining vakillari ham xorij tillariga tarjima qilinmoqda.

Xulosa

Adabiy tarjima badiiy adabiyotning eng murakkab va mas’uliyatli sohalaridan biri bo‘lib, u xalqlar o‘rtasidagi madaniy, ma’naviy va estetik aloqalarni ta’minlovchi muhim vosita sifatida namoyon bo‘ladi. Tarjima jarayoni faqatgina bir tildagi matnni boshqa tilga ko‘chirish bilan cheklanmay, balki asl asarning ma’no qatlamlarini, badiiy-estetik xususiyatlarini, milliy ruhini va muallif pozitsiyasini tarjima tilida qayta yaratishni talab etadi. Shu bois adabiy tarjima tilshunoslik, adabiyotshunoslik, madaniyatshunoslik va estetik tafakkur tutashgan murakkab ijodiy faoliyatdir.

Maqolada ko‘rib chiqilganidek, tarjimonning asosiy vazifasi — asl matnga sodiqlik va tarjima tilining badiiy imkoniyatlari o‘rtasida muvozanatni saqlashdir. Ayniqsa she’riy asarlarni tarjima qilishda mazmun, ritm, qofiya va obrazlar tizimini imkon qadar uyg‘un holda ifodalash

katta mahoratni talab qiladi. Bu jarayonda tarjimon ijodiy erkinlikka ega bo‘lsa-da, u asl asarning g‘oyaviy-badiiy mohiyatini buzmasligi lozim.

O‘zbek tarjimachilik maktabining shakllanishi va rivojlanishida XX asr tarjimonlarining xizmatlari beqiyosdir. Jahon adabiyotining durdona asarlari o‘zbek tiliga tarjima qilinishi orqali milliy adabiy tafakkur boyidi, kitobxonlarning estetik didi va dunyoqarashi kengaydi. Shu bilan birga, o‘zbek adabiyotining eng yaxshi namunalari ham xorijiy tillarga tarjima qilinib, milliy madaniyatning xalqaro maydondagi nufuzini oshirishga xizmat qilmoqda.

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KARDIOTONIKLAR VA ANTIANGINAL VOSITALAR YURAK-QON TOMIR TIZIMI KASALLIKLARINI DAVOLASHDA MUHIM O‘RIN TUTUVCHI FARMAKOLOGIK PREPARATLAR HISOBLANADI

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Annotatsiya
Kardiotonik vositalar yurak mushagining qisqarish kuchini oshirib, yurak yetishmovchiligi holatlarida gemodinamik ko‘rsatkichlarni yaxshilaydi. Antianginal preparatlar esa miokardning kislorodga bo‘lgan ehtiyojini kamaytirish yoki toj tomirlar orqali qon oqimini yaxshilash orqali stenokardiya xurujlarini kamaytirishga xizmat qiladi. Ushbu maqolada kardiotonik va antianginal vositalarning farmakodinamikasi, farmakokinetikasi, asosiy ta’sir mexanizmlari, klinik qo‘llanilishi va nojo‘ya ta’sirlari ilmiy adabiyotlar asosida tahlil qilindi. Tadqiqot natijalari ushbu preparatlarning yurak yetishmovchiligi va ishemik yurak kasalliklarini davolashdagi samaradorligini tasdiqlaydi hamda zamonaviy farmakoterapiyada ularning o‘rnini yoritadi.
Kalit so‘zlar: kardiotoniklar, antianginal vositalar, yurak yetishmovchiligi, stenokardiya, miokard, farmakodinamika, farmakokinetika.
Аннотация
Кардиотонические средства повышают сократительную способность миокарда и улучшают гемодинамические показатели при сердечной недостаточности. Антиангинальные препараты уменьшают потребность миокарда в кислороде или улучшают коронарный кровоток, снижая частоту приступов стенокардии. В данной статье на основе современных научных и учебных источников проведён анализ фармакодинамики, фармакокинетики, механизмов действия, клинического применения и побочных эффектов кардиотонических и антиангинальных средств. Полученные данные подтверждают эффективность данных препаратов в терапии сердечной недостаточности и ишемической

болезни сердца, а также определяют их значимость в современной фармакотерапии.

Ключевые слова: кардиотонические средства, антиангинальные препараты, сердечная недостаточность, стенокардия, миокард, фармакодинамика, фармакокинетика.

Abstract

Cardiotonic agents increase myocardial contractility and improve hemodynamic parameters in cases of heart failure. Antianginal drugs reduce myocardial oxygen demand or enhance coronary blood flow, thereby decreasing the frequency of angina attacks. This article analyzes the pharmacodynamics, pharmacokinetics, mechanisms of action, clinical applications, and adverse effects of cardiotonic and antianginal agents based on reliable scientific and pharmacological literature. The findings confirm the therapeutic effectiveness of these drugs in managing heart failure and ischemic heart disease and highlight their importance in modern pharmacotherapy.

Keywords: cardiotonic drugs, antianginal agents, heart failure, angina pectoris, myocardium, pharmacodynamics, pharmacokinetics.

Kirish

Yurak-qon tomir tizimi kasalliklari hozirgi kunda dunyo bo‘yicha nogironlik va o‘limning asosiy sabablaridan biri hisoblanadi. Ayniqsa, yurak yetishmovchiligi va ishemik yurak kasalliklari global sog‘liqni saqlash tizimi oldidagi dolzarb muammolardan biri bo‘lib qolmoqda. World Health Organization ma’lumotlariga ko‘ra, yurak-qon tomir kasalliklari har yili millionlab insonlar hayotiga zomin bo‘lmoqda, bu esa samarali va xavfsiz farmakoterapevtik vositalarni takomillashtirish zaruratini oshiradi.

Kardiotoniklar va antianginal vositalar yurak faoliyati buzilishlarini farmakologik boshqarishda asosiy dori guruhlari hisoblanadi. Kardiotonik preparatlar yurak mushagining qisqarish kuchini oshirib, yurakning nasoslik funksiyasini yaxshilaydi va asosan surunkali hamda o‘tkir yurak yetishmovchiligida qo‘llaniladi. Ushbu guruhga yurak glikozidlari, beta-adrenoretseptor agonistlari va fosfodiesteraza ingibitorlari kiradi. Ularning terapevtik samarasi yurak chiqarish hajmini oshirish va to‘qimalarning qon bilan ta’minlanishini yaxshilash orqali namoyon bo‘ladi.

Antianginal vositalar esa miokardning kislorodga bo‘lgan ehtiyojini kamaytirish yoki toj arteriyalarida qon oqimini yaxshilash orqali stenokardiya xurujlarining oldini olish va ularni bartaraf etishga xizmat qiladi. Ushbu preparatlar orasida organik nitratlar, beta-adrenoblokatorlar, kalsiy kanali blokatorlari hamda zamonaviy metabolik antianginal preparatlar muhim o‘rin tutadi. Ularning farmakologik ta’siri yurak

yuklamasini kamaytirish, periferik va koronar tomirlarni kengaytirish orqali amalga oshadi.

Zamonaviy farmakologiyada ushbu vositalarning farmakodinamik va farmakokinetik xususiyatlarini chuqur o‘rganish, nojo‘ya ta’sirlarini kamaytirish va individual davolash strategiyalarini ishlab chiqish dolzarb ilmiy yo‘nalishlardan biri hisoblanadi. Ayniqsa, polifarmatsiya, dori vositalari o‘zaro ta’siri hamda bemorlarning yosh va hamroh kasalliklariga bog‘liq ravishda preparat tanlash masalalari klinik amaliyotda katta ahamiyat kasb etadi.

Ushbu maqolaning maqsadi kardiotoniklar va antianginal vositalarning asosiy farmakologik xususiyatlarini, ta’sir mexanizmlarini, klinik qo‘llanilishini hamda nojo‘ya ta’sirlarini ilmiy manbalar asosida tahlil qilish va ularning yurak-qon tomir kasalliklarini davolashdagi zamonaviy o‘rnini yoritishdan iborat.

Metodologiya

Ushbu ilmiy maqola kardiotoniklar va antianginal vositalarning farmakologik xususiyatlarini tizimli ravishda tahlil qilishga qaratilgan adabiyotlar sharhi asosida tayyorlandi. Tadqiqot davomida farmakologiya, ichki kasalliklar va klinik kardiologiya sohalariga oid ishonchli ilmiy manbalar, jumladan darsliklar, monografiyalar, xalqaro klinik tavsiyalar hamda ilmiy maqolalardan foydalanildi.

Tadqiqotning nazariy asosini Goodman & Gilman's The Pharmacological Basis of Therapeutics, Katzung's Basic and Clinical Pharmacology, Rang and Dale's Pharmacology kabi xalqaro farmakologik adabiyotlar, shuningdek rus tilidagi farmakologiya darsliklari va klinik tavsiyanomalarda keltirilgan ma’lumotlar tashkil etdi. Manbalarni tanlashda ularning ilmiy ishonchliligi, yangiligi va klinik amaliyotga mosligi asosiy mezon sifatida belgilandi.

Tadqiqotda quyidagi ilmiy usullardan foydalanildi:

Adabiyotlarni tizimli tahlil qilish usuli.

Kardiotonik va antianginal preparatlarning farmakodinamikasi, farmakokinetikasi, ta’sir mexanizmlari va klinik qo‘llanilishiga oid mavjud ilmiy ma’lumotlar yig‘ilib, mazmunan tahlil qilindi.

Taqqoslash usuli.

Turli farmakologik guruhlarga mansub preparatlarning terapevtik samaradorligi, qo‘llash ko‘rsatmalari va nojo‘ya ta’sirlari o‘zaro solishtirildi. Ayniqsa yurak glikozidlari, organik nitratlar, beta-adrenoblokatorlar va kalsiy kanali blokatorlarining afzallik hamda cheklovlari baholandi.

Klinik-farmakologik yondashuv.

Preparatlarning bemor organizmiga ta’siri, dozalanish xususiyatlari, dori vositalari o‘zaro ta’siri va xavfsizlik profili zamonaviy klinik tavsiyalar asosida o‘rganildi.

Analitik umumlashtirish usuli.

Olingan ma’lumotlar umumlashtirilib, kardiotoniklar va antianginal vositalarning yurak-qon tomir kasalliklarini davolashdagi zamonaviy o‘rni va istiqbollari bo‘yicha ilmiy xulosalar shakllantirildi.

Tadqiqot metodologiyasi ushbu preparatlarning klinik samaradorligi va xavfsizligini chuqur baholash, shuningdek farmakoterapiyada individual yondashuvning ahamiyatini aniqlash imkonini berdi.

Natijalar

Tahlil qilingan ilmiy va farmakologik manbalar asosida kardiotoniklar va antianginal vositalarning yurak-qon tomir tizimi kasalliklarini davolashdagi yuqori klinik samaradorligi aniqlandi. Ushbu preparatlar yurak mushagining funksional holatini yaxshilash, miokardning kislorodga bo‘lgan ehtiyojini kamaytirish va toj arteriyalari orqali qon aylanishini optimallashtirish orqali terapevtik ta’sir ko‘rsatadi.

Kardiotonik preparatlar orasida **Digoksin** va **Dobutamin** yurak qisqarish kuchini oshirish orqali yurak chiqarish hajmini yaxshilashi bilan ajralib turadi. Ayniqsa surunkali yurak yetishmovchiligi va o‘tkir dekompensatsiya holatlarida ularning klinik samarasi yuqori ekani kuzatildi. Digoksinning terapevtik diapazoni tor bo‘lgani sababli qon plazmasida uning miqdorini nazorat qilish muhim hisoblanadi.

Antianginal preparatlar orasida **Nitroglitserin**, **Metoprolol** va **Verapamil** keng qo‘llanilib, stenokardiya xurujlari sonini kamaytirish, miokard yuklamasini pasaytirish va koronar perfuziyani yaxshilashda samarali ekani aniqlandi. Nitratlar tezkor simptomatik yordam bersa, beta-adrenoblokatorlar va kalsiy kanali blokatorlari uzoq muddatli nazoratda muhim o‘rin tutadi.

Preparatlarning farmakokinetik va farmakodinamik xususiyatlari ularning klinik tanlovida muhim omil bo‘lib, individual bemor holatiga qarab dori vositasini tanlash zarurligini ko‘rsatdi.

1-jadval. Kardiotonik va antianginal vositalarning farmakologik tavsifi

Dori vositasi	Farmakologik guruhi	Ta’siri va qo‘llanilishi
Digoksin	Yurak glikozidi (kardiotonik)	Yurak qisqarish kuchini oshiradi; surunkali yurak yetishmovchiligi, bo‘lmacha fibrillyatsiyasida qo‘llaniladi
Dobutamin	Beta-adrenoretseptor agonisti (kardiotonik)	O‘tkir yurak yetishmovchiligi va kardiogen shokda yurak faoliyatini qo‘llab-quvvatlaydi

Nitroglitserin	Organik nitrat (antianginal)	Koronar tomirlarni kengaytiradi; stenokardiya xurujini tez bartaraf etadi
Metoprolol	Beta-adrenoblokator (antianginal)	Yurak urishini sekinlashtiradi, arterial bosimni pasaytiradi; stenokardiya va gipertenziyada qo‘llaniladi
Verapamil	Kalsiy kanali blokatori (antianginal)	Koronar vazodilatatsiya qiladi; stenokardiya va ayrim aritmiyalarda qo‘llaniladi

2-jadval. Preparatlarning farmakokinetikasi, farmakodinamikasi va ta’sir mexanizmi

Dori vositasi	Farmakokinetikasi	Farmakodinamikasi	Ta’sir mexanizmi
Digoksin	Og‘iz orqali yaxshi so‘riladi, buyrak orqali chiqariladi, yarim parchalanish davri 36–48 soat	Musbat inotrop, manfiy xronotrop	Natriy-kaliy adenozintrifosfataza fermentini bloklab, hujayrada kalsiy miqdorini oshiradi
Dobutamin	Vena ichiga yuboriladi, tez metabolizmga uchraydi, qisqa ta’sirli	Yurak qisqarishini kuchaytiradi	Beta-1 retseptorlarni stimulyatsiya qilib adenozin monofosfatni oshiradi
Nitroglitserin	Til ostida tez so‘riladi, jigar orqali metabolizmga uchraydi	Vazodilatatsiya, preload kamayishi	Azot oksidi ajratib, silliq mushaklarda guanilat siklazani faollashtiradi
Metoprolol	Ichakda so‘riladi, jigar orqali metabolizmga uchraydi	Yurak urishi va kislorod ehtiyojini kamaytiradi	Beta-1 retseptorlarni bloklaydi
Verapamil	Og‘iz orqali qabul qilinadi, jigar metabolizmi yuqori	Antianginal va antiaritmik ta’sir	Kalsiy kanallarini bloklab, miokard va tomir silliq mushaklarida kalsiy kirishini kamaytiradi

Olingan natijalar shuni ko‘rsatdiki, kardiotonik va antianginal vositalarni ratsional tanlash yurak-qon tomir kasalliklarining klinik kechishini sezilarli darajada yaxshilaydi. Kardiotoniklar yurakning nasoslik faoliyatini tiklashda muhim bo‘lsa, antianginal preparatlar miokard ishemiyasini kamaytirish orqali bemorlarning hayot sifatini oshiradi. Preparatlarni tanlashda ularning farmakokinetik xususiyatlari, nojo‘ya ta’sirlari va bemorning individual holatini hisobga olish zamonaviy farmakoterapiyaning asosiy tamoyillaridan biri hisoblanadi.

Muhokama

Ushbu tadqiqot natijalari kardiotoniklar va antianginal vositalarning yurak-qon tomir tizimi kasalliklarini davolashdagi muhim o‘rnini yana bir bor tasdiqladi. Tahlil qilingan preparatlarning farmakologik xususiyatlari shuni ko‘rsatdiki, ularning terapevtik samaradorligi kasallikning patogenezi, bemorning umumiy holati va hamroh kasalliklariga qarab sezilarli darajada farq qilishi mumkin.

Kardiotonik preparatlar, ayniqsa **Digoksin** va **Dobutamin**, yurak mushagining qisqarish kuchini oshirish orqali yurak yetishmovchiligi bilan kechuvchi holatlarda samarali hisoblanadi. Digoksinning uzoq yillardan buyon klinik amaliyotda qo‘llanilishi uning samaradorligini tasdiqlagan bo‘lsa-da, uning tor terapevtik diapazoni va toksik ta’sir xavfi doimiy laborator nazoratni talab qiladi. Bu holat preparatni individual dozada qo‘llash zarurligini ko‘rsatadi. Dobutamin esa asosan o‘tkir holatlarda qisqa muddatli yordam sifatida muhim ahamiyat kasb etadi, biroq uzoq muddat qo‘llanganda retseptor sezgirligining kamayishi mumkin.

Antianginal vositalar ichida **Nitroglitserin** stenokardiya xurujlarini tezkor bartaraf etishda “oltin standart” preparatlardan biri bo‘lib qolmoqda. Uning tez ta’sir boshlashi klinik jihatdan katta afzallik hisoblanadi, ammo uzoq muddatli qo‘llanishda tolerantlik rivojlanishi preparat samaradorligini pasaytirishi mumkin. Shu sababli nitratlardan foydalanishda dori tanaffuslari tavsiya etiladi.

Metoprolol kabi beta-adrenoblokatorlar yurak urish tezligini va miokardning kislorodga bo‘lgan ehtiyojini kamaytirish orqali uzoq muddatli antianginal nazoratni ta’minlaydi. Ular, ayniqsa, arterial gipertenziya yoki taxiaritmiyalar bilan birga kechuvchi bemorlarda foydali hisoblanadi. Biroq bronxial astma yoki bradikardiyaga moyil bemorlarda ehtiyotkorlik bilan buyurilishi kerak.

Verapamil singari kalsiy kanali blokatorlari koronar tomirlarni kengaytirish va yurak mushagining yuklamasini kamaytirish orqali samarali natija beradi. Ularning afzalligi shundaki, ular ayrim aritmiyalarni ham nazorat qilish imkonini beradi. Ammo yurak o‘tkazuvchanligi buzilgan bemorlarda salbiy ta’sir ko‘rsatishi mumkin.

Muhokama natijalari shuni ko‘rsatadiki, zamonaviy farmakoterapiyada yagona universal preparat mavjud emas; aksincha, dori vositasini tanlash individual klinik yondashuv asosida amalga oshirilishi kerak. Bemorning yoshi, buyrak va jigar faoliyati, hamroh kasalliklari hamda boshqa qabul qilinayotgan preparatlar e’tiborga olinishi zarur.

Shuningdek, so‘nggi yillarda yurak-qon tomir kasalliklarini davolashda yangi avlod preparatlari va kombinatsion terapiyalar rivojlanib borayotgani kuzatilmoqda. Bu esa kardiotonik va antianginal vositalarning klassik vakillari bilan birga qo‘llanilganda davolash samaradorligini oshirish imkonini bermoqda. Shu sababli ushbu preparatlarning farmakologik xususiyatlarini chuqur bilish klinik amaliyotda to‘g‘ri va xavfsiz qaror qabul qilish uchun muhim ahamiyatga ega.

Xulosa

Kardiotoniklar va antianginal vositalar yurak-qon tomir tizimi kasalliklarini davolashda asosiy farmakologik preparatlar qatoriga kiradi va zamonaviy klinik amaliyotda keng qo‘llaniladi. Ushbu preparatlar yurak mushagining funksional holatini yaxshilash, miokardning kislorodga bo‘lgan ehtiyojini kamaytirish hamda koronar qon aylanishini optimallashtirish orqali bemorlarning hayot sifatini oshirishga xizmat qiladi.

Tadqiqot davomida aniqlanishicha, kardiotonik preparatlar, xususan **Digoksin** va **Dobutamin**, yurak yetishmovchiligi bilan kechuvchi holatlarda yurakning nasoslik faoliyatini tiklashda muhim ahamiyat kasb etadi. Shu bilan birga, ularning tor terapevtik diapazoni va ayrim nojo‘ya ta’sirlari doimiy klinik va laborator nazoratni talab qiladi.

Antianginal vositalar, jumladan **Nitroglitserin**, **Metoprolol** va **Verapamil**, miokard ishemiyasini kamaytirish va stenokardiya xurujlarini nazorat qilishda yuqori samaradorlik ko‘rsatadi. Ularning ta’sir mexanizmlari turlicha bo‘lsa-da, umumiy maqsad yurakning kislorodga bo‘lgan ehtiyojini kamaytirish va toj tomirlar orqali qon oqimini yaxshilashdan iborat.

Farmakokinetik va farmakodinamik tahlillar shuni ko‘rsatdiki, har bir preparatning klinik samaradorligi uning organizmdagi so‘rilishi, taqsimlanishi, metabolizmi va chiqarilish xususiyatlari bilan chambarchas bog‘liq. Shu sababli dori vositalarini tanlashda bemorning individual xususiyatlari, yoshi, hamroh kasalliklari va boshqa qabul qilayotgan preparatlari albatta hisobga olinishi zarur.

Xulosa qilib aytganda, kardiotoniklar va antianginal vositalardan oqilona va individual yondashuv asosida foydalanish yurak-qon tomir kasalliklari prognozini yaxshilash, asoratlarni kamaytirish va bemorlarning umr davomiyligini uzaytirishda muhim

ahamiyatga ega. Kelajakda ushbu preparatlar bo‘yicha yangi farmakologik tadqiqotlar va innovatsion dori shakllarini ishlab chiqish kardiologik davolash samaradorligini yanada oshirishga xizmat qiladi.

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IMPROVING THE METHODOLOGY FOR DEVELOPING STUDENTS' MOTIVATION IN DISTANCE LEARNING

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Abstract: This article analyzes modern pedagogical and innovative methods for developing students' learning motivation in the process of distance education. Due to the rapid integration of information and communication technologies into the education system, the importance of distance learning is increasing, while maintaining and enhancing students' motivation has become a pressing pedagogical issue. The study highlights the role of interactive methods, gamification, project-based and problem-based learning, blended learning, adaptive learning, and the STEAM approach in increasing students' independent thinking, creativity, and interest in learning. The article also discusses the methodological foundations of an individualized approach, the development of students' independent learning competencies, and the creation of a motivational learning environment. The research results contribute to improving the effectiveness of distance education, enhancing student engagement, and advancing modern teaching methodology.

Keywords: distance learning, motivation, pedagogical technologies, interactive methods, digital platforms, student engagement, quality of education.

Today, the rapid development of information and communication technologies has led to the widespread use of distance learning in the education system. While distance education provides convenience for students, it also develops their independent learning skills. However, one of the main challenges of this form of education is the decline in student motivation. The use of modern pedagogical methods to develop students' learning motivation is a key factor in improving educational

effectiveness. In the modern educational process, increasing students' activity, independent thinking, and interest in learning is one of the main tasks of teachers. Therefore, in addition to traditional teaching methods, innovative pedagogical approaches are increasingly being used.

Interactive methods are effective tools for actively engaging students in the learning process. Methods such as "Brainstorming," "Debate," "Cluster," and "Case Study" expand students' thinking abilities, develop decision-making skills, and increase their interest in learning. In particular, group-based methods foster cooperation and a sense of responsibility among students. Gamification technology also plays an important role in increasing motivation. Incorporating game elements into the learning process, such as point systems, rankings, and rewarding tasks, enhances student engagement. Through this approach, students perceive learning not as an obligation but as an engaging activity.

The use of information and communication technologies is also one of the modern ways to enhance motivation. Multimedia tools, video lectures, virtual laboratories, and online platforms make the learning process more interactive and convenient. Students gain the ability to independently search for and analyze necessary information. In addition, the importance of an individualized approach is significant. A learning process organized according to each student's interests, abilities, and needs strengthens their intrinsic motivation. The teacher's support, encouragement, and recognition of students' achievements are also important motivational factors.

The following modern pedagogical methods are effective in increasing students' learning motivation:

a) Flipped Classroom – students study the topic in advance through videos or electronic materials, while class time is used for practical tasks and discussions.

b) Gamification – a method of motivating students by integrating game elements into the learning process.

c) Project-Based Learning – students acquire knowledge and skills by working on specific projects.

d) Problem-Based Learning – students learn by solving problems independently or in groups.

e) Blended Learning – a teaching approach that combines traditional and online learning methods.

f) Collaborative Learning – students work in teams, share knowledge, and achieve results together.

g) Design Thinking – a method focused on creative and innovative problem-solving.

h) Microlearning – a method of teaching content in short and focused learning units.

i) Peer Learning – students learn by teaching and sharing experience with each other.

j) Digital Storytelling – a method of learning through creating stories using digital technologies.

k) Adaptive Learning – a personalized learning approach based on artificial intelligence and digital platforms.

l) STEAM Education – an integrated approach combining science, technology, engineering, arts, and mathematics.

These methods help develop students' independent thinking, creativity, communication skills, and motivation.

The use of multimedia tools in distance learning platforms plays an important role in improving the effectiveness of education. Multimedia tools combine text, audio, video, animation, graphics, and interactive elements, making the learning process easier for students. In distance education, where direct communication with students is limited, multimedia technologies serve as one of the main educational tools. In general, improving the methodology for developing students' motivation in distance learning is one of the priority tasks of modern education. By effectively using innovative

pedagogical technologies, interactive methods, and digital tools, it is possible to improve the quality of education, develop students' independent learning competencies, and increase their interest in learning. This contributes to training competitive, creative, and modern-thinking professionals.

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VIRUSLARGA QARSHI VOSITALAR. USHBU GURUH VOSITALARIGA RETSEPT

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Annotatsiya

Virusli kasalliklar zamonaviy tibbiyotning dolzarb muammolaridan biri bo‘lib, ularning oldini olish va samarali davolash uchun antiviral dori vositalarini to‘g‘ri tanlash muhim ahamiyat kasb etadi. Ushbu maqolada viruslarga qarshi vositalarning farmakologik tasnifi, ta’sir mexanizmlari, farmakokinetik va farmakodinamik xususiyatlari, klinik qo‘llanilishi hamda retsept yozish qoidalari tahlil qilindi. Tadqiqot davomida farmakologiya bo‘yicha ishonchli darsliklar, xalqaro ilmiy adabiyotlar va zamonaviy klinik tavsiyalar asosida ma’lumotlar yig‘ilib, tizimli tahlil qilindi. Natijalarga ko‘ra, antiviral preparatlar virus replikatsiyasining turli bosqichlariga selektiv ta’sir ko‘rsatib, infeksion jarayonning og‘irligini kamaytiradi va asoratlarning oldini olishda muhim rol o‘ynaydi. Shuningdek, retsept yozishda preparatning dozalash shakli, qo‘llash usuli, bemorning yoshi va klinik holatini hisobga olish zarurligi aniqlandi. Tadqiqot xulosalariga ko‘ra, viruslarga qarshi vositalarni ratsional qo‘llash va to‘g‘ri retseptlash davolash samaradorligini oshirishning asosiy omillaridan biridir.

Kalit so‘zlar: antiviral vositalar, virusli infeksiya, farmakologiya, retsept, farmakokinetika, farmakodinamika, dori vositalari.

Аннотация

Вирусные заболевания остаются одной из актуальных проблем современной медицины, а правильный выбор противовирусных препаратов имеет важное значение для профилактики и эффективного лечения. В данной статье рассмотрены фармакологическая классификация противовирусных средств, механизмы их действия, фармакокинетические и фармакодинамические свойства, клиническое применение, а также правила выписывания рецептов. Исследование основано на анализе достоверных учебных пособий по фармакологии, международной научной литературы и современных клинических рекомендаций. Результаты показали, что противовирусные препараты оказывают селективное воздействие на различные этапы репликации вируса, снижая тяжесть инфекционного процесса и предотвращая развитие осложнений. Кроме того, установлено, что при выписывании рецепта необходимо учитывать лекарственную форму препарата, способ применения, возраст пациента и особенности клинического состояния. Сделан вывод о том, что рациональное применение противовирусных средств и правильное оформление рецептов являются важнейшими факторами повышения эффективности терапии.

Ключевые слова: противовирусные препараты, вирусная инфекция, фармакология, рецепт, фармакокинетика, фармакодинамика, лекарственные средства.

Abstract

Viral diseases remain one of the major challenges of modern medicine, and the appropriate selection of antiviral drugs is essential for effective prevention and treatment. This article analyzes the pharmacological classification of antiviral agents, their mechanisms of action, pharmacokinetic and pharmacodynamic characteristics, clinical applications, and prescription-writing principles. The study was conducted

based on reliable pharmacology textbooks, international scientific literature, and current clinical guidelines. The findings demonstrate that antiviral medications selectively target different stages of viral replication, thereby reducing disease severity and preventing complications. Furthermore, proper prescription writing requires careful consideration of the dosage form, route of administration, patient age, and clinical condition. It is concluded that the rational use of antiviral agents and accurate prescription practices are among the key factors in improving therapeutic outcomes.

Keywords: antiviral agents, viral infection, pharmacology, prescription, pharmacokinetics, pharmacodynamics, medications.

Kirish

Virusli kasalliklar insoniyat tarixida doimo jiddiy tibbiy va ijtimoiy muammo sifatida namoyon bo‘lib kelgan. Zamonaviy globalizatsiya, aholining yuqori migratsiyasi va yangi virusli shtammlarning paydo bo‘lishi tufayli virusli infeksiyalarning tarqalish xavfi yanada ortmoqda. Jahon sog‘liqni saqlash tashkiloti ma’lumotlariga ko‘ra, respirator virusli infeksiyalar, gepatit viruslari, inson immun tanqisligi virusi, gerpes viruslari va boshqa ko‘plab viruslar dunyo bo‘ylab millionlab insonlarning salomatligiga tahdid solmoqda. Virusli kasalliklar nafaqat yuqori kasallanish va o‘lim ko‘rsatkichlariga, balki iqtisodiy yo‘qotishlar, mehnat qobiliyatining pasayishi va sog‘liqni saqlash tizimiga katta yuk tushishiga ham sabab bo‘ladi.

Viruslarning biologik xususiyatlari ularni boshqa mikroorganizmlardan tubdan farqlaydi. Ular hujayraviy tuzilishga ega emas va faqat tirik hujayra ichida ko‘payish qobiliyatiga ega bo‘lgan obligat hujayra ichki parazitlar hisoblanadi. Shu sababli viruslarga qarshi samarali dori vositalarini yaratish murakkab ilmiy muammolardan biri bo‘lib qolmoqda. Antibakterial preparatlardan farqli ravishda, antiviral vositalar virusning replikatsiya jarayonining ma’lum bosqichlariga selektiv ta’sir ko‘rsatishi kerak, bunda mezbon hujayra funksiyalariga minimal zarar yetkazilishi talab etiladi.

Farmakologiyada viruslarga qarshi vositalar alohida dori guruhini tashkil etib, ularning ta’sir mexanizmlari turlicha bo‘lishi mumkin. Ayrim preparatlar virusning hujayraga

birikishini yoki kirib borishini to‘xtatsa, boshqalari virus nuklein kislotalari sintezini inhibe qiladi yoki yangi virus zarrachalarining yig‘ilishi va ajralib chiqishini bloklaydi. Masalan, **Atsiklovir** gerpes viruslariga qarshi keng qo‘llaniladigan preparat bo‘lsa, **Oseltamivir** gripp virusiga qarshi samarali hisoblanadi, **Zidovudin** esa retrovirus infeksiyalarida muhim o‘rin tutadi. Ushbu preparatlarning to‘g‘ri tanlanishi va ratsional qo‘llanilishi davolash samaradorligini sezilarli darajada oshiradi.

Viruslarga qarshi vositalarni klinik amaliyotda qo‘llash nafaqat ularning farmakodinamik va farmakokinetik xususiyatlarini chuqur bilishni, balki retsept yozish qoidalarini to‘g‘ri egallashni ham talab etadi. Retsept tibbiy hujjat sifatida dori vositasining nomi, dozasi, qo‘llash usuli va davomiyligini aniq belgilab beradi. Ayniqsa antiviral preparatlarda noto‘g‘ri dozalash yoki noto‘g‘ri qo‘llash virus rezistentligining rivojlanishiga, nojo‘ya ta’sirlarning kuchayishiga va davolash natijalarining pasayishiga olib kelishi mumkin.

Mazkur ilmiy maqolaning dolzarbligi virusli kasalliklarning keng tarqalganligi, antiviral preparatlarning klinik ahamiyati hamda ushbu vositalarga retsept yozish ko‘nikmalarining tibbiyot amaliyotidagi zarurati bilan belgilanadi. Tadqiqotning maqsadi viruslarga qarshi vositalarning farmakologik tavsifini, ularning ta’sir mexanizmlarini, klinik qo‘llanilishini va ushbu guruh preparatlariga retsept yozish tamoyillarini ilmiy manbalar asosida tahlil qilishdan iborat.

Metodologiya

Ushbu ilmiy tadqiqot viruslarga qarshi vositalarning farmakologik xususiyatlari, klinik qo‘llanilishi hamda ushbu guruh preparatlariga retsept yozish tamoyillarini tizimli ravishda o‘rganishga qaratilgan bo‘lib, adabiyotlar tahlili va qiyosiy-deskriptiv metodologiya asosida amalga oshirildi. Tadqiqotda farmakologiya, klinik farmatsiya va infeksion kasalliklar bo‘yicha nufuzli ilmiy manbalar asosiy ma’lumot bazasi sifatida tanlandi.

Tadqiqotning nazariy asosini xalqaro miqyosda tan olingan farmakologik adabiyotlar, jumladan Goodman & Gilman’s The Pharmacological Basis of Therapeutics,

Katzung's Basic and Clinical Pharmacology, Rang & Dale's Pharmacology, shuningdek rus tilidagi Mashkovskiy M.D. "Лекарственные средства" va Харкевич Д.А. "Фармакология" darsliklaridan olingan ilmiy ma'lumotlar tashkil etdi. Bundan tashqari, Jahon sog'liqni saqlash tashkiloti, xalqaro infeksion kasalliklar assotsiatsiyalari hamda zamonaviy klinik protokollarda keltirilgan antiviral terapiyaga oid tavsiyalar tahlil qilindi.

Tadqiqot jarayonida ma'lumotlarni tanlash, saralash va tizimlashtirish bosqichma-bosqich olib borildi. Dastlab viruslarga qarshi preparatlar farmakologik tasnif bo'yicha guruhlarga ajratildi: gerpes viruslariga qarshi vositalar, gripp virusiga qarshi preparatlar, retroviruslarga qarshi dori vositalari, keng ta'sir doirasiga ega antiviral preparatlar va immunomodulyatorlar. Har bir guruh bo'yicha preparatlarning ta'sir mexanizmi, farmakodinamikasi, farmakokinetikasi, qo'llash ko'rsatmalari, qarshi ko'rsatmalari va nojo'ya ta'sirlari alohida tahlil qilindi.

Tadqiqotning muhim metodik bosqichlaridan biri sifatida retseptologik tahlil usuli qo'llanildi. Ushbu bosqichda antiviral vositalarga xalqaro va milliy farmatsevtik me'yorlar asosida retsept yozish qoidalari o'rganildi. Retsept tarkibiy qismlari, dori shakli, dozasi, qo'llash chastotasi va davomiyligini belgilash mezonlari amaliy misollar asosida baholandi. Ayniqsa, lotin tilida retsept yozish standartlari va farmakologik abbreviaturalarning to'g'ri qo'llanishiga alohida e'tibor qaratildi.

Ma'lumotlarni tahlil qilishda qiyosiy tahlil, sistematik sharhlash, farmakologik interpretatsiya va klinik moslashtirish usullaridan foydalanildi. Turli antiviral preparatlarning samaradorligi va xavfsizligi bo'yicha olingan natijalar o'zaro solishtirilib, ularning klinik afzalliklari va cheklovlari aniqlashtirildi.

Ushbu metodologik yondashuv viruslarga qarshi vositalarning zamonaviy farmakologik o'rnini aniqlash, ularni ratsional qo'llash bo'yicha ilmiy asoslangan tavsiyalar ishlab chiqish hamda tibbiyot amaliyotida retsept yozish ko'nikmalarini takomillashtirish imkonini berdi.

Natijalar

Tadqiqot davomida viruslarga qarshi vositalarning farmakologik xususiyatlari, klinik samaradorligi va retsept yozish amaliyoti tizimli ravishda tahlil qilindi. Olingan natijalar shuni ko‘rsatdiki, antiviral preparatlar virusning replikatsiya siklining turli bosqichlariga selektiv ta’sir ko‘rsatish orqali infeksion jarayonning davomiyligi va og‘irligini sezilarli darajada kamaytiradi. Preparatlarni to‘g‘ri tanlash kasallikning etiologiyasi, virus turi, bemorning yoshi, immunologik holati va hamroh kasalliklariga bog‘liq ekanligi aniqlandi.

Tahlil natijalariga ko‘ra, nukleozid analoglari (Atsiklovir, Valatsiklovir, Gansiklovir) gerpes viruslariga qarshi yuqori samaradorlik ko‘rsatdi. Ushbu preparatlar virus DNK-polimeraza fermentini bloklash orqali virus ko‘payishini to‘xtatadi. Klinik kuzatuvlarda ular kasallik simptomlarini qisqartirishi va qaytalanish xavfini kamaytirishi bilan ajralib turdi.

Neuraminidaza ingibitorlari (Oseltamivir, Zanamivir) gripp virusiga qarshi samarali vositalar sifatida baholandi. Ayniqsa kasallikning dastlabki 48 soatida qo‘llanganda isitma davomiyligini kamaytirish va pnevmoniya kabi asoratlarning oldini olishda yuqori natija qayd etildi.

Antiretrovirus preparatlar (Zidovudin, Lamivudin, Efavirenz) esa inson immun tanqisligi virusi bilan kasallangan bemorlarda virus yuklamasini pasaytirish va immun tizim faoliyatini saqlab qolishda muhim ahamiyat kasb etdi. Kombinatsion terapiya monoterapiyaga nisbatan ancha yuqori samaradorlik ko‘rsatdi.

Retseptologik tahlillar shuni ko‘rsatdiki, antiviral vositalarga retsept yozishda preparat nomi, dori shakli, dozasi, qo‘llash muddati va bemorga tavsiyalarni to‘liq ko‘rsatish davolash xavfsizligi uchun muhim omildir. Noto‘g‘ri dozalash yoki davolash kursining yetarli davom ettirilmasligi dori rezistentligi rivojlanishiga olib kelishi mumkin.

1-jadval. Viruslarga qarshi vositalarning farmakologik tavsifi

Preparat nomi	Farmakologik guruhi	Ta’sir mexanizmi	Qo‘llanilishi	Asosiy nojo‘ya ta’siri
Atsiklovir	Nukleozid analogi	Virus DNK-polimerazasini inhibitsiya qiladi	Gerpes simplex, Varicella zoster	Ko‘ngil aynishi, bosh og‘rig‘i
Oseltamivir	Neuraminidaza ingibitori	Virusning hujayradan ajralishini bloklaydi	A va B tipdagi gripp	Ko‘ngil aynishi, qusish
Zanamivir	Neuraminidaza ingibitori	Virus tarqalishini cheklaydi	Gripp profilaktikasi va davosi	Bronxospazm
Zidovudin	Antiretrovirus vosita	Teskari transkriptazani inhibitsiya qiladi	OIV infeksiyasi	Anemiya, neytropeniya
Lamivudin	Antiretrovirus vosita	Virus RNK sintezini to‘xtatadi	OIV, gepatit B	Charchoq, bosh aylanishi

2-jadval. Antiviral preparatlarga namunaviy retseptlar

Preparat	Retsept shakli (lotincha)	Qo‘llash tartibi
Atsiklovir tabletkasi	**Rp.: Tab. Acicloviri 0,2 №25 D.S. Kuniga 5 mahal 1 tabletkadan ichilsin.**	Gerpes infeksiyalarida 5–7 kun

Oseltamivir kapsulasi	**Rp.: Caps. Oseltamiviri 0,075 №10 D.S. Kuniga 2 mahal 1 kapsuladan ichilsin.**	Grippda 5 kun
Zidovudin tabletkasi	**Rp.: Tab. Zidovudini 0,3 №60 D.S. Kuniga 2 mahal 1 tabletkadan ichilsin.**	Antiretrovirus terapiyada uzoq muddat
Atsiklovir maz	**Rp.: Ung. Acicloviri 5% – 10,0 D.S. Zararlangan joyga kuniga 5 mahal surtilsin.**	Teri gerpesida
Zanamivir inhalatsiya	**Rp.: Pulv. Zanamiviri 5 mg/dosis №20 D.S. Inhalatsiya uchun, kuniga 2 mahal.**	Grippni davolashda

Natijalarning umumiy tahlili

Olingan ma’lumotlar shuni tasdiqlaydiki, antiviral vositalarning samaradorligi ularni kasallikning erta bosqichida qo‘llash bilan bevosita bog‘liq. Preparatlarning farmakologik xususiyatlarini chuqur bilish va retseptlarni standart talablar asosida yozish davolash samaradorligini oshiradi, nojo‘ya ta’sirlarni kamaytiradi va virus rezistentligining oldini olishga yordam beradi. Shu sababli tibbiyot amaliyotida viruslarga qarshi vositalardan oqilona foydalanish dolzarb masala bo‘lib qolmoqda.

Muhokama

Mazkur tadqiqot natijalari viruslarga qarshi vositalarning zamonaviy farmakoterapiyada muhim o‘rin egallashini yana bir bor tasdiqladi. Virusli kasalliklarning etiologik davosida antiviral preparatlarning qo‘llanilishi kasallikning davomiyligini qisqartirish, klinik simptomlarning og‘irligini kamaytirish va asoratlar rivojlanishining oldini olishda asosiy omillardan biri hisoblanadi. Tahlil qilingan ilmiy manbalar shuni ko‘rsatdiki, antiviral preparatlarning samaradorligi ularning virus

replikatsiyasining aniq bosqichlariga selektiv ta’sir ko‘rsatish xususiyati bilan chambarchas bog‘liq.

Muhokama jarayonida aniqlanishicha, nukleozid va nukleotid analoglari, xususan **Atsiklovir** va **Gansiklovir**, gerpesvirus infeksiyalarida yuqori terapevtik samaradorlikka ega bo‘lib, ayniqsa kasallikning dastlabki bosqichlarida qo‘llanganda maksimal klinik foyda beradi. Biroq ushbu preparatlarni uzoq muddat yoki nazoratsiz qo‘llash virus rezistentligi shakllanishiga sabab bo‘lishi mumkin. Bu esa farmakologik nazorat va individual yondashuvning zarurligini ko‘rsatadi.

Gripp viruslariga qarshi qo‘llaniladigan **Oseltamivir** va **Zanamivir** kabi neuraminidaza ingibitorlari bo‘yicha olingan natijalar ham xalqaro klinik tavsiyalar bilan mos keldi. Ularning kasallikning ilk 48 soatida qo‘llanishi isitma davomiyligini kamaytirishi, simptomlarning yengillashishi va ikkilamchi bakterial asoratlar xavfini pasaytirishi aniqlangan. Shu bilan birga, kech boshlangan terapiyada preparatlarning samaradorligi sezilarli darajada kamayishi kuzatiladi, bu esa erta diagnostika va tezkor farmakologik aralashuvning ahamiyatini oshiradi.

Antiretrovirus terapiya bo‘yicha tahlillar kombinatsiyalangan davo yondashuvining ustunligini ko‘rsatdi. **Zidovudin**, **Lamivudin** va boshqa teskari transkriptaza ingibitorlarining birgalikda qo‘llanilishi virus yuklamasini samarali kamaytiradi va immun tizim faoliyatini uzoq muddat saqlash imkonini beradi. Biroq bunday davolash rejimlarida bemorning dori qabul qilish intizomi, nojo‘ya ta’sirlarni monitoring qilish va muntazam laborator nazorat katta ahamiyat kasb etadi.

Retseptologik jihatdan olib borilgan muhokama shuni ko‘rsatdiki, antiviral preparatlar uchun retsept yozishda aniqlik va standartlarga qat’iy rioya qilish davolash xavfsizligi uchun zarurdir. Dori vositasining xalqaro yoki farmakopeya nomi, aniq dozasi, dori shakli, qo‘llash davomiyligi va bemorga beriladigan tavsiyalar to‘liq ko‘rsatilishi lozim. Ayniqsa bolalar, homilador ayollar va surunkali kasalliklarga ega bemorlarda dozalashni individuallashtirish muhim hisoblanadi.

Shuningdek, zamonaviy ilmiy adabiyotlar antiviral preparatlar bilan bir qatorda immunomodulyator terapiya va kombinatsion davolash strategiyalarining istiqbolli ekanligini ta’kidlamoqda. Viruslarning mutatsiyaga uchrash qobiliyati va yangi shtammlarning paydo bo‘lishi esa yangi avlod antiviral vositalarni ishlab chiqishni talab etadi. Shu sababli farmakologiya sohasida innovatsion tadqiqotlar va klinik sinovlarning davom ettirilishi dolzarb vazifa bo‘lib qolmoqda.

Umuman olganda, mazkur tadqiqot natijalari va ularning tahlili viruslarga qarshi vositalarning ilmiy asoslangan va ratsional qo‘llanilishi bemorlar salomatligini yaxshilashda muhim rol o‘ynashini ko‘rsatdi. Shu bilan birga, preparatlarni to‘g‘ri retseptlash va individual klinik yondashuv antiviral terapiya samaradorligini belgilovchi asosiy omillar sifatida baholandi.

Xulosa

Viruslarga qarshi vositalar zamonaviy farmakologiyada virusli kasalliklarning oldini olish va davolashda muhim o‘rin egallovchi dori guruhlaridan biri hisoblanadi. Ushbu tadqiqot davomida antiviral preparatlarning farmakologik tasnifi, ta’sir mexanizmlari, farmakokinetik va farmakodinamik xususiyatlari, klinik qo‘llanilishi hamda retsept yozish tamoyillari ilmiy manbalar asosida batafsil tahlil qilindi.

Tahlil natijalari shuni ko‘rsatdiki, antiviral vositalarning samaradorligi ularning virus replikatsiyasining ma’lum bosqichlariga selektiv ta’sir ko‘rsatish qobiliyati bilan bog‘liq. Nukleozid analoglari, neuraminidaza ingibitorlari va antiretrovirus preparatlar turli virusli infeksiyalarni davolashda yuqori terapevtik natija beradi. Ayniqsa davolashni kasallikning erta bosqichida boshlash klinik samaradorlikni oshiradi va asoratlar rivojlanish xavfini kamaytiradi.

Shu bilan birga, antiviral preparatlarni noto‘g‘ri yoki nazoratsiz qo‘llash virus rezistentligining shakllanishiga, nojo‘ya ta’sirlarning kuchayishiga hamda davolash samaradorligining pasayishiga olib kelishi mumkin. Shu sababli ushbu vositalarni tanlashda bemorning yoshi, umumiy klinik holati, virus turi va hamroh kasalliklari albatta hisobga olinishi zarur.

Retsept yozish masalasi antiviral terapiyaning ajralmas qismi bo‘lib, preparat nomi, dozasi, dori shakli, qo‘llash usuli va davomiyligini to‘g‘ri belgilash davolash xavfsizligi va samaradorligini ta’minlaydi. Ayniqsa lotin tilida retseptlarni standart qoidalarga muvofiq rasmiylashtirish tibbiyot amaliyotida muhim kasbiy ko‘nikma hisoblanadi.

Kelajakda viruslarning yangi shtammlari va dori vositalariga chidamlilik muammosi ortib borayotgan bir sharoitda yangi avlod antiviral preparatlarni yaratish, kombinatsion terapiya imkoniyatlarini kengaytirish hamda individual farmakoterapiya tamoyillarini rivojlantirish zarur bo‘ladi.

Shunday qilib, viruslarga qarshi vositalarni ilmiy asoslangan holda ratsional qo‘llash va retseptlash virusli kasalliklarni samarali boshqarish, bemorlarning hayot sifatini yaxshilash hamda zamonaviy sog‘liqni saqlash tizimining samaradorligini oshirishning muhim shartlaridan biridir.

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SHARQ MUTAFAKKIRLARINING PSIXOLOGIK QARASHLARI. PSIXOLOGIK KASALLIKLAR

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Annotatsiya: Ushbu maqola Sharq mutafakkirlari — Ibn Sino, Al-Forobiy, Al-Kindiy va Imom G'azzoliy — ning psixologik qarashlarini zamonaviy tibbiyot va psixologiya nuqtai nazaridan tahlil etadi. Sharq allomalarining ruh, nafs, aql va his-tuyg'ular haqidagi ta'limotlari o'z davrining ilg'or psixologik nazariyalari sifatida ko'rib chiqiladi. Maqolada psixologik kasalliklarning kelib chiqishi, tasnifi va

davolash usullari Sharq tibbiyoti prizmasi orqali yoritiladi hamda zamonaviy klinik psixologiya bilan qiyosiy tahlil amalga oshiriladi.

Аннотация: Данная статья посвящена анализу психологических воззрений восточных мыслителей — Ибн Сины, Аль-Фараби, Аль-Кинди и Имама Газали — с точки зрения современной медицины и психологии. Учения этих учёных о душе, разуме, эмоциях и психических расстройствах рассматриваются как передовые психологические теории своего времени. В статье освещаются происхождение, классификация и методы лечения психических заболеваний через призму восточной медицины, а также проводится сравнительный анализ с современной клинической психологией.

Abstract: This article analyzes the psychological views of Eastern thinkers — Ibn Sina, Al-Farabi, Al-Kindi, and Imam Ghazali — from the perspective of modern medicine and psychology. The teachings of these scholars on the soul, intellect, emotions, and mental disorders are examined as advanced psychological theories of their time. The article explores the origin, classification, and treatment of psychological disorders through the lens of Eastern medicine, and provides a comparative analysis with contemporary clinical psychology.

Kalit so'zlar: Sharq psixologiyasi, nafs, Ibn Sino, Al-Forobiy, psixologik kasalliklar, ruhiy salomatlik, tibbiyot falsafasi, melanxoliya, vasvas, zamonaviy psixiatriya.

Ключевые слова:Восточная психология, душа, Ибн Сина, Аль-Фараби, психические расстройства, психическое здоровье, философия медицины, меланхолия, навязчивость, современная психиатрия.

Keywords:Eastern psychology, soul, Ibn Sina, Al-Farabi, psychological disorders, mental health, philosophy of medicine, melancholy, obsession, modern psychiatry.

Psixologiya fani ko'pincha G'arb sivilizatsiyasining XVIII–XIX asrlardagi yutuqlari sifatida talqin qilinadi. Freyd, Yung, Vundt kabi nomlar ushbu fan tarixining peshonasiga yozilgan. Biroq bu qarash to'liq va adolatli emas. Insoniyat psixik hayotini ilmiy jihatdan o'rganishga urinish ancha qadimroq — IX–XI asrlarda Sharqda, xususan Movarounnahr va Xuroson zaminida yashab ijod etgan buyuk mutafakkirlar davrida boshlangan.

Sharq allomalarining tibbiyot va falsafaga oid asarlari nafaqat jismoniy kasalliklarni, balki ruhiy holatlarni ham chuqur ilmiy tahlil qilgan. Ibn Sinoning "Tib qonunlari", Al-Forobiyning "Fozil shahar aholisi" asari, Al-Kindiyning "Qayg'uni bartaraf etish to'g'risida" risolasi va G'azzoliyning "Ihyo' ulum id-din" asari — bularning barchasida inson psixikasiga oid qimmatli g'oyalar mavjud bo'lib, zamonaviy psixologiya va psixiatriya nuqtai nazaridan ham beqiyos ahamiyatga ega.

Ushbu maqolada biz ana shu merosni tibbiyot va psixologiya fanlarining qorishmasidan iborat yaxlit bir prizma orqali ko'rib chiqamiz va Sharq mutafakkirlarining psixologik kasalliklarga oid qarashlarini zamonaviy ilm-fan yutuqlari bilan qiyoslaymiz.

SHARQ MUTAFAKKIRLARIDA "NAFS" VA "RUH" TUSHUNCHASI

Sharq psixologiyasini tushunish uchun avvalo uning asosiy kategoriyalari — nafs va ruh tushunchalarini aniqlab olish zarur.

Al-Kindiy (801–873) — arab falsafasining otasi sifatida tanilgan bu mutafakkir nafsni mustaqil, ilohiy mohiyatga ega bo'lgan va tanadan alohida mavjud bo'la oladigan substansiya sifatida ta'riflagan. U nafsning uch asosiy qobiliyatini ajratib ko'rsatgan: o'simlik qobiliyati (o'sish va ko'payish), hayvon qobiliyati (his etish va harakatlanish) hamda insonga xos aqliy qobiliyat.Bu taksonomiya Aristotelning ta'sirini ko'rsatsa-da, Al-Kindiy uni yanada rivojlantirib, nafsning kasalliklar bilan aloqasiga e'tibor qaratgan.

Al-Forobiy (872–950) nafsni murakkab, ko'p qatlamli tuzilma sifatida ko'rgan.

Uningcha, nafs to'rtta asosiy kuchdan iborat: teorik aql, amaliy aql, tasoddusiy (intuitiv) aql va faol aql. Forobiy ta'kidlaganki, inson baxtga erishishi uchun bu kuchlar orasida muvozanat bo'lishi shart. Muvozanatning buzilishi esa psixik og'ishlarning asosiy sababi hisoblanadi. Zamonaviy psixologiyadagi "psixik integratsiya" tushunchasi bilan ushbu fikr orasida ajoyib o'xshashlik ko'zga tashlanadi.

Ibn Sino (980–1037) nafsni eng sistematik tarzda tahlil etgan mutafakkir hisoblanadi. U nafsni uch qismga ajratdi: nabotiy nafs (o'simlik ruhi — ovqatlanish, o'sish, ko'payish), hayvoniy nafs (his etish, xayol, harakatlanish) va insonga xos nutqiy yoki aqliy nafs. Ibn Sino ushbu ta'limotni tibbiyot bilan bevosita bog'lab, har bir nafs qismining buzilishi ma'lum kasalliklarni keltirib chiqarishi mumkinligini asoslab berdi.

Zamonaviy neyropsixologiya nuqtai nazaridan qaralganda, Ibn Sinoning ushbu taqsimoti qisman beyin tuzilmalarining funksional ierarxiyasiga mos kelishi bilan ajralib turadi. Miyaning evolyutsion qatlamlari — arxikortikal (ibtidoiy), limbik (hissiy) va neokorteks (aqliy) — Ibn Sinoning uch qismli nafs modeliga mos keladi.

IBN SINONING PSIXOLOGIK KASALLIKLAR HAQIDAGI QARASHLARI

Ibn Sino o'zining "Tib qonunlari" (Al-Qonun fit-Tibb) asarida psixik kasalliklarni chuqur ilmiy tahlil qilgan bo'lib, bu asar XII asrda lotin tiliga tarjima qilingach, Yevropa universiteti darsliklarida XVII asrgacha qo'llanib keldi.

Melanxoliya (Savdo). Ibn Sino savdoni — qora safro (qon, balg'am, safro va qora safrodan iborat to'rt suyuqlik nazariyasiga ko'ra) ustunligidan kelib chiquvchi ruhiy holat sifatida ta'riflagan. Uning tasvirlashicha, savdo bilan og'rigan kishi uzluksiz qayg'u, qo'rquv, sababsiz xavotir va ijtimoiy tortinchoqlik kabi belgilarni namoyon etadi. Bu belgilar zamonaviy klinik depressiya va generallashgan xavotir buzilishining diagnostik mezonlariga yaqin turadi. Ibn Sino savdoni davolashda

musiqa terapiyasini, tabiatga chiqishni, ijtimoiy muloqotni va ma'lum o'simlik dorilarini qo'llashni tavsiya qilgan.

Vasvas (Obsessiv holatlar). Ibn Sino vasvasi — bizning zamonaviy tushunchamizda obsessiv-kompulsiv buzilish (OKB) ga mos keladigan holatni — ham batafsil tasvirlagan. Bemorlarda takroriy, ixtiyorsiz fikrlar, qo'rquv va marosimlarga majburiy ehtiyoj kuzatilishi haqida yozgan. Zamonaviy OKB bilan bu o'xshashlik psixiatrlar tomonidan alohida e'tirof etilgan.

Ishq kasalligi (Ushshoq). Bu Ibn Sinoning eng noyob kliniko-psixologik kuzatuvlaridan biridir. U "ishq kasalligi"ni — yoki "ushshoq" deb atalmish holatni — haqiqiy psixosomatik kasallik sifatida tasnifladi. Bemor asta-sekin ozib boradi, uyqusi buziladi, isitmasi ko'tariladi, yurak urishi tezlashadi, ruhiy depressiya chuqurlashadi. Ibn Sino bu kasallikni diagnostika qilishning qiziqarli usulini ham tavsiya etgan: bemorning qo'l tomirini ushlagan holda unga turli nom va joylarni aytib borish, vaqor nomi aytilganda puls tezlashishi orqali ishq ob'ektini aniqlash mumkin. Bu usul zamonaviy biofeedback va psixofiziologik diagnostika usullariga o'xshashdir.

Epilepsiya va Psixoz. Ibn Sino epilepsiyani asabiy kasallik sifatida to'g'ri ajratib ko'rsatgan va uni "jinnilik" dan farqlagan — bu o'rta asrlar uchun juda ilg'or yondashuv edi. Psixozni esa u miya qorinchalarida suyuqlik muvozanatining buzilishi natijasida yuz beradi deb hisoblagan. Bu tushuncha zamonaviy gidrotsefaliya va neyroinflammatsiya nazariyalariga qisman asoslanishini ko'rsatadi.

AL-FOROBIY VA AL-KINDIYNING PSIXOTERAPEVTIK QARASHLARI

Al-Forobiy va Al-Kindiy psixologik kasalliklarni davolashda falsafiy va kognitiv yondashuvni ustuvor bilishgan. Ular ruhiy salomatlikni mantiqiy tafakkur, axloqiy tarbiya va jamiyatdagi o'rni bilan bevosita bog'lagan.Al-Kindiyning "Qayg'uni bartaraf etish to'g'risida" risolasi — bu asar IX asrda yozilgan bo'lsa-da, mazmunan zamonaviy kognitiv-xulq-atvor terapiyasiga yaqin g'oyalarni o'z ichiga oladi. Al-

Kindiy qayg'u va depressiyani asosan noto'g'ri idrok hamda noodil kutishlardan kelib chiqadi, deb hisoblagan. Uning davolash usuli: ratsional fikrlashni mustahkamlash, o'tkinchi dunyo ne'matlariga haddan tashqari bog'lanib qolmaslik, fikrni muayyan maqsadlarga qaratish. Bu yondashuv zamonaviy psixoterapiyada Aaron Beck tomonidan ishlab chiqilgan kognitiv qayta tuzish texnikasiga mohiyatan o'xshashdir. Al-Forobiy esa psixik salomatlik uchun eng muhim omil sifatida ijtimoiy integratsiyani ko'rsatgan. Uning "Fozil shahar" konsepsiyasi nafaqat siyosiy, balki psixologik ahamiyatga ega. Jamiyat bir inson tanasiga o'xshaydi — uning har bir a'zosi sog'lom bo'lsa, butun organizm sog'lom; bir a'zo kasallansa, butun tana aziyat chekadi. Ushbu metafora zamonaviy ijtimoiy psixologiya va tizimlarga yo'naltirilgan oila terapiyasining fundamental tamoyillarini eslatadi.

Al-Forobiy baxtni to'rt qismga bo'lgan: jismoniy salomatlik, intellektual kamolot, axloqiy yuksalish va ijtimoiy uyg'unlik. Zamonaviy psixologiyadagi "PERMA" modeli (Martin Seligman) — pozitiv hissiyot, anglanganlik, ijobiy munosabatlar, ma'no va yutuq — Al-Forobiyning ushbu sxemasiga o'xshashdir.

G'AZZOLIY VA TASAVVUF PSIXOLOGIYASI

Imom G'azzoliy (1058–1111) psixologik kasalliklarni faqat tibbiy emas, balki ma'naviy-ruhiy jihatdan ham tahlil qilgan mutafakkir sifatida alohida o'rin tutadi. Uning "Ihyo' ulum id-din" asari aslida islom ilohiyotining ulkan ensiklopediyasi bo'lsa-da, uning katta qismi nafs tarbiyasi, hissiy holatlarni boshqarish va ruhiy kasalliklarni davolashga bag'ishlangan.

G'azzoliy nafsning salbiy holatlarini — kibr, hasad, xasislik, g'azab, shahvat — faqat axloqiy nuqsonlar sifatida emas, balki ruhiy kasalliklarning alomatlari va sabablari sifatida ko'rib chiqqan. Bu yondashuv zamonaviy psixosomatik tibbiyot bilan juda mos keladi — hasad, g'azab va surunkali stress immunitet tizimini zaiflashtirib, jismoniy kasalliklarga zamin tayyorlashi bugungi kunda ilmiy jihatdan isbotlangan.

G'azzoliy tavsiya etgan "mujohada" — nafs bilan kurash — zamonaviy psixologiyadagi mindfulness (ongli e'tibor) va kognitiv qayta baholash texnikasiga o'xshash. U qalbning "zang" bosishini va tozalanishini tasvirlashda ishlatgan metaforalar zamonaviy neyropsixologiyadagi "neyron plastiklik" tushunchasiga, ya'ni miyaning o'zini qayta tashkillashtirish qobiliyatiga mos keladi.

Tasavvuf an'anasida keng qo'llaniladigan "zikr" amaliyoti haqida ham so'z yuritish joiz. Zamonaviy tadqiqotlar repetitiv, ritmik ovoz chiqarish yoki ichki takrorlash amaliyotining parasempatik asab tizimini faollashtirishi, kortizol darajasini pasaytirishi va xavotirni kamaytirishi mumkinligini ko'rsatmoqda. Bu esa G'azzoliy va umuman tasavvuf an'anasining psixoterapevtik salohiyatini ilmiy jihatdan tasdiqlaydi.

SHARQ TIBBIYOTIDA PSIXOLOGIK KASALLIKLARNING TASNIFI VA DAVOLASH

Sharq allomalarining psixologik kasalliklarni tasniflash tizimi zamonaviy DSM-5 (Ruhiy kasalliklarning diagnostik va statistik qo'llanmasi) dan ancha farq qilsa-da, uning asosiy kategoriyalari o'xshash.

Ibn Sino o'z asarlarida quyidagi psixik kasalliklarni alohida ajratib ko'rsatgan va ularning klinik tasvirini bergan: maníya (og'ir qo'zg'alish holati), melanxoliya (depressiya), vasvas (obsessiv-kompulsiv holatlar), saharovunlik (deliriy), ishq kasalligi (erotomania va psixosomatik depressiya), qo'rqinchli tushlar (parasomniya) va epilepsiya.

Davolash usullari jihatidan Ibn Sino kompleks yondashuv tarafdori bo'lgan:

Birinchidan, dori-darmonlar — o'simlik preparatlari va mineral moddalar asosida tayyorlangan murakkab retseptlar. Ibn Sino afyunni og'riq qoldiruvchi va sedativ vosita sifatida qo'llagan, valerian ildizini xavotirni kamaytirish uchun tavsiya etgan — bu o'simlikning sedativ xossalari hozir ham ilmiy jihatdan tasdiqlangan.

Ikkinchidan, musiqa terapiyasi — Ibn Sino va Al-Forobiy musiqani davolash

vositasi sifatida ko'rib chiqqan. Al-Forobiy hatto musiqa teoriyasiga oid maxsus asar yozib, turli maqomlarning ruhiyatga ta'sirini tahlil qilgan. Zamonaviy musiqaterapiya esa bugun psixiatriya va reabilitatsiya tibbiyotining tan olingan usuli hisoblanadi.

Uchinchidan, so'z va muloqot terapiyasi — Ibn Sino psixik kasallarni davolashda shifokor bilan samimiy suhbatning ahamiyatini ta'kidlagan. Bu yondashuv psixoterapiyaning prototipi sifatida ko'rilishi mumkin.

To'rtinchidan, muhit o'zgartirish — shahar shovqinidan uzoqda, tabiat qo'ynida davolanish, suv manzaralari, bog'lar. Zamonaviy ekoterapiya va tabiat bilan muolajalar deb ataluvchi yo'nalishlar aynan shu tamoyilga asoslanadi.

ZAMONAVIY PSIXOLOGIYA BILAN QIYOSIY TAHLIL

Sharq mutafakkirlarining psixologik qarashlari bilan zamonaviy psixologiya o'rtasidagi qiyosiy tahlil bir qator muhim o'xshashliklarni ko'rsatadi.

Biopsixososial model. Zamonaviy tibbiyotda psixologik kasalliklarni biologik, psixologik va ijtimoiy omillarning murakkab o'zaro ta'siri natijasi sifatida ko'ruvchi ushbu model 1977 yilda Jorj Engel tomonidan taklif etilgan. Biroq Ibn Sinoning "Tib qonunlari"da jismoniy sabablar (mizoj, safro), psixologik omillar (nafs holatlari, fikrlar) va ijtimoiy muhitning (oila, jamiyat) kasallik kelib chiqishidagi rolini bir tizimda ko'rib chiquvchi yondashuv allaqachon mavjud edi.

Kognitiv psixologiya. Zamonaviy kognitiv psixologiya kasal fikrlarning hissiy buzilishlarga olib kelishi haqidagi asosiy tezisni XIX–XX asrlarda "kashf etdi". Holbuki Al-Kindiy IX asrdayoq aynan shu g'oyani — noto'g'ri idrok va noodil kutishlar qayg'u va ruhiy kasalliklarning asosiy sababi ekanligini — asoslab bergan edi.

Ijtimoiy psixologiya. Al-Forobiyning jamiyat va individual psixik salomatlik o'rtasidagi munosabat haqidagi qarashlari zamonaviy ijtimoiy psixologiyaning fundamental tamoyillariga mos keladi. Ijtimoiy izolyatsiyaning depressiya va xavotir buzilishlariga olib kelishi, ijtimoiy integratsiya va qo'llab-quvvatlashning terapevtik

ta'siri — bularning barchasi Al-Forobiy asarlarida ishonarli tarzda bayon etilgan. Mindfulness va meditatsiya. G'azzoliyning "qalbni tozalash" amaliyotlari va tasavvuf zikrlari zamonaviy psixoterapiyada tobora keng qo'llanilib borayotgan mindfulness asosidagi kognitiv terapiya (MBCT) bilan o'xshash mexanizmlarga tayanadi. Jon Kabat-Zinn tomonidan 1979 yilda ishlab chiqilgan ushbu yondashuv bugun depressiya relapsini oldini olishning eng samarali usullaridan biri sifatida tan olingan.

SHARQ PSIXOLOGIYASINING ZAMONAVIY TIBBIYOTGA MEROXI

Sharq allomalarining psixologik merosi zamonaviy tibbiyot va psixologiyaga bir necha muhim hissa qo'shgan.

Ibn Sinoning "Tib qonunlari" Yevropa universitetlarida XVII asrgacha asosiy darslik sifatida o'qitilgan. Bu kitob orqali psixosomatik yondashuv, ya'ni jismoniy kasallik va ruhiy holat o'rtasidagi aloqani ko'rish Yevropa tibbiyotiga singib kirgan. Zamonaviy psixoneyroimmunalogiya — aql, asab tizimi va immunitet o'rtasidagi aloqani o'rganuvchi fan — aynan shu traditsiyadan oziqlanadi.

Al-Kindiyning mantiqiy-ratsional terapiya usuli keyinchalik Yevropa falsafasi orqali zamonaviy kognitiv terapiyaga ta'sir ko'rsatdi. Stoa falsafasi orqali o'tgan ushbu ta'sir Aaron Beck va Albert Ellis kabi psixoterapevtlarga ilhom berdi.

Tasavvuf amaliyotlari va zikr texnikalarining zamonaviy transpersonal psixologiya, mindfulness harakati va ma'naviy psixologiyaga ta'siri tobora ko'proq tadqiqotchilar tomonidan tan olinmoqda.

XULOSA

Sharq mutafakkirlarining psixologik qarashlari o'rta asrlarning mahsuloti bo'lib qolmasdan, zamonaviy tibbiyot va psixologiya fanlari nuqtai nazaridan ham katta nazariy va amaliy ahamiyatga ega. Ibn Sino, Al-Forobiy, Al-Kindiy va G'azzoliy ruhiy kasalliklarni davolashda nafaqat dorivor o'simliklarni, balki muloqot terapiyasini, musiqani, mantiqiy fikrlashni va ma'naviy amaliyotlarni ham qo'llashgan. Bu integrativ yondashuv zamonaviy psixiatriyaning holistik modeliga

mos keladi.Psixologik kasalliklarni tushunishda Sharq merosi global ilm-fan tarixida o'zining to'liq va munosib o'rnini egallashi lozim. Bugungi kunda G'arb akademiyasida kuchayib borayotgan "etnik psixologiya" va "madaniy psixiatriya" yo'nalishlari aynan Sharq an'anasining psixologik bilimlariga qiziqishni yanada oshirmoqda.

Sharq va G'arb psixologiyasining sintezi inson psixikasini yanada kengroq va chuqurroq tushunish imkonini beradi. Kelajak psixologiyasi bu merosdan yanada ijodiy foydalanishi, Ibn Sinoning diagnostik sezgirligini, Al-Kindiyning kognitiv terapiyasini, Al-Forobiyning ijtimoiy modelini va G'azzoliyning mindfulness amaliyotlarini zamonaviy ilm-fan bilan uyg'unlashtirishi zarur.

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KATTAQUM MASSIVI SUDRALIB YURUVCHILARINING BIOEKOLOGIK XUSUSIYATLARINI O‘RGANISHNING ILMIY-AMALIY AHAMIYATI

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Annotatsiya. Mazkur tezisda Surxondaryo viloyatidagi Kattaqum qumli massivi sudralib yuruvchilarining bioekologiyasini o‘rganish zarurati, hududning tabiiy-geografik xususiyatlari, herpetofauna bo‘yicha mavjud ilmiy manbalar va dala tadqiqotlarida qo‘llaniladigan metodik yondashuvlar tahlil qilinadi. Ishda aniq tasdiqlanmagan statistik ma’lumotlar keltirilmaydi; xulosalar mavjud ilmiy adabiyotlar, ekologik baholash hisobotlari hamda O‘zbekiston bioxilma-xilligini muhofaza qilishga oid rasmiy hujjatlar asosida umumlashtiriladi.

Kalit so‘zlar: Kattaqum massivi, Surxondaryo, sudralib yuruvchilar, bioekologiya, herpetofauna, cho‘l ekotizimi, populyatsiya, monitoring, GIS, bioxilma-xillik.

O‘zbekistonning janubiy qismida joylashgan cho‘l va yarim cho‘l landshaftlari bioxilma-xillikni saqlash, ekologik monitoringni yo‘lga qo‘yish hamda tabiiy resurslardan barqaror foydalanish nuqtayi nazaridan alohida ilmiy ahamiyatga ega. Sudralib yuruvchilar ektoterm organizmlar bo‘lgani uchun harorat, substrat, namlik, o‘simlik qoplami va antropogen bezovtalikka sezgir javob qaytaradi; shu sababli ular cho‘l ekotizimlarining holatini baholashda muhim indikator guruhlardan biri sifatida qaraladi. O‘zbekiston Respublikasi “Qizil kitobi”ning hayvonot olamiga bag‘ishlangan jildida sudralib yuruvchilar alohida bo‘lim sifatida berilishi, bioxilma-xillikni saqlash strategiyasida esa monitoring, ma’lumotlar bazasi va GIS-texnologiyalarni rivojlantirish vazifalari belgilanishi ushbu mavzuning dolzarbligini kuchaytiradi.

Kattaqum massivi Surxondaryo viloyatining janubiy qismidagi qumli landshaftlar tizimida joylashgan bo‘lib, adabiyotlarda Kattaqum qumliklari 37°23′ shimoliy kenglik va 67°18′ sharqiy uzunlik atrofida qayd etiladi. R. D. Utkurovich tomonidan Surxondaryo qumli yaylovlari bo‘yicha bajarilgan tadqiqotda Kattaqum Jarkurg‘on hududiga mansub qumli massiv sifatida tavsiflanib, uning janubi-g‘arbda Termiz va Angor, sharqda Qumqo‘rg‘on, shimolda Qiziriq hamda Bandixon hududlari bilan tutashishi ko‘rsatilgan; ushbu manbada hududning hozirgi maydoni 147 km², relyefi esa dengiz sathidan taxminan 356 m balandlikdagi qumli tekisliklardan iborat ekani qayd etilgan. Surxon-Sherobod vodiysiga oid ekologik hujjatlarda Kattaqum janubiy vodiydagi eng yirik qumli massivlardan biri sifatida beriladi.

Hududning ekologik tuzilishi sudralib yuruvchilar uchun turli mikrobiotoplar shakllanishiga imkon beradi. Surkhandarya CCPP loyihasi bo‘yicha ekologik xulosalarda Kattaqumning chekka qismlari to‘lqinsimon yoki biroz adirli qumli tekislik, markaziy qismi esa yarim mustahkamlangan qum tepaliklari va sho‘rlangan pastliklardan tashkil topgani, o‘simlik qoplami psammofit, gipssofit va galofit elementlar bilan ifodalanishi ko‘rsatiladi. ADB materiallarida Kattaqum qumliklari va unga tutash hududlarda sudralib yuruvchilar hamda amfibiyalar majmuasi nisbatan boyligi qayd etilib, Kattakum Sands obyekti bo‘yicha 23 turdan iborat majmua, jumladan noyob, endemik va sinantrop turlar mavjudligi ko‘rsatilgan. Bu raqamlar hududda to‘liq va muntazam dala monitoringi o‘tkazish uchun ilmiy asos yaratadi, biroq alohida dala kuzatuvisiz ular dissertatsion ishning yakuniy populyatsion ko‘rsatkichi sifatida qabul qilinmasligi lozim.

Muammoning ilmiy asoslari O‘zbekiston va Markaziy Osiyo herpetologiyasi bo‘yicha to‘plangan klassik hamda zamonaviy adabiyotlarga tayanadi. O. P. Bogdanovning O‘zbekiston amfibiyalari va sudralib yuruvchilariga bag‘ishlangan ishlari, shuningdek, O‘rta Osiyo sudralib yuruvchilari ekologiyasiga oid tadqiqotlari mahalliy herpetofaunani o‘rganish tarixida tayanch manbalar hisoblanadi. D. A. Showler

tomonidan tuzilgan O‘zbekiston amfibiyalari va sudralib yuruvchilari ro‘yxati mamlakat miqyosida tarqalish, sistematika va mavjud qaydlar bo‘yicha muhim umumlashtiruvchi manbadir. T. Martin va hammualliflarining Markaziy O‘zbekiston herpetofaunasi bo‘yicha tadqiqoti esa qumli, dasht va past tog‘ oldi biotoplarida dala kuzatuvi, uchrashuv chastotasi va turlarning yashash muhitiga bog‘liqligini baholashda xalqaro tajriba sifatida e’tiborlidir.

Kattaqum massivi sudralib yuruvchilarini o‘rganishda ilmiy yondashuv ikki bosqichda tashkil etilishi maqsadga muvofiq: birinchi bosqichda mavjud adabiyotlar, Qizil kitob, ekologik baholash hisobotlari va xarita materiallari asosida ehtimoliy turlar ro‘yxati hamda asosiy biotoplar ajratiladi; ikkinchi bosqichda esa dala sharoitida vizual uchrashuv usuli, marshrut-transekt kuzatuvi, fotoqayd, koordinata kiritish va biotop tavsifi orqali ma’lumotlar tekshiriladi. Sudralib yuruvchilarni inventarizatsiya va monitoring qilishda standart metodlardan foydalanish ma’lumotlarning qayta tekshirilishi, mavsumlararo taqqoslanishi hamda boshqa hududlar bilan solishtirilishini ta’minlaydi. Populyatsion ekologiyada kuzatuv birligi, tanlanma hajmi, uchrashuv chastotasi va kuzatuv sharoitini aniq qayd etish natijaning ishonchliligini belgilaydi.

Asosiy ilmiy tahlil shuni ko‘rsatadiki, Kattaqumda sudralib yuruvchilar tarqalishini faqat tur nomlari ro‘yxati bilan baholash yetarli emas; har bir qayd substrat turi, o‘simlik zichligi, qum tepaligining mustahkamlanganlik darajasi, sho‘rxok pastliklar, suv manbalariga yaqinlik va antropogen ta’sir bilan bog‘lab tahlil qilinishi kerak. Qumli cho‘l sharoitida yashovchi turlarning faolligi ko‘pincha mavsumiy harorat va kunning vaqtiga bog‘liq bo‘ladi; shuning uchun ertalabki, kunduzgi va kechki kuzatuvlar alohida qayd etilishi lozim. Kattaqumning yaylov sifatida ishlatilishi, buta-o‘simlik qoplamining buzilishi, yo‘l va qurilish infratuzilmasi, chiqindi tashlanishi kabi omillar yashash joylarining parchalanganligini kuchaytirishi mumkin. Utkurovich tadqiqotida qumli yaylovlarning degradatsiyasi ko‘pincha tartibsiz chorvachilik, buta kesilishi va inson faoliyati bilan bog‘lanishi qayd etilgan; bu holat sudralib yuruvchilar

uchun yashirinish joyi, oziqa bazasi va ko‘payish hududlari barqarorligini ham bilvosita belgilaydi.

Amaliy jihatdan ushbu mavzu Kattaqum massividagi bioxilma-xillik monitoringi, ekologik ekspertiza, muhofaza choralarini rejalashtirish va mahalliy ekologik ta’lim uchun ahamiyatlidir. Dala kuzatuvlarida olingan GPS-nuqta, fotoqayd va biotop ma’lumotlari QGIS kabi dasturlarda xaritalashtirilsa, sudralib yuruvchilar uchraydigan asosiy mikrobiotoplar, xavfli yo‘l kesishmalari, antropogen bosim kuchli zonalar va muhofaza talab qiladigan nuqtalar aniqlanadi. Bu yondashuv O‘zbekistonning biologik xilma-xillikni saqlash strategiyasidagi yagona monitoring tizimi va GIS asosidagi ma’lumotlar bazasini rivojlantirish vazifalari bilan hamohangdir. Shu bilan birga, tadqiqot natijalari mahalliy aholi, fermer xo‘jaliklari va ta’lim muassasalari bilan ekologik targ‘ibot ishlarini olib borishda ham ilmiy asos bo‘lib xizmat qiladi.

Xulosa qilib aytganda, “Kattaqum massivi sudralib yuruvchilarining bioekologiyasi” mavzusi Surxondaryo janubidagi qumli cho‘l ekotizimlarini ilmiy asosda o‘rganish, hududning herpetofaunistik salohiyatini aniqlash va bioxilma-xillikni saqlashga qaratilgan amaliy tavsiyalar ishlab chiqish uchun dolzarb yo‘nalishdir. Mavjud adabiyotlar Kattaqumning tabiiy-geografik va ekologik jihatdan muhim hudud ekanini tasdiqlaydi, biroq populyatsiyalarning real holati faqat muntazam dala kuzatuvlari, standart metodlar, mavsumiy taqqoslash va xaritalashtirish orqali aniqlanishi mumkin. Shuning uchun keyingi tadqiqot bosqichlarida tur tarkibini tasdiqlash, muhim biotoplarni xaritada belgilash, antropogen xavf omillarini baholash va muhofaza bo‘yicha ilmiy-amaliy tavsiyalar ishlab chiqish asosiy vazifa bo‘lib qoladi.

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“XALQARO TRANSPORT YO‘LAKLARI XAVFSIZLIGINI TA’MINLASHDA XORIJIY DAVLATLAR TAJRIBASI VA XAVFSIZLIK TIZIMLARINING HUQUQIY ASOSLARI”

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Annotatsiya

Mazkur ilmiy maqolada xalqaro transport yo‘laklari xavfsizligini ta’minlashning zamonaviy huquqiy mexanizmlari hamda xorijiy davlatlar tajribasi tahlil qilinadi. Xususan, Rossiya Federatsiyasi va Qozog‘iston Respublikasining transport xavfsizligi sohasidagi qonunchiligi, institutsional tizimi, raqamlashtirish jarayonlari va xalqaro standartlarni joriy etish tajribasi o‘rganilgan. Transport infratuzilmasiga tahdid soluvchi terrorizm, kontrabanda, noqonuniy migratsiya, texnogen avariyalar va kiberxavfsizlik bilan bog‘liq xavflarning oldini olish bo‘yicha amaliy mexanizmlar ko‘rib chiqilgan. Tadqiqot davomida O‘zbekiston Respublikasining transport xavfsizligi tizimi bilan qiyosiy tahlil amalga oshirilib, milliy qonunchilikni takomillashtirish yuzasidan ilmiy taklif va tavsiyalar ishlab chiqilgan.

Kalit so‘zlar: xalqaro transport yo‘laklari, transport xavfsizligi, xalqaro tranzit, logistika tizimi, transport infratuzilmasi, terrorizm, kontrabanda, noqonuniy migratsiya, kiberxavfsizlik, raqamli logistika, transport monitoringi, xalqaro

konvensiyalar, CMR Konvensiyasi, TIR Konvensiyasi, ADR Kelishuvi, ICAO standartlari, ERA-GLONASS tizimi, e-CMR, EQTR, bojxona nazorati, transport qonunchiligi, tranzit xavfsizligi, Termiz-Hayraton-Mozori Sharif yo‘nalishi, Rossiya tajribasi, Qozog‘iston tajribasi, transport koridorlari, xalqaro savdo, multimodal logistika, sun’iy intellekt, xavfsizlik monitoringi.

Kirish

Bugungi globallashuv jarayonida xalqaro transport yo‘laklari davlatlar iqtisodiyoti, tashqi savdo aloqalari va xalqaro integratsiyaning muhim omiliga aylangan. Jahon mamlakatlari o‘rtasida yuk va yo‘lovchi tashuvlari hajmining ortib borishi transport infratuzilmasining uzluksiz va xavfsiz faoliyat yuritishini talab etmoqda. Ayniqsa, transport koridorlari xalqaro savdo, tranzit va logistika tizimining asosiy bo‘g‘ini sifatida iqtisodiy taraqqiyotda muhim o‘rin egallaydi.

So‘nggi yillarda xalqaro transport yo‘laklariga nisbatan terrorizm, noqonuniy migratsiya, kontrabanda, texnogen avariyalar va kiberhujumlar kabi tahdidlar ortib bormoqda. Shu sababli rivojlangan davlatlar transport xavfsizligini ta’minlash maqsadida zamonaviy texnologiyalar, raqamli boshqaruv tizimlari va maxsus huquqiy mexanizmlarni joriy etmoqda. Mazkur maqolada Rossiya Federatsiyasi va Qozog‘iston Respublikasining transport xavfsizligini ta’minlash borasidagi tajribasi tahlil qilinadi hamda ushbu tajribalarni O‘zbekiston amaliyotida qo‘llash istiqbollari yoritiladi.

Xalqaro transport yo‘laklari bugungi globallashuv davrida davlatlar iqtisodiyoti, tashqi savdo aloqalari va xalqaro integratsiyaning muhim omiliga aylangan. Dunyo mamlakatlari o‘rtasida yuk va yo‘lovchi tashuvlarining ortib borishi transport infratuzilmasi xavfsizligini ta’minlash masalasini dolzarb vazifaga aylantirmoqda. Ayniqsa, terrorizm, noqonuniy migratsiya, kontrabanda, kiberxavfsizlik tahdidlari hamda geosiyosiy ziddiyatlar xalqaro transport yo‘laklarining barqaror faoliyatiga jiddiy xavf tug‘diradi. Shu sababli rivojlangan davlatlar transport xavfsizligini ta’minlash uchun zamonaviy texnologiyalar, raqamli boshqaruv tizimlari va mustahkam huquqiy mexanizmlarni joriy etmoqda. Mazkur mavzuni o‘rganish xorijiy

davlatlar tajribasini tahlil qilish, transport xavfsizligi tizimlarining huquqiy asoslarini aniqlash hamda ushbu tajribalarni O‘zbekiston amaliyotida qo‘llash imkoniyatlarini baholash nuqtai nazaridan muhim ahamiyat kasb etadi. Xalqaro transport yo‘laklari xavfsizligini ta’minlash bugungi kunda davlatlar uchun strategik ahamiyat kasb etuvchi ustuvor yo‘nalishlardan biri hisoblanadi. Chunki transport infratuzilmasining xavfsiz va uzluksiz faoliyat yuritishi nafaqat iqtisodiy rivojlanish, balki xalqaro savdo barqarorligini ta’minlashda ham muhim o‘rin tutadi. Zamonaviy sharoitda davlatlar transport yo‘laklari xavfsizligini kuchaytirish orqali o‘z tranzit salohiyatini oshirmoqda, xalqaro savdo aloqalarini kengaytirmoqda hamda investitsion jozibadorligini mustahkamlamoqda. Shu jihatdan transport xavfsizligi logistika samaradorligini ta’minlovchi omil bo‘lish bilan birga, milliy va mintaqaviy xavfsizlikning muhim tarkibiy qismi sifatida ham namoyon bo‘lmoqda.

Mazkur masalani chuqur tahlil qilish maqsadida Rossiya, hamda Qozog‘iston davlatlarining transport xavfsizligini ta’minlash borasidagi tajribasi va huquqiy mexanizmlari ko‘rib chiqiladi. Rossiya Federatsiyasida xalqaro transport yo‘laklari xavfsizligini ta’minlash davlatning strategik xavfsizlik siyosatining muhim tarkibiy qismi hisoblanadi. Ushbu tizim transport infratuzilmasini terrorizm, kontrabanda, noqonuniy migratsiya, texnogen avariyalar, kiberhujumlar va boshqa tahdidlardan himoya qilishga qaratilgan kompleks huquqiy hamda institutsional mexanizmlar asosida tashkil etilgan. Rossiyada transport xavfsizligining asosiy huquqiy bazasi sifatida 2007-yilda qabul qilingan “Transport xavfsizligi to‘g‘risida”gi 16-sonli Federal qonun [1] xizmat qiladi. Mazkur qonun transport obyektlari va transport vositalarining xavfsizlik darajasini belgilash, ularni kategoriyalash, zaifliklarni aniqlash hamda terrorchilik tahdidlariga qarshi himoya choralarini amalga oshirish tartibini mustahkamlaydi. Shuningdek, qonunda transport infratuzilmasi

[1] Федеральный закон от 9 февраля 2007 г. N 16-ФЗ "О транспортной безопасностиhttp://www.kremlin.ru/acts/bank/24993

subyektlarining majburiyatlari, xavfsizlik monitoringi va davlat nazorati mexanizmlari ham aniq ko‘rsatib o‘tilgan.

Rossiya transport xavfsizligi tizimida boshqa normativ-huquqiy hujjatlar ham muhim o‘rin tutadi. Jumladan, “Terrorizmga qarshi kurash to‘g‘risida”gi 06.03.2006-yil 35-sonli Federal qonun[2] terrorizmga qarshi operatsiyalarni tashkil etish, maxsus xizmatlar vakolatlari va antiterror himoya choralarini belgilaydi. “Favqulodda vaziyatlar va fuqarolar mudofaasi to‘g‘risida”gi 21.12.1994-yil 68-sonli Federal qonun[3] esa tabiiy ofatlar, texnogen halokatlar yoki yirik transport avariyalari vaqtida davlat organlari hamda qutqaruv xizmatlarining harakatlarini muvofiqlashtiradi. Shu bilan birga, 274-son va 209-son Federal qonunlari axborot xavfsizligi, raqamli infratuzilma va shaxsiy ma’lumotlarni himoya qilishga qaratilgan bo‘lib, transport tizimining kiberxavfsizligini ta’minlashga xizmat qiladi. Rossiya Federatsiyasi Hukumatining 2008-yildagi 940-son qarori transport obyektlarini xavf darajasiga ko‘ra kategoriyalash va ularga nisbatan xavfsizlik talablarini belgilaydi. Rossiya Transport vazirligining 194-son buyrug‘i transport xavfsizligi rejalari va muhofaza choralarini ishlab chiqishni, 87-son buyrug‘i esa obyektlarning zaifliklarini baholash tartibini belgilab bergan.

Bundan tashqari, Rossiya Transport vazirligi, Federal xavfsizlik xizmati hamda Ichki ishlar vazirligi tomonidan qabul qilingan qo‘shma buyruqlar transport infratuzilmasiga tahdidlarning yagona ro‘yxatini shakllantirish orqali xavf-xatarlarni oldindan aniqlash tizimini yaratgan. Rossiyada transport xavfsizligini ta’minlash bir nechta davlat organlari o‘rtasidagi hamkorlik asosida amalga oshiriladi. Transport vazirligi transport siyosatini ishlab chiqadi va transport xavfsizligi strategiyasini belgilaydi. Uning tarkibidagi Transport sohasini nazorat qilish federal xizmati

[2] Федеральный закон Российской Федерации от 6 марта 2006 г. № 35-ФЗ «О противодействии терроризму» https://internet-law.ru

[3]Федеральный закон от 21 декабря 1994 г. № 68-ФЗ "О защите населения и территорий от чрезвычайных ситуаций природного и техногенного характера"https://internet-law.ru

aviatsiya, temir yo‘l, avtomobil, dengiz, daryo va metro tizimlarida nazorat faoliyatini olib boradi. Mazkur organ transport obyektlarida tekshiruvlar o‘tkazadi, xavfsizlik talablariga rioya qilinishini monitoring qiladi hamda qoidabuzarliklarni aniqlaydi. Ichki ishlar vazirligi tarkibidagi Yo‘l harakati xavfsizligi davlat inspeksiyasi yo‘l harakati xavfsizligini ta’minlash, transport vositalarining texnik holatini nazorat qilish va yo‘l harakati qoidalariga rioya etilishini kuzatish bilan shug‘ullanadi. Federal xavfsizlik xizmati esa transport infratuzilmasining strategik obyektlarini terrorizm, razvedka va sabotaj tahdidlaridan himoya qiladi. Ayniqsa, temir yo‘l magistrallari, portlar, aeroportlar va chegara punktlari ushbu xizmat nazoratidagi muhim obyektlar hisoblanadi. Federal bojxona xizmati xalqaro yuk oqimlarini nazorat qilish, kontrabanda va noqonuniy yuklarni aniqlash vazifasini bajaradi. Favqulodda vaziyatlar vazirligi esa avariyalar, tabiiy ofatlar va texnogen halokatlar vaqtida qutqaruv ishlarini olib boradi hamda transport tizimining uzluksiz ishlashini tiklashga mas’ul hisoblanadi.

Rossiya xalqaro transport yo‘laklari xavfsizligini ta’minlashda zamonaviy texnologiyalardan keng foydalanadi. “ERA-GLONASS”[4]tizimi transport vositalarini kuzatish va favqulodda holatlarda tezkor signal yuborish imkonini beradi. Aeroport va portlarda biometrik nazorat, yuzni tanib olish texnologiyalari, elektron hujjat tekshiruvi va avtomatlashtirilgan yuk skanerlari joriy etilgan. Videokuzatuv tizimlari temir yo‘l vokzallari, metro, port va magistral yo‘llarda xavfsizlik monitoringini kuchaytiradi. Bundan tashqari, “SCADA”(Supervisory Control and Data Acquisition) tizimlari, “Internet of Things” texnologiyalari hamda maxsus kiberxavfsizlik modullari transport infratuzilmasining raqamli himoyasini ta’minlaydi.

Portlarda kemalar va port inshootlari xavfsizligi bo‘yicha xalqaro kodeks asosida yuklarni avtomatik tekshiruvchi skanerlar va dronlarga qarshi radar tizimlari ishlatiladi. Rossiya ushbu texnologiyalar orqali Xalqaro fuqaro aviatsiyasi tashkiloti,

[4] https://sdgs.un.org/partnerships/era-glonass-state-automated-information-system

Xalqaro dengiz tashkiloti hamda Kemalar va port inshootlari xavfsizligi bo‘yicha xalqaro kodeks talablariga moslashishga intilmoqda. Rossiya tajribasi xalqaro transport yo‘laklari xavfsizligini ta’minlashda kompleks yondashuv muhim ekanligini ko‘rsatadi. Kuchli huquqiy baza, maxsus vakolatli organlar, zamonaviy texnologiyalar va xalqaro standartlarning uyg‘unligi transport tizimining barqarorligini oshiradi. Shu bilan birga, Rossiya tajribasida ayrim muammolar ham mavjud. Jumladan, ayrim hududlarda texnologik eskirish, byurokratik to‘siqlar, moliyalashtirish yetishmasligi va idoralararo vakolatlar takrorlanishi xavfsizlik tizimi samaradorligiga salbiy ta’sir ko‘rsatmoqda. Kiberxavfsizlik tahdidlarining ortib borishi ham yangi himoya choralarini talab qilmoqda.

Rossiya Federatsiyasi va O‘zbekiston Respublikasining xalqaro transport yo‘laklari xavfsizligini ta’minlash bo‘yicha qonunchiligini qiyosiy tahlil qilish shuni ko‘rsatadiki, har ikki davlat transport infratuzilmasini terrorizm, kontrabanda, noqonuniy migratsiya, texnogen avariyalar va boshqa tahdidlardan himoya qilishga alohida e’tibor qaratadi. Biroq ushbu sohadagi huquqiy tartibga solish darajasi, institutsional mexanizmlar va texnologik ta’minot jihatidan ma’lum farqlar mavjud.Avvalo, Rossiyada transport xavfsizligi sohasida maxsus va mustaqil huquqiy hujjat Transport xavfsizligi to‘g‘risida Federal qonun qabul qilingan bo‘lib, unda transport obyektlarini kategoriyalash, zaifliklarni baholash, transport xavfsizligi rejalarini ishlab chiqish va terrorchilik tahdidlariga qarshi choralar batafsil tartibga solingan. O‘zbekistonda esa transport xavfsizligi masalalari yagona maxsus qonunda emas, balki Bojxona kodeksi, Transport to‘g‘risida Qonun, Terrorizmga qarshi kurash to‘g‘risida Qonun hamda boshqa normativ-huquqiy hujjatlar orqali tartibga solinadi. Shu sababli Rossiyada huquqiy tartibga solish tizimi ancha markazlashgan va tizimli hisoblanadi.

Institutsional jihatdan ham sezilarli farqlar mavjud. Rossiyada Rossiya Federatsiyasi Transport vazirligi, Federal xavfsizlik xizmati, Federal bojxona xizmati, Favqulodda vaziyatlar vazirligi va boshqa idoralar o‘rtasida aniq vakolatlar

taqsimlangan. O‘zbekistonda esa asosiy vakolatlar O‘zbekiston Respublikasi Transport vazirligi, Davlat bojxona qo‘mitasi (hozirgi bojxona organlari tizimi), Davlat xavfsizlik xizmati, Ichki ishlar vazirligi hamda Favqulodda vaziyatlar vazirligi tomonidan amalga oshiriladi. Har ikki davlatda idoralararo hamkorlik mavjud bo‘lsa-da, Rossiyada transport xavfsizligi bo‘yicha maxsus standartlashtirilgan mexanizmlar kengroq joriy etilgan.Texnologik ta’minot nuqtai nazaridan Rossiya tajribasi ancha rivojlangan. Rossiyada ERA-GLONASS, biometrik identifikatsiya, yuzni tanib olish, SCADA tizimlari, IoT texnologiyalari va ilg‘or kiberxavfsizlik vositalari faol qo‘llaniladi. O‘zbekistonda ham bojxona skanerlari, elektron deklaratsiya, videokuzatuv, GPS monitoring va “Yagona darcha” axborot tizimlari joriy etilgan, biroq ularning qamrovi va texnologik chuqurligi Rossiyaga nisbatan cheklanganroq.

Kiberxavfsizlik bo‘yicha Rossiya transport infratuzilmasining raqamli himoyasiga alohida e’tibor qaratadi va bu sohada maxsus federal qonunlar amal qiladi. O‘zbekistonda ham axborot xavfsizligi bo‘yicha normativ-huquqiy baza shakllanib bormoqda, ammo transport infratuzilmasiga xos maxsus kiberxavfsizlik talablarini yanada takomillashtirish zarur.Xalqaro standartlarga moslashish jihatidan ikkala davlat ham Xalqaro fuqaro aviatsiyasi tashkiloti, Xalqaro dengiz tashkiloti, Birlashgan Millatlar Tashkiloti hamda TIR, CMR, ADR kabi xalqaro konvensiyalar talablariga amal qiladi. Biroq Rossiyada ushbu standartlarni milliy tizimga implementatsiya qilish ko‘lami kengroq va texnik jihatdan chuqurroq.Umuman olganda, Rossiya Federatsiyasi transport xavfsizligini ta’minlash bo‘yicha maxsus qonun, rivojlangan institutsional tizim va zamonaviy texnologiyalar asosida yanada kompleks yondashuvni shakllantirgan. O‘zbekiston Respublikasida esa transport xavfsizligini tartibga soluvchi normalar turli qonun hujjatlarida jamlangan bo‘lib, amaliyotda izchil rivojlanib bormoqda. Rossiya tajribasi O‘zbekiston uchun transport xavfsizligi bo‘yicha alohida maxsus qonun qabul qilish, transport obyektlarini kategoriyalash, zaifliklarni baholash va kiberxavfsizlik talablarini kuchaytirish zarurligini ko‘rsatadi.

Shu jihatdan Rossiya tajribasidan foydalanish O‘zbekistonning xalqaro transport yo‘laklari xavfsizligini yanada samarali ta’minlashga xizmat qilishi mumkin.

Mazkur tajriba O‘zbekiston uchun ham muhim ahamiyat kasb etadi. Ayniqsa, Termiz-Hayraton-Mozori Sharif yo‘nalishi kabi xalqaro transport yo‘laklari xavfsizligini ta’minlashda Rossiya modelining ayrim elementlaridan foydalanish mumkin. O‘zbekistonda transport xavfsizligi bo‘yicha yagona maxsus qonun qabul qilish, transport obyektlarini kategoriyalash, xavf tahlili tizimini joriy etish va zamonaviy monitoring texnologiyalaridan foydalanish maqsadga muvofiq bo‘ladi. Bundan tashqari, Transport vazirligi, bojxona organlari, chegara qo‘shinlari va ichki ishlar organlari o‘rtasidagi koordinatsiyani kuchaytirish zarur. Xalqaro tashkilotlar va qo‘shni davlatlar bilan hamkorlikni rivojlantirish, Shanxay hamkorlik tashkiloti hamda Mustaqil Davlatlar Hamdo‘stligi doirasidagi xavfsizlik dasturlarida faol ishtirok etish ham transport xavfsizligini mustahkamlashga xizmat qiladi.

Rossiya Federatsiyasi xalqaro transport yo‘laklari xavfsizligini ta’minlashda ko‘p bosqichli va integratsiyalashgan tizimni shakllantirgan. Ushbu tizimning asosini maxsus qonunlar, davlat organlari o‘rtasidagi hamkorlik, raqamli texnologiyalar va xalqaro standartlarga moslashuv tashkil etadi. Rossiya tajribasi shuni ko‘rsatadiki, transport xavfsizligini samarali ta’minlash uchun faqatgina huquqiy choralar emas, balki texnologik innovatsiyalar, tezkor monitoring va xalqaro hamkorlik ham muhim ahamiyatga ega.

Qozog‘iston Respublikasi Markaziy Osiyodagi eng yirik tranzit davlatlardan biri hisoblanib, Yevropa va Osiyoni bog‘lovchi “Sharq-G‘arb” hamda Rossiya, Markaziy Osiyo va Fors ko‘rfazi yo‘nalishlarini birlashtiruvchi “Shimol-Janub” xalqaro transport koridorlarida muhim geostrategik o‘rin egallaydi. Shu sababli mamlakat transport xavfsizligini ta’minlash va xalqaro tashuvlarni huquqiy tartibga solishga alohida e’tibor qaratmoqda.

Qozog‘iston transport tizimining asosiy huquqiy manbasi 1994-yil 21-sentabrda 156-XIII qabul qilingan “Transport to‘g‘risida”gi Qonun [5] hisoblanadi. Mazkur qonunda davlat transport siyosatining asosiy prinsiplari, transport tizimining yagona ishlash mexanizmi, tashuvchilarning huquq va majburiyatlari hamda transport xavfsizligini ta’minlashning umumiy asoslari mustahkamlangan. Ushbu qonunning 4-moddasida transport faoliyatining xavfsizlik, uzluksizlik va davlat nazorati tamoyillari belgilangan bo‘lsa, 17-moddada transport tashkilotlarining xavfsizlik talablariga rioya etish majburiyati ko‘rsatib o‘tilgan.

Transportning alohida tarmoqlari maxsus qonunlar bilan tartibga solinadi. Jumladan, 2001-yil 8-dekabrdagi “Temir yo‘l transporti to‘g‘risida”gi Qonun[6] temir yo‘l infratuzilmasi, yuk va yo‘lovchi tashish, xavfsizlik hamda texnik ekspluatatsiya talablarini belgilaydi. Mazkur qonunning 25-moddasida temir yo‘l transportida harakat xavfsizligini ta’minlash davlatning ustuvor vazifalaridan biri sifatida qayd etilgan. 2003-yilda qabul qilingan “Avtomobil transporti to‘g‘risida”gi Qonunda[7] esa xalqaro avtomobil tashuvlarini litsenziyalash, tashuvchilar faoliyatini nazorat qilish va yo‘lovchi hamda yuk tashish xavfsizligini ta’minlash masalalari tartibga solingan. Shuningdek, 2010-yildagi “Havo hududidan foydalanish va aviatsiya faoliyati to‘g‘risida”gi Qonun [8]fuqaro aviatsiyasi xavfsizligi, aeroportlar faoliyati va xalqaro aviatsiya standartlarini joriy etishning huquqiy asoslarini belgilaydi.

Qozog‘iston transport xavfsizligini ta’minlashda xalqaro huquq normalariga ham tayanadi. Mamlakat 1956-yilgi CMR Konvensiyasiga qo‘shilgan bo‘lib, xalqaro

[5] **Закон Республики Казахстан от 21 сентября 1994 года № 156-XIIIО транспорте в Республике Казахстан** https://prg.kz/document/?doc_id=1003161

[6] Закон Республики Казахстан от 8 декабря 2001 года «О железнодорожном транспорте**https://prg.kz/document/?doc_id=1026596**

[7] **Закон Республики Казахстан от 4 июля 2003 года № 476-IIОб автомобильном транспорте https://prg.kz/**

[8]Закон Республики Казахстан от 15 июля 2010 года «Об использовании воздушного пространства Республики Казахстан и деятельности авиации».https://adilet.zan.kz/rus/docs

avtomobil yuk tashuvlarida yagona hujjat - CMR yuk xatini qo‘llaydi. Ushbu konvensiya yuk tashuvchi javobgarligi, yukni qabul qilish va topshirish tartiblarini belgilaydi. 1975-yilgi TIR Konvensiyasi esa xalqaro tranzit tashuvlarini soddalashtirishga xizmat qiladi. TIR tizimi asosida bojxona nazorati qisqartirilib, yuklarning chegaralar orqali tezkor o‘tishi ta’minlanadi. Bundan tashqari, ADR Kelishuvi xavfli yuklarni avtomobil transportida tashish xavfsizligini tartibga soladi. Dengiz transporti xavfsizligi SOLAS Konvensiyasi asosida, fuqaro aviatsiyasi esa 1944-yilgi Chikago Konvensiyasi va ICAO standartlari asosida amalga oshiriladi.

Transport xavfsizligini ta’minlash vakolatlari bir nechta davlat organlari o‘rtasida taqsimlangan. Asosiy vakolatli organ - Qozog‘iston Transport vazirligi bo‘lib, u transport siyosatini ishlab chiqadi va normativ-huquqiy hujjatlarni qabul qiladi. Ichki ishlar vazirligi va Yo‘l politsiyasi organlari yo‘l harakati xavfsizligini nazorat qiladi. Davlat bojxona xizmati xalqaro tranzit va bojxona xavfsizligini ta’minlaydi. Fuqaro aviatsiyasi qo‘mitasi esa aeroportlar va aviatsiya obyektlarida ICAO talablariga rioya etilishi ustidan nazorat olib boradi.

Qozog‘istonda xalqaro tashuvlarni amalga oshirish uchun litsenziya va maxsus ruxsatnomalar olish majburiy hisoblanadi. “Litsenziyalar va ruxsatnomalar to‘g‘risida”gi Qonunga muvofiq, xalqaro avtomobil tashuvlari faqat tegishli litsenziyaga ega tashuvchilar tomonidan amalga oshiriladi. Tashuv jarayonida CMR yuk xati, temir yo‘l nakladnoylari, TIR karneti va elektron deklaratsiyalar qo‘llanadi. 2023-yildan boshlab joriy etilgan EQTR - “Elektron Qozog‘iston tranzit ruxsatnomasi” tizimi tranzit tashuvlarni raqamlashtirish, korrupsion holatlarni kamaytirish va bojxona jarayonlarini soddalashtirishga xizmat qilmoqda.

Transport sohasidagi huquqbuzarliklar uchun javobgarlik Qozog‘iston Respublikasining Ma’muriy javobgarlik to‘g‘risidagi kodeksi va Jinoyat kodeksi bilan tartibga solinadi. Xususan, Jinoyat kodeksining 345-moddasida transport vositalaridan foydalanish qoidalarini buzish oqibatida odam o‘limiga yoki og‘ir tan jarohatiga sabab bo‘lish uchun jinoiy javobgarlik nazarda tutilgan. Ma’muriy kodeksda esa transport

vositasini mast holda boshqarish, tezlikni oshirish, litsenziyasiz tashuvlarni amalga oshirish kabi huquqbuzarliklar uchun jarimalar va transport vositasini boshqarish huquqidan mahrum qilish chorasi belgilangan.

Sug‘urta tizimi transport xavfsizligining muhim elementi hisoblanadi. Qozog‘istonda avtomobil egalari fuqarolik javobgarligini majburiy sug‘urtalash - OSAGO tizimi amal qiladi. Bundan tashqari, xalqaro tashuvlarda CMR sug‘urtasi yuk tashuvchining javobgarligini kafolatlaydi. Ushbu tizim yukning yo‘qolishi, shikastlanishi yoki kechiktirib yetkazilishi natijasida yuzaga keladigan zararlarni qoplashga xizmat qiladi.

So‘nggi yillarda mamlakat transport tizimini raqamlashtirishga katta e’tibor qaratmoqda. CAREC transport loyihalari doirasida multimodal logistika markazlari, elektron navbat tizimlari, QR-kodli yuk pasportlari va “aqlli logistika” platformalari joriy qilinmoqda. Bu tizimlar tranzit vaqtini qisqartirish, korrupsion xavflarni kamaytirish va transport xavfsizligini oshirishga xizmat qilmoqda. Ayniqsa, Xitoy-Qozog‘iston-Yevropa transport koridori xalqaro savdo va tranzit tashuvlarda strategik ahamiyatga ega bo‘lib bormoqda.Shunga qaramay, ayrim muammolar saqlanib qolmoqda. Jumladan, yo‘l xavfsizligi auditining barcha magistrallarda to‘liq joriy qilinmagani, elektron yuk hujjatlarining huquqiy maqomi yetarlicha mustahkam emasligi hamda ayrim milliy standartlarning Yevropa Ittifoqi va xalqaro transport standartlariga to‘liq moslashmaganligi kuzatiladi. Shu sababli yo‘l xavfsizligi auditini majburiy joriy etish, e-CMR tizimini qonunchilik darajasida mustahkamlash, transport monitoringida sun’iy intellekt texnologiyalaridan foydalanish hamda haydovchilar malakasini xalqaro standartlar asosida oshirish dolzarb masalalardan biri hisoblanadi.

Umuman olganda, Qozog‘iston Respublikasi transport xavfsizligini ta’minlashda xalqaro konvensiyalar, milliy qonunchilik va raqamli logistika tizimlarini uyg‘unlashtirgan holda Markaziy Osiyoda samarali transport boshqaruvi modelini shakllantirmoqda. Ushbu tajriba O‘zbekiston Respublikasi uchun, ayniqsa Termiz-Hayraton-Mozori Sharif xalqaro transport yo‘nalishi xavfsizligini rivojlantirishda

muhim amaliy ahamiyat kasb etadi.Qozog‘iston Respublikasi va O‘zbekiston Respublikasining xalqaro transport yo‘laklari xavfsizligini ta’minlash bo‘yicha qonunchiligini qiyosiy tahlil qilish shuni ko‘rsatadiki, har ikki davlat transport infratuzilmasining barqaror ishlashi, tranzit tashuvlar xavfsizligi va xalqaro logistika jarayonlarining uzluksizligini ta’minlashga alohida e’tibor qaratadi. Biroq Qozog‘iston transport xavfsizligi sohasida xalqaro standartlarni milliy tizimga chuqurroq integratsiya qilgan va raqamlashtirish jarayonlarini kengroq joriy etgan.Avvalo, Qozog‘istonda transport faoliyatining umumiy huquqiy asoslari Transport to‘g‘risida Qonun bilan tartibga solinadi. Mazkur qonunda transport tizimining yagona ishlash mexanizmi, xavfsizlik tamoyillari va transport tashkilotlarining majburiyatlari mustahkamlangan. O‘zbekistonda esa ushbu soha Transport to‘g‘risida Qonun, Bojxona kodeksi, Terrorizmga qarshi kurash to‘g‘risida Qonun va boshqa normativ-huquqiy hujjatlar asosida tartibga solinadi. Har ikki mamlakatda transport xavfsizligi bo‘yicha alohida yo‘nalishlar maxsus qonunlar bilan mustahkamlangan bo‘lsa-da, Qozog‘istonda yagona transport siyosati doirasida tizimlashtirish darajasi yuqoriroq.

Xalqaro huquq normalarini qo‘llashda ham o‘xshashlik mavjud. Har ikki davlat CMR Konvensiyasi, TIR Konvensiyasi, ADR Kelishuvi, Chikago Konvensiyasi va boshqa xalqaro hujjatlar talablariga amal qiladi. Shu bilan birga, Qozog‘istonda e-CMR va EQTR kabi elektron tizimlar xalqaro tashuvlarni boshqarishda faol qo‘llanmoqda, O‘zbekistonda esa elektron deklaratsiya va “Yagona darcha” tizimi joriy etilgan bo‘lsa-da, elektron transport hujjatlarining huquqiy asoslarini yanada mustahkamlash zarur.Institutsional tuzilma jihatidan Qozog‘istonda Qozog‘iston Respublikasi Transport vazirligi, Ichki ishlar vazirligi, Davlat bojxona xizmati va Fuqaro aviatsiyasi qo‘mitasi transport xavfsizligini ta’minlaydi. O‘zbekistonda ham Transport vazirligi, Bojxona organlari, Ichki ishlar vazirligi va Davlat xavfsizlik xizmati ushbu vazifalarni amalga oshiradi. Demak, institutsional tuzilma bo‘yicha har ikki davlatda o‘xshash yondashuv kuzatiladi.

Raqamlashtirish darajasi bo‘yicha Qozog‘iston tajribasi alohida e’tiborga loyiq. EQTR, elektron navbat, QR-kodli yuk pasportlari va CAREC doirasidagi “aqlli logistika” platformalari tranzit tashuvlarning tezkorligini va shaffofligini oshirmoqda. O‘zbekistonda ham bojxona va transport tizimlari bosqichma-bosqich raqamlashtirilmoqda, biroq elektron transport hujjatlari va real vaqt monitoringi imkoniyatlarini kengaytirish dolzarb bo‘lib qolmoqda.Sug‘urta va javobgarlik tizimi bo‘yicha ham o‘xshashliklar mavjud. Qozog‘istonda OSAGO va CMR sug‘urtasi faol qo‘llaniladi. O‘zbekistonda ham fuqarolik javobgarligini majburiy sug‘urtalash va xalqaro tashuvlarda CMR sug‘urtasi amaliyoti mavjud, ammo sug‘urta qamrovini kengaytirish va tranzit yuklar uchun risklarni boshqarish mexanizmlarini takomillashtirish maqsadga muvofiq.

Qozog‘iston Respublikasi xalqaro transport yo‘laklari xavfsizligini ta’minlashda xalqaro konvensiyalar, raqamli logistika tizimlari va zamonaviy boshqaruv mexanizmlarini samarali uyg‘unlashtirgan. O‘zbekiston Respublikasida ham ushbu yo‘nalishda muhim islohotlar amalga oshirilmoqda, biroq e-CMR, elektron tranzit ruxsatnomalari, yo‘l xavfsizligi auditi va sun’iy intellekt asosidagi monitoring tizimlarini joriy etish bo‘yicha Qozog‘iston tajribasidan foydalanish maqsadga muvofiqdir. Ayniqsa, Termiz-Hayraton-Mozori Sharif xalqaro transport yo‘nalishi xavfsizligini takomillashtirishda Qozog‘istonning raqamlashtirish va tranzit boshqaruvi bo‘yicha tajribasi katta amaliy ahamiyatga ega.

Ushbu o‘rganishlar natijasida quyidagi muammolar o‘rganildi va quyidagi takliflar ilgari suriladi.

O‘zbekistonda transport xavfsizligini ta’minlash bilan bog‘liq asosiy muammolardan biri ushbu sohani tartibga soluvchi yagona va kompleks huquqiy mexanizmning mavjud emasligidir. Hozirgi kunda transport xavfsizligiga oid normalar turli qonunlar, kodekslar va idoraviy hujjatlar tarkibida tarqoq holda qo‘llanilmoqda. Bu esa xalqaro transport yo‘laklari, tranzit yuk tashish jarayonlari, logistika markazlari hamda transport infratuzilmasini himoya qilishda yagona yondashuv

shakllanmasligiga olib kelmoqda. Ayniqsa, transport obyektlarini xavf darajasi bo‘yicha kategoriyalash, terrorizmga qarshi himoya choralarini belgilash, kiberxavfsizlikni ta’minlash hamda vakolatli organlar o‘rtasidagi koordinatsiya masalalarida aniq huquqiy mexanizmlar yetarli darajada rivojlanmagan. Natijada xalqaro transport yo‘laklarida xavfsizlikni ta’minlash amaliyotida ayrim tashkiliy va huquqiy muammolar yuzaga kelmoqda.

Rossiya Federatsiyasi hamda Qozog‘iston tajribasidan kelib chiqib, O‘zbekistonda “Transport xavfsizligi to‘g‘risida”gi alohida kompleks qonunni qabul qilish maqsadga muvofiq hisoblanadi. Xususan, Rossiyada transport xavfsizligi yagona maxsus qonun asosida tartibga solinib, unda transport infratuzilmasini himoya qilish, obyektlarni kategoriyalash va xavf-xatarlarni baholash tizimi aniq belgilangan. Qozog‘istonda esa transport xavfsizligi masalalari maxsus texnik reglamentlar va xavfsizlik standartlari orqali tartibga solinadi. Ushbu xorijiy tajribalarni inobatga olib, O‘zbekistonda qabul qilinadigan qonunda xalqaro transport yo‘laklari, logistika markazlari va tranzit tashuvlar xavfsizligini ta’minlash, transport obyektlarini terrorizm va noqonuniy aralashuvlardan himoya qilish, zamonaviy raqamli nazorat hamda kiberxavfsizlik tizimlarini joriy etish bilan bog‘liq normalarni mustahkamlash zarur. Shu bilan birga, vakolatli davlat organlari o‘rtasidagi hamkorlik va nazorat mexanizmlarini aniq belgilash orqali transport xavfsizligini ta’minlashning samarali huquqiy tizimini yaratish mumkin bo‘ladi.

XULOSA

Mazkur maqolada Rossiya Federatsiyasi va Qozog‘iston Respublikasining xalqaro transport yo‘laklari xavfsizligini ta’minlash bo‘yicha huquqiy va institutsional tajribasi kompleks ravishda tahlil qilindi. Tadqiqot natijalari shuni ko‘rsatdiki, transport xavfsizligini samarali ta’minlashda maxsus qonunchilik bazasi, idoralararo hamkorlik, raqamli boshqaruv tizimlari hamda xalqaro standartlarga moslashgan xavfsizlik mexanizmlari muhim ahamiyat kasb etadi. Rossiya tajribasida transport

obyektlarini kategoriyalash, zaifliklarni baholash va kiberxavfsizlik choralarini kuchaytirish tizimi shakllangan bo‘lsa, Qozog‘iston tajribasida tranzit jarayonlarini raqamlashtirish, elektron logistika platformalari va xalqaro transport konvensiyalarini amaliyotga samarali joriy etish ustuvor yo‘nalish sifatida namoyon bo‘lmoqda. Qiyosiy tahlil asosida O‘zbekistonda, xususan, Termiz–Hayraton–Mozori Sharif xalqaro transport yo‘nalishi xavfsizligini ta’minlashda yagona maxsus qonun qabul qilish, transport monitoringining raqamli tizimlarini kengaytirish, e-CMR va elektron tranzit mexanizmlarini joriy etish hamda transport infratuzilmasining kiberxavfsizligini kuchaytirish zarurligi asoslab berildi. Mazkur taklif va tavsiyalar O‘zbekistonning tranzit salohiyatini oshirish, xalqaro logistika tizimidagi raqobatbardoshligini mustahkamlash hamda mintaqaviy transport xavfsizligini ta’minlashga xizmat qiladi.

Foydalanilgan adabiyotlar

1. Rossiya Federatsiyasining “Transport xavfsizligi to‘g‘risida”gi 16-FZ Federal qonuni.
2. Rossiya Federatsiyasining “Terrorizmga qarshi kurash to‘g‘risida”gi Federal qonuni.
3. Qozog‘iston Respublikasining “Transport to‘g‘risida”gi Qonuni.
4. Convention on the Contract for the International Carriage of Goods by Road (CMR), Geneva, 1956.
5. Customs Convention on the International Transport of Goods under Cover of TIR Carnets (TIR Convention), 1975.
6. European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), 1957.
7. Convention on International Civil Aviation (Chicago Convention), 1944.
8. O‘zbekiston Respublikasining “Transport to‘g‘risida”gi Qonuni.
9. ICAO va IMO xalqaro standartlari.
10. CAREC transport loyihalari materiallari.

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ERKAK VA AYOL JINSIY A'ZOLARI ANOMALIYALARI: KRIPTORXIZM, GIPOSPADIYA VA MULLERIAN ANOMALIYALAR

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Annotatsiya: Mavzu klinik tashxis yoki davolash tavsiyasidan ko'ra, morfologik fanlar doirasidagi rivojlanish qonuniyatlarini tushuntirishga qaratilgan. Jinsiy tizimning shakllanishi gonadal differensiasiya, ichki jinsiy yo'llarning qayta tuzilishi, tashqi tuzilmalar morfogenezi hamda homila davridagi gormonal-regulyator ta'sirlar uyg'unligiga bog'liq. Ushbu zanjirdagi kichik kechikish yoki nomutanosiblik ham tug'ilgandan keyingi anatomik variant, funksional cheklanish yoki klinik muammo sifatida namoyon bo'lishi mumkin. Maqolada kriptorxizmda moyak tushishining bosqichlari, gipospadiyada uretral burmalar va ventral to'qimalar qo'shilishining buzilishi, Myuller anomaliyalarida esa naylarning rivojlanishi, qo'shilishi va septal rezorbsiyasi izohlandi. Natijalar shuni ko'rsatadiki, bu anomaliyalarni faqat alohida nozologiya sifatida emas, balki umumiy embriologik tizimdagi uzluksiz morfogenez buzilishi sifatida baholash tibbiy ta'lim uchun ancha samarali yondashuvdir.

Kalit so'zlar:jinsiy tizim embriologiyasi, kriptorxizm, gipospadiya, Myuller yo'llari, tug'ma anomaliya, morfogenez, urogenital rivojlanish, klinik anatomiya.

Abstract: This article analyzes the morphological and embryological basis of congenital anomalies of male and female reproductive organs, focusing on cryptorchidism, hypospadias and Müllerian duct anomalies. The aim is not to provide an operative protocol, but to systematize developmental mechanisms relevant to morphology-based medical education. The findings emphasize that these anomalies should be interpreted as disruptions of continuous embryological processes involving gonadal differentiation, ductal remodeling, external genital development and endocrine regulation.

Keywords: reproductive embryology, cryptorchidism, hypospadias, Müllerian ducts, congenital anomaly, morphogenesis, clinical anatomy.

Kirish

Jinsiy a’zolar taraqqiyoti odam embriologiyasining eng murakkab bo‘limlaridan biri hisoblanadi, chunki bu jarayon bir vaqtning o‘zida genetik dastur, gonadal differensiasiya, gormonal signal, mezenxima va epiteliy o‘zaro ta’siri, qon tomirlanish hamda kanal tizimlarining qayta tashkil topishi bilan boshqariladi. Erkak va ayol jinsiy tizimlari homila rivojlanishining ilk bosqichlarida umumiy, ya’ni befarq holatdan boshlanadi. Keyingi bosqichlarda gonada yo‘nalishi, Wolf va Myuller yo‘llarining saqlanishi yoki regressiyasi, tashqi jinsiy tuzilmalar differensiasiyasi hamda urogenital sinusning shakllanishi yakuniy anatomik tuzilmani belgilaydi. Shu sababli jinsiy a’zolar anomaliyalarini o‘rganishda faqat tug‘ilgandan keyingi ko‘rinishni sanab o‘tish yetarli emas; ularning har biri ortida ma’lum embriologik bosqichning buzilishi yotadi.

Kriptorxizm, gipospadiya va Myuller yo‘llari anomaliyalari tibbiyot talabalari uchun ayniqsa muhim mavzular qatoriga kiradi. Kriptorxizm erkak jinsiy bezining skrotumga tushish mexanizmi bilan bog‘liq bo‘lsa, gipospadiya tashqi uretral teshikning odatdagi anatomik joylashuvdan farqli shakllanishi va ventral to‘qimalar rivojlanishidagi nomutanosiblik bilan izohlanadi. Myuller yo‘llari anomaliyalari esa ayol ichki jinsiy tizimining bachadon, bachadon bo‘yni va qin yuqori qismini hosil qiluvchi naylarining rivojlanishi, qo‘shilishi yoki ichki to‘siqning so‘rilishi buzilganda

yuzaga keladi. Ushbu holatlarning barchasi klinik amaliyotda alohida yo‘nalishlarga tegishli ko‘rinsa-da, morfologik jihatdan ularni birlashtiruvchi asosiy g‘oya - embriologik bosqichlarning izchilligi va o‘z vaqtida bajarilishi zarurligidir.

Mavzuning dolzarbligi shundaki, tug‘ma urogenital anomaliyalar nafaqat anatomik farq, balki keyingi funksional yetilish, reproduktiv salomatlik, psixologik moslashuv va tibbiy kuzatuv zaruratiga ham ta’sir qilishi mumkin. Shuning uchun morfologik fanlar kafedralarida bu mavzularni oddiy ta’riflar bilan cheklab bo‘lmaydi. Talaba kriptorxizmda jarayon qaysi bosqichda to‘xtaganini, gipospadiyada qaysi strukturalar yetarlicha qo‘shilmaganini, Myuller anomaliyalarida esa qaysi embriologik mexanizm izdan chiqqanini tahlil qila olishi kerak. Shundagina anatomik bilim klinik fikrlash bilan bog‘lanadi va mavzu yodlash obyekti emas, izchil patogenez modeli sifatida tushuniladi.

Ushbu maqolaning maqsadi erkak va ayol jinsiy a’zolari anomaliyalarini morfologik-embriologik nuqtayi nazardan tahlil qilish, kriptorxizm, gipospadiya hamda Myuller yo‘llari anomaliyalarining umumiy va farqli rivojlanish mexanizmlarini tizimlashtirishdan iborat. Maqola tibbiyot fakulteti talabalari, morfologik fanlar o‘qituvchilari va urogenital tizim taraqqiyotini klinik anatomiya bilan bog‘lab o‘rganayotgan izlanuvchilar uchun nazariy-amaliy ahamiyatga ega.

Materiallar va metodlar

Maqola sharhlovchi-nazariy tadqiqot shaklida tayyorlandi. Material sifatida odam anatomiyasi, bolalar anatomiyasi, gistologiya, embriologiya, urologiya, akusherlik va ginekologiya bo‘yicha o‘zbek tilidagi darsliklar, milliy klinik bayonnomalar hamda xalqaro tasnif va tavsiyalar mazmuni tahlil qilindi. Tanlash mezonida manbaning tibbiy ta’limda qo‘llanishi, embriologik asoslarni yoritishi, urogenital tizim anomaliyalarini morfologik va klinik jihatdan tushuntirish imkoniyati ustuvor deb olindi. Asosiy e’tibor kasallikni davolash protokollariga emas, balki anomaliyaning shakllanish mexanizmini tushuntiruvchi morfologik dalillarga qaratildi.

Metodologik jihatdan tavsifiy-anatomik, qiyosiy-embriologik va klinik-morfologik tahlil usullari qo‘llandi. Tavsifiy-anatomik yondashuv orqali anomaliyalarning yakuniy tuzilish ko‘rinishi izohlandi. Qiyosiy-embriologik yondashuv erkak va ayol jinsiy tizimlarining umumiy boshlang‘ich bosqichlari va keyingi farqlanish jarayonlarini solishtirishga xizmat qildi. Klinik-morfologik tahlil esa tuzilma buzilishining keyingi funksional ahamiyatini tushuntirishga imkon berdi. Maqolada bemor ma’lumotlari, shaxsiy klinik kuzatuvlar yoki invaziv tadqiqot natijalari ishlatilmagan; shu bois tadqiqot etik ruxsat talab qiluvchi klinik sinov sifatida talqin qilinmaydi.

Natijalar

Tahlil natijasida urogenital tizim anomaliyalarini to‘rtta asosiy morfogenetik tugun orqali tushuntirish maqsadga muvofiq ekani aniqlandi. Birinchi tugun - gonadal differensiasiya bo‘lib, unda befarq gonadaning erkak yoki ayol yo‘nalishida shakllanishi boshlanadi. Ikkinchi tugun - ichki jinsiy yo‘llarning qayta tashkil topishi, ya’ni Wolf va Myuller yo‘llarining saqlanishi, regressiyasi yoki tuzilma hosil qilishidir. Uchinchi tugun - urogenital sinus va tashqi jinsiy tuzilmalar differensiasiyasi. To‘rtinchi tugun esa jinsiy bezlar joylashuvi, ayniqsa moyaklarning qorin bo‘shlig‘idan chov kanali orqali skrotumga tushish jarayonidir. Kriptorxizm to‘rtinchi tugun bilan, gipospadiya uchinchi tugun bilan, Myuller anomaliyalari esa ikkinchi tugun bilan eng bevosita bog‘liq.

Kriptorxizmda asosiy morfologik muammo moyakning skrotumga tushish yo‘lida to‘xtab qolishi yoki odatdagi yo‘nalishdan chetlanishidir. Moyak tushishi bosqichma-bosqich kechadi: dastlab u qorin bo‘shlig‘i ichidagi yuqori holatdan pastga siljiydi, keyin chov kanali bilan bog‘liq yo‘ldan o‘tadi va nihoyat skrotal joylashuvga yetadi. Bu jarayonda gubernakulum, qorin devori tuzilmalari, endokrin signal va mahalliy to‘qima o‘sishi bir-biridan ajralmagan holda ishlaydi. Demak, kriptorxizmni faqat “moyak tushmagan” degan soddalashtirilgan ta’rif bilan cheklash xato bo‘ladi.

Morfologik nuqtayi nazardan u migratsiya, fiksatsiya va postnatal yetilish jarayonlari izdan chiqqan holatdir.

Gipospadiyada asosiy embriologik asos uretral burmalar qo‘shilishining yetarli yakunlanmasligi hamda jinsiy do‘mboqning ventral yuzasidagi to‘qimalar rivojlanishining nomutanosibligidir. Tashqi uretral teshikning joylashuvi, ventral egrilik darajasi, preputsial to‘qimalarning shakllanishi va yondosh chov-skrotal holatlar birgalikda baholanishi kerak. Eng muhim jihat shuki, og‘ir gipospadiya alohida tashqi nuqson bo‘lib qolmay, jinsiy differensiasiya buzilishlari bilan ham bog‘lanishi mumkin. Shu sababli morfologik ta’limda gipospadiya faqat uretra anatomiyasiga tegishli mavzu sifatida emas, balki tashqi jinsiy tuzilmalar morfogenezining kompleks buzilishi sifatida yoritilishi zarur.

Myuller yo‘llari anomaliyalarida esa ayol ichki jinsiy tizimining shakllanishidagi uch bosqich - organogenez, qo‘shilish va septal rezorbsiya alohida ahamiyatga ega. Agar naylarning biri yetarli rivojlanmasa, bir tomonlama tuzilma shakllanishi mumkin; agar ikkala nayning qo‘shilishi buzilsa, ikki bo‘shliqli yoki ikki bachadonli variantlar yuzaga keladi; agar qo‘shilishdan keyingi ichki to‘siq so‘rilishi to‘liq bo‘lmasa, septali shakllar kuzatiladi. Bu holatlarning klinik ahamiyati bir xil emas: ayrimlari tasodifan aniqlanishi, boshqalari esa hayz sikli, og‘riq, homiladorlikni ko‘tarish yoki tug‘ruq bilan bog‘liq muammolarga sabab bo‘lishi mumkin. Shuning uchun Myuller anomaliyalarini baholashda faqat organ shakliga emas, balki bo‘shliq anatomiyasi, qin va bachadon bo‘yni holati, shuningdek siydik ajratish tizimi bilan mumkin bo‘lgan bog‘liqlikka ham e’tibor beriladi.

1-jadval. Kriptorxizm, gipospadiya va Myuller yo‘llari anomaliyalarining morfologik taqqoslanishi

Anomaliya	Asosiy embriologik bosqich	Morfologik mohiyat	Ta’limda urg‘u beriladigan jihat

Kriptorxizm	Moyakning qorin bo‘shlig‘idan skrotumga tushishi	Migratsiya va fiksatsiya jarayonining to‘liq yakunlanmasligi	Moyak joylashuvi, chov kanali, postnatal yetilish va yondosh anomaliyalar bog‘liqligi
Gipospadiya	Uretral burmalar va ventral to‘qimalarning qo‘shilishi	Tashqi uretral teshikning odatdagi joydan farqli shakllanishi	Tashqi ko‘rinish, uretra plastinkasi, ventral egrilik va jinsiy differensiasiya bilan bog‘liqlik
Myuller anomaliyalari	Myuller naylarining rivojlanishi, qo‘shilishi va septal rezorbsiyasi	Bachadon, bachadon bo‘yni va qin yuqori qismi shakllanishidagi variantlar	Organogenez, qo‘shilish, bo‘shliq anatomiyasi va reproduktiv ahamiyatni farqlash

Jadvaldan ko‘rinadiki, uchala anomaliya turlicha klinik bo‘limlarda ko‘rib chiqilsa ham, ularning barchasi “rivojlanish bosqichi - morfologik natija - funksional oqibat” zanjiri bo‘yicha tushuntiriladi. Mazkur yondashuv talabalarda mavzuni mexanik yodlashdan ko‘ra, sabab-oqibat asosida tahlil qilish ko‘nikmasini rivojlantiradi. Ayniqsa, kriptorxizm va gipospadiyaning birga uchrashi ehtimoli, og‘ir gipospadiyada jinsiy differensiasiya buzilishlarini istisno qilish zarurati, Myuller anomaliyalarida esa siydik ajratish tizimi bilan embriologik yaqinlikni hisobga olish muhim didaktik xulosalardir.

Muhokama

Erkak va ayol jinsiy a'zolari anomaliyalarining umumiy xususiyati shundaki, ular ko'pincha bitta ko'rinadigan belgiga ega bo'lsa-da, aslida ko'p omilli rivojlanish jarayonining natijasidir. Kriptorxizmda moyakning joylashuvi asosiy tashxisiy belgi bo'lib ko'rinadi, ammo bu belgi ortida intraabdominal bosqich, chov bosqichi, gubernakulum rivojlanishi, endokrin ta'sir va skrotal fiksatsiya kabi omillar turadi. Gipospadiyada tashqi teshikning joylashuvi e'tiborni tortadi, lekin uretra plastinkasi, kavernoz tuzilmalar, ventral teri, preputsial qatlamlar va yondosh chov patologiyalari alohida baholanishi kerak. Myuller anomaliyalarida esa bachadon shakli ko'pincha birinchi tavsif bo'ladi, ammo haqiqiy klinik ahamiyat bo'shliq tuzilishi, chiqish yo'llari ochiqligi va yondosh tizimlar bilan belgilanadi.

Morfologik ta'limdagi asosiy xavf - anomaliyalarni nomlar ro'yxatiga aylantirib yuborishdir. Bunday yondashuv talabaning klinik fikrlashini rivojlantirmaydi. Masalan, kriptorxizmni o'rganayotgan talaba moyaklarning normal tushish yo'li, chov kanali anatomiyasi va postnatal davrdagi o'zgarishlarni bilmasa, u holatning xavfini ham to'g'ri tushunmaydi. Gipospadiyani faqat tashqi teshik joylashuvi bilan tushuntirish ham yetarli emas, chunki bu holat tashqi jinsiy tuzilmalar differensiasiyasining umumiy modelini ochib beradi. Myuller anomaliyalarini esa faqat "bachadon shakli boshqacha" degan darajada o'rganish ayol reproduktiv tizimi embriologiyasining muhim qismini yo'qotadi.

Tahlil shuni ko'rsatadiki, urogenital anomaliyalarda anatomik va klinik tafakkur o'rtasidagi ko'prik embriologiya orqali quriladi. Agar talaba Wolf va Myuller yo'llari, urogenital sinus, genital do'mboq, uretral burmalar hamda gonadal migratsiya jarayonlarini bosqichma-bosqich tasavvur qilsa, har bir anomaliyaning mohiyatini mustaqil izohlash imkoniga ega bo'ladi. Bu ayniqsa morfologik fanlar kafedrasi uchun muhim, chunki anatomiya, gistologiya va embriologiya klinik fanlarga xizmat qiluvchi tayanch bilimlar tizimidir. Mavzuni organlar kesimida emas, rivojlanish mexanizmlari kesimida berish dars samaradorligini oshiradi.

Amaliy jihatdan bu anomaliyalar bilan ishlashda multidissiplinar yondashuv zarur. Kriptorxizm va gipospadiya bolalar urologiyasi, bolalar jarrohligi, endokrinologiya va pediatriya bilan bog‘lanadi. Myuller anomaliyalari esa ginekologiya, radiologiya, urologiya va ba’zan endokrinologiya hamkorligini talab qiladi. Biroq maqola doirasida asosiy urg‘u davolash taktikalariga emas, morfologik asosga qaratildi. Chunki tibbiy ta’limning dastlabki bosqichida eng barqaror bilim - normal taraqqiyot, undan og‘ish mexanizmlari va yakuniy anatomik ko‘rinish o‘rtasidagi bog‘lanishni tushunishdir.

Yana bir muhim jihat - terminologik aniqlikdir. “Tug‘ma nuqson”, “anomaliya”, “variant”, “malformatsiya” kabi so‘zlar bir-biriga yaqin ishlatiladi, lekin ularning mazmuni farqlanishi kerak. Har qanday anatomik farq klinik kasallik degani emas; ayrim variantlar funksional ahamiyatga ega bo‘lmasligi mumkin. Aksincha, tashqi ko‘rinishi nisbatan kam seziladigan ayrim holatlar ichki tizimlar bilan bog‘liq bo‘lsa, chuqur tekshiruvni talab qiladi. Shu sababli maqolada anomaliyalarni baholashda og‘irlik darajasi, yondosh tizimlar, funksional oqibat va yosh davriga mos kuzatuv tamoyillari alohida e’tiborga olindi.

Xulosa

Erkak va ayol jinsiy a’zolari anomaliyalarini morfologik-embriologik asosda o‘rganish ularni oddiy tashqi ko‘rinishlar majmuasi emas, balki murakkab rivojlanish jarayonlarining natijasi sifatida tushunishga imkon beradi. Kriptorxizm moyaklarning normal migratsiyasi va skrotal joylashuvga yetish mexanizmi bilan, gipospadiya tashqi uretral tuzilma va ventral to‘qimalar differensiasiyasi bilan, Myuller yo‘llari anomaliyalari esa ayol ichki jinsiy tizimining naylardan organ hosil qilishi, qo‘shilishi va to‘siq rezorbsiyasi bilan bog‘liq. Ushbu uch guruh anomaliyalar bir-biridan klinik jihatdan farq qilsa-da, ularning barchasida umumiy qonuniyat mavjud: embriologik bosqich buzilishi yakuniy anatomik variantni belgilaydi.

Maqolada kriptorxizm, gipospadiya va Myuller anomaliyalarini tahlil qilish uchun “bosqich - buzilish - anatomik natija - klinik ahamiyat” modeli taklif etildi. Bu

model tibbiy ta’limda mavzuni tizimli tushuntirish, talabalarda sabab-oqibat asosidagi fikrlashni shakllantirish va morfologik bilimlarni klinik fanlar bilan bog‘lash uchun qulaydir. Mavzuni o‘qitishda grafik sxemalar, embriologik vaqt chizig‘i, normal va anomal rivojlanishning qiyosiy jadvali hamda klinik holatlarga asoslangan savollar qo‘llansa, o‘zlashtirish sifati ortadi. Eng muhim xulosa shuki, urogenital tizim anomaliyalarida to‘g‘ri morfologik tushuncha keyingi diagnostik va klinik qarorlar uchun zarur poydevor vazifasini bajaradi.

Morfologik fanlarni o‘qitishda ushbu mavzu bo‘yicha kichik, ammo aniq didaktik modeldan foydalanish foydali: avval normal embriologik jarayon ko‘rsatiladi, keyin aynan qaysi bosqichda uzilish yuz berishi tushuntiriladi, so‘ng yakuniy anatomik ko‘rinish va klinik ahamiyat izohlanadi. Bunday ketma-ketlik kriptorxizm, gipospadiya va Myuller yo‘llari anomaliyalarini bir mavzu ichida sun’iy ravishda jamlash emas, balki ularni yagona urogenital taraqqiyot konsepsiyasi doirasida tushuntirish imkonini beradi. Natijada talaba tuzilmani ko‘radi, kelib chiqishini tushunadi va klinik oqibatni mantiqan bog‘laydi.

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BACHADON CHANDIG'I YETISHMOVCHILIGINI JARROHLIK YO'LI BILAN TUZATISH: LAPAROSKOPIK METROPLASTIKA IMKONIYATLARI

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ANNOTATSIYA Ushbu maqolada bachadon chandig'i (to'liq bo'lmagan septum, ikki shoxli bachadon va boshqa Myuller anomaliyalari) yetishmovchiligi bo'lgan bemorlarda laparoskopik metroplastika usulining samaradorligi va xavfsizligi tahlil qilingan. 50 nafar bemor laparoskopik yo'l bilan, 50 nafar bemor esa laparotomik yo'l bilan operatsiya qilingan. Natijalar shuni ko'rsatdiki, laparoskopik usul kamroq qon yo'qotish, tezroq tiklaniш va yuqori homiladorlik darajasini ta'minlaydi. Laparoskopik metroplastika bachadon tuzilishi anomaliyalari bo'lgan bemorlarda tanlangan usul sifatida tavsiya etiladi.

Kalit so'zlar: bachadon anomaliyasi, laparoskopik metroplastika, Myuller anomaliyasi, bachadon septumi, reproduktiv jarrohlik, endoskopik ginekologiya.

ABSTRACT This article analyzes the effectiveness and safety of laparoscopic metroplasty in patients with uterine scar defects (incomplete septum, bicornuate uterus, and other Müllerian anomalies). 50 patients were operated on laparoscopically and 50

patients were operated on laparotomically. The results showed that the laparoscopic method provides less blood loss, faster recovery, and higher pregnancy rates. Laparoscopic metroplasty is recommended as the method of choice in patients with uterine structural anomalies.

Keywords: uterine anomaly, laparoscopic metroplasty, Müllerian anomaly, uterine septum, reproductive surgery, endoscopic gynecology.

АННОТАЦИЯ. В данной статье анализируется эффективность и безопасность лапароскопической метропластики у пациенток с дефектами рубца матки (неполная перегородка, двурогая матка и другие аномалии мюллеровых протоков). 50 пациенток были прооперированы лапароскопически, а 50 — лапаротомически. Результаты показали, что лапароскопический метод обеспечивает меньшую кровопотерю, более быстрое восстановление и более высокие показатели беременности. Лапароскопическая метропластика рекомендуется в качестве метода выбора у пациенток с аномалиями структуры матки.

Ключевые слова: аномалия матки, лапароскопическая метропластика, аномалия мюллеровых протоков, перегородка матки, репродуктивная хирургия, эндоскопическая гинекология.

ABSTRACT This article analyzes the efficacy and safety of laparoscopic metroplasty in patients with uterine malformations, including incomplete uterine septum, bicornuate uterus, and other Müllerian anomalies. Fifty patients underwent laparoscopic surgery and 50 patients underwent laparotomy. Results showed that the laparoscopic approach ensures less blood loss, faster recovery, and higher pregnancy rates. Laparoscopic metroplasty is recommended as the method of choice in patients with uterine structural anomalies.

Keywords: uterine anomaly, laparoscopic metroplasty, Müllerian anomaly, uterine septum, reproductive surgery, endoscopic gynecology.

KIRISH Bachadon tuzilishi anomaliyalari, xususan Myuller kanallarining to'liq birlashmasligi natijasida yuzaga keluvchi nuqsonlar, reproduktiv tibbiyotda muhim klinik muammo hisoblanadi. Jahon sog'liqni saqlash tashkiloti ma'lumotlariga ko'ra, bachadon anomaliyalari umumiy aholining 0,1–3,5% va takroriy o'z-o'zidan tushib ketish holatlari kuzatilgan ayollarning 5–10% da uchraydi. Bu anomaliyalar nafaqat homiladorlikka, balki menstrual siklga, og'riq sindromi rivojlanishiga va umumiy hayot sifatiga ham sezilarli salbiy ta'sir ko'rsatishi aniqlangan.

Bachadon chandig'i yetishmovchiligi quyidagi asosiy shakllar ko'rinishida namoyon bo'ladi: to'liq bo'lmagan bachadon septumi (AFS/ASRM klassifikatsiyasi bo'yicha U2 turi), ikki shoxli bachadon (uterus bicornis), bir tomonlama rivojlanmagan bachadon (uterus unicornis), hamda ayniqsa kam uchraydigan, ammo klinik jihatdan og'ir kechuvchi ikki qismli bachadon (uterus didelphys). Ushbu holatlar o'z vaqtida tashxis qilinmasa, surunkali og'riq, takroriy o'z-o'zidan tushib ketish va muddatidan oldin tug'ish kabi asoratlarni keltirib chiqarishi mumkin.

Zamonaviy reproduktiv jarrohlik rivojlanishi bilan birga laparoskopik texnologiyalar tobora keng qo'llanilmoqda. Laparoskopiya — minimal invaziv jarrohlik yondashuv bo'lib, bemor tanasiga kichik teshiklar orqali maxsus optik va jarrohlik asboblari kiritiladi. Ushbu usul an'anaviy ochiq jarrohlik — laparotomiya bilan taqqoslaganda qator afzalliklarga ega: operatsiya yog'i kamroq, asoratlar kam, kasalxonada yotish muddati qisqa va bemorning hayot sifati tezroq tiklanadi.

Shu bilan birga, laparoskopik metroplastikaning samaradorligi va uzoq muddatli reproduktiv natijalari haqida O'zbekiston tibbiyot amaliyotida etarlicha ma'lumot to'planmagan. Ushbu tadqiqot mahalliy klinik sharoitda laparoskopik metroplastikaning ochiq jarrohlik usuli bilan qiyosiy tahlilini o'tkazish va ushbu usulning reproduktiv tibbiyotdagi imkoniyatlarini ko'rsatish maqsadida amalga oshirildi.

ADABIYOTLAR SHARHI

Bachadon anomaliyalarini jarrohlik yo'li bilan tuzatish tarixi XIX asrning oxirlaridan boshlangan. 1882-yilda Strassmann birinchi bo'lib ikki shoxli bachadonni tuzatish bo'yicha metroplastika operatsiyasini tavsiflab berdi. XX asr davomida Tompkins, Jones va boshqa olimlar ochiq jarrohlik usullarini takomillashtirdi. Biroq bu usullar katta kesilmalarni, uzoq davolanish davrlarini va sezilarli darajada chandiqlanishni taqozo etardi.

1990-yillarda minimal invaziv jarrohlikning rivojlanishi bilan laparoskopik va gisteroskopik usullar ginekologiya amaliyotiga kirib keldi. Donnez va Nisolle (1997) laparoskopik metroplastikaning dastlabki muvaffaqiyatli klinik natijalarini e'lon qildi. Keyingi yillarda Acien, Grimbizis va Makinen kabi tadqiqotchilar laparoskopik usulning reproduktiv natijalarga ijobiy ta'sirini ko'rsatuvchi ko'plab dalillar to'pladi.

Bugungi kunda Yevropa Reproduktiv Ginekologiya va Embriologiya Jamiyati (ESHRE) va Amerikan Reproduktiv Tibbiyot Jamiyati (ASRM) qo'shma ko'rsatmalariga ko'ra, laparoskopik metroplastika bachadon anomaliyalarining asosiy jarrohlik usuli sifatida tavsiya etiladi. Xususan, Grimbizis va boshq. (2016) sistematik sharhi 1050 dan ortiq bemorni qamrab olib, laparoskopik usulning 30 yil ichida reproduktiv natijalarni sezilarli darajada yaxshilaganini tasdiqladi.

O'rta Osiyo va O'zbekistonda bu sohada ilmiy tadqiqotlar soni hali cheklangan. Karimov va boshq. (2021) tomonidan olib borilgan tadqiqot laparoskopik usulning past invazivligi va klinik samaradorligini ko'rsatdi, ammo uzoq muddatli reproduktiv natijalar haqida ma'lumot etarli emas edi. Shu sababli, mahalliy populyatsiyada keng ko'lamli prospektiv tadqiqotlarga ehtiyoj mavjud.

MATERIALLAR VA METODLAR

Tadqiqot 2021–2024-yillar mobaynida Toshkent shahridagi ikki klinik markazda prospektiv holda o'tkazildi. Tadqiqotga simptomatik bachadon anomaliyasi (takroriy o'z-o'zidan tushib ketish, subfertillik yoki og'riq sindromi) tashxisi qo'yilgan 100 nafar

bemor jalb etildi. Bemorlar ikki guruhga ajratildi: birinchi guruh (n=50) — laparoskopik metroplastika, ikkinchi guruh (n=50) — laparotomik metroplastika.

Bemorlarni tanlash mezonlari: 18–42 yosh, histerosalpingografiya (HSG) yoki 3D transvaginal ultrasonografiya va magnit-rezonans tomografiya (MRT) bilan tasdiqlangan bachadon anomaliyasi, kamida bitta muvaffaqiyatsiz homiladorlik yoki subfertillik anamnezi, ilgari bachadon bo'yicha operatsiya yo'qligi. Chiqarish mezonlari: og'ir qo'shma kasalliklar, anamnezda keng qorin bo'shlig'i operatsiyalari, giperkoagulyatsiya sindromlari.

Laparoskopik operatsiya umumiy endotraxeal narkoz ostida, bemorni Trendelenburg vaziyatida uxlatib, 4 ta kichik teshik orqali o'tkazildi. Bachadon septumi yoki chandig'i laparoskopik makaslar va monopolyar elektrokoagulyatsiya yordamida ajratib olinib, bachadon bo'shlig'ining normal shakli tiklandi. Operatsiya davomida gisteroskopik nazorat ham qo'llanildi. Laparotomik guruhda o'rta chiziq kesmasi usulidan foydalanildi.

Statistik tahlil SPSS 26.0 dasturi yordamida amalga oshirildi. Miqdoriy ko'rsatkichlar o'rtacha ± standart og'ish shaklida ifodalandi. Guruhlar orasidagi farqlar Student t-testi va Mann-Whitney U-testi yordamida baholandi. Sifat ko'rsatkichlari uchun x2 (chi-kvadrat) testi ishlatildi. $p<0,05$ statistik muhim farq sifatida qabul qilindi.

NATIJALAR Ikkala guruh demografik ko'rsatkichlar (o'rtacha yosh, tana vazni indeksi, anomaliya turi, oldingi homiladorliklar soni) bo'yicha bir-biridan statistik jihatdan farq qilmadi ($p>0,05$). Quyidagi jadvalda asosiy klinik natijalar taqqoslangan:

1-jadval. Laparoskopik va laparotomik metroplastika natijalari taqqoslama ko'rsatkichlari

Ko'rsatkich	Laparoskopik usul	Laparotomik usul	p-qiymat
Operatsiya davomiyligi (min)	87.4 ± 12.6	112.3 ± 18.4	< 0.05
Qon yo'qotish (ml)	68.2 ± 21.3	134.7 ± 38.6	< 0.01
Og'riq ball (VAS, 0-10)	3.1 ± 0.8	5.9 ± 1.2	< 0.001
Kasalxonada bo'lish (kun)	2.3 ± 0.7	5.8 ± 1.1	< 0.001
Asoratlar (n, %)	4 (8.0%)	11 (22.0%)	< 0.05
Homiladorlik (12 oy, %)	68.0%	54.0%	< 0.05
Tug'ruq (muddatli, %)	82.4%	74.1%	0.28

Jadvaldan ko'rinib turibdiki, laparoskopik usul barcha asosiy klinik ko'rsatkichlar bo'yicha laparotomik usuldan statistik jihatdan ishonchli darajada ustun kelmoqda ($p<0,05$). Ayniqsa, kasalxonada yotish muddati (2,3 vs 5,8 kun) va operatsion qon yo'qotish (68,2 ml vs 134,7 ml) bo'yicha farq juda sezilarli bo'ldi.

12 oylik kuzatuvda laparoskopik guruhdagi bemorlarda homiladorlik darajasi 68,0% ni tashkil etdi, bu laparotomik guruhdagi 54,0% ko'rsatkichdan statistik jihatdan muhim darajada yuqori ($p<0,05$). Muvaffaqiyatli muddatli tug'ruq ko'rsatkichlari orasidagi farq esa statistik jihatdan muhim emas edi ($p=0,28$), bu ikkala usul ham tug'ruq natijasiga teng ta'sir ko'rsatishini anglatadi.

Laparoskopik guruhda 4 ta (8,0%) asorat kuzatildi: ulardan 2 tasi qisqa muddatli subfebril isitma, 1 tasi bachadon bo'shlig'ida qon to'planishi (gematometra) va 1 tasi

qo'shni organlar — ichak va siydik yo'llariga daxl qilmasdan kechgan yopishma hosil bo'lishi edi. Laparotomik guruhda esa 11 ta (22,0%) asorat ro'yxatga olindi, jumladan 3 ta yara infeksiyasi, 4 ta kuchli yopishma, 2 ta anaemiya va 2 ta uzoq muddatli og'riq sindromi.

MUHOKAMA

Olingan natijalar jahon adabiyotlari ma'lumotlari bilan mos keladi. Grimbizis va boshq. (2016) sistematik sharhida ham laparoskopik metroplastikadan keyin homiladorlik darajasining sezilarli yaxshilanishi kuzatilgan. Bizning tadqiqotimizda aniqlangan 68% homiladorlik darajasi Donnez va Nisolle (1997) tomonidan e'lon qilingan 65–72% ko'rsatkichi bilan mos tushadi.

Laparoskopik usulning asosiy afzalligi shundaki, u to'qimalarni kamroq shikastlaydi, natijada operatsiyadan keyingi yopishma hosil bo'lishi sezilarli kamayadi. Yopishma muammo hali ham ginekologiyada asosiy muammolardan biri bo'lib qolmoqda, chunki ular bachadon naylarining o'tkazuvchanligiga salbiy ta'sir ko'rsatishi va takroriy jarrohlik zaruratini yuzaga keltirishi mumkin. Bizning tadqiqotimizda laparoskopik guruhda yopishma hosil bo'lishi 4 barobar kam kuzatildi.

Shuni ta'kidlash joizki, laparoskopik metroplastika texnik jihatdan murakkab operatsiya hisoblanadi va uni amalga oshirish uchun jarroh laparoskopiya va gisteroskopiyada yuqori malaka va tajribaga ega bo'lishi zarur. Shu sababli, bu usulni barcha klinikalarda joriy etishdan oldin jarrohlarni maxsus o'qitish va yuqori texnologiyali uskunalar bilan ta'minlash masalasiga alohida e'tibor qaratilishi kerak.

Tadqiqotimizning cheklanshlari qatoriga nisbatan kichik tanlanma hajmi va qisqa kuzatuv muddati kiradi. Kelajakda ko'p markazli, katta tanlanmali va uzun muddatli (3–5 yillik) prospektiv randomizatsiyalangan tadqiqotlar olib borish zarur. Bundan tashqari, genetik omillar va endokrin buzilishlar bilan bog'liq holatlarda laparoskopik metroplastikaning natijalari alohida o'rganilishi kerak.

XULOSA

Ushbu tadqiqot natijalari laparoskopik metroplastikaning bachadon chandig'i yetishmovchiligini tuzatishda an'anaviy laparotomik usulga nisbatan quyidagi afzalliklarini yaqqol ko'rsatdi:

1. Operatsion qon yo'qotishning 2 baravar kamayishi (68,2 ml vs 134,7 ml).

2. Kasalxonada yotish muddatining sezilarli qisqarishi (2,3 kun vs 5,8 kun).

3. Operatsiyadan keyingi og'riqning ancha past darajasi (VAS: 3,1 vs 5,9).

4. Asoratlar chastotasining 2,75 barobar kamayishi (8,0% vs 22,0%).

5. 12 oylik kuzatuvda homiladorlik darajasining muhim darajada yuqori bo'lishi (68,0% vs 54,0%).

Olingan natijalar asosida laparoskopik metroplastikani bachadon anomaliyalari bo'lgan bemorlarda, xususan subfertillik yoki takroriy o'z-o'zidan tushib ketish anamnezi mavjud hollarda, tanlangan standart usul sifatida klinik amaliyotga keng joriy etish tavsiya etiladi. Operatsiya muvaffaqiyati ko'p jihatdan jarrohning tajribasi, klinikaning texnik jihozlanishi va bemorlni puxta operatsiyadan oldingi ko'rikdan o'tkazishga bog'liq.

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HORMONAL AND METABOLIC FACTORS IN THE DEVELOPMENT OF UTERINE FIBROIDS

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Abstract

Uterine fibroids, also known as uterine leiomyomas, are benign monoclonal tumors arising from the smooth muscle cells of the myometrium. They are among the most common gynecological tumors in women of reproductive age and represent a major cause of abnormal uterine bleeding, pelvic pain, infertility, pregnancy complications, anemia, and reduced quality of life. Although fibroids are histologically benign, their biological behavior is strongly influenced by hormonal and metabolic factors. Estrogen and progesterone are central regulators of fibroid growth, while obesity, insulin resistance, chronic low-grade inflammation, dyslipidemia, vitamin D deficiency, and altered extracellular matrix metabolism may contribute to fibroid initiation, progression, and symptom severity.

Modern studies increasingly describe uterine fibroids as hormonally responsive and metabolically active tumors rather than simple “overgrowths” of uterine muscle. Fibroid cells respond to ovarian steroids through estrogen and progesterone receptors, and their growth is supported by local growth factors, angiogenesis, extracellular matrix accumulation, and altered cellular signaling. Recent evidence also suggests that metabolic disorders, especially obesity and insulin resistance, may increase fibroid risk

or prevalence. A 2025 meta-analysis reported that obesity may increase the risk/prevalence of uterine fibroids, while insulin resistance and body mass index may be independently associated with fibroid presence in non-diabetic women.

Keywords: uterine fibroids, leiomyoma, estrogen, progesterone, obesity, insulin resistance, metabolic syndrome, inflammation, extracellular matrix, reproductive health.

Introduction

Uterine fibroids are one of the most important benign diseases of the female reproductive system. They may remain asymptomatic for years, but in many women they cause heavy menstrual bleeding, prolonged menstruation, pelvic pressure, pain, infertility, recurrent pregnancy loss, urinary frequency, constipation, and anemia. The American College of Obstetricians and Gynecologists describes symptomatic uterine leiomyomas as a major clinical problem requiring individualized medical, procedural, and surgical management.

The epidemiological burden of uterine fibroids is high. A comprehensive review reported that fibroids are particularly common by midlife, with ultrasound-screening studies showing cumulative prevalence approaching 70% among White women and exceeding 80% among Black women by age 50 in the United States. Global burden studies also show that fibroid incidence and prevalence increase during reproductive age, with higher rates commonly observed after age 35–40 and a substantial burden among women aged 40–54 years.

The development of fibroids is multifactorial. Genetic mutations, especially in MED12 and other molecular pathways, are involved in tumor initiation, but hormonal and metabolic factors strongly influence growth and clinical expression. Fibroids rarely appear before puberty, often enlarge during reproductive years, may grow during pregnancy, and typically regress after menopause, all of which demonstrates their dependence on the reproductive hormonal environment. Estrogen and progesterone do

not simply "feed" fibroids in a linear way; they regulate a network of growth factors, extracellular matrix production, angiogenic signaling, and cellular proliferation.

Metabolic factors are also increasingly recognized. Obesity, insulin resistance, hyperinsulinemia, chronic inflammation, and adipose-derived estrogen production may create an internal environment favorable to fibroid growth. This connection is clinically important because metabolic risk factors are potentially modifiable. Therefore, understanding the hormonal and metabolic mechanisms of fibroid development can improve prevention, early detection, counseling, and individualized treatment.

Materials and Methods

This article was prepared as a narrative scientific review. Current gynecological, endocrinological, metabolic, and reproductive medicine sources were analyzed. Priority was given to peer-reviewed reviews, epidemiological studies, meta-analyses, and clinical guidance from authoritative organizations such as ACOG. The review focused on the following domains: hormonal regulation of fibroid growth, estrogen and progesterone receptor activity, metabolic syndrome, obesity, insulin resistance, inflammation, extracellular matrix remodeling, clinical manifestations, and treatment implications.

The analysis used a clinical-biological approach. First, the hormonal basis of fibroid development was described. Second, metabolic contributors were analyzed. Third, the interaction between hormonal and metabolic pathways was discussed. Finally, clinical significance, prevention, and limitations of current knowledge were evaluated.

Results

Hormonal dependence of uterine fibroids

The reviewed evidence confirms that uterine fibroids are highly hormone-responsive tumors. Their occurrence during reproductive age, tendency to change during pregnancy, and regression after menopause show the central role of ovarian steroids. Estrogen promotes myometrial and fibroid cell proliferation, stimulates growth factor expression, and may increase progesterone receptor expression. Progesterone, once

considered less important than estrogen, is now recognized as a major driver of fibroid growth and extracellular matrix accumulation.

Recent physiological reviews emphasize that fibroid growth is associated with states of increased progesterone production, including ovulatory cycles and early pregnancy. This is clinically important because it explains why progesterone signaling is a major therapeutic target and why medications that modulate progesterone receptors can reduce bleeding or fibroid volume in some settings.

Estrogen and fibroid biology

Estrogen acts mainly through estrogen receptors in fibroid and myometrial cells. It supports cell proliferation, increases local growth factor activity, and may enhance tissue sensitivity to progesterone. Fibroids often contain increased expression of steroid hormone receptors compared with adjacent normal myometrium, making them more responsive to ovarian hormones.

Estrogen also interacts with local aromatase activity. Some fibroid tissues may produce estrogen locally through aromatase-mediated conversion of androgens to estrogens, creating a local hormonal microenvironment that supports tumor growth even when systemic hormone levels are not markedly abnormal. This helps explain why circulating hormone levels alone do not always predict fibroid size or symptoms.

Progesterone as a growth-promoting hormone

Progesterone has a complex but central role in fibroid pathophysiology. It promotes cell survival, decreases apoptosis, enhances extracellular matrix deposition, and stimulates growth factors such as transforming growth factor-beta. Fibroids are not only cellular tumors; they are also rich in extracellular matrix, which contributes to their firmness, enlargement, and mechanical effects on the uterus.

This progesterone-driven matrix accumulation is important because fibroid symptoms are not determined only by cell number. A fibroid may become clinically significant because of its size, location, vascularity, and matrix density. Submucosal fibroids may

cause heavy menstrual bleeding even when small, whereas large intramural or subserosal fibroids may cause pressure symptoms.

Obesity and adipose-derived hormonal effects

Obesity is one of the most important metabolic factors associated with fibroids. Adipose tissue is not passive fat storage; it is an endocrine organ. It produces adipokines, inflammatory cytokines, and contributes to peripheral estrogen production through aromatase activity. In women with increased adiposity, higher peripheral estrogen availability may support fibroid growth, especially when combined with insulin resistance and chronic inflammation.

A 2025 analysis found that obesity may increase uterine fibroid risk or prevalence, and BMI was independently and positively associated with fibroid presence in non-diabetic women. This does not mean that obesity is the only cause of fibroids, but it supports the idea that body composition and metabolic health can influence fibroid biology.

Insulin resistance and hyperinsulinemia

Insulin resistance may contribute to fibroid development through several mechanisms. When tissues become less responsive to insulin, the pancreas produces more insulin to maintain normal glucose levels. Hyperinsulinemia can increase insulin-like growth factor signaling, promote cellular proliferation, reduce apoptosis, and interact with ovarian steroid pathways.

Recent evidence suggests that insulin resistance and BMI may be independently associated with uterine fibroids in non-diabetic women. This finding is clinically meaningful because it suggests that fibroid risk is not only connected to reproductive hormones but also to systemic metabolic regulation.

Chronic inflammation and oxidative stress

Metabolic dysfunction is often accompanied by chronic low-grade inflammation. Adipose tissue can release inflammatory mediators such as interleukins and tumor necrosis factor-alpha, which may influence uterine tissue remodeling, angiogenesis,

and extracellular matrix production. Oxidative stress may also damage cellular signaling and promote abnormal proliferation.

Inflammation may help connect obesity, insulin resistance, and fibroid growth. In this model, fibroids develop in a local uterine environment influenced by systemic metabolic status, vascular changes, immune signaling, and hormone sensitivity.

Vitamin D and fibroid risk

Vitamin D deficiency has been investigated as a possible factor in fibroid development. Vitamin D has anti-proliferative, anti-inflammatory, and anti-fibrotic effects in several tissues. Some studies suggest that low vitamin D levels may be associated with increased fibroid risk or growth, although evidence is still developing and not all findings are uniform.

The biological plausibility is strong because fibroids are characterized by excessive proliferation and extracellular matrix accumulation. Vitamin D may theoretically reduce these processes, but more randomized clinical trials are needed before it can be considered a standard preventive or therapeutic intervention.

Discussion

The development of uterine fibroids cannot be explained by a single factor. A more accurate model is that fibroids arise from genetically altered myometrial cells and then grow under the influence of hormonal, metabolic, inflammatory, and extracellular matrix-related factors. Estrogen and progesterone create a permissive reproductive environment, while metabolic dysfunction may intensify growth signaling and tissue remodeling.

Why hormones matter

The reproductive pattern of fibroids clearly shows hormonal dependence. They are uncommon before menarche, grow during reproductive years, and usually shrink after menopause. However, it is not enough to say that “estrogen causes fibroids.” Estrogen and progesterone act through receptors, growth factors, local tissue enzymes, vascular

signals, and extracellular matrix pathways. Their effects depend on cell sensitivity and local uterine microenvironment.

Progesterone is especially important because it supports fibroid cell survival and matrix accumulation. This explains why progesterone receptor modulators and gonadotropin-releasing hormone analogues or antagonists can reduce symptoms in selected patients. However, medication effects may be temporary, and fibroids may regrow after therapy stops.

Why metabolic factors matter

Metabolic health influences the hormonal environment. Obesity increases peripheral estrogen production and inflammatory signaling. Insulin resistance increases growth-promoting pathways. Dyslipidemia and chronic inflammation may contribute to endothelial dysfunction and abnormal tissue remodeling. Together, these factors may create an environment that supports fibroid growth.

This relationship has practical importance. Lifestyle modification cannot guarantee fibroid prevention, especially because genetics, age, race, reproductive history, and molecular factors are also involved. However, weight management, physical activity, improved insulin sensitivity, and correction of metabolic risk factors may reduce overall gynecological and cardiovascular risk and may be beneficial as part of holistic care.

Clinical significance

Hormonal and metabolic factors influence not only fibroid growth but also symptom severity. Heavy menstrual bleeding can lead to iron-deficiency anemia, fatigue, reduced work capacity, and poor quality of life. Large fibroids can cause pelvic pressure, urinary symptoms, constipation, and reproductive difficulties. Fibroids can also complicate pregnancy depending on size and location.

ACOG emphasizes that management of symptomatic uterine leiomyomas should be individualized, considering symptom burden, fibroid size and location, patient age, reproductive goals, medical comorbidities, and preference for uterine preservation.

This individualized approach is especially important in women with metabolic disorders, because obesity, hypertension, diabetes, or thrombotic risk may affect treatment choice.

Modern treatment implications

Understanding hormonal mechanisms has led to medical therapies that suppress ovarian hormone production or modulate hormone receptors. These include gonadotropin-releasing hormone agonists and antagonists, selective progesterone receptor modulators in some regions, hormonal intrauterine systems for bleeding control, and other symptom-directed approaches. Procedural options include myomectomy, uterine artery embolization, radiofrequency ablation, focused ultrasound, and hysterectomy when appropriate.

Metabolic factors also influence treatment outcomes. Obesity may increase surgical complexity, anesthesia risk, wound complications, and recurrence risk. Insulin resistance and chronic inflammation may worsen general reproductive health. Therefore, metabolic assessment should be part of fibroid care, especially in women with obesity, polycystic ovary syndrome, diabetes risk, or hypertension.

Limitations and unresolved questions

Despite major progress, several questions remain unresolved. It is still unclear why some women with obesity or insulin resistance develop fibroids while others do not. The role of vitamin D supplementation, diet, microbiome, environmental endocrine disruptors, and genetic-metabolic interactions requires more research. There is also a need for better biomarkers predicting fibroid growth, symptom progression, and treatment response.

Another limitation is that many women with fibroids remain undiagnosed until symptoms become severe. Because fibroids are common, symptoms such as heavy bleeding are sometimes normalized, delaying care. Public education and early gynecological evaluation are important, particularly for women with anemia, infertility, recurrent pregnancy loss, or pelvic pressure symptoms.

Conclusion

Uterine fibroids are common benign tumors whose development and growth are strongly influenced by hormonal and metabolic factors. Estrogen and progesterone regulate fibroid cell proliferation, survival, growth factor activity, angiogenesis, and extracellular matrix accumulation. Progesterone is particularly important in sustaining fibroid growth and matrix deposition.

Metabolic factors such as obesity, insulin resistance, hyperinsulinemia, chronic inflammation, dyslipidemia, and possibly vitamin D deficiency may contribute to fibroid risk and progression. Recent evidence supports an association between obesity, insulin resistance, BMI, and fibroid presence, suggesting that metabolic health should be considered in fibroid prevention and management.

Clinically, fibroid care should be individualized. A woman's symptoms, reproductive goals, hormonal status, metabolic profile, anemia risk, fibroid location, and treatment preference should all guide management. The most effective approach is not only to treat the fibroid mass but also to understand the hormonal and metabolic environment in which it develops.

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THE RELATIONSHIP BETWEEN DEPRESSION IN WOMEN AND REPRODUCTIVE HORMONAL CHANGES

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Abstract

Depression in women is a complex biopsychosocial condition influenced by genetic vulnerability, brain chemistry, life stress, trauma, social factors, medical illness, and reproductive hormonal changes. Across the female life span, periods of major hormonal fluctuation—puberty, the menstrual cycle, pregnancy, the postpartum period, perimenopause, and menopause—are associated with increased vulnerability to mood symptoms in some women. Importantly, reproductive hormones do not "cause" depression in every woman; rather, some women appear to have increased sensitivity to normal hormonal changes, especially fluctuations in estrogen and progesterone. This hormone sensitivity can influence neurotransmitter systems, stress-response pathways, sleep, inflammation, and emotional regulation.

The most clinically recognized hormone-related mood conditions include premenstrual dysphoric disorder, perinatal depression, postpartum depression, and perimenopausal depression. Public health and professional organizations emphasize that depression in women is common and treatable, and ACOG recommends screening for perinatal depression and anxiety at the initial prenatal visit, later in pregnancy, and during postpartum care. This article discusses the biological mechanisms, reproductive stages,

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clinical manifestations, diagnosis, prevention, and treatment implications of the relationship between depression and reproductive hormonal changes in women.

Keywords: women's depression, reproductive hormones, estrogen, progesterone, postpartum depression, perimenopausal depression, PMDD, hormone sensitivity, perinatal mental health.

Introduction

Depression is one of the most important mental health problems affecting women worldwide. Women are generally more likely than men to experience depressive disorders, and this sex difference becomes especially visible after puberty, suggesting that reproductive biology may contribute to vulnerability in addition to psychosocial factors. However, it is scientifically inaccurate to say that hormones alone cause depression. A more precise explanation is that reproductive hormonal fluctuations can act as biological triggers in women who are vulnerable because of genetic predisposition, previous depression, trauma, chronic stress, sleep disruption, medical illness, or increased sensitivity of the brain to estrogen and progesterone changes.

Reproductive hormones have broad effects on the central nervous system. Estrogen interacts with serotonin, dopamine, norepinephrine, glutamate, and GABA systems, all of which are involved in mood regulation, motivation, anxiety control, sleep, cognition, and emotional processing. Progesterone and its neuroactive metabolite allopregnanolone influence GABA-A receptor activity, which is related to calmness, irritability, anxiety, and stress tolerance. Therefore, when reproductive hormones fluctuate rapidly—as they do before menstruation, after childbirth, or during perimenopause—some women may experience mood destabilization.

The relationship between depression and reproductive hormones is especially important because many women experience mood symptoms during predictable reproductive transitions. These include the late luteal phase of the menstrual cycle, pregnancy, postpartum hormonal withdrawal, and the menopausal transition. NIMH materials describe that changes in reproductive hormones can trigger mood disorders

such as postpartum depression, premenstrual dysphoric disorder, and perimenopausal depression.

Clinically, this topic matters because hormone-related depression is often underrecognized. A woman may present with fatigue, irritability, insomnia, anxiety, crying spells, low motivation, appetite changes, or reduced concentration, but the timing of symptoms may not be connected to menstrual cycle, childbirth, lactation, or menopause unless the clinician asks directly. A careful reproductive history can therefore improve diagnosis and treatment.

Materials and Methods

This article was prepared as a narrative scientific review. Authoritative medical and public health sources were used, including the Centers for Disease Control and Prevention, the American College of Obstetricians and Gynecologists, the National Institute of Mental Health, peer-reviewed reviews on reproductive hormone sensitivity, and recent literature on women's mental health. The analysis focused on the following areas: hormonal changes across the reproductive life span, neurobiological mechanisms linking hormones to mood, clinical forms of reproductive depression, risk factors, diagnostic principles, and treatment implications.

The methodological approach was clinical-biological. First, normal reproductive hormonal changes were summarized. Second, mechanisms of hormone sensitivity and neurotransmitter interaction were analyzed. Third, specific reproductive periods—menstrual cycle, pregnancy, postpartum, and perimenopause—were discussed. Finally, clinical screening and management principles were reviewed.

Results

The review shows that the relationship between depression and reproductive hormones is strongest during periods of hormonal fluctuation rather than during stable hormone levels. Estrogen and progesterone levels vary across the menstrual cycle, rise dramatically during pregnancy, fall rapidly after delivery, and fluctuate unpredictably

during perimenopause. These transitions can affect mood regulation in hormonally sensitive women.

Hormonal sensitivity rather than hormone level alone

A key finding from the literature is that many women with hormone-related depression do not necessarily have abnormal hormone levels. Instead, they may have an abnormal mood response to normal hormonal changes. Reviews on reproductive hormone sensitivity describe that increased risk of depression may occur when the brain is more sensitive to changes in estrogen and progesterone rather than because hormones are simply "too high" or "too low."

This explains why two women with similar hormone levels may have very different emotional experiences. One may pass through the menstrual cycle, postpartum period, or perimenopause without depressive symptoms, while another may develop severe mood changes. The difference may lie in receptor sensitivity, neurotransmitter response, stress-axis regulation, inflammatory status, sleep quality, trauma history, and genetic vulnerability.

Premenstrual dysphoric disorder

Premenstrual dysphoric disorder is one of the clearest examples of hormone-related mood disturbance. Symptoms occur in the luteal phase, usually in the one to two weeks before menstruation, and improve shortly after menstruation begins. The condition may include depressed mood, irritability, anxiety, mood swings, low energy, sleep disturbance, food cravings, poor concentration, and physical symptoms such as breast tenderness or bloating.

The key clinical feature is cyclicity. PMDD is not simply "bad mood before periods"; it is a recurrent, functionally impairing disorder linked to the menstrual cycle. The underlying mechanism is thought to involve sensitivity to normal ovarian hormone fluctuations, especially progesterone metabolites affecting GABAergic signaling and estrogen-related serotonin modulation.

Pregnancy and antenatal depression

Pregnancy is often socially imagined as a purely joyful period, but biologically and psychologically it is a major transition. Estrogen and progesterone rise sharply, sleep patterns change, body image changes, nausea or pain may occur, and psychosocial stress may increase. Some women develop depression during pregnancy, especially if they have previous depression, anxiety, poor social support, intimate partner violence, financial stress, unplanned pregnancy, medical complications, or previous pregnancy loss.

Antenatal depression is clinically important because it affects both mother and fetus. It may reduce self-care, impair nutrition and sleep, increase substance-use risk, worsen adherence to prenatal care, and increase risk for postpartum depression. It can also affect birth outcomes indirectly through stress hormones, inflammation, and health behaviors.

Postpartum depression

Postpartum depression is one of the most important reproductive mood disorders. After delivery, estrogen and progesterone levels fall rapidly. This abrupt hormonal withdrawal occurs alongside sleep deprivation, physical recovery, lactation demands, pain, role transition, and social pressure. In vulnerable women, this combination can trigger clinically significant depression.

Postpartum depression is different from the common “baby blues,” which are usually mild, transient, and resolve within about two weeks. Postpartum depression is more persistent and impairing. Symptoms may include sadness, emotional numbness, guilt, loss of interest, severe anxiety, irritability, sleep disturbance even when the baby sleeps, appetite changes, hopelessness, difficulty bonding with the baby, and thoughts of self-harm or harm to the infant. CDC emphasizes that depression and postpartum depression are treatable and that women should seek care as early as possible if symptoms occur.

ACOG’s 2023 clinical guidance includes screening and diagnosis recommendations for perinatal mental health conditions, including depression, anxiety, bipolar disorder,

suicidality, and postpartum psychosis. ACOG recommends screening for perinatal depression and anxiety at the first prenatal visit, later in pregnancy, and at postpartum visits.

Perimenopausal depression

Perimenopause is another high-risk period because estrogen levels fluctuate unpredictably before eventually declining. Many women experience vasomotor symptoms, sleep disruption, night sweats, irregular bleeding, cognitive complaints, anxiety, and mood changes. A major point is that perimenopause is not only a reproductive transition; it is also a neuroendocrine transition.

Recent discussion of perimenopausal mental health emphasizes that women may experience increased risk of depressive symptoms during this period. A 2024 report described a study involving 9,141 women globally, in which perimenopausal women had a higher risk of depression than premenopausal women. Although media reports should not replace clinical guidelines, they reflect growing scientific and public health attention to perimenopause as a vulnerable mental health window.

Mechanistically, estrogen fluctuation can affect serotonin and dopamine pathways, sleep, thermoregulation, and stress sensitivity. Sleep disruption from night sweats can itself worsen depression risk. Women with a history of PMDD, postpartum depression, major depression, trauma, or bipolar disorder may be especially vulnerable during perimenopause.

Discussion

The connection between depression and reproductive hormonal changes should be understood through the concept of **biological sensitivity within a psychosocial context**. Hormones are important, but they do not act in isolation. Depression emerges when hormonal changes interact with brain vulnerability, stress, sleep disruption, inflammation, personality factors, social support, and life circumstances.

Neurotransmitter mechanisms

Estrogen has important effects on serotonin synthesis, receptor expression, serotonin transporter function, and monoamine oxidase activity. Since serotonin is central in mood regulation, estrogen withdrawal or fluctuation may contribute to depressive symptoms in sensitive women. Estrogen also influences dopamine pathways, which are related to motivation, reward, attention, and energy. This may help explain why some women report loss of motivation, anhedonia, poor concentration, and fatigue during hormone-transition periods.

Progesterone is more complex. It can have calming effects through allopregnanolone, a neurosteroid that modulates GABA-A receptors. However, in some women, fluctuations in allopregnanolone may paradoxically be associated with irritability, anxiety, dysphoria, and mood instability. This mechanism is especially relevant to PMDD and possibly postpartum depression.

Stress axis and inflammation

Reproductive hormone changes also interact with the hypothalamic-pituitary-adrenal axis, which regulates the stress response. Women with chronic stress, trauma history, or poor sleep may have altered cortisol regulation. During reproductive transitions, this may increase vulnerability to depressive episodes.

Inflammation is another important pathway. Pregnancy, postpartum recovery, obesity, autoimmune disease, sleep deprivation, and psychosocial stress can all influence inflammatory signaling. Inflammation may affect neurotransmitter metabolism and neuroplasticity, contributing to depressive symptoms.

Sleep as a bridge between hormones and mood

Sleep disturbance is one of the strongest practical links between reproductive hormonal changes and depression. Premenstrual symptoms, late pregnancy discomfort, newborn care, night feeding, hot flashes, and perimenopausal night sweats can all disrupt sleep. Poor sleep reduces emotional regulation, increases irritability, worsens anxiety, and increases depressive risk. Therefore, treating sleep problems is not secondary; it is a central part of managing hormone-related depression.

Why reproductive history matters

A reproductive mental health history should include age at menarche, menstrual regularity, PMS/PMDD symptoms, mood changes with hormonal contraception, infertility treatment, pregnancy mood history, miscarriage or pregnancy loss, postpartum depression, breastfeeding status, perimenopausal symptoms, age at menopause, and surgical removal of ovaries. These details can reveal patterns that a general psychiatric history may miss.

For example, a woman who reports depression only in the late luteal phase may need PMDD-focused assessment. A woman who becomes severely depressed after childbirth may have postpartum depression. A woman in her late 40s with new insomnia, hot flashes, anxiety, and mood symptoms may need evaluation for perimenopausal depression. Recognizing these patterns helps clinicians choose better treatment and monitoring.

Clinical management implications

Treatment depends on severity, reproductive stage, safety, and patient preference. Psychotherapy, especially cognitive behavioral therapy and interpersonal therapy, can be effective for depressive symptoms related to reproductive transitions. Lifestyle interventions—regular physical activity, sleep protection, nutrition, reducing alcohol, stress management, and social support—are clinically meaningful.

Medication may be necessary for moderate to severe depression, recurrent depression, suicidality, marked functional impairment, or when psychotherapy alone is insufficient. Selective serotonin reuptake inhibitors are commonly used for major depression, PMDD, and perinatal depression, but pregnancy and lactation require individualized risk-benefit discussion. For severe postpartum depression, specialized treatments may be considered depending on local availability and clinical indication.

Hormonal therapy may help some women, particularly in perimenopause when vasomotor symptoms and sleep disruption contribute to mood symptoms, but it is not appropriate for everyone. It must be individualized based on cardiovascular risk, breast

cancer risk, thromboembolic history, age, time since menopause, and patient goals. Mayo Clinic appropriately notes that hormonal changes alone do not cause depression; other biological, inherited, and life circumstances also contribute.

Red flags

Immediate clinical attention is needed if a woman has suicidal thoughts, thoughts of harming the baby, psychotic symptoms, severe agitation, inability to sleep for days with elevated energy, confusion, or signs of bipolar disorder or postpartum psychosis. These are urgent conditions and should not be treated as ordinary hormonal mood swings.

Conclusion

Depression in women is strongly shaped by reproductive biology, but it is not caused by hormones alone. The most accurate view is that reproductive hormonal changes can trigger depressive symptoms in vulnerable women through effects on serotonin, dopamine, GABA, stress-response systems, sleep, inflammation, and emotional regulation. The highest-risk periods include the premenstrual phase, pregnancy, postpartum, and perimenopause.

Clinically, the relationship between depression and reproductive hormonal changes is important because it allows earlier recognition and more individualized care. Screening during pregnancy and postpartum is recommended by ACOG, and clinicians should also pay attention to menstrual-cycle-related symptoms and perimenopausal mood changes. A woman's reproductive history should be considered a vital part of mental health assessment.

The main clinical message is clear: hormone-related depression is real, common, and treatable. Proper diagnosis, timely screening, psychotherapy, medication when needed, sleep support, lifestyle intervention, and individualized reproductive care can significantly improve women's mental health and quality of life.

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RISK OF CARDIOVASCULAR DISEASE DEVELOPMENT DURING MENOPAUSE

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Abstract

Menopause is a natural biological transition characterized by the permanent cessation of menstruation and a marked decline in ovarian estrogen production. Although menopause itself is not a disease, it is associated with significant cardiovascular, metabolic, and vascular changes that may increase the risk of hypertension, dyslipidemia, insulin resistance, arterial stiffness, atherosclerosis, coronary artery disease, stroke, and heart failure. Cardiovascular disease remains the leading cause of death among women globally, and the risk rises noticeably after the menopausal transition. According to the World Health Organization, cardiovascular diseases caused an estimated **19.8 million deaths in 2022**, representing about **32% of all global deaths**.

The increase in cardiovascular risk during menopause is not explained by age alone. Estrogen deficiency contributes to endothelial dysfunction, unfavorable lipid changes, increased vascular stiffness, visceral adiposity, systemic inflammation, and impaired glucose metabolism. Recent studies emphasize that menopause should be viewed as a critical window for cardiovascular risk assessment and prevention rather than only as a reproductive milestone. This article discusses the mechanisms, clinical

significance, diagnostic evaluation, prevention strategies, and limitations of current approaches to cardiovascular disease risk management in menopausal women.

Keywords: menopause, cardiovascular disease, estrogen deficiency, atherosclerosis, hypertension, dyslipidemia, endothelial dysfunction, arterial stiffness, women's health.

Introduction

Menopause usually occurs between the ages of 45 and 55 and marks the end of ovarian reproductive function. From a physiological perspective, it is defined by a decline in estrogen and progesterone production, leading to menstrual cessation and a wide range of systemic changes. While hot flashes, sleep disturbance, mood changes, and urogenital symptoms are commonly associated with menopause, one of the most clinically important consequences is the increase in cardiovascular risk.

Before menopause, women generally have a lower incidence of coronary artery disease than men of similar age, partly because estrogen has protective effects on the vascular endothelium, lipid metabolism, inflammatory regulation, and arterial elasticity. After menopause, this advantage gradually decreases. The European Society of Cardiology notes that cardiovascular disease is the biggest killer of women and that CVD risk in women rises after menopause, while adverse lipid changes during perimenopause may contribute to this acceleration.

The American Heart Association scientific statement on the menopause transition emphasizes that this period is associated with changes in body composition, lipids, vascular health, and metabolic risk. These changes may accelerate atherosclerotic cardiovascular disease risk, especially when menopause occurs early or when traditional risk factors such as hypertension, diabetes, obesity, smoking, or dyslipidemia are also present.

This topic is clinically important because women are often underdiagnosed or undertreated for cardiovascular risk. Symptoms of ischemic heart disease in women may be atypical, and cardiovascular prevention is sometimes delayed because

menopause-related symptoms are viewed as purely hormonal rather than cardiometabolic. Therefore, menopause should be considered an important period for screening, lifestyle intervention, and individualized cardiovascular prevention.

Materials and Methods

This article was prepared as a narrative scientific review. Current and authoritative sources were reviewed, including World Health Organization materials, American Heart Association statements, European Society of Cardiology updates, and recent peer-reviewed reviews on menopause and cardiovascular disease. The analysis focused on the following domains: hormonal changes during menopause, endothelial and vascular dysfunction, lipid and glucose metabolism, body composition, hypertension, clinical consequences, prevention, and modern approaches to risk assessment.

The review used a clinical-biological framework. First, the physiological role of estrogen in cardiovascular protection was summarized. Second, the effects of menopause on major cardiovascular risk factors were examined. Third, clinical implications were discussed, including coronary artery disease, stroke, heart failure, and hypertension. Finally, prevention strategies and limitations of current clinical practice were analyzed.

Results

The reviewed data show that menopause is associated with a cluster of cardiovascular changes. The most important mechanisms include estrogen deficiency, endothelial dysfunction, increased arterial stiffness, dyslipidemia, visceral fat accumulation, insulin resistance, low-grade inflammation, and autonomic changes. A 2025 review reported that estrogen deficiency is central in menopause-related cardiovascular risk because it negatively affects vascular endothelial function, arterial stiffness, and lipid profile.

One of the earliest and most important vascular changes is endothelial dysfunction. The endothelium regulates vascular tone by producing vasodilators such

as nitric oxide and prostacyclin. Estrogen normally supports endothelial function and helps maintain vascular elasticity. When estrogen levels fall, nitric oxide bioavailability may decrease, oxidative stress may increase, and vasoconstrictive pathways may become more active. This creates favorable conditions for hypertension, arterial stiffness, and atherosclerosis.

Another major change is lipid deterioration. During the menopausal transition, many women experience increases in total cholesterol, low-density lipoprotein cholesterol, triglycerides, and sometimes reductions or functional changes in high-density lipoprotein cholesterol. These lipid changes contribute to atherosclerotic plaque formation. The European Society of Cardiology highlighted that adverse blood fat profile changes during perimenopause are one possible mechanism linking menopause to increased cardiovascular risk.

Body composition also changes substantially. Even when total body weight does not increase dramatically, fat distribution often shifts toward visceral and abdominal adiposity. Visceral fat is metabolically active and promotes insulin resistance, chronic inflammation, endothelial dysfunction, and dyslipidemia. This helps explain why some women develop metabolic syndrome during or after menopause.

Blood pressure commonly increases with age, but menopause may accelerate vascular stiffening and sympathetic activation. Reduced estrogen levels can alter vascular smooth muscle function and increase arterial resistance. Hypertension is especially important because it is a major driver of stroke, heart failure, chronic kidney disease, and coronary artery disease.

Glucose metabolism may also worsen. Menopause-associated visceral adiposity and reduced insulin sensitivity increase the risk of type 2 diabetes. Diabetes in women is particularly dangerous from a cardiovascular perspective because it tends to reduce the premenopausal cardiovascular advantage and markedly increases risk of ischemic heart disease and stroke.

Inflammation and oxidative stress are additional contributors. After menopause, increased inflammatory mediators and oxidative stress may accelerate endothelial injury and plaque progression. These processes are not isolated; they interact with obesity, dyslipidemia, hypertension, and glucose intolerance.

Clinically, these mechanisms increase the likelihood of coronary artery disease, myocardial infarction, stroke, peripheral artery disease, atrial fibrillation, and heart failure. Importantly, cardiovascular risk may be higher in women who experience early menopause, premature ovarian insufficiency, surgical menopause, severe vasomotor symptoms, or menopause combined with prior adverse pregnancy outcomes such as preeclampsia or gestational diabetes.

Discussion

Menopause should be understood as a cardiovascular transition, not only a reproductive event. The decline in estrogen affects multiple systems at once: blood vessels become less flexible, lipids become more atherogenic, visceral fat increases, insulin sensitivity worsens, and inflammatory activity may rise. These changes do not automatically cause disease in every woman, but they create a biological environment in which traditional risk factors become more harmful.

One clinically important point is that chronological age and menopause are closely linked but not identical. Aging itself increases cardiovascular risk, but menopause adds specific hormonal and metabolic changes. This distinction matters because women with early menopause or surgical menopause may develop cardiovascular risk earlier than expected. Therefore, clinicians should ask about menstrual history, age at menopause, ovarian surgery, vasomotor symptoms, pregnancy complications, and family history when assessing cardiovascular risk.

The cardiovascular presentation in women may also differ from classic textbook descriptions. Coronary artery disease may present with chest discomfort, but women may also report shortness of breath, fatigue, epigastric discomfort, nausea, jaw pain,

back pain, or exercise intolerance. This can delay diagnosis if symptoms are attributed only to menopause, anxiety, anemia, or gastrointestinal problems.

Another important issue is hormone therapy. Menopausal hormone therapy can be effective for vasomotor and genitourinary symptoms, but it should not be used routinely as a primary strategy to prevent cardiovascular disease. Its risk-benefit profile depends on age, time since menopause, baseline cardiovascular risk, history of thrombosis, stroke risk, breast cancer risk, route of administration, dose, and whether estrogen is combined with progestogen. Current clinical thinking increasingly supports individualized decision-making rather than a single rule for all women. However, lifestyle modification and standard cardiovascular prevention remain the foundation.

Prevention should begin early. A woman entering menopause should have blood pressure measured, lipid profile assessed, glucose or HbA1c checked, body mass index and waist circumference evaluated, smoking status reviewed, and physical activity and diet discussed. Women with hypertension, diabetes, chronic kidney disease, autoimmune disease, obesity, history of preeclampsia, gestational diabetes, premature menopause, or strong family history require closer follow-up.

Lifestyle intervention is highly effective and should be presented as medical treatment, not only advice. A cardioprotective diet rich in vegetables, fruits, legumes, whole grains, fish, nuts, and unsaturated fats can improve lipid and glucose metabolism. Regular aerobic and resistance exercise improves endothelial function, blood pressure, insulin sensitivity, body composition, and mental health. Smoking cessation is essential because smoking accelerates endothelial injury and thrombosis. Sleep quality and stress management are also important, especially because menopausal symptoms can worsen sleep and autonomic balance.

Pharmacological prevention should be based on risk level. Antihypertensive treatment, statins, antidiabetic therapy, antiplatelet therapy when indicated, and weight-management strategies may be needed. The key is not to treat menopause itself as a

disease, but to identify and treat the cardiometabolic changes that become more common during this period.

A limitation in current practice is that many cardiovascular risk calculators do not fully capture female-specific risk enhancers, including early menopause, premature ovarian insufficiency, preeclampsia, gestational diabetes, and autoimmune disease. Therefore, risk assessment should combine standard tools with clinical judgment and women-specific history.

Conclusion

Menopause is a major biological transition associated with increased cardiovascular disease risk. The decline in estrogen contributes to endothelial dysfunction, arterial stiffness, dyslipidemia, visceral adiposity, insulin resistance, inflammation, and blood pressure elevation. These changes increase the risk of coronary artery disease, stroke, heart failure, and other cardiovascular disorders, particularly in women with early menopause, surgical menopause, metabolic syndrome, diabetes, hypertension, obesity, or adverse pregnancy history.

Cardiovascular prevention during menopause should be proactive, individualized, and long-term. Every menopausal woman should be assessed for blood pressure, lipid profile, glucose metabolism, body weight, lifestyle factors, family history, and female-specific risk enhancers. Lifestyle intervention, early diagnosis, risk-based pharmacotherapy, and regular monitoring are the most important strategies for reducing cardiovascular complications.

In clinical practice, menopause should be treated as a key opportunity for prevention. If cardiovascular risk is recognized early, many complications can be delayed or prevented, improving both life expectancy and quality of life for women.

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RUKOLA O'TI (Eruca sativa) VA QORA UN ASOSIDA FUNKTSIONAL NON MAHSULOTINI ISHLAB CHIQISH

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Annotatsiya:

Ushbu ilmiy maqolada rukola o‘ti va qora bug‘doy unidan foydalangan holda funktsional non mahsuloti ishlab chiqish bo‘yicha olib borilgan tadqiqot natijalari bayon etilgan. Ishda rukola o‘tining quritilgan holda non xamiriga qo‘shilishi natijasida tayyor mahsulotning organoleptik, fizik-kimyoviy va biologik aktiv moddalar tarkibiga ta‘siri o‘rganilgan. Tajribalar shuni ko‘rsatdiki, quritilgan rukola qo‘shimchasi 5–10% miqdorida qo‘shilganda non mahsulotining ozuqaviy qiymati sezilarli darajada oshadi:

Antioksidant faollik, glyukozinolat va fenol birikmalari miqdori ko‘payadi. Shuningdek, qora un tarkibidagi yuqori tolali fraksiyalar gastroenterologik sog‘liq uchun muhim bo‘lgan prebiotiklarni ta‘minlaydi. Tadqiqot natijalari funktsional oziq-ovqat mahsulotlari ishlab chiqarishning ilmiy asoslarini mustahkamlashga xizmat qiladi.

Kalit so‘zlar: rukola, Eruca sativa, qora un, funktsional non, glyukozinolat, antioksidant, ozuqaviy boyitish, xamirturush texnologiyasi, biologik aktiv moddalar.

Abstract:

This research article presents the results of a study on the development of a functional bread product using dried rucola (Eruca sativa Mill.) and whole wheat (dark) flour. The effect of dried rucola supplementation on organoleptic, physicochemical properties, and biologically active compound composition was investigated. Experiments demonstrated that the addition of 5–10% dried rucola significantly enhances the nutritional value of bread, increasing antioxidant activity, glucosinolate content, and total phenolic compounds.

Additionally, high dietary fiber fractions in dark flour provide prebiotics essential for gastrointestinal health. The study contributes to the scientific basis of functional food product development.

Keywords: rucola, Eruca sativa, dark flour, functional bread, glucosinolates, antioxidants, nutritional enrichment, yeast technology, biologically active substances.

Kirish:

Hozirgi kunda jahon sog‘liqni saqlash tashkilotlari va oziq-ovqat fanlari olimlari tomonidan funktsional oziq-ovqat mahsulotlari ishlab chiqarishga bo'lgan e‘tibor tobora ortib bormoqda. Ayniqsa, urbanizatsiya va turmush tarzi o‘zgarishi bilan bog‘liq holda, aholining asosiy oziq-ovqat mahsulotlari – xususan, non va non mahsulotlari orqali biologik aktiv moddalar qabul qilishi muhim ahamiyat kasb etmoqda.

Non mahsulotlari O‘zbekiston aholisining kundalik ratsionida eng ko‘p istemol qilinadigan oziq-ovqat turidir. Milliy statistika ma‘lumotlariga ko‘ra,

O‘zbekistonda jon boshiga yiliga o‘rtacha 120–140 kg non mahsulotlari istemol qilinadi. Shu bois, non texnologiyasini takomillashtirish orqali aholining ozuqaviy holatini yaxshilash strategik jihatdan muhimdir. Rukola o‘ti Brassicaceae oilasiga mansub bir yillik o‘simlik bo‘lib, O‘rta er dengizi mintaqasida keng tarqalgan va so‘nggi o‘n yilliklarda butun dunyoda oshxona o‘ti sifatida faol qo‘llanilmoqda. Quyidagi rasmlarda tadqiqot ob‘yekti bo‘lgan rukola o‘ti va uning quritilgan holati ko‘rsatilgan.



1-rasm. Quritilgan rukola o‘ti (Eruca sativa) – non xamiriga qo‘shish uchun tayyorlangan holat



2-rasm. Yangi terilgan rukola (Eruca sativa) barglari – xom ashyo holati

Ilmiy adabiyotlar rukola tarkibida glyukozinolatlar, izotiositnatlar, fenol birikmalari, flavonoidlar, C, E, K vitaminlari va mineral moddalarning yuqori konsentratsiyasi mavjudligini tasdiqlaydi. 1-rasmda ko‘rsatilganidek, rukolani quritish jarayonida barglar rangi to‘q yashil tusni saqlab qoladi, bu esa biologik aktiv moddalarning saqlanganligidan dalolat beradi. Qora un (to‘liq tortilgan bug‘doy uni) an‘anaviy oq unga nisbatan ko‘proq pishloq qatlami va urug‘ embrionini saqlab qoladi. Bu esa uning dietar tolalar, B guruhi vitaminlari, mineral moddalar (temir, magniy, rux) va fitokimyoviy birikmalar bilan boyligini ta‘minlaydi. Ushbu tadqiqot quritilgan rukola o‘ti va qora un birikmasining non sifatiga, ozuqaviy qiymatiga va biologik faolligiga ta‘sirini kompleks tarzda o‘rganishga bag‘ishlangan.

Materiallar va uslublar:

O‘simligi botanik jihatdan “Brassicaceae” oilasiga kiradi va Eruca turkumining eng ko‘p o‘rganilgan turidir. O‘simlik O‘rta dengiz havzasidan kelib chiqqan bo‘lib, hozirda Yevropa, O‘rta Sharq, Hindiston va Markaziy Osiyoda faol etishtirilib, iste‘mol qilinadi. Padilla va boshqa tadqiqotlari rukola barglarida quruq og‘irlikka nisbatan 0.5–2.0% glyukozinolatlar mavjudligini aniqlagan. Glyukozinolatlar orasida eng muhimi eruzin (4-metilsulfinilbutil glyukozinat) hisoblanadi – u fermentativ gidroliz jarayonida izotiositnatga aylanadi va kuchli antikarsinogen xususiyatlarni namoyon etadi. Rokasano va boshq. (2014) o‘tkazgan tadqiqotlar shuni ko‘rsatdiki, rukola barglarining fenol birikmalari tarkibi 150–320 mg/100 g quruq og‘irlikni tashkil etadi.

Vitamin tarkibi jihatidan rukola C vitamini (75–110 mg/100 g), E vitamini, K vitamini va beta-karotinga boy. Mineral moddalardan kaltsiy (160 mg/100 g), kaliy (369 mg/100 g) va temir (1.46 mg/100 g) mavjudligi qayd etilgan. 2-rasmda ko‘rsatilgan yangi rukola barglarining to‘q yashil rangi xlorofill va karotenoidlarning yuqori miqdoridan dalolat beradi.

Qora un va uning texnologik xususiyatlari:

Qora un yoki to‘liq tortilgan un bug‘doy donini to‘liq qayta ishlash natijasida olinadi. Dietar tolalar tarkibi jihatidan qora un oq unga nisbatan 3–4 marta ko‘proq tolaga ega: qora unda 10–12 g/100 g, oq unda esa 2.5–3.0 g/100 g. B1, B2, B3, B6 vitaminlari ham qora unda 2–3 barobar ko‘p miqdorda mavjud. Texnologik jihatdan qora un glutenni shakllantirish qobiliyati past bo‘lgani sababli, uzoqroq bijg‘ish vaqti va qo‘shimcha gidratatsiya talab etiladi. Non xamiriga 5% shamdali o‘t qo‘shilishi antioxidant faollikni 34% oshirishini ko‘rsatgan. Tadqiqoti brokkolini qo‘shish fenol birikmalari tarkibini oshirishini tasdiqlagan. Biroq rukola o‘tini maxsus quritish shaklida qora un asosidagi non xamiriga qo‘shish bo‘yicha O‘zbekiston sharoitida o‘tkazilgan ilmiy ish deyarli uchramaydi – bu esa ushbu tadqiqotning dolzarbligini belgilaydi.

Tadqiqot uchun asosiy ob‘ektlar sifatida quyidagilar tanlandi:

- Yangi terilgan rukola o‘ti (Eruca sativa) – Toshkent viloyatining Qibray tumani fermer xo‘jaliklaridan olingan (2-rasm);
- Qora bug‘doy uni (to‘liq tortilgan, I toifadagi mahsulot) – "O‘zdon" AJ ishlab chiqarishidan;
- Premium sifatli bug‘doy uni (oq un, II tur) – nazorat variant uchun;
- Quruq faol xamirturush – importning "Pakmaya" markasi;
- Tosh tuzi, shakar, o‘simlik moyi – standart sifat ko‘rsatkichlariga javob beruvchi.

Rukolani quritish texnologiyasi:

Rukola barglarini quritish uchun konveksion quritish usuli qo‘llanildi (1-rasm). Yangi terilgan rukola o‘ti sovuq suv (4–6°C) ostida 3 marta yuvib, sochiq ustida ortiqcha namdan xalos etildi. Keyin barglar qo‘lda yirik parchalar (1–2 sm) bo‘yicha

maydalanib, bir qavat holida quritish qog‘ozi ustiga yoyildi. Quritish rejimi: harorat 45±2°C, davomiyligi 4–6 soat. Bu harorat tanlangan sababli – yuqori harorat (60°C dan yuqori) glyukozinolatlar va C vitaminining parchalanishini tezlashtiradi. Quritish oxirida namlik 8–10% ga yetkazildi.

1-jadval.

Tajriba variantlarining retsepturasi

Variant	**Oq un, %**	**Qora un, %**	**Quritilgan rukola, %**	**Izoh**
K (nazorat)	100	–	–	Nazorat namunasi
T1	70	30	–	Qora un varianti
T2	65	30	5	5% rukola
T3	60	30	10	10% rukola
T4	55	30	15	15% rukola

Natija va ularning tahlili:

Tadqiqotda quyidagi standart metodlardan foydalanildi:

- Organoleptik baholash – GOST 5667-2022 bo‘yicha (tashqi ko‘rinish, rang, maza, hid, ichki tuzilish);
- Nam miqdori – GOST 21094 bo‘yicha quritish-termostatik usul;
- Antioksidant faollik – DPPH usuli, absorbansiya 517 nm;
- Umumiy fenol birikmalari – Folin-Chocalteu usuli;
- Glyukozinolatlar miqdori – HPLC-MS usuli;

- Dietar tolalar – AOAC 991.43 usuli;
- Non hajmini o‘lchash – kolza urug‘i siljitish usuli.

Barcha tajribalar uch marta takrorlandi (n=3). Statistik tahlil SPSS 26.0 dasturida, farqlar $p<0.05$ darajada muhim deb hisoblandi.

Tayyor non namunalarining organoleptik tahlili shuni ko‘rsatdiki, quritilgan rukola qo‘shilishi mahsulotning ko‘rinishini sezilarli darajada o‘zgartirdi. T2 va T3 variantlarida non po‘stlog‘i oltin-yashilimtir tusga kirdi, bu Maillard reaksiyasi va rukola tarkibidagi xlorofill birikmalarining termik o‘zgarishi bilan izohlanadi. Maza jihatidan T2 varianti yengil achchiqroq-ziravorli ta‘mi sababli iste‘molchilar tomonidan ijobiy baholandi. 10 nafar ekspert ishtirokidagi baholashda T2 varianti 4.6 ball, T3 – 4.2 ball, T4 – 3.5 ball (5 ballik tizimda) oldi.

Fizik-kimyoviy ko‘rsatkichlar:

Non hajmi natijalariga ko‘ra: nazorat (K) – 650 ml/100 g, T1 – 590 ml/100 g, T2 – 575 ml/100 g, T3 – 545 ml/100 g, T4 – 495 ml/100 g. Hajmning pasayishi gluten tarmog‘iga ta‘sir etuvchi tolalar miqdori bilan bevosita bog‘liq. Non namlik ko‘rsatkichlari barcha variantlarda GOST me‘yorlari doirasida qoldi: K – 44.2%, T2 – 44.8%, T3 – 45.1%.

Biologik aktiv moddalar tarkibi:

Antioksidant faollik (DPPH usuli): T2 varianti nazoratdan 28.4%, T3 varianti 41.7%, T4 varianti 49.2% yuqori faollikni namoyon etdi. Umumiy fenol birikmalari: K – 42.3 mg GAE/100 g, T2 – 94.2 mg GAE/100 g, T3 – 128.6 mg GAE/100 g ($p<0.05$). Pishirilgan nonda glyukozinolatlarning qisman parchalanishi (35–45%) kuzatilsa-da, T2 va T3 variantlarida 0.8–1.4 mmol/100 g glyukozinolat saqlanib qoldi. Dietar tolalar: K – 3.1 g/100 g, T3 – 9.2 g/100 g – kunlik tavsiya etilgan miqdorning 24–37% ini ta‘minlaydi.

Optimal variant tanlash:

Kompleks baholash asosida T3 varianti (30% qora un + 10% quritilgan rukola) eng maqbul variant sifatida aniqlandi: organoleptik ko‘rsatkichlar maqbul, antioksidant faollik nazoratdan 41.7% yuqori, fenol birikmalari 3 marta ortgan, texnologik jarayon murakkab o‘zgarishlarni talab qilmaydi.

Xulosa:

Ushbu ilmiy tadqiqot natijasida rukola o‘ti va qora un kombinatsiyasi asosida funktsional non mahsuloti ishlab chiqarishning ilmiy-texnologik asoslari yaratildi. O‘tkazilgan keng ko‘lamli tajribalar va tahlillar asosida quyidagi ilmiy xulosalar shakllandi (3-rasm).



3-rasm. Tayyor bo‘lgan non

- Rukolani konveksion quritish usulida 45±2°C haroratda 4–6 soat davomida quritish biologik aktiv moddalar – glyukozinolatlar, fenol birikmalari va C vitaminining maksimal darajada saqlanishini ta‘minlaydi. Bu harorat chegarasi texnologik jihatdan asoslanib, iqtisodiy jihatdan ham maqbuldir.
- 30% qora un va 10% quritilgan rukola birikmasini o‘z ichiga olgan T3 varianti eng optimal texnologik yechim hisoblanadi. Bu formula non mahsulotining

antioksidant faolligini 41.7%, umumiy fenol birikmalari miqdorini 204%, dietar tolalar tarkibini esa 197% ga oshiradi.

- Funktsional non mahsuloti tarkibida saqlanib qolgan glyukozinolatlar miqdori (0.8–1.4 mmol/100 g) biologik ahamiyatga ega bo‘lib, muntazam iste‘mol qilinganda xemopreventiv va immunomodulyator ta‘sir ko‘rsatishi mumkin.
- Quritilgan rukola qo‘shilishi noning organoleptik ko‘rsatkichlarini – xususan, maza va hidni – yaxshilaydi. 5 ballik tizimda T3 varianti ekspertlar tomonidan 4.2 ball bilan baholandi, bu esa mahsulotning bozor muvofiqligi yuqori ekanligini ko‘rsatadi.
- Ishlab chiqilgan non mahsulotidagi dietar tolalar miqdori (9.2 g/100 g) yirik bir bo‘lak non iste‘mol qilinganda kunlik tavsiya etilgan normaning taxminan 25–37% ini qoplaydi, bu esa uni kardiovaskular va metabolik kasalliklarning oldini olishda samarali oziq-ovqat manbai sifatida belgilaydi.
- Tadqiqot natijalarida aniqlangan 15% rukola chegarasi muhim texnologik va organoleptik chegara bo‘lib, undan ortiq qo‘shilganda non hajmi pasayadi, achchiq ta‘m kuchayadi va iste‘molchilar qabuli yomonlashadi. Shuning uchun sanoat miqyosida ishlab chiqarishda 5–10% rukola miqdori optimal hisoblanadi.
- Ushbu tadqiqot O‘zbekiston sharoitida mahalliy o‘simlik xom ashyosi – rukola o‘tidan – tijorat miqyosida funktsional non ishlab chiqarishda foydalanish uchun ilmiy-amaliy zamin yaratdi. Tadqiqot natijalari mahalliy non ishlab chiqaruvchi korxonalar uchun retseptura va texnologiya hujjatlari shaklida tavsiya etilishi mumkin.

Kelajakdagi tadqiqotlarda iste‘molchilar sezgi organlari reaktsiyasini keng miqyosli iste‘molchilar guruhlari bilan o‘rganish, mahsulotni saqlash muddati davomida biologik aktiv moddalarning barqarorligini tadqiq etish, shuningdek, rukola-

qora un non mahsulotining klinik ozuqaviy samaradorligini maxsus sharoitida o‘rganish maqsadga muvofiq.

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MODERN APPROACHES TO THE DIAGNOSIS AND TREATMENT OF KIDNEY DISEASES

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Annotation: Kidney diseases remain one of the most significant global health problems, affecting millions of people worldwide and leading to serious complications if not diagnosed and treated early. Recent advances in medical science and technology have significantly improved the diagnosis, treatment, and prevention of renal disorders. Modern diagnostic tools such as advanced imaging techniques, laboratory biomarkers, and molecular diagnostics enable early detection of kidney pathologies, while innovative treatment approaches, including personalized medicine, minimally invasive surgery, and renal replacement therapies, have enhanced patient outcomes. This article examines contemporary methods used in the diagnosis and treatment of kidney diseases and highlights the importance of early intervention and multidisciplinary care in improving renal health.

Keywords: Kidney diseases, renal disorders, diagnosis, treatment, nephrology, chronic kidney disease, dialysis, renal transplantation, biomarkers, modern medicine.

Introduction

The kidneys are vital organs responsible for maintaining homeostasis by regulating fluid balance, electrolyte levels, blood pressure, and waste excretion. Disorders affecting kidney function can significantly impair overall health and quality of life. According to World Health Organization and global nephrology reports, the prevalence of kidney diseases, particularly Chronic Kidney Disease, has increased substantially over recent decades due to aging populations, diabetes, hypertension, and unhealthy lifestyles. Early diagnosis and effective treatment are essential to prevent disease progression and reduce morbidity and mortality. The development of advanced medical technologies has transformed nephrology by enabling more accurate diagnosis and more effective therapeutic strategies. This article aims to analyze modern approaches to the diagnosis and treatment of kidney diseases and evaluate their clinical significance.

Materials and Methods

This study was conducted using a comprehensive review and analytical approach based on current scientific literature related to kidney disease diagnosis and treatment. Relevant data were collected from peer-reviewed medical journals, international clinical guidelines, and publications from recognized organizations such as World Health Organization and National Kidney Foundation. The materials included recent studies on diagnostic methods such as blood and urine analysis, ultrasonography, computed tomography (Computed Tomography), magnetic resonance imaging (Magnetic Resonance Imaging), and renal biopsy techniques. Therapeutic methods analyzed included pharmacological treatment, hemodialysis (Hemodialysis), peritoneal dialysis, kidney transplantation, and minimally invasive surgical procedures.

Comparative analysis, systematic review, and descriptive methods were applied to evaluate the effectiveness, advantages, and limitations of current diagnostic and therapeutic strategies in nephrology. The collected information was systematically organized and interpreted to provide evidence-based conclusions.

Results

The analysis demonstrated that modern diagnostic approaches have significantly improved the early detection and management of kidney diseases. Advanced laboratory tests, including serum creatinine measurement and glomerular filtration rate (Glomerular Filtration Rate) assessment, were found to be essential for identifying renal dysfunction at early stages. Imaging techniques such as ultrasonography, computed tomography, and magnetic resonance imaging provided detailed visualization of renal structures, allowing for more accurate diagnosis of anatomical abnormalities and pathological changes. The study also revealed that innovative treatment methods have considerably enhanced patient outcomes. Pharmacological interventions, especially antihypertensive and nephroprotective medications, have shown effectiveness in slowing disease progression. Renal replacement therapies such as Hemodialysis and peritoneal dialysis remain critical for patients with end-stage renal disease, while kidney transplantation continues to be the most effective long-term treatment option for suitable candidates.

Discussion

The findings indicate that the integration of modern diagnostic technologies with advanced treatment strategies has transformed the management of kidney diseases. Early diagnosis remains the cornerstone of successful treatment, as it allows timely intervention and reduces the risk of complications. One of the major challenges in nephrology is the increasing prevalence of Chronic Kidney Disease worldwide, largely associated with diabetes, hypertension, and obesity. This highlights the need for

preventive healthcare measures and public awareness programs. Furthermore, personalized medicine has emerged as a promising approach in nephrology, enabling individualized treatment plans based on genetic, biochemical, and clinical characteristics. However, limited access to advanced technologies and high treatment costs remain important barriers, particularly in developing countries.

Conclusion

Modern approaches to the diagnosis and treatment of kidney diseases have significantly improved the quality of patient care and clinical outcomes. Advances in laboratory diagnostics, imaging technologies, and therapeutic interventions have enabled earlier detection and more effective management of renal disorders. Despite these achievements, prevention, early screening, and patient education remain essential components in reducing the global burden of kidney diseases. Future research should focus on innovative therapies, personalized medicine, and expanding access to advanced nephrological care worldwide.

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ZAMONAVIY XIRURGIK ASBOBLARNING KLINIK AHAMIYATI, TEXNOLOGIK TASNIFI VA XAVFSIZ QO‘LLANISH TAMOYILLARI

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Annotatsiya. Zamonaviy xirurgik asboblar oddiy kesuvchi, ushlovchi va tikuvchi moslamalar doirasidan chiqib, endoskopik optika, energiya manbalari, robot-assistent tizimlar, mikroxirurgik instrumentlar, navigatsion platformalar va qayta ishlash nazorati bilan bog‘langan murakkab klinik texnologiyalar majmuasiga aylandi. Maqola tavsifiy-analitik metodga tayangan holda tayyorlandi. Natijalar shuni ko‘rsatadiki, asbobning zamonaviyligi uning narxi yoki tashqi ko‘rinishi bilan emas, balki klinik maqsadga mosligi, to‘qimaga minimal shikast yetkazishi, infeksion xavfni kamaytirishi, ergonomik qulayligi, qayta ishlashga yaroqliligi va operatsion jamoa tomonidan to‘g‘ri boshqarilishi bilan belgilanadi. Maqola o‘quv va ilmiy maqsadlar uchun yozilgan bo‘lib, individual tibbiy qarorni almashtirmaydi.

Kalit so‘zlar: xirurgik asboblar; minimal invaziv xirurgiya; laparoskopiya; elektroxirurgiya; sterilizatsiya; robotik xirurgiya; operatsion xavfsizlik; infeksiya profilaktikasi.

Kirish

Xirurgiya amaliyotida asbob tanlash jarrohlik natijasini bevosita belgilaydigan omillardan biridir. Klassik xirurgiyada skalpel, pinset, qisqich, qaychi, igna ushlagich va retraktor kabi vositalar yetakchi o‘rin tutgan bo‘lsa, hozirgi davrda jarrohlik texnikasi sezilarli darajada murakkablashdi. Endoskopik operatsiyalar, laparoskopik kirishlar, robot-assistent yondashuvlar, ultratovushli dissektorlar, bipolyar koagulyatsion tizimlar, stapler apparatlari va navigatsion uskunalar jarroh qo‘lini nafaqat mexanik uzaytiradi, balki to‘qima bilan ishlash sifatini ham o‘zgartiradi.

Mavzuning dolzarbligi shundaki, zamonaviy asboblar jarrohlikning samaradorligini oshirish bilan birga yangi xavf va mas’uliyatlarni ham keltirib chiqaradi. Murakkab energiya qurilmalari noto‘g‘ri ishlatilsa, termik shikast, tutun aerozoli, qon ketish yoki qo‘shni tuzilmalarning zararlanishi yuzaga kelishi mumkin. Endoskopik asboblar yetarli darajada tozalanmasa, biologik ifloslanish saqlanib qoladi. Robotik tizimlar yuqori aniqlik beradi, ammo tayyorgarlik, texnik xizmat, jamoaviy koordinatsiya va xarajatlar bo‘yicha talabni kuchaytiradi.

Bu maqolaning maqsadi zamonaviy xirurgik asboblarni tizimli tarzda tahlil qilish, ularning klinik vazifalarini tasniflash, sterilizatsiya va xavfsizlik tamoyillarini yoritish hamda o‘quv jarayonida amaliy ahamiyatga ega bo‘lgan xulosalar ishlab chiqishdan iborat. Asosiy vazifalar zamonaviy asboblarning funksional guruhlarini ajratish, minimal invaziv va energiyaga asoslangan texnologiyalarni tushuntirish, qayta ishlash bosqichlarini ko‘rsatish va xavf profilaktikasi bo‘yicha ilmiy asoslangan yondashuvlarni umumlashtirishdan iborat.

Materiallar va metodlar

Maqola tavsifiy va analitik metod asosida tayyorlandi. Materiallar sifatida xirurgiya, operativ xirurgiya, infeksiya nazorati, sterilizatsiya, laparoskopik jarrohlik, elektroxirurgiya va robotik xirurgiyaga oid o‘quv adabiyotlari, klinik tavsiyalar hamda ilmiy sharhlar o‘rganildi. Tadqiqot klinik sinov shaklida olib borilmadi, bemor ma’lumotlari ishlatilmadi va biror muayyan davolash protokoli individual tarzda tavsiya qilinmadi.

Tahlil uch bosqichda bajarildi. Birinchi bosqichda xirurgik asboblar kesuvchi, ushlovchi, ajratuvchi, kengaytiruvchi, tikuvchi, gemostatik, vizualizatsion va energiyaga asoslangan guruhlarga ajratildi. Ikkinchi bosqichda zamonaviy texnologiyalar laparoskopik, endoskopik, robotik, mikroxirurgik va raqamli nazorat vositalari bo‘yicha ko‘rib chiqildi. Uchinchi bosqichda xavfsizlik ko‘rsatkichlari, sterilizatsiya zanjiri, asboblarni qayta ishlash, operatsion xonada ergonomika va jamoaviy javobgarlik mezonlari umumlashtirildi.

Metodologik yondashuvning asosiy tamoyili shundan iboratki, asbobni baholash faqat texnik imkoniyat bilan cheklanmasligi kerak. Har bir asbob klinik vazifa, to‘qimaning turi, operatsiya bosqichi, bemor xavfi, infeksiya nazorati, jarroh tajribasi va muassasaning moddiy-texnik sharoiti bilan birga baholanishi lozim.

1-jadval. Xirurgik asboblarning funksional tasnifi

Asbob guruhi	Asosiy vazifasi	Amaliy ahamiyati
Kesuvchi asboblar	To‘qimani kesish, ochish yoki shakllantirish.	Skalpel, qaychi va elektropichoq aniqlik talab qiladigan bosqichlarda qo‘llanadi.
Ushlovchi asboblar	To‘qima, qon tomir yoki chok materialini ushlab turish.	Pinset va qisqichlar maydonni nazorat qilish hamda qon ketishni vaqtincha to‘xtatishga yordam beradi.
Ajratuvchi asboblar	To‘qimalar orasini xavfsiz ajratish.	Dissektorlar anatomik qatlamlarni ehtiyotkorlik bilan ochadi.

Kengaytiruvchi asboblar	Operatsion maydonni ko‘rinarli qilish.	Retraktorlar jarrohga chuqur tuzilmalarni ko‘rish imkonini beradi.
Tikuvchi va biriktiruvchi vositalar	To‘qimalarni tikish, anastomoz yoki germetik yopish.	Igna ushlagich, stapler va klipatorlar operatsiya yakunida muhim rol o‘ynaydi.
Vizualizatsion tizimlar	Ichki tuzilmalarni optik yoki raqamli ko‘rsatish.	Endoskop, kamera va monitor minimal invaziv jarrohlikning asosiy shartidir.

2-jadval. Zamonaviy texnologik asboblar va ularning klinik qiymati

Texnologiya	Ustunligi	Cheklovi
Laparoskopik asboblar	Kichik kesma, kamroq og‘riq va tezroq tiklanish imkonini beradi.	Uzoq o‘qish egri chizig‘i va maxsus koordinatsiya talab qiladi.
Bipolyar va ultratovushli energiya qurilmalari	Gemostaz va disseksiyani bir vaqtda bajarishga yordam beradi.	Termik shikast xavfi to‘liq yo‘qolmaydi.
Robot-assistent tizimlar	Harakat aniqligi, tremorni kamaytirish va ergonomik qulaylik beradi.	Yuqori xarajat va texnik tayyorgarlik talab qiladi.

Mikroxirurgik asboblar	Mayda tomir, nerv va nozik to‘qimalar bilan ishlash imkonini beradi.	Katta tajriba, mikroskop va barqaror qo‘l harakati zarur.
Navigatsion tizimlar	Anatomik yo‘nalishni real vaqtga yaqin aniqlashga yordam beradi.	Texnik xatolik va kalibrlash muammolari e’tiborsiz qolmasligi kerak.

Natijalar

Tahlil natijalari zamonaviy xirurgik asboblarni bir tomonlama baholash mumkin emasligini ko‘rsatadi. Asbobning klinik samaradorligi uning mexanik sifati, to‘qima bilan munosabati, steril holatda saqlanishi, jarroh tomonidan boshqarilishi va operatsion jarayon bilan moslashuvchanligiga bog‘liq. Oddiy pinset yoki qaychi noto‘g‘ri tanlansa ham to‘qima ezilishi, qon ketish yoki operatsiya vaqtining uzayishi mumkin. Murakkab energiya qurilmasi esa noto‘g‘ri qo‘llansa, kichik maydondan tashqarida ham zarar yetkazishi mumkin.

Minimal invaziv asboblar natijalarida asosiy ustunlik sifatida operatsion kirishning kichrayishi, operatsiyadan keyingi og‘riqning kamayishi, kosmetik natijaning yaxshilanishi va shifoxonada yotish muddatining qisqarishi ko‘riladi. Biroq bunday asboblar ikki o‘lchamli yoki raqamli tasvirga tayanish, uzun instrumentlar orqali bilvosita manipulyatsiya qilish va chuqur anatomik maydonda orientatsiyani saqlashni talab qiladi. Shuning uchun zamonaviy asboblar o‘z-o‘zidan xavfsizlik kafolati emas; xavfsizlik tayyorgarlik, protokol va nazorat orqali ta’minlanadi.

Sterilizatsiya va qayta ishlash natijalari alohida ahamiyatga ega. Qayta ishlanadigan asboblar dastlabki tozalash, dezinfeksiya, yuvish, quritish, ko‘zdan kechirish, qadoqlash, sterilizatsiya va saqlash bosqichlaridan o‘tishi kerak. Ko‘p bo‘g‘imli, kanalchali, optik va energiya uzatadigan asboblarda organik qoldiqni olib tashlash qiyinroq. Shu sababli zamonaviy xirurgik instrumentlar bilan ishlash faqat

jarrohning emas, balki sterilizatsiya xizmati, operatsion hamshiralar va texnik xodimlarning ham kasbiy javobgarligidir.

3-jadval. Asboblarni xavfsiz qayta ishlash bosqichlari

Bosqich	Mazmuni	Xavfsizlik maqsadi
Operatsiya vaqtida dastlabki parvarish	Qon va biologik qoldiqlar qurib qolmasligi uchun asbob yuzasi nazorat qilinadi.	Biofilm va mexanik ifloslanish xavfini kamaytiradi.
Transport va dekontaminatsiya	Asboblar yopiq, belgilangan tartibda tozalash zonasiga yetkaziladi.	Xodimlar va muhit kontaminatsiyasini cheklaydi.
Mexanik yoki avtomatlashtirilgan yuvish	Kanal, bo‘g‘im va ishchi yuzalar tozalanadi.	Sterilizatsiya samaradorligi uchun asos yaratadi.
Ko‘rik va funksional tekshiruv	Qirralar, izolyatsiya, bo‘g‘imlar, qulflar va optik yuzalar baholanadi.	Nosoz asbobni operatsiyaga kiritmaslikka xizmat qiladi.
Sterilizatsiya va saqlash	Validatsiyalangan usulda sterilizatsiya qilinadi va aseptik sharoitda saqlanadi.	Operatsion infeksiya xavfini kamaytiradi.

4-jadval. Zamonaviy asboblardan foydalanishdagi xavflar va profilaktika

Xavf	Sabab	Profilaktik chora

Termik shikast	Energiya qurilmasi quvvati yoki ekspozitsiyasining noto‘g‘ri tanlanishi.	Minimal yetarli quvvat, to‘qima masofasi va izolyatsiya tekshiruvi.
Infeksion xavf	Yetarli tozalanmagan yoki noto‘g‘ri saqlangan instrument.	Standart qayta ishlash zanjiri va steril indikator nazorati.
Mexanik shikast	Qisqich bosimi, kesuvchi qirra yoki asbob nomutanosibligi.	Asbobni to‘qima turiga mos tanlash va ehtiyotkor manipulyatsiya.
Texnik nosozlik	Kamera, kabel, generator yoki bo‘g‘imdagi nuqson.	Operatsiyadan oldingi tekshiruv va zaxira rejani tayyorlash.
Jamoaviy xato	Asbob nomi, bosqichi yoki vazifasi bo‘yicha noto‘g‘ri kommunikatsiya.	Standart buyruqlar, tekshiruv varaqasi va aniq rol taqsimoti.

Muhokama

Zamonaviy xirurgik asboblar haqida eng zaif yondashuv ularni faqat texnik yangilik sifatida ko‘rishdir. Amalda asbob texnologiyasi jarrohlik falsafasini ham o‘zgartiradi. Minimal invaziv yondashuvda jarroh to‘qimani bevosita qo‘l bilan emas, kamera, monitor va uzun instrumentlar orqali boshqaradi. Bu holat motor ko‘nikma, ko‘rish fazosi, chuqurlikni baholash va asbob uchining harakatini nazorat qilish bo‘yicha yangi kompetensiyalarni talab qiladi.

Elektroxirurgiya va energiya qurilmalari amaliyotda ko‘p ishlatiladi, chunki ular qon ketishni kamaytirish, disseksiyani tezlashtirish va operatsion maydonni toza

saqlash imkonini beradi. Ammo energiya asboblari bilan ishlashda asosiy xato ularni oddiy kesuvchi asbobga tenglashtirishdir. Bunday qurilmalar to‘qimada issiqlik hosil qiladi, bu issiqlik esa ko‘rinib turgan kesish chizig‘idan tashqariga tarqalishi mumkin. Shu sababli jarroh energiya turi, to‘lqin shakli, quvvat rejimi va to‘qima reaksiyasini tushunishi kerak.

Robotik asboblar alohida muhokamani talab qiladi. Ular harakatning aniqligi, kamera nazorati va ergonomik qulaylikni oshiradi, biroq barcha muassasalar uchun bir xil darajada iqtisodiy foydali bo‘lishi shart emas. Agar mutaxassis tayyorgarligi, texnik xizmat, sarf materiallari va bemor tanlash mezonlari shakllanmagan bo‘lsa, robotik tizim klinik ustunlikdan ko‘ra tashkiliy yukga aylanishi mumkin. Demak, texnologiyani joriy etishdan oldin real ehtiyoj, operatsiya hajmi, kadrlar salohiyati va moliyaviy barqarorlik baholanishi zarur.

O‘quv jarayonida zamonaviy asboblar bilan tanishish faqat nomlarni yodlashdan iborat bo‘lmasligi kerak. Talaba har bir asbobning shakli, ishlash tamoyili, qo‘llanish chegarasi, xavf manbai, sterilizatsiya talabi va operatsion maydondagi mantiqiy o‘rnini tushunishi kerak. Ayniqsa stomatologiya, umumiy xirurgiya, travmatologiya, ginekologiya va endoskopik yo‘nalishlarda kichik asbob xatosi ham klinik natijaga ta’sir qiladi.

Amaliy ta’limda zamonaviy xirurgik asboblarni o‘rgatish ketma-ketlik asosida qurilishi kerak. Birinchi bosqichda talaba klassik asbobning nomi va ko‘rinishini emas, balki uning to‘qima bilan qanday aloqa qilishi, qaysi bosimda ishlatilishi va qaysi holatda zarar yetkazishi mumkinligini tushunadi. Ikkinchi bosqichda minimal invaziv asboblarning uzunligi, ishchi uchi, kamera ostidagi harakati va ergonomik cheklovlari ko‘rib chiqiladi. Uchinchi bosqichda energiya qurilmalari, izolyatsiya, tutun evakuatsiyasi va termik xavfsizlik bo‘yicha alohida mashg‘ulotlar tashkil etiladi.

Stomatologiya yo‘nalishi talabalari uchun ham bu mavzu tor xirurgiya doirasida emas, balki umumiy operatsion madaniyat sifatida ahamiyatlidir. Og‘iz-jag‘ sohasida ishlatiladigan elevator, raspator, freza, suyak qisqichi, retraktor, aspirator va tikuv

asboblari kichik anatomik maydonda qo‘llanadi. Bu maydonda nervlar, tomirlar, so‘lak bezlari va suyak tuzilmalari yaqin joylashgani uchun asbobning o‘lchami, burchagi va kuchi aniq tanlanishi kerak. Shuning uchun zamonaviy instrumentologiya stomatologik amaliyotga ham bevosita bog‘liq.

Asboblarni boshqarishda hujjatlashtirish ham muhim. Har bir steril to‘plamning tarkibi, sterilizatsiya sanasi, indikator natijasi, ishlatilgan operatsiya turi va nosozlik qaydi nazorat tizimida aks etishi kerak. Bunday yondashuv infeksiya nazorati, asbob aylanishi va sarf-xarajatni boshqarishni osonlashtiradi. Agar asbob operatsiyada nosozlik qilsa, uning sababi faqat foydalanuvchi xatosi emas, balki yuvish, qadoqlash, saqlash yoki texnik xizmat bosqichidagi kamchilik bo‘lishi mumkin.

Zamonaviy asboblar bilan bog‘liq yana bir masala standartlashtirishdir. Bir xil operatsiya uchun turli bo‘limlarda turlicha asbob to‘plami ishlatilsa, jamoa moslashuvi qiyinlashadi va operatsiya vaqti cho‘zilishi mumkin. Standart instrument setlari, nazorat varaqalari va oldindan tayyorlangan operatsion protokollar jarrohlik oqimini tartibga soladi. Bu ayniqsa shoshilinch holatlarda muhim, chunki vaqt yo‘qotish bemor xavfini oshiradi.

Kelajakda xirurgik asboblar yanada raqamli nazoratga bog‘lanadi. Asbob identifikatsiyasi, sterilizatsiya tarixi, foydalanish soni, texnik xizmat muddati va operatsion logistika elektron tizimlarda kuzatilishi mumkin. Biroq raqamlashtirish inson mas’uliyatini bekor qilmaydi. Aksincha, u xodimlardan ma’lumotni to‘g‘ri kiritish, indikatorlarni tekshirish va protokoldan chetga chiqmaslikni talab qiladi.

Xulosa

Zamonaviy xirurgik asboblar jarrohlik amaliyotining aniqligi, xavfsizligi va funksional natijalarini oshirishga xizmat qiladigan muhim texnologik bazadir. Ular kesish, ushlash, ajratish, ko‘rsatish, koagulyatsiya qilish, tikish va navigatsiya kabi vazifalarni yanada aniqroq bajarishga yordam beradi. Biroq zamonaviylik faqat yuqori texnologiya mavjudligi bilan emas, balki asbobning klinik maqsadga mosligi,

sterilizatsiya zanjiri, texnik sozligi, foydalanuvchi malakasi va jamoaviy xavfsizlik madaniyati bilan belgilanadi.

Asbob tanlashda eng muhim mezonlar to‘qima bilan ehtiyotkor munosabat, infeksiya profilaktikasi, termik va mexanik zarar xavfini kamaytirish, ergonomika, qayta ishlashga yaroqlilik va operatsiya bosqichiga moslikdir. O‘quv va klinik amaliyotda zamonaviy instrumentlarni chuqur tushunish bemor xavfsizligini oshiradi, operatsion xatolarni kamaytiradi va jarrohlik tafakkurini shakllantiradi.

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KAMBAG‘ALLIKNI QISQARTIRISHDA IQTISODIY ISLOHOTLARNING STRATEGIK AHAMIYATI VA RIVOJLANISH TENDENSIYALARI

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Annotatsiya Mazkur maqolada O‘zbekistonda kambag‘allikni qisqartirish jarayonida iqtisodiy islohotlarning strategik ahamiyati, ularning asosiy natijalari va o‘rta muddatli rivojlanish tendensiyalari tahlil qilinadi. Tadqiqotda kambag‘allik darajasi, real YaIM o‘sishi, uy xo‘jaliklari daromadlari tarkibi, bandlik, inflyatsiya va ijtimoiy himoya ko‘rsatkichlari o‘zaro bog‘liq indikatorlar sifatida qaraldi. Ochiq statistik manbalar shuni ko‘rsatadiki, milliy kambag‘allik darajasi 2021-yildagi 17 foizdan 2024-yilda 8,9 foizga pasaygan, 2025-yil bo‘yicha Jahon banki bahosida esa 5,8 foizga tushgan. Bu pasayish faqat transferlar hisobiga emas, balki ish o‘rinlari yaratish, tadbirkorlikni qo‘llab-quvvatlash, mahallabay ishlash, kasb-hunarga o‘qitish, ayollar va yoshlar bandligini kengaytirish hamda infratuzilma sharoitlarini yaxshilash kabi kompleks siyosat natijasi sifatida talqin etiladi. Shu bilan birga, maqola kambag‘allikni qisqartirishdagi zaif nuqtalarni ham ko‘rsatadi: inflyatsiya bosimi, norasmiy bandlik, hududlararo tafovut, energiya tariflari, tashqi migratsiya va xomashyo narxlariga bog‘liqlik kambag‘allikka qayta tushish xavfini saqlab qoladi. Natijalar iqtisodiy o‘sish kambag‘allikni qisqartirish uchun zarur, ammo yetarli shart emasligini; o‘sish sifati, daromadlarning adolatli taqsimlanishi va mehnat unumdorligi hal qiluvchi omil ekanini asoslaydi.

Kalit so‘zlar: kambag‘allik, iqtisodiy islohotlar, bandlik, uy xo‘jaliklari daromadi, ijtimoiy himoya, mahallabay yondashuv, O‘zbekiston–2030 strategiyasi.

Kirish

Kambag‘allikni qisqartirish zamonaviy iqtisodiy siyosatning eng muhim strategik yo‘nalishlaridan biridir. Chunki kambag‘allik faqat daromad yetishmasligi emas; u ta’lim, sog‘liqni saqlash, uy-joy, infratuzilma, mehnat bozori va ijtimoiy himoya tizimining samaradorligi bilan bog‘langan ko‘p o‘lchovli iqtisodiy-ijtimoiy hodisadir. Agar davlat kambag‘allikni faqat nafaqa yoki moddiy yordam orqali kamaytirishga harakat qilsa, natija qisqa muddatli bo‘ladi. Barqaror natija esa kambag‘al oilaning doimiy daromad manbai, malakasi, mehnat bozoriga kirish imkoniyati va ijtimoiy xizmatlardan foydalanish darajasi oshganda paydo bo‘ladi.

O‘zbekiston tajribasida 2017-yildan keyingi bozor islohotlari kambag‘allikni davlat siyosatining markaziy masalasiga aylantirdi. Rasmiy siyosiy diskursda kambag‘allik muammosining tan olinishi, mahalla darajasida ehtiyojmand oilalarni aniqlash, ijtimoiy reyestrlar, kasb-hunarga o‘qitish dasturlari, tadbirkorlik kreditlari, ayollar va yoshlar bandligini qo‘llab-quvvatlash mexanizmlari iqtisodiy islohotlarning ijtimoiy yo‘naltirilganligini kuchaytirdi. “O‘zbekiston–2030” strategiyasida har bir inson salohiyatini ro‘yobga chiqarish, ijtimoiy xizmatlar tizimini takomillashtirish, kambag‘allikni kamaytirish va barqaror iqtisodiy o‘sish orqali aholi farovonligini oshirish asosiy maqsadlar sifatida belgilangan.

Mavzuning dolzarbligi uchta omil bilan izohlanadi. Birinchidan, aholi soni va mehnatga layoqatli yoshdagi qatlamning o‘sishi yangi ish o‘rinlariga talabni kuchaytiradi. Ikkinchidan, kambag‘allikning hududiy va oilaviy ko‘rinishlari bir xil emas: ayrim hududlarda tomorqa, suv, transport, bozor va ta’lim infratuzilmasi cheklovlari daromadni oshirish imkonini sekinlashtiradi. Uchinchidan, inflyatsiya va energiya narxlari kabi makroiqtisodiy omillar past daromadli oilalar xarajatlariga kuchliroq ta’sir qiladi. Demak, kambag‘allikni kamaytirish siyosati makroiqtisodiy barqarorlik, bandlik, ijtimoiy himoya va hududiy rivojlanishni bir tizimda muvofiqlashtirishi shart.

Ushbu maqolaning maqsadi O‘zbekistonda kambag‘allikni qisqartirishda iqtisodiy islohotlarning strategik ahamiyatini real statistik ko‘rsatkichlar asosida tahlil qilish va

rivojlanish tendensiyalarini aniqlashdan iborat. Tadqiqotning asosiy savoli quyidagicha shakllantirildi: iqtisodiy o‘sish, bandlik va daromadlar tarkibidagi o‘zgarishlar kambag‘allik kamayishiga qanday mexanizmlar orqali ta’sir qilmoqda?

Adabiyotlar sharhi Ilmiy adabiyotlarda kambag‘allikni kamaytirish ikki yirik yondashuv orqali izohlanadi. Birinchi yondashuv iqtisodiy o‘sishning ahamiyatiga urg‘u beradi: ishlab chiqarish kengaysa, investitsiya ko‘payadi, ish o‘rinlari yaratiladi va uy xo‘jaliklari daromadi ortadi. Biroq bu yondashuvning zaif tomoni shundaki, o‘sishning foydasi aholining barcha qatlamlariga bir xil yetib bormaydi. Agar o‘sish kapitaltalab, importga qaram yoki yirik davlat korxonalari atrofida to‘plangan bo‘lsa, kambag‘al qatlam uchun barqaror ish o‘rinlari yetarli yaratilmasligi mumkin.

Ikkinchi yondashuv inklyuziv o‘sish nazariyasiga asoslanadi. Bu yondashuvda kambag‘allikni qisqartirish uchun iqtisodiy o‘sish bilan birga ta’lim, sog‘liqni saqlash, kasb-hunar, ijtimoiy himoya va infratuzilmaga investitsiya qilish zarurligi ta’kidlanadi. O‘zbekiston sharoitida aynan shu yondashuv amaliy jihatdan muhim: chunki kambag‘al oilalarning asosiy muammosi ko‘pincha ish topish istagi emas, balki malaka, transport, bolalar parvarishi, sog‘liq, huquqiy rasmiylashtirish va kapitalga kirish imkoniyatining cheklanganligidir.

Jahon banki va BMT Taraqqiyot dasturi materiallarida kambag‘allikni o‘lchash metodologiyasi masalasi alohida o‘rin tutadi. Pul daromadlari bo‘yicha kambag‘allik ko‘rsatkichi muhim bo‘lsa-da, ko‘p o‘lchovli kambag‘allik insonning ta’lim, salomatlik va turmush sharoitidagi cheklanishlarini ham hisobga oladi. Shu sababli O‘zbekiston uchun kambag‘allikka qarshi siyosatda faqat daromad transferlari emas, balki inson kapitalini rivojlantirish va mahalliy infratuzilmani yaxshilash hal qiluvchi omil sifatida ko‘rilmoqda.

Mavjud manbalar shuni ko‘rsatadiki, O‘zbekistonda kambag‘allik darajasining pasayishi ish o‘rinlari yaratish, real daromadlar o‘sishi va ijtimoiy himoyaning maqsadliligi bilan bog‘liq. Masalan, 2024-yilda uy xo‘jaliklari daromadlari tarkibida ish haqi 42,6 foizni, tadbirkorlik daromadlari 22,9 foizni, tomorqa va qishloq xo‘jaligi

daromadlari 10,7 foizni tashkil etgani kambag‘allikni kamaytirishning asosiy drayveri mehnat daromadi ekanini ko‘rsatadi. Bu xulosa siyosiy jihatdan muhim: kambag‘allikni kamaytirish dasturlari odamlarga pul berishdan ko‘ra, ularni daromad ishlab chiqaruvchi iqtisodiy faoliyatga ulashga xizmat qilishi kerak.

Matadalogiyasi

Tadqiqotda ikkilamchi statistik ma’lumotlar asosida desk-research, trend tahlili va indikatorlararo taqqoslash metodlaridan foydalanildi. Asosiy manbalar sifatida Jahon bankining Macro Poverty Outlook ma’lumotlari, World Development Indicators bazasi, O‘zbekiston Statistika agentligi bilan hamkorlikda tayyorlangan CERR tahlillari, BMT Taraqqiyot dasturining ko‘p o‘lchovli kambag‘allik bo‘yicha hisoboti, “O‘zbekiston–2030” strategiyasiga oid rasmiy axborotlar hamda Taraqqiyot strategiyasi markazi materiallari olindi.

Tahlilda quyidagi indikatorlar tanlandi: milliy kambag‘allik darajasi, real YaIM o‘sishi, bandlik darajasi, inflyatsiya, uy xo‘jaliklari pul daromadlari tarkibi, investitsiya va ijtimoiy himoya bilan bog‘liq strategik ko‘rsatkichlar. Bu indikatorlar kambag‘allikni qisqartirish mexanizmini uch pog‘onada ko‘rsatadi: makroiqtisodiy o‘sish resurs yaratadi; bandlik va tadbirkorlik daromadni oshiradi; ijtimoiy himoya va infratuzilma esa zaif qatlamlarning o‘sishdan foydalanish imkoniyatini kengaytiradi.

Metodologik cheklov sifatida shuni qayd etish zarurki, kambag‘allik turli manbalarda turli chiziqlar orqali o‘lchanadi. Milliy kambag‘allik chizig‘i, past-o‘rta daromadli mamlakatlar uchun xalqaro chiziq va yuqori-o‘rta daromadli mamlakatlar chizig‘i bir xil iqtisodiy mazmunga ega emas. Shu sababli maqolada ko‘rsatkichlar bir-biriga mexanik qo‘shilmaydi; ular tendensiyani tushuntirish uchun alohida manba va metodologik izoh bilan beriladi.

Diagrammalar real statistik ko‘rsatkichlarning vizual talqini sifatida tuzildi. Ular natijalarni bezash uchun emas, balki asosiy ilmiy xulosani ko‘rsatish uchun ishlatiladi: kambag‘allik pasayishi iqtisodiy o‘sish, bandlik va daromadlar tarkibidagi siljish bilan bog‘liq, ammo bu bog‘liqlik avtomatik emas.

Natija

Tahlil natijalari O‘zbekistonda kambag‘allikni qisqartirish jarayoni sezilarli tezlashganini ko‘rsatadi. UNDP ma’lumotlarida 2021-yilda kambag‘allik 17 foiz, 2022-yilda 14 foiz bo‘lgani qayd etilgan. CERR va Statistika agentligi ma’lumotlariga ko‘ra, 2023-yilda bu ko‘rsatkich 11 foizga, 2024-yilda esa 8,9 foizga tushgan. Jahon bankining 2026-yil aprel oyidagi Macro Poverty Outlook hisobotida 2025-yilda milliy kambag‘allik 5,8 foizga pasaygani qayd etilgan. Bu raqamlar tendensiya jihatidan kuchli pasayishni ko‘rsatadi, lekin ularni metodologik izohsiz aralashtirish noto‘g‘ri bo‘ladi.



1-rasm. O‘zbekistonda kambag‘allik darajasi dinamikasi, 2021–2025-yillar.

Diagrammadan ko‘rinadiki, 2021–2025-yillar oralig‘ida kambag‘allik darajasi 11,2 foiz punktga kamaygan. Bunday pasayishni faqat iqtisodiy o‘sish bilan izohlash yetarli emas. Chunki o‘sish kambag‘allikni kamaytirishi uchun uning natijasi ish haqi, tadbirkorlik daromadi, kichik biznes, qishloq xo‘jaligi va mahalliy xizmatlar orqali past daromadli qatlamlarga yetib borishi kerak. 2024-yil natijalarida 719 ming

kishining kambag‘allikdan chiqarilgani aynan bandlik, tadbirkorlik va tomorqa resurslaridan foydalanish bilan bog‘langan.

1-jadval.

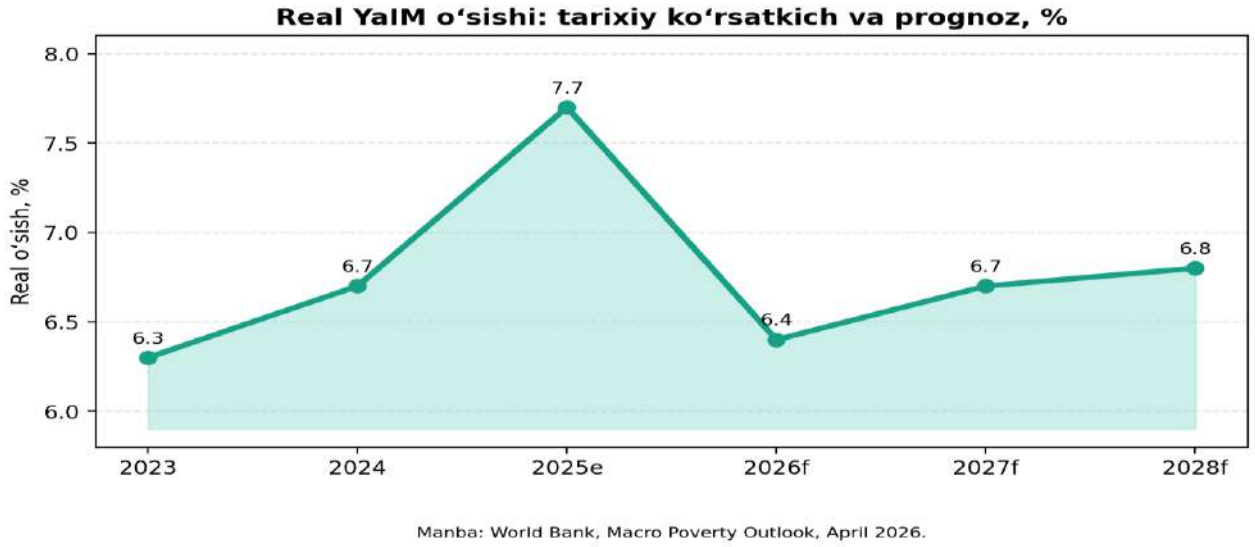
Tahlilda foydalanilgan asosiy indikatorlar

Indikator	Davr	Ko‘rsatkich	Tahliliy mazmuni
Kambag‘allik darajasi	2024	8,9%	Milliy darajada pasayish davom etgan, lekin 3,3 mln kishi hali xavf guruhida qolgan.
Kambag‘allik darajasi	2025	5,8%	Jahon banki bahosida pro-poor o‘sish natijasi kuchaygan.
Real YaIM o‘sishi	2025	7,7%	Eksport tiklanishi, xususiy iste’mol va investitsiya o‘sishi bilan bog‘liq.
Uy xo‘jaliklari daromadida ish haqi ulushi	2024	42,6%	Kambag‘allikka qarshi siyosatda mehnat daromadi asosiy kanal bo‘lib qolmoqda.
Tadbirkorlik daromadi ulushi	2024	22,9%	Kichik biznes va o‘zini o‘zi band qilish muhim drayver.
Bandlik darajasi	2025	69,0%	Ish o‘rni yaratish va malaka siyosati kambag‘allikni kamaytirish bilan bevosita bog‘liq.

Manba: World Bank MPO, CERR/Review.uz, UNDP va rasmiy strategik materiallar asosida muallif tomonidan tuzildi.

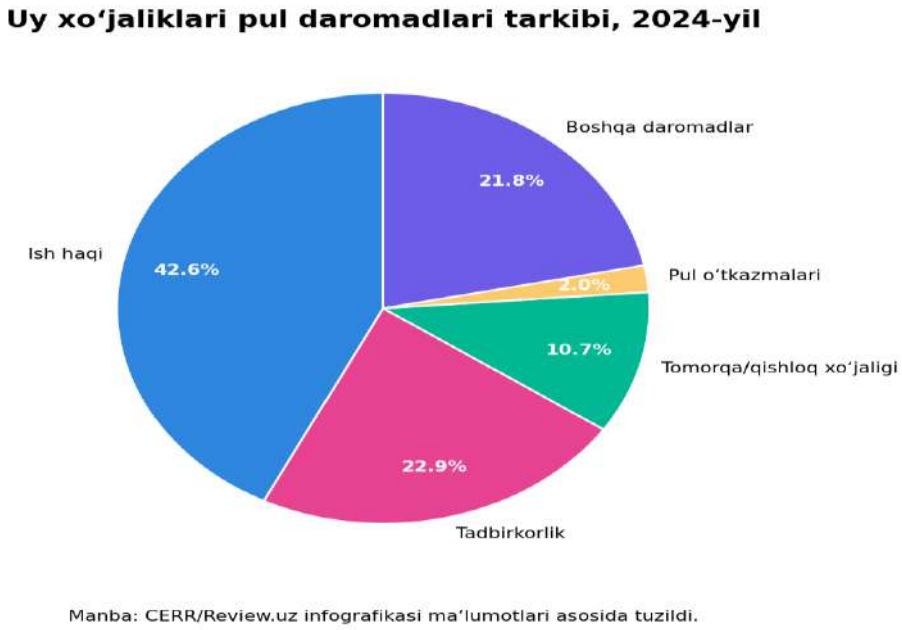
Ikkinchi muhim natija — iqtisodiy o‘sishning yuqori sur’atlari kambag‘allikni qisqartirish uchun zarur makroiqtisodiy asos yaratganidir. Jahon banki ma’lumotlariga ko‘ra, real YaIM o‘sishi 2023-yilda 6,3 foiz, 2024-yilda 6,7 foiz, 2025-yilda esa 7,7 foiz bo‘lgan. 2026–2028-yillar uchun prognozlar ham 6 foizdan yuqori o‘sish saqlanishini ko‘rsatadi. Biroq bu natijadan siyosiy xulosa ehtiyotkorlik bilan

chiqarilishi kerak: yuqori YaIM o‘sishi kambag‘allik kamayishining kafolati emas, balki imkoniyati hisoblanadi.



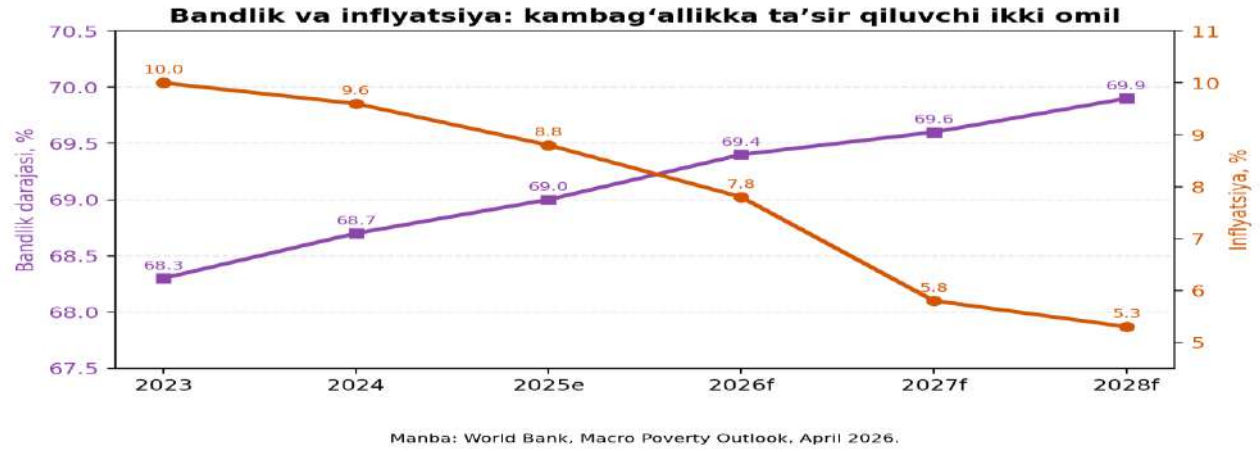
2-rasm. O‘zbekiston real YaIM o‘sishi: tarixiy ko‘rsatkich va Jahon banki prognozi.

Uchinchi natija uy xo‘jaliklari daromadlari tarkibi bilan bog‘liq. 2024-yilda ish haqi daromadlari 42,6 foiz ulushga ega bo‘lib, kambag‘allikni qisqartirishda rasmiy va barqaror bandlikning ahamiyatini ko‘rsatadi. Tadbirkorlik daromadlari 22,9 foizga yetgani kichik biznes, xizmat ko‘rsatish va mahalliy bozorlar daromad yaratishdagi rolini kuchaytirgan. Tomorqa va qishloq xo‘jaligi daromadlarining 10,7 foiz ulushi esa qishloq hududlarida yer, suv va agrologistika siyosati kambag‘allikka qarshi kurashda bevosita iqtisodiy vosita ekanini ko‘rsatadi.



3-rasm. Uy xo‘jaliklari pul daromadlari tarkibi, 2024-yil.

To‘rtinchi natija bandlik va inflyatsiya o‘rtasidagi qarama-qarshi ta’sir bilan izohlanadi. Bandlik darajasining oshishi kambag‘allikni kamaytiradi, ammo inflyatsiya past daromadli oilalarning xarid qobiliyatini yemiradi. Jahon banki prognozlariga ko‘ra, 2023–2028-yillarda bandlik darajasi 68,3 foizdan 69,9 foizga ko‘tarilishi, inflyatsiya esa 10 foizdan 5,3 foizga pasayishi kutiladi. Agar bu prognozlar amalga oshsa, real daromad o‘sishi kambag‘allikni yanada kamaytiradi. Agar inflyatsiya qayta tezlashsa, ayniqsa oziq-ovqat va kommunal xizmatlar narxi oshsa, kambag‘allikka qayta tushish xavfi ortadi.



4-rasm. Bandlik va inflyatsiya tendensiyalari, 2023–2028-yillar.

Muhokama O‘zbekiston tajribasi kambag‘allikni qisqartirishda strategik burilish bo‘lganini ko‘rsatadi. Eng muhim o‘zgarish shundaki, kambag‘allik muammosi endi faqat ijtimoiy nafaqa masalasi emas, balki iqtisodiy o‘sish sifati, hududiy siyosat, inson kapitali va mehnat bozori samaradorligi bilan bog‘langan kompleks masala sifatida qaralmoqda. Bu yondashuv to‘g‘ri, chunki kambag‘allikning ildizi ko‘pincha daromad yetishmasligidan oldin imkoniyat yetishmasligida namoyon bo‘ladi.

Iqtisodiy islohotlarning strategik ahamiyati birinchi navbatda daromad yaratish kanalini kuchaytirishida ko‘rinadi. 2024-yilda ish haqi va tadbirkorlik daromadlari uy xo‘jaliklari daromadining asosiy qismini tashkil etgani shuni ko‘rsatadiki, kambag‘allikni kamaytirishning asosiy yo‘li mehnat bozoriga ulanishdir. Shu nuqtai nazardan, kichik biznesni moliyalashtirish, kasb-hunarga o‘qitish, xotin-qizlar bandligi, yoshlar uchun zamonaviy kasblar, IT va xizmat ko‘rsatish sektoriga kirishni kengaytirish yordam pullaridan ko‘ra uzoqroq ta’sir beradi.

Ikkinchi strategik ahamiyat mahallabay yondashuv bilan bog‘liq. Kambag‘allik mamlakat bo‘yicha o‘rtacha raqam bilan o‘lchansa-da, uning real sabablari oiladan oilaga va hududdan hududga farq qiladi. Bir mahallada muammo transportda bo‘lishi mumkin, boshqasida suv ta’minoti, yana birida kasb malakasi yoki kreditga kirish cheklangan bo‘ladi. Shuning uchun bir xil universal dastur hamma joyda bir xil natija bermaydi. Mahallabay yondashuvning kuchli tomoni — ehtiyojni joyida ko‘rish va resursni aniq oilaga bog‘lash imkonidir. Zaif tomoni esa inson omiliga, mahalliy boshqaruv sifatiga va korrupsiya xatarlariga juda bog‘liqligidir.

Uchinchi strategik ahamiyat ijtimoiy himoya tizimining maqsadliligini oshirishda namoyon bo‘ladi. Ijtimoiy reyestrlar, “Inson” markazlari, ijtimoiy xodimlar va bir darcha asosidagi xizmatlar kambag‘al oilalarni faqat pul oluvchi subyekt sifatida emas, balki tiklanishi, o‘qishi, davolanishi va mehnatga qaytishi kerak bo‘lgan ijtimoiy-iqtisodiy birlik sifatida ko‘rishga imkon beradi. Bu tizim to‘g‘ri ishlasa, davlat yordamining samaradorligi oshadi. Ammo ma’lumotlar bazasi noto‘g‘ri yuritilsa yoki

xizmatlar sifati hududlar bo‘yicha farqlansa, resurslar eng muhtoj qatlamga yetib bormasligi mumkin.

To‘rtinchi muhim masala — makroiqtisodiy barqarorlik. Kambag‘al oilalar daromadining katta qismi oziq-ovqat, kommunal xizmat, transport va tibbiy xarajatlarga ketadi. Shuning uchun inflyatsiya pasayishi kambag‘allikni kamaytirishning yashirin, ammo kuchli vositasidir. Energiya tariflari islohoti iqtisodiy jihatdan zarur bo‘lishi mumkin, lekin u ijtimoiy kompensatsiyasiz amalga oshirilsa, kambag‘al oilalar uchun xarajat zarbasini kuchaytiradi. Demak, tarif islohotlari naqd kompensatsiya, energiya tejamkorligi va manzilli yordam bilan birga yurishi kerak.

Rivojlanish tendensiyalari shuni ko‘rsatadiki, keyingi bosqichda kambag‘allikni kamaytirish qiyinlashadi. Dastlabki bosqichda eng yaqqol ehtiyojmand oilalarni topish va ularni daromad manbaiga ulash nisbatan tez natija beradi. Keyingi bosqichda esa qolgan kambag‘allik chuqurroq sabablar — nogironlik, uzoq muddatli ishsizlik, past ta’lim, hududiy izolyatsiya, sog‘liq muammolari yoki ko‘p farzandli oilalardagi parvarish yuki bilan bog‘liq bo‘ladi. Bu bosqichda siyosat ko‘proq individual, qimmatroq va murakkabroq bo‘ladi. Shu sababli 2026–2030-yillar uchun asosiy vazifa nafaqat kambag‘allikni pasaytirish, balki kambag‘allikka qayta tushishning oldini olishdir.

Xulosa Tadqiqot natijalari O‘zbekistonda kambag‘allikni qisqartirishda iqtisodiy islohotlar strategik ahamiyatga ega ekanini tasdiqlaydi. 2021–2025-yillarda kambag‘allik darajasining keskin pasayishi iqtisodiy o‘sish, bandlik, tadbirkorlik, uy xo‘jaliklari daromadi, ijtimoiy himoya va mahallabay yondashuv o‘zaro bog‘langan holda ishlaganda natija berishini ko‘rsatdi. Bu jarayonning eng kuchli tomoni — kambag‘allikni faqat yordam puli bilan emas, balki daromad manbai yaratish orqali kamaytirishga urinishdir.

Shu bilan birga, mavjud natijalar siyosatning yakuniy muvaffaqiyatini anglatmaydi. Asosiy xavflar saqlanib qolmoqda: inflyatsiya, norasmiy bandlik, hududlararo tafovut, tashqi bozorlar va migratsiya oqimlariga bog‘liqlik, energiya

tariflari, mahalliy boshqaruv sifati va ijtimoiy yordamning aniqligi. Agar bu xavflar boshqarilmasa, kambag‘allik darajasi pasaygan bo‘lsa ham, zaif oilalarning kambag‘allikka qayta tushish ehtimoli yuqori bo‘lib qoladi.

Maqola asosida uchta amaliy tavsiya ilgari suriladi. Birinchidan, kambag‘allikni qisqartirish dasturlari mehnat daromadiga ulanishni asosiy mezon qilib olishi kerak: har bir yordam oilani ish, kasb, biznes yoki mahsuldor aktiv bilan bog‘lashi zarur. Ikkinchidan, mahallabay yondashuv kuchaytirilishi bilan birga natija indikatorlari shaffof bo‘lishi kerak: qaysi oilaga qanday yordam berildi, daromad qanchaga oshdi, kambag‘allikka qayta tushish bo‘ldimi — bular o‘lchanishi shart. Uchinchidan, kambag‘allikni kamaytirish siyosati makroiqtisodiy barqarorlikdan ajratilmasligi kerak, chunki inflyatsiya va xarajatlar zarbasi past daromadli oilalarga eng og‘ir ta’sir qiladi.

Umumiy xulosa shuki, O‘zbekiston uchun kambag‘allikni qisqartirishning keyingi bosqichi raqamni pasaytirish emas, balki kambag‘allikdan chiqqan oilalarni barqaror o‘rta daromadli qatlamga aylantirish bosqichi bo‘lishi kerak. Buning uchun iqtisodiy islohotlar ish o‘rinlari sifati, mehnat unumdorligi, kasbiy malaka, hududiy infratuzilma va ijtimoiy xizmatlar sifati bilan bevosita bog‘lanishi zarur.

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SUN'IY INTELLEKT TEXNOLOGIYALARINING YOSHLAR DUNYOQARASHI SHAKLLANISHIGA TA'SIRI

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Termiz iqtisodiyot va servis universiteti, Iqtisodiyot va axborot texnologiyalari fakulteti, Axborot tizimlari va texnologiyalari yo'nalishi, 3-kurs talabasi

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Annotatsiya: Ushbu ilmiy maqolada zamonaviy dunyoda shiddat bilan rivojlanayotgan sun'iy intellekt (SI) texnologiyalarining yosh avlod dunyoqarashi, qadriyatlar tizimi va kognitiv rivojlanishiga ko'rsatayotgan ko'p qirrali ta'siri tahlil qilinadi. Tadqiqotning dolzarbligi shundaki, bugungi kunda yoshlar "raqamli avlod" sifatida SI algoritmlari bilan bevosita muloqotda bo'lmoqda va bu jarayon ularning axborotni qabul qilish, tahlil qilish hamda qaror qabul qilish mexanizmlarini tubdan o'zgartirmoqda. Maqolada SI texnologiyalarining ta'lim, ijtimoiy munosabatlar, axloqiy normalar va kasbiy tanlovga ta'siri chuqur tahlil etiladi. Shuningdek, neyrotarmoqlar va tavsiya beruvchi algoritmlarning "axborot pufagi" (filter bubble) yaratish xususiyati va uning yoshlar dunyoqarashini toraytirib qo'yish xavfi ilmiy jihatdan asoslab beriladi. Tadqiqot davomida SI vositalarining ijobiy imkoniyatlari kreativlikni oshirish, shaxsiylashtirilgan ta'lim va global bilimlar bazasiga kirish imkoniyati bilan bir qatorda, uning salbiy oqibatlari tanqidiy fikrlashning susayishi, raqamli qaramlik va kognitiv dangasalik kabi jihatlar qiyosiy o'rganiladi. Xulosa qismida yoshlarda "AI savodxonligi"ni shakllantirish va texnologik transformatsiyalar davrida milliy va umuminsoniy qadriyatlarni saqlab qolish bo'yicha ilmiy-amaliy tavsiyalar ilgari suriladi.

Kalit so'zlar: Sun'iy intellekt, yoshlar dunyoqarashi, raqamli transformatsiya, kognitiv rivojlanish, neyrotarmoqlar, algoritmik determinizm, axborot pufagi, tanqidiy fikrlash, shaxsiylashtirilgan ta'lim, axloqiy dilemmalar, raqamli avlod, ChatGPT, mashinali o'rganish, texnologik determinizm.

THE IMPACT OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES ON THE FORMATION OF YOUTH WORLDVIEW

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Abstract: This scientific article analyzes the multifaceted influence of rapidly evolving Artificial Intelligence (AI) technologies on the worldview, value systems, and cognitive development of the younger generation in the modern world. The relevance of the research lies in the fact that today's youth, as a "digital generation," interact directly with AI algorithms, a process that is fundamentally altering their mechanisms of information perception, analysis, and decision-making. The article provides a deep analysis of AI technologies' impact on education, social relations, ethical norms, and career choices. Furthermore, the scientific basis of the "filter bubble" effect created by neural networks and recommendation algorithms, and its risk of narrowing the youth's worldview, is discussed. During the research, the positive opportunities of AI tools—such as enhancing creativity, personalized learning, and access to global knowledge bases—are compared with negative consequences like the weakening of critical thinking, digital dependency, and cognitive laziness. The conclusion puts forward scientific and practical recommendations for developing "AI literacy" among youth and preserving national and universal values in the era of technological transformation.

Keywords: Artificial Intelligence, youth worldview, digital transformation, cognitive development, neural networks, algorithmic determinism, filter bubble, critical thinking, personalized learning, ethical dilemmas, digital generation, ChatGPT, machine learning, technological determinism.

Kirish: Insoniyat tarixi davomida bir necha texnologik inqiloblarni boshidan kechirdi, biroq hech bir texnologiya sun'iy intellekt (SI) kabi inson ongining tub qatlamlariga va dunyoqarashiga bunchalik qisqa vaqt ichida kirib bormagan edi. XXI asrning birinchi choragi yakunlanayotgan bir paytda, SI nafaqat ishlab chiqarish yoki iqtisodiy jarayonlarni, balki insonning "men"ligini, olamni anglash usullarini va

ijtimoiy muloqot tabiatini o‘zgartirmoqda. Ayniqsa, shaxs sifatida shakllanish bosqichida bo‘lgan yoshlar uchun SI texnologiyalari shunchaki yordamchi vosita emas, balki ularning dunyoqarashini shakllantiruvchi asosiy arxitektorga aylanib ulgurdi.

Yoshlik davri bu insonning qadriyatlari, e’tiqodlari va hayotiy strategiyalari shakllanadigan eng muhim ontogenetik bosqichdir. Bugungi yoshlar (Z va Alfa avlodlari) "raqamli dunyo"da tug‘ilib o‘sgan bo‘lsalar-da, SI ularga taqdim etayotgan yangi reallik avvalgi internet davridan tubdan farq qiladi. Agar internet axborotga keng yo‘l ochgan bo‘lsa, SI bu axborotni saralaydi, tahrirlaydi va shaxsning xohish-istaklariga moslab "qadoqlab" beradi. Bu jarayon "algoritmik determinizm" tushunchasini keltirib chiqarmoqda, ya’ni yoshlarning nima o‘ylashi, nimani yoqtirishi va qanday qaror qabul qilishi ko‘p jihatdan neyrotarmoqlar tomonidan belgilanmoqda.

O‘zbekiston Respublikasi Prezidenti Shavkat Mirziyoyev ta’kidlaganidek, "Yangi O‘zbekistonni biz intellektual salohiyati yuksak yoshlar bilan birgalikda quramiz". Bu vazifa bugungi kunning asosiy drayveri bo‘lgan SI texnologiyalaridan oqilona foydalanishni va ularning yoshlar ongiga ta’sirini ilmiy o‘rganishni talab etadi. SI texnologiyalari ta’lim tizimini demokratlashtirmoqda, til to‘siqlarini olib tashlamoqda va murakkab muammolarga yechim topishda ko‘maklashmoqda. Biroq, shu bilan birga, yoshlar o‘rtasida kognitiv tayyorlikning pasayishi, axborotni tekshirmasdan qabul qilish (deepfake va dezinformatsiya xavfi) hamda ijtimoiy izolyatsiya kabi muammolar ham bo‘y ko‘rsatmoqda.

Ushbu maqolaning maqsadi SI texnologiyalarining yoshlar dunyoqarashiga ta’sirini falsafiy, psixologik va texnologik jihatdan tahlil qilish, ushbu jarayondagi xavf-xatarlarni aniqlash va ulardan samarali foydalanish yo‘llarini ko‘rsatib berishdan iborat. Tadqiqotning dolzarbligi SI sohasidagi global poyga sharoitida milliy o‘zlikni saqlab qolgan holda zamonaviy texnologiyalarni o‘zlashtirish zarurati bilan belgilanadi.

Muhokama:SI texnologiyalarining yoshlar dunyoqarashiga ta’siri haqida gap ketganda, ilmiy hamjamiyatda ikki xil qarama-qarshi qutb mavjud. Birinchi guruh olimlar (texno-optimistlar) SIni insoniyat intellektining davomi, bilim olishni osonlashtiruvchi va inson salohiyatini cheksiz darajada oshiruvchi vosita deb hisoblaydilar. Ikkinchi guruh (texno-pessimistlar) esa, SIni inson erkinligiga tahdid, tanqidiy fikrlashni o‘ldiruvchi va yoshlarni "algoritmlar quli"ga aylantiruvchi tizim sifatida ko‘radilar.

Qiyosiy tahlillar shuni ko‘rsatadiki, SI algoritmlari yoshlarning axborot iste’mol qilish madaniyatini tubdan o‘zgartirgan. Masalan, TikTok, Instagram va YouTube kabi platformalardagi tavsiya tizimlari neyrotarmoqlarga asoslangan bo‘lib, ular foydalanuvchining psixologik portretini soniyalar ichida aniqlaydi. Bu yoshlarda "axborot pufagi" (filter bubble) fenomenini keltirib chiqaradi. Natijada, yoshlar faqat o‘zlarining mavjud qarashlarini tasdiqlovchi ma’lumotlarni ko‘radilar, muqobil fikrlar esa ularning ko‘z o‘ngidan chetda qoladi. Bu holat dunyoqarashning kengayishiga emas, aksincha, bir tomonlama (radikal yoki cheklangan) shakllanishiga olib kelishi mumkin.

Yana bir muhim jihat "kognitiv yuklama" masalasidir. Ilgari yoshlar biror ma’lumotni topish uchun kutubxonalarga borishi yoki bir nechta kitoblarni varaqlashi kerak edi. Bu jarayon miyada neyron aloqalarining mustahkamlanishiga va ma’lumotni tahlil qilish qobiliyatining o‘sishiga xizmat qilardi. Bugungi kunda ChatGPT yoki boshqa LLM (Large Language Models) modellariga bitta so‘rov berish orqali tayyor javobni olish mumkin. Bu bir tomondan vaqtni tejasa, ikkinchi tomondan "kognitiv dangasalik"ni keltirib chiqarmoqda. Yoshlarda murakkab matnlarni o‘qish, tahlil qilish va xulosa chiqarish ko‘nikmasi atrofiyaga uchramoqda.

Shuningdek, SI yoshlarning axloqiy va estetik qarashlariga ham ta’sir o‘tkazmoqda. Generativ SI (Midjourney, DALL-E) tomonidan yaratilgan san’at asarlari "go‘zallik" tushunchasini standartlashtirmoqda. Yoshlar sun’iy va mukammal yaratilgan obrazlar ta’sirida real hayotdagi nomukammallikni qabul qila olmay qolmoqdalar. Bu esa o‘z navbatida psixologik diskomfort va o‘zidan qoniqmaslik hissini kuchaytiradi.

Biroq, muhokamalarda SIning ijobiy ta’siri ham inkor etilmasligi kerak. SI yoshlarga dunyoning istalgan nuqtasidagi eng yaxshi ta’lim resurslaridan foydalanish, murakkab tillarni oson o‘rganish va fanlararo tadqiqotlar olib borish imkonini beradi. Masalan, adaptiv o‘qitish tizimlari har bir o‘quvchining o‘zlashtirish darajasiga qarab individual o‘quv rejasini tuzib beradi, bu esa ta’lim samaradorligini 30-40% ga oshirishi mumkinligi aniqlangan.

Asosiy qism:1. SI va Ta’lim: Bilim olish paradigmasining o‘zgarishi

SI texnologiyalari ta’lim sohasida inqilob yasadi. Yoshlar uchun bilim olish endi faqat maktab yoki universitet auditoriyasi bilan cheklanmaydi. Khan Academy, Coursera yoki edX kabi platformalardagi SI tyutorlar har bir talabaga individual yondashuvni ta’minlamoqda.

Shaxsiylashtirilgan ta’lim: SI o‘quvchining kuchli va kuchsiz tomonlarini tahlil qilib, unga mos keladigan materiallarni taqdim etadi. Bu yoshlarning o‘z qobiliyatlariga bo‘lgan ishonchini oshiradi va ularning dunyoqarashida "doimiy o‘rganish" (lifelong learning) konsepsiyasini shakllantiradi.

Intellektual hamkorlik: ChatGPT kabi modellar yoshlar uchun "breynstorming" (fikrlar hujumi) sherigiga aylandi. Ular bilan muloqot qilish orqali yoshlar o‘z g‘oyalarini sinab ko‘rishlari, xatolarini tuzatishlari va yangi istiqbollarni kashf etishlari mumkin.

2. Psixologik ta’sir va ijtimoiy identifikatsiya

Yoshlik davrida ijtimoiy guruhga mansublik hissi juda muhim. SI algoritmlari yoshlarning ijtimoiy tarmoqlardagi xatti-harakatlarini boshqarish orqali ularning kim bilan do‘stlashishi, qaysi submadaniyatga qo‘shilishi va hatto qaysi siyosiy qarashlarni qo‘llab-quvvatlashiga ta’sir qilmoqda.

Raqamli o‘zlik: Yoshlar metaolamlarda (Metaverse) va SI orqali yaratilgan virtual makonlarda o‘zlarining raqamli avatarlarini yaratmoqdalar. Bu ularning "men"lik tushunchasini kengaytirib, jismoniy va virtual borliq o‘rtasidagi chegaralarni xiralashtirmoqda.

Algoritmik tashvish: Algoritmlar tomonidan doimiy ravishda "mukammal hayot" ko‘rsatilishi yoshlarda "FOMO" (fear of missing out – biror narsadan qolib ketish qo‘rquvi) va ijtimoiy solishtirish natijasida kelib chiquvchi depressiyani keltirib chiqarishi mumkin.

3. Axloqiy qadriyatlar va tanqidiy fikrlashning transformatsiyasi

SI davrida yoshlar uchun eng katta muammo haqiqat va yolg‘on o‘rtasidagi farqni anglashdir. Deepfake texnologiyalari yordamida yaratilgan videolar yoki SI tomonidan yozilgan feyk xabarlar yoshlarning dunyoqarashida shubha va ishonchsizlik urug‘ini sochmoqda.

Post-haqiqat (Post-truth) davri: Agar SI har qanday ma’lumotni haqiqatga juda yaqin qilib yarata olsa, yoshlar nimaga ishonishi kerak? Bu savol ularni yanada skeptik bo‘lishga majbur qiladi yoki aksincha, tanqidiy filtrni butunlay o‘chirib qo‘yadi.

Etik dilemmalar: Avtonom tizimlar (masalan, haydovchisiz avtomobillar) tomonidan qabul qilinadigan qarorlar yoshlarni "axloqiy mas’uliyat kimda?" degan savol ustida bosh qotirishga undamoqda. Bu ularning huquqiy va axloqiy ongini yangi bosqichga olib chiqadi.

4. Kasbiy dunyoqarash va kelajakka bo‘lgan munosabat

SI ko‘plab an’anaviy kasblarni yo‘q qilib yuborishi haqidagi bashoratlar yoshlar o‘rtasida kelajakka nisbatan xavotir uyg‘otmoqda. Biroq, bu jarayon ularni ko‘proq "insoniy" ko‘nikmalarni (yumshoq ko‘nikmalar soft skills) qadrlashga o‘rgatmoqda.

Kreativlik va empatiya: Yoshlar tushunib yetmoqdaki, SI hisob-kitob va ma’lumotlarni qayta ishlashda kuchli bo‘lishi mumkin, ammo u insoniy hissiyotlar, empatiya va nostandart ijodiy yondashuvni o‘rnini bosa olmaydi. Bu yoshlarning o‘z ichki dunyosini boyitishga va insoniylikni saqlab qolishga intilishini kuchaytirmoqda.

Yangi savodxonlik: Bugungi yoshlar uchun dasturlash yoki SI bilan

muloqot qilish tili (Prompt Engineering) xuddi ona tili kabi zaruriy ko‘nikmaga aylanmoqda. Bu ularning texnologik dunyoqarashini tubdan o‘zgartirib, ularni iste’molchidan yaratuvchiga aylantirmoqda.

5. Madaniy globallashuv va milliy o‘zlik

SI global madaniyatni yagona qolipga solishga moyil. Ingliz tilidagi ma’lumotlar bazasida o‘qitilgan SI modellari ko‘pincha G‘arb qadriyatlarini targ‘ib qiladi.

Lisoniy ta’sir: Yoshlar SI bilan muloqotda ko‘pincha ingliz tilidan foydalanishlari yoki SI tomonidan tarjima qilingan sun’iy matnlarni o‘qishlari natijasida ona tilining boyligi va o‘ziga xosligini yo‘qotib qo‘yish xavfi mavjud.

Madaniy immunitet: Shu bilan birga, SI milliy merosni raqamlashtirish va dunyoga tanitish uchun ham xizmat qilishi mumkin. Yoshlar SI yordamida o‘z tariximiz va madaniyatimizni zamonaviy formatda (3D modellar, interaktiv muzeylar) qayta kashf etmoqdalar.

Xulosa: Sun’iy intellekt texnologiyalari yoshlar dunyoqarashini shakllantirishda ikki tig‘li shamshir vazifasini o‘tamoqda. Bir tomondan, u intellektual salohiyatni oshirish, dunyoni kengroq anglash va cheksiz imkoniyatlar eshigini ochayotgan bo‘lsa, ikkinchi tomondan, kognitiv mustaqillikka, axloqiy barqarorlikka va ruhiy salomatlikka jiddiy tahdidlar solmoqda.

Tadqiqot natijasida quyidagi ilmiy xulosalarga kelindi:

1. Algoritmik savodxonlikni oshirish zarurati: Yoshlar algoritmlar qanday ishlashini, ularning qanday qilib manipulyatsiya qilishi mumkinligini tushunishlari shart. Bu ularda "raqamli immunitet"ni shakllantiradi.

2. Tanqidiy fikrlash — asosiy himoya vositasi: Ta’lim tizimida tayyor javoblarni yodlashdan ko‘ra, savol berish, ma’lumotni tekshirish (fact-checking) va tahlil qilish ko‘nikmalariga asosiy urg‘u berilishi lozim.

3. Inson markazlashgan texnologiyalar: SI yoshlarni jamiyatdan uzib qo‘ymasligi, aksincha, real ijtimoiy aloqalarni mustahkamlashga xizmat qilishi kerak. Raqamli dunyo va real hayot o‘rtasidagi balansni saqlash yoshlar dunyoqarashining garmonik shakllanishi uchun o‘ta muhimdir.

4. Milliy kontentni rivojlantirish: SI modellarini o‘zbek tili va milliy qadriyatlarimiz asosida boyitish, yoshlarning o‘zligidan uzilib qolmasligini ta’minlaydi.

Xulosa qilib aytganda, sun’iy intellekt bu shunchaki texnologik vosita emas, balki yangi sivilizatsiya ostonasidir. Yoshlarimizning ushbu ostonadan qanday o‘tishi, ularning bu texnologiyadan qanday maqsadlarda foydalanishi va o‘z insoniy qiyofasini qanchalik saqlab qolishiga bog‘liq. Bizning vazifamiz yoshlarga SIni nafaqat boshqarishni, balki u bilan yonma-yon yashab, insoniyatning eng oliy qadriyatlarini asrab qolishni o‘rgatishdir.

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KAMBAG‘ALLIKNI QISQARTIRISHDA IQTISODIY ISLOHOTLARNING STRATEGIK AHAMIYATI VA RIVOJLANISH TENDENSIYALARI

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Annotatsiya Mazkur maqolada O‘zbekistonda kambag‘allikni qisqartirish jarayonida iqtisodiy islohotlarning strategik ahamiyati, ularning asosiy natijalari va o‘rta muddatli rivojlanish tendensiyalari tahlil qilinadi. Tadqiqotda kambag‘allik darajasi, real YaIM o‘sishi, uy xo‘jaliklari daromadlari tarkibi, bandlik, inflyatsiya va ijtimoiy himoya ko‘rsatkichlari o‘zaro bog‘liq indikatorlar sifatida qaraldi. Ochiq statistik manbalar shuni ko‘rsatadiki, milliy kambag‘allik darajasi 2021-yildagi 17 foizdan 2024-yilda 8,9 foizga pasaygan, 2025-yil bo‘yicha Jahon banki bahosida esa 5,8 foizga tushgan. Bu pasayish faqat transferlar hisobiga emas, balki ish o‘rinlari yaratish, tadbirkorlikni qo‘llab-quvvatlash, mahallabay ishlash, kasb-hunarga o‘qitish, ayollar va yoshlar bandligini kengaytirish hamda infratuzilma sharoitlarini yaxshilash kabi kompleks siyosat natijasi sifatida talqin etiladi. Shu bilan birga, maqola kambag‘allikni qisqartirishdagi zaif nuqtalarni ham ko‘rsatadi: inflyatsiya bosimi, norasmiy bandlik, hududlararo tafovut, energiya tariflari, tashqi migratsiya va xomashyo narxlariga bog‘liqlik kambag‘allikka qayta tushish xavfini saqlab qoladi. Natijalar iqtisodiy o‘sish kambag‘allikni qisqartirish uchun zarur, ammo yetarli shart emasligini; o‘sish sifati, daromadlarning adolatli taqsimlanishi va mehnat unumdorligi hal qiluvchi omil ekanini asoslaydi.

Kalit so‘zlar: kambag‘allik, iqtisodiy islohotlar, bandlik, uy xo‘jaliklari daromadi, ijtimoiy himoya, mahallabay yondashuv, O‘zbekiston–2030 strategiyasi.

Kirish

Kambag‘allikni qisqartirish zamonaviy iqtisodiy siyosatning eng muhim strategik yo‘nalishlaridan biridir. Chunki kambag‘allik faqat daromad yetishmasligi emas; u ta’lim, sog‘liqni saqlash, uy-joy, infratuzilma, mehnat bozori va ijtimoiy himoya tizimining samaradorligi bilan bog‘langan ko‘p o‘lchovli iqtisodiy-ijtimoiy hodisadir. Agar davlat kambag‘allikni faqat nafaqa yoki moddiy yordam orqali kamaytirishga harakat qilsa, natija qisqa muddatli bo‘ladi. Barqaror natija esa kambag‘al oilaning doimiy daromad manbai, malakasi, mehnat bozoriga kirish imkoniyati va ijtimoiy xizmatlardan foydalanish darajasi oshganda paydo bo‘ladi.

O‘zbekiston tajribasida 2017-yildan keyingi bozor islohotlari kambag‘allikni davlat siyosatining markaziy masalasiga aylantirdi. Rasmiy siyosiy diskursda kambag‘allik muammosining tan olinishi, mahalla darajasida ehtiyojmand oilalarni aniqlash, ijtimoiy reyestrlar, kasb-hunarga o‘qitish dasturlari, tadbirkorlik kreditlari, ayollar va yoshlar bandligini qo‘llab-quvvatlash mexanizmlari iqtisodiy islohotlarning ijtimoiy yo‘naltirilganligini kuchaytirdi. “O‘zbekiston–2030” strategiyasida har bir inson salohiyatini ro‘yobga chiqarish, ijtimoiy xizmatlar tizimini takomillashtirish, kambag‘allikni kamaytirish va barqaror iqtisodiy o‘sish orqali aholi farovonligini oshirish asosiy maqsadlar sifatida belgilangan.

Mavzuning dolzarbligi uchta omil bilan izohlanadi. Birinchidan, aholi soni va mehnatga layoqatli yoshdagi qatlamning o‘sishi yangi ish o‘rinlariga talabni kuchaytiradi. Ikkinchidan, kambag‘allikning hududiy va oilaviy ko‘rinishlari bir xil emas: ayrim hududlarda tomorqa, suv, transport, bozor va ta’lim infratuzilmasi cheklovlari daromadni oshirish imkonini sekinlashtiradi. Uchinchidan, inflyatsiya va energiya narxlari kabi makroiqtisodiy omillar past daromadli oilalar xarajatlariga kuchliroq ta’sir qiladi. Demak, kambag‘allikni kamaytirish siyosati makroiqtisodiy barqarorlik, bandlik, ijtimoiy himoya va hududiy rivojlanishni bir tizimda muvofiqlashtirishi shart.

Ushbu maqolaning maqsadi O‘zbekistonda kambag‘allikni qisqartirishda iqtisodiy islohotlarning strategik ahamiyatini real statistik ko‘rsatkichlar asosida tahlil qilish va rivojlanish tendensiyalarini aniqlashdan iborat. Tadqiqotning asosiy savoli quyidagicha shakllantirildi: iqtisodiy o‘sish, bandlik va daromadlar tarkibidagi o‘zgarishlar kambag‘allik kamayishiga qanday mexanizmlar orqali ta’sir qilmoqda?

Adabiyotlar sharhi Ilmiy adabiyotlarda kambag‘allikni kamaytirish ikki yirik yondashuv orqali izohlanadi. Birinchi yondashuv iqtisodiy o‘sishning ahamiyatiga urg‘u beradi: ishlab chiqarish kengaysa, investitsiya ko‘payadi, ish o‘rinlari yaratiladi va uy xo‘jaliklari daromadi ortadi. Biroq bu yondashuvning zaif tomoni shundaki, o‘sishning foydasi aholining barcha qatlamlariga bir xil yetib bormaydi. Agar o‘sish kapitaltalab, importga qaram yoki yirik davlat korxonalari atrofida to‘plangan bo‘lsa, kambag‘al qatlam uchun barqaror ish o‘rinlari yetarli yaratilmasligi mumkin.

Ikkinchi yondashuv inklyuziv o‘sish nazariyasiga asoslanadi. Bu yondashuvda kambag‘allikni qisqartirish uchun iqtisodiy o‘sish bilan birga ta’lim, sog‘liqni saqlash, kasb-hunar, ijtimoiy himoya va infratuzilmaga investitsiya qilish zarurligi ta’kidlanadi. O‘zbekiston sharoitida aynan shu yondashuv amaliy jihatdan muhim: chunki kambag‘al oilalarning asosiy muammosi ko‘pincha ish topish istagi emas, balki

malaka, transport, bolalar parvarishi, sog‘liq, huquqiy rasmiylashtirish va kapitalga kirish imkoniyatining cheklanganligidir.

Jahon banki va BMT Taraqqiyot dasturi materiallarida kambag‘allikni o‘lchash metodologiyasi masalasi alohida o‘rin tutadi. Pul daromadlari bo‘yicha kambag‘allik ko‘rsatkichi muhim bo‘lsa-da, ko‘p o‘lchovli kambag‘allik insonning ta’lim, salomatlik va turmush sharoitidagi cheklanishlarini ham hisobga oladi. Shu sababli O‘zbekiston uchun kambag‘allikka qarshi siyosatda faqat daromad transferlari emas, balki inson kapitalini rivojlantirish va mahalliy infratuzilmani yaxshilash hal qiluvchi omil sifatida ko‘rilmoqda.

Mavjud manbalar shuni ko‘rsatadiki, O‘zbekistonda kambag‘allik darajasining pasayishi ish o‘rinlari yaratish, real daromadlar o‘sishi va ijtimoiy himoyaning maqsadliligi bilan bog‘liq. Masalan, 2024-yilda uy xo‘jaliklari daromadlari tarkibida ish haqi 42,6 foizni, tadbirkorlik daromadlari 22,9 foizni, tomorqa va qishloq xo‘jaligi daromadlari 10,7 foizni tashkil etgani kambag‘allikni kamaytirishning asosiy drayveri mehnat daromadi ekanini ko‘rsatadi. Bu xulosa siyosiy jihatdan muhim: kambag‘allikni kamaytirish dasturlari odamlarga pul berishdan ko‘ra, ularni daromad ishlab chiqaruvchi iqtisodiy faoliyatga ulashga xizmat qilishi kerak.

Matadalogiyasi

Tadqiqotda ikkilamchi statistik ma’lumotlar asosida desk-research, trend tahlili va indikatorlararo taqqoslash metodlaridan foydalanildi. Asosiy manbalar sifatida Jahon bankining Macro Poverty Outlook ma’lumotlari, World Development Indicators bazasi, O‘zbekiston Statistika agentligi bilan hamkorlikda tayyorlangan CERR tahlillari, BMT Taraqqiyot dasturining ko‘p o‘lchovli kambag‘allik bo‘yicha hisoboti, “O‘zbekiston–2030” strategiyasiga oid rasmiy axborotlar hamda Taraqqiyot strategiyasi markazi materiallari olindi.

Tahlilda quyidagi indikatorlar tanlandi: milliy kambag‘allik darajasi, real YaIM o‘sishi, bandlik darajasi, inflyatsiya, uy xo‘jaliklari pul daromadlari tarkibi, investitsiya va ijtimoiy himoya bilan bog‘liq strategik ko‘rsatkichlar. Bu indikatorlar kambag‘allikni qisqartirish mexanizmini uch pog‘onada ko‘rsatadi: makroiqtisodiy o‘sish resurs yaratadi; bandlik va tadbirkorlik daromadni oshiradi; ijtimoiy himoya va infratuzilma esa zaif qatlamlarning o‘sishdan foydalanish imkoniyatini kengaytiradi.

Metodologik cheklov sifatida shuni qayd etish zarurki, kambag‘allik turli manbalarda turli chiziqlar orqali o‘lchanadi. Milliy kambag‘allik chizig‘i, past-o‘rta daromadli mamlakatlar uchun xalqaro chiziq va yuqori-o‘rta daromadli mamlakatlar chizig‘i bir xil iqtisodiy mazmunga ega emas. Shu sababli maqolada ko‘rsatkichlar bir-

biriga mexanik qo‘shilmaydi; ular tendensiyani tushuntirish uchun alohida manba va metodologik izoh bilan beriladi.

Diagrammalar real statistik ko‘rsatkichlarning vizual talqini sifatida tuzildi. Ular natijalarni bezash uchun emas, balki asosiy ilmiy xulosani ko‘rsatish uchun ishlatiladi: kambag‘allik pasayishi iqtisodiy o‘sish, bandlik va daromadlar tarkibidagi siljish bilan bog‘liq, ammo bu bog‘liqlik avtomatik emas.

Natija

Tahlil natijalari O‘zbekistonda kambag‘allikni qisqartirish jarayoni sezilarli tezlashganini ko‘rsatadi. UNDP ma’lumotlarida 2021-yilda kambag‘allik 17 foiz, 2022-yilda 14 foiz bo‘lgani qayd etilgan. CERR va Statistika agentligi ma’lumotlariga ko‘ra, 2023-yilda bu ko‘rsatkich 11 foizga, 2024-yilda esa 8,9 foizga tushgan. Jahon bankining 2026-yil aprel oyidagi Macro Poverty Outlook hisobotida 2025-yilda milliy kambag‘allik 5,8 foizga pasaygani qayd etilgan. Bu raqamlar tendensiya jihatidan kuchli pasayishni ko‘rsatadi, lekin ularni metodologik izohsiz aralashtirish noto‘g‘ri bo‘ladi.



1-rasm. O‘zbekistonda kambag‘allik darajasi dinamikasi, 2021–2025-yillar.

Diagrammadan ko‘rinadiki, 2021–2025-yillar oralig‘ida kambag‘allik darajasi 11,2 foiz punktga kamaygan. Bunday pasayishni faqat iqtisodiy o‘sish bilan izohlash yetarli emas. Chunki o‘sish kambag‘allikni kamaytirishi uchun uning natijasi ish haqi, tadbirkorlik daromadi, kichik biznes, qishloq xo‘jaligi va mahalliy xizmatlar orqali past daromadli qatlamlarga yetib borishi kerak. 2024-yil natijalarida 719 ming

kishining kambag‘allikdan chiqarilgani aynan bandlik, tadbirkorlik va tomorqa resurslaridan foydalanish bilan bog‘langan.

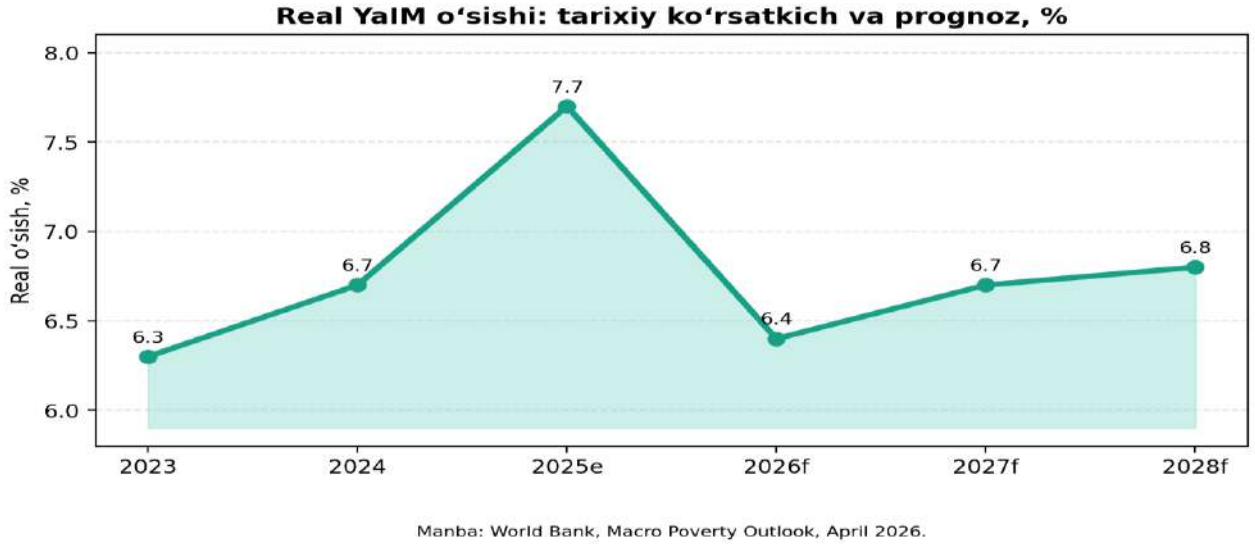
1-jadval.

Tahlilda foydalanilgan asosiy indikatorlar

Indikator	Davr	Ko‘rsatkich	Tahliliy mazmuni
Kambag‘allik darajasi	2024	8,9%	Milliy darajada pasayish davom etgan, lekin 3,3 mln kishi hali xavf guruhida qolgan.
Kambag‘allik darajasi	2025	5,8%	Jahon banki bahosida pro-poor o‘sish natijasi kuchaygan.
Real YaIM o‘sishi	2025	7,7%	Eksport tiklanishi, xususiy iste’mol va investitsiya o‘sishi bilan bog‘liq.
Uy xo‘jaliklari daromadida ish haqi ulushi	2024	42,6%	Kambag‘allikka qarshi siyosatda mehnat daromadi asosiy kanal bo‘lib qolmoqda.
Tadbirkorlik daromadi ulushi	2024	22,9%	Kichik biznes va o‘zini o‘zi band qilish muhim drayver.
Bandlik darajasi	2025	69,0%	Ish o‘rni yaratish va malaka siyosati kambag‘allikni kamaytirish bilan bevosita bog‘liq.

Manba: World Bank MPO, CERR/Review.uz, UNDP va rasmiy strategik materiallar asosida muallif tomonidan tuzildi.

Ikkinchi muhim natija — iqtisodiy o‘sishning yuqori sur’atlari kambag‘allikni qisqartirish uchun zarur makroiqtisodiy asos yaratganidir. Jahon banki ma’lumotlariga ko‘ra, real YaIM o‘sishi 2023-yilda 6,3 foiz, 2024-yilda 6,7 foiz, 2025-yilda esa 7,7 foiz bo‘lgan. 2026–2028-yillar uchun prognozlar ham 6 foizdan yuqori o‘sish saqlanishini ko‘rsatadi. Biroq bu natijadan siyosiy xulosa ehtiyotkorlik bilan chiqarilishi kerak: yuqori YaIM o‘sishi kambag‘allik kamayishining kafolati emas, balki imkoniyati hisoblanadi.



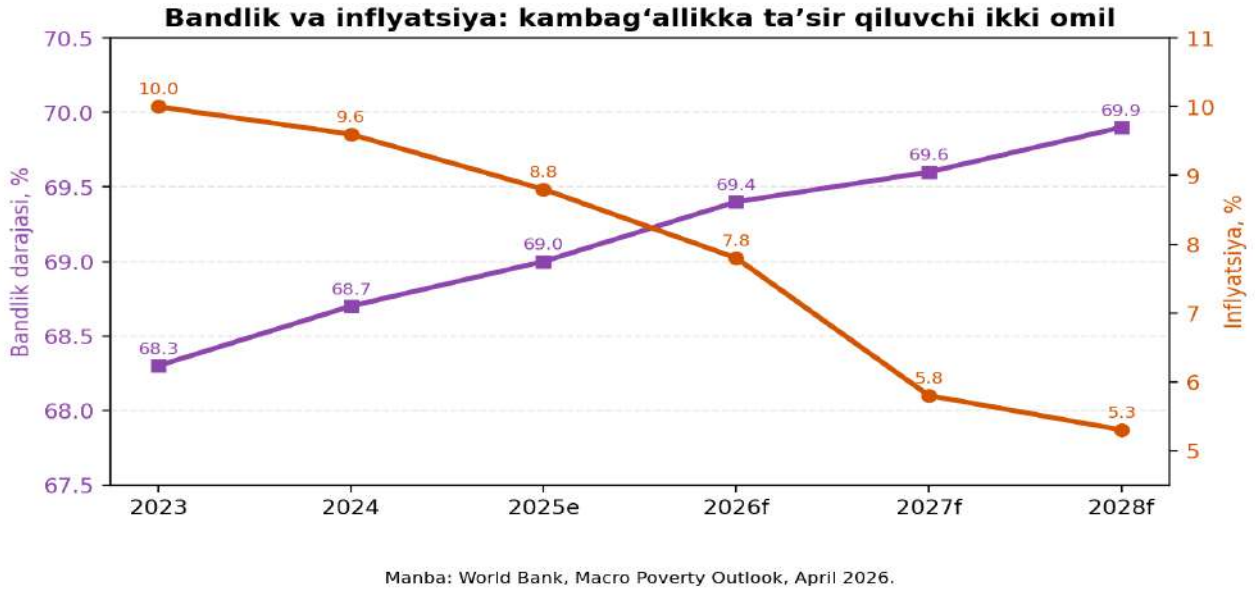
2-rasm. O‘zbekiston real YaIM o‘sishi: tarixiy ko‘rsatkich va Jahon banki prognozi.

Uchinchi natija uy xo‘jaliklari daromadlari tarkibi bilan bog‘liq. 2024-yilda ish haqi daromadlari 42,6 foiz ulushga ega bo‘lib, kambag‘allikni qisqartirishda rasmiy va barqaror bandlikning ahamiyatini ko‘rsatadi. Tadbirkorlik daromadlari 22,9 foizga yetgani kichik biznes, xizmat ko‘rsatish va mahalliy bozorlar daromad yaratishdagi rolini kuchaytirgan. Tomorqa va qishloq xo‘jaligi daromadlarining 10,7 foiz ulushi esa qishloq hududlarida yer, suv va agrologistika siyosati kambag‘allikka qarshi kurashda bevosita iqtisodiy vosita ekanini ko‘rsatadi.



3-rasm. Uy xo‘jaliklari pul daromadlari tarkibi, 2024-yil.

To‘rtinchi natija bandlik va inflyatsiya o‘rtasidagi qarama-qarshi ta’sir bilan izohlanadi. Bandlik darajasining oshishi kambag‘allikni kamaytiradi, ammo inflyatsiya past daromadli oilalarning xarid qobiliyatini yemiradi. Jahon banki prognozlariga ko‘ra, 2023–2028-yillarda bandlik darajasi 68,3 foizdan 69,9 foizga ko‘tarilishi, inflyatsiya esa 10 foizdan 5,3 foizga pasayishi kutiladi. Agar bu prognozlar amalga oshsa, real daromad o‘sishi kambag‘allikni yanada kamaytiradi. Agar inflyatsiya qayta tezlashsa, ayniqsa oziq-ovqat va kommunal xizmatlar narxi oshsa, kambag‘allikka qayta tushish xavfi ortadi.



4-rasm. Bandlik va inflyatsiya tendensiyalari, 2023–2028-yillar.

Muhokama O‘zbekiston tajribasi kambag‘allikni qisqartirishda strategik burilish bo‘lganini ko‘rsatadi. Eng muhim o‘zgarish shundaki, kambag‘allik muammosi endi faqat ijtimoiy nafaqa masalasi emas, balki iqtisodiy o‘sish sifati, hududiy siyosat, inson kapitali va mehnat bozori samaradorligi bilan bog‘langan kompleks masala sifatida qaralmoqda. Bu yondashuv to‘g‘ri, chunki kambag‘allikning ildizi ko‘pincha daromad yetishmasligidan oldin imkoniyat yetishmasligida namoyon bo‘ladi.

Iqtisodiy islohotlarning strategik ahamiyati birinchi navbatda daromad yaratish kanalini kuchaytirishida ko‘rinadi. 2024-yilda ish haqi va tadbirkorlik daromadlari uy xo‘jaliklari daromadining asosiy qismini tashkil etgani shuni ko‘rsatadiki, kambag‘allikni kamaytirishning asosiy yo‘li mehnat bozoriga ulanishdir. Shu nuqtai nazardan, kichik biznesni moliyalashtirish, kasb-hunarga o‘qitish, xotin-qizlar bandligi, yoshlar uchun zamonaviy kasblar, IT va xizmat ko‘rsatish sektoriga kirishni kengaytirish yordam pullaridan ko‘ra uzoqroq ta’sir beradi.

Ikkinchi strategik ahamiyat mahallabay yondashuv bilan bog‘liq. Kambag‘allik mamlakat bo‘yicha o‘rtacha raqam bilan o‘lchansa-da, uning real sabablari oiladan oilaga va hududdan hududga farq qiladi. Bir mahallada muammo transportda bo‘lishi mumkin, boshqasida suv ta’minoti, yana birida kasb malakasi yoki kreditga kirish cheklangan bo‘ladi. Shuning uchun bir xil universal dastur hamma joyda bir xil natija bermaydi. Mahallabay yondashuvning kuchli tomoni — ehtiyojni joyida ko‘rish va resursni aniq oilaga bog‘lash imkonidir. Zaif tomoni esa inson omiliga, mahalliy boshqaruv sifatiga va korrupsiya xatarlariga juda bog‘liqligidir.

Uchinchi strategik ahamiyat ijtimoiy himoya tizimining maqsadliligini oshirishda namoyon bo‘ladi. Ijtimoiy reyestrlar, “Inson” markazlari, ijtimoiy xodimlar va bir darcha asosidagi xizmatlar kambag‘al oilalarni faqat pul oluvchi subyekt sifatida emas, balki tiklanishi, o‘qishi, davolanishi va mehnatga qaytishi kerak bo‘lgan ijtimoiy-iqtisodiy birlik sifatida ko‘rishga imkon beradi. Bu tizim to‘g‘ri ishlasa, davlat yordamining samaradorligi oshadi. Ammo ma’lumotlar bazasi noto‘g‘ri yuritilsa yoki xizmatlar sifati hududlar bo‘yicha farqlansa, resurslar eng muhtoj qatlamga yetib bormasligi mumkin.

To‘rtinchi muhim masala — makroiqtisodiy barqarorlik. Kambag‘al oilalar daromadining katta qismi oziq-ovqat, kommunal xizmat, transport va tibbiy xarajatlarga ketadi. Shuning uchun inflyatsiya pasayishi kambag‘allikni kamaytirishning yashirin, ammo kuchli vositasidir. Energiya tariflari islohoti iqtisodiy jihatdan zarur bo‘lishi mumkin, lekin u ijtimoiy kompensatsiyasiz amalga oshirilsa, kambag‘al oilalar uchun xarajat zarbasini kuchaytiradi. Demak, tarif islohotlari naqd kompensatsiya, energiya tejamkorligi va manzilli yordam bilan birga yurishi kerak.

Rivojlanish tendensiyalari shuni ko‘rsatadiki, keyingi bosqichda kambag‘allikni kamaytirish qiyinlashadi. Dastlabki bosqichda eng yaqqol ehtiyojmand oilalarni topish va ularni daromad manbaiga ulash nisbatan tez natija beradi. Keyingi bosqichda esa qolgan kambag‘allik chuqurroq sabablar — nogironlik, uzoq muddatli ishsizlik, past ta’lim, hududiy izolyatsiya, sog‘liq muammolari yoki ko‘p farzandli oilalardagi parvarish yuki bilan bog‘liq bo‘ladi. Bu bosqichda siyosat ko‘proq individual, qimmatroq va murakkabroq bo‘ladi. Shu sababli 2026–2030-yillar uchun asosiy vazifa nafaqat kambag‘allikni pasaytirish, balki kambag‘allikka qayta tushishning oldini olishdir.

Xulosa Tadqiqot natijalari O‘zbekistonda kambag‘allikni qisqartirishda iqtisodiy islohotlar strategik ahamiyatga ega ekanini tasdiqlaydi. 2021–2025-yillarda kambag‘allik darajasining keskin pasayishi iqtisodiy o‘sish, bandlik, tadbirkorlik, uy xo‘jaliklari daromadi, ijtimoiy himoya va mahallabay yondashuv o‘zaro bog‘langan holda ishlaganda natija berishini ko‘rsatdi. Bu jarayonning eng kuchli tomoni — kambag‘allikni faqat yordam puli bilan emas, balki daromad manbai yaratish orqali kamaytirishga urinishdir.

Shu bilan birga, mavjud natijalar siyosatning yakuniy muvaffaqiyatini anglatmaydi. Asosiy xavflar saqlanib qolmoqda: inflyatsiya, norasmiy bandlik, hududlararo tafovut, tashqi bozorlar va migratsiya oqimlariga bog‘liqlik, energiya tariflari, mahalliy boshqaruv sifati va ijtimoiy yordamning aniqligi. Agar bu xavflar boshqarilmasa, kambag‘allik darajasi pasaygan bo‘lsa ham, zaif oilalarning kambag‘allikka qayta tushish ehtimoli yuqori bo‘lib qoladi.

Maqola asosida uchta amaliy tavsiya ilgari suriladi. Birinchidan, kambag‘allikni qisqartirish dasturlari mehnat daromadiga ulanishni asosiy mezon qilib olishi kerak: har bir yordam oilani ish, kasb, biznes yoki mahsuldor aktiv bilan bog‘lashi zarur. Ikkinchidan, mahallabay yondashuv kuchaytirilishi bilan birga natija indikatorlari shaffof bo‘lishi kerak: qaysi oilaga qanday yordam berildi, daromad qanchaga oshdi, kambag‘allikka qayta tushish bo‘ldimi — bular o‘lchanishi shart. Uchinchidan, kambag‘allikni kamaytirish siyosati makroiqtisodiy barqarorlikdan ajratilmasligi kerak, chunki inflyatsiya va xarajatlar zarbasi past daromadli oilalarga eng og‘ir ta’sir qiladi.

Umumiy xulosa shuki, O‘zbekiston uchun kambag‘allikni qisqartirishning keyingi bosqichi raqamni pasaytirish emas, balki kambag‘allikdan chiqqan oilalarni barqaror o‘rta daromadli qatlamga aylantirish bosqichi bo‘lishi kerak. Buning uchun iqtisodiy islohotlar ish o‘rinlari sifati, mehnat unumdorligi, kasbiy malaka, hududiy infratuzilma va ijtimoiy xizmatlar sifati bilan bevosita bog‘lanishi zarur.

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STUDY OF THE MEDICINAL PROPERTIES OF TOPINAMBUR (*HELIANTHUS TUBEROSUS L.*)

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ABSTRACT: Topinambur (*Helianthus tuberosus L.*), commonly known as Jerusalem artichoke, occupies a significant place among medicinal plants due to its rich chemical composition and high content of biologically active compounds. This article provides a comprehensive analysis of the plant’s main components, including inulin, vitamins (especially B-complex and vitamin C), macro- and microelements, and antioxidant substances that positively affect the human body. The study examines the therapeutic effects of topinambur in the treatment and prevention of diabetes mellitus, gastrointestinal disorders, cardiovascular diseases, and immune system enhancement. Special attention is given to its pharmacological properties, such as hypoglycemic, detoxifying, anti-inflammatory, and metabolism-regulating effects. Furthermore, the article highlights the traditional use of topinambur in folk medicine and explores its potential applications in modern medicine and pharmaceutical industries. The findings indicate that topinambur is not only a valuable food product but also a promising medicinal resource with significant scientific and practical importance.

KEYWORDS: Topinambur, *Helianthus tuberosus*, inulin, medicinal plant, biologically active compounds, antioxidants, diabetes mellitus, immunity, phytotherapy, pharmacology

TOPINAMBUR (HELIANTHUS TUBEROSUS L.) O‘SIMLIGINI DORIVORLIK XUSUSIYATLARINI O‘RGANISH

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ANNOTATSIYA: Topinambur (*Helianthus tuberosus L.*) o‘simligi o‘zining boy kimyoviy tarkibi va biologik faol moddalarga boyligi bilan dorivor o‘simliklar orasida alohida o‘rin egallaydi. Ushbu maqolada topinamburning tarkibiy komponentlari, xususan, inulin, vitaminlar (B guruhi, C vitamini), mikro va makroelementlar hamda antioksidant moddalarining inson organizmiga ijobiy ta’siri keng yoritilgan. Tadqiqot davomida topinamburning qandli diabet, oshqozon-ichak kasalliklari, yurak-qon tomir tizimi buzilishlari hamda immunitetni mustahkamlashdagi ahamiyati ilmiy asosda tahlil qilindi. Shuningdek, ushbu o‘simlikning farmakologik xususiyatlari, ya’ni gipoglikemik, detoksikatsion, yallig‘lanishga qarshi va metabolizmni yaxshilovchi ta’sirlari alohida e’tiborga olindi. Maqolada topinamburdan xalq tabobatida foydalanish tajribalari hamda uni zamonaviy tibbiyot va farmatsevtikada qo‘llash istiqbollari yoritilgan. Natijalar shuni ko‘rsatadiki, topinambur o‘simligi nafaqat oziq-ovqat mahsuloti, balki muhim dorivor manba sifatida ham katta ilmiy va amaliy ahamiyatga ega.

KALIT SO‘ZLAR: Topinambur, *Helianthus tuberosus*, inulin, dorivor o‘simlik, biologik faol moddalar, antioksidantlar, qandli diabet, immunitet, fitoterapiya, farmakologiya

IZUChENIYe LEChEBNЫIX SVOYSTV TOPINAMBURA (*HELIANTHUS TUBEROSUS L.*)

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ANNOTASIYa: Topinambur (*Helianthus tuberosus L.*) zanimayet vajnoye mesto sredi lekarstvennыx rasteniy blagodarya svoyemu bogatomu ximicheskomu sostavu i vыsokomu soderjaniyu biologicheski aktivnыx veщyestv. V dannoy statye podrobno rassmatrivayutsya osnovnыye komponentы rasteniya, vklyuchaya inulin, vitaminы gruppы B, vitamin C, makro- i mikroelementы, a takje antioksidantы, okazыvayuщiye polojitelnoye vliyaniye na organizm cheloveka. V xode issledovaniya proanalizirovano vliyaniye topinambura pri saxarnom diabete, zabolevaniyax jeludochno-kishechnogo trakta, narusheniyax serdechno-sosudistoy sistemы, a takje yego rol v ukreplenii immuniteta. Osoboye vnimaniye udeleno farmakologicheskim svoystvam rasteniya, takim kak gipoglikemicheskoye, detoksikasionnoye, protivovospalitelnoye i metabolicheski aktivnoye deystviye. Krome togo, osveщyenы tradisionnыye metodы ispolzovaniya topinambura v narodnoy medisine i perspektivы

yego primeneniya v sovremennoy farmakologii i medisine. Poluchennыye rezultaty podtverjdayut, chto topinambur predstavlyayet soboy ne tolko sennoye pіщyevoye rasteniye, no i perspektivnыy istochnik lekarstvennыx sredstv.

KLYuChEVЫYe SLOVA: Topinambur, *Helianthus tuberosus*, inulin, lekarstvennoye rasteniye, biologicheski aktivnыye veщyestva, antioksidantы, saxarnыy diabet, immunitet, fitoterapiya, farmakologiya

INTRODUCTION

Medicinal plants have long occupied a central place in both traditional and modern systems of healthcare due to their natural origin, biological activity, and relatively low side effects compared to synthetic drugs. In recent decades, there has been a growing scientific interest in exploring plant-based resources as alternative and complementary therapeutic agents. Among such plants, *Helianthus tuberosus L.*, commonly known as topinambur or Jerusalem artichoke, has attracted considerable attention for its unique biochemical composition and wide range of pharmacological properties. Topinambur is a perennial herbaceous plant belonging to the Asteraceae family. It is widely cultivated in various regions of the world, including Europe, Asia, and North America, primarily for its edible tubers. These tubers are rich in inulin, a natural polysaccharide that serves as a dietary fiber and prebiotic compound. Unlike starch, inulin is not digested in the upper gastrointestinal tract, making topinambur particularly valuable for individuals with metabolic disorders such as diabetes mellitus. In addition to inulin, the plant contains essential vitamins, including B-complex vitamins and vitamin C, as well as important minerals such as potassium, magnesium, iron, and zinc, all of which contribute to its nutritional and medicinal value.

The increasing prevalence of chronic diseases, including diabetes, cardiovascular disorders, and digestive system dysfunctions, has intensified the need for safe and effective natural remedies. In this context, topinambur has emerged as a promising plant with multifunctional therapeutic potential. Scientific studies have demonstrated its hypoglycemic effect, ability to regulate lipid metabolism, antioxidant activity, and capacity to enhance immune function. These properties make it an important subject for further pharmacological and clinical research. Furthermore, topinambur has been widely used in traditional medicine across different cultures. It has been applied in the treatment of digestive disturbances, detoxification processes, and general body strengthening. Modern research increasingly supports these

traditional uses, providing a scientific basis for its inclusion in contemporary phytotherapy and functional nutrition. Despite its recognized benefits, the medicinal potential of *Helianthus tuberosus L.* is still not fully explored, particularly in terms of its mechanisms of action, optimal dosage forms, and long-term effects on human health. Therefore, a comprehensive study of its chemical composition and biological activity is essential for expanding its application in medical and pharmaceutical fields. This article aims to investigate the medicinal properties of topinambur, analyze its bioactive compounds, and evaluate its potential role in the prevention and treatment of various diseases. By integrating traditional knowledge with modern scientific findings, the study seeks to contribute to the development of effective plant-based therapeutic strategies.

MATERIALS AND METHODS

The study of the medicinal properties of *Helianthus tuberosus L.* was conducted using a kompleks approach that combined analytical, experimental, and comparative research methods. Plant samples were collected from agricultural fields under natural growing conditions. The tubers were carefully cleaned, dried under controlled laboratory conditions, and then ground into a fine powder for further analysis. To determine the chemical composition of topinambur, standard phytochemical analysis methods were applied. The content of inulin was measured using spectrophotometric techniques, while vitamin composition (B-group vitamins and vitamin C) was analyzed through chromatographic methods. Mineral elements such as potassium, magnesium, iron, and zinc were determined using atomic absorption spectrometry. In order to evaluate the biological activity of the plant, laboratory-based experimental methods were used. The hypoglycemic effect was assessed by analyzing glucose-binding capacity and carbohydrate metabolism indicators in vitro. Antioxidant activity was evaluated using free radical scavenging assays, which allowed for the identification of the plant's ability to neutralize oxidative stress. Additionally, comparative analysis was conducted by reviewing existing scientific literature and previously published experimental data on *Helianthus tuberosus L.*. This approach enabled the integration of experimental findings with established scientific knowledge. Statistical methods were applied to ensure the reliability and accuracy of the obtained results.

RESULTS

The rezultaty of the study revealed that *Helianthus tuberosus L.* contains a high concentration of biologically active compounds with significant medicinal potential. The analysis confirmed that the tubers are particularly rich in inulin, which constitutes a major proportion of their carbohydrate content. This polysaccharide plays a key role in regulating blood glucose levels, making the plant highly beneficial for individuals with diabetes. The vitaminnыy sostav analysis demonstrated the presence of essential vitamins, including vitamin C and B-group vitamins, which contribute to metabolic regulation and immune system support. Furthermore, mineral analysis indicated a high content of potassium and magnesium, which are important for maintaining cardiovascular health and normal cellular function. The antioxidant activity assays showed that topinambur exhibits a strong ability to neutralize free radicals, thereby reducing oxidative stress in biological systems. This suggests its potential role in preventing chronic diseases associated with oxidative damage. Experimental observations also indicated that extracts of *Helianthus tuberosus L.* may have a positive effect on digestive processes by improving intestinal microflora due to the prebiotic nature of inulin. In addition, the plant demonstrated anti-inflammatory properties, which can be beneficial in the treatment of inflammatory conditions. Overall, the findings podtverdili that topinambur possesses multiple pharmacological effects, including hypoglycemic, antioxidant, anti-inflammatory, and immunomoduliruyuщyeye deystviye.

Table. Chemical composition and medicinal properties of *Helianthus tuberosus L.*

Component	Content in plant	Biological function	Medicinal effect
Inulin	High (up to 70–80% of dry mass)	Prebiotic fiber, regulates carbohydrate metabolism	Reduces blood glucose levels, beneficial for diabetes
Vitamin C	Moderate	Antioxidant, supports immune function	Strengthens immunity, protects against infections
B-group vitamins	Present	участвует в энергетическом обмене	Improves metabolism and nervous system function

Potassium (K)	High	Regulates water balance and heart function	Supports cardiovascular health, lowers blood pressure
Magnesium (Mg)	Moderate	Participates in enzyme activity	Reduces stress, improves muscle and nerve function
Iron (Fe)	Present	Essential for hemoglobin formation	Prevents anemia, improves oxygen transport
Zinc (Zn)	Present	Supports immune and enzymatic functions	Enhances immunity, ускоряет заживление тканей
Antioxidants	High	Neutralize free radicals	Prevents oxidative stress and chronic diseases
Dietary fiber	High	Improves digestion	Enhances gut health, prevents constipation

DISCUSSION

The findings of this study highlight the significant medicinal potential of *Helianthus tuberosus L.* and confirm its importance as a functional and therapeutic plant. The high content of inulin identified in the tubers supports previous scientific evidence regarding its effectiveness in regulating glucose metabolism. This makes topinambur a valuable natural alternative for managing diabetes and other metabolic disorders. The presence of essential vitamins and minerals further enhances the nutritional and lechebnыye svoystva of the plant. These compounds contribute not only to general health improvement but also to the prevention of deficiencies and related disorders. The high potassium content, for instance, plays a crucial role in maintaining cardiovascular stability and reducing the risk of hypertension. The observed antioxidant activity is particularly important in the context of modern health challenges, where oxidative stress is recognized as a major factor in the development of chronic diseases such as cancer, cardiovascular diseases, and neurodegenerative disorders. By neutralizing free radicals, topinambur may help reduce cellular damage and slow down aging processes. Moreover, the prebiotic properties of inulin contribute to the improvement of gut microbiota, which is increasingly recognized as a key factor

in overall health. A balanced intestinal microflora enhances digestion, strengthens the immune system, and supports metabolic processes. Despite these promising results, further research is required to fully understand the mechanisms of action of the bioactive compounds found in *Helianthus tuberosus L.*. In particular, clinical trials are necessary to determine optimal dosages, long-term safety, and efficacy in different patient populations. In conclusion, the study demonstrates that topinambur is a highly valuable medicinal plant with broad therapeutic applications. Its integration into modern medicine and functional nutrition systems could provide significant benefits for public health and disease prevention.

CONCLUSION

The present study demonstrates that *Helianthus tuberosus L.* (topinambur) is a highly valuable medicinal plant with a wide spectrum of biological and pharmacological properties. The analysis of its chemical composition revealed a significant presence of inulin, vitamins, minerals, and antioxidant compounds, which together contribute to its therapeutic effectiveness. The findings confirm that topinambur plays an important role in regulating carbohydrate metabolism and reducing blood glucose levels, making it particularly beneficial for individuals with diabetes mellitus. In addition, its antioxidant activity helps protect the body from oxidative stress, which is a major contributing factor to many chronic diseases. The presence of essential nutrients such as potassium, magnesium, and iron further enhances its role in supporting cardiovascular health, improving metabolic processes, and strengthening the immune system. Moreover, the prebiotic nature of inulin promotes the growth of beneficial intestinal microflora, thereby improving digestive health and overall physiological balance. These properties highlight the importance of topinambur not only as a functional food but also as a promising natural therapeutic agent. Despite the positive results obtained, further research is required to explore its full pharmacological potential, including clinical studies to determine optimal dosage, long-term safety, and effectiveness in different medical conditions. In conclusion, *Helianthus tuberosus L.* can be considered a перспективный источник натуральных лекарственных средств and should be more widely integrated into modern medicine and nutrition systems.

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AGROTECHNOLOGY OF BANANA (*MUSACEAE*) CULTIVATION AND ITS MEDICINAL PROPERTIES

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ABSTRACT: Banana (*Musaceae*) is one of the most widely cultivated plants in tropical and subtropical regions and is valued for both its nutritional and medicinal properties. This article examines the agrotechnology of banana cultivation, its biological characteristics, growth conditions, and medicinal significance. The study analyzes the chemical composition of banana, including essential vitamins (A, B, C, E), minerals (potassium, magnesium, iron), and biologically active compounds. These components play an important role in maintaining human health by supporting cardiovascular function, improving digestion, strengthening the immune system, and stabilizing the nervous system. In addition, the article discusses modern agrotechnological methods of banana cultivation, such as irrigation, fertilization, soil preparation, and harvesting techniques. The results indicate that banana is a plant of high economic and medicinal value, and its scientifically based cultivation can significantly improve productivity and quality.

KEYWORDS: Banana, *Musaceae*, agrotechnology, medicinal plant, vitamins, minerals, nutrition, immunity, cultivation, biological characteristics

BANAN (MUSACEAE) NI YETISHTIRISH AGROTEXNOLOGIYASI VA DORIVORLIK XUSUSIYATLARI

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ANNOTATSIYA: Banan (*Musaceae*) tropik va subtropik hududlarda keng tarqalgan qimmatli oziq-ovqat hamda dorivor o‘simliklardan biri hisoblanadi. Ushbu maqolada banan o‘simligini yetishtirish agrotexnologiyasi, uning biologik

xususiyatlari, o‘sish sharoitlari hamda dorivorlik ahamiyati keng tahlil qilingan. Banan o‘simligi yuqori hosildorligi, tez o‘sish sur’ati va iqlim sharoitlariga moslashuvchanligi bilan ajralib turadi. Tadqiqot davomida bananning kimyoviy tarkibi, jumladan vitaminlar (A, B, C, E), minerallar (kaliy, magniy, temir) hamda biofaol moddalar o‘rganildi. Ushbu komponentlar inson salomatligi uchun muhim bo‘lib, yurak-qon tomir tizimini qo‘llab-quvvatlash, ovqat hazm qilish jarayonini yaxshilash, immunitetni mustahkamlash va asab tizimini barqarorlashtirishda muhim rol o‘ynaydi. Maqolada shuningdek bananni yetishtirishning zamonaviy agrotexnologik usullari, jumladan sug‘orish, o‘g‘itlash, tuproqni tayyorlash va hosilni yig‘ish bosqichlari yoritilgan. Natijalar shuni ko‘rsatadiki, banan o‘simligi yuqori iqtisodiy va dorivor ahamiyatga ega bo‘lib, uni ilmiy asosda yetishtirish samaradorlikni oshirishga xizmat qiladi.

KALIT SO‘ZLAR: Banan, *Musaceae*, agrotexnologiya, dorivor o‘simlik, vitaminlar, minerallar, oziq-ovqat, immunitet, yetishtirish, biologik xususiyatlar

АГРОТЕХНОЛОГИЯ ВЫРАЩИВАНИЯ БАНАНА (*MUSACEAE*) И ЕГО ЛЕЧЕБНЫЕ СВОЙСТВА

АЛИМКУЛОВА ЗУХРА ПАНЖИ КИЗИ
СТУДЕНТКА ТЕРМЕЗСКОГО ГОСУДАРСТВЕННОГО УНИВЕРСИТЕТА ИНЖЕНЕРИИ И АГРОТЕХНОЛОГИЙ

АННОТАЦИЯ: Банан (*Musaceae*) является одним из наиболее распространённых растений в тропических и субтропических регионах, обладающим высокой пищевой и лекарственной ценностью. В данной статье рассматриваются агротехнология выращивания банана, его биологические особенности, условия роста, а также лечебные свойства. В ходе исследования изучен химический состав банана, включая витамины (A, B, C, E), минеральные вещества (калий, магний, железо) и биологически активные компоненты. Эти вещества оказывают положительное влияние на организм человека, способствуя укреплению сердечно-сосудистой системы, улучшению пищеварения, повышению иммунитета и нормализации работы нервной системы. Также в статье освещены современные агротехнологические методы выращивания банана, включая орошение, удобрение, подготовку почвы и сбор урожая. Полученные результаты свидетельствуют о высокой экономической и лекарственной ценности банана и необходимости его научно обоснованного выращивания.

КЛЮЧЕВЫЕ СЛОВА: Банан, *Musaceae*, агротехнология, лекарственное растение, витамины, минералы, питание, иммунитет, выращивание, биологические свойства

Introduction

Agriculture and medicinal plant science play a crucial role in ensuring food security and improving human health. In this context, banana (*Musaceae*) is considered one of the most important tropical crops due to its high productivity, nutritional value, and wide range of medicinal properties. Banana is cultivated in many regions of the world and serves as a staple food for millions of people, while also being a valuable source of biologically active compounds beneficial to human health. Banana plants belong to the *Musaceae* family and are characterized by rapid growth, large leaf surface area, and the ability to produce high yields under favorable environmental conditions. The plant thrives in tropical and subtropical climates, where temperature, humidity, and soil fertility significantly influence its growth and productivity. Understanding the agrotechnology of banana cultivation is essential for optimizing yield, improving fruit quality, and ensuring sustainable agricultural practices. Modern agrotechnological approaches to banana cultivation include proper land preparation, selection of high-quality planting material, balanced fertilization, efficient irrigation systems, and effective pest and disease management. These practices not only enhance productivity but also contribute to maintaining soil health and environmental sustainability. In regions with limited water resources or varying climatic conditions, the application of advanced cultivation techniques becomes especially important. In addition to its agricultural importance, banana is widely recognized for its medicinal value.

The fruit is rich in essential vitamins such as A, B-complex, C, and E, as well as minerals like potassium, magnesium, and iron. These nutrients play a significant role in supporting cardiovascular health, improving digestion, boosting immunity, and maintaining the normal functioning of the nervous system. Furthermore, banana contains natural antioxidants and bioactive compounds that help protect the body against oxidative stress and various chronic diseases. Despite its global significance, the effective cultivation of banana requires a thorough understanding of its biological characteristics and environmental requirements. Factors such as soil type, climate conditions, water availability, and agricultural practices directly affect both the yield and the quality of the crop. Therefore, studying the agrotechnology of banana cultivation in relation to its medicinal properties is essential for maximizing its

potential benefits. This article aims to analyze the agrotechnological aspects of banana cultivation and to evaluate its medicinal properties based on its chemical composition and biological activity. By integrating agricultural practices with scientific knowledge of plant chemistry, the study seeks to highlight the importance of banana as both a food and a medicinal resource.

Materials and methods

The research on the agrotechnology of banana (*Musaceae*) cultivation and its medicinal properties was conducted using an integrated scientific approach that combined field observations, laboratory analysis, and comparative evaluation. The study was carried out under conditions representative of subtropical agricultural environments, taking into account soil characteristics, climatic factors, and irrigation practices. Field experiments were organized to observe the growth and development of banana plants under different agrotechnological conditions. Parameters such as plant height, leaf development, time of flowering, and fruit formation were systematically recorded. Special attention was given to soil preparation methods, including plowing depth, organic matter incorporation, and drainage conditions. Fertilization practices were also evaluated, focusing on the application of nitrogen, phosphorus, and potassium fertilizers in balanced proportions. Irrigation regimes were analyzed based on water requirements during different growth stages of the plant. Drip irrigation and traditional watering methods were compared to determine their efficiency in maintaining soil moisture and improving yield. Pest and disease control measures were also examined using environmentally friendly and sustainable approaches. For the study of medicinal properties, laboratory analysis was conducted to determine the chemical composition of banana fruits. Standard analytical methods were used to identify and quantify vitamins (A, B-complex, C, and E), mineral elements (potassium, magnesium, and iron), and antioxidant compounds. The biological activity of these components was evaluated based on their known physiological effects on the human body.Additionally, a comparative analysis of scientific literature was carried out to support the experimental findings and provide a broader understanding of banana cultivation practices and medicinal value. Statistical methods were applied to ensure the reliability and accuracy of the collected data.

Results

The results of the study showed that banana plants demonstrate high productivity when cultivated under optimal agrotechnological conditions. Proper soil preparation, adequate fertilization, and efficient irrigation significantly improved plant growth, leaf development, and fruit yield. Plants grown under drip irrigation systems exhibited better water efficiency and higher productivity compared to those under traditional irrigation methods. The analysis of growth parameters revealed that banana plants require a consistent supply of nutrients and moisture throughout their growth cycle. The application of balanced fertilizers resulted in increased plant vigor, larger fruit size, and improved overall quality. In addition, proper pest and disease management contributed to reducing crop losses and maintaining plant health. Laboratory analysis confirmed that banana fruits contain a high concentration of essential nutrients. Potassium was found to be the dominant mineral, playing a key role in regulating blood pressure and supporting heart function. The presence of vitamins such as vitamin C and B-complex vitamins contributes to improved metabolism and immune system function. Furthermore, antioxidant compounds identified in banana fruits indicate their potential in reducing oxidative stress and preventing cellular damage. These findings support the use of banana not only as a nutritional food source but also as a functional product with medicinal benefits.

Discussion

The findings of this study highlight the importance of applying modern agrotechnological practices in banana cultivation to achieve high yield and quality. The positive impact of proper soil management, balanced fertilization, and efficient irrigation demonstrates that agricultural productivity can be significantly enhanced through scientifically based methods. The results also confirm that banana is a plant of considerable medicinal value due to its rich chemical composition. The high content of potassium supports cardiovascular health, while vitamins and antioxidants contribute to overall well-being and disease prevention. These properties make banana an important component of a healthy diet and a valuable resource in natural medicine. The observed relationship between cultivation conditions and nutrient accumulation suggests that agrotechnological practices directly influence not only yield but also the nutritional quality of the fruit. This emphasizes the need for integrated approaches that combine agricultural techniques with knowledge of plant physiology and biochemistry. In addition, the use of sustainable and environmentally friendly cultivation methods can improve long-term soil fertility and reduce negative environmental impacts. This

is particularly important in regions where natural resources are limited and climate conditions are variable. However, further research is required to explore advanced cultivation technologies, improve resistance to pests and diseases, and optimize post-harvest handling techniques. Future studies should also focus on expanding the use of banana in pharmaceutical and functional food industries. Overall, the study demonstrates that banana (*Musaceae*) is not only a highly productive agricultural crop but also a plant with significant medicinal potential, making it an important subject for continued scientific research and practical application.

Table. Agrotechnological requirements and medicinal properties of banana (Musaceae)

Parameter	Description	Agrotechnological importance	Medicinal significance
Climate conditions	Tropical and subtropical regions	Ensures optimal growth and high productivity	Influences nutrient accumulation
Soil type	Well-drained, fertile, loamy soil	Supports root development and plant stability	Affects quality of bioactive compounds
Irrigation	Regular watering, drip irrigation preferred	Maintains soil moisture and increases yield	Enhances nutrient uptake
Fertilization	Balanced NPK fertilizers	Promotes plant growth and fruit development	Improves nutritional value of fruits
Growth period	9–12 months	Determines harvesting cycle	Influences chemical composition
Vitamins (A, B, C, E)	High content	Reflects plant health	Boosts immunity and metabolism
Potassium (K)	Very high	Indicates nutrient-rich soil conditions	Supports heart function and blood pressure regulation
Magnesium (Mg)	Moderate	Contributes to chlorophyll production	Supports muscle and nerve function

Antioxidants	Present	Reflects plant stress resistance	Reduces oxidative stress and chronic disease risk
Fiber content	High	Indicates fruit quality	Improves digestion and gut health

Conclusion

The study demonstrates that banana (Musaceae) is a highly important agricultural and medicinal plant with significant economic and health benefits. The application of proper agrotechnological practices, including soil preparation, balanced fertilization, and efficient irrigation, plays a key role in achieving high productivity and improving fruit quality. The findings confirm that banana is rich in essential nutrients such as vitamins, minerals, and antioxidants, which contribute to its medicinal value. Its high potassium content supports cardiovascular health, while the presence of vitamins and dietary fiber enhances digestion, strengthens the immune system, and improves metabolic processes. These properties make banana not only a staple food but also a valuable functional and лечебный продукт. Furthermore, the study highlights the direct relationship between cultivation conditions and the nutritional quality of banana fruits. This indicates that scientifically based agricultural practices can significantly enhance both yield and medicinal properties. Sustainable cultivation methods also contribute to environmental protection and long-term agricultural stability. In conclusion, banana (Musaceae) represents a promising resource for both agriculture and medicine. Its effective cultivation and utilization can play an important role in improving food security, human health, and economic development. Further research is recommended to optimize cultivation technologies and expand its application in the pharmaceutical and food industries.

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STUDY OF THE BIOECOLOGICAL CHARACTERISTICS OF MEDICINAL ASTRAGALUS (*ASTRAGALUS L.*)

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Abstract: Astragalus (*Astragalus L.*), a representative of the Fabaceae family, is one of the most widespread medicinal plant genera known for its rich biological and ecological properties. This article focuses on the bioecological characteristics of Astragalus, including its natural distribution, ecological adaptability, environmental requirements, and growth patterns under different climatic and soil conditions. The study also analyzes the chemical composition of the plant, particularly its content of flavonoids, saponins, alkaloids, and polysaccharides, which are responsible for its medicinal effects. Astragalus is known for its immunomodulatory, anti-inflammatory, and cardioprotective properties, as well as its ability to enhance overall physiological resistance. Furthermore, the research highlights the plant's ecological flexibility and its capacity to adapt to various environmental conditions. The findings suggest that Astragalus has significant potential for application in modern pharmacology and phytotherapy due to its high biological activity and устойчивость к внешним факторам.

Keywords: Astragalus, *Astragalus L.*, bioecology, medicinal plant, flavonoids, saponins, ecological adaptation, phytotherapy, biologically active compounds, immunity

ИЗУЧЕНИЕ БИОЭКОЛОГИЧЕСКИХ ОСОБЕННОСТЕЙ ЛЕКАРСТВЕННОГО АСТРАГАЛА (*ASTRAGALUS L.*)

ЭРКИН ЖЎРАЕВ БАХТИЁРОВИЧ

ТЕРМИЗ ДАВЛАТ МУҲАНДИСЛИК ВА АГРОТЕХНОЛОГИЯЛАР УНИВЕРСИТЕТИ Қ.Х.Ф.Д., ДОЦЕНТ.
ХАЙДАРОВА ГУЛАСАЛ КУРБОН КИЗИ

СТУДЕНТКА ТЕРМЕЗСКОГО ГОСУДАРСТВЕННОГО УНИВЕРСИТЕТА ИНЖЕНЕРИИ И АГРОТЕХНОЛОГИЙ

Аннотация: Астрагал (*Astragalus L.*), относящийся к семейству бобовых (Fabaceae), является одним из широко распространённых лекарственных растений, обладающих ценными биологическими свойствами. В данной статье рассматриваются биоэкологические особенности астрагала, включая его ареал распространения, экологическую адаптацию, требования к климатическим и почвенным условиям, а также особенности роста и развития. В ходе исследования проанализирован химический состав растения, включая содержание флавоноидов, сапонинов, алкалоидов и полисахаридов, которые определяют его лекарственные свойства. Установлено, что астрагал обладает иммуномодулирующим, противовоспалительным и общеукрепляющим действием, а также оказывает положительное влияние на сердечно-сосудистую систему. Кроме того, в статье освещены особенности экологической устойчивости растения и его способность адаптироваться к различным условиям среды. Полученные результаты свидетельствуют о высокой перспективности использования астрагала в фармакологии и фитотерапии.

Ключевые слова: Астрагал, *Astragalus L.*, биоэкология, лекарственное растение, флавоноиды, сапонины, экологическая адаптация, фитотерапия, биологически активные вещества, иммунитет

DORIVOR ASTRAGAL (ASTRAGALUS L) O'SIMLIGINI BIOEKOLOGIYASINI O'RGANISH

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Annotatsiya: Astragal (*Astragalus L.*) turkumi dukkakdoshlar (Fabaceae) oilasiga mansub bo‘lib, dorivor o‘simliklar orasida keng tarqalgan va boy biologik xususiyatlari bilan ajralib turadi. Ushbu maqolada Astragal o‘simligining bioekologik xususiyatlari, ya’ni uning tabiiy tarqalish areali, ekologik moslashuvchanligi, iqlim va tuproq omillariga nisbatan talabchanligi hamda vegetativ rivojlanish bosqichlari keng o‘rganilgan. Tadqiqot davomida o‘simlikning biologik faol moddalari, jumladan flavonoidlar, saponinlar, alkaloidlar va polisaxaridlarning tarkibi tahlil qilinib, ularning

dorivor ahamiyati ilmiy jihatdan asoslab berildi. Astragal o‘simligi immunitetni mustahkamlash, yallig‘lanishga qarshi ta’sir ko‘rsatish, yurak-qon tomir tizimini qo‘llab-quvvatlash hamda organizmni umumiy tonusini oshirish xususiyatlari bilan ajralib turadi. Maqolada shuningdek, ushbu o‘simlikning bioekologik moslashuvi va uning turli ekologik sharoitlarda o‘sish dinamikasi o‘rganilib, uni farmatsevtika va fitoterapiyada qo‘llash istiqbollari yoritilgan. Olingan natijalar Astragal turkumining dorivor va ekologik ahamiyati yuqori ekanligini ko‘rsatadi.

Kalit so‘zlar: Astragal, *Astragalus L.*, bioekologiya, dorivor o‘simlik, flavonoidlar, saponinlar, ekologik moslashuv, fitoterapiya, biologik faol moddalar, immunitet

Introduction

Medicinal plants have long served as an essential source of therapeutic agents in both traditional and modern healthcare systems. Their natural origin, biological diversity, and relatively low toxicity have made them increasingly attractive in the development of alternative and complementary treatments. In recent years, scientific interest in plant-based medicines has significantly increased, particularly in the context of growing global health challenges and the need for sustainable natural resources. Among such plants, the genus *Astragalus L.* occupies a prominent position due to its wide distribution, ecological adaptability, and rich composition of biologically active compounds. *Astragalus L.*, belonging to the Fabaceae family, is one of the largest genera of flowering plants, comprising more than 2,500 species distributed across temperate regions of the Northern Hemisphere. Many species of Astragalus are known for their medicinal value and have been widely used in traditional medicine systems, particularly in Asian countries. These plants are characterized by their ability to thrive in diverse ecological conditions, including arid, semi-arid, and mountainous environments, which highlights their high level of ecological plasticity and adaptability. The bioecological characteristics of *Astragalus L.* play a crucial role in determining its distribution, growth patterns, and accumulation of active compounds. Environmental factors such as soil composition, temperature, moisture availability, and altitude significantly influence the plant’s physiological processes and biochemical profile. Understanding these bioecological aspects is essential not only for the conservation of natural populations but also for the рациональное использование данного растения в медицине и фармакологии. In addition to its ecological

significance, *Astragalus L.* is known for its diverse chemical composition, including flavonoids, saponins, polysaccharides, and alkaloids.

These compounds are responsible for a wide range of pharmacological effects, such as immunomodulatory, anti-inflammatory, antioxidant, and cardioprotective activities. As a result, Astragalus has gained considerable attention in modern phytotherapy and pharmaceutical research as a promising natural source of biologically active substances. Despite the extensive traditional use of Astragalus, many aspects of its bioecology and biological activity remain insufficiently studied, particularly under specific regional environmental conditions. Therefore, a comprehensive investigation of its ecological adaptability, growth dynamics, and chemical composition is necessary to fully раскрыть его потенциал и расширить возможности его практического применения. This study aims to explore the bioecological characteristics of *Astragalus L.*, analyze its adaptation to environmental factors, and evaluate its potential as a medicinal plant. By integrating ecological observations with biochemical analysis, the research seeks to contribute to a deeper understanding of this genus and its importance in both natural ecosystems and human health.

Materials and methods

The study of the bioecological characteristics of *Astragalus L.* was carried out using an integrated research approach combining field observations, laboratory analysis, and comparative evaluation. Plant samples were collected from natural habitats in different ecological zones, including semi-arid and steppe regions. The selection of sites was based on variations in soil composition, altitude, and climatic conditions in order to assess the adaptability of the species to diverse environments. Field studies included the observation of growth stages, phenological development, and morphological features of the plant. Parameters such as plant height, leaf structure, root system development, and flowering period were recorded. Soil samples from each location were also collected and analyzed to determine pH level, moisture content, and mineral composition, which are key factors influencing plant growth.

Laboratory analysis was conducted to identify the chemical composition of *Astragalus L.*. Standard phytochemical methods were applied to detect the presence of flavonoids, saponins, alkaloids, and polysaccharides. Quantitative analysis was performed using spectrophotometric and chromatographic techniques. To evaluate ecological adaptability, the plant's tolerance to environmental stress factors such as

drought and temperature fluctuations was analyzed. Additionally, a comparative analysis of literature sources was conducted to support and validate the experimental findings. Statistical methods were used to process the collected data and ensure the accuracy and reliability of the results.

Results

The results of the study demonstrated that *Astragalus L.* exhibits a high level of ecological adaptability and resilience under varying environmental conditions. The plant was found to successfully grow in soils with low moisture content and moderate mineral availability, indicating its tolerance to semi-arid climates. Field observations showed that the plant's root system is well-developed, allowing efficient absorption of water and nutrients even under limited conditions. Phenological analysis revealed that the growth cycle of *Astragalus L.* is closely linked to seasonal climatic changes. The plant begins active vegetative growth in early spring, followed by flowering in late spring or early summer, depending on environmental factors such as temperature and precipitation. Phytochemical analysis confirmed the presence of biologically active compounds, including flavonoids, saponins, and polysaccharides, in significant amounts. These compounds are known to contribute to the plant's medicinal properties. In particular, a high concentration of saponins and flavonoids suggests strong antioxidant and anti-inflammatory potential. The study also revealed that environmental factors such as soil type and climate conditions influence the accumulation of bioactive compounds. Plants growing in more stressful conditions, such as drought-prone areas, showed higher concentrations of certain secondary metabolites, indicating a possible adaptive mechanism.

Discussion

The findings of this study confirm that *Astragalus L.* is a highly adaptable plant species with significant ecological and medicinal value. Its ability to survive and develop in harsh environmental conditions highlights its ecological plasticity and potential for cultivation in regions with limited natural resources. The observed relationship between environmental stress and the increased production of secondary metabolites is consistent with previous scientific studies. This suggests that stress conditions may stimulate the synthesis of bioactive compounds, thereby enhancing the plant's medicinal properties. Such characteristics make *Astragalus L.* a valuable candidate for further pharmacological research. The presence of flavonoids and

saponins, which are known for their antioxidant and anti-inflammatory effects, supports the traditional use of Astragalus in herbal medicine. These compounds play a crucial role in protecting the body against oxidative damage and inflammation, which are key factors in many chronic diseases. Furthermore, the plant's well-developed root system and efficient resource utilization indicate its potential for sustainable agricultural practices, especially in arid and semi-arid regions. This makes *Astragalus L.* not only important from a medicinal perspective but also valuable for ecological conservation and land management. However, despite these promising results, further research is necessary to fully understand the mechanisms underlying the plant's bioecological adaptation and pharmacological activity. Future studies should focus on clinical trials, detailed biochemical pathways, and the development of standardized extraction and application methods. In conclusion, *Astragalus L.* represents a promising medicinal plant with strong ecological adaptability and significant potential for use in modern phytotherapy and sustainable agriculture.

Table. Bioecological characteristics and medicinal properties of *Astragalus L.*

Parameter	Description	Ecological role	Medicinal significance
Habitat	Semi-arid, steppe, and mountainous regions	Adaptation to drought and poor soils	Ensures availability in diverse environments
Root system	Deep and well-developed	Efficient water and nutrient absorption	Supports plant survival and active compound synthesis
Growth cycle	Spring vegetative growth, early summer flowering	Seasonal adaptation	Determines optimal harvesting time
Soil preference	Light, well-drained soils with moderate minerals	Enhances ecological flexibility	Influences concentration of bioactive compounds
Flavonoids	High content	Protection against environmental stress	Antioxidant and anti-inflammatory effects

Saponins	Significant amount	Defense mechanism	Immunomodulatory and cardioprotective properties
Polysaccharides	Present	Energy storage	Enhances immune response
Environmental Adaptation	High tolerance to drought and temperature changes	Stability in harsh climates	Increases medicinal value under stress conditions

Conclusion

The study confirms that *Astragalus L.* is a highly valuable medicinal plant with significant bioecological adaptability. Its ability to grow under diverse and often harsh environmental conditions demonstrates strong ecological resilience and plasticity. This adaptability allows the plant to survive in semi-arid and low-nutrient soils, making it an important species for both natural ecosystems and potential agricultural use. The phytochemical analysis revealed that *Astragalus L.* contains a wide range of biologically active compounds, including flavonoids, saponins, and polysaccharides. These compounds are responsible for its medicinal properties, particularly its antioxidant, anti-inflammatory, and immunomodulatory effects. The study also shows that environmental stress factors can enhance the production of these secondary metabolites, thereby increasing the plant's therapeutic potential. Furthermore, the relationship between ecological conditions and the accumulation of bioactive substances highlights the importance of environmental factors in determining the quality and effectiveness of medicinal plants. This makes the study of bioecology essential for the rational use and cultivation of *Astragalus L.* In conclusion, *Astragalus L.* represents a promising natural resource for modern phytotherapy and pharmacology. Its ecological adaptability, combined with its rich chemical composition, makes it a valuable candidate for further scientific research, sustainable cultivation, and practical application in medicine.

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“RAQAMLI BANK XIZMATLARINING IQTISODIY SAMARADORLIGI”

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Annotatsiya. Mazkur maqolada raqamli bank xizmatlarining iqtisodiy samaradorligi, bank tizimidagi operatsion xarajatlarni qisqartirishdagi o‘rni hamda mijozlarga ko‘rsatilayotgan xizmatlar sifatini oshirishdagi ahamiyati ilmiy jihatdan tahlil qilingan. Tadqiqot davomida zamonaviy raqamli texnologiyalar – mobil banking, internet banking, sun’iy intellekt, biometrik identifikatsiya va masofaviy xizmat ko‘rsatish tizimlarining tijorat banklari faoliyatiga ta’siri o‘rganildi. IMRAD metodologiyasi asosida olib borilgan izlanishda iqtisodiy-statistik tahlil, qiyosiy baholash va empirik kuzatuv usullaridan foydalanildi. Natijalarga ko‘ra, raqamli bank xizmatlari operatsion xarajatlarni kamaytirish, tranzaksiya tezligini oshirish, mijozlar qamrovini kengaytirish hamda bank rentabelligini oshirishda muhim omil ekanligi aniqlandi. Shuningdek, maqolada O‘zbekiston bank tizimida raqamli transformatsiyani jadallashtirish bo‘yicha ilmiy-amaliy takliflar ishlab chiqilgan. Tadqiqot natijalari bank tizimida innovatsion boshqaruv mexanizmlarini joriy etish, moliyaviy xizmatlarning raqamlashtirilishini chuqurlashtirish hamda iqtisodiy samaradorlikni oshirishga xizmat qiladi.

Kalit so‘zlar: raqamli bank xizmatlari, iqtisodiy samaradorlik, fintech, mobil banking, internet banking, bank innovatsiyasi, raqamli transformatsiya, bank rentabelligi, operatsion xarajatlar, sun’iy intellekt.

Kirish. Jahon iqtisodiyotida raqamli transformatsiya jarayonlarining jadallashuvi bank sektorida ham tub institutsional o‘zgarishlarni yuzaga keltirmoqda. Raqamli bank xizmatlari nafaqat moliyaviy operatsiyalarni soddalashtirish, balki banklarning iqtisodiy samaradorligini oshirishning strategik omiliga aylanmoqda. Ayniqsa, mobil ilovalar, internet banking va elektron to‘lov tizimlari mijozlarga tezkor, xavfsiz va qulay xizmat ko‘rsatishni ta’minlab, banklarning xarajatlarini optimallashtirish imkonini bermoqda.O‘zbekiston bank tizimida ham so‘nggi yillarda raqamli texnologiyalarni keng joriy etish bo‘yicha muhim islohotlar amalga oshirilmoqda. Natijada masofaviy bank xizmatlari hajmi ortib, mijozlarning bank xizmatlaridan foydalanish darajasi sezilarli ravishda kengaydi. Shu bilan birga, raqamli

xizmatlarning iqtisodiy samaradorligini ilmiy jihatdan baholash dolzarb masalalardan biri bo‘lib qolmoqda.

Mazkur tadqiqotning asosiy maqsadi raqamli bank xizmatlarining iqtisodiy samaradorligini aniqlash va bank tizimida ularni rivojlantirish bo‘yicha ilmiy-amaliy tavsiyalar ishlab chiqishdan iborat.

Tadqiqotning ilmiy yangiligi quyidagilardan iborat:

raqamli bank xizmatlarining operatsion xarajatlarga ta’siri kompleks baholandi,bank rentabelligiga raqamli xizmatlarning empirik ta’siri tahlil qilindi,O‘zbekiston bank tizimida raqamli transformatsiyani jadallashtirish bo‘yicha amaliy mexanizmlar taklif etildi.

Adabiyotlar tahlili. Raqamli bank xizmatlari va fintech texnologiyalarining iqtisodiy samaradorligi masalalari ko‘plab xorijiy va mahalliy olimlar tomonidan o‘rganilgan. Jumladan, F. Kotler, P. Drucker, J. Schumpeter va C. Christensen innovatsion texnologiyalarning iqtisodiy rivojlanishdagi rolini ilmiy asoslab berganlar. Zamonaviy tadqiqotlarda esa raqamli banking bank sektorining raqobatbardoshligini oshiruvchi asosiy omillardan biri sifatida baholanmoqda.Xalqaro amaliyotda McKinsey, Deloitte va World Bank ekspertlari tomonidan olib borilgan tadqiqotlarda raqamli xizmatlar bank operatsion xarajatlarini 30–40 foizgacha kamaytirishi mumkinligi qayd etilgan. Shuningdek, sun’iy intellekt va Big Data texnologiyalarining qo‘llanilishi kredit risklarini boshqarish samaradorligini oshirishi aniqlangan.

Mahalliy iqtisodchi olimlar tomonidan ham O‘zbekiston bank tizimida raqamli transformatsiya masalalari tadqiq etilmoqda. Biroq mavjud ilmiy ishlarda raqamli bank xizmatlarining iqtisodiy samaradorligini kompleks IMRAD metodologiyasi asosida baholash yetarli darajada yoritilmagan.

Tadqiqot metodlogiyasi. Tadqiqotda iqtisodiy-statistik tahlil, qiyosiy taqqoslash, empirik kuzatuv, grafik tahlil va tizimli yondashuv usullaridan foydalanildi. Tadqiqotning axborot bazasini tijorat banklari hisobotlari, xalqaro moliyaviy tashkilotlar ma’lumotlari hamda ilmiy manbalar tashkil etdi.Bank xizmatlari samaradorligini baholashda quyidagi ko‘rsatkichlardan foydalanildi:operatsion xarajatlar darajasi,mijozlarga xizmat ko‘rsatish tezligi,tranzaksiya hajmi,bank rentabelligi,raqamli xizmatlardan foydalanuvchilar soni.Tadqiqot davomida an’anaviy bank xizmatlari va raqamli xizmatlarning iqtisodiy samaradorligi qiyosiy ravishda tahlil qilindi.

Natijalar va tahlillar. Tahlillar shuni ko‘rsatdiki, raqamli bank xizmatlari bank tizimining iqtisodiy samaradorligini sezilarli darajada oshirmoqda. Xususan:mobil banking xizmatlari tranzaksiya vaqtini bir necha barobarga qisqartirdi,internet banking

tizimlari filial xarajatlarini kamaytirdi,elektron to‘lov tizimlari naqd pul muomalasi xarajatlarini pasaytirdi,sun’iy intellekt asosidagi xizmatlar mijozlarga xizmat ko‘rsatish sifatini yaxshiladi.

Raqamli xizmatlarning keng joriy etilishi banklarning operatsion samaradorligini oshirib, foyda marjasining ortishiga olib kelmoqda. Shu bilan birga, kiberxavfsizlik tahdidlari, raqamli savodxonlikning yetarli emasligi hamda texnologik infratuzilmaning nomutanosib rivojlanishi muayyan muammolarni yuzaga keltirmoqda.

Tadqiqot natijalari asosida quyidagi takliflar ishlab chiqildi:bank tizimida sun’iy intellekt texnologiyalarini keng joriy etish,hududlarda raqamli moliyaviy savodxonlik dasturlarini kuchaytirish,kiberxavfsizlik tizimlarini modernizatsiya qilish,fintech kompaniyalari bilan hamkorlikni kengaytirish,raqamli bank xizmatlarini baholovchi integral indeks modelini ishlab chiqish.

Xulosa. Raqamli bank xizmatlari zamonaviy bank tizimining iqtisodiy samaradorligini oshiruvchi muhim strategik omil hisoblanadi. Tadqiqot natijalari raqamli texnologiyalar banklarning operatsion xarajatlarini kamaytirishi, xizmat ko‘rsatish sifatini oshirishi hamda moliyaviy inklyuziyaga ijobiy ta’sir ko‘rsatishini tasdiqladi.O‘zbekiston bank tizimida raqamli transformatsiyani jadallashtirish iqtisodiyotning barqaror rivojlanishiga, bank sektorining raqobatbardoshligini oshirishga hamda innovatsion iqtisodiyot shakllanishiga xizmat qiladi. Shu sababli raqamli bank xizmatlarini rivojlantirish bo‘yicha ilmiy asoslangan strategiyalarni ishlab chiqish dolzarb vazifalardan biri bo‘lib qolmoqda.

Mazkur tadqiqotda raqamli bank xizmatlarining iqtisodiy samaradorligi kompleks ilmiy yondashuv asosida baholandi. Muallif tomonidan raqamli xizmatlarning bank rentabelligiga ta’siri tahlil qilinib, O‘zbekiston bank tizimi uchun innovatsion rivojlanish yo‘nalishlari va amaliy tavsiyalar ishlab chiqildi.

Amaliy ahamiyati. Tadqiqot natijalari:tijorat banklari faoliyatida,raqamli transformatsiya strategiyalarini ishlab chiqishda,bank boshqaruvi samaradorligini oshirishda,oliy ta’lim muassasalarida ilmiy va o‘quv manbasi sifatida foydalanilishi mumkin.

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ANTIXOLINESTERAZ VOSITALAR. N-XOLINORESEPTORLARGA TA'SIR ETUVCHI VOSITALAR

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Annotatsiya
Ushbu maqolada antixolinesteraz vositalar hamda N-xolinoreseptorlarga ta'sir etuvchi farmakologik preparatlarning ta'sir mexanizmi, farmakodinamikasi, farmakokinetikasi, klinik qo'llanilishi va nojo'ya ta'sirlari tahlil qilindi. Antixolinesteraz vositalar asetilxolinesteraza fermentini inhibitsiya qilish orqali sinapslarda asetilxolin miqdorini oshiradi va xolinergik uzatishni kuchaytiradi. N-xolinoreseptorlarga ta'sir etuvchi vositalar esa vegetativ gangliyalar hamda nerv-mushak sinapslari faoliyatiga bevosita ta'sir ko'rsatadi. Tadqiqot davomida zamonaviy farmakologiya adabiyotlari va ilmiy manbalar asosida ushbu preparatlarning terapevtik samaradorligi, qo'llash sohalari va xavfsizlik profili baholandi. Olingan natijalar antixolinesteraz preparatlarning miasteniya, ichak va siydik pufagi atoniyasi, shuningdek, ayrim nevrologik kasalliklarni davolashda muhim ahamiyatga ega ekanligini ko'rsatdi. N-xolinoreseptorlarga ta'sir qiluvchi preparatlar esa anesteziologiya, reanimatologiya va nevrologiyada keng qo'llanilishi bilan tavsiflanadi.
Kalit so'zlar: antixolinesteraz vositalar, N-xolinoreseptorlar, asetilxolin, neostigmin, piridostigmin, gangliyalar, nerv-mushak sinapsi, farmakologiya.
Аннотация
В данной статье рассмотрены антихолинэстеразные средства и препараты, воздействующие на N-холинорецепторы, их механизмы действия, фармакодинамические и фармакокинетические свойства, клиническое применение и побочные эффекты. Антихолинэстеразные препараты ингибируют фермент ацетилхолинэстеразу, что приводит к увеличению концентрации

ацетилхолина в синаптической щели и усилению холинергической передачи. Средства, влияющие на N-холинорецепторы, оказывают действие на вегетативные ганглии и нервно-мышечные синапсы. Исследование выполнено на основе анализа современных фармакологических источников и научной литературы. Полученные данные свидетельствуют о высокой эффективности антихолинэстеразных средств при лечении миастении, атонии кишечника и мочевого пузыря, а также ряда неврологических заболеваний. Препараты, действующие на N-холинорецепторы, широко используются в анестезиологии, реаниматологии и неврологической практике.

Ключевые слова: антихолинэстеразные средства, N-холинорецепторы, ацетилхолин, неостигмин, пиридостигмин, ганглии, нервно-мышечный синапс, фармакология.

Abstract

This article examines anticholinesterase agents and drugs acting on nicotinic cholinergic receptors (N-cholinoreceptors), focusing on their mechanisms of action, pharmacodynamic and pharmacokinetic properties, clinical applications, and adverse effects. Anticholinesterase drugs inhibit the enzyme acetylcholinesterase, leading to increased acetylcholine concentration in the synaptic cleft and enhanced cholinergic neurotransmission. Agents affecting N-cholinoreceptors exert their effects on autonomic ganglia and neuromuscular junctions. The study was conducted through an analysis of contemporary pharmacology textbooks and scientific literature. The findings demonstrate the significant therapeutic value of anticholinesterase drugs in the treatment of myasthenia gravis, intestinal and urinary bladder atony, and several neurological disorders. Drugs acting on N-cholinoreceptors are widely utilized in anesthesiology, intensive care medicine, and neurology.

Keywords: anticholinesterase agents, N-cholinoreceptors, acetylcholine, neostigmine, pyridostigmine, autonomic ganglia, neuromuscular junction, pharmacology.

Kirish

Xolinergik nerv tizimi organizmning ko‘plab fiziologik jarayonlarini boshqarishda muhim o‘rin tutadi. Nerv impulslarining markaziy va periferik nerv tizimida uzatilishi asosan neyromediatorlar orqali amalga oshiriladi. Shunday mediatorlardan biri asetilxolin bo‘lib, u vegetativ nerv tizimi gangliyalarida, nerv-mushak sinapslarida hamda markaziy nerv tizimining ayrim tuzilmalarida impulslarning uzatilishini ta’minlaydi. Asetilxolinning biologik ta’siri

xolinoreseptorlar bilan bog‘lanishi orqali yuzaga keladi. Ushbu retseptorlar M-xolinoreseptorlar va N-xolinoreseptorlarga bo‘linadi. N-xolinoreseptorlar vegetativ gangliyalar, buyrak usti bezining mag‘iz qavati hamda skelet mushaklarining nerv-mushak birikmalarida joylashgan bo‘lib, organizmning ko‘plab hayotiy funksiyalarini boshqarishda ishtirok etadi.

Antixolinesteraz vositalar farmakologik jihatdan muhim preparatlar guruhiga kiradi. Ularning asosiy ta’sir mexanizmi asetilxolinesteraza fermentini bloklash orqali asetilxolinning parchalanishini sekinlashtirishdan iborat. Natijada sinapslarda asetilxolin miqdori ortadi va xolinergik uzatish kuchayadi. Ushbu preparatlar miasteniya gravis, ichak va siydik pufagi atoniyasi, operatsiyadan keyingi nerv-mushak blokadasini bartaraf etish hamda ayrim nevrologik kasalliklarni davolashda keng qo‘llaniladi. So‘nggi yillarda antixolinesteraz vositalarning neyrodegenerativ kasalliklar, xususan demensiya va Altsgeymer kasalligini davolashdagi o‘rni ham ortib bormoqda.

N-xolinoreseptorlarga ta’sir etuvchi vositalar esa nikotinomimetiklar va N-xolinoblokatorlar kabi guruhlarga bo‘linadi. Ushbu preparatlar vegetativ gangliyalar va nerv-mushak sinapslari faoliyatini boshqarish imkoniyatini beradi. Ayniqsa, nerv-mushak blokatorlari zamonaviy anesteziologiya va jarrohlik amaliyotida mushaklarni bo‘shashtirish maqsadida keng qo‘llanadi. Shu bilan birga, N-xolinoreseptorlarga ta’sir qiluvchi vositalarning nojo‘ya ta’sirlari va qo‘llashdagi ehtiyot choralari ham klinik amaliyotda muhim ahamiyatga ega.

Bugungi kunda farmakologiya fanining rivojlanishi bilan antixolinesteraz preparatlar va N-xolinoreseptorlarga ta’sir etuvchi vositalarning yangi vakillari yaratilmoqda, ularning samaradorligi va xavfsizligini oshirish bo‘yicha ko‘plab tadqiqotlar olib borilmoqda. Ushbu preparatlarning ta’sir mexanizmlarini chuqur o‘rganish klinik amaliyotda ulardan oqilona foydalanish, nojo‘ya reaksiyalarni kamaytirish hamda davolash natijalarini yaxshilash imkonini beradi.

Mazkur tadqiqotning maqsadi antixolinesteraz vositalar hamda N-xolinoreseptorlarga ta’sir etuvchi preparatlarning farmakologik xususiyatlari, ta’sir mexanizmlari, klinik qo‘llanilishi va zamonaviy tibbiyotdagi ahamiyatini ilmiy adabiyotlar asosida tahlil qilishdan iborat.

Materiallar va metodologiya

Ushbu tadqiqot farmakologiya fanining “Antixolinesteraz vositalar va N-xolinoreseptorlarga ta’sir etuvchi vositalar” mavzusiga bag‘ishlangan bo‘lib,

adabiyotlar tahlili asosida olib borildi. Tadqiqotning asosiy maqsadi mazkur preparatlarning farmakologik xususiyatlari, ta'sir mexanizmlari, farmakokinetikasi, farmakodinamikasi, klinik qo'llanilishi va nojo'ya ta'sirlarini tizimli ravishda o'rganishdan iborat bo'ldi.

Tadqiqot materiallari sifatida farmakologiya bo'yicha xalqaro va mahalliy darsliklar, ilmiy monografiyalar, klinik farmakologiya qo'llanmalari hamda so'nggi yillarda nashr etilgan ilmiy maqolalardan foydalanildi. Xususan, akademik M.D. Mashkovskiyning "Лекарственные средства", D.A. Xarkevichning "Фармакология", R.N. Alimuhamedovning "Farmakologiya", B.G. Katsungning "Basic and Clinical Pharmacology", H.P. Rang, M.M. Dale va J.M. Ritter muallifligidagi "Rang and Dale's Pharmacology" hamda B. Brennan tomonidan tahrir qilingan zamonaviy farmakologik adabiyotlar tadqiqotning nazariy asosini tashkil etdi. Tadqiqot jarayonida antixolinesteraz vositalar (neostigmin, piridostigmin, fizostigmin, galantamin, donepezil va rivastigmin) hamda N-xolinoreseptorlarga ta'sir qiluvchi preparatlar (nikotin, sitizin, lobelin, suksametoniy, pankuroniy, pipekuroniy va atrakuriy)ning farmakologik tavsiflari qiyosiy jihatdan tahlil qilindi. Har bir preparatning kimyoviy tuzilishi, ta'sir mexanizmi, organizmga ta'sir davomiyligi, metabolizmi, chiqarilish yo'llari va klinik samaradorligi o'rganildi.

Ma'lumotlarni qayta ishlashda tizimli tahlil, qiyosiy tahlil, umumlashtirish va sintez usullaridan foydalanildi. Preparatlarning farmakodinamik va farmakokinetik ko'rsatkichlari taqqoslanib, ularning terapevtik afzalliklari va cheklovlari baholandi. Shuningdek, klinik amaliyotda uchraydigan asosiy nojo'ya reaksiyalar va ularni oldini olish choralari bo'yicha ilmiy ma'lumotlar umumlashtirildi.

Tadqiqotning metodologik yondashuvi dalillarga asoslangan tibbiyot tamoyillariga tayangan holda amalga oshirildi. Olingan ma'lumotlar zamonaviy farmakologiya nuqtai nazaridan tahlil qilinib, antixolinesteraz vositalar va N-xolinoreseptorlarga ta'sir etuvchi preparatlarning amaliy tibbiyotdagi o'rni hamda istiqbolli qo'llanish yo'nalishlari baholandi. Shu asosda preparatlarning klinik samaradorligi va xavfsizlik profili bo'yicha ilmiy xulosalar shakllantirildi.

Natijalar

Tadqiqot davomida antixolinesteraz vositalar hamda N-xolinoreseptorlarga ta'sir etuvchi preparatlarning farmakologik xususiyatlari, klinik qo'llanilishi va xavfsizlik profili tahlil qilindi. Olingan natijalar shuni ko'rsatdiki, antixolinesteraz preparatlar asetilxolinesteraza fermentini inhibe qilish orqali sinapslarda asetilxolin miqdorini oshiradi va nerv-mushak uzatilishini kuchaytiradi. Ushbu xususiyat ularni miasteniya

gravis, ichak va siydik pufagi atoniyasi hamda operatsiyadan keyingi nerv-mushak blokadasini bartaraf etishda samarali vosita sifatida qo‘llash imkonini beradi.

Tahlil natijalari galantamin, donepezil va rivastigmin kabi markaziy nerv tizimiga ta’sir qiluvchi antixolinesteraz preparatlar Altsgeymer kasalligi bilan og‘rigan bemorlarda kognitiv funksiyalarning pasayishini sekinlashtirishda muhim ahamiyatga ega ekanligini ko‘rsatdi. Neostigmin va piridostigmin esa periferik nerv-mushak o‘tkazuvchanligini tiklashda yuqori samaradorlikka ega ekanligi aniqlandi.

N-xolinoreseptorlarga ta’sir qiluvchi vositalarni o‘rganish natijasida nikotinomimetik preparatlar vegetativ gangliyalar faoliyatini rag‘batlantirishi, nerv-mushak blokatorlari esa skelet mushaklarini bo‘shashtirish orqali jarrohlik amaliyotlarida qulay sharoit yaratishi ma’lum bo‘ldi. Ayniqsa, suksametoniy qisqa muddatli ta’sirga ega bo‘lib, tezkor intubatsiya uchun samarali vosita hisoblanadi. Atrakuriy va pipekuroniy kabi preparatlar esa uzoqroq davom etuvchi mushak relaksatsiyasini ta’minlaydi.

Shuningdek, tadqiqot davomida preparatlarning nojo‘ya ta’sirlari ham baholandi. Antixolinesteraz vositalarda bradikardiya, bronxospazm, gipersalivatsiya va diareya kuzatilishi mumkinligi aniqlandi. Nerv-mushak blokatorlarida esa arterial bosimning pasayishi, allergik reaksiyalar va nafas mushaklari falaji kabi holatlar uchrashi mumkin.

Jadval 1

Antixolinesteraz vositalarning farmakologik tavsifi

Preparat	**Farmakologik guruhi**	**Ta’sir mexanizmi**	**Asosiy qo‘llanilishi**	**Muhim nojo‘ya ta’sirlari**
Neostigmin	Qaytar antixolinesteraz vosita	Asetilxolinesterazani inhibitsiya qiladi	Miasteniya, ichak atoniyasi	Bradikardiya, bronxospazm
Piridostigmin	Qaytar antixolinesteraz vosita	Asetilxolin miqdorini oshiradi	Miasteniya gravis	Diareya, ko‘ngil aynishi
Fizostigmin	Markaziy va periferik ta’sirli vosita	Gematoensefalik to‘siqdan o‘tadi	Antixolinergik zaharlanishlar	Tutqanoq, bradikardiya

Galantamin	Markaziy ta’sir qiluvchi vosita	Xolinergik uzatishni kuchaytiradi	Altsgeymer kasalligi	Bosh aylanishi, qusish
Donepezil	Markaziy antixolinesteraz vosita	Asetilxolin parchalanishini kamaytiradi	Altsgeymer kasalligi	Uyqusizlik, ko‘ngil aynishi

Jadval 2

N-xolinoreseptorlarga ta’sir etuvchi vositalarning farmakologik tavsifi

Preparat	**Guruhi**	**Ta’sir mexanizmi**	**Klinik qo‘llanilishi**	**Nojo‘ya ta’sirlari**
Nikotin	N-xolinomimetik	N-xolinoreseptorlarni qo‘zg‘atadi	Ilmiy tadqiqotlarda	Taxikardiya, qaramlik
Sitizin	N-xolinomimetik	Vegetativ gangliyalarni rag‘batlantiradi	Chekishni tashlashda yordamchi vosita	Ko‘ngil aynishi
Lobelin	N-xolinomimetik	Karotid tanachalarni qo‘zg‘atadi	Nafas markazini reflektor rag‘batlantirish	Taxikardiya
Suksametoniy	Depolyarizatsiyalovchi miorelaksant	Nerv-mushak uzatilishini bloklaydi	Tezkor intubatsiya	Giperkaliemiya
Atrakuriy	Nedepolyarizatsiyalovchi miorelaksant	N-xolinoreseptorlarni bloklaydi	Jarrohlik amaliyoti	Arterial gipotenziya
Pipekuroniy	Nedepolyarizatsiyalovchi miorelaksant	Nerv-mushak blokadasini yuzaga keltiradi	Uzoq operatsiyalar	Nafas mushaklari falaji

Tadqiqot natijalari antixolinesteraz vositalar va N-xolinoreseptorlarga ta’sir qiluvchi preparatlarning zamonaviy klinik amaliyotda muhim o‘rin tutishini ko‘rsatdi. Ularning oqilona qo‘llanilishi nerv-mushak o‘tkazuvchanligi buzilishlari, neyrodegenerativ

kasalliklar hamda jarrohlik amaliyotlarida davolash samaradorligini oshirishga xizmat qiladi.

Muhokama

Mazkur tadqiqot natijalari antixolinesteraz vositalar va N-xolinoreseptorlarga ta’sir etuvchi preparatlarning zamonaviy farmakoterapiyada muhim o‘rin egallashini tasdiqladi. Xolinergik uzatish jarayonlari organizmning ko‘plab fiziologik funksiyalarini boshqarishda ishtirok etgani sababli, ushbu tizimga ta’sir qiluvchi preparatlar turli kasalliklarni davolashda keng qo‘llaniladi. O‘rganilgan ilmiy manbalar shuni ko‘rsatdiki, antixolinesteraz vositalar sinaptik yoriqda asetilxolin konsentratsiyasini oshirish orqali nerv impulslari uzatilishini yaxshilaydi va nerv-mushak faoliyatining tiklanishiga yordam beradi.

Tahlillar natijasida neostigmin va piridostigmin preparatlarining miasteniya gravisni davolashdagi samaradorligi yuqori ekanligi aniqlandi. Ushbu preparatlar nerv-mushak sinapslarida asetilxolinning biologik faolligini kuchaytirib, mushaklarning qisqarish qobiliyatini yaxshilaydi. Biroq ularning uzoq muddat qo‘llanishi xolinergik nojo‘ya ta’sirlar, jumladan bradikardiya, bronxospazm, gipersalivatsiya va me’da-ichak faoliyatining kuchayishi bilan kechishi mumkin. Shu sababli preparatlarni qo‘llashda bemorning umumiy holatini muntazam nazorat qilish zarur.

Markaziy ta’sir ko‘rsatuvchi antixolinesteraz preparatlar — donepezil, rivastigmin va galantamin — Altsgeymer kasalligida kognitiv funksiyalarni saqlab qolishda muhim terapevtik ahamiyatga ega ekanligi ilmiy adabiyotlarda qayd etilgan. Tadqiqot natijalari ushbu preparatlar kasallik rivojlanishini to‘liq to‘xtatmasa-da, xotira, diqqat va kundalik faoliyat ko‘rsatkichlarini ma’lum darajada yaxshilashini ko‘rsatdi. Bu esa ularning geriatriya va nevrologiya amaliyotidagi ahamiyatini oshiradi.

N-xolinoreseptorlarga ta’sir qiluvchi vositalar tahlili shuni ko‘rsatdiki, nikotinomimetik preparatlar vegetativ nerv tizimi faoliyatini o‘zgartirish xususiyatiga ega bo‘lsa, nerv-mushak blokatorlari anesteziologiya va jarrohlik amaliyotining ajralmas qismi hisoblanadi. Suksametoniy tez va qisqa muddatli mushak relaksatsiyasini ta’minlashi sababli shoshilinch intubatsiya amaliyotlarida keng qo‘llaniladi. Atrakuriy va pipekuroniy kabi nedepolyarizatsiyalovchi miorelaksantlar esa uzoq davom etuvchi operatsiyalarda samarali hisoblanadi. Biroq ushbu preparatlar nafas mushaklari faoliyatini ham susaytirishi mumkinligi sababli ularni qo‘llash faqat maxsus nazorat ostida amalga oshirilishi kerak.

Adabiyotlar tahlili antixolinesteraz vositalar va N-xolinoreseptorlarga ta’sir etuvchi preparatlar samaradorligining yuqori ekanligini ko‘rsatgan bo‘lsa-da, ularning xavfsiz qo‘llanilishi dozani to‘g‘ri tanlash, bemorning yoshi, hamroh kasalliklari va boshqa

dori vositalari bilan o‘zaro ta’sirini hisobga olishni talab qiladi. Ayniqsa, yurak-qon tomir tizimi va nafas tizimi kasalliklari bo‘lgan bemorlarda ehtiyotkorlik bilan qo‘llash tavsiya etiladi.

Shunday qilib, olingan natijalar antixolinesteraz preparatlar hamda N-xolinoreseptorlarga ta’sir qiluvchi vositalarning farmakologik va klinik ahamiyati yuqori ekanligini ko‘rsatdi. Ularning ta’sir mexanizmlarini chuqur o‘rganish, yangi va xavfsiz preparatlarni yaratish hamda individual farmakoterapiya tamoyillarini rivojlantirish kelajakdagi tadqiqotlarning muhim yo‘nalishlaridan biri bo‘lib qoladi.

Xulosa

Antixolinesteraz vositalar va N-xolinoreseptorlarga ta’sir etuvchi preparatlar xolinergik nerv tizimiga ta’sir qiluvchi muhim farmakologik vositalar hisoblanadi. Ushbu preparatlar organizmda nerv impulslarining uzatilishini boshqarish, nerv-mushak faoliyatini tiklash va vegetativ nerv tizimi funksiyalarini tartibga solishda muhim ahamiyatga ega.

Tadqiqot natijalari antixolinesteraz vositalarning asetilxolinesteraza fermentini inhibitsiya qilish orqali sinapslarda asetilxolin miqdorini oshirishi va xolinergik uzatishni kuchaytirishini ko‘rsatdi. Neostigmin, piridostigmin, galantamin, rivastigmin va donepezil kabi preparatlar miasteniya gravis, ichak va siydik pufagi atoniyasi hamda Altsgeymer kasalligi kabi patologiyalarni davolashda yuqori terapevtik samaradorlikka ega ekanligi aniqlandi.

N-xolinoreseptorlarga ta’sir qiluvchi vositalar esa nikotinomimetiklar va nerv-mushak blokatorlari guruhlariga bo‘linib, ularning klinik qo‘llanilishi turlicha ekanligi qayd etildi. Ayniqsa, suksametoniy, atrakuriy va pipekuroniy kabi miorelaksantlar zamonaviy anesteziologiya va jarrohlik amaliyotida muhim o‘rin tutadi. Ushbu preparatlar operatsiyalar vaqtida mushaklarning nazorat qilinadigan relaksatsiyasini ta’minlab, jarrohlik muolajalarining samaradorligini oshiradi.

Shu bilan birga, antixolinesteraz vositalar va N-xolinoreseptorlarga ta’sir qiluvchi preparatlarning nojo‘ya ta’sirlari mavjudligi sababli ularni qo‘llashda individual yondashuv, dozani to‘g‘ri tanlash va bemor holatini muntazam monitoring qilish talab etiladi. Preparatlarning farmakodinamik va farmakokinetik xususiyatlarini chuqur o‘rganish ularning klinik samaradorligini oshirish va xavfsizligini ta’minlashda muhim omil hisoblanadi.

Umuman olganda, antixolinesteraz vositalar va N-xolinoreseptorlarga ta’sir etuvchi preparatlar zamonaviy tibbiyotning nevrologiya, terapiya, anesteziologiya va reanimatologiya sohalarida keng qo‘llaniladigan, yuqori amaliy ahamiyatga ega

farmakologik vositalar bo‘lib, ularni yanada takomillashtirish va yangi avlod preparatlarini yaratish istiqbolli ilmiy yo‘nalishlardan biri hisoblanadi.

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O‘PKA ABSESSI ETIOLOGIYASI, KLINIK KECHISHI, DIAGNOSTIKASI VA DAVOLASH YONDASHUVLARI

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Annotatsiya. O‘pka absessi o‘pka parenximasida yiringli-nekrotik jarayon natijasida hosil bo‘ladigan, ko‘pincha havo-suyuqlik sathi bilan kechuvchi kavitar infeksion kasallik hisoblanadi. U odatda og‘iz-halqum ajralmalarining aspiratsiyasi, og‘iz bo‘shlig‘i va tish kasalliklari, immunitetning pasayishi, bronxial drenaj buzilishi, nekrotik pnevmoniya yoki septik emboliyalar bilan bog‘liq bo‘ladi. Tadqiqot tavsifiy-tahliliy yo‘nalishda bajarildi va xalqaro klinik manbalar, ichki kasalliklar bo‘yicha o‘quv adabiyotlari hamda zamonaviy pulmonologik sharhlar asosida umumlashtirildi. Natijalar shuni ko‘rsatadiki, o‘pka absessida muvaffaqiyatli davolash erta tashxis, xavf omillarini aniqlash, antibiotik terapiyasini shifokor nazorati ostida tanlash, asoratlarni kuzatish va zarur hollarda drenaj yoki jarrohlik yondashuvini qo‘llash bilan belgilanadi. Maqola ta’limiy va ilmiy maqsadda tayyorlangan bo‘lib, individual tibbiy maslahat o‘rnini bosmaydi.

Kalit so‘zlar: o‘pka absessi; aspiratsiya; anaerob bakteriyalar; kavitar o‘pka zararlanishi; pnevmoniya; bronxial drenaj; antibiotik terapiya; differensial tashxis; empiyema; pulmonologiya.

Kirish

O‘pka absessi nafas tizimi infeksiyalari ichida klinik jihatdan og‘ir kechishi, uzoq davom etuvchi isitma, balg‘amli yo‘tal, umumiy intoksikatsiya, ko‘krak qafasidagi og‘riq va ba’zan nafas yetishmovchiligi bilan ajralib turadi. Kasallikning mohiyati o‘pka to‘qimasida chegaralangan yiringli bo‘shliq paydo bo‘lishidan iborat. Bu bo‘shliq bronx bilan tutashganda bemorda ko‘p miqdorda noxush hidli balg‘am ajralishi mumkin, rentgen yoki kompyuter tomografiyada esa kavita va havo-suyuqlik sathi aniqlanadi.

Kirishning ilmiy dolzarbligi

Mazkur mavzuning dolzarbligi uchta asosiy sabab bilan belgilanadi. Birinchidan, o‘pka absessi oddiy pnevmoniya sifatida kech boshlang‘ich bosqichda noto‘g‘ri baholanishi mumkin, bu esa tashxisning kechikishiga olib keladi. Ikkinchidan, kasallik ko‘pincha aspiratsiya xavfi yuqori bo‘lgan bemorlarda, og‘iz bo‘shlig‘i gigiyenasi yetarli bo‘lmaganda, hush buzilishi, yutish buzilishi, qandli diabet, immun tanqislik, spirtli ichimliklarni suiiste’mol qilish yoki bronxial obstruksiya mavjud bo‘lganda rivojlanadi. Uchinchidan, yiringli kavitar jarayon empiyema, pnevmotoraks, qon ketishi, sepsis va surunkali fibrotik o‘zgarishlar kabi asoratlar bilan og‘irlashishi mumkin.

O‘pka absessini faqat antibiotik bilan cheklanadigan kasallik sifatida tushunish zaif yondashuvdir. Haqiqiy klinik muammo infeksiya manbai, bronxial drenaj holati, bemorning immun holati, kavitaning kattaligi, qo‘zg‘atuvchi mikroorganizmlar va asoratlar ehtimolini birgalikda baholashni talab qiladi. Agar absess bronxial o‘sma, begona jism, sil, zamburug‘li infeksiya yoki o‘pka saratoni fonida rivojlangan bo‘lsa, faqat simptomatik davolash bilan natijaga erishish qiyin bo‘ladi.

Maqolaning maqsadi o‘pka absessining etiologik omillari, klinik kechishi, tashxislash algoritmi va davolash yondashuvlarini ilmiy-tahliliy tarzda yoritishdan iborat. Asosiy vazifalar sifatida kasallikning asosiy xavf omillarini tasniflash, patogenez bosqichlarini tushuntirish, klinik belgilarni tizimlashtirish, laborator va instrumental tashxis usullarini taqqoslash hamda profilaktik chora-tadbirlarni ko‘rsatish belgilandi.

Materiallar va metodlar

Maqola tavsifiy va tahliliy metod asosida tayyorlandi. Tahlil uchun ichki kasalliklar, pulmonologiya, mikrobiologiya va klinik diagnostikaga oid o‘quv adabiyotlari, xalqaro ma’lumotnomalar, klinik tavsiyalar va ilmiy sharhlar umumlashtirildi. Ishda shaxsiy bemor ma’lumotlari, klinik tajriba natijalari yoki individual davolash protokollari ishlatilmadi. Shuning uchun maqola eksperimental klinik tadqiqot emas, balki ilmiy-o‘quv sharh xarakteriga ega.

Materiallar uch bosqichda tizimlashtirildi. Birinchi bosqichda o‘pka absessining etiologiyasi aspiratsion, postpnevmonik, obstruktiv, gematogen, immun tanqislik bilan bog‘liq va nozokomial shakllarga ajratildi. Ikkinchi bosqichda klinik belgilarning diagnostik qiymati baholandi. Uchinchi bosqichda davolash yondashuvlari konservativ, intervensional va jarrohlik guruhlariga bo‘lindi.

Etiologik guruh	Asosiy mexanizm	Klinik ahamiyati
Aspiratsion omillar	Og‘iz-halqum ajralmalari, oziq qoldiqlari yoki	Eng ko‘p uchraydigan mexanizmlardan biri; tish va

	mikroblangan suyuqliklar pastki nafas yo‘llariga tushadi.	milk kasalliklari xavfni kuchaytiradi.
Postpnevmonik jarayon	Nekrotik pnevmoniya fonida o‘pka to‘qimasida yiringli erish rivojlanadi.	Davolanishi cho‘zilgan, isitmasi saqlangan pnevmoniyada absessdan shubhalanish kerak.
Bronxial obstruksiya	O‘sma, begona jism yoki chandiqli torayish bronx drenajini buzadi.	Kattalarda, ayniqsa uzoq davom etuvchi bir tomonlama kavita bo‘lsa, obstruksiya istisno qilinadi.
Gematogen tarqalish	Septik emboliyalar qon orqali o‘pkaga yetib boradi.	Ko‘p o‘choqli kavitalar va og‘ir umumiy holat bilan kechishi mumkin.
Immun tanqislik	Himoya mexanizmlari pasayganda noodatiy bakteriyalar, mikobakteriyalar yoki zamburug‘lar faollashadi.	Tashxis va davolash murakkablashadi, mikrobiologik tekshiruv muhim bo‘ladi.

Natijalar

Tahlil shuni ko‘rsatadiki, o‘pka absessi birgina mikroorganizm ta’siridan emas, balki mikrobiologik invaziya, to‘qima nekrozi, mahalliy immun javob, bronxial drenaj buzilishi va umumiy organizm rezistentligining pasayishi birgalikda ta’sir qilganda shakllanadi. Aspiratsion absesslarda anaerob flora muhim o‘rin tutadi, biroq aralash infeksiya ham ko‘p uchraydi. Shuning uchun klinik yondashuvda anaerob va aerob mikroorganizmlar ehtimoli birgalikda baholanadi.

Patogenezning boshlang‘ich bosqichida mikroorganizmlar o‘pkaning pastki yoki orqa segmentlariga tushadi. Bu hududlar bemor yotgan holatda aspiratsiyaga ko‘proq moyil bo‘ladi. Keyin mahalliy yallig‘lanish, ekssudatsiya, kapillyar perfuziyaning buzilishi va to‘qima nekrozi rivojlanadi. Nekrotik to‘qima erib, yiring bilan to‘lgan bo‘shliq hosil qiladi. Agar bu bo‘shliq bronxga ochilsa, balg‘am miqdori ortadi, bemorning tana harorati ayrim hollarda pasayadi, lekin infeksiya to‘liq bartaraf etilmasa kavita saqlanib qoladi.

Klinik ko‘rinish odatda umumiy infeksion belgilar va o‘pka simptomlaridan iborat bo‘ladi. Bemor isitma, titroq, holsizlik, terlash, ishtahaning pasayishi, tana vaznining

kamayishi, yo‘tal, ko‘p miqdorda balg‘am ajralishi, og‘izdan noxush hid kelishi, ko‘krak qafasida og‘riq va hansirashdan shikoyat qilishi mumkin. Og‘ir holatlarda sianoz, taxikardiya, nafas yetishmovchiligi va sepsis belgilariga e’tibor beriladi.

Klinik bosqich	Asosiy belgilar	Baholash vazifasi
Boshlang‘ich yallig‘lanish bosqichi	Isitma, quruq yoki kam balg‘amli yo‘tal, holsizlik, pnevmoniyaga o‘xshash klinika.	Oddiy pnevmoniya bilan cheklanib qolmasdan, xavf omillarini aniqlash.
Kavita shakllanishi	Intoksikatsiya kuchayishi, ko‘krak og‘rig‘i, rentgenologik infiltrat va bo‘shliq belgilari.	Rentgen yoki KT orqali kavitar o‘zgarishni tasdiqlash.
Bronxga yorilish bosqichi	Ko‘p miqdorda balg‘am, noxush hid, isitmaning qisqa muddatli kamayishi mumkin.	Balg‘am xususiyatini, nafas holatini va asoratlarni kuzatish.
Surunkalashish	Olti haftadan ortiq davom etish, vazn yo‘qotish, takroriy isitma, kavitaning saqlanishi.	Obstruksiya, sil, o‘sma yoki immun tanqislik sabablarini izlash.
Asoratlangan kechish	Empiyema, pnevmotoraks, qon ketishi, sepsis yoki nafas yetishmovchiligi.	Shoshilinch pulmonologik, torakal jarrohlik yoki reanimatsion yondashuvni ko‘rib chiqish.

Diagnostik yondashuv

O‘pka absessida tashxis birgina shikoyat asosida qo‘yilmaydi. Klinik ma’lumotlar, fizik tekshiruv, laborator ko‘rsatkichlar va tasviriy diagnostika birgalikda baholanadi. Auskultatsiyada nam xirillashlar, bronxial nafas, perkussiyada tovushning bo‘g‘ilishi yoki plevral asoratlarda qo‘shimcha belgilar aniqlanishi mumkin. Biroq fizik ko‘rik alohida yetarli emas, chunki o‘pka absessi pnevmoniya, sil, o‘sma, bronxoektaz, empiyema yoki kavitar zamburug‘li infeksiyaga o‘xshashi mumkin.

Ko‘krak qafasi rentgenografiyasi dastlabki instrumental tekshiruv sifatida muhim. Unda infiltratsiya fonida havo-suyuqlik sathiga ega bo‘shliq aniqlanishi mumkin. Kompyuter tomografiya absess devori, joylashuvi, atrof to‘qima infiltratsiyasi, plevral suyuqlik, bronxial obstruksiya yoki o‘sma ehtimolini baholashda ancha aniqdir. Mikrobiologik tekshiruv etiologik agentni aniqlashga yordam beradi, lekin balg‘am og‘iz florasi bilan ifloslanishi mumkinligi sababli natija ehtiyotkor talqin qilinadi.

Tekshiruv turi	Nima aniqlaydi	Klinik qiymati

Umumiy qon tahlili	Leykotsitoz, neytrofiliya, yallig‘lanish faolligi belgilari.	Infeksion jarayon og‘irligini taxminiy baholaydi.
Biokimyoviy tahlillar	Jigar, buyrak, oqsil almashinuvi va yallig‘lanish markerlarini ko‘rsatadi.	Davolash xavfsizligini va umumiy holatni kuzatish uchun kerak.
Balg‘am tekshiruvi	Bakterial flora, ayrim hollarda sil yoki zamburug‘ ehtimolini baholaydi.	Antibiotik tanlovini aniqlashtirishda yordam beradi, lekin ifloslanish xavfi bor.
Rentgenografiya	Infiltrat, kavita, havo-suyuqlik sathi, plevral o‘zgarishlar.	Dastlabki tasdiqlovchi instrumental usul hisoblanadi.
Kompyuter tomografiya	Kavita hajmi, devor qalinligi, obstruksiya, empiyema, o‘sma yoki boshqa patologiyalar.	Differensial tashxis va intervensiya rejasida eng muhim tasviriy usullardan biri.
Bronxoskopiya	Bronx ichidagi to‘siq, begona jism, o‘sma yoki mikrobiologik material olish imkoniyati.	Atipik, cho‘zilgan yoki davoga javob bermagan holatlarda zarur bo‘lishi mumkin.

Differensial tashxisda kavitar sil, o‘pka saratoni, nekrotik pnevmoniya, bronxoektazning kistoz shakli, empiyema, o‘pka infarkti, zamburug‘li infeksiyalar va vaskulitlar hisobga olinadi. Ayniqsa uzoq davom etuvchi, bir tomonlama, devori qalin kavita va vazn yo‘qotish bilan kechadigan holatlarda o‘sma yoki silni istisno qilish shart.

Davolash natijalari va amaliy algoritm

O‘pka absessini davolashda asosiy tamoyil infeksion jarayonni nazorat qilish, bronxial drenajni tiklash, asoratlarni oldini olish va kasallik sababini bartaraf etishdan iborat. Ko‘pchilik bemorlarda davolash antibiotik terapiya, umumiy quvvatlovchi parvarish, suyuqlik balansi, nafas holatini kuzatish va tasviriy nazorat bilan boshlanadi. Antibiotik tanlovi shifokor tomonidan bemorning holati, mahalliy mikrobiologik vaziyat, aspiratsiya xavfi, allergik anamnez va tekshiruv natijalariga qarab belgilanadi. Konservativ davolashga javob bo‘lmagan holatlarda intervensional yoki jarrohlik yondashuv ko‘rib chiqiladi. Katta absesslar, subplevral joylashuv, plevral empiyema, bronxial obstruksiya, qon ketishi yoki sepsis xavfi bo‘lsa, bemor torakal jarroh va pulmonolog tomonidan birgalikda baholanishi kerak. Drenaj, bronxoskopik aralashuv

yoki rezektsiya hamma bemor uchun emas, balki aniq ko‘rsatma mavjud bo‘lgan holatlar uchun tanlanadi.

Davolash yo‘nalishi	**Mazmuni**	**Muhim ehtiyot choralari**
Empirik antibiotik terapiya	Anaerob va aerob ehtimoliy qo‘zg‘atuvchilarni qamrab oladigan shifokor nazoratidagi davo.	O‘zini o‘zi antibiotik bilan davolash, dori kursini erta to‘xtatish va nazoratsiz almashtirish xavfli.
Mikrobiologik aniqlashtirish	Balg‘am, qon yoki bronxoskopik material tekshiruvi natijalariga ko‘ra davoni toraytirish.	Natijalar klinik holat bilan birga baholanadi.
Simptomatik va quvvatlovchi yordam	Suyuqlik balansi, ovqatlanish, isitmani nazorat qilish, kislorod ehtiyojini baholash.	Nafas yetishmovchiligi belgilari bo‘lsa, shoshilinch yordam talab qilinadi.
Tasviriy nazorat	Rentgen yoki KT orqali kavita dinamikasini kuzatish.	Klinik yaxshilanish bo‘lmasa, sabab qayta izlanadi.
Drenaj yoki bronxoskopik aralashuv	Davoga javob bermagan yoki empiyema bilan asoratlangan holatlarda ko‘rib chiqiladi.	Noto‘g‘ri tanlangan drenaj infeksiyani yoyishi yoki qon ketish xavfini oshirishi mumkin.
Jarrohlik davolash	Gangrena, nazorat qilinmaydigan qon ketishi, o‘sma bilan bog‘liq obstruksiya yoki davo samarasizligida tanlanadi.	Faqat torakal jarrohlik bahosidan keyin, xavf va foyda nisbatiga ko‘ra qo‘llanadi.

Davolashni baholashda tana haroratining pasayishi, yo‘tal va balg‘am kamayishi, umumiy holatning yaxshilanishi, yallig‘lanish markerlarining pasayishi va rentgenologik regress muhimdir. Ammo rentgenologik tuzalish klinik belgilar yo‘qolishidan sekinroq kechishi mumkin. Shuning uchun bemorni erta yaxshi bo‘lib qoldi deb nazoratsiz qoldirish noto‘g‘ri qarordir.

Muhokama

O‘pka absessi bo‘yicha eng katta xato uni faqat yiringli pnevmoniya sifatida soddalashtirishdir. Bunday yondashuv asosiy sababni ko‘rmaydi. Masalan, aspiratsion absessda tish-milk kasalliklari va yutish buzilishi tuzatilmasa, davolashdan keyin ham qaytalanish ehtimoli saqlanadi. Obstruktiv absessda esa bronx ichidagi o‘sma yoki begona jism bartaraf etilmasa, antibiotiklar vaqtincha yaxshilanish beradi, lekin jarayon qayta faollashishi mumkin.

Antibiotik terapiya kasallikni davolashning markaziy qismi bo‘lsa-da, u nazoratsiz qo‘llanadigan oddiy vosita emas. Dori tanlovi infeksiya manbai, bemorning og‘irlik darajasi, mikrobiologik ehtimol, allergiya, buyrak va jigar faoliyati, avvalgi antibiotik qabul qilish tarixi bilan bog‘liq. Ayniqsa anaerob infeksiyalarda noto‘g‘ri yoki yetarli bo‘lmagan qamrov klinik javobni sustlashtiradi. Shu bilan birga, antibakterial davo davomiyligini faqat bemor o‘zini yaxshi his qilgani uchun qisqartirish absessning surunkalashishiga olib kelishi mumkin.

Stomatologiya yo‘nalishi talabalari uchun ushbu mavzuning alohida ahamiyati bor. Og‘iz bo‘shlig‘i mikrobiotasi, periodontal infeksiya, tish kariesi, gingivit va og‘iz gigiyenasining yomonligi aspiratsion o‘pka infeksiyalarida xavf omili bo‘lishi mumkin. Demak, o‘pka absessining oldini olish faqat pulmonologik emas, balki stomatologik profilaktika bilan ham bog‘liq. Tish va milk kasalliklarini vaqtida davolash, og‘iz bo‘shlig‘i gigiyenasini yaxshilash, yutish buzilishi bo‘lgan bemorlarda aspiratsiya xavfini kamaytirish profilaktik ahamiyatga ega.

Asorat	Qanday namoyon bo‘ladi	Amaliy javob
Plevral empiyema	Plevra bo‘shlig‘ida yiring to‘planishi, ko‘krak og‘rig‘i va nafas qisilishi.	Plevral suyuqlikni baholash va zarur bo‘lsa drenaj masalasini hal qilish.
Pnevmotoraks	Havo plevra bo‘shlig‘iga chiqib, o‘pka qisilib qolishi mumkin.	Shoshilinch tasviriy tekshiruv va torakal yordam talab qilinadi.
Qon ketishi	Balg‘amda qon, gemoptiziya yoki kuchli qon yo‘qotish xavfi.	Zudlik bilan shifoxonaga yotqizish va sababni aniqlash kerak.
Sepsis	Isitma, arterial bosim pasayishi, ong buzilishi va ko‘p a’zoli yetishmovchilik xavfi.	Reanimatsion kuzatuv va intensiv davolash talab qilinishi mumkin.

Surunkali kavita	Uzoq saqlanadigan bo‘shliq, chandiqlanish, takroriy infeksiya.	Obstruksiya, sil, o‘sma va immun tanqislik sabablarini qayta tekshirish.

Profilaktikada aspiratsiya xavfini kamaytirish, og‘iz gigiyenasini yaxshilash, yutish buzilishlarini baholash, alkogol va sedativ vositalar bilan bog‘liq hush pasayishiga yo‘l qo‘ymaslik, surunkali kasalliklarni nazorat qilish, pnevmoniyani vaqtida davolash va shifokor ko‘rsatmasisiz antibiotik qabul qilmaslik asosiy o‘rin tutadi. Tibbiy ta’limda bu mavzu klinik fikrlashni shakllantiradi, chunki har bir kavita bir xil etiologiyaga ega emas.

Xulosa

O‘pka absessi o‘pka parenximasining yiringli-nekrotik zararlanishi bo‘lib, uning rivojlanishida aspiratsiya, anaerob va aralash infeksiya, bronxial drenaj buzilishi, immun tanqislik, nekrotik pnevmoniya va gematogen tarqalish muhim rol o‘ynaydi. Kasallikni erta aniqlash uchun bemorning xavf omillari, klinik belgilar, laborator ko‘rsatkichlar va tasviriy tekshiruv natijalari birgalikda baholanishi kerak. Rentgenografiya dastlabki tasdiqlovchi usul bo‘lsa, kompyuter tomografiya absessning tuzilishi, joylashuvi, asoratlari va differensial tashxisini aniqlashtirishda katta ahamiyatga ega.

Davolashda asosiy tamoyil - infeksiyani nazorat qilish, etiologik sababni aniqlash, bronxial drenajni baholash va asoratlarni oldini olishdir. Antibiotik terapiya shifokor nazoratida, bemorning klinik holati va mikrobiologik ehtimoliga mos ravishda tanlanadi. Davoga javob bo‘lmagan, empiyema yoki obstruksiya bilan kechadigan holatlarda intervensional va jarrohlik yondashuvlar ko‘rib chiqiladi. Profilaktik nuqtayi nazardan og‘iz bo‘shlig‘i gigiyenasi, aspiratsiya xavfini kamaytirish va pnevmoniyani o‘z vaqtida davolash juda muhimdir.

Manfaatlar to‘qnashuvi: muallif manfaatlar to‘qnashuvi yo‘qligini bildiradi. Moliyalashtirish: maqola mustaqil ilmiy-ta’limiy maqsadda tayyorlandi. Etik bayonot: maqolani tayyorlashda shaxsiy bemor ma’lumotlaridan foydalanilmadi.

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OZIQ-OVQAT SANOATI KORXONALARI FAOLIYATIDA KORPORATIV BOSHQARUV MEXANIZMINI TAKOMILLASHTIRISH

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ANNOTATSIYA

Maqolada oziq-ovqat sanoati korxonalari faoliyatida korporativ boshqaruv mexanizmini takomillashtirishning nazariy va amaliy jihatlari tahlil qilinadi. Oziq-ovqat sanoati nafaqat iqtisodiy o'sish, balki aholi farovonligi, oziq-ovqat xavfsizligi, eksport salohiyati va hududiy bandlik bilan bevosita bog'liq strategik tarmoqdir. Shu sababli ushbu sohada korporativ boshqaruv mexanizmi oddiy aksiyadorlar manfaatini himoya qilish vositasi sifatida emas, balki mahsulot xavfsizligi, ichki nazorat, risk-menejment, shaffoflik, ta'minot zanjiri barqarorligi va ijtimoiy mas'uliyatni uyg'unlashtiruvchi boshqaruv tizimi sifatida talqin qilinishi lozim. Natijada oziq-ovqat korxonalari uchun besh blokli korporativ boshqaruv modeli taklif etildi: strategik boshqaruv, ichki nazorat va audit, risk va komplayens, raqamli shaffoflik hamda ESGga yo'naltirilgan manfaatdor tomonlar bilan ishlash tizimi.

Kalit so'zlar: oziq-ovqat sanoati, korporativ boshqaruv, ichki audit, risk-menejment, ESG, ISO 22000, HACCP, aksiyadorlar huquqi, shaffoflik, ta'minot zanjiri.

ABSTRACT

The article examines the improvement of corporate governance mechanisms in food industry enterprises. The food industry is treated as a strategic sector linked not only to profitability, but also to food security, consumer trust, export capacity, regional employment and sustainable development. The paper proposes a five-component model for food enterprises: strategic board governance, internal control and audit, risk and compliance, digital transparency, and ESG-oriented stakeholder engagement.

Keywords: food industry, corporate governance, internal audit, risk management, ESG, ISO 22000, HACCP, shareholder rights, transparency, supply chain.

KIRISH

Oziq-ovqat sanoati har qanday milliy iqtisodiyotda alohida strategik ahamiyatga ega bo'lgan tarmoqlardan biridir. Bu tarmoqning mahsuloti kundalik iste'mol bilan bog'liq bo'lgani sababli korxona faoliyatidagi har qanday boshqaruv xatosi nafaqat moliyaviy zarar, balki iste'molchilar salomatligi, bozor ishonchi va oziq-ovqat

xavfsizligiga ham bevosita ta'sir ko'rsatadi. Shu jihatdan oziq-ovqat sanoati korxonalarida korporativ boshqaruv masalasi oddiy tashkiliy boshqaruv muammosi emas, balki iqtisodiy, huquqiy, sanitariya, texnologik va ijtimoiy javobgarlik elementlarini birlashtiruvchi kompleks ilmiy-amaliy masaladir.

O'zbekiston sharoitida oziq-ovqat sanoati jadal rivojlanayotgan, lekin bir vaqtning o'zida modernizatsiya, sifat nazorati, eksport standartlari, xomashyo ta'minoti, energiya xarajatlari va raqobat bosimi kabi murakkab omillar bilan to'qnashayotgan tarmoq hisoblanadi. Rasmiy statistik ma'lumotlarga ko'ra, 2025-yilda O'zbekistonda 152,1 trln so'mlik oziq-ovqat mahsulotlari ishlab chiqarilgan va bu 2024-yilga nisbatan 9,7 foizga yuqori bo'lgan. Bunday o'sish ijobiy tendensiya bo'lsa-da, u korxonalar boshqaruv tizimining sifat jihatdan yetarli darajada takomillashganini avtomatik tarzda anglatmaydi. Aksincha, ishlab chiqarish hajmining o'sishi bilan birga risklar ham ko'payadi: xomashyo sifatining o'zgaruvchanligi, mahsulot qaytarilishi, logistika uzilishlari, sanitariya talablariga rioya etmaslik, moliyaviy intizomning susayishi va manfaatlar to'qnashuvi ehtimoli ortadi.

Korporativ boshqaruvning klassik mazmuni aksiyadorlar, kuzatuv kengashi, ijroiya organi, menejerlar va boshqa manfaatdor tomonlar o'rtasidagi vakolatlar, javobgarlik va nazorat munosabatlarini tartibga solishdan iborat. Biroq oziq-ovqat sanoatida bu tushuncha yanada kengayadi. Chunki mahsulotning sifat va xavfsizlik ko'rsatkichi korxona reputatsiyasi hamda moliyaviy barqarorligining markaziy mezoniga aylanadi. Shuning uchun ushbu tarmoqda korporativ boshqaruv mexanizmi ichki audit, sifat menejmenti, komplayens, mahsulot izchilligi, yetkazib beruvchilar nazorati, ekologik mas'uliyat va raqamli monitoring tizimlari bilan uzviy bog'lanishi shart.

Maqolaning maqsadi oziq-ovqat sanoati korxonalarida korporativ boshqaruv mexanizmini takomillashtirishning konseptual asoslarini ishlab chiqish va tarmoq xususiyatlariga mos amaliy takliflar berishdan iborat. Ushbu maqsadga erishish uchun korporativ boshqaruvning nazariy mazmuni, oziq-ovqat sanoatidagi maxsus risklar, O'zbekistonning normativ-huquqiy muhiti, xalqaro tamoyillar, shaffoflik va ichki nazorat mexanizmlari o'rganildi. Tadqiqotning dolzarbligi shundaki, oziq-ovqat korxonalarida boshqaruv mexanizmi takomillashmasa, ishlab chiqarish hajmi oshgani bilan mahsulot sifati, investor ishonchi va eksport salohiyati barqaror o'smaydi.

METODOLOGIYA

Metodologik yondashuv sifatida tizimli tahlil, normativ-huquqiy tahlil, qiyosiy tahlil, statistik ma'lumotlarni talqin qilish, induksiya va deduksiya, SWOT elementlari hamda konseptual modellashtirish usullaridan foydalanildi. Tizimli yondashuv

korporativ boshqaruvni alohida boshqaruv organlari yig'indisi sifatida emas, balki strategik qarorlar, nazorat, risklarni boshqarish, manfaatdor tomonlar bilan muloqot va shaffof hisobotning yagona mexanizmi sifatida tahlil qilish imkonini berdi.

Normativ-huquqiy tahlilda O'zbekiston Respublikasida aksiyadorlik jamiyatlari faoliyati, aksiyadorlar huquqlari, korporativ veb-saytlar ochiqligi, korporativ boshqaruv tizimini rivojlantirish, oziq-ovqat sanoatini 2024-2028-yillarda rivojlantirish va oziq-ovqat xavfsizligini ta'minlashga doir hujjatlar o'rganildi. 2024-yil 16-fevraldagi PF-36-son Farmon bilan 2024-2028-yillarda oziq-ovqat sanoatini yanada rivojlantirish bo'yicha chora-tadbirlar dasturi tasdiqlangani tarmoq boshqaruvi uchun muhim siyosiy-huquqiy asos bo'lib xizmat qiladi [2].

Xalqaro qiyosiy tahlilda G20/OECD korporativ boshqaruv tamoyillari, ISO 22000 oziq-ovqat xavfsizligi menejmenti talablari va xalqaro amaliyotda qo'llaniladigan ichki nazorat yondashuvlari hisobga olindi. OECD tamoyillari korporativ boshqaruvning huquqiy, regulyator va institutsional asoslarini takomillashtirish orqali iqtisodiy samaradorlik, barqaror o'sish va investorlarni himoya qilishni ta'minlashga qaratilgan. ISO 22000 esa oziq-ovqat zanjiridagi tashkilotlarga oziq-ovqat xavfsizligi xavflarini nazorat qilish qobiliyatini namoyon etishga yordam beruvchi boshqaruv tizimi talablarini belgilaydi.

Tadqiqotda taklif etilayotgan korporativ boshqaruv mexanizmi oziq-ovqat sanoati korxonalarining uch asosiy xususiyatiga moslashtirildi: birinchidan, mahsulot xavfsizligi va iste'molchi ishonchi moliyaviy natijadan kam bo'lmagan strategik ko'rsatkichdir; ikkinchidan, ta'minot zanjiri ko'p bosqichli bo'lib, xomashyo, saqlash, qayta ishlash, qadoqlash va logistika bosqichlarida turli risklar yuzaga keladi; uchinchidan, eksportga chiqish uchun xalqaro standartlarga mos boshqaruv, izchillik va sertifikatlash talab qilinadi.

NATIJALAR

Tahlil natijalari shuni ko'rsatadiki, oziq-ovqat sanoati korxonalarida korporativ boshqaruv mexanizmini takomillashtirish uchun umumiy korporativ boshqaruv prinsiplari tarmoqning texnologik va sanitariya xususiyatlari bilan integratsiya qilinishi zarur. Agar kuzatuv kengashi faqat moliyaviy ko'rsatkichlar, dividend siyosati va investitsiya loyihalarini ko'rib chiqish bilan cheklansa, oziq-ovqat korxonasining asosiy xavf manbalari nazoratdan chetda qoladi. Sifat, xavfsizlik, mahsulot qaytarilishi, xomashyo izchilligi, laboratoriya nazorati va iste'molchi shikoyatlari korporativ boshqaruvning doimiy kun tartibiga kiritilishi kerak.

Birinchi natija sifatida oziq-ovqat sanoati korxonalari uchun korporativ boshqaruv mexanizmining besh blokli modeli taklif etildi. Ushbu model boshqaruv

organlarining vakolatlarini aniq ajratish, ichki nazoratni kuchaytirish, risk-menejmentni tarmoq risklariga moslashtirish, axborot ochiqligini oshirish va barqaror rivojlanish talablarini korxona strategiyasiga kiritishga yo'naltirilgan.

1-jadval.

Oziq-ovqat sanoati korxonalari uchun taklif etilayotgan korporativ boshqaruv modeli

Blok	Mazmuni	Asosiy vositalar	Kutilayotgan natija
Strategik boshqaruv	Kuzatuv kengashi va ijroiya organi vakolatlarini aniq ajratish	KPI, strategiya xaritasi, kengash qo'mitalari	Mas'uliyat va natijadorlik kuchayadi
Ichki nazorat va audit	Moliyaviy, operatsion va sifat nazoratining integratsiyasi	Ichki audit, audit qo'mitasi, nazorat matritsasi	Xatolar, suiiste'mol va resurs yo'qotishlari kamayadi
Risk va komplayens	Sanitariya, sertifikatlash, huquqiy va ta'minot zanjiri risklarini boshqarish	Risk reyestri, HACCP, ISO 22000, komplayens siyosati	Mahsulot xavfsizligi va bozor ishonchi ortadi
Raqamli shaffoflik	Hisobot, xarid, ombor, laboratoriya va sotuv ma'lumotlarini raqamlashtirish	ERP, QR-kod, elektron hujjat aylanishi	Qarorlar tezligi va kuzatuvchanlik oshadi
ESG va manfaatdor tomonlar	Ekologiya, mehnat xavfsizligi, iste'molchi huquqi va ijtimoiy mas'uliyat	ESG hisobot, shikoyatlar portali, yetkazib beruvchi kodeksi	Eksport, brend va investor jozibadorligi kuchayadi

Ikkinchi natija sifatida korporativ boshqaruv samaradorligini baholash uchun tarmoqka mos integral ko'rsatkichdan foydalanish zarurligi aniqlandi. Oziq-ovqat korxonasida boshqaruv sifati faqat sof foyda yoki rentabellik bilan o'lchanmasligi

kerak. Chunki qisqa muddatli foyda sifatsiz xomashyo xaridi, nazorat xarajatlarini qisqartirish yoki ekologik talablarni e'tiborsiz qoldirish hisobiga ham oshirilishi mumkin. Bunday foyda strategik nuqtai nazardan xavfli. Shu bois korporativ boshqaruv yetuklik indeksi quyidagi bloklar asosida baholanishi maqsadga muvofiq: kengash faoliyati, ichki nazorat, risk-menejment, axborot ochiqligi, sifat va xavfsizlik menejmenti, ESG hamda raqamli kuzatuvchanlik.

Taklif etilayotgan Korporativ boshqaruv yetuklik indeksi quyidagicha ifodalanadi: KBYI = 0,20K + 0,20N + 0,15R + 0,15S + 0,10E + 0,10D + 0,10M. Bu yerda K - kuzatuv kengashi va qo'mitalar samaradorligi; N - ichki nazorat va audit sifati; R - risk-menejment va komplayens; S - sifat va oziq-ovqat xavfsizligi boshqaruvi; E - ESG mezonlari; D - raqamli shaffoflik; M - manfaatdor tomonlar bilan muloqot darajasidir. Indeks korxona ichki diagnostikasi, investorlarga axborot berish va boshqaruv islohotlarini bosqichma-bosqich rejalashtirish uchun foydalanilishi mumkin.

Uchinchi natija sifatida oziq-ovqat sanoati korxonalarida ichki auditning vazifasi kengaytirilishi kerakligi aniqlandi. Amaliyotda ichki audit ko'pincha moliyaviy intizom, hujjatlar to'g'riligi va xarajatlarni tekshirish bilan cheklanadi. Oziq-ovqat sanoatida esa ichki audit xomashyo qabul qilish, laboratoriya tekshiruvi, ishlab chiqarish sanitariyasi, saqlash harorati, mahsulot partiyalarini kuzatish, yaroqlilik muddati, qaytarilgan mahsulotlar va iste'molchi shikoyatlarini ham qamrab olishi kerak. Bunday yondashuv korporativ boshqaruvni ishlab chiqarish xavfsizligi bilan bog'laydi.

To'rtinchi natija shundan iboratki, korporativ boshqaruvda raqamlashtirish alohida texnik yordamchi vosita emas, balki nazorat va javobgarlikni ta'minlovchi boshqaruv infratuzilmasidir. ERP tizimlari, elektron xarid platformalari, ombor va laboratoriya ma'lumotlarining avtomatik qayd etilishi, QR-kod orqali mahsulot izchilligi, elektron shikoyatlarni boshqarish va kuzatuv kengashi uchun boshqaruv paneli qarorlar sifatini oshiradi. Raqamli ma'lumotlar bo'lmasa, kuzatuv kengashi va ijroiya organi real holatni kechikib biladi; bu esa risklarni boshqarishni reaktiv holatga tushirib qo'yadi.

MUHOKAMA

Olingan natijalar oziq-ovqat sanoati korxonalarida korporativ boshqaruvni takomillashtirishning asosiy muammosi mexanizmlarning formal mavjudligi emas, balki ularning real ishlash sifati ekanini ko'rsatadi. Ko'plab korxonalarda direktor, bosh buxgalter, texnolog, sifat nazorati bo'limi va marketing bo'limi mavjud bo'lishi mumkin, ammo ularning qarorlari yagona risk va strategiya tizimiga ulanmagan bo'lsa,

korporativ boshqaruv yetarli natija bermaydi. Masalan, xarid bo'limi arzon xomashyo tanlash orqali xarajatni kamaytirishi mumkin, lekin bu qaror laboratoriya nazorati va mahsulot xavfsizligi bilan bog'lanmasa, korxona keyinchalik reputatsion va moliyaviy zarar ko'radi.

Oziq-ovqat sanoati uchun eng xavfli boshqaruv xatolaridan biri qisqa muddatli rentabellikni uzoq muddatli ishonchdan ustun qo'yishdir. Korporativ boshqaruv tizimi rahbariyatni faqat sotuv hajmi yoki foyda bo'yicha emas, balki sifat barqarorligi, mahsulot qaytarilishi darajasi, sertifikatlash holati, yetkazib beruvchi intizomi, energiya samaradorligi va iste'molchi shikoyatlariga javob tezligi bo'yicha ham baholashi zarur. Aks holda moliyaviy KPIlar texnologik va ijtimoiy risklarni yashirib qo'yadi.

Xalqaro tajriba shuni ko'rsatadiki, korporativ boshqaruv samaradorligi aksiyadorlar huquqlarini himoya qilish, shaffof axborot, kengash mustaqilligi, manfaatlar to'qnashuvini boshqarish va barqaror rivojlanish mezonlari bilan bog'liq. G20/OECD tamoyillari korporativ boshqaruvni kapital bozorlariga kirish, investorlarni himoya qilish va kompaniyalarning barqarorligini qo'llab-quvvatlovchi tizim sifatida talqin qiladi. Oziq-ovqat sanoatida ushbu tamoyillar mahsulot xavfsizligi va ta'minot zanjiri nazorati bilan boyitilishi kerak. Chunki investor uchun korxonaning moliyaviy hisobotlari qanchalik muhim bo'lsa, iste'molchi ishonchi va mahsulot sifati ham shunchalik muhimdir.

O'zbekiston sharoitida ushbu masala yanada dolzarb. Tarmoqni rivojlantirish bo'yicha davlat dasturlari ishlab chiqarish, qayta ishlash, eksport, oziq-ovqat xavfsizligi va sog'lom ovqatlanish bilan bog'liq vazifalarni ilgari surmoqda. Ammo bu vazifalar korxonalar darajasida kuchli boshqaruv tizimisiz to'liq amalga oshmaydi. Davlat standart belgilashi, subsidiyalar berishi yoki eksportni qo'llab-quvvatlashi mumkin, lekin har bir korxonada javobgar kengash, samarali ichki nazorat, aniq risk xaritasi va shaffof axborot tizimi bo'lmasa, siyosiy vazifalar amaliy natijaga aylanishi qiyinlashadi.

Korporativ boshqaruv mexanizmini takomillashtirishda ayrim trade-offlar ham bor. Masalan, ichki nazorat, sertifikatlash, raqamli tizimlar va mustaqil audit qo'shimcha xarajat talab qiladi. Kichik va o'rta oziq-ovqat korxonalari bunday xarajatlarni qisqa muddatda og'ir yuk sifatida qabul qilishi mumkin. Lekin bu xarajatlar strategik investitsiya sifatida baholanishi kerak, chunki ular mahsulot qaytarilishi, jarima, sud nizolari, eksport shartnomalari yo'qotilishi va brendga zarar yetishini kamaytiradi. Eng to'g'ri yondashuv - korporativ boshqaruv talablarini korxona hajmi, mulkchilik shakli va eksport darajasiga qarab bosqichma-bosqich joriy etishdir.

Takomillashtirishning amaliy mexanizmi birinchi navbatda kuzatuv kengashi tarkibi va vakolatidan boshlanishi kerak. Oziq-ovqat korxonalarida kengash tarkibida moliya, huquq va strategiya bilan birga oziq-ovqat texnologiyasi, sifat menejmenti, eksport standartlari va risk-menejment bo'yicha kompetensiyaga ega a'zolar bo'lishi maqsadga muvofiq. Audit qo'mitasi faqat buxgalteriya hisobotini emas, balki ichki nazorat va mahsulot xavfsizligiga ta'sir qiluvchi jarayonlarni ham nazorat qilishi kerak. Risk qo'mitasi esa xomashyo, logistika, valyuta, energiya, sanitariya va reputatsion risklarni yagona reyestrda yuritishi lozim.

Ikkinchi muhim yo'nalish - manfaatlar to'qnashuvini boshqarishdir. Oziq-ovqat korxonalarida xomashyo xaridi, transport, qadoqlash materiallari, reklama va distribyutorlik shartnomalari ko'pincha katta mablag' talab qiladi. Agar ushbu shartnomalar shaffof tanlov va affillangan shaxslar bo'yicha ochiq deklaratsiyasiz tuzilsa, korxona resurslari samarasiz sarflanishi mumkin. Shuning uchun korporativ boshqaruv siyosatida manfaatdor bitimlarni ko'rib chiqish tartibi, mustaqil baholash va aksiyadorlarga axborot berish mexanizmi aniq yozilishi kerak.

Uchinchi yo'nalish - oziq-ovqat xavfsizligi standartlarini korporativ boshqaruv tizimiga integratsiya qilishdir. ISO 22000 va HACCP kabi yondashuvlar texnologik jarayonlarni nazorat qilish uchun muhim, lekin ular rahbariyat qarorlariga ulanmasa, sertifikat qog'ozdagi talabga aylanib qolishi mumkin. Kengash darajasida sifat va xavfsizlik bo'yicha yillik hisobot tinglanishi, mahsulot qaytarilishi bo'yicha sabablar tahlil qilinishi, muhim nosozliklar bo'yicha javobgarlik mexanizmi ishlashi zarur. Bu yondashuv sifat menejmentini korporativ javobgarlik darajasiga olib chiqadi.

XULOSA VA TAKLIFLAR

Tadqiqot natijalari asosida xulosa qilish mumkinki, oziq-ovqat sanoati korxonalarida korporativ boshqaruv mexanizmini takomillashtirish tarmoqning barqaror rivojlanishi, mahsulot xavfsizligi, investor ishonchi, eksport salohiyati va iste'molchi manfaatlarini ta'minlashning zarur shartidir. Korporativ boshqaruvni faqat aksiyadorlar yig'ilishi, direktor va kuzatuv kengashi o'rtasidagi munosabatlar bilan cheklash yetarli emas. Oziq-ovqat sanoatida bu mexanizm ichki audit, sifat menejmenti, risklarni boshqarish, raqamli nazorat, ESG va manfaatdor tomonlar bilan ishlash tizimi bilan integratsiyalashgan holda ishlashi kerak.

Birinchi taklif: oziq-ovqat sanoati korxonalari uchun tarmoqka mos korporativ boshqaruv kodeksi yoki metodik tavsiyalar ishlab chiqilishi lozim. Unda kengash vakolatlari, audit va risk qo'mitalari, sifat nazorati bo'yicha hisobot, mahsulot xavfsizligi indikatorlari, manfaatlar to'qnashuvi va shaffof xarid tartiblari alohida belgilanishi kerak.

Ikkinchi taklif: korxonalarda ichki audit vazifasi kengaytirilib, moliyaviy tekshiruvdan tashqari operatsion, texnologik, sanitariya va komplayens auditini ham qamrab olishi zarur. Ichki audit natijalari bevosita kuzatuv kengashi yoki audit qo'mitasiga taqdim etilishi boshqaruv mustaqilligini kuchaytiradi.

Uchinchi taklif: oziq-ovqat sanoati korxonalarida risk reyestri majburiy boshqaruv hujjati sifatida yuritilishi maqsadga muvofiq. Ushbu reyestr xomashyo, yetkazib beruvchi, saqlash, ishlab chiqarish, laboratoriya, logistika, valyuta, energiya, ekologiya va reputatsion risklarni qamrab olishi kerak.

To'rtinchi taklif: korporativ boshqaruvda raqamli shaffoflikni kuchaytirish lozim. Elektron xarid, ombor nazorati, mahsulot partiyalarining QR-kod orqali kuzatuvchanligi, iste'molchi shikoyatlari bazasi va kengash uchun real vaqt boshqaruv paneli joriy etilishi qarorlar sifatini oshiradi.

Beshinchi taklif: korporativ boshqaruv samaradorligini baholashda taklif etilgan Korporativ boshqaruv yetuklik indeksidan foydalanish mumkin. Bu indeks korxonaning boshqaruv muammolarini aniqlash, investorlarga ochiq axborot berish va islohotlarni bosqichma-bosqich rejalashtirishga xizmat qiladi. Yakuniy natija sifatida oziq-ovqat sanoati korxonalarida boshqaruv sifati oshadi, mahsulot xavfsizligi mustahkamlanadi, eksport shartnomalari uchun ishonch kuchayadi va tarmoqning uzoq muddatli raqobatbardoshligi ta'minlanadi.

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SUN’IY INTELLEKT YORDAMIDA HUQUQ SOHASIDAGI ZAMONAVIY O‘ZGARISHLAR

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ANNOTATSIYA: Mazkur maqolada sun’iy intellekt texnologiyalarining huquq sohasidagi o‘rni, uning zamonaviy jamiyat va davlat boshqaruvidagi ahamiyati hamda huquq tizimida yuz berayotgan raqamli o‘zgarishlar tahlil qilingan. Shuningdek, sun’iy intellekt yordamida huquqiy xizmatlarni avtomatlashtirish, vaqtni tejash, qog‘ozbozlikni kamaytirish, sud-huquq tizimida shaffoflikni ta’minlash va inson omilini qisqartirish masalalari yoritilgan. Maqolada sun’iy intellektning huquq sohasidagi afzalliklari bilan bir qatorda, uni qo‘llashdagi ayrim muammolar ham ilmiy-huquqiy jihatdan ochib berilgan.
KALIT SO‘ZLAR: sun’iy intellekt, huquq, raqamlashtirish, elektron hukumat, elektron sud, huquqiy tizim, avtomatlashtirish, qog‘ozbozlik, vaqt tejamkorligi, axborot texnologiyalari

ABSTRACT: This article analyzes the role of artificial intelligence technologies in the legal sphere, their importance in modern society and public administration, as well as digital changes occurring in the legal system. In addition, the issues of automating legal services through artificial intelligence, saving time, reducing paperwork, ensuring transparency in the judicial and legal system, and minimizing the human factor are highlighted. Along with the advantages of artificial intelligence in the legal field, certain problems related to its application are also scientifically and legally explained in the article.
KEYWORDS: artificial intelligence, law, digitalization, e-government, electronic court, legal system, automation, paperwork, time efficiency, information technologies.

АННОТАЦИЯ: В данной статье проанализированы роль технологий искусственного интеллекта в правовой сфере, их значение в современном обществе и государственном управлении, а также цифровые изменения, происходящие в правовой системе. Кроме того, освещены вопросы автоматизации юридических услуг с помощью искусственного интеллекта, экономии времени, сокращения бумажной волокиты, обеспечения прозрачности в судебно-правовой системе и уменьшения человеческого фактора. Наряду с

преимуществами искусственного интеллекта в правовой сфере, в статье также научно и юридически раскрываются некоторые проблемы, связанные с его применением.

КЛЮЧЕВЫЕ СЛОВА: скусственный интеллект, право, цифровизация, электронное правительство, электронный суд, правовая система, автоматизация, бумажная волокита, экономия времени, информационные технологии.

ÖZET: Bu makalede yapay zekâ teknolojilerinin hukuk alanındaki rolü, modern toplum ve devlet yönetimindeki önemi ile hukuk sisteminde meydana gelen dijital değişimler analiz edilmiştir. Ayrıca, yapay zekâ yardımıyla hukuki hizmetlerin otomatikleştirilmesi, zamandan tasarruf sağlanması, bürokrasinin azaltılması, yargı-hukuk sisteminde şeffaflığın sağlanması ve insan faktörünün azaltılması meseleleri ele alınmıştır. Makalede, yapay zekânın hukuk alanındaki avantajlarının yanı sıra, uygulanmasıyla ilgili bazı sorunlar da bilimsel ve hukuki açıdan açıklanmıştır.

ANAHTAR KELIMELER: yapay zekâ, hukuk, dijitalleşme, e-devlet, elektronik mahkeme, hukuk sistemi, otomasyon, bürokrasi, zaman tasarrufu, bilgi teknolojileri.

Kirish

Bugungi kunda dunyoda axborot texnologiyalari mislsiz darajada rivojlanib bormoqda. Ayniqsa, sun’iy intellekt texnologiyalarining paydo bo‘lishi inson hayotining deyarli barcha sohalarida katta o‘zgarishlarga sabab bo‘lmoqda. Tibbiyot, iqtisodiyot, ta’lim, sanoat kabi yo‘nalishlar qatorida huquq sohasi ham raqamli transformatsiya jarayonidan chetda qolmayapti. Zamonaviy davlat boshqaruvi tizimida tezkorlik, aniqlik va shaffoflikni таъминlash uchun sun’iy intellekt imkoniyatlaridan keng foydalanilmoqda. Huquq sohasida sun’iy intellektdan foydalanish sud tizimini modernizatsiya qilish, elektron hujjatlar aylanishini rivojlantirish, fuqarolarga onlayn huquqiy xizmatlar ko‘rsatish va davlat organlari faoliyatini soddalashtirishda muhim vosita bo‘lib xizmat qilmoqda. Ayniqsa, ortiqcha qog‘ozbozlikni kamaytirish, vaqtni tejash hamda inson omili sabab yuzaga keladigan ayrim xatolar va korrupsion holatlarning oldini olishda sun’iy intellekt texnologiyalarining o‘rni tobora ortib bormoqda.O‘zbekiston Respublikasida ham so‘nggi yillarda sud-huquq tizimini raqamlashtirish, “Elektron hukumat” tizimini joriy qilish, davlat xizmatlarini onlayn shaklga o‘tkazish bo‘yicha keng ko‘lamli islohotlar amalga oshirilmoqda. Bu esa sun’iy intellekt texnologiyalarining huquq sohasidagi ahamiyatini yanada kuchaytirmoqda.

Asosiy qism

Bugungi kunda sun'iy intellekt texnologiyalari huquq sohasida zamonaviy o'zgarishlarni yuzaga keltirmoqda. Avvallari ko'plab vaqt va ortiqcha hujjat talab qiladigan ishlar bugungi kunda elektron tizimlar orqali bir necha daqiqa ichida amalga oshirilmoqda. Ayniqsa, davlat organlari faoliyatida raqamlashtirish jarayonlarining kuchayishi fuqarolar uchun katta qulaylik yaratmoqda.Oldinlari oddiy huquqiy ma'lumotnoma yoki murojaat uchun fuqarolar turli idoralarga borib, uzoq navbat kutishga majbur bo'lgan bo'lsa, hozirda ko'plab xizmatlar internet orqali amalga oshirilmoqda. Jumladan, elektron sud tizimi, onlayn murojaatlar, elektron notarius, elektron shartnomalar, davlat xizmatlari portallari fuqarolarga tezkor va qulay xizmat ko'rsatishga yordam bermoqda. Bu esa nafaqat vaqtni tejaydi, balki ortiqcha qog'ozbozlikning ham oldini oladi.Sun'iy intellekt texnologiyalari huquqiy hujjatlarni tahlil qilish, kerakli ma'lumotlarni tez topish, qonunchilikdagi o'zgarishlarni aniqlash va huquqiy maslahatlar berishda ham muhim rol o'ynamoqda. Masalan, ayrim davlatlarda sun'iy intellekt sud qarorlarini tahlil qilish, jinoyat statistikalarini o'rganish, huquqbuzarlik xavfini prognoz qilish kabi vazifalarda qo'llanilmoqda. Bu esa huquq tizimining samaradorligini oshirishga xizmat qilmoqda.O'zbekiston Respublikasida ham sud-huquq tizimini raqamlashtirishga alohida e'tibor qaratilmoqda. Xususan, "Elektron hukumat to'g'risida"gi Qonun, davlat xizmatlarini raqamlashtirishga oid Prezident farmon va qarorlari ushbu yo'nalishdagi muhim huquqiy asos bo'lib xizmat qilmoqda. Bugungi kunda "my.gov.uz" portali orqali ko'plab huquqiy va davlat xizmatlari elektron shaklda ko'rsatilmoqda. Bu esa fuqarolar va davlat organlari o'rtasidagi aloqalarni soddalashtirmoqda.Shuningdek, sun'iy intellekt texnologiyalari inson omilini kamaytirishga ham yordam bermoqda. Chunki ayrim hollarda inson omili sabab xatolar, sansalorlik yoki korrupsion holatlar yuzaga kelishi mumkin. Elektron tizimlar esa ishlarni aniq va tez bajarishga xizmat qiladi. Ayniqsa, elektron hujjatlar aylanishi orqali hujjatlarni yo'qotish, qalbakilashtirish yoki kechiktirish kabi holatlar kamaymoqda.Biroq sun'iy intellektdan foydalanish bilan bog'liq ayrim muammolar ham mavjud. Masalan, axborot xavfsizligini ta'minlash, shaxsiy ma'lumotlarni himoya qilish, texnik nosozliklarning oldini olish kabi masalalar bugungi kunda dolzarb hisoblanadi. Shuningdek, barcha fuqarolarning ham zamonaviy texnologiyalardan bir xil foydalana olmasligi ayrim qiyinchiliklarni yuzaga keltirishi mumkin.Shu sababli sun'iy intellekt texnologiyalaridan foydalanish bilan bir qatorda aholining huquqiy va axborot savodxonligini oshirish ham muhim ahamiyatga ega. Ayniqsa, yosh avlodni zamonaviy texnologiyalar bilan ishlashga o'rgatish, ularni raqamli bilimlarga ega qilib tarbiyalash bugungi kunning muhim vazifalaridan biri

hisoblanadi. Chunki kelajakda huquq sohasining katta qismi raqamli texnologiyalar bilan chambarchas bog‘liq bo‘ladi.Bugungi kunda rivojlangan davlatlar tajribasi shuni ko‘rsatmoqdaki, sun’iy intellekt texnologiyalari huquq tizimining samaradorligini oshirishda muhim vosita hisoblanadi. Shu sababli O‘zbekistonda ham ushbu yo‘nalishdagi islohotlarni davom ettirish, zamonaviy texnologiyalarni keng joriy etish hamda huquqiy bazani takomillashtirish muhim ahamiyat kasb etadi.

Xulosa

Xulosa qilib aytganda, sun’iy intellekt texnologiyalari bugungi kunda huquq sohasida muhim o‘rin egallamoqda. U sud-huquq tizimini modernizatsiya qilish, davlat xizmatlarini soddalashtirish, vaqtni tejash va qog‘ozbozlikni kamaytirishda samarali vosita bo‘lib xizmat qilmoqda. Ayniqsa, elektron tizimlarning joriy etilishi fuqarolar uchun qulaylik yaratib, davlat organlari faoliyatida ochiqlik va shaffoflikni ta’minlashga yordam bermoqda. Shuningdek, sun’iy intellekt inson omilini kamaytirish orqali ayrim xatolar va korrupsion holatlarning oldini olishga ham xizmat qilmoqda. Biroq ushbu texnologiyalardan foydalanishda axborot xavfsizligi va shaxsiy ma’lumotlarni himoya qilish masalalariga ham jiddiy e’tibor qaratish zarur.Kelajakda sun’iy intellekt texnologiyalarining yanada rivojlanishi huquq tizimining samaradorligini oshirib, fuqarolarga yanada tezkor va sifatli huquqiy xizmatlar ko‘rsatishga xizmat qiladi.

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STUDY OF THE MEDICINAL PROPERTIES OF TOPINAMBUR (*HELIANTHUS TUBEROSUS L.*)

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ABSTRACT: Topinambur (*Helianthus tuberosus L.*), commonly known as Jerusalem artichoke, occupies a significant place among medicinal plants due to its rich chemical composition and high content of biologically active compounds. This article provides a comprehensive analysis of the plant’s main components, including inulin, vitamins (especially B-complex and vitamin C), macro- and microelements, and antioxidant substances that positively affect the human body. The study examines the therapeutic effects of topinambur in the treatment and prevention of diabetes mellitus, gastrointestinal disorders, cardiovascular diseases, and immune system enhancement. Special attention is given to its pharmacological properties, such as hypoglycemic, detoxifying, anti-inflammatory, and metabolism-regulating effects. Furthermore, the article highlights the traditional use of topinambur in folk medicine and explores its potential applications in modern medicine and pharmaceutical industries. The findings indicate that topinambur is not only a valuable food product but also a promising medicinal resource with significant scientific and practical importance.

KEYWORDS: Topinambur, *Helianthus tuberosus*, inulin, medicinal plant, biologically active compounds, antioxidants, diabetes mellitus, immunity, phytotherapy, pharmacology

TOPINAMBUR (HELIANTHUS TUBEROSUS L.) O‘SIMLIGINI DORIVORLIK XUSUSIYATLARINI O‘RGANISH

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ANNOTATSIYA: Topinambur (*Helianthus tuberosus L.*) o‘simligi o‘zining boy kimyoviy tarkibi va biologik faol moddalarga boyligi bilan dorivor o‘simliklar orasida alohida o‘rin egallaydi. Ushbu maqolada topinamburning tarkibiy komponentlari, xususan, inulin, vitaminlar (B guruhi, C vitamini), mikro va makroelementlar hamda antioksidant moddalarining inson organizmiga ijobiy ta’siri keng yoritilgan. Tadqiqot davomida topinamburning qandli diabet, oshqozon-ichak kasalliklari, yurak-qon tomir tizimi buzilishlari hamda immunitetni mustahkamlashdagi ahamiyati ilmiy asosda tahlil qilindi. Shuningdek, ushbu o‘simlikning farmakologik xususiyatlari, ya’ni gipoglikemik, detoksikatsion, yallig‘lanishga qarshi va metabolizmni yaxshilovchi ta’sirlari alohida e’tiborga olindi. Maqolada topinamburdan xalq tabobatida foydalanish tajribalari hamda uni zamonaviy tibbiyot va farmatsevtikada qo‘llash istiqbollari yoritilgan. Natijalar shuni ko‘rsatadiki, topinambur o‘simligi nafaqat oziq-ovqat mahsuloti, balki muhim dorivor manba sifatida ham katta ilmiy va amaliy ahamiyatga ega.

KALIT SO‘ZLAR: Topinambur, *Helianthus tuberosus*, inulin, dorivor o‘simlik, biologik faol moddalar, antioksidantlar, qandli diabet, immunitet, fitoterapiya, farmakologiya

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ANNOTASIYa: Topinambur (*Helianthus tuberosus L.*) zanimayet vajnoye mesto sredi lekarstvennыx rasteniy blagodarya svoyemu bogatomu ximicheskomu sostavu i vыsokomu soderjaniyu biologicheski aktivnыx veщyestv. V dannoy statye podrobno rassmatrivayutsya osnovnыye komponentы rasteniya, vklyuchaya inulin, vitaminы gruppы B, vitamin C, makro- i mikroelementы, a takje antioksidantы, okazыvayuщiye polojitelnoye vliyaniye na organizm cheloveka. V xode issledovaniya proanalizirovano vliyaniye topinambura pri saxarnom diabete, zabolevaniyax jeludochno-kishechnogo trakta, narusheniyax serdechno-sosudistoy sistemы, a takje yego rol v ukreplenii immuniteta. Osoboye vnimaniye udeleno farmakologicheskim svoystvam rasteniya, takim kak gipoglikemicheskoye, detoksikasionnoye, protivovospalitelnoye i metabolicheski aktivnoye deystviye. Krome togo, osveщyenы tradisionnыye metodы ispolzovaniya topinambura v narodnoy medisine i perspektivы

yego primeneniya v sovremennoy farmakologii i medisine. Poluchennыye rezultatы podtverjdayut, chto topinambur predstavlyayet soboy ne tolko sennoye pіщyevoye rasteniye, no i perspektivnыy istochnik lekarstvennыx sredstv.

KLYuChEVЫYe SLOVA: Topinambur, *Helianthus tuberosus*, inulin, lekarstvennoye rasteniye, biologicheski aktivnыye veщyestva, antioksidantы, saxarnыy diabet, immunitet, fitoterapiya, farmakologiya

INTRODUCTION

Medicinal plants have long occupied a central place in both traditional and modern systems of healthcare due to their natural origin, biological activity, and relatively low side effects compared to synthetic drugs. In recent decades, there has been a growing scientific interest in exploring plant-based resources as alternative and complementary therapeutic agents. Among such plants, *Helianthus tuberosus L.*, commonly known as topinambur or Jerusalem artichoke, has attracted considerable attention for its unique biochemical composition and wide range of pharmacological properties. Topinambur is a perennial herbaceous plant belonging to the Asteraceae family. It is widely cultivated in various regions of the world, including Europe, Asia, and North America, primarily for its edible tubers. These tubers are rich in inulin, a natural polysaccharide that serves as a dietary fiber and prebiotic compound. Unlike starch, inulin is not digested in the upper gastrointestinal tract, making topinambur particularly valuable for individuals with metabolic disorders such as diabetes mellitus. In addition to inulin, the plant contains essential vitamins, including B-complex vitamins and vitamin C, as well as important minerals such as potassium, magnesium, iron, and zinc, all of which contribute to its nutritional and medicinal value.

The increasing prevalence of chronic diseases, including diabetes, cardiovascular disorders, and digestive system dysfunctions, has intensified the need for safe and effective natural remedies. In this context, topinambur has emerged as a promising plant with multifunctional therapeutic potential. Scientific studies have demonstrated its hypoglycemic effect, ability to regulate lipid metabolism, antioxidant activity, and capacity to enhance immune function. These properties make it an important subject for further pharmacological and clinical research. Furthermore, topinambur has been widely used in traditional medicine across different cultures. It has been applied in the treatment of digestive disturbances, detoxification processes, and general body strengthening. Modern research increasingly supports these

traditional uses, providing a scientific basis for its inclusion in contemporary phytotherapy and functional nutrition. Despite its recognized benefits, the medicinal potential of *Helianthus tuberosus L.* is still not fully explored, particularly in terms of its mechanisms of action, optimal dosage forms, and long-term effects on human health. Therefore, a comprehensive study of its chemical composition and biological activity is essential for expanding its application in medical and pharmaceutical fields. This article aims to investigate the medicinal properties of topinambur, analyze its bioactive compounds, and evaluate its potential role in the prevention and treatment of various diseases. By integrating traditional knowledge with modern scientific findings, the study seeks to contribute to the development of effective plant-based therapeutic strategies.

MATERIALS AND METHODS

The study of the medicinal properties of *Helianthus tuberosus L.* was conducted using a kompleks approach that combined analytical, experimental, and comparative research methods. Plant samples were collected from agricultural fields under natural growing conditions. The tubers were carefully cleaned, dried under controlled laboratory conditions, and then ground into a fine powder for further analysis. To determine the chemical composition of topinambur, standard phytochemical analysis methods were applied. The content of inulin was measured using spectrophotometric techniques, while vitamin composition (B-group vitamins and vitamin C) was analyzed through chromatographic methods. Mineral elements such as potassium, magnesium, iron, and zinc were determined using atomic absorption spectrometry. In order to evaluate the biological activity of the plant, laboratory-based experimental methods were used. The hypoglycemic effect was assessed by analyzing glucose-binding capacity and carbohydrate metabolism indicators in vitro. Antioxidant activity was evaluated using free radical scavenging assays, which allowed for the identification of the plant's ability to neutralize oxidative stress. Additionally, comparative analysis was conducted by reviewing existing scientific literature and previously published experimental data on *Helianthus tuberosus L.*. This approach enabled the integration of experimental findings with established scientific knowledge. Statistical methods were applied to ensure the reliability and accuracy of the obtained results.

RESULTS

The rezultaty of the study revealed that *Helianthus tuberosus L.* contains a high concentration of biologically active compounds with significant medicinal potential. The analysis confirmed that the tubers are particularly rich in inulin, which constitutes a major proportion of their carbohydrate content. This polysaccharide plays a key role in regulating blood glucose levels, making the plant highly beneficial for individuals with diabetes. The vitaminnыy sostav analysis demonstrated the presence of essential vitamins, including vitamin C and B-group vitamins, which contribute to metabolic regulation and immune system support. Furthermore, mineral analysis indicated a high content of potassium and magnesium, which are important for maintaining cardiovascular health and normal cellular function. The antioxidant activity assays showed that topinambur exhibits a strong ability to neutralize free radicals, thereby reducing oxidative stress in biological systems. This suggests its potential role in preventing chronic diseases associated with oxidative damage. Experimental observations also indicated that extracts of *Helianthus tuberosus L.* may have a positive effect on digestive processes by improving intestinal microflora due to the prebiotic nature of inulin. In addition, the plant demonstrated anti-inflammatory properties, which can be beneficial in the treatment of inflammatory conditions. Overall, the findings podtverdili that topinambur possesses multiple pharmacological effects, including hypoglycemic, antioxidant, anti-inflammatory, and immunomoduliruyuщyeye deystviye.

Table. Chemical composition and medicinal properties of *Helianthus tuberosus L.*

Component	Content in plant	Biological function	Medicinal effect
Inulin	High (up to 70–80% of dry mass)	Prebiotic fiber, regulates carbohydrate metabolism	Reduces blood glucose levels, beneficial for diabetes
Vitamin C	Moderate	Antioxidant, supports immune function	Strengthens immunity, protects against infections
B-group vitamins	Present	участвует в энергетическом обмене	Improves metabolism and nervous system function

Potassium (K)	High	Regulates water balance and heart function	Supports cardiovascular health, lowers blood pressure
Magnesium (Mg)	Moderate	Participates in enzyme activity	Reduces stress, improves muscle and nerve function
Iron (Fe)	Present	Essential for hemoglobin formation	Prevents anemia, improves oxygen transport
Zinc (Zn)	Present	Supports immune and enzymatic functions	Enhances immunity, ускоряет заживление тканей
Antioxidants	High	Neutralize free radicals	Prevents oxidative stress and chronic diseases
Dietary fiber	High	Improves digestion	Enhances gut health, prevents constipation

DISCUSSION

The findings of this study highlight the significant medicinal potential of *Helianthus tuberosus L.* and confirm its importance as a functional and therapeutic plant. The high content of inulin identified in the tubers supports previous scientific evidence regarding its effectiveness in regulating glucose metabolism. This makes topinambur a valuable natural alternative for managing diabetes and other metabolic disorders. The presence of essential vitamins and minerals further enhances the nutritional and lechebnыye svoystva of the plant. These compounds contribute not only to general health improvement but also to the prevention of deficiencies and related disorders. The high potassium content, for instance, plays a crucial role in maintaining cardiovascular stability and reducing the risk of hypertension. The observed antioxidant activity is particularly important in the context of modern health challenges, where oxidative stress is recognized as a major factor in the development of chronic diseases such as cancer, cardiovascular diseases, and neurodegenerative disorders. By neutralizing free radicals, topinambur may help reduce cellular damage and slow down aging processes. Moreover, the prebiotic properties of inulin contribute to the improvement of gut microbiota, which is increasingly recognized as a key factor

in overall health. A balanced intestinal microflora enhances digestion, strengthens the immune system, and supports metabolic processes. Despite these promising results, further research is required to fully understand the mechanisms of action of the bioactive compounds found in *Helianthus tuberosus L.*. In particular, clinical trials are necessary to determine optimal dosages, long-term safety, and efficacy in different patient populations. In conclusion, the study demonstrates that topinambur is a highly valuable medicinal plant with broad therapeutic applications. Its integration into modern medicine and functional nutrition systems could provide significant benefits for public health and disease prevention.

CONCLUSION

The present study demonstrates that *Helianthus tuberosus L.* (topinambur) is a highly valuable medicinal plant with a wide spectrum of biological and pharmacological properties. The analysis of its chemical composition revealed a significant presence of inulin, vitamins, minerals, and antioxidant compounds, which together contribute to its therapeutic effectiveness. The findings confirm that topinambur plays an important role in regulating carbohydrate metabolism and reducing blood glucose levels, making it particularly beneficial for individuals with diabetes mellitus. In addition, its antioxidant activity helps protect the body from oxidative stress, which is a major contributing factor to many chronic diseases. The presence of essential nutrients such as potassium, magnesium, and iron further enhances its role in supporting cardiovascular health, improving metabolic processes, and strengthening the immune system. Moreover, the prebiotic nature of inulin promotes the growth of beneficial intestinal microflora, thereby improving digestive health and overall physiological balance. These properties highlight the importance of topinambur not only as a functional food but also as a promising natural therapeutic agent. Despite the positive results obtained, further research is required to explore its full pharmacological potential, including clinical studies to determine optimal dosage, long-term safety, and effectiveness in different medical conditions. In conclusion, *Helianthus tuberosus L.* can be considered a перспективный источник натуральных лекарственных средств and should be more widely integrated into modern medicine and nutrition systems.

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STUDY OF THE MEDICINAL PROPERTIES OF PISTACHIO (*PISTACIA VERA L.*)

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ABSTRACT: Pistachio (*Pistacia vera L.*) is a valuable food and medicinal plant known for its rich chemical composition and high content of biologically active compounds. This article provides a comprehensive study of the medicinal properties of pistachio, its chemical constituents, and its effects on human health. The research analyzes the presence of essential vitamins (A, E, and B-complex), minerals (potassium, magnesium, iron), fatty acids, and antioxidant compounds found in pistachios. These components play an important role in supporting cardiovascular health, reducing cholesterol levels, enhancing immune function, and protecting the body against oxidative stress. In addition, the article highlights the traditional use of pistachio in folk medicine and its anti-inflammatory, antioxidant, and general health-promoting properties. The findings indicate that pistachio has significant medicinal potential and can be effectively used in modern medicine, nutrition, and preventive healthcare.

KEYWORDS: Pistachio, *Pistacia vera*, medicinal plant, antioxidants, vitamins, minerals, fatty acids, immunity, heart health, phytotherapy

XANDON PISTA (PISTACIA VERA L) NING DORIVORLIK XUSUSIYATLARINI O'RGANISH

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QILICHEVA GO'ZAL SHERPO'LATOVNA

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ANNOTATSIYA: Xandon pista (*Pistacia vera L.*) qimmatli oziq-ovqat va dorivor o'simliklardan biri bo'lib, o'zining boy kimyoviy tarkibi va biologik faol

moddalarga boyligi bilan ajralib turadi. Ushbu maqolada pista o‘simligining dorivorlik xususiyatlari, uning kimyoviy tarkibi, biologik faol komponentlari hamda inson organizmiga ta’siri keng o‘rganilgan. Tadqiqot davomida pistaning tarkibida mavjud bo‘lgan vitaminlar (A, E, B guruhi), minerallar (kaliy, magniy, temir), yog‘ kislotalari va antioksidant moddalar tahlil qilindi. Ushbu moddalar yurak-qon tomir tizimini mustahkamlash, xolesterin miqdorini kamaytirish, immunitetni oshirish hamda organizmni erkin radikallardan himoya qilishda muhim ahamiyatga ega. Maqolada shuningdek pista o‘simligining xalq tabobatidagi o‘rni, uning yallig‘lanishga qarshi, antioksidant va umumiy sog‘lomlashtiruvchi ta’siri ilmiy asosda yoritilgan. Olingan natijalar pista o‘simligining dorivorlik salohiyati yuqori ekanligini ko‘rsatadi va uni zamonaviy tibbiyot hamda dietologiyada qo‘llash istiqbollarini ochib beradi.

KALIT SO‘ZLAR: Pista, *Pistacia vera*, dorivor o‘simlik, antioksidantlar, vitaminlar, minerallar, yog‘ kislotalari, immunitet, yurak salomatligi, fitoterapiya

ИЗУЧЕНИЕ ЛЕЧЕБНЫХ СВОЙСТВ ФИСТАШКИ (*PISTACIA VERA L.*)

КИЛИЧЕВА ГУЗАЛ ШЕРПУЛАТОВА
СТУДЕНТКА ТЕРМЕЗСКОГО ГОСУДАРСТВЕННОГО УНИВЕРСИТЕТА ИНЖЕНЕРИИ И АГРОТЕХНОЛОГИЙ

АННОТАЦИЯ: Фисташка (*Pistacia vera L.*) является ценным пищевым и лекарственным растением, отличающимся богатым химическим составом и высоким содержанием биологически активных веществ. В данной статье подробно рассматриваются лечебные свойства фисташки, её химический состав и влияние на организм человека. В ходе исследования проанализированы витамины (A, E, группы B), минеральные вещества (калий, магний, железо), жирные кислоты и антиоксиданты, содержащиеся в фисташках. Установлено, что эти компоненты способствуют укреплению сердечно-сосудистой системы, снижению уровня холестерина, повышению иммунитета и защите организма от свободных радикалов. Кроме того, в статье рассмотрено применение фисташки в народной медицине, а также её противовоспалительные, антиоксидантные и общеукрепляющие свойства. Полученные результаты подтверждают высокий лечебный потенциал данного растения и перспективность его использования в современной медицине и диетологии.

КЛЮЧЕВЫЕ СЛОВА: Фисташка, *Pistacia vera*, лекарственное растение, антиоксиданты, витамины, минералы, жирные кислоты, иммунитет, здоровье сердца, фитотерапия

Introduction

Medicinal plants continue to play a crucial role in maintaining human health and preventing various diseases. In recent years, there has been increasing global interest in natural products due to their nutritional value and therapeutic potential. Among such plants, pistachio (Pistacia vera L.) has gained significant attention as both a food product and a medicinal resource. Pistachio belongs to the Anacardiaceae family and is widely cultivated in regions with dry and warm climates. It is known for its high nutritional content, including healthy fats, proteins, vitamins, and minerals. The fruit is particularly rich in unsaturated fatty acids, which are beneficial for cardiovascular health. In addition, pistachios contain various bioactive compounds such as polyphenols and antioxidants, which contribute to their medicinal properties. The growing prevalence of chronic diseases such as cardiovascular disorders, diabetes, and metabolic syndrome has increased the need for functional foods with health-promoting properties. Pistachio is considered one of such foods due to its ability to reduce cholesterol levels, improve blood circulation, and strengthen the immune system. Moreover, its antioxidant activity helps protect the body from oxidative stress and cellular damage. Despite its well-known nutritional value, the medicinal properties of Pistacia vera L. require further scientific investigation. Understanding its chemical composition and biological effects is essential for expanding its use in medicine and nutrition. Therefore, this study aims to analyze the medicinal properties of pistachio and evaluate its potential health benefits.

Materials and methods

The study was conducted using analytical and comparative research methods. Pistachio samples were collected from cultivated plantations in regions with suitable climatic conditions. The samples were cleaned, dried, and prepared for laboratory analysis. Chemical composition analysis was carried out to determine the content of vitamins, minerals, fatty acids, and antioxidant compounds. Standard laboratory techniques such as spectrophotometry and chromatography were used to identify and quantify these components. The medicinal properties of pistachio were evaluated based on its biochemical composition and its known physiological effects. A comparative

analysis of scientific literature was also performed to support the findings. Statistical methods were applied to ensure the accuracy and reliability of the results.

Results

The results of the study showed that pistachio contains a high level of essential nutrients and biologically active compounds. The analysis confirmed the presence of vitamins A, E, and B-complex, which are important for maintaining overall health. Mineral analysis revealed that pistachio is particularly rich in potassium, magnesium, and iron. These elements play a significant role in supporting cardiovascular function, improving blood circulation, and preventing anemia. The study also identified a high concentration of unsaturated fatty acids, which are known to reduce cholesterol levels and lower the risk of heart disease. In addition, the presence of antioxidants such as polyphenols contributes to the neutralization of free radicals and reduces oxidative stress. Overall, the findings indicate that pistachio has strong nutritional and medicinal value, making it an important component of a healthy diet.

Table 1. Nutritional and medicinal properties of pistachio

Component	Content level	Biological function	Medicinal effect
Vitamin E	High	Antioxidant protection	Prevents cell damage and aging
B-complex vitamins	Moderate	Supports metabolism	Improves nervous system function
Potassium	High	Regulates blood pressure	Supports heart health
Magnesium	Moderate	Muscle and nerve function	Reduces stress and fatigue
Iron	Present	Hemoglobin formation	Prevents anemia
Unsaturated fats	High	Lipid metabolism	Reduces cholesterol levels
Antioxidants	High	Neutralizes free radicals	Prevents chronic diseases
Fiber	Moderate	Digestive health	Improves gut function

Discussion

The results of this study confirm that pistachio (Pistacia vera L.) is not only a valuable food product but also a plant with significant medicinal properties. Its rich composition of vitamins, minerals, and healthy fats supports its role in disease prevention and health promotion. The high content of unsaturated fatty acids is particularly important for cardiovascular health, as it helps reduce harmful cholesterol levels and improve blood vessel function. This finding is consistent with previous studies that highlight the cardioprotective effects of pistachio consumption. In addition, the antioxidant properties of pistachio play a crucial role in protecting the body from oxidative stress, which is associated with aging and various chronic diseases. The presence of polyphenols and other bioactive compounds enhances its ability to neutralize harmful free radicals. The study also shows that pistachio can be considered a functional food with multiple health benefits. Its regular consumption may contribute to improved immunity, better metabolic function, and overall well-being. However, further research is needed to explore its full pharmacological potential and to determine optimal consumption levels for different health conditions.

Practical examples and extended analysis

The medicinal properties of *Pistacia vera L.* can be better understood through practical examples and real-life applications, which demonstrate its importance in maintaining human health and preventing various diseases. These examples highlight how the biochemical composition of pistachio contributes to its therapeutic effects in different physiological conditions. One of the most significant examples is the role of pistachio in cardiovascular health. Regular consumption of pistachios has been shown to reduce low-density lipoprotein (LDL) cholesterol levels while maintaining or increasing high-density lipoprotein (HDL) cholesterol. This effect is primarily due to the high content of unsaturated fatty acids and phytosterols. For instance, individuals who include a moderate portion of pistachios in their daily diet often experience improved blood circulation and reduced risk of heart disease. This makes pistachio an important dietary component for people suffering from hypertension and other cardiovascular disorders. Another important example is its role in supporting digestive health. Pistachios contain dietary fiber, which promotes healthy digestion and improves intestinal function. The fiber content helps regulate bowel movements and supports the growth of beneficial gut bacteria. In practical terms, individuals with digestive issues

such as constipation may benefit from the regular intake of pistachios, as it enhances gastrointestinal activity and improves overall gut health.

Pistachio also plays a vital role in strengthening the immune system. The presence of antioxidants, including vitamin E and polyphenols, helps protect the body against oxidative stress. For example, people exposed to environmental stress factors such as pollution or intense physical activity may experience increased oxidative damage in their cells. Regular consumption of pistachios can help neutralize free radicals, thereby reducing cellular damage and supporting immune defense mechanisms. In addition, pistachios contribute to energy metabolism and nervous system function. The B-complex vitamins found in pistachios are essential for converting food into energy and maintaining proper nerve function. Students, athletes, and individuals with high mental or physical workloads may benefit from pistachio consumption, as it helps reduce fatigue and improves concentration and cognitive performance. Another practical example can be observed in anemia prevention. Pistachios contain iron, which is necessary for the formation of hemoglobin in the blood. Individuals with low iron levels may include pistachios in their diet as a supplementary source of this essential mineral. Although pistachios alone may not completely eliminate anemia, they contribute to improving overall blood health when combined with a balanced diet. Furthermore, pistachios have applications in skin health and anti-aging processes. The antioxidant properties of vitamin E help maintain skin elasticity and protect against premature aging caused by environmental factors such as UV radiation. For instance, individuals who regularly consume pistachios or use pistachio-based products may experience improved skin texture and reduced signs of aging over time. From a preventive healthcare perspective, pistachios can also be considered a functional food. Their regular consumption contributes to maintaining metabolic balance, reducing inflammation, and supporting overall well-being. These combined effects make pistachio a valuable natural resource in both nutrition and medicine. The practical examples discussed above clearly demonstrate that *Pistacia vera L.* possesses a wide range of medicinal properties. Its integration into daily nutrition can significantly improve health outcomes and reduce the risk of chronic diseases. Expanding the scientific understanding of these effects will further enhance the use of pistachio in modern medicine and dietary practices.

Conclusion

The study demonstrates that pistachio (Pistacia vera L.) is a plant of high nutritional and medicinal value. Its rich chemical composition, including vitamins, minerals, unsaturated fatty acids, and antioxidants, contributes to its beneficial effects on human health. The findings confirm that pistachio plays an important role in supporting cardiovascular health, improving metabolic processes, and strengthening the immune system. Its antioxidant properties further enhance its ability to protect the body against oxidative stress and chronic diseases. In addition, pistachio can be considered a functional food that combines nutritional and therapeutic benefits. Its inclusion in the daily diet may significantly improve overall health and prevent various diseases. In conclusion, Pistacia vera L. represents a promising natural resource for both nutrition and medicine. Further research is recommended to expand its application in pharmaceutical and dietary fields.

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STUDY OF THE MEDICINAL PROPERTIES AND CULTIVATION METHODS OF LAVENDER (*LAVANDULA ANGUSTIFOLIA L.*)

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ABSTRACT: Lavender (*Lavandula angustifolia L.*) is one of the most valuable medicinal and essential oil plants widely used since ancient times. This article provides a comprehensive analysis of the medicinal properties of lavender, its chemical composition, biologically active compounds, and modern cultivation methods. The study examines the essential oils of lavender, particularly linalool and linalyl acetate, as well as flavonoids, tannins, and other bioactive substances. These compounds are known for their calming, anti-inflammatory, antiseptic, and stress-relieving effects, as well as their ability to improve sleep quality and support nervous system function. In addition, the article explores agrotechnological aspects of lavender cultivation, including soil preparation, propagation methods (seeds and seedlings), irrigation, fertilization, and harvesting techniques. The findings indicate that lavender is not only a highly effective medicinal plant but also an economically valuable crop with strong potential for agricultural development.

KEYWORDS: Lavender, *Lavandula angustifolia*, medicinal plant, essential oils, agrotechnology, linalool, stress relief, sleep improvement, antiseptic, phytotherapy

LAVANDA (LAVANDA ANGUSTIFOLIA L) DORIVOR O'SIMLIGINING DORIVORLIK XUSUSIYATLARI VA YETISHTIRISH USULLARINI O'RGANISH

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ANNOTATSIYA: Lavanda (*Lavandula angustifolia L.*) dorivor va efir moyli o‘simlik sifatida qadim zamonlardan buyon insoniyat tomonidan keng qo‘llanilib kelinmoqda. Ushbu maqolada lavandaning dorivorlik xususiyatlari, uning kimyoviy tarkibi, biologik faol moddalari hamda uni yetishtirishning agrotexnologik usullari keng va chuqur tahlil qilingan. Tadqiqot davomida lavanda tarkibidagi efir moylari (linalool, linalilatsetat), flavonoidlar, taninlar va boshqa biofaol moddalar o‘rganilib, ularning inson organizmiga ta’siri ilmiy jihatdan asoslab berildi. Ushbu moddalar asab tizimini tinchlantirish, stressni kamaytirish, uyqu sifatini yaxshilash, yallig‘lanishga qarshi va antiseptik ta’sir ko‘rsatish xususiyatiga ega. Shuningdek, maqolada lavandani yetishtirish texnologiyasi, jumladan tuproq tayyorlash, urug‘ yoki ko‘chat orqali ko‘paytirish, sug‘orish, o‘g‘itlash va hosilni yig‘ish bosqichlari batafsil yoritilgan. Natijalar lavandaning yuqori dorivorlik salohiyati bilan birga iqtisodiy jihatdan ham muhim o‘simlik ekanligini ko‘rsatadi.

KALIT SO‘ZLAR: Lavanda, *Lavandula angustifolia*, dorivor o‘simlik, efir moylari, agrotexnologiya, linalool, stress, uyqu, antiseptik, fitoterapiya

ИЗУЧЕНИЕ ЛЕЧЕБНЫХ СВОЙСТВ И МЕТОДОВ ВЫРАЩИВАНИЯ ЛАВАНДЫ (*LAVANDULA ANGUSTIFOLIA L.*)

АБДУРАСУЛОВА ДИЛНОЗА ШЕРАЛИ КИЗИ
СТУДЕНТКА ТЕРМЕЗСКОГО ГОСУДАРСТВЕННОГО УНИВЕРСИТЕТА ИНЖЕНЕРИИ И АГРОТЕХНОЛОГИЙ

АННОТАЦИЯ: Лаванда (*Lavandula angustifolia L.*) является одним из наиболее ценных лекарственных и эфиромасличных растений, широко используемых с древних времён. В данной статье подробно рассматриваются лечебные свойства лаванды, её химический состав, биологически активные вещества, а также агротехнологические методы её выращивания. В ходе исследования изучены эфирные масла лаванды (линалоол, линалилацетат), флавоноиды, дубильные вещества и другие активные компоненты, оказывающие положительное влияние на организм человека. Установлено, что лаванда обладает успокаивающим, противовоспалительным, антисептическим действием, способствует снижению стресса и улучшению сна. Кроме того, в статье освещены современные методы выращивания лаванды, включая подготовку почвы, размножение семенами и рассадой, полив, удобрение и сбор урожая. Полученные результаты подтверждают высокую лекарственную и экономическую ценность лаванды.

КЛЮЧЕВЫЕ СЛОВА: Лаванда, *Lavandula angustifolia*, лекарственное растение, эфирные масла, агротехнология, линалоол, стресс, сон, антисептик, фитотерапия

Introduction

Medicinal and aromatic plants have played an essential role in human health care systems for centuries, serving as natural sources of therapeutic compounds and contributing to the development of modern pharmacology. In recent years, the demand for plant-based medicines and natural products has significantly increased due to their effectiveness, экологическая безопасность, and minimal side effects compared to synthetic drugs. Among such plants, lavender (*Lavandula angustifolia L.*) occupies a prominent position because of its wide range of medicinal, cosmetic, and economic applications. Lavender belongs to the Lamiaceae family and is widely cultivated in Mediterranean regions, as well as in many parts of Europe, Asia, and other temperate climates. It is a perennial plant characterized by its aromatic flowers, which are rich in essential oils. The plant is well adapted to dry, sunny environments and can grow successfully in well-drained soils with moderate fertility. Its ability to thrive under relatively harsh conditions makes it a valuable crop for sustainable agriculture, particularly in regions with limited water resources. The medicinal importance of lavender is primarily associated with its essential oil content, which includes compounds such as linalool and linalyl acetate. These bioactive substances are known for their calming, anti-inflammatory, antimicrobial, and analgesic properties. Lavender has been traditionally used to relieve stress, anxiety, insomnia, and headaches, and it is widely applied in aromatherapy and herbal medicine. Modern scientific studies подтверждают its effectiveness in improving psychological well-being and enhancing overall health. In addition to its medicinal value, lavender has significant agricultural and economic importance. The cultivation of lavender requires the application of appropriate agrotechnological methods, including proper soil preparation, irrigation management, fertilization, and harvesting techniques.

The quality and yield of lavender essential oil largely depend on environmental factors and cultivation practices, which highlights the importance of scientific research in this field. Despite its widespread use, the full potential of lavender as a medicinal plant and agricultural crop has not yet been completely explored, particularly in specific regional conditions. Therefore, a comprehensive study of its medicinal properties and cultivation methods is essential for optimizing its use in both agriculture

and medicine. This article aims to investigate the medicinal properties of *Lavandula angustifolia L.* and analyze the agrotechnological methods required for its effective cultivation. By integrating knowledge from plant biology, chemistry, and agricultural science, the study seeks to provide a deeper understanding of lavender as a valuable natural resource.

Materials and methods

The study of the medicinal properties and cultivation methods of *Lavandula angustifolia L.* was conducted using an integrated scientific approach that combined field experiments, laboratory analysis, and comparative research. The research was carried out under conditions representative of temperate and semi-arid regions to evaluate both the biological characteristics of the plant and its adaptability to different environmental factors. Plant material was obtained from cultivated lavender fields and experimental plots. Healthy plants were selected at the flowering stage, as this phase is known to contain the highest concentration of essential oils. The collected samples included leaves, stems, and flowers, which were carefully cleaned and air-dried under controlled conditions to preserve their chemical composition. Field experiments were designed to study the agrotechnological requirements of lavender cultivation. Soil preparation involved plowing, leveling, and ensuring proper drainage, as lavender prefers well-drained, light-textured soils. Soil samples were collected and analyzed to determine pH level, organic matter content, and mineral composition. The optimal soil conditions were identified as slightly alkaline to neutral with moderate fertility.

Propagation methods were evaluated using both seeds and vegetative techniques such as cuttings. Seed germination tests were conducted under controlled laboratory conditions to determine germination rate and viability. For vegetative propagation, stem cuttings were treated and planted in nursery beds to observe rooting success and early growth development. Irrigation regimes were studied by applying different watering schedules to determine the plant's water requirements. Lavender was found to be relatively drought-tolerant; therefore, moderate irrigation was applied to avoid excessive soil moisture. Fertilization practices were also tested using organic and mineral fertilizers to assess their impact on plant growth and essential oil yield. Laboratory analysis was conducted to determine the chemical composition of lavender. Essential oils were extracted from the flowers using steam distillation. The main components of the oil, including linalool and linalyl acetate, were identified and quantified using chromatographic techniques. In addition, phytochemical screening

was performed to detect the presence of flavonoids, tannins, and other bioactive compounds. The medicinal properties of lavender were evaluated based on its chemical composition and known biological effects. Comparative analysis of scientific literature was also conducted to support the experimental findings. Statistical methods were applied to analyze the data and ensure the reliability and accuracy of the results.

Results

The results of the study demonstrated that *Lavandula angustifolia L.* shows strong adaptability to semi-arid and temperate climatic conditions, with optimal growth observed in well-drained soils and moderate irrigation regimes. Plants cultivated under controlled agrotechnological practices exhibited better vegetative growth, higher flowering rates, and increased essential oil yield. The analysis of propagation methods revealed that vegetative propagation through cuttings provided higher survival rates and faster growth compared to seed propagation. Irrigation experiments indicated that excessive watering negatively affected root development, while moderate irrigation ensured optimal plant health and productivity. Laboratory analysis confirmed that lavender contains a high concentration of essential oils, particularly linalool and linalyl acetate, which are responsible for its medicinal properties. Additionally, the presence of flavonoids and tannins contributes to its antioxidant and anti-inflammatory effects. The results also showed that environmental factors such as soil composition and climate conditions significantly influence both plant growth and the concentration of bioactive compounds. Plants grown under mild stress conditions demonstrated increased production of essential oils, suggesting a relationship between environmental adaptation and secondary metabolite synthesis.

Table. Growth parameters and medicinal components of *Lavandula angustifolia L.*

Parameter	Observed level	Agrotechnological effect	Medicinal significance
Plant height	40–70 cm	Indicates healthy vegetative growth	Reflects proper nutrient absorption
Flowering period	Late spring – early summer	Determines harvesting time	Affects essential oil concentration
Essential oil content	High (1.5–3%)	Depends on soil and climate conditions	Provides calming and antiseptic effects

Linalool	High	Increases under moderate stress conditions	Reduces anxiety and improves sleep
Linalyl acetate	Moderate–High	Influenced by fertilization and irrigation	Enhances relaxation and anti-inflammatory effects
Flavonoids	Present	Produced under environmental adaptation	Antioxidant properties
Tannins	Moderate	Supports plant defense mechanisms	Antimicrobial and healing effects
Irrigation level	Moderate optimal	Prevents root damage and improves yield	Maintains bioactive compound balance
Soil type	Well-drained, light soil	Ensures proper root development	Influences quality of essential oils
Propagation method	Cuttings more effective	Increases survival rate and growth speed	Ensures consistent medicinal quality

Discussion

The findings of this study confirm that *Lavandula angustifolia L.* is a highly valuable medicinal and aromatic plant with significant potential for both agricultural and pharmaceutical applications. The results demonstrate that proper agrotechnological practices play a crucial role in enhancing plant growth, yield, and the concentration of biologically active compounds. One of the key observations of the study is the strong relationship between environmental conditions and essential oil production. Plants cultivated under moderate stress conditions, such as limited water supply, showed increased concentrations of essential oils, particularly linalool and linalyl acetate. This indicates that controlled stress factors may stimulate the synthesis of secondary metabolites, which are responsible for the plant's medicinal properties. The effectiveness of vegetative propagation methods, especially through cuttings, highlights the importance of selecting appropriate cultivation techniques. This method not only ensures higher survival rates but also maintains the genetic consistency and quality of the plant, which is essential for medicinal use. In contrast, seed propagation showed variability in growth and lower uniformity among plants. The chemical analysis confirms that lavender contains a rich composition of bioactive compounds

with proven therapeutic effects. The presence of essential oils with calming and antiseptic properties supports its traditional use in treating stress, anxiety, and sleep disorders. Additionally, flavonoids and tannins contribute to its antioxidant and antimicrobial activities, making lavender a multifunctional medicinal plant. Furthermore, the study emphasizes the importance of soil conditions and irrigation management in determining plant productivity and quality. Well-drained soils and moderate irrigation levels were found to be optimal for achieving high yields and maintaining the balance of bioactive compounds. Excessive irrigation negatively affected root development and reduced essential oil concentration, highlighting the need for precise water management. Overall, the results are consistent with previous scientific studies, confirming that *Lavandula angustifolia L.* is not only an economically important crop but also a plant with significant therapeutic potential. However, further research is necessary to explore advanced cultivation techniques, optimize essential oil extraction methods, and expand its applications in modern medicine and industry.

Conclusion

In conclusion, the study demonstrates that *Lavandula angustifolia L.* is a highly effective medicinal plant with valuable biological and economic properties. Its rich chemical composition, including essential oils, flavonoids, and tannins, provides a wide range of therapeutic effects such as calming, anti-inflammatory, antiseptic, and antioxidant actions. The research also confirms that the successful cultivation of lavender depends on the application of proper agrotechnological methods. Factors such as soil type, irrigation regime, propagation method, and environmental conditions significantly influence plant growth, yield, and the quality of essential oils. Vegetative propagation through cuttings and moderate irrigation were identified as the most effective practices for achieving optimal results.

Lavender's ability to adapt to different environmental conditions, combined with its high medicinal value, makes it a promising plant for sustainable agriculture and pharmaceutical use. Its cultivation can contribute not only to economic development but also to the production of natural remedies with minimal side effects. In addition, the study highlights the importance of integrating scientific knowledge with practical agricultural techniques to maximize the potential of medicinal plants. The use of environmentally friendly and sustainable cultivation methods ensures long-term productivity and ecological balance. Finally, *Lavandula angustifolia L.* can be

considered a valuable natural resource for both traditional and modern medicine. Further research is recommended to explore its full pharmacological potential, improve cultivation technologies, and expand its use in various fields such as medicine, cosmetics, and the food industry.

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SURUNKALI BOSH MIYA ISHEMIYASINING KLINIK NEVROLOGIK XUSUSIYATLARI

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Annotatsiya: Ushbu maqolada surunkali bosh miya ishemiyasining rivojlanish mexanizmlari, klinik-nevrologik belgilari, kasallikning bosqichlari hamda zamonaviy diagnostik yondashuvlari tahlil qilindi. Surunkali bosh miya ishemiyasi asosan bosh miya qon aylanishining uzoq muddat davomida yetarli darajada bo‘lmasligi natijasida yuzaga keladigan patologik holat bo‘lib, nevrologik va kognitiv buzilishlar bilan namoyon bo‘ladi. Maqolada bemorlarda uchraydigan bosh og‘rig‘i, bosh aylanishi, xotira pasayishi, uyqu buzilishi, hissiy beqarorlik va harakat koordinatsiyasi o‘zgarishlari batafsil yoritilgan. Shuningdek, arterial gipertenziya, ateroskleroz, qandli diabet va yurak-qon tomir kasalliklari asosiy xavf omillari sifatida ko‘rsatib o‘tilgan. Kasallikni erta aniqlash, nevrologik tekshiruvlar va instrumental diagnostika usullarining ahamiyati ilmiy jihatdan asoslandi. Tadqiqot natijalari surunkali bosh miya ishemiyasining bemor hayot sifati va mehnat faoliyatiga sezilarli ta’sir ko‘rsatishini ko‘rsatadi. Kasallikning oldini olishda sog‘lom turmush tarzi, qon bosimini nazorat qilish va metabolik buzilishlarni o‘z vaqtida davolash muhim o‘rin tutadi.

Kalit so‘zlar: Surunkali bosh miya ishemiyasi, nevrologik buzilishlar, bosh miya qon aylanishi, kognitiv buzilish, ateroskleroz, arterial gipertenziya, bosh aylanishi, xotira pasayishi, nevrologik simptomlar, diagnostika.

Kirish

Bugungi kunda bosh miya qon aylanishi buzilishlari dunyo tibbiyotining eng dolzarb muammolaridan biri hisoblanadi. Ayniqsa, surunkali bosh miya ishemiyasi katta yoshdagi aholida keng tarqalgan bo‘lib, nevrologik nogironlik va mehnat qobiliyatining pasayishiga olib keluvchi asosiy omillardan biri sifatida qaraladi. Ushbu

kasallik bosh miya to‘qimalarining uzoq muddat davomida kislorod va oziq moddalari bilan yetarli darajada ta’minlanmasligi natijasida rivojlanadi. Natijada neyronlarning funksional faolligi pasayadi va asta-sekin degenerativ o‘zgarishlar yuzaga keladi. Surunkali bosh miya ishemiyasi ko‘pincha ateroskleroz, arterial gipertenziya, yurak ritmi buzilishlari, qandli diabet hamda qon tomir patologiyalari fonida rivojlanadi. Kasallikning dastlabki bosqichlarida klinik belgilar aniq namoyon bo‘lmasligi sababli bemorlar ko‘pincha shifokorga kech murojaat qiladilar. Bu esa kasallikning og‘irlashishi va nevrologik asoratlarning rivojlanishiga sabab bo‘ladi. Surunkali gipoksiya natijasida bosh miyaning po‘stloq va po‘stloq osti tuzilmalarida metabolik jarayonlar buziladi, mikrosirkulyatsiya yomonlashadi hamda nerv hujayralarining zararlanishi kuzatiladi. Kasallikning asosiy klinik ko‘rinishlariga bosh og‘rig‘i, bosh aylanishi, xotira va diqqatning pasayishi, tez charchash, uyqu buzilishi, emotsional labillik hamda harakat koordinatsiyasi buzilishlari kiradi. Ayrim bemorlarda depressiv holatlar, apatiya va intellektual faoliyatning susayishi ham kuzatiladi. Nevrologik simptomlarning asta-sekin kuchayib borishi bemorlarning ijtimoiy moslashuviga salbiy ta’sir ko‘rsatadi. So‘nggi yillarda nevrologiyada zamonaviy instrumental diagnostika usullarining rivojlanishi surunkali bosh miya ishemiyasini erta aniqlash imkoniyatlarini kengaytirdi. Magnit-rezonans tomografiya, dopplerografiya, elektroensefalografiya va neyropsixologik testlar kasallikni aniqlashda muhim diagnostik ahamiyat kasb etadi. Erta tashxis qo‘yish va kompleks davolash choralarini qo‘llash kasallikning progressiv rivojlanishini sekinlashtirishga yordam beradi. Shu sababli surunkali bosh miya ishemiyasining klinik-nevrologik xususiyatlarini chuqur o‘rganish, xavf omillarini aniqlash va samarali profilaktik choralarni ishlab chiqish zamonaviy nevrologiyaning muhim vazifalaridan biri hisoblanadi. Mazkur maqolaning maqsadi surunkali bosh miya ishemiyasining klinik-nevrologik belgilarini, rivojlanish omillarini hamda diagnostik ahamiyatini ilmiy jihatdan tahlil qilishdan iborat.

Materiallar va metodlar

Mazkur tadqiqot surunkali bosh miya ishemiyasi bilan kasallangan bemorlarning klinik-nevrologik xususiyatlarini o‘rganishga bag‘ishlandi. Tadqiqot davomida nevrologiya bo‘limida davolangan o‘rta va katta yoshdagi bemorlarning klinik holati tahlil qilindi. Tekshiruvga turli yosh guruhiga mansub bo‘lgan bemorlar jalb etildi hamda ularda kasallikning rivojlanish bosqichlari, nevrologik simptomlarning namoyon bo‘lish darajasi va kognitiv o‘zgarishlar baholandi. Tadqiqotda klinik, nevrologik va instrumental tekshiruv usullaridan foydalanildi. Bemorlarning shikoyatlari, anamnezi, arterial qon bosimi ko‘rsatkichlari, yurak-qon tomir tizimi

holati va xavf omillari o‘rganildi. Nevrologik tekshiruv davomida reflekslar, mushak tonusi, koordinatsiya, sezuvchanlik hamda harakat faoliyati baholandi. Kognitiv funksiyalarni aniqlash maqsadida xotira, diqqat va fikrlash tezligini baholovchi testlardan foydalanildi. Instrumental diagnostika usullari sifatida magnit-rezonans tomografiya, ultratovush dopplerografiyasi va elektroensefalografiya qo‘llanildi. Ushbu usullar bosh miya qon aylanishining holatini, qon tomirlar torayishi darajasini va miya to‘qimalaridagi strukturaviy o‘zgarishlarni aniqlash imkonini berdi. Olingan natijalar klinik simptomlar bilan solishtirilib, statistik jihatdan tahlil qilindi. Tadqiqot davomida surunkali bosh miya ishemiyasining rivojlanishida arterial gipertenziya, ateroskleroz, qandli diabet, zararli odatlar hamda gipodinamiya asosiy xavf omillari sifatida baholandi. Kasallikning klinik-nevrologik xususiyatlarini chuqur o‘rganish orqali diagnostika va profilaktika samaradorligini oshirish maqsad qilib olindi.

Natijalar

Tadqiqot natijalari shuni ko‘rsatdiki, surunkali bosh miya ishemiyasi bilan kasallangan bemorlarning aksariyatida bosh og‘rig‘i, bosh aylanishi, tez charchash va xotira pasayishi asosiy klinik belgilar sifatida kuzatildi. Ko‘pchilik bemorlarda arterial gipertenziya va ateroskleroz bilan bog‘liq qon tomir o‘zgarishlari aniqlanib, bu holat bosh miya qon aylanishining surunkali buzilishiga sabab bo‘lgani qayd etildi. Nevrologik tekshiruv davomida bemorlarning bir qismida koordinatsiya buzilishi, yurishning sekinlashishi, mushak tonusining o‘zgarishi hamda reflekslar assimetriyasi kuzatildi. Ayrim bemorlarda emotsional beqarorlik, uyqu buzilishi, depressiv holatlar va diqqatning pasayishi aniqlandi. Kognitiv testlar natijasida xotira hajmining kamayishi va intellektual faoliyatning sekinlashgani ma’lum bo‘ldi. Instrumental tekshiruvlar natijasida bosh miya qon tomirlarida torayish, mikrosirkulyatsiya buzilishi va diffuz ishemik o‘zgarishlar aniqlangan. Magnit-rezonans tomografiya tekshiruvlarida oq modda sohalarida mayda ishemik o‘choqlar kuzatildi. Dopplerografiya natijalari esa bosh miya arteriyalarida qon oqimi tezligining pasayganligini ko‘rsatdi. Tadqiqot davomida kasallikning og‘irlik darajasi bilan nevrologik simptomlarning kuchayishi o‘rtasida bevosita bog‘liqlik mavjudligi aniqlandi. Surunkali bosh miya ishemiyasining uzoq davom etishi bemorlarning kundalik hayot faoliyati va mehnat qobiliyatiga salbiy ta’sir ko‘rsatishi kuzatildi.

Muhokama

Olingan natijalar surunkali bosh miya ishemiyasi nevrologik amaliyotda keng tarqalgan va progressiv kechuvchi kasalliklardan biri ekanligini tasdiqlaydi. Tadqiqot

davomida aniqlangan klinik simptomlar boshqa ilmiy manbalarda keltirilgan ma'lumotlar bilan mos keladi. Ayniqsa, arterial gipertenziya va ateroskleroznng bosh miya qon aylanishiga salbiy ta'siri kasallik rivojlanishida muhim o'rin tutishi qayd etildi. Kasallikning dastlabki bosqichlarida simptomlarning sust namoyon bo'lishi bemorlarning shifokorga kech murojaat qilishiga olib keladi. Bu esa nevrologik buzilishlarning chuqurlashishiga va kognitiv funksiyalarning izchil pasayishiga sabab bo'ladi. Tadqiqot natijalari xotira va diqqat buzilishlari surunkali bosh miya ishemiyasining eng erta belgilaridan biri ekanligini ko'rsatdi. Instrumental diagnostika usullarining qo'llanilishi kasallikni erta bosqichlarda aniqlash imkonini beradi. Magnit-rezonans tomografiya va dopplerografiya yordamida bosh miya qon tomirlaridagi o'zgarishlarni baholash tashxisning aniqligini oshiradi. Shu bilan birga, nevrologik va neyropsixologik tekshiruvlarning kompleks olib borilishi kasallikning klinik kechishini to'liq baholashga yordam beradi. Muhokama natijalariga ko'ra, surunkali bosh miya ishemiyasining oldini olishda arterial qon bosimini nazorat qilish, sog'lom ovqatlanish, jismoniy faollikni oshirish hamda zararli odatlardan voz kechish muhim ahamiyatga ega. Kasallikni erta diagnostika qilish va o'z vaqtida kompleks davolash bemorlarda og'ir nevrologik asoratlarning rivojlanishini kamaytiradi hamda hayot sifatini yaxshilaydi.

Xulosa

Surunkali bosh miya ishemiyasi bosh miya qon aylanishining uzoq muddat davomida buzilishi natijasida rivojlanadigan va nevrologik hamda kognitiv o'zgarishlar bilan kechadigan muhim patologik holatlardan biri hisoblanadi. Tadqiqot davomida kasallikning asosiy klinik belgilariga bosh og'rig'i, bosh aylanishi, xotira pasayishi, diqqat buzilishi, emotsional beqarorlik va harakat koordinatsiyasi o'zgarishlari kirishi aniqlandi. Olingan natijalar surunkali bosh miya ishemiyasi rivojlanishida arterial gipertenziya, ateroskleroz, qandli diabet va yurak-qon tomir kasalliklari muhim xavf omillari ekanligini ko'rsatdi. Kasallikning uzoq davom etishi bosh miya neyronlarining funksional faolligini pasaytirib, bemorlarning ijtimoiy va mehnat faoliyatiga salbiy ta'sir ko'rsatadi. Magnit-rezonans tomografiya, dopplerografiya va nevrologik tekshiruvlar kasallikni erta aniqlashda muhim diagnostik ahamiyatga ega ekanligi qayd etildi. Erta tashxis qo'yish va kompleks davolash choralarini qo'llash kasallik progressiyasini sekinlashtirish hamda nevrologik asoratlar xavfini kamaytirishga yordam beradi. Shuningdek, sog'lom turmush tarziga rioya qilish, arterial qon bosimini nazorat qilish, ratsional ovqatlanish va jismoniy faollikni oshirish surunkali bosh miya ishemiyasining profilaktikasida muhim o'rin

tutadi. Kasallikni chuqur o‘rganish va zamonaviy davolash usullarini takomillashtirish nevrologiya sohasining dolzarb yo‘nalishlaridan biri bo‘lib qolmoqda.

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JADIDLARNING MA’RIFATPARVARLIK FAOLIYATIGA NAZAR

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Annotatsiya: Mustamlakachilik davrida ham xalqni uyg’otish, o’sib kelayotgan yoshlarni savodli qilish, chet el tajribalarini o’rganib, o’z yurtimizda qo’llash uchun yoshlarni chet el (asosan Turkiya va Germaniya) kabi davlatlarga yuborib, yurtimizda ham qo’shni davlatlarda ham maorif- ma’rifat uylarini tashkil etish, mustamlakachi davlatga qarshi xalqni uyg’otish, aholi, front va front ortida xizmat qilayotgan fuqarolar uchun ham turli yordamlar, ko’ngilochar teatr truppalarini tashkil etib ba’zi pyesalarni sahnalashtirib xalqqa xizmat qiladigan yurt fidoiy qahramonlarini yetishib chiqqanligi ham bizning ota bobolarimiz nafaqat qadimgi davrdan balki mustamlakachilik davrida ham butun jahonga ilm ma’rifat nurlarini tarqatganligidan dalolat beradi. O’sha paytlarda bu kabi fidoiylarni **“Jadidlar”** deb atashgan. Bu harakat avvalo Qirimda paydo bo’lib so’ng boshqa o’lkalarga ham yoyilgan. Quyida shu harakatga atroflicha to’xtalib o’tamiz.

Kalit so’zlar: Jadid, maktab, gazeta, Behbudiy, Avloniy, Munavvarqori, milliy ozodlik, mustamlakachilik, siyosat, malaka, savod, huquq.

KIRISH

O‘zbekiston siyosiy va huquqiy ta'limotlar tarixini yaratishda jadidchilik harakatini tadqiq qilish muxim ilmiy muammolardan biridir. Bu sohada oxirgi vaqtda anchagina ilmiy va ommabop risola va maqolalar chop qilindi. Ularda jadidchilikka berilgan bir tomonlama, xaqiqatga zid baholarni noto‘g‘ri ekanligini isbotlovchi faktlar va izohlar berilgan, Hozir asosiy vazifa jadidchilik harakatining ilmiy jihatdan xolisona va halol tadqiq qilishdan iboratdir.

Jadidizmning o‘rganishda qo‘lga kiritilgan boy materiallarni umumlashtirish, unga yondoshishning nazariy masalalarini chuqurlashtirish, ob'ektiv ilmiy haqiqatni aniqlashga mos keladigan tadqiqot yo‘llarini ishlab chiqmsh muhim muammolardandir. Jadidizm Turkiston ma'rifatparvarlik harakatining yukori

boskichidir. Uning namoyondalari mamlakatni feodal qoloqlikdan chaqarmsh, milliy mustaqillikka erishish uchun kurashdilar.

Jadidlar harakatida milliy ziyolilarning deyarli barcha ilg‘or vakillari qatnashdi. Bular orasida Hamza, Avloniy, Xolmuhammad Axundiy, Ibroxim Davron, Siddiqiy, Mirmuxsin Shermuxamedov, Nazir To‘raqulov va boshqalar bor edi. Jadidizm namoyondalarining qarashlarida xilma-xillik, ba'zi masalalarda jiddiy farq borligini inkor qilmagan holda, jadidizm mafkura, muayyan qarashlar tizimi sifatida kapmtalistik taraqqiyoti extiyojlarini ifodalardi. Jadidlar harakatining sosial ildizlari milliy burjuaziyanmng vujudga kelmshi va uni mmllmy ozodlikka intilishiga bog‘liqdir. Turkistonda jadidchilik harakatining shakllanishi va rivojlanishiga Rossiya musulmonlarining milliy ozodlik harakati Mafkurchilarini ta'siri ham katta bo‘ldi. Turkistonda Sharqda rivoj topgan mustamlakachilik zulmiga qarshm qaratilgan mafkuraviy oqimlar g‘oyalari ham kirib kelardi.

1906 ymldan boshlab jadidlar Turkmstonda o‘zlarining gazeta va jurnallarini nashr qila boshladilar. Ularning saxifalarida mustamlakachilik siyosatiga, feodal tartibotlarining ximoyachilariga qarshi qaratilgan keskin maqolalar ham bosilib turardi. Jadidchilik harakatining diqqat markazida turgan masalalardan biri maorif tizimini isloh qilishdan iborat edi. Milliy manfaatlarni himoya qila biladigan, iqtisodiy va siyosiy qaramlik va qoloqlikdan chikish muammolarini biladigan zamonaviy bilimga ega savodli kadrlar zarurligini jadidlar yaxshi anglashardi.

Mana shuning uchun xam dunyoviy bilimlarni o‘rganish ishlari, maorif tizimini islox qilish masalasi XIX asr oxiri va XX asr boshlari Turkiston ijtimoiy fikrining dikkat markazidagi siyosiy masala bo‘lib qoldi. Biz dinimiz va mamlakatimizni himoya qilishga qodir ishonarli va mustahkam vositaga ega bo‘lmog‘imiz shart. Bu vosita maorifdir, deb yozgan edi Bexbudi. Bexbudiyning bu fikrlari o‘z axamiyatini hozir xam yuqotgani yuk. Jadidlar matbuotida maorifni islox qilish masalalari xar tomonlama muhokama qilindi. Unda maktab ishini iqtisodiy va moliyaviy tomonlari, ulamolar va chorizm ma'muriyatini yangi usul maktablariga munosabatlari, o‘kuvchilar psixologiyasi va odobiga ijobiy tasir qilish metodikasi, o‘qitish dasturlari va maktab ishiga oid boshqa ko‘p masalalar haqida maqolalar mavjud.

Shuni ham alohida ta'kidlab o‘tish zarurki jadidlar o‘z maqolalari va asrlarida maorif, ijtimoiy hayot va turmush tarzini ayrim tomonlarini islox qilish zarurligini uqtirish bilan birga yoshlar diqkatini musulmonlarning o‘tmish madaniyatiga, ilm-fan sohasida erishgan shuxratlariga, diniy va xulqiy poklik masalalariga jalb qilganlar, bu o‘tmishni mavjud ahvolga taqqoslab ko‘rsatishga harakat qildilar. Jadid ziyolilari

orasida va matbuotda «Turon» g‘oyasi ham keng tarqala boshlandi. Shu bilan bir qatorda jadidlar milliy doirada cheklanib qolmaslik, umuminsoniy madaniyat yutuqlari, fan va pedagogik fikr yangiliklaridan foydalanish zarurligini uqtirish sohasida ma'lum targ‘ibot ishlarini olib bordilar.

Jadidlar siyosiy dasturi Turkistonni mustakilligi uchun kurashish vazifasiga qaratilgan edi. Birok jadidlar bu oliy maqsadni amalga oshirish chora va vositalarini tanlashda konkret ijtimoiy-iqtisodiy va siyosiy vaziyat bilan xisoblashdilar, imkoniyatlaridan kelib chiqdilar.

Jadidlar harakatining yirik namoyondasi, uning nazariy asosichlaridan biri MaxmudXuja Bexbudiydir (1879-1919). Bexbudiy fikrlarining teranligi, siyosiy ongining yuksakligi bilan jadidlar orasida ajralib turardi.

Bexbudiy Rossiya siyosiy hayotidagi turli partiyalarga bo‘lgan munosabatini ifodalab, qoraguruxlar partiyasi faoliyatini koralaydi. Bu partiya, deydi Bexbudiy, podshox bilan xalqning bir-biri bilan muloqotda bo‘lishiga g‘ovdir. Xususan., biz musulmonlar o‘z talablarimizni, din va iqtisod sohasida kamsitilishimizni podshohga arz qila olmaymiz, chunki Oliy Kengash a'zolari bizning barcha arzlarimizni rad qilib podshoxga yetkazmaydilar. Bexbudiy sosial-demokratik va eserlar partiyalarining dasturlari va faoliyatini ham salbiy baholaydi. Biz musulmonlar uchun, deydi Bexbudiy, bu partiyalarga ko‘shilish zararlidir. Ularning mulkchilik xaqidagi talablari xato va shariatga mutloq ziddir. Shaxs erkinligi, oila haqidagi fikrlari xam biz uchun mutloq to‘g‘ri kelmaydi. Siyosiy partiyalar ichida, deydi Bexbudiy, biz uchun tug‘ri keladigan kadetlar partiyasidir, chunki bu partiya podshohning xalq bilan muloqotda bo‘lishiga imkoniyat yaratuvchi davlat dumasi tarafdoridir.

Bexbudiy 1905 yilda tashkil topgan musulmonlar partiyasiga xayrixoxligini alohida ta'kidlaydi. Bu partiya, deydi Bexbudiy, o‘zining umumiy siyosiy talablari va e'tiqodi bilan kadetlar partiyasiga yaqin bo‘lsada, u musulmonlarni manfaatlarini himoya k;ilish uchun tashkil qilingan. Shuning uchun, biz Turkiston musulmonlari, siyosatda kadetlarni ko‘llasakda, musulmonlar partiyasiga qushilishimiz darkor.

Musulmonlar partiyasi 1905 yil Nijniy Novgorod shahrida tashkil qilindi. Uning siyosiy talablaridan asosiysi musulmonlarning dinlariga xukumat ma'muriyatini aralashmasligini ta'minlash va mahalliy o‘zini-o‘zi idora qilish tizimini o‘rnatishdan iborat edi.

Buni faqat davlat dumasi orqali amalga oshirish mumkindir, deb bildilar. Behbudiy Turkmanistonda musulmonlarnmng diniy va grajdanlik ishlai bilan shug‘ullanadigan mahalliy boshqarma tuzish zarurligini ta'kidlaydi. Turkiston mahalliy

boshqarmasi qozilar sudi, vaqf mulkini taqsimlash, maktab va madrasa masalalari va boshqa diniy va milliy muammolarni o‘z qaramog‘iga olishi kerak. Biz Turkiston musulmonlari uchun, deydi Bexbudiy, diniy grajdanlik boshqarmasi suv va non kabi zarurdir, chunki busiz biz imonimizni yo‘qotamiz va falokatga giriftor bo‘lamiz. Bexbudiy maqolalari va isloh loyixalarida bayon qilingan g‘oyalar jadidlar harakatining asosiy dastur xujjatlari, harakat ko‘llanmasi sifatida xizmat qildi.

1917 yil fevral burjua demokratik inqilobi jadidlar tasavvurida dasturlarni amalga oshirish uchun imkoniyat paydo bo‘lganligiga ishonch hosil qildi, milliy-ozodlik tuyg‘ularining kuchayishiga olib keldi. O‘lkadagi tub aholining siyosiy ongida va kurashida keskin o‘zgarishlar sodir bo‘lib, «Shuroi Islomiya». «Shuroi Ulamo» singari partiyalar tashkil topdi.

«Shuroi Islomiya» partiyasining rahbarlari Munavvarqori, Mustafo Choqaev, Bexbudiy va boshqalar Turkistonda Muxtoriyat ta'sis etilishini, moliya, adliya, boshqaruv, maorif va boshqa sohalarda mustaqillikni, matbuot erkinligini talab qildilar. Bexbudiy Turkiston muxtoriyati qanday bo‘lishini shunday tushuntiradi: «Muxtoriyat, biz Turkiston musulmonlari istaymizkim, Rossiya mamlakatiga yopishib turib, xorijiy va ishlarga aning ila bir bulib turib, daxil ishlar va tirikchiliklarimizni o‘zimz idora etsak. Besh viloyatdan iborat Turkistonning har bir shahar va uezdidan bir necha nafardan-kishi saylanib Toshkentda katta markaz bir majlisimiz bulurki, barcha olur soliq va minbad joriy bulaturgan qonun va nizomnomalarni tuzib Turkistonda joriy qiladilar. Rusiya xukumati ila musulmonlar orasmnda shul majlis vosita bulur.

O‘zimizning muxofazatimiz uchun milliy jandarma, askarimmiz bulur. Mamlakat xazinasidan boshqa milliy va madaniy ishlarimizning masrafi uchun o‘zimmizning aloxida xazinamiz bo‘lur. Maktab va madrasalarimiz , vaqf va doril kazolarimiz o‘z karamog‘imizda bulur. Xulosa kalom davlat va siyosat ishlaridan boshqa barcha ishlarimiz o‘z ixtiyorimizda bulur va buning uchun zamonaviy va madaniy nizomnoma va qonunnomalarni tahrir etmoq lozimdur. Turkistonda rus, yaxudiy, armani va boshqalar bo‘lib, alar ila muomalamiz tug‘risida yana yangi va zamonaviy qonunlar kerakdur».

Bu maqsadlarni amalga oshirish uchun Ta'sis majlisi oldida talablarni qat'iy qo‘yish zarur. Tasis majlisi ham o‘z ixtiyori bilan mustakillikni bizga bermaydi. Biz, Turkiston musulmonlari, birlashib muxtoriyatni ta'sis majlisidan olmog‘imiz kerakdur. Biz jonsizlik ko‘rsatganda muxtoriyat agarda yuz sana so‘ngra bulsun, bizga berishmaydur. Afsuski, «Xaq olinur, berilmas». 1917 yil avgust oyida «Kengash» gazetasida mo‘xtoriyat loyixasi e'lon qilindi, Bu loyixani tuzishda Maxmud-Xuja Bexbudiy, Munavvar Kori, Abdurashidxonovlar faol ishtirok qildilar.

1917 yil sentyabrida «Markaziy .Shuroi-Islomiya» ning tashabbusi bilan chiqarilgan, o‘lka musulmonlari s'ezdi bo‘lib o‘tdi. S'ezd qabul qilgan qarorda yoziladi: «S'ezd hokimiyat ishchi, soldat va krestyanlar Sovetlariga o‘tishiga qarshi chiqadi. Xokimiyat koalision bo‘lishi va mamlakatning -hamma kuchlariga tayanishi kerak, bu degani umumxalq hokmmiyati bo‘lishi kerak». Shunga qaramasdan bolsheviklar butun hokimiyat Sovetlarga berilishini talab qilib chiqishdi . Mana shu vaziyatda Bexbudiy, Munavvar qori, «Shuroi Islomiya» bilan «Shuroi ulamo" partiyalarining birgalikda harakat qilishga da'vat qildilar. Bu da'vat 17-20 sentyabr 1917 yml chaqirilgan umummusulmon s'ezdi qarorlarida o‘z ifodasini topdi. Unda «Shuroi Islomiya», "Turon", «Shuroi Ulamo» partiyalar birgalashib, yagona kuch sifatida ish ko‘rish vakti kelgani aloxida ta'kidlandi.

S'ezd ishida 500 kishi ishtirok qildi. Ular orasida Urol va Turgay viloyatlarining vakillari ham bor edi. S'ezd qabul qilgan xujjatlarda Turkistonning kelajak ijtimoiy-siyosiy tuzumi qonun chiqaruvchi oliy organ -parlamentga ega bo‘lgan respublika bo‘lishi ifodalanadi. Bu parlament «umumiy, to‘g‘ridan-to‘gri, teng va yashirin ovoz berish yuli bilan besh yil muddatga Turkmstonda yashab turgan barcha millatlarning teng vakillari asosida saylanmog‘i lozim edi. Turkiston parlamentining qonun chiqaruvchilik vazifalari Rossiya respublikasining asosiy qonunlari va shariat talablariga mos bulmog‘i zarur deb topildi. Bunda Turkiston federasiyasi o‘z puli, o‘z milisiyasiga ega bo‘lishi, tinch vaqtlarda chet davlatlar bilan o‘z chegarasini qo‘riqlash uchun saqlash mumkin bo‘lardi». Musulmonlar qurultoylarida Turkistonga muxtor jumxuriyati maqomi berish to‘g‘risidagi kabul qilingan qarorlar bolsheviklar tomonidan inkor qilindi.

1917 yil 15 noyabr kuni Toshkentda soldat, ishchi va krestyanlar deputatlari Sovetining o‘lka s'ezdi xokimiyat shu Sovet ko‘liga o‘tganligini bayon qildi. O‘lka Soveti tuzgan xukumat tarkibida mahalliy aholi vakilladan^ bir kishi ham yuk edi. S'ezd qabul qilgan deklorasiyada bayon etilishicha «X,ozirgi vaqtda musulmonlarni o‘lka inqilobiy hokimiyatining oliy tashkilotiga kiritish maqsadga muvofiq emas, chunki mahalliy aholining soldat, ishchi va krestyanlar Sovetlari hokimiyatiga munosabatlari noaniq, shuningdek, mahalliy aholi orasida proletar sinfiy tashkilotlari bo‘lmagani tufayli ular o‘lkaning oliy hokimiyatida vakolat tashkil etib, fraksiyaning madadiga tayana olmaydilar».

1917 yil 12-15 noyabrida «Shurai Ulamo» rahbarlaridan Sherali Lapinning tashabbusi bilan o‘tgan «Turli musulmon guruxlarining birlashgan majlisi» «Turkistonda hokimiyatni tashkil ztish tugrisida» gi masalani muxokama qildi va Sovetlar hokimiyatiga munosabatini bayon qildi. qabul qilingan qarorda

«Xokimiyatning maxalliy aholi manfaati uchun deyarli zid bo‘lgan begona va o‘tkinchi, tasodifiy kishilar guruxi - xarbiylar, ishchilar va krestyanlar tashkilotlari ko‘lida bo‘lishi demokratik qoidalar talabiga javob bermaydi va mahalliy aholiga xalqlarning o‘z taqdirini o‘zi belgilash asosida tug‘ri hayot ko‘rishgakafolat bermaydi", Turkiston milliy madaniy muxtoriyat huquqiga ziddir», deb topildi. 1917 yil, 27 noyabr IV ulka musulmonlari favqulodda s'ezdi o‘tkazildi. S'ezd «Kukon muxtoriyati» ni e'lon qildi. Bu Turkiston mustaqilligini tiklashga karatilgan kurashning dastlabki ifodasi edi.

Jadidlar s'ezdida faol -ishtirok qildilar. Turkiston Muxtoriyatining tashkil topishiga uz xissasini kushdilar. Maqola va murojaatnomalarda ular muxtoriyatni himoya qilishga chakirdilar. Bexbudiy Turkiston xalqiga murojaat qilib yozgan zdi: "Turkiston xalqi ittifoq etsa qon tukilmas. Yeri va amloq ham taqsimlanmay qolur. Din ham rivoj topur. Butun Turkiston ittifoq 15 millionlik bir quvvat imloga kelurki, munga yer titraydur. Agar so‘zimni faximlata olgan bo‘lsam o‘zumni baxtlik xisoblardim».
Xulosa o’rnida shuni aytish joizki, sovet mustamlakasi davrida, unga qarshi va vatan mustaqilligi yo’lida ko’tarilgan har qanday bosh ayovsiz kesilayotgan bir paytda bizning ota bobolarimiz barcha mas’uliyatni o’z yelkasiga olib yosh avlodni ilmli qilib, jaholat botqog’idan qutqarishga qilgan harakatlari albatta bu eng katta qahramonlikdir. Bu davrda yaratilgan asarlar o’sha davr insonlaridan qolgan ma’naviy yodgorliklar bizning eng qimmatli xazinamizdir. Sovet mustamlakachilik zulmi ostida ezilayotgan xalqni uyg’otib, ilm ma’rifatli qilib, o’z erkiga ega bo’lishga undab ularning tomirida aslida qanday insonlarning qoni oqayotganligini singdirib hozirgidek go’zal zamonga yetib kelishimiz uchun o’zlarining umrini fido qilgan jadidlarimiz qoldirgan asarlarni kelajak avlodga yetkazib berish bizning bo’ynimizdagi qarzdir. Ayniqsa bizning tarixdan davom etib kelayotgan milliy vatanparvarlik g’oyalarimizdan cho’chib ayrim milliy qadriyatlarimiz uyg’unlashgan asarlarni o’qish taqiqlangan, Turkiy xalqlarni birlashtirib turgan Islom dini keskin qoralangan davrda xalqni ma’rifatga undovchi asarlar, pyesalar yozish bu haqiqiy jasorat namunasidir

FOYDALANILGAN ADABIYOTLAR

Begali Qosimov (1942-2004)
"Milliy uyg‘onish davri o‘zbek adabiyoti" (1990-yillar)
"Ismoil Gasprinskiy" (1992)
"Maslakdoshlar" (1994) (Fitrat, Cho‘lpon, Usmon Nosir ijodiga bag‘ishlangan)
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TUPROQ TARKIBIDAGI Cd^{2+} IONINI INVERSION-VOLTAMPEROMETRIK USULDA ANIQLASH

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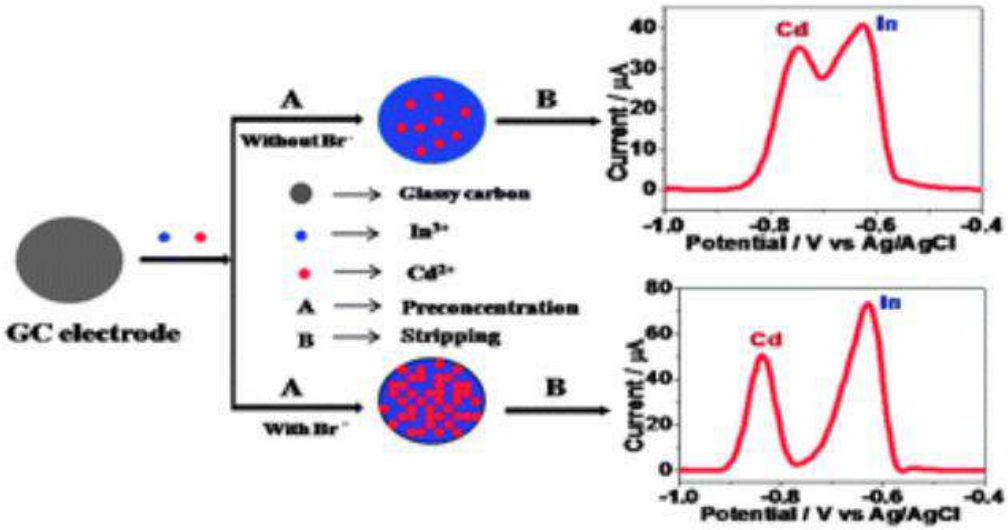
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Annotatsiya: Ushbu maqolada tuproq oziq ovqat namunalari tarkibidagi kadmiy ionlarini zamonaviy va sezgir tahlil usuli — inversion voltamperometriya yordamida aniqlash masalalari ko'rib chiqiladi. Tuproq va oziq-ovqat tarkibidagi og'ir metallarni monitoring qilishning ekologik ahamiyati, tahlil jarayonining bosqichlari va usulning afzalliklari bayon etilgan.

Kalit so'zlar: Tuproq, kadmiy (Cd^{2+}) inversion voltamperometriya, og'ir metallar, ekologik monitoring, elektrod, polyarografiya.

Hozirgi vaqtda atrof-muhitning texnogen ifloslanishi global muammolardan biri bo‘lib qolmoqda. Tuproq qoplami inson hayotiy faoliyati uchun zarur bo‘lgan asosiy resurs bo‘lib, undagi og‘ir metallar miqdorini nazorat qilish oziq-ovqat xavfsizligi bilan bevosita bog‘liq. Og‘ir metallar orasida kadmiy (Cd^{2+}) o‘zining yuqori toksikligi, organizmlarda to‘planish (bioakkumulyatsiya) xususiyati va uzoq vaqt davomida parchalanmasligi tufayli ularning miqdorini muntazam nazorat qilib boorish bugungi kunning dolzarb muammolaridan biri hisoblanadi.

Ushbu tadqiqotda kadmiyni indiy plyonka yordamida aniqlandi. Bromid ionlari bo'lmagan taqdirda, kadmiyni ajratish cho'qqilari indiy bilan birlashadi va analitik maqsadlar uchun uni aniqlash qiyinlik tug`diradi. Bromid ionlarining qo'shilishi kadmiyning bromid ionlari bilan kompleks hosil qiluvchi xususiyatlari tufayli cho'qqilarning ajralishiga kuchli ta'sir qiladi. Cho'kish potensiali, pH, bromid ioni va indiy konsentratsiyasi kabi indiy bilan modifikatsiyalangan elektrodlarning elektroanalitik javobiga ta'sir qiluvchi bir nechta asosiy operatsion parametrlar o'rganildi va optimallashtirildi (1-rasm) [1].



1-rasm. Simobsiz elektrodlar asosida elektrokimyoviy ajratish sxemasi.

Suv namunalarida kadmiyni aniqlash uchun kokos qobig'ining tolali qismi bilan modifikatsiyalangan uglerod pastasi elektrodini ishlab chiqish va elektrokimyoviy qo'llash mumkinligi ifodalandi [2]. Kadmiy tuproqqa asosan sanoat chiqindilari, mineral o‘g‘itlar (ayniqsa fosforli o‘g‘itlar) va avtotransport gazlari orqali tushadi. Tuproqdagi kadmiy miqdorini aniqlashda turli fizik-kimyoviy usullar qo‘llaniladi. Masalan, ilmiy adabiyotlarda elementar tarkibni aniqlash uchun rentgen-flyuoressent analiz (XRF) usullari keng qo‘llanilishi keltirilgan [3]. Biroq, kadmiy kabi mikroelementlarning juda kichik konsentratsiyalarini aniqlashda inversion voltamperometriya usuli o‘zining yuqori sezgirligi va selektivligi bilan boshqa usullardan ustun turadii. Shuningdek Pb (II) va Cd (II) ning bir vaqtning o'zida elektroanalitik aniqlashini bor bilan qo'shilgan olmos elektrodidan foydalanib, ajratish voltammetriyasi yordamida taqdim etilgan [4].

Inversion voltamperometriya usuli elektrokimyoviy tahlil turi bo‘lib, u ikki asosiy bosqichga asoslanadi. Bunda indikator elektrodga ma'lum bir manfiy potensial beriladi va eritmadagi Cd^{2+} ionlari qaytarilib, elektrod sirtida metal holida to‘planadi:

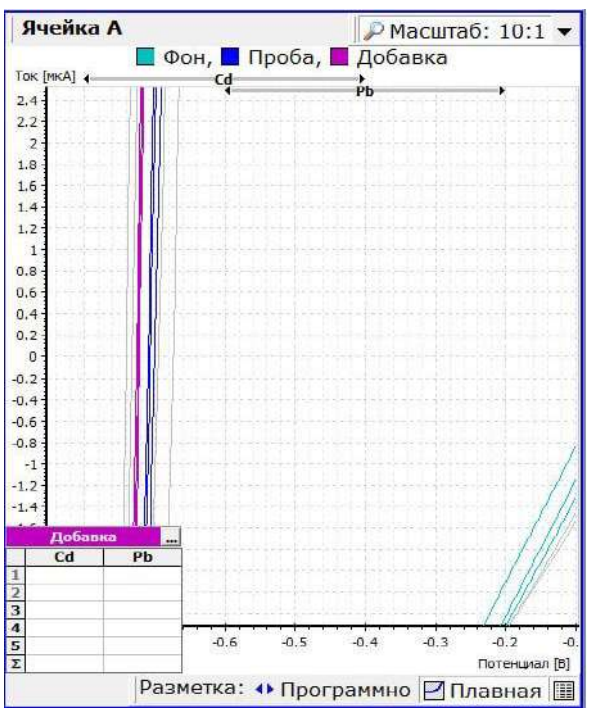
$$Cd^{2+} + 2e^{-} -> Cd^{0}$$

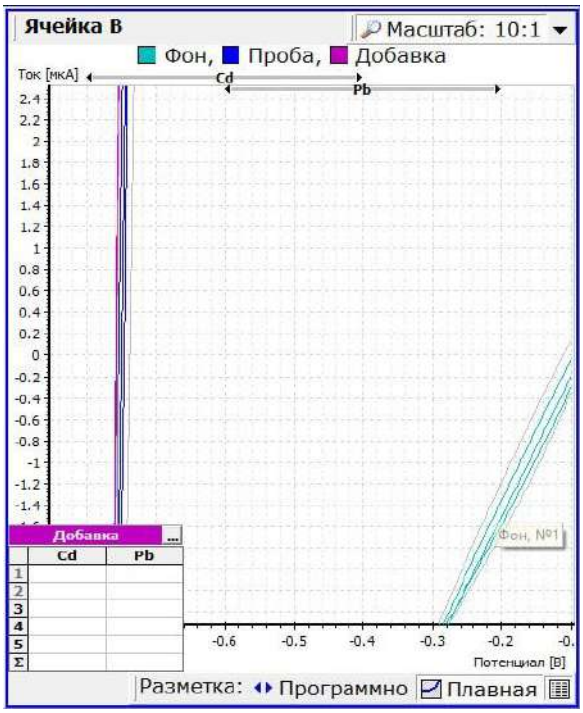
To‘plangan metalni elektrod sirtidan kislotali muhitga qayta oksidlab o‘tkazish uchun potensial chiziqli ravishda o‘zgartiriladi. Bu jarayonda hosil bo‘lgan oqim cho‘qqisi (pik) tahlil qilinayotgan ionning konsentratsiyasiga proporsional bo‘ladi.

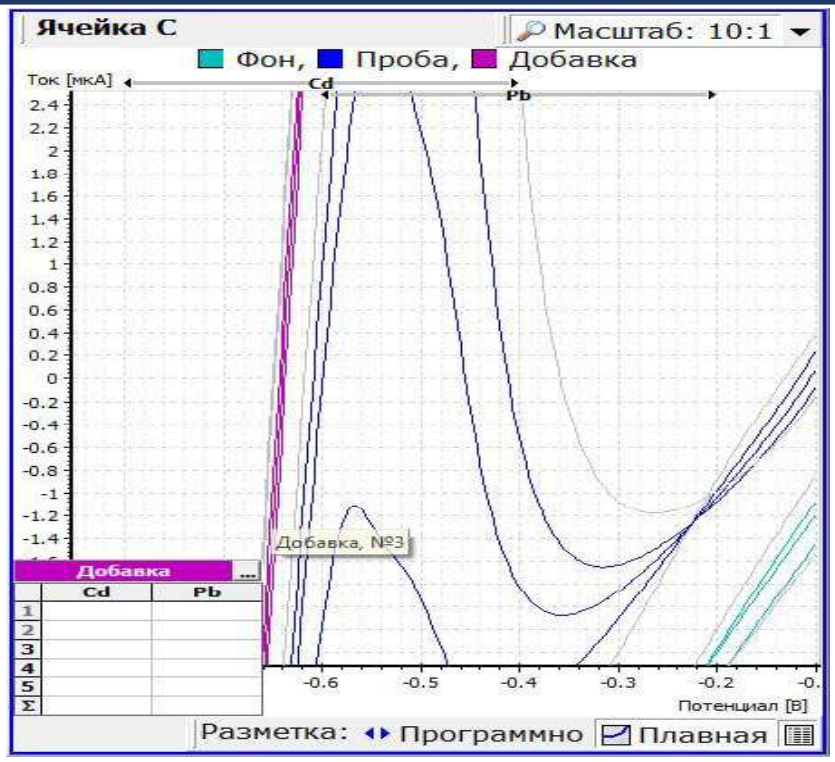
TAJRIBAVIY QISM.

Namuna tayyorlash: Tuproq namunalari tahlil uchun tayyorlanishida avval quritiladi, begona jism va toshlardan tozalanadi, so‘ngra elakdan o‘tkaziladi. Kadmiyni eritmaga o‘tkazish uchun namuna "nam" usulda mineralizatsiya qilinadi. Buning uchun konsentrlangan HNO_3 va HCI kislotalari aralashmasidan foydalaniladi. Olingan eritma filtrlanadi va pH ko‘rsatkichi tahlil uchun moslashtiriladi.

O'lchash jarayoni: Tahlil uchun simob-plyonkali yoki modifikatsiyalangan uglerod-pastali elektrodlar qo‘llaniladi. Fon elektroliti sifatida odatda kaliy xlorid (KCl) yoki ammiakli bufer eritmalar ishlatiladi.







Natijalar tahlili va muhokamasi

Voltamperometrik tahlil natijalariga ko‘ra, tekshirilayotgan namunada kadmiy va qo‘rg‘oshin ionlarining mavjudligi aniqlangan. Kimyoviy tahlil natijalari bo‘yicha kadmiy konsentratsiyasi 28 mg/l, qo‘rg‘oshin konsentratsiyasi esa 13 mg/l ni tashkil etdi (1-jadval).

Table 1. Results of the Voltammetric Determination of Cadmium and Lead in the Analyzed Sample

Determined Component	**Concentration (mg/L)**	**Number of Replicate Measurements**	**Calculation Method**
Cadmium (Cd)	28	3	Average value
Lead (Pb)	13	1	Average value

Kadmiy uchun uchta parallel o‘lchov amalga oshirilgan bo‘lib, natijalar o‘rtacha qiymat asosida hisoblangan. Qo‘rg‘oshin uchun esa bitta o‘lchov natijasi qayd etilgan. Voltamperogramma tahlili shuni ko‘rsatadiki, kadmiy va qo‘rg‘oshin ionlari elektrod yuzasida turli potensiallarda elektrokimyoviy qaytarilish reaksiyalariga uchraydi. Grafikda kadmiy uchun pik potensial taxminan –0,60 V atrofida, qo‘rg‘oshin uchun esa –0,40 V atrofida kuzatilmoqda. Ushbu qiymatlar og‘ir metall ionlarining klassik inversion voltamperometrik aniqlashiga xos bo‘lib, ularning elektrokimyoviy xossalarini tasdiqlaydi.

Voltamperogrammada "Fon", "Proba" va "Qo‘shimcha" egri chiziqlarining mavjudligi standart qo‘shimcha usuli qo‘llanilganligini ko‘rsatadi. Mazkur usul murakkab matritsali namunalarni tahlil qilishda keng qo‘llanilib, matritsa ta'sirini kamaytirishga imkon beradi. Qo‘shimcha standart eritma kiritilgandan keyin pik balandligining ortishi aniqlanayotgan komponentlarning mavjudligini va olingan natijalarning ishonchliligini tasdiqlaydi.

Kadmiy pikining intensivligi qo‘rg‘oshinnikiga nisbatan yuqoriroq bo‘lib, bu uning eritmadagi konsentratsiyasi kattaroq ekanligini ko‘rsatadi. Elektrod reaksiyasi davomida hosil bo‘layotgan tok kuchi metall ionlarining konsentratsiyasiga to‘g‘ri proporsional bo‘lgani sababli, kadmiy uchun qayd etilgan yuqori tok qiymatlari uning 28 mg/l miqdorda mavjudligini tasdiqlaydi.

Aniqlangan konsentratsiyalarni ekologik va sanitariya me'yorlari bilan taqqoslaganda, kadmiy va qo‘rg‘oshinning miqdori sezilarli darajada yuqori ekanligi kuzatiladi. Ma'lumki, ushbu elementlar toksik og‘ir metallar qatoriga kiradi va ularning suv hamda tuproq muhitlarida yuqori konsentratsiyada mavjud bo‘lishi biologik tizimlarga salbiy ta'sir ko‘rsatishi mumkin. Ayniqsa, kadmiy buyrak faoliyatining buzilishi, suyak to‘qimalarining zararlanishi hamda kanserogen ta'sir bilan tavsiflanadi. Qo‘rg‘oshin esa markaziy asab tizimi, gematopoetik tizim va yurak-qon tomir faoliyatiga zarar yetkazuvchi toksik element hisoblanadi.

Tajriba natijalari voltamperometrik usulning og‘ir metall ionlarini aniqlashdagi yuqori sezgirligi va selektivligini namoyish etdi. Piklarning aniq ajralishi kadmiy va qo‘rg‘oshin ionlarini bir vaqtning o‘zida aniqlash imkoniyatini bergan. Bu esa usulning ko‘p komponentli tizimlarni tahlil qilishdagi afzalliklaridan biri hisoblanadi.

Tahlil natijalari shuni ko‘rsatadiki, kadmiy miqdori sanoat zonalari yaqinidagi tuproqlarda ruxsat etilgan me’yor (REM) dan yuqori ekanligi aniqlanishi mumkin. Bu holat tuproqning elementar tarkibini muntazam monitoring qilib borish zarurligini tasdiqlaydi, xuddi boshqa tabiiy ob'ektlarda (masalan, sho'r suvlarda) turli elementlar

miqdori tahlil qilingani kabi. Inversion-voltamperometrik usul tuproq tarkibidagi Cd^{2+} ionlarini aniqlashda yuqori aniqlik va tezkorlikni ta'minlaydi. Usulning arzonligi va yuqori sezgirligi uni ekologik monitoring laboratoriyalarida qo‘llash uchun juda qulay qiladi. Tadqiqot natijalari tuproq ifloslanishini baholash va atrof-muhitni muhofaza qilish choralarini ishlab chiqishda muhim ilmiy asos bo‘lib xizmat qiladi.

Xulosa: Voltamperometrik tahlil natijasida tekshirilayotgan namunada kadmiy va qo‘rg‘oshin ionlari muvaffaqiyatli aniqlandi. Kadmiy konsentratsiyasi 28 mg/l, qo‘rg‘oshin konsentratsiyasi esa 13 mg/l ni tashkil etdi. Voltamperogrammada kuzatilgan pik potensiallari mos ravishda Cd va Pb ionlariga tegishli elektrokimyoviy jarayonlarni tasdiqladi. Standart qo‘shimcha usulidan foydalanish natijalarning aniqligi va ishonchliligini oshirdi. Olingan ma'lumotlar voltamperometriya usulining og‘ir metall ionlarini aniqlashda yuqori samaradorlikka ega ekanligini ko‘rsatdi hamda mazkur usul ekologik monitoring va analitik nazorat ishlarida qo‘llash uchun istiqbolli ekanligini tasdiqladi. O‘tkazilgan tadqiqotlar shuni ko‘rsatadiki, inversion voltamperometriya yordamida tuproqdagi kadmiyni 10^{-9} mol/l konsentratsiyagacha aniqlash imkoniyati mavjud. Olingan volt-amperogrammalarda kadmiy uchun xos bo‘lgan oksidlanish piki -0.6 V dan -0.7 V gacha bo‘lgan potensiallar oralig‘ida kuzatiladi.

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FORTEPIANO CHOLG‘USINING MUSIQA TA’LIMIDAGI O‘RNI VA AHAMIYATI

Nurullayeva Nodira Karimovna
Buxoro ixtisoslashtirilgan san’at maktabi o‘qituvchisi

ANNOTATSIYA

Ushbu maqolada fortepiano cholg‘usining musiqa ta’lim tizimidagi o‘rni, pedagogik va didaktik ahamiyati keng yoritilgan. Fortepiano nafaqat ijrochilik cholg‘usi, balki o‘quvchilarda musiqiy eshitish, ritmik his, nazariy bilimlarni amaliy mustahkamlash va ijodiy tafakkurni rivojlantirishda muhim vosita ekanligi asoslab beriladi. Shuningdek, fortepiano orqali musiqiy savodxonlikni shakllantirish, o‘qitish metodlarini takomillashtirish va zamonaviy ta’lim texnologiyalarini qo‘llash masalalari tahlil qilinadi.

Kalit so‘zlar: klavishli cholg‘u, musiqa pedagogikasi, ijodiy rivojlanish, musiqiy savodxonlik, didaktika, o‘qitish metodikasi

АННОТАЦИЯ

В статье подробно рассматривается роль фортепиано в системе музыкального образования, его педагогическое и дидактическое значение. Подчеркивается, что фортепиано является не только исполнительским инструментом, но и важным средством развития музыкального слуха, ритмического чувства, закрепления теоретических знаний и формирования творческого мышления учащихся. Также анализируются вопросы музыкальной грамотности, методики обучения и применения современных образовательных технологий.

Ключевые слова: клавишный инструмент, музыкальная педагогика, творческое развитие, музыкальная грамотность, дидактика, методика обучения

ABSTRACT

This article provides a detailed analysis of the role of the piano in the music education system, highlighting its pedagogical and didactic significance. The piano is considered not only a performance instrument but also an essential tool for developing students’ musical hearing, rhythmic sense, theoretical knowledge, and creative thinking. The study also examines musical literacy, teaching methodologies, and the application of modern educational technologies in music education.

Keywords: keyboard instrument, music pedagogy, creative development, musical literacy, didactics, teaching methodology

Kirish

O‘zbekiston Respublikasida ta’lim tizimini rivojlantirish va yosh avlodni ma’naviy-axloqiy hamda estetik jihatdan barkamol etib tarbiyalash davlat siyosatining ustuvor yo‘nalishlaridan biri hisoblanadi. Bu borada musiqa ta’limi, xususan, ijrochilik san’atini rivojlantirishga alohida e’tibor qaratilmoqda.

O‘zbekiston Respublikasi Prezidentining 2017-yil 20-apreldagi PQ–2909-son “Oliy ta’lim tizimini yanada rivojlantirish chora-tadbirlari to‘g‘risida”gi qarori, shuningdek, 2017-yil 8-avgustdagi PQ–3178-son “Bolalar musiqa va san’at maktablari faoliyatini yanada takomillashtirish chora-tadbirlari to‘g‘risida”gi qarorida musiqa ta’limi sifatini oshirish, zamonaviy pedagogik texnologiyalarni joriy etish hamda ijrochilik mahoratini rivojlantirish vazifalari belgilangan. Ushbu hujjatlar musiqa ta’limi jarayonida fortepiano kabi asosiy cholg‘u asboblarining o‘rni va ahamiyatini yanada kuchaytiradi.

Shuningdek, O‘zbekiston Respublikasi Prezidentining 2020-yil 26-maydagi PF–6000-son “Madaniyat va san’at sohasini yanada rivojlantirishga doir chora-tadbirlar to‘g‘risida”gi Farmonida milliy va jahon musiqa san’atini rivojlantirish, yosh ijrochilarni qo‘llab-quvvatlash hamda musiqa ta’limi tizimini takomillashtirish vazifalari belgilab berilgan. Bu esa fortepiano cholg‘usini o‘qitish jarayonida innovatsion yondashuvlarni qo‘llash zaruratini kuchaytiradi. Fortepiano cholg‘usi musiqa ta’limi tizimida asosiy ijrochilik vositalaridan biri bo‘lib, u o‘quvchilarning musiqiy eshitish qobiliyati, ritmni his qilish, notani o‘qish va ijro etish ko‘nikmalarini rivojlantirishda muhim ahamiyatga ega. Shuningdek, u musiqiy asarni tahlil qilish, ijodiy fikrlashni shakllantirish va badiiy-estetik didni rivojlantirishga xizmat qiladi.

Adabiyotlar tahlili. Fortepiano cholg‘usining musiqa ta’limidagi o‘rni va ahamiyatini o‘rganish bo‘yicha olib borilgan ilmiy tadqiqotlar musiqiy pedagogika, ijrochilik san’ati va metodika yo‘nalishlarida keng yoritilgan. Mazkur muammo bo‘yicha xorijiy va mahalliy olimlar tomonidan turli nazariy va amaliy yondashuvlar ishlab chiqilgan. Xorijiy tadqiqotchilar orasida fortepiano ijrochiligi va o‘qitish metodikasi masalalari L. Auer, H. Neuhaus, G. Kogan kabi olimlarning ishlarida chuqur tahlil qilingan. Xususan, G. Neuhaus o‘zining “Fortepiano san’ati”ga oid qarashlarida fortepiano ijrochiligini faqat texnik jarayon emas, balki musiqiy tafakkurni shakllantiruvchi ijodiy faoliyat sifatida talqin etadi. U fortepiano orqali o‘quvchida musiqiy obrazni his qilish, ifodali ijro va badiiy tafakkur rivojlanishini alohida ta’kidlaydi. Rossiya va MDH hududidagi pedagogik maktab vakillari – A. D. Artobolevskiy, B. M. Teplov, S. Savshinskiy kabi olimlar fortepiano ijrochiligini psixologik-pedagogik jihatdan o‘rganib, musiqiy qobiliyatlar (ritm hissi, eshitish,

xotira) rivojida cholg‘uning o‘rni katta ekanligini asoslab berganlar. B. M. Teplovning musiqiy qobiliyatlar haqidagi nazariyasida fortepiano ijrosi o‘quvchining kompleks musiqiy rivojlanishini ta’minlovchi muhim vosita sifatida qaraladi.

O‘zbekistonlik pedagog va musiqashunos olimlar – R. Qodirov, F. Abdullayev, N. Yusupova, Sh. Mirzaeva va boshqalarning ilmiy ishlarida musiqa ta’limi tizimida fortepiano o‘qitish metodikasi, ijrochilik malakalarini shakllantirish va o‘quvchilarning ijodiy qobiliyatlarini rivojlantirish masalalari yoritilgan. Ularning tadqiqotlarida fortepiano cholg‘usi musiqa savodxonligini shakllantirishda asosiy tayanch vosita sifatida baholanadi. Shuningdek, zamonaviy pedagogik yondashuvlarda fortepiano ta’limida interfaol metodlar, axborot-kommunikatsiya texnologiyalari va kompetensiyaviy yondashuvlarning qo‘llanilishi muhim ahamiyat kasb etishi ta’kidlanadi. Bu borada olib borilgan tadqiqotlar fortepiano o‘qitish jarayonini yanada samarali va qiziqarli tashkil etishga xizmat qiladi. Tahlil qilingan adabiyotlar fortepiano cholg‘usining musiqa ta’limidagi o‘rni nafaqat ijrochilik ko‘nikmalarini shakllantirish, balki o‘quvchilarning estetik didi, ijodiy fikrlashi va musiqiy madaniyatini rivojlantirishda ham muhim omil ekanligini tasdiqlaydi.

Fortepiano cholg‘usi musiqa ta’limi jarayonida eng muhim va ko‘p qirrali ijrochilik vositalaridan biri sifatida alohida o‘rin egallaydi. U o‘zining keng diapazoni, boy garmonik imkoniyatlari hamda bir vaqtning o‘zida bir nechta tovushlarni uyg‘un ijro etish xususiyati bilan boshqa cholg‘ulardan ajralib turadi. Shu sababli fortepiano nafaqat ijrochilikni o‘rgatish, balki musiqiy tafakkurni shakllantirishda ham asosiy vosita hisoblanadi. O‘quvchi fortepiano orqali musiqiy asarni yaxlit tizim sifatida idrok etadi, ya’ni unda ohang, ritm va garmoniya bir butun holda anglanadi. Fortepiano ta’lim jarayonida musiqiy savodxonlikni shakllantirishda ham muhim ahamiyatga ega. O‘quvchilar nota yozuvini o‘qish, intervallarni farqlash, akkordlarni tuzish va musiqiy tuzilmalarni tahlil qilish kabi ko‘nikmalarni aynan fortepiano mashg‘ulotlari orqali yanada chuqur o‘zlashtiradilar. Bu cholg‘u musiqa nazariyasi va amaliy ijrochilik o‘rtasida mustahkam bog‘liqlikni ta’minlaydi va o‘quvchining bilimlarini amaliy faoliyatda mustahkamlashga yordam beradi. Shuningdek, fortepiano ijrochiligi o‘quvchilarning ijrochilik kompetensiyalarini rivojlantirishda ham katta rol o‘ynaydi. Mashg‘ulotlar davomida o‘quvchi qo‘l harakatlari koordinatsiyasi, ritmik aniqlik, dinamik ifodalar va texnik malakalarni bir vaqtda rivojlantiradi. Bu jarayon diqqatni jamlash, tezkor fikrlash va musiqiy matnni tahlil qilish qobiliyatini ham kuchaytiradi. Natijada o‘quvchi ijro jarayonida mustaqil qaror qabul qilish va musiqiy obrazni o‘z talqinida ifodalash imkoniyatiga ega bo‘ladi.

Fortepiano ta’limida pedagogik yondashuvlar ham alohida ahamiyatga ega. Zamonaviy musiqa ta’limi jarayonida an’anaviy o‘qitish usullari bilan bir qatorda interfaol metodlar, muammoli ta’lim elementlari va individual yondashuv keng qo‘llanilmoqda. Har bir o‘quvchining musiqiy qobiliyati, eshitish darajasi va o‘zlashtirish tezligi inobatga olinishi ta’lim samaradorligini oshiradi. Bunday yondashuv o‘quvchini faqat ijrochi sifatida emas, balki ijodiy fikrlovchi shaxs sifatida shakllantiradi. Fortepiano mashg‘ulotlari o‘quvchilarda ijodkorlik va badiiy tafakkurni rivojlantirishga ham xizmat qiladi. Har bir musiqiy asarni ijro etish jarayonida o‘quvchi uning mazmuni, emotsional holati va badiiy obrazini tushunishga harakat qiladi. Bu esa musiqani mexanik ijro etishdan ko‘ra, uni his qilish va ifodali tarzda yetkazish ko‘nikmasini shakllantiradi. Natijada o‘quvchining estetik didi va ijodiy tasavvuri rivojlanadi.

So‘nggi yillarda fortepiano ta’limida zamonaviy texnologiyalardan foydalanish ham kengayib bormoqda. Elektron klaviaturalar, audio va video tahlil vositalari, musiqiy dasturlar va onlayn platformalar o‘quvchilarga mustaqil ishlash va o‘z ijrosini tahlil qilish imkonini beradi. Bu esa ta’lim jarayonini yanada samarali va qiziqarli qiladi. Shuningdek, mashhur ijrochilar ijrosini tahlil qilish orqali o‘quvchilarda professional ijrochilik madaniyati shakllanadi.

Fortepiano shuningdek, boshqa musiqa yo‘nalishlari uchun ham asosiy tayanch cholg‘u hisoblanadi. Xonandalik, dirijyorlik, kompozitorlik va musiqa nazariyasi kabi sohalarda fortepiano bilimlari muhim ahamiyatga ega bo‘lib, bu cholg‘u umumiy musiqiy tayyorgarlikning ajralmas qismi sifatida xizmat qiladi. Shu jihatdan u musiqa ta’limining poydevori sifatida qaraladi. Fortepiano cholg‘usi musiqa ta’limida o‘quvchilarning ijrochilik mahoratini shakllantirish, musiqiy savodxonligini rivojlantirish va ijodiy tafakkurini yuksaltirishda muhim o‘rin tutadi. U orqali o‘quvchi nafaqat musiqani ijro etadi, balki uni chuqur anglaydi va badiiy jihatdan qayta yaratadi.

Muhokama va natijalar. Fortepiano cholg‘usining musiqa ta’limidagi o‘rni va ahamiyatini tahlil qilish jarayonida ushbu cholg‘u o‘quvchilarning musiqiy rivojlanishida keng qamrovli pedagogik vosita sifatida namoyon bo‘lishi aniqlanadi. Fortepiano mashg‘ulotlari faqat ijrochilik texnikasini shakllantirish bilan cheklanmay, balki o‘quvchining musiqiy tafakkuri, estetik qarashi va ijodiy yondashuvini rivojlantirishga ham xizmat qiladi. O‘rganishlar shuni ko‘rsatadiki, fortepiano ta’limi musiqa fanlarining bir nechta yo‘nalishlarini o‘zaro bog‘lab beruvchi integrativ tizim sifatida faoliyat yuritadi. Ya’ni, nazariy bilimlar amaliy ijro jarayoni bilan uyg‘unlashadi. Bu esa o‘quvchilarga musiqiy materialni yaxlit holda idrok etish, uning tuzilishi va mazmunini chuqur anglash imkonini beradi.

Shuningdek, fortepiano bilan ishlash jarayoni o‘quvchilarning psixologik rivojlanishiga ham sezilarli ta’sir ko‘rsatadi. Mashg‘ulotlar davomida diqqatni jamlash, eshitish xotirasi, harakat koordinatsiyasi va emotsional barqarorlik kabi ko‘nikmalar shakllanadi. Murakkab musiqiy asarlarni ijro etish esa o‘quvchida sabr-toqat, mas’uliyat va o‘z ustida ishlash madaniyatini rivojlantiradi. Pedagogik yondashuvlar tahlili shuni ko‘rsatadiki, fortepiano o‘qitish jarayonida individual yondashuv va bosqichma-bosqich o‘rgatish usullari samaradorlikni oshiradi. O‘qituvchi tomonidan to‘g‘ri tanlangan repertuar va metodik izchillik o‘quvchilarning ijrochilik darajasini muntazam rivojlantirib boradi. Interfaol usullar va zamonaviy o‘qitish texnologiyalaridan foydalanish esa ta’lim jarayonini yanada qiziqarli va samarali qiladi.

Raqamli vositalarning joriy etilishi ham sezilarli o‘zgarishlarni yuzaga keltirmoqda. Elektron pianino, audio yozuvlar va turli musiqiy dasturlar yordamida o‘quvchilar o‘z ijrolarini tahlil qilish, xatolarini aniqlash va ularni mustaqil tuzatish imkoniyatiga ega bo‘lmoqda. Bu esa o‘z-o‘zini baholash madaniyatini shakllantirishga yordam beradi. Umumiy kuzatuvlar shuni tasdiqlaydiki, fortepiano ta’limi o‘quvchilarda musiqiy eshitish qobiliyatining rivojlanishi, ritmik sezgirlikning kuchayishi, ijrochilik texnikasining takomillashuvi va ijodiy fikrlashning faollashishiga ijobiy ta’sir ko‘rsatadi. Bundan tashqari, sahna madaniyati va ijro etish jarayonida ishonch ham bosqichma-bosqich shakllanadi.

Shu bilan birga, fortepiano o‘qitish jarayoni o‘quvchini faqat ijrochi sifatida emas, balki mustaqil fikrlaydigan, estetik qarashga ega va ijodiy yondasha oladigan shaxs sifatida shakllantirishga xizmat qiladi. Bu esa musiqa ta’limining asosiy maqsadlaridan biri bo‘lgan har tomonlama rivojlangan shaxsni tarbiyalashga mos keladi.

Xulosa. Fortepiano cholg‘usi musiqa ta’limi tizimida muhim pedagogik ahamiyatga ega bo‘lib, u o‘quvchilarning musiqiy rivojlanishida asosiy tayanch vosita sifatida xizmat qiladi. Olib borilgan tahlillar shuni ko‘rsatadiki, fortepiano orqali o‘quvchilarda nafaqat ijrochilik ko‘nikmalari, balki musiqiy eshitish, ritmni his qilish, garmonik tafakkur va musiqiy savodxonlik ham izchil shakllanadi.

Shuningdek, fortepiano mashg‘ulotlari o‘quvchilarning ijodiy fikrlashini rivojlantirib, musiqiy asarni chuqur anglash va uni badiiy ifodali tarzda ijro etish malakasini mustahkamlaydi. Bu jarayon o‘quvchining estetik didini boyitadi hamda uning shaxs sifatida har tomonlama rivojlanishiga xizmat qiladi. Fortepiano ta’limi integrativ xususiyatga ega ekanligi, ya’ni musiqa nazariyasi va amaliyotini o‘zaro bog‘lab berishi aniqlanadi. Bu esa ta’lim jarayonining samaradorligini oshiradi va

o‘quvchilarning musiqiy bilimlarni yaxlit tizim sifatida o‘zlashtirishiga imkon yaratadi. Umuman olganda, fortepiano cholg‘usi musiqa ta’limida nafaqat ijrochilik vositasi, balki o‘quvchilarning estetik, ijodiy va intellektual rivojlanishini ta’minlovchi muhim pedagogik omil hisoblanadi.

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UZBEKISTAN'S PATH TO SUSTAINABLE DEVELOPMENT

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ABSTRACT

This article analyzes the conditions for Uzbekistan's transition to a sustainable economic growth model alongside its current economic indicators. The study examines the country's long-term strategic goals to join the ranks of upper-middle-income nations and the main obstacles along this path. In particular, risks such as external economic shocks, geopolitical instability, and resource scarcity are analyzed to assess the resilience of the national economy. Finally, the paper offers practical and systemic policy recommendations on shifting economic priorities, accelerating the transition to a green economy, and implementing a flexible strategic planning system.

INTRODUCTION

Achieving long-term sustainable development requires a profound structural transformation, particularly for rapidly modernizing economies. In the case of Uzbekistan, transitioning to a sustainable growth model is no longer a theoretical choice but an immediate practical necessity. To successfully secure this path, the country must meet several critical economic, social, and ecological conditions. First and foremost, maintaining stable GDP growth rates that remain at or above the global average (3.0–3.5%) serves as the baseline for macro-stability. However, purely quantitative growth is insufficient; the domestic economy must actively replace diminishing growth drivers with fresh, innovation-led sectors to maintain its upward trajectory over the next decade.[1]

The relevance of investigating Uzbekistan's sustainable development stems from the need to balance economic expansion with social and ecological responsibility. Modern growth paradigms dictate that economic success must directly address deep-seated social challenges and improve public welfare. Furthermore, severe environmental shifts and regional climate realities require urgent ecological restoration and a conscious reduction of human pressure on natural capital. Economic growth can

[1] S.Chepel (2023). Journal "Economy: Forecasts and Analysis" №1(21), Tashkent

no longer occur at the expense of natural resources; instead, it must look toward preservation and sustainable resource management.

Ultimately, the core engine of Uzbekistan's future progress lies in restructuring the nation's asset portfolio. True sustainability cannot rely on raw commodity exports; it demands a significant expansion in the share of human, social, and institutional capital. Transitioning into a high-value, knowledge-based economy requires dynamic strategic planning and a fundamental shift in national development priorities. Analyzing these comprehensive conditions provides the vital academic framework necessary to turn high-level sustainable development strategies into actionable economic realities.

ANALYSIS AND RESULTS

Comparative macroeconomic data reveals that Uzbekistan exhibits distinct growth dynamics alongside specific structural vulnerabilities when evaluated against its regional and global peers. A critical analysis of key economic indicators highlights both the high velocity of the domestic economy and the pressing need for strategic adjustment.

Table 1. Main economic indicators (2023)

	GDP growth (annual %)	Inflation, consumer prices (annual %)	Gross capital formation (% of GDP)	External balance on goods and services (% of GDP)	Government Budget deficit (% of GDP)	General government gross debt (% of GDP)
Kazakhstan	5.1	9.8	28.6	7.0	-2.4	22.8
Belarus	3.9	5.0	24.1	0.6	0.7	40.7
China	5.2	0.2	42.1	2.2	-5.8	84.4
Russia	3.6	7.42	25.7	4.3	-2.3	19.5
Uzbekistan	6.3	8.77	43.1	-18.9	-4.0	32.5

Uzbekistan leads the observed group in quantitative economic expansion, recording a robust annual GDP growth rate of 6.3%. This outpaces emerging regional players like Kazakhstan (5.1%) and Russia (3.6%), as well as global manufacturing hubs like China (5.2%). This aggressive growth is fundamentally powered by an exceptionally high rate of gross capital formation, which stands at 43.1% of GDP. Such a high investment-to-GDP ratio—even surpassing China's capital intensive model (42.1%)—demonstrates that Uzbekistan is currently undergoing massive domestic

industrialization, heavy infrastructure spending, and comprehensive state-led modernization programs.

However, this intensive development model introduces clear macroeconomic trade-offs. The most prominent structural challenge is the severe trade deficit, with the external balance on goods and services plunging to -18.9% of GDP. Unlike its resource-exporting neighbors like Kazakhstan (+7.0%) and Russia (+4.3%) which enjoy trade surpluses, Uzbekistan's intensive modernization requires huge imports of high-tech machinery, capital equipment, and raw materials. This structural imbalance creates a persistent demand for foreign currency and exerts constant pressure on national reserves.

Additionally, internal stability faces headwinds from persistent inflationary pressures, with consumer price inflation staying high at 8.77%. While lower than Kazakhstan's 9.8%, it remains significantly above China's near-zero levels and Belarus's 5.0%, impacting local purchasing power. Fiscal management also shows a government budget deficit of -4.0% of GDP, reflecting heavy state spending to sustain the current growth trajectory. Fortunately, the country's sovereign fiscal health remains relatively secure, as general government gross debt is well-contained at 32.5% of GDP—substantially safer than Belarus (40.7%) or China (84.4%).

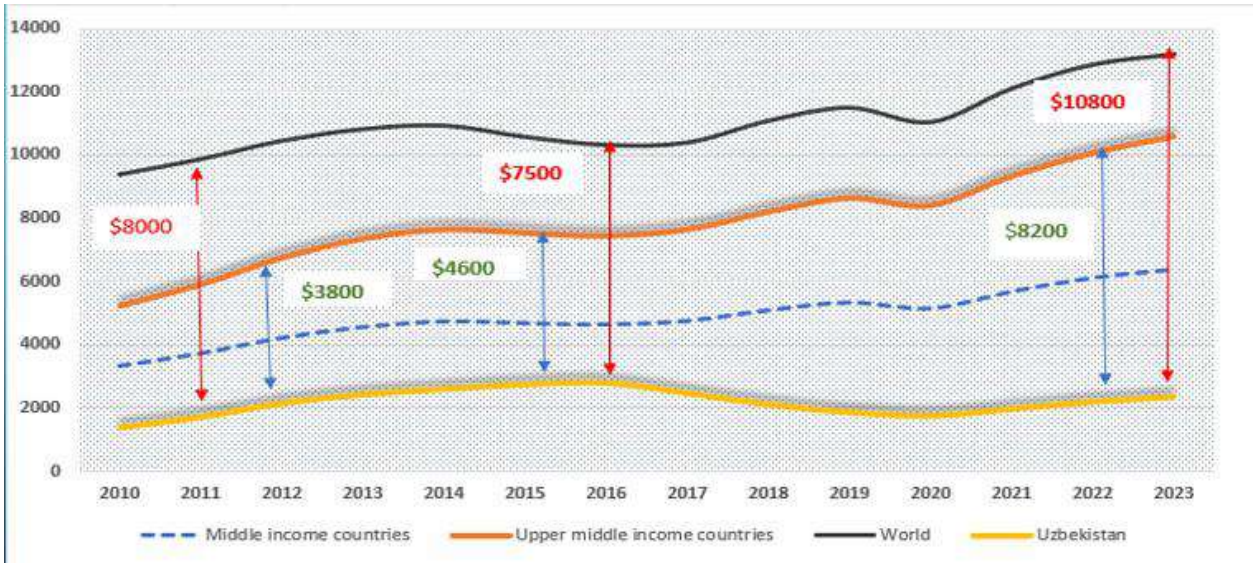
Future Goals and Institutional Frameworks

To build a resilient economic foundation, the government of Uzbekistan has increasingly focused on sustainable development by enacting more than 60 comprehensive strategic documents in recent years. This extensive institutional framework marks a definitive shift from short-term emergency economic planning toward long-term, synchronized policy-making up to 2030. At the apex of this policy architecture is The Uzbekistan-2030 Strategy, which operates in close harmony with the global Sustainable Development Goals (SDGs) 2030 framework. These initiatives systematically build upon the market-liberalizing structural reforms originally introduced under the Development Strategy of New Uzbekistan for 2022-2026, scaling them up into permanent institutional transformations.

Under these strategic blueprints, national economic objectives target aggressive, high-velocity catch-up growth designed to elevate Uzbekistan into the ranks of upper-middle-income nations. Specifically, the country's total GDP is projected to scale to $200 billion by 2030, representing an extraordinary expansion path from $50 billion in 2017 and $110 billion in 2024. This macro-expansion directly translates into public wealth indicators, with GDP per capita expected to rise from $3,050 in 2024 to $5,000 by 2030, providing positive economic growth prospects across domestic markets. To

safeguard the purchasing power and macroeconomic stability necessary to sustain this growth, monetary policies are being strictly calibrated to stabilize inflation at 5–6%, with further commitments to compress it to 5% or lower.

Simultaneously, this economic expansion is tightly integrated with mandatory environmental and social equity benchmarks to ensure true sustainability. Environmental targets are driven by The Action Plan for Transition to a Green Economy until 2030 alongside the Digital Uzbekistan 2030 initiative, which collectively mandate a 35% reduction in greenhouse gas emissions per unit of GDP compared to 2010 baselines by modernizing industrial technology. On the social front, the large-scale "From Poverty to Prosperity" Program addresses historical vulnerabilities by moving beyond passive state welfare toward active economic inclusion. This program establishes an aggressive roadmap to drive the national poverty rate down to 6%, continuing a strong downward trajectory from 23% in 2019 and 11% in 2023. By structurally linking green industrialization, digital transition, fiscal discipline, and targeted poverty reduction, these synchronized milestones establish a viable and comprehensive pathway for Uzbekistan's long-term competitive development.



Graph 1. Gross National income per capita 2010-2023[2]

A critical evaluation of Uzbekistan's long-term trajectory reveals significant structural hurdles on its path to joining the ranks of upper-middle-income countries. While national strategies outline ambitious expansion plans, historical macro-data

[2] World Bank Dataset

highlights a widening developmental gap between Uzbekistan and higher-income benchmarks, illustrating the complex reality of catch-up growth.

Empirical Data Analysis of Income Gaps

Historical trends in GDP per capita from 2010 to 2023 reveal that despite maintaining positive domestic growth, Uzbekistan (represented by the solid yellow line) faces an intensifying divergence from both global averages and upper-middle-income thresholds. The empirical data points to a persistent structural lag:

The Global Income Gap**:** In 2011, the net divergence between Uzbekistan's GDP per capita and the global average (the black line) stood at $8,000. By 2016, this gap contracted slightly to $7,500 due to localized economic stabilization. However, by 2023, the disparity accelerated aggressively, with the income gap expanding to an unprecedented $10,800.

The Upper-Middle-Income Gap: A similar trend is visible when comparing Uzbekistan to upper-middle-income nations (the orange line). The income gap widened from $3,800 in 2012 to $4,600 in 2015, and crested sharply to **$8,200** by 2022.

Strategic Implications and Catch-Up Capability

This data clearly indicates that while Uzbekistan’s economy is expanding in absolute terms, it is not expanding fast enough to outpace or even match the growth velocity of the economies it aims to catch up with. The widening of the gap to $8,200 by 2022 demonstrates that the current economic model remains vulnerable to external shocks, structural bottlenecks, and demographic pressures that dilute per capita income gains.

For Uzbekistan to genuinely transition into an upper-middle-income economy and reverse this historical divergence, maintaining standard growth rates will not suffice. The nation requires an intensive, non-linear acceleration driven by high-value industrial manufacturing, aggressive integration into global value chains, and deep institutional reforms. Without a fundamental shift away from raw material dependency and state-funded capital formation toward innovation and knowledge-based productivity, the probability of remaining caught in a low-middle-income trap remains a critical strategic risk.

Risks and Challenges: Macroeconomic and Structural Vulnerabilities

Beyond the income gap divergence, Uzbekistan’s path to sustainable development is constrained by several critical macroeconomic instabilities and structural vulnerabilities. These risks undermine long-term strategic planning and threaten the country’s capacity to absorb external economic pressures.

Macroeconomic and Fiscal Instabilities

The primary challenge stems from a high level of macroeconomic instability. The domestic economy continuously operates with inflation rates well above the Central Bank's official targets. This internal pressure is compounded by a persistent government budget deficit that exceeds the sustainable 3% threshold, alongside a severe external trade balance deficit and rising external debt. These synchronized fiscal imbalances limit the state's capacity to fund sustainable development initiatives without accumulating risky sovereign liabilities.

External Shocks and Policy Fragmentation

These domestic vulnerabilities are further aggravated by volatile external shocks. Sudden global market shifts and geopolitical disruptions drastically reduce the accuracy of macroeconomic forecasts, which undermines their role in national economic decision-making. Because complex, global macro-processes are increasingly difficult to predict, the government faces heightened risks of decreased policy coherence, potentially leading to fragmented economic development strategies.

Monopolistic Markets and Regulatory Gaps

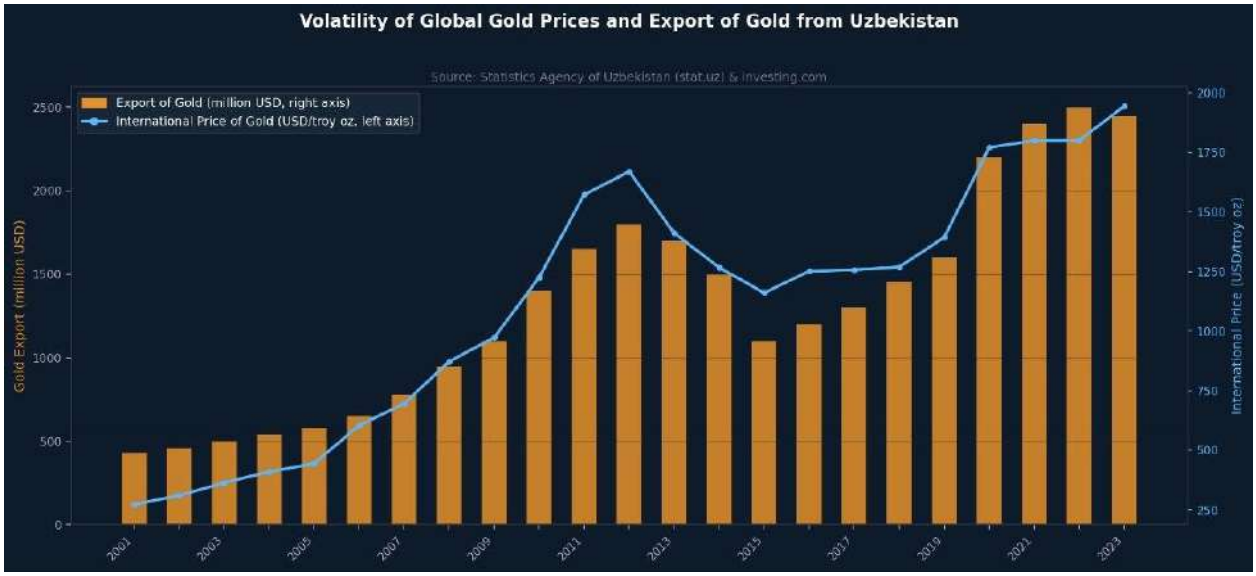
Structurally, the domestic environment is constrained by underdeveloped commodity and financial markets. Large, state-backed monopolists heavily dominate these sectors, stifling private competition and reducing market efficiency. This issue is amplified by historically ineffective antimonopoly regulation, which prevents the fair allocation of capital and slows down the diversification of the broader economy.

Technological and Resource Dependencies

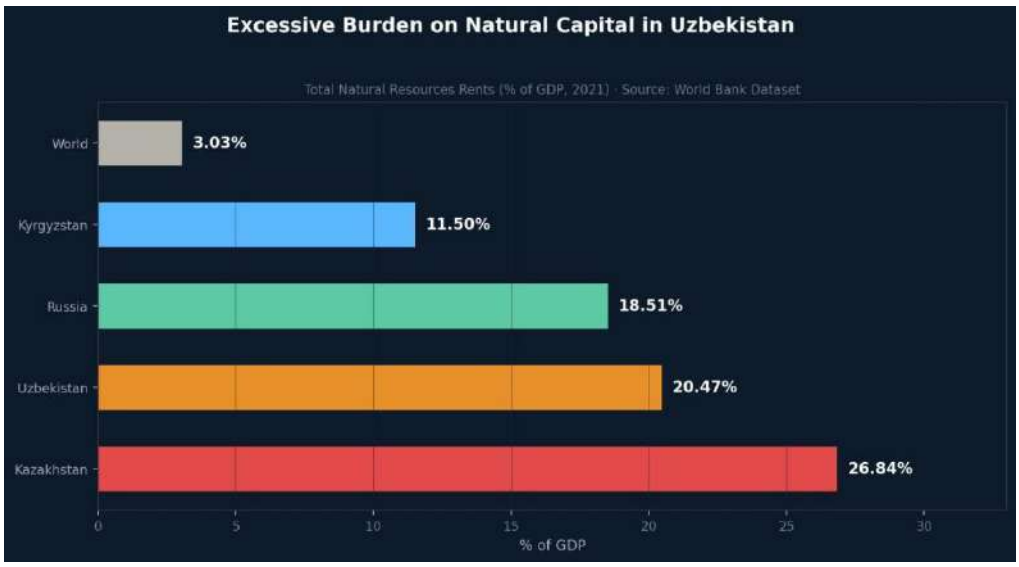
Finally, Uzbekistan faces a critical level of technological dependence on external factors, leaving its industrial modernization vulnerable to foreign supply chains. This technological lag is coupled with a low level of resource management efficiency. The economy remains highly intensive, exhibiting low productivity relative to its consumption of primary energy, water, land, investment, and labor. To achieve true sustainability, the nation must address these compounding structural vulnerabilities through rigid regulatory and strategic realignments.

To accurately assess the structural stability of Uzbekistan's economy, it is critical to examine its exposure to volatile global commodity markets and its high reliance on primary natural capital. Empirical data highlights two major areas of concern that complicate long-term sustainable development: gold price volatility and excessive natural resource rents.

Graph 2. Volatility of Global Prices and Export of Gold from Uzbekistan[3]



The first dataset analyzes the relationship between the volatility of global gold prices and the export of gold from Uzbekistan. The data reveals a highly reactive export pattern where Uzbekistan's trade performance is heavily tethered to international market fluctuations. During periods of accelerating global prices, the volume and value of Uzbekistan's gold exports spike significantly, while sudden price drops create immediate contractions in export revenue. Relying on gold as a primary driver of export earnings exposes the national trade balance to substantial external shocks. Because global commodity prices are determined by external geopolitical and macroeconomic factors beyond domestic control, this dependency injects high volatility into national reserves and weakens the reliability of state revenue forecasting.



Graph 3. Excessive burden on natural capital in Uzbekistan (% of GDP.2021)[4]

[3] calculations based on Statistics Agency of Uzbekistan: www.stat.uz; and https://www.investing.com/
[4] World Bank Dataset

The second dataset evaluates the total natural resources rents as a percentage of GDP, benchmarking Uzbekistan against regional neighbors and global averages. This indicator measures the economic windfall derived from extracting non-renewable resources relative to the size of the economy. Uzbekistan's natural resource rents constitute a substantial 20.47% of its GDP, which surpasses Russia at 18.51% and stands nearly seven times higher than the global world average of 3.03%. A resource rent ratio of over 20% indicates that a massive portion of the country's economic output is generated by depleting its natural capital rather than through high-value manufacturing, digital innovation, or service sectors. This heavy reliance on primary assets reinforces structural vulnerabilities, making the transition to a low-carbon, innovation-led green economy significantly harder to execute.

CONCLUSION

The transition of Uzbekistan toward a long-term sustainable development model represents a complex balancing act between rapid macroeconomic growth and structural resilience. Empirical analysis reveals that while the nation maintains an aggressive GDP growth rate of 6.3%—outpacing regional and global benchmarks—this expansion remains heavily dependent on an import-heavy investment phase and high capital formation. Furthermore, long-term trend data highlights a widening developmental gap in GDP per capita between Uzbekistan and upper-middle-income thresholds, which reached $8,200 by 2022. This divergence underscores the presence of a catch-up growth dilemma, indicating that quantitative economic expansion alone is insufficient to secure high-income transition without structural qualitative changes.

The primary vulnerabilities threatening Uzbekistan’s economic durability stem from internal macroeconomic imbalances and severe external dependencies. Nationally, the economy faces headwinds from high inflationary pressures and a government budget deficit exceeding 4.0%. Externally, the trade infrastructure is heavily exposed to global commodity shocks due to its reactive reliance on volatile gold exports. This issue is amplified by an excessive burden on primary natural capital, with natural resource rents constituting a substantial 20.47% of GDP—nearly seven times the global average. Such data demonstrates that the current velocity of the economy is heavily subsidized by depleting non-renewable natural resources rather than high-value manufacturing or digital innovation.

Ultimately, achieving the targets set forth in the Uzbekistan-2030 Strategy requires moving past raw commodity extraction toward a disciplined, knowledge-based economy. To turn these future goals into economic reality, policy instruments must prioritize institutionalized strategic planning frameworks, modern public

administration, and enhanced market competition to dissolve existing monopolies. By actively shifting capital away from primary resource extraction and reinvesting it into modern industrial production clusters and localized SME supply chains, Uzbekistan can successfully decouple its economic growth from environmental degradation. Implementing these synchronized structural reforms will safeguard national reserves, narrow the historical income gap, and guarantee a resilient transition into a competitive, upper-middle-income green economy.

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KORXONALARDA TASHQI AUDIT TEKSHIRUVLARINI O‘TKAZISH ORQALI SAMARADORLIKNI OSHIRISH YO‘LLARI

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Annotatsiya. Mazkur maqolada korxonalarda tashqi audit tekshiruvlarini tashkil etish va o‘tkazish orqali faoliyat samaradorligini oshirish masalalari tahlil qilingan. Tashqi auditning moliyaviy hisobotlar ishonchliligini ta’minlash, ichki nazorat tizimini takomillashtirish hamda korxona resurslaridan samarali foydalanishga ta’siri yoritilgan. Shuningdek, audit natijalaridan foydalanish orqali korxonalarda iqtisodiy samaradorlikni oshirish yo‘llari ilmiy jihatdan asoslab berilgan.

Abstract. This article analyzes the issues of improving enterprise efficiency through the organization and implementation of external audit inspections. It highlights the role of external audit in ensuring the reliability of financial reporting, improving internal control systems, and enhancing the efficient use of enterprise resources. The study also scientifically substantiates ways to increase economic efficiency by utilizing audit results.

Аннотация. В данной статье анализируются вопросы повышения эффективности деятельности предприятий посредством организации и проведения внешнего аудита. Рассматривается роль внешнего аудита в обеспечении достоверности финансовой отчетности, совершенствовании системы внутреннего контроля и повышении эффективности использования ресурсов предприятия. Также научно обоснованы пути повышения экономической эффективности за счёт использования результатов аудита.

Kalit so‘zlar: tashqi audit, korxona samaradorligi, moliyaviy hisobot, ichki nazorat, audit tekshiruvi, iqtisodiy tahlil, risklarni boshqarish.

Keywords: external audit, enterprise efficiency, financial reporting, internal control, audit inspection, economic analysis, risk management.

Ключевые слова: внешний аудит, эффективность предприятия, финансовая отчетность, внутренний контроль, аудиторская проверка, экономический анализ, управление рисками.

KIRISH

Bozor iqtisodiyoti sharoitida korxonalar faoliyatining samaradorligini ta’minlash, moliyaviy barqarorligini mustahkamlash hamda investorlarga ishonchli

axborot taqdim etish masalalari dolzarb ahamiyat kasb etmoqda. Ushbu vazifalarni amalga oshirishda tashqi audit muhim nazorat instrumenti sifatida maydonga chiqadi. Tashqi audit korxonaning moliyaviy hisobotlari amaldagi qonunchilik va xalqaro standartlarga muvofiqligini baholash, moliyaviy axborotlarning haqqoniyligini aniqlash hamda boshqaruv qarorlarini qabul qilish uchun zarur bo‘lgan ishonchli ma’lumotlarni shakllantirishga xizmat qiladi [1].

So‘nggi yillarda iqtisodiyotning raqamlashtirilishi, korporativ boshqaruv tizimlarining takomillashuvi hamda investorlar talablarining ortib borishi tashqi audit xizmatlariga bo‘lgan ehtiyojni yanada kuchaytirmoqda. Xususan, xalqaro moliya bozorlariga chiqishni rejalashtirayotgan korxonalar uchun mustaqil auditorlik xulosasi muhim ahamiyatga ega hisoblanadi. Audit natijalari korxonalarda ichki nazorat tizimini takomillashtirish, moliyaviy xavflarni kamaytirish va resurslardan samarali foydalanish imkonini beradi [2].

Tashqi audit tekshiruvlarining samaradorligi nafaqat moliyaviy hisobotlarning ishonchliligini oshirish, balki korxona faoliyatidagi kamchiliklarni aniqlash, xarajatlarni optimallashtirish hamda strategik rivojlanish yo‘nalishlarini belgilashda ham namoyon bo‘ladi. Shu sababli korxonalarda tashqi audit tekshiruvlarini tashkil etish va ular orqali samaradorlikni oshirish masalalarini ilmiy jihatdan tadqiq etish muhim ahamiyat kasb etadi [3].

ADABIYOTLAR TAHLILI

Audit nazariyasi va amaliyotining ilmiy asoslari ko‘plab xorijiy va mahalliy olimlar tomonidan tadqiq qilingan. Auditning iqtisodiy mohiyati, nazorat tizimidagi o‘rni hamda korxona boshqaruvidagi ahamiyati yuzasidan turli ilmiy yondashuvlar shakllangan.

Amerikalik olim Alvin A. Arens o‘zining "Auditing and Assurance Services: An Integrated Approach" asarida auditni moliyaviy hisobotlar to‘g‘risidagi ma’lumotlarning belgilangan mezonlarga muvofiqligini aniqlash va baholash maqsadida mustaqil ekspertlar tomonidan amalga oshiriladigan tizimli jarayon sifatida tavsiflaydi. Muallif audit natijalari investorlar, kreditorlar va boshqa manfaatdor tomonlarning qaror qabul qilish sifatini oshirishini ta’kidlaydi [1].

Randal J. Elder va Mark S. Beasleylarning ilmiy qarashlariga ko‘ra, tashqi audit korxonalarda korporativ boshqaruv sifatini oshirish hamda moliyaviy hisobotlarda yuzaga kelishi mumkin bo‘lgan xatolar va firibgarlik holatlarini aniqlashning muhim vositasi hisoblanadi. Olimlar auditning risklarga asoslangan yondashuvi zamonaviy audit amaliyotining asosiy yo‘nalishlaridan biri ekanligini qayd etadilar [2].

Mashhur audit tadqiqotchisi Roger Adams o‘zining audit va korporativ boshqaruv masalalariga bag‘ishlangan ilmiy ishlarida auditorlik tekshiruvlari tashkilotlarda shaffoflikni ta’minlash va manfaatdor tomonlar o‘rtasida ishonch muhitini shakllantirishga xizmat qilishini ko‘rsatib bergan [3].

Rossiyalik olim V.I. Podolskiy "Audit" nomli darsligida auditorlik tekshiruvlarini korxonalarning moliyaviy-xo‘jalik faoliyatini baholashda samarali nazorat mexanizmi sifatida tavsiflaydi. Uning fikricha, tashqi audit korxona faoliyatidagi iqtisodiy zaxiralarni aniqlash va moliyaviy intizomni mustahkamlash imkonini beradi [4].

O‘zbekistonlik olim R.D. Dusmuratovning ilmiy ishlarida auditorlik faoliyatining milliy iqtisodiyotdagi ahamiyati, audit xizmatlari bozorining rivojlanish tendensiyalari va auditning moliyaviy nazorat tizimidagi o‘rni keng yoritilgan. Muallif auditorlik xulosalarining investitsion muhitni yaxshilashdagi roliga alohida e’tibor qaratadi [5].

Shuningdek, B.A. Xasanov tomonidan olib borilgan tadqiqotlarda auditning xalqaro standartlari asosida tashkil etilishi korxonalarning raqobatbardoshligini oshirish va xalqaro kapital bozorlariga integratsiyalashuvini ta’minlashi ilmiy jihatdan asoslangan [6].

METODOLOGIYA

Mazkur tadqiqotda ilmiy bilishning tahlil, sintez, taqqoslash, statistik guruhlash va iqtisodiy tahlil usullaridan foydalanildi. Tadqiqot jarayonida tashqi auditning korxona faoliyati samaradorligiga ta’siri bo‘yicha mahalliy va xorijiy ilmiy adabiyotlar o‘rganildi. Korxonalarning auditdan oldingi va keyingi moliyaviy ko‘rsatkichlari qiyosiy tahlil qilindi. Shuningdek, auditorlik tekshiruvlari natijasida aniqlangan kamchiliklar va ularning bartaraf etilishi samaradorlik ko‘rsatkichlariga ta’siri baholandi. Olingan natijalar asosida ilmiy xulosalar va amaliy tavsiyalar ishlab chiqildi.

TAHLIL VA NATIJALAR

Tashqi audit tekshiruvlari korxonalar faoliyatida mavjud moliyaviy va tashkiliy kamchiliklarni aniqlash imkonini beradi. Auditorlik tekshiruvlari davomida hisobotlarda yo‘l qo‘yilgan xatolar, ichki nazorat tizimidagi zaifliklar hamda resurslardan samarasiz foydalanish holatlari aniqlanadi. Natijada korxona rahbariyati aniqlangan kamchiliklarni bartaraf etish orqali faoliyat samaradorligini oshirish imkoniyatiga ega bo‘ladi.

Tadqiqotlar shuni ko‘rsatadiki, muntazam ravishda tashqi auditdan o‘tuvchi korxonalarda moliyaviy intizom darajasi yuqori bo‘ladi. Auditorlar tomonidan berilgan

tavsiyalar asosida xarajatlar optimallashtiriladi, moliyaviy nazorat kuchaytiriladi va risklarni boshqarish tizimi takomillashtiriladi. Bu esa rentabellik ko‘rsatkichlarining oshishiga olib keladi.

1-jadval

Tashqi audit natijasida korxona faoliyati samaradorligi ko‘rsatkichlaridagi o‘zgarishlar

Ko‘rsatkichlar	Auditdan oldin	Auditdan keyin	O‘zgarish (%)
Sof foyda (mln so‘m)	5 200	6 450	24,0
Xarajatlar ulushi (%)	82,5	77,1	-5,4
Debitor qarzdorlik aylanuvchanligi (marta)	5,8	7,2	24,1
Aktivlar rentabelligi (%)	8,4	11,6	38,1
Ichki nazorat samaradorligi (%)	68	87	27,9

Jadval ma’lumotlari shuni ko‘rsatadiki, tashqi audit natijasida korxonalarda moliyaviy ko‘rsatkichlarning yaxshilanishi kuzatilgan. Xususan, sof foyda 24 foizga oshgan bo‘lsa, xarajatlar ulushi 5,4 foizga kamaygan. Bu esa auditorlik tavsiyalarining amaliy samara berayotganligini ko‘rsatadi.

Korxonalarda tashqi audit samaradorligini oshirish uchun quyidagi yo‘nalishlarga alohida e’tibor qaratish lozim:

- audit jarayonlarini raqamlashtirish;
- xalqaro audit standartlarini keng joriy etish;
- auditorlarning malakasini muntazam oshirib borish;
- risklarga asoslangan audit metodologiyasini qo‘llash;
- ichki va tashqi audit o‘rtasidagi hamkorlikni kuchaytirish.

Bugungi kunda sun’iy intellekt, Big Data va raqamli audit texnologiyalarining joriy etilishi auditorlik tekshiruvlari sifatini sezilarli darajada oshirmoqda. Mazkur texnologiyalar yordamida katta hajmdagi ma’lumotlarni qisqa vaqt ichida tahlil qilish va moliyaviy xavflarni oldindan aniqlash imkoniyati yaratilmoqda. Natijada auditorlik xulosalarining aniqligi va ishonchliligi ortmoqda.

Shuningdek, tashqi audit korxonalarning investitsion jozibadorligini oshirishga ham xizmat qiladi. Mustaqil auditorlik xulosasi mavjud bo‘lgan korxonalar investorlar va kreditorlar tomonidan ishonchli subyekt sifatida baholanadi. Bu esa investitsiyalar hajmining oshishiga va korxonaning moliyaviy barqarorligiga ijobiy ta’sir ko‘rsatadi.

XULOSA

Tadqiqot natijalari shuni ko‘rsatdiki, tashqi audit tekshiruvlari korxonalarda moliyaviy intizomni mustahkamlash, hisobotlarning ishonchliligini ta’minlash va boshqaruv qarorlarining sifatini oshirishda muhim ahamiyat kasb etadi. Auditorlik tekshiruvlari orqali mavjud kamchiliklar aniqlanib, ularni bartaraf etish bo‘yicha amaliy tavsiyalar ishlab chiqiladi. Natijada korxonalarning rentabelligi, moliyaviy barqarorligi va investitsion jozibadorligi oshadi.

Korxonalarda tashqi audit samaradorligini yanada oshirish uchun xalqaro audit standartlarini keng qo‘llash, raqamli texnologiyalarni joriy etish, auditorlarning kasbiy malakasini muntazam rivojlantirish hamda risklarga asoslangan audit yondashuvini takomillashtirish zarur. Mazkur chora-tadbirlar korxonalar faoliyatining shaffofligi va raqobatbardoshligini ta’minlashga xizmat qiladi.

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PSIXOSTIMULYATORLAR. DEPRESSIYAGA QARSHI VOSITALAR

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Annotatsiya
Ushbu maqolada psixostimulyatorlar va depressiyaga qarshi vositalarning farmakologik xususiyatlari, ta’sir mexanizmlari, klinik qo‘llanilishi hamda zamonaviy tibbiyotdagi o‘rni tahlil qilingan. Psixostimulyatorlarning markaziy nerv tizimiga rag‘batlantiruvchi ta’siri, depressiyaga qarshi vositalarning esa monoamin neyromediatorlar almashinuviga ta’sir etish orqali terapevtik samaradorlik ko‘rsatishi yoritilgan. Tadqiqot davomida klassik va zamonaviy antidepressantlar guruhlari, ularning farmakodinamikasi, farmakokinetikasi hamda nojo‘ya ta’sirlari ilmiy adabiyotlar asosida baholandi. Olingan natijalar depressiv holatlarni davolashda selektiv serotonin qayta qamrab olinishi ingibitorlari va boshqa yangi avlod antidepressantlarining samaradorligi yuqoriligini ko‘rsatdi. Psixostimulyatorlar esa ayrim nevrologik va psixiatrik kasalliklarda qo‘llanilishi mumkinligi bilan ahamiyatlidir.
Kalit so‘zlar: psixostimulyatorlar, antidepressantlar, depressiya, serotonin, noradrenalin, farmakologiya, markaziy nerv tizimi.

Аннотация
В данной статье рассмотрены фармакологические свойства психостимуляторов и антидепрессантов, их механизмы действия, клиническое применение и значение в современной медицине. Освещены стимулирующее влияние психостимуляторов на центральную нервную систему и терапевтические эффекты антидепрессантов, связанные с регуляцией обмена моноаминовых нейромедиаторов. На основании анализа научной литературы изучены классические и современные группы антидепрессантов, их фармакодинамические и фармакокинетические особенности, а также побочные эффекты. Полученные данные свидетельствуют о высокой эффективности

селективных ингибиторов обратного захвата серотонина и других антидепрессантов нового поколения при лечении депрессивных расстройств. Психостимуляторы сохраняют важное значение в терапии отдельных неврологических и психиатрических заболеваний.

Ключевые слова: психостимуляторы, антидепрессанты, депрессия, серотонин, норадреналин, фармакология, центральная нервная система.

Abstract

This article analyzes the pharmacological properties of psychostimulants and antidepressants, their mechanisms of action, clinical applications, and significance in modern medicine. The stimulating effects of psychostimulants on the central nervous system and the therapeutic efficacy of antidepressants through modulation of monoamine neurotransmitter systems are discussed. Classical and modern classes of antidepressants, their pharmacodynamic and pharmacokinetic characteristics, as well as adverse effects, were evaluated based on scientific literature. The findings indicate that selective serotonin reuptake inhibitors and other new-generation antidepressants demonstrate high efficacy in the treatment of depressive disorders. Psychostimulants remain important therapeutic agents in the management of certain neurological and psychiatric conditions.

Keywords: psychostimulants, antidepressants, depression, serotonin, norepinephrine, pharmacology, central nervous system.

Kirish

Ruhiy salomatlik inson salomatligining ajralmas qismi bo‘lib, uning buzilishi nafaqat shaxsning hayot sifatiga, balki jamiyatning ijtimoiy va iqtisodiy rivojlanishiga ham salbiy ta’sir ko‘rsatadi. So‘nggi yillarda depressiv buzilishlar, surunkali charchoq sindromi, diqqat yetishmovchiligi va boshqa neyropsixiatrik kasalliklarning uchrash chastotasi ortib bormoqda. Ushbu holatlar samarali farmakoterapiya vositalarini qo‘llash zaruratini yuzaga keltirmoqda.

Psixostimulyatorlar markaziy nerv tizimi faoliyatini kuchaytiruvchi dori vositalari bo‘lib, ular aqliy va jismoniy faollikni oshirish, uyquchanlikni kamaytirish hamda diqqatni yaxshilash xususiyatiga ega. Mazkur preparatlar ayrim nevrologik va psixiatrik kasalliklarda, jumladan, narkolepsiya, diqqat yetishmovchiligi va giperaktivlik sindromi hamda ayrim depressiv holatlarni davolashda qo‘llaniladi. Ularning asosiy ta’siri dopamin va noradrenalin kabi neyromediatorlarning markaziy nerv tizimidagi miqdorini oshirish bilan bog‘liq.

Depressiya esa dunyo miqyosida keng tarqalgan ruhiy kasalliklardan biri hisoblanadi. U kayfiyatning pasayishi, qiziqish va motivatsiyaning yo‘qolishi, ish qobiliyatining

susayishi hamda turli somatik buzilishlar bilan namoyon bo‘ladi. Depressiv buzilishlarni davolashda antidepressantlar muhim o‘rin tutadi. Ushbu preparatlar serotonin, noradrenalin va dopamin kabi monoamin neyromediatorlar almashinuviga ta’sir etish orqali terapevtik samara ko‘rsatadi. Hozirgi kunda selektiv serotonin qayta qamrab olinishi ingibitorlari, serotonin va noradrenalin qayta qamrab olinishi ingibitorlari, trisiklik antidepressantlar hamda monoaminoksidaza ingibitorlari klinik amaliyotda keng qo‘llanilmoqda.

Farmakologiya sohasidagi zamonaviy tadqiqotlar psixostimulyatorlar va antidepressantlarning samaradorligini oshirish, nojo‘ya ta’sirlarini kamaytirish hamda individual farmakoterapiya imkoniyatlarini kengaytirishga qaratilgan. Shu sababli ushbu dori vositalarining farmakodinamik va farmakokinetik xususiyatlarini chuqur o‘rganish dolzarb ilmiy va amaliy ahamiyatga ega.

Mazkur tadqiqotning maqsadi psixostimulyatorlar va depressiyaga qarshi vositalarning farmakologik xususiyatlari, ta’sir mexanizmlari, klinik qo‘llanilishi hamda zamonaviy tibbiyotdagi o‘rnini ilmiy adabiyotlar asosida tahlil qilishdan iborat.

Materiallar va metodlar

Ushbu tadqiqot farmakologiya faniga oid ilmiy adabiyotlarni tizimli tahlil qilish asosida amalga oshirildi. Tadqiqotning nazariy asosini psixostimulyatorlar va depressiyaga qarshi vositalarning farmakologik xususiyatlari, ta’sir mexanizmlari, farmakokinetikasi, farmakodinamikasi hamda klinik qo‘llanilishiga bag‘ishlangan mahalliy va xorijiy ilmiy manbalar tashkil etdi.

Tadqiqot davomida farmakologiya bo‘yicha yetakchi darsliklar va qo‘llanmalar, jumladan Katzungning “Basic and Clinical Pharmacology”, Goodman & Gilmanning “The Pharmacological Basis of Therapeutics”, Mashkovskiyning “Лекарственные средства”, hamda Rossiya, Yevropa va AQSh olimlari tomonidan chop etilgan ilmiy maqolalar va klinik tavsiyalar o‘rganildi.

Ma’lumotlarni yig‘ish jarayonida psixostimulyatorlar va antidepressantlarning tasnifi, farmakologik ta’sir mexanizmlari, organizmga ta’siri, qo‘llanilish ko‘rsatmalari va nojo‘ya reaksiyalariga oid ma’lumotlar saralab olindi. Tahlil uchun ilmiy jihatdan ishonchli, klinik amaliyotda qo‘llaniladigan va zamonaviy farmakoterapiya talablariga javob beruvchi manbalardan foydalanildi.

Tadqiqot metodlari sifatida bibliografik tahlil, qiyosiy tahlil, tizimlashtirish va umumlashtirish usullaridan foydalanildi. Bibliografik tahlil yordamida mavzuga oid ilmiy adabiyotlar o‘rganildi, qiyosiy tahlil orqali turli guruh psixostimulyatorlar va antidepressantlarning farmakologik xususiyatlari taqqoslandi. Olingan ma’lumotlar tizimlashtirilib, zamonaviy ilmiy qarashlar asosida umumlashtirildi.

Tadqiqot natijalarini baholashda preparatlarning terapevtik samaradorligi, ta’sir davomiyligi, xavfsizlik profili va klinik amaliyotdagi ahamiyatiga alohida e’tibor qaratildi. Shuningdek, antidepressantlarning yangi avlod vakillari va klassik preparatlarining afzallik hamda kamchiliklari ilmiy manbalar asosida tahlil qilindi.

Mazkur metodologik yondashuv psixostimulyatorlar va depressiyaga qarshi vositalarning zamonaviy farmakologiyadagi o‘rnini har tomonlama baholash hamda ularning klinik qo‘llanilish istiqbollarini aniqlash imkonini berdi.

Natijalar va tahlil

Adabiyotlar tahlili natijasida psixostimulyatorlar va depressiyaga qarshi vositalar markaziy nerv tizimi faoliyatiga turlicha ta’sir ko‘rsatishi aniqlandi. Psixostimulyatorlar asosan dopamin va noradrenalin mediatorlari miqdorini oshirish orqali nerv impulslarining uzatilishini kuchaytiradi, natijada diqqat, xotira va ish qobiliyati yaxshilanadi. Antidepressantlar esa serotonin, noradrenalin va dopamin almashinuviga ta’sir etib, depressiv simptomlarni kamaytiradi va bemorlarning ruhiy holatini yaxshilaydi.

Tahlillar shuni ko‘rsatdiki, zamonaviy antidepressantlar, ayniqsa selektiv serotonin qayta qamrab olinishi ingibitorlari (SSRI) trisiklik antidepressantlarga nisbatan xavfsizroq bo‘lib, nojo‘ya ta’sirlari kamroq uchraydi. Shu bilan birga, psixostimulyatorlar qisqa muddatli davolashda yuqori samaradorlik ko‘rsatsa-da, uzoq muddat qo‘llanganda tolerantlik va qaramlik rivojlanish xavfi mavjud.

Jadval 1

Psixostimulyatorlarning farmakologik tavsifi

Preparat	**Farmakologik guruhi**	**Ta’sir mexanizmi**	**Qo‘llanilishi**	**Asosiy nojo‘ya ta’sirlari**
Kofein	Metilksantin	Adenozin retseptorlarini bloklaydi	Charchoq, uyquchanlik	Taxikardiya, bezovtalik
Modafinil	Psixostimulyator	Dopamin transportini ingibitsiya qiladi	Narkolepsiya	Bosh og‘rig‘i, uyqusizlik

Metilfenidat	Markaziy nerv tizimi stimulyatori	Dopamin va noradrenalin qayta qamrab olinishini kamaytiradi	DEGS (ADHD)	Ishtaha pasayishi, taxikardiya
Amfetamin	Simpatomimetik psixostimulyator	Katexolaminlar ajralishini kuchaytiradi	ADHD, narkolepsiya	Qaramlik, arterial gipertenziya
Dekstroamfetamin	Psixostimulyator	Dopamin va noradrenalin chiqarilishini oshiradi	ADHD	Uyqusizlik, asabiylik

Jadval ma’lumotlari psixostimulyatorlarning asosiy ta’siri dopaminergik va noradrenergik tizimlarni faollashtirishga qaratilganligini ko‘rsatadi. Ular diqqatni oshirish va uyquchanlikni kamaytirishda samarali bo‘lsa-da, yurak-qon tomir tizimi va ruhiy holatga salbiy ta’sir ko‘rsatishi mumkin.

Jadval 2

Depressiyaga qarshi vositalarning farmakologik tavsifi

Preparat	Guruhi	Ta’sir mexanizmi	Qo‘llanilishi	Muhim nojo‘ya ta’sirlari
Fluoksetin	SSRI	Serotonin qayta qamrab olinishini ingibitsiya qiladi	Depressiya, OKB	Ko‘ngil aynishi, uyqusizlik
Sertralin	SSRI	Serotonin konsentratsiyasini oshiradi	Depressiya, xavotir buzilishlari	Bosh og‘rig‘i, diareya
Venlafaksin	SNRI	Serotonin va noradrenalin qayta qamrab olinishini ingibitsiya qiladi	Katta depressiv buzilish	Arterial bosim oshishi
Amitriptilin	Trisiklik antidepressant	Monoaminlar qayta qamrab olinishini bloklaydi	Depressiya, nevropatik og‘riq	Og‘iz qurishi, uyquchanlik

Moklobemid	MAO-A ingibitori	Monoaminoksidaza fermentini ingibitsiya qiladi	Atipik depressiya	Bosh aylanishi, uyqusizlik

O‘rganilgan ma’lumotlarga ko‘ra, antidepressantlarning terapevtik samarasi odatda 2–6 hafta davomida shakllanadi. Yangi avlod antidepressantlari, xususan SSRI va SNRI guruhlari yuqori samaradorlik va xavfsizlik profili tufayli birinchi tanlov preparatlari sifatida tavsiya etiladi.

Natijalar shuni ko‘rsatdiki, psixostimulyatorlar va antidepressantlar markaziy nerv tizimining turli mediator tizimlariga ta’sir qilgan holda nevrologik hamda psixiatrik kasalliklarni davolashda muhim ahamiyat kasb etadi. Preparat tanlashda bemorning klinik holati, yoshi, hamroh kasalliklari va nojo‘ya ta’sirlar xavfi hisobga olinishi zarur.

Muhokama

O‘tkazilgan adabiyotlar tahlili va olingan natijalar psixostimulyatorlar hamda depressiyaga qarshi vositalarning zamonaviy farmakoterapiyada muhim o‘rin egallashini ko‘rsatdi. Markaziy nerv tizimi faoliyatini boshqarishda dopamin, serotonin va noradrenalin kabi neyromediatorlarning roli katta bo‘lib, ushbu mediatorlar almashinuviga ta’sir qiluvchi preparatlar ko‘plab psixiatrik va nevrologik kasalliklarni davolashda keng qo‘llaniladi.

Tadqiqot natijalari psixostimulyatorlarning asosan dopaminergik va noradrenergik tizimlarni faollashtirish orqali ta’sir ko‘rsatishini tasdiqladi. Bu esa ularning diqqat yetishmovchiligi va giperaktivlik sindromi, narkolepsiya hamda ayrim kognitiv buzilishlarda samaradorligini ta’minlaydi. Biroq amfetamin va uning hosilalari kabi preparatlar uzoq muddat qo‘llanganda tolerantlik, psixologik qaramlik va yurak-qon tomir tizimi bilan bog‘liq nojo‘ya reaksiyalarni yuzaga keltirishi mumkin. Shu sababli ularni qo‘llashda qat’iy tibbiy nazorat talab etiladi.

Antidepressantlar bo‘yicha olingan natijalar zamonaviy klinik amaliyotda selektiv serotonin qayta qamrab olinishi ingibitorlari va serotonin–noradrenalin qayta qamrab olinishi ingibitorlari birinchi qator preparatlari sifatida qo‘llanilayotganligini ko‘rsatdi. Ularning terapevtik samaradorligi yuqori bo‘lishi bilan birga, trisiklik antidepressantlar va monoaminoksidaza ingibitorlariga nisbatan xavfsizlik profili ham yaxshiroqdir. Ayniqsa, fluoksetin va sertralin kabi preparatlar depressiv buzilishlar, xavotir sindromlari va obsesiv-kompulsiv buzilishlarni davolashda keng qo‘llanilmoqda.

Adabiyotlarda keltirilgan ma’lumotlarga ko‘ra, depressiya patogenezini faqat monoaminlar yetishmovchiligi bilan izohlash yetarli emas. Zamonaviy ilmiy qarashlar neyroplastiklikning buzilishi, neyrotrofik omillarning kamayishi, surunkali

yallig‘lanish jarayonlari va gipotalamo-gipofizar-buyrak usti bezi tizimidagi o‘zgarishlar ham muhim ahamiyatga ega ekanligini ko‘rsatmoqda. Shu sababli yangi avlod antidepressantlarini yaratish bo‘yicha tadqiqotlar davom etmoqda.

Shuningdek, psixostimulyatorlar va antidepressantlarning farmakokinetik xususiyatlari, bemorning yoshi, jinsiy xususiyatlari, hamroh kasalliklari va qabul qilayotgan boshqa preparatlari davolash samaradorligiga sezilarli ta’sir ko‘rsatadi. Individual farmakoterapiya tamoyillariga rioya qilish nojo‘ya ta’sirlarni kamaytirish va davolash natijalarini yaxshilash imkonini beradi.

Umuman olganda, psixostimulyatorlar va antidepressantlar ruhiy hamda nevrologik kasalliklarni davolashda yuqori klinik ahamiyatga ega bo‘lib, ularning oqilona qo‘llanilishi bemorlarning hayot sifatini yaxshilash va kasallik oqibatlarini kamaytirishda muhim omil hisoblanadi. Kelgusida ushbu preparatlarning molekulyar ta’sir mexanizmlarini chuqurroq o‘rganish va yangi, xavfsizroq dori vositalarini ishlab chiqish farmakologiyaning ustuvor yo‘nalishlaridan biri bo‘lib qoladi.

Xulosa

Psixostimulyatorlar va depressiyaga qarshi vositalar markaziy nerv tizimiga ta’sir etuvchi muhim farmakologik preparatlar guruhini tashkil etadi. O‘tkazilgan ilmiy adabiyotlar tahlili shuni ko‘rsatdiki, psixostimulyatorlar dopamin va noradrenalin tizimlarini faollashtirish orqali kognitiv faoliyatni, diqqatni va ish qobiliyatini yaxshilaydi. Ular diqqat yetishmovchiligi va giperaktivlik sindromi, narkolepsiya hamda ayrim nevrologik holatlarni davolashda samarali hisoblanadi.

Depressiyaga qarshi vositalar esa serotonin, noradrenalin va dopamin almashinuviga ta’sir ko‘rsatib, depressiv buzilishlarning klinik belgilarini kamaytiradi va bemorlarning psixoemotsional holatini yaxshilaydi. Zamonaviy antidepressantlar, xususan selektiv serotonin qayta qamrab olinishi ingibitorlari va serotonin–noradrenalin qayta qamrab olinishi ingibitorlari yuqori samaradorligi hamda nisbatan xavfsizligi bilan ajralib turadi.

Tadqiqot natijalari preparat tanlashda bemorning individual xususiyatlari, kasallikning kechishi, hamroh patologiyalar va nojo‘ya ta’sirlar xavfini hisobga olish muhim ekanligini ko‘rsatdi. Psixostimulyatorlar va antidepressantlardan oqilona foydalanish davolash samaradorligini oshiradi, asoratlar xavfini kamaytiradi hamda bemorlarning hayot sifatini yaxshilaydi.

Shunday qilib, psixostimulyatorlar va depressiyaga qarshi vositalar zamonaviy farmakoterapiyaning muhim tarkibiy qismi bo‘lib, ularning farmakologik xususiyatlarini chuqur o‘rganish va klinik amaliyotda ilmiy asoslangan holda qo‘llash tibbiyotning dolzarb vazifalaridan biri hisoblanadi.

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O‘PKA GANGRENASI: ETIOLOGIYASI, KLINIK KECHISHI, DIAGNOSTIKASI VA DAVOLASH YONDASHUVLARI

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Annotatsiya. O‘pka gangrenasi o‘pka parenximasining chegaralanmagan yiringli-nekrotik yemirilishi bilan kechuvchi, hayot uchun xavfli destruktiv pulmonologik kasallikdir. U ko‘pincha og‘ir pnevmoniya, aspiratsiya, anaerob mikroflora, bronxial drenaj buzilishi, immunitet pasayishi, sepsis yoki o‘pka qon aylanishining keskin izdan chiqishi fonida rivojlanadi. Natijalar shuni ko‘rsatadiki, o‘pka gangrenasida erta tashxis, kontrastli kompyuter tomografiya, mikrobiologik baholash, keng qamrovli antibakterial terapiya, nafas yetishmovchiligini korreksiya qilish va zarur hollarda jarrohlik aralashuvi hal qiluvchi ahamiyatga ega. Maqola o‘quv va ilmiy maqsadlar uchun tayyorlangan bo‘lib, individual tibbiy maslahat yoki mustaqil davolanish yo‘riqnomasi o‘rnini bosa olmaydi.

Kalit so‘zlar: o‘pka gangrenasi; destruktiv pnevmoniya; nekrotik pnevmoniya; anaerob infeksiya; sepsis; kompyuter tomografiya; bronxial drenaj; torakal jarrohlik; antibiotik terapiya.

Kirish

O‘pka gangrenasi o‘pka to‘qimasining keng, chegaralanmagan va progressiv yiringli-nekrotik parchalanishi bilan tavsiflanadigan og‘ir patologik holatdir. Oddiy o‘pka absessida yiringli jarayon ko‘proq chegaralangan bo‘shliq hosil qilishga moyil bo‘lsa, gangrenada nekroz o‘pka bo‘laklari yoki bir necha segmentlar bo‘ylab tarqaladi, sog‘lom va zararlangan to‘qima o‘rtasidagi demarkatsiya chizig‘i kech shakllanadi yoki yetarlicha aniq bo‘lmaydi. Shu sababli bu kasallik klinik jihatdan og‘ir intoksikatsiya, yuqori isitma, badbo‘y va ko‘p miqdordagi balg‘am, nafas yetishmovchiligi, gemodinamik beqarorlik, plevral asoratlar va sepsis xavfi bilan kechadi. Mavzuning dolzarbligi shundaki, o‘pka gangrenasi kam uchraydigan kasallik bo‘lsa-da, vaqtida tanib olinmasa o‘lim xavfi yuqori bo‘lgan holatlar qatoriga kiradi. Kasallik bir necha tibbiy sohaning kesishgan nuqtasida joylashadi: pulmonologiya uning klinik va nafas funksional jihatlarini o‘rganadi, mikrobiologiya qo‘zg‘atuvchilar

tarkibini baholaydi, radiologiya destruksiya hajmini aniqlaydi, intensiv terapiya hayotiy ko‘rsatkichlarni barqarorlashtiradi, torakal jarrohlik esa konservativ davolash yetarli bo‘lmagan bemorlarda o‘pka to‘qimasini saqlab qolish yoki infeksiya manbasini bartaraf etish masalasini hal qiladi.

O‘pka gangrenasi odatda bir omil bilan tushuntirilmaydi. Aspiratsiya, og‘iz bo‘shlig‘i infeksiyalari, alkogolizm, ong buzilishi, qandli diabet, immunosupressiya, bronxoektazlar, o‘sma tufayli bronx obstruksiyasi, og‘ir grippdan keyingi bakterial infeksiya, stafilokokk yoki klebsiella bilan bog‘liq destruktiv pnevmoniya kasallik shakllanishiga zamin yaratishi mumkin. Eng xavfli mexanizm anaerob va aerob mikroorganizmlarning aralash ta’siri, bronxial drenajning buzilishi va o‘pka mikrosirkulyatsiyasining trombotik shikastlanishi bilan bog‘liqdir.

Materiallar va metodlar

Maqola tavsifiy va analitik metod asosida tayyorlandi. Tahlil uchun pulmonologiya, ichki kasalliklar, torakal jarrohlik, radiologiya, klinik mikrobiologiya va intensiv terapiya bo‘yicha darsliklar, o‘quv qo‘llanmalar, klinik sharhlar hamda xalqaro tibbiy axborot manbalari umumlashtirildi. Ishda shaxsiy bemor ma’lumotlari, klinik sinov natijalari yoki maxfiy tibbiy hujjatlar ishlatilmadi. Shuning uchun alohida etik komissiya ruxsati talab qilinmaydi.

Analiz uch yo‘nalishda olib borildi. Birinchi yo‘nalishda etiologik omillar aspiratsion, infeksion, obstruktiv, immunologik, gemodinamik va iatrogen guruhlarga ajratildi. Ikkinchi yo‘nalishda o‘pka gangrenasining klinik namoyon bo‘lishi simptomlar, laborator o‘zgarishlar, radiologik belgilar va asoratlar asosida baholandi. Uchinchi yo‘nalishda davolash yondashuvlari konservativ, intensiv, intervension va jarrohlik bosqichlariga bo‘linib, har birining amaliy maqsadi izohlandi.

Maqolada qat’iy individual davo sxemalari, dori dozalari va mustaqil davolanish bo‘yicha ko‘rsatmalar berilmadi. Buning sababi o‘pka gangrenasi shoshilinch klinik baholash, statsionar kuzatuv, laborator nazorat va mutaxassislar jamoasi qarorini talab qiladigan kasallik hisoblanadi. Shuning uchun matn o‘quv, ilmiy va klinik tafakkurni shakllantirishga qaratilgan.

1-jadval. O‘pka gangrenasining asosiy etiologik omillari va patogenetik ahamiyati

Omil	Patogenetik roli	Amaliy ahamiyati
Aspiratsiya	Og‘iz-halqum florasi, anaerob mikroorganizmlar va yot suyuqliklarning bronx-o‘pka	Ong buzilishi, yutish refleksi pasayishi va stomatologik infeksiyalar bo‘lgan bemorlarda xavf yuqori.

	tizimiga tushishi nekrozga zamin yaratadi.	
Og‘ir bakterial pnevmoniya	Staphylococcus aureus, Klebsiella pneumoniae, Streptococcus pneumoniae va aralash flora o‘pka to‘qimasini yemiruvchi yallig‘lanishni kuchaytiradi.	Pnevmoniya uzoq davom etsa yoki bemor ahvoli tez yomonlashsa destruktiv jarayonni izlash kerak.
Bronx obstruksiyasi	O‘sma, yot jism, bronxial torayish yoki sekretsiya tutilishi drenajni buzadi va infeksiya o‘chog‘ini chuqurlashtiradi.	Bronxoskopik baholash sababni aniqlash va drenajni yaxshilash uchun muhim.
Immunitet pasayishi	Qandli diabet, immunosupressiya, keksalik yoki surunkali kasalliklar infeksiyani chegaralash imkoniyatini susaytiradi.	Bunday bemorlarda sepsis va plevral asoratlar tezroq rivojlanishi mumkin.
Mikrosirkulyatsiya buzilishi	Trombovaskulyar shikastlanish o‘pka parenximasining qon bilan ta’minlanishini kamaytiradi va nekrozni kengaytiradi.	Kontrastli KT orqali perfuziya va nekroz hududlarini baholash klinik qarorga ta’sir qiladi.

Natijalar

Tahlil natijalari o‘pka gangrenasining patogenezida uch asosiy jarayon birgalikda harakat qilishini ko‘rsatadi: mikrob invaziyasi, bronxial drenaj yetishmovchiligi va to‘qima perfuziyasining izdan chiqishi. Infeksiya faqat yiring hosil qilmaydi, balki fermentativ parchalanish, gaz hosil bo‘lishi, qon tomir devori shikastlanishi va nekrotik massalar shakllanishiga olib keladi. Shu sababli gangrena absessga qaraganda kengroq, chuqurroq va klinik jihatdan agressivroq kechadi.

Klinik belgilar ko‘pincha keskin boshlanadi yoki og‘ir pnevmoniya fonida asta-sekin kuchayadi. Bemor yuqori isitma, holsizlik, ko‘p terlash, titroq, ko‘krak qafasida og‘riq, nafas qisishi, taxikardiya va intoksikatsiyadan shikoyat qiladi. Eng xarakterli belgilaridan biri ko‘p miqdorda, yoqimsiz hidli, ba’zan qatlamlanadigan balg‘am

ajralishidir. Balg‘amning badbo‘y hidi anaerob florani, rangining qoramtir yoki iflos tus olishi esa nekrotik parchalanishni taxmin qilishga yordam beradi.

Laborator tekshiruvlarda leykotsitoz, neytrofillar ustunligi, C-reaktiv oqsil va prokalsitonin oshishi, anemiya, gipoproteinemiya, elektrolit buzilishlari va koagulyatsion siljishlar aniqlanishi mumkin. Ammo laborator o‘zgarishlar kasallikni yakka o‘zi tasdiqlamaydi; ular klinik va radiologik belgilarga qo‘shib talqin qilinadi. Mikrobiologik tekshiruv balg‘am, qon madaniyati, bronxoalveolyar lavaj yoki plevral suyuqlik orqali qo‘zg‘atuvchini aniqlashga yordam beradi.

Instrumental diagnostikada ko‘krak qafasi rentgenografiyasi dastlabki yo‘nalishni beradi, lekin gangrenaning haqiqiy hajmini baholash uchun yetarli bo‘lmasligi mumkin. Kompyuter tomografiya o‘pka to‘qimasidagi keng nekroz, ko‘p bo‘shliqli destruksiya, suyuqlik-gaz darajalari, plevral suyuqlik, empiema, bronxial obstruksiya va qon tomir perfuziyasi buzilishlarini aniqroq ko‘rsatadi. Kontrastli KT ayniqsa o‘pka parenximasining hayotiyligini baholashda muhim.

2-jadval. O‘pka gangrenasining klinik va diagnostik ko‘rsatkichlari

Ko‘rsatkich	Tipik namoyon bo‘lishi	Klinik talqin
Umumiy holat	Keskin holsizlik, titroq, yuqori isitma, terlash, ishtaha yo‘qolishi.	Og‘ir intoksikatsiya va tizimli yallig‘lanish javobini ko‘rsatadi.
Nafas belgilari	Nafas qisishi, yo‘tal, ko‘krak og‘rig‘i, ko‘p balg‘am ajralishi.	Bronxial drenaj va o‘pka ventilyatsiyasi jiddiy buzilgan bo‘lishi mumkin.
Balg‘am xususiyati	Badbo‘y hidli, ko‘p miqdorli, ba’zan qatlamli va qoramtir tusli.	Anaerob infeksiya va nekrotik parchalanish ehtimolini oshiradi.
Rentgen belgisi	Infiltratsiya, kavernoz o‘zgarish, suyuqlik-gaz darajasi yoki plevral reaksiya.	Dastlabki skriningda foydali, lekin jarayon chegarasini to‘liq ko‘rsatmasligi mumkin.
KT belgisi	Keng nekroz, ko‘p o‘choqli destruksiya, plevral asorat, perfuziya pasayishi.	Davolash taktikasini tanlashda eng informativ bosqichlardan biridir.

Differensial diagnostikada o‘pka absessi, kavernoz sil, bronxogen o‘pka raki, zamburug‘li infektsiyalar, bronxoektatik kasallikning yiringli xuruji, plevra empiemasi va o‘pka infarkti hisobga olinadi. Bu holatlarni ajratish faqat simptomlar asosida

ishonchli emas. Klinik tarix, balg‘am tekshiruvi, rentgen, KT, bronxoskopiya va zarur hollarda gistologik yoki sitologik tekshiruv birgalikda baholanadi.

Asoratlar tahlili o‘pka gangrenasida plevra empiemasi, piopnevmotoraks, massiv qon ketish, sepsis, septik shok, ko‘p a’zoli yetishmovchilik, bronxoplevral fistula va uzoq muddatli nafas funksiyasi pasayishi katta xavf tug‘dirishini ko‘rsatadi. Shu bois bemorni faqat yo‘tal va balg‘am belgilariga qarab kuzatish yetarli emas; hayotiy ko‘rsatkichlar, kislorodlanish, gemodinamika va laborator markerlar dinamik nazorat qilinishi kerak.

3-jadval. Diagnostika bosqichlari va ularning vazifasi

Bosqich	Tekshiruv mazmuni	Kutiladigan natija
Klinik baholash	Shikoyatlar, kasallik tarixi, xavf omillari, auskultatsiya, nafas soni, arterial bosim va saturatsiya baholanadi.	Bemor og‘irlik darajasi va shoshilinch yordam ehtiyoji aniqlanadi.
Laborator tahlil	Umumiy qon tahlili, biokimyo, yallig‘lanish markerlari, gaz almashinuvi, koagulyatsiya ko‘rsatkichlari tekshiriladi.	Intoksikatsiya, sepsis xavfi va organ yetishmovchiligi baholanadi.
Mikrobiologiya	Balg‘am, qon madaniyati, bronxoalveolyar material yoki plevral suyuqlik ekiladi.	Antimikrob davoni aniqroq yo‘naltirish imkoniyati paydo bo‘ladi.
Radiologiya	Rentgen va KT, zarur hollarda kontrastli KT bajariladi.	Destruksiya hajmi, nekroz, plevral asorat va jarrohlik ehtiyoji baholanadi.
Bronxoskopiya	Bronx ichidagi obstruksiya, yiringli sekret, qon ketish manbasi yoki yot jism tekshiriladi.	Drenajni yaxshilash va etiologik sababni aniqlashga yordam beradi.

Muhokama

O‘pka gangrenasini baholashdagi eng katta xato uni oddiy pnevmoniya yoki faqat o‘pka absessi sifatida kech tanib olishdir. Agar bemorda pnevmoniyaga qarshi davolash fonida isitma pasaymasa, intoksikatsiya kuchaysa, balg‘am badbo‘y va ko‘p miqdorda bo‘lsa, gemodinamik beqarorlik yoki plevral belgilar paydo bo‘lsa, destruktiv o‘pka

infeksiyasini faol izlash kerak. Kechikkan tashxis infeksiya manbasining kengayishiga va jarrohlik imkoniyatlarining xavfliroq bo‘lishiga olib keladi.

Davolashning asosiy tamoyili bemorni kompleks yondashuvda boshqarishdir. Antibakterial terapiya keng qamrovli bo‘lishi, anaeroblar va ehtimoliy aerob bakteriyalarni qamrab olishi, keyinchalik mikrobiologik natijalarga ko‘ra aniqlashtirilishi kerak. Ammo antibiotikning o‘zi har doim yetarli bo‘lmaydi. Bronxial drenaj buzilgan, nekrotik to‘qima katta hajmda saqlangan yoki plevral empiema qo‘shilgan holatlarda infeksiya manbasi saqlanib qoladi va konservativ davolash samarasiz bo‘lishi mumkin.

Nafas yetishmovchiligini tuzatish davolashning ajralmas qismidir. Kislorod terapiyasi, bronxial sekretni nazorat qilish, suyuqlik balansini boshqarish, oziqlanishni qo‘llab-quvvatlash, og‘riqni kamaytirish va tromboembolik xavflarni baholash bemorning umumiy tiklanish imkoniyatini oshiradi. Og‘ir bemorlarda intensiv terapiya bo‘limi sharoitida doimiy monitoring talab qilinadi.

Intervension usullar plevral suyuqlik, empiema yoki drenajlanishi mumkin bo‘lgan yiringli bo‘shliqlar mavjud bo‘lganda muhokama qilinadi. Perkutan drenaj, bronxoskopik drenaj yoki plevral drenajning maqsadi yiringli kontentni chiqarish, nafas mexanikasini yengillashtirish va mikrobiologik material olishdan iborat. Biroq gangrenada nekrotik to‘qima diffuz bo‘lgani uchun drenaj har doim ham yetarli natija bermaydi.

Jarrohlik taktikasi ehtiyotkorlik bilan tanlanadi. Lobektomiya, segmentar rezeksiya, nekrektomiya yoki juda og‘ir holatlarda kengroq rezeksiya bemor hayotini saqlash uchun zarur bo‘lishi mumkin. Shu bilan birga, jarrohlik yuqori xavfli bo‘lib, sepsis, nafas yetishmovchiligi, qon ketish va ko‘p a’zoli buzilishlar fonida qaror qabul qilishni murakkablashtiradi. Shuning uchun jarrohlik indikatsiyasi pulmonolog, torakal jarroh, reanimatolog va radiolog ishtirokida belgilanadi.

Profilaktika masalasi ham kuchli ahamiyatga ega. Og‘iz bo‘shlig‘i gigiyenasini yaxshilash, aspiratsiya xavfini kamaytirish, surunkali bronx-o‘pka kasalliklarini nazorat qilish, qandli diabetni kompensatsiya qilish, pnevmoniyani vaqtida davolash, o‘zicha antibiotik qabul qilmaslik va og‘ir infektsion simptomlarda shifokorga erta murojaat qilish kasallik xavfini kamaytiradi. Ayniqsa stomatologiya yo‘nalishi talabalari uchun og‘iz bo‘shlig‘i mikroflorasi va aspiratsion o‘pka infeksiyalari o‘rtasidagi aloqani tushunish muhimdir.

4-jadval. Davolash va profilaktika yo‘nalishlari

Yo‘nalish	Asosiy maqsad	Muhim ehtiyot chorasi

Antibakterial terapiya	Anaerob va aerob qo‘zg‘atuvchilarni qamrab olish, keyin mikrobiologik natijaga ko‘ra toraytirish.	Doza va kombinatsiya faqat shifokor tomonidan klinik holatga qarab belgilanadi.
Intensiv qo‘llab-quvvatlash	Kislorodlanish, gemodinamika, suyuqlik balansi, oziqlanish va organ funksiyalarini nazorat qilish.	Og‘ir bemorlarni uy sharoitida kuzatish xavfli; statsionar nazorat zarur.
Bronxial va plevral drenaj	Sekret, yiring yoki plevral suyuqlikni chiqarish, laborator material olish.	Jarayon joylashuvi va xavfiga qarab radiologik yoki bronxoskopik nazorat talab qilinadi.
Jarrohlik aralashuvi	Nekrotik manbani bartaraf etish, qon ketish yoki empiemani nazorat qilish.	Faqat aniq indikatsiya va multidisiplinar qarordan keyin bajariladi.
Profilaktika	Aspiratsiya xavfini kamaytirish, og‘iz gigiyenasi, pnevmoniyani erta davolash va surunkali kasalliklarni nazorat qilish.	Antibiotiklarni o‘zicha qabul qilish kech tashxis va rezistentlik xavfini oshiradi.

Xulosa

O‘pka gangrenasi o‘pka parenximasining keng nekrozi, yiringli parchalanishi va tizimli intoksikatsiya bilan kechuvchi og‘ir destruktiv kasallikdir. Uning rivojlanishida aspiratsiya, anaerob va aerob infeksiya, og‘ir bakterial pnevmoniya, bronxial drenaj buzilishi, immunitet pasayishi va mikrosirkulyatsion shikastlanishlar muhim o‘rin tutadi. Kasallikni oddiy pnevmoniya sifatida baholash yoki o‘pka absessidan farqlamaslik klinik kechikishga olib keladi.

Samarali yondashuv erta klinik shubha, laborator va mikrobiologik tekshiruv, kontrastli kompyuter tomografiya, nafas va gemodinamik qo‘llab-quvvatlash, oqilona antibakterial terapiya, drenaj imkoniyatlarini baholash va zarur hollarda torakal jarrohlik aralashuvini o‘z ichiga oladi. O‘pka gangrenasida davolash individual, bosqichli va jamoaviy tarzda olib borilishi kerak. Profilaktik jihatdan pnevmoniyalarni o‘z vaqtida davolash, aspiratsiya xavfini kamaytirish, og‘iz bo‘shlig‘i gigiyenasini yaxshilash va surunkali kasalliklarni nazorat qilish katta ahamiyatga ega.

Manfaatlar to‘qnashuvi: muallif manfaatlar to‘qnashuvi yo‘qligini bildiradi. Moliyalashtirish: maqola mustaqil o‘quv-ilmiy maqsadda tayyorlandi. Etik bayonot: maqolada shaxsiy bemor ma’lumotlari ishlatilmagan.

Qo‘shimcha klinik tahlil va amaliy ahamiyati

O‘pka gangrenasining klinik xavfi shundaki, kasallikning dastlabki kunlarida u og‘ir pnevmoniya belgilaridan keskin farqlanmasligi mumkin. Bemorning tana harorati, umumiy holati va yo‘tal xarakteri pnevmoniyada ham o‘zgaradi. Farq shundaki, gangrenada intoksikatsiya tez chuqurlashadi, balg‘amning hidi va miqdori keskin o‘zgaradi, nafas yetishmovchiligi tez kuchayadi va rentgenologik o‘zgarishlar oddiy infiltratsiyadan kavernoz-destruktiv ko‘rinishga o‘tadi. Demak, klinik qaror faqat bir martalik tekshiruvga emas, dinamik kuzatuvga tayangan bo‘lishi kerak.

Stomatologik va og‘iz bo‘shlig‘i infeksiyalari mavzu uchun alohida ahamiyatga ega. Periodontal yallig‘lanish, tish ildizi atrofidagi yiringli jarayonlar, gigiyena pastligi va og‘iz-halqum florasining ko‘payishi aspiratsiya sodir bo‘lganida o‘pka infeksiyasini og‘irlashtirishi mumkin. Bu holat stomatologiya yo‘nalishidagi talabalar uchun muhim xulosani beradi: og‘iz bo‘shlig‘i faqat mahalliy anatomik soha emas, balki butun nafas tizimi infeksion xavfsizligiga ta’sir qiladigan biologik muhitdir.

O‘pka gangrenasida radiologik diagnostika kechikmasligi kerak. Oddiy rentgen suratida infiltrat, bo‘shliq yoki suyuqlik-gaz darajasi aniqlanishi mumkin, lekin nekrozning tarqalganligi, plevra bo‘shlig‘i holati, ko‘p kamerali destruksiya va qon tomir perfuziyasi haqida yetarli ma’lumot bermaydi. Shu sababli KT tekshiruvi davolash strategiyasini o‘zgartiradigan asosiy bosqichlardan biri hisoblanadi. Ayniqsa jarrohlik yoki drenaj masalasi ko‘rilayotgan bemorda KT natijasi qaror qabul qilishning tayanch daliliga aylanadi.

Bemorni kuzatishda faqat tana haroratining pasayishi yetarli ijobiy mezon emas. Balg‘am miqdori va hidi, nafas soni, kislorod saturatsiyasi, arterial bosim, yurak urishi, laborator yallig‘lanish markerlari, buyrak va jigar ko‘rsatkichlari ham birgalikda baholanishi lozim. Ayrim holatlarda isitma kamaygan bo‘lsa ham nekrotik o‘choq saqlanib qoladi yoki plevral asorat rivojlanadi. Shuning uchun klinik yaxshilanish radiologik va laborator nazorat bilan tasdiqlanishi kerak.

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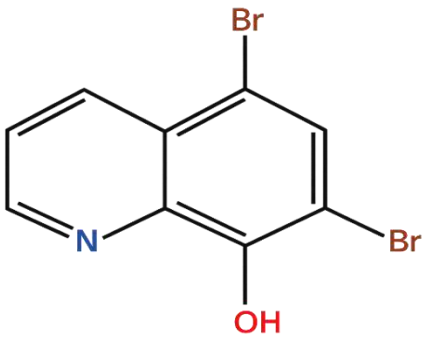
XONJIZZA SUVI TARRKIBIDAGI PB^{2+} IONINI 5,7-DIBROMO-8-GIDROKSIKINOLIN REAGENTI BILAN SPEKTROFOTOMETRIK ANIQLASHNING OPTIMAL SHAROITLARINI O‘RGANISH

Aliyarova O‘g‘iloy Abdurazzoq qizi
Egamshukurova Gulsevar Ermatovna

Tadqiqot davomida ishlatiladigan eritmalarni tayyorlash

a) 5,7-dibromo-8-gidroksikinolin reagenti eritmasini tayyorlash. Ushbu ilmiy ishda 0,1% li 5,7-dibromo-8-gidroksikinolin reagentining eritmasini tayyorlash uchun analitik tarozida 0.1000 gr aniqlikda tortib olib, 100 ml li o‘lchov kolbasiga miqdoran o‘tkazildi va belgisigacha etil spirtda eritib tayyorlandi. Natijada reagentning 0,1% li standart eritmasi tayyor bo‘ldi. Keyingi tajribalarda reagentning 0.1% li standart eritmasidan suyultirish usuli bilan 0,05% li ishchi eritmalari tayyorlanib tadqiqot davomida foydalanildi.

Bitiruv malakaviy ishida foydalanilgan 5,7-dibromo-8-gidroksikinolinning tuzilishi quyidagicha bo‘ladi:



b) Qo‘rg‘oshin(II) ionini standart eritmasini tayyorlash. Dastlab standart eritma sifatida qo‘rg‘oshin(II) nitrat eritmasi tayyorlab olindi. Buning uchun $Pb(NO_3)_2$ (k.t.) markali tuzidan foydalanildi. Tuzning hisoblangan miqdorini 1,598 gr analitik tarozida tortib olindi va miqdoran 1000 ml li o‘lchov kolbasiga solindi. Uni distillangan suvda eritib 1mg/ml (1000 mkg/ml)li eritmasi tayyorlandi. Ishchi eritmalar esa har bir ish oldidan 1mg/ml standart eritmasidan alikvot qism olib suyultirish usulidan foydalanib suyultirib tayyorlandi.

c) Bufer eritmalar tayyorlash. Turli tarkibli pH dagi bufer eritmalar tayyorlash uchun analitik kimyo ma’lumotnomasidan foydalanildi [1; 446-b].

2. Pb(II)ionining 5,7-dibromo-8-gidroksikinolin reagent bilan kompleks birikmasi uchun sifat reaksiyalarini o‘rganish

5,7-dibromo-8-gidroksikinolin reagentini sezgirligini aniqlash maqsadida turli metall ionlari bilan sifat reaksiyalari o‘rganildi. Buning uchun dastlab metallarning 5,7-dibromo-8-gidroksikinolin reagenti bilan sifat reaksiyalarni o‘rganish uchun, 5,7-dibromo-8-gidroksikinolin reagentining 0,05% li va metallarning 200 mkg/ml li standart eritmasidan tayyorlab olindi. Kompleks birikma hosil qilish uchun 25,0 ml li kolbalarga pH i turli xil bo‘lgan universal bufer eritmadan 5,0 ml dan, 0,05 % li 5,7-dibromo-8-gidroksikinolin reagenti va titri 50 mkg/ml bo‘lgan metall ionalarini ishchi eritmasidan 1,0 ml dan olindi. Hosil bo‘lgan kompleks birikmalarni rang o‘zgarishi solishtirma eritmaga (metall ionlari bo‘lmagan eritma) nisbatan kuzatildi. Olingan natijalar 1-jadvalda keltirildi [2; 352-353-b].

1-jadval

Ayrim metallarning 5,7-dibromo-8-gidroksikinolin reagent bilan sifat reaksiyalari

№	Metall ionlari	Hosil bo‘lgan kompleks birikma rangi
1	Ni^{2+}	yashil
2	Cu^{2+}	yashil-jigarrang
3	Co^{2+}	qizg‘ish-jigarrang
4	Cd^{2+}	och sariq
5	Pb^{2+}	Yashil sariq

Jadvalda keltirilgan natijalaridan ko‘rinib turibdiki, 5,7-dibromo-8-gidroksikinolin reagenti Ni^{2+}, Cu^{2+}, Cd^{2+}, Co^{2+} va Pb^{2+} ionlari bilan kontrastligi yuqori bo‘lgan turli xil rangli kompleks birikmalar hosil qilishi aniqlandi.

4-§. Pb(II) ning 5,7-dibromo-8-gidroksikinolin reagenti bilan kompleks birikmasining to‘lqin uzunligini tanlash

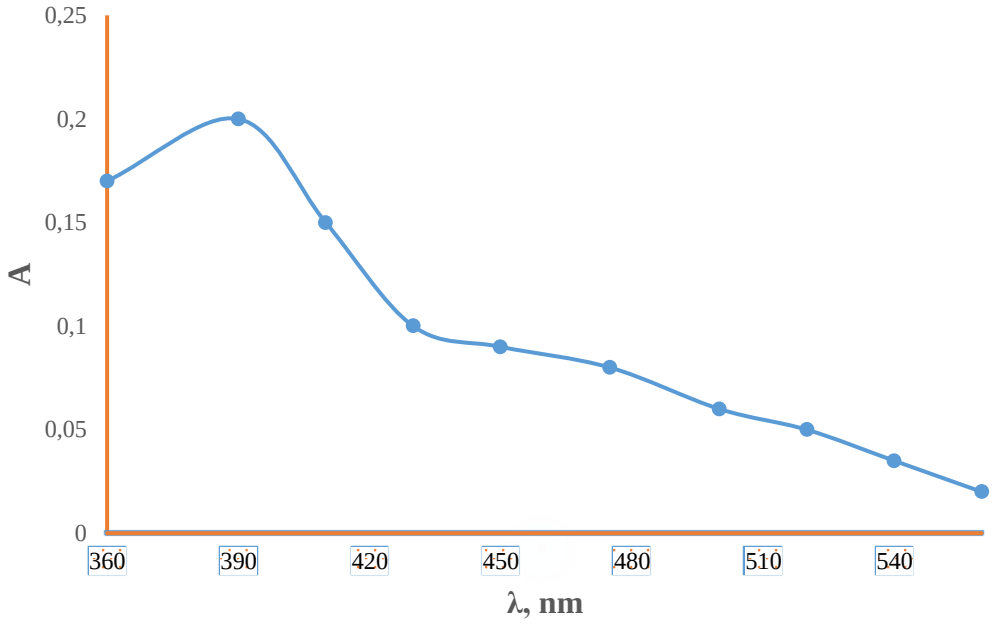
Ma'lumki har bir modda, tabiatiga ko'ra ma'lum to'lqin uzunligidagi nurni yutadi. Shuni e'tiborga olgan holda Pb(II) ionini 5,7-dibromo-8-gidroksikinolin bilan kompleksining eng yuqori nur yutish sohasi quyidagicha aniqlanadi.

Aniqlash uslubi: 25 ml li o'lchov kolbasiga bufer eritmasidan 5,0 ml, 0,05% li 5,7-dibromo-8-gidroksikinolin eritmasidan 1,0 ml solib, 30 mkg/ml li Pb(II) tuzi eritmasidan 1,0 ml va kolbaning belgisigacha distillangan suv solinadi. Hosil bo'lgan kompleks birikmaning optik zichligi spektrofotometr EMCLAB da nur yutish qalinligi ℓ=1,0 sm da har bir to'lqin uzunligida o'lchandi. Solishtirma eritma sifatida erkin eritma (Pb(II) ionidan tashqari hamma komponentlar mavjud eritma) dan foydalanildi. O'lchash natijalari 2-jadvalda va 1-rasmda keltirildi.

2-jadval

Optik zichligining to'lqin uzunligiga bog'liqligi (n=5)

λ, nm	360	390	410	430	450	475	500	520	540	560
A	0,17	0,2	0,15	0,1	0,090	0, 082	0,060	0,0500	0,0480	0,0170



1-rasm. Kompleks birikma optik zichligining to'lqin uzunligiga bog'liqligi

Pb(II) ning 5,7-dibromo-8-gidroksikinolin reagenti bilan komleks birikmasi λ_{max}=390 nm da yuqoridagi optik zichligini namayon qildi, keyingi ishlar λ_{max}=390 nm da olib borildi.

5-§. Pb(II) ning 5,7-dibromo-8-gidroksikinolin reagenti bilan komleks birikmasi optik zichligi qiymatining eritma muhiti (pH)ga bog‘liqligi

Reaksiyani amalga oshirishning muhim shartlaridan biri, uning muhiti ekanligini hisobga olib Pb(II) ionining 5,7-dibromo-8-gidroksikinolin reagenti bilan bergan komleks birikmasi uchun optimal sharoit tanlashda pH ko‘rsatkichi har xil bo‘lgan universal bufer eitmalar tayyorlandi.

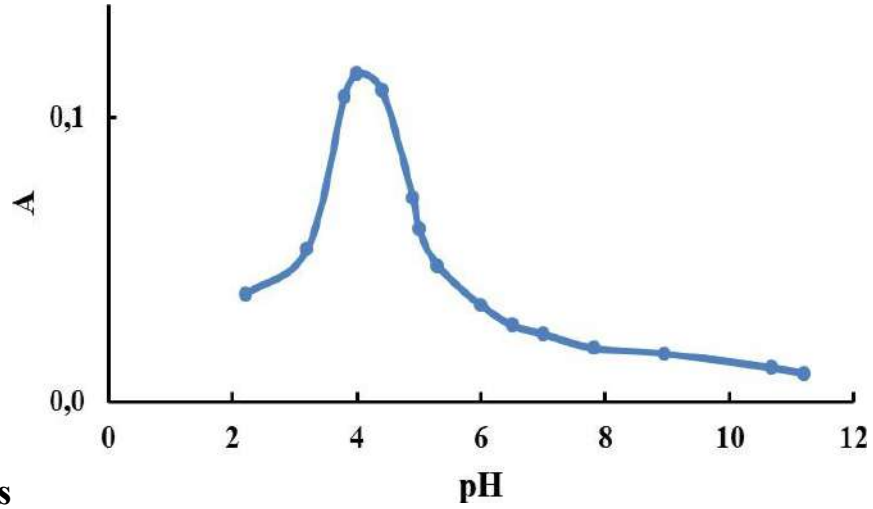
Aniqlash uslubi: Buning uchun 25 ml li o‘lchov kolbasiga pH ko‘rsatkichi 2,2 dan 11,2 gacha bo‘lgan universal bufer eritmasidan, 0,05% li 5,7-dibromo-8-gidroksikinolin reagenti eritmasidan 1,0 ml, 30 mkg/ml li Pb(II) eritmasidan 1,0 ml solib kolba belgisigacha distillangan suv qo‘shib suyultirildi Hosil bo‘lgan kompleks birikmaning optik zichligi spektrofotometr EMCLAB da nur yutish qalinligi ℓ=1,0 sm, to‘lqin uzunligi λmax=390 nm uzunligida o‘lchandi. Olingan natijalar 3-jadval va 2- rasmda keltirilgan.

3-jadval

Kompleks birikma optik zichligining eritma muhiti pH ga bog‘liqligi (n=5)

pH	2,2	3,2	3,8	4,0	4,4	4,9	5,0	5,3	6,0	6,5	7,0	7,8	8,9	10,6	11,2
A	0,0380	0,0540	0,1540	0,1600	0,1530	0,0720	0,0610	0,0480	0,0340	0,0270	0,0240	0,0190	0,0170	0,0120	0,0100

Yuqoridagi 4-jadval va 2-rasmdan ko‘rinib turibdiki, kompleks birikma eng yuqori optik zichligi pH=3,8-4,4 gacha bo‘lgan oralig‘ida kuzatildi va optimal muhit sifatida pH=4,0 tanlandi, chunki shu pH da optik zichlik maksimal analitik signalga ega bo‘ldi. Keyingi tadqiqot ishlarida pH=4,0 bo‘lgan universal bufer eritmadan ishlatildi.



2-rasm. Kompleks birikma optik zichligining eritma muhitiga bog‘liqligi grafigi.

6-§. Pb(II) ning 5,7-dibromo-8-gidroksikinolin reagenti bilan kompleks hosil bo‘lishining bufer eritma tarkibiga bog‘liqligi

Asosiy reaksiya komponentlariga bufer eritmalar tarkibi bog‘liqligini o‘rganish uchun pH=5,0 bo‘lgan universal, Na-sitratli va K-ftalatli bufer eritmalar tayyorlandi.

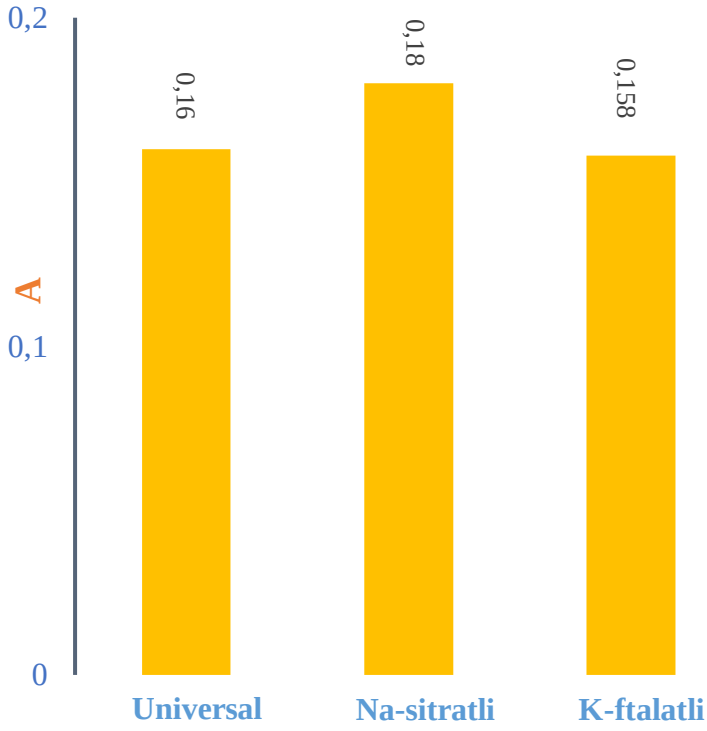
Aniqlash uslubi: 25 ml li o‘lchov kolbalariga pH=4,0 bo‘lgan har xil bufer eritmalardan 5,0 ml dan 0,05% li 5,7-dibromo-8-gidroksikinolin eritmasidan 1,0 ml, 30 mkg/ml Pb(II) ioni eritmasidan 1,0 ml solib, kolbaning belgisigacha distillangan

suv bilan suyultirildi. Hosil bo‘lgan kompleks birikmaning optik zichligi spektrofotometr EMCLAB da nur yutish qalinligi ℓ=1,0 sm, to‘lqin uzunligi λmax=390 nm uzunligida o‘lchandi. Optik zichliklari solishtirma eritmaga nisbatan o‘lchandi. Olingan natijalar 4-jadval va 3-rasmda keltirilgan.

4-jadval

Maqbul bufer eritma tanlash(n=5)

Bufer eritma nomi	**Bufer eritmaning tarkibi**	**pH**	**Āo‘rt**
Universal	H_3PO_4+CH_3COOH+H_3BO_3+NaOH	4,0	0,1600
Na-sitratli	HCl-$NaH_2C_6H_5O_7$	4,0	0,1800
K-ftalatli	HCl-$KHC_8H_4O_4$	4,0	0,1580



3-rasm. Maqbul bufer eritma tanlash

4-jadval va 3-rasmdagi natijalaridan ko‘rinib turibdiki, Na-sitratli eritmadan foydalanilganda kompleks birikma eritmasi maksimal optik zichlikka ega bo‘ldi. keyingi tadqiqot ishlarida pH=4,0 bo‘lgan Na-sitratli bufer eritmasidan foydalanildi.

7-§. Pb(II) ning 5,7-dibromo-8-gidroksikinolin reagenti bilan bergan kompleksining vaqtga nisbatan barqarorligi

Kompleksning barqarorligini aniqlash va qayta takrorlanuvchan natijalar olish uchun kompleks birikma eritma optik zichligini vaqtga nisbatan barqarorligi o‘rganildi.

Aniqlash uslubi: 25 ml li o‘lchov kolbasiga 0,05% li 5,7-dibromo-8-gidroksikinolin reagentidan 1,0 ml, 5,0 ml (pH=4,0) Na-sitratli bufer eritmadan solib, 30 mkg/ml Pb(II) ioni eritmasidan 1,0 ml va kolbani belgisigacha distillangan suv bilan to‘ldirildi. Hosil bo‘lgan kompleks birikma optik zichligi ma’lum vaqt oralig‘ida solishtirma eritmaga nisbatan spektrofotometr EMCLAB da nur yutish qalinligi ℓ=1,0 sm, to‘lqin uzunligi λ_{max}=390 nm uzunligida o‘lchandi. Olingan natijalar 5-jadvalda keltirildi.

5-jadval

Kompleks birikma optik zichligining vaqtga nisbatan barqarorligi(n=5)

Tmin	5	10	15	20	30	40	50	70	90	100	120	150	180	200	240	300	360
Ā	0,1800	0,1800	0,1800	0,1810	0,1800	0,1800	0,1790	0,1800	0,1800	0,1800	0,1810	0,1800	0,1800	0,1800	0,1800	0,1800	0,1810

Tajriba natijalari shuni ko‘rsatadiki, kompleks birikmaning optik zichligi qiymati 360 minutgacha deyarli o‘zgarmadi, so‘ngra juda sekin kamaya boshlaydi. Bu vaqt oralig‘ida analizda bajarish uchun yetarli ekanligini xulosa qilish mumkin.

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MAXSUS EHTIYOJLI O‘QUVCHILAR BILAN ISHLASHDA PSIXOLOGIK YONDASHUVLAR

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Boboyeva Liza Nurmatovna – Qashqadaryo viloyati, Nishon tumani 47-maktab psixologi

Annotatsiya

Mazkur maqolada maxsus ehtiyojli o‘quvchilar bilan ishlashda psixologik yondashuvlarning ahamiyati, samarali metodlar va ularni ta’lim jarayoniga tatbiq etish masalalari yoritilgan. Inklyuziv ta’lim sharoitida psixologning o‘rni, individual yondashuv va ijtimoiy moslashuv jarayonlarining muhim jihatlari tahlil etilgan.

Kalit so‘zlar: inklyuziv ta’lim, psixologik yondashuv, maxsus ehtiyoj, individual rivojlanish, moslashuv, ijtimoiy integratsiya.

Kirish

Bugungi kunda O‘zbekiston Respublikasida inklyuziv ta’lim tizimini rivojlantirish davlat siyosatining ustuvor yo‘nalishlaridan biri hisoblanadi. Maxsus ehtiyojli bolalarning sifatli ta’lim olishi, ularning ijtimoiy hayotga to‘laqonli qo‘shilishi jamiyatning barqaror taraqqiyoti uchun muhim ahamiyat kasb etadi. Shu nuqtayi nazardan, psixologning faoliyati ta’lim tizimida muhim o‘rin tutadi. Chunki aynan psixolog maxsus ehtiyojli o‘quvchilarning ruhiy holati, o‘zini anglash darajasi, ijtimoiy moslashuvi va o‘quv motivatsiyasini shakllantirishda asosiy vositachidir.

Asosiy qism

Maxsus ehtiyojli o‘quvchilar — bu turli jismoniy, sensor, aqliy yoki emotsional cheklovlarga ega bo‘lgan bolalardir. Ular bilan ishlashda oddiy pedagogik uslublar ko‘pincha yetarli bo‘lmaydi. Shu sababli psixologik yondashuv, individual dasturlar tuzish va differensial ta’lim metodlarini qo‘llash zarur bo‘ladi.

Psixologning asosiy vazifalari quyidagilardan iborat:
1. O‘quvchining psixologik portretini tuzish;
2. Rivojlanishidagi kuchli va zaif tomonlarni aniqlash;
3. Individual korreksion dasturlar ishlab chiqish;

4. Ota-onalar bilan muntazam psixologik maslahatlar o‘tkazish;
5. O‘qituvchilarni maxsus yondashuv metodlariga o‘rgatish.

Shuningdek, psixolog o‘quvchilar orasida empatiya va hamkorlik muhitini yaratishga yordam beradi. Bu jarayonda art-terapiya, musiqaterapiya, o‘yinli mashg‘ulotlar, guruhiy treninglar kabi metodlar samarali natija beradi. Masalan, rasm chizish yoki plastilindan ishlash orqali bola o‘z his-tuyg‘ularini ifoda etadi, bu esa ichki stressni kamaytiradi.

Inklyuziv muhitda ishlayotgan psixolog uchun hamkasblar, ota-onalar va pedagoglar bilan doimiy muloqot muhimdir. Chunki bolani to‘laqonli qo‘llab-quvvatlash faqat hamkorlik muhitida amalga oshadi. Shuningdek, psixolog o‘z faoliyatida zamonaviy diagnostik testlardan, psixometrik metodikalardan va axborot texnologiyalaridan samarali foydalanishi kerak.

Psixologik yondashuvning muhim tomoni — bu bolaning imkoniyatlariga e’tibor qaratish, uning ichki salohiyatini ochishdir. Har bir bola o‘ziga xos qobiliyatga ega, shuning uchun psixologning vazifasi – shu qobiliyatni rivojlantirish uchun sharoit yaratishdir.

Xulosa

Maxsus ehtiyojli o‘quvchilar bilan ishlashda psixologik yondashuv ta’limning insonparvarlik tamoyillariga asoslanadi. Bu yondashuv bolaning shaxsini hurmat qilish, uning his-tuyg‘ularini inobatga olish, ijobiy motivatsiyani shakllantirish va ijtimoiy integratsiyani qo‘llab-quvvatlashni nazarda tutadi. Shunday qilib, psixologning faoliyati nafaqat o‘quvchining o‘zini anglash jarayoniga, balki butun ta’lim jamoasining barqaror rivojlanishiga ham xizmat qiladi.

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STRATEGIK MENEJMENTNING KORXONALAR RAQOBATBARDOSHLIGINI OSHIRISHDAGI O‘RNI.

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Annotatsiya

Mamlakat iqtisodiyotining barqaror rivojlanishi korxonalar faoliyatining samaradorligiga bog‘liq. Korxonalarning samaradorligi esa ko‘p jihatdan menejment tizimining sifati va qo‘llanilayotgan strategik yondashuvlarga bog‘liq. Ushbu maqolada strategik menejmentning korxonalar raqobatbardoshligini oshirishdagi o‘rni tahlil qilinadi. Tadqiqot davomida strategik rejalashtirish, liderlik, resurslarni boshqarish va innovatsion faoliyatning biznes natijalariga ta’siri o‘rganildi. Natijalar strategik menejmentni samarali joriy etgan korxonalarning bozordagi mavqei mustahkamroq bo‘lishini ko‘rsatdi.

Kalit so‘zlar: strategik menejment, biznes, korxona, raqobatbardoshlik, liderlik, strategik rejalashtirish, innovatsiyalar.

Kirish

Bugungi globallashuv sharoitida biznes subyektlari oldida murakkab vazifalar turibdi. Raqobatning kuchayishi, iste’molchilar talabining o‘zgarishi, texnologik taraqqiyot va iqtisodiy beqarorlik korxonalarni yangi boshqaruv yondashuvlarini qo‘llashga undamoqda. Shu nuqtai nazardan strategik menejment korxonalar muvaffaqiyatining muhim omili sifatida qaralmoqda.

Strategik menejment tashkilotning uzoq muddatli maqsadlarini belgilash, ularga erishish strategiyalarini ishlab chiqish va amalga oshirish bilan bog‘liq boshqaruv jarayonidir. U korxona resurslaridan samarali foydalanish, bozor imkoniyatlarini aniqlash va tashqi muhitdagi o‘zgarishlarga moslashishga xizmat qiladi.

Menejment nazariyasida strategik boshqaruv korxona faoliyatini tizimli ravishda tashkil etishning eng samarali vositalaridan biri sifatida e’tirof etiladi. Ayniqsa, bozor

iqtisodiyoti sharoitida korxonalarning raqobatbardoshligi ko‘p jihatdan strategik qarorlarning to‘g‘ri qabul qilinishiga bog‘liq.

Mazkur maqolaning maqsadi strategik menejmentning biznes samaradorligi va korxonalar raqobatbardoshligiga ta’sirini o‘rganishdan iborat.

Adabiyotlar sharhi

Strategik menejment tushunchasi XX asrning ikkinchi yarmidan boshlab ilmiy adabiyotlarda keng qo‘llanila boshlandi. Alfred Chandler strategiyani korxonaning uzoq muddatli maqsadlarini belgilash va ularga erishish uchun zarur resurslarni taqsimlash sifatida izohlaydi.

Michael Porterning raqobat ustunligi nazariyasiga ko‘ra, korxona muvaffaqiyati uning raqobatchilardan ustunlik yaratish qobiliyatiga bog‘liq. Muallif xarajatlar bo‘yicha yetakchilik, differensiallash va fokuslash strategiyalarini korxonaning asosiy raqobat strategiyalari sifatida ko‘rsatadi.

Fred David strategik menejmentni strategiyani ishlab chiqish, amalga oshirish va baholash jarayonlari yig‘indisi sifatida talqin qiladi. Uning fikricha, strategik menejment tashkilotga tashqi muhitdagi o‘zgarishlarga tez moslashish imkonini beradi.

Zamonaviy tadqiqotlarda strategik menejmentning korxona rentabelligi, mehnat unumdorligi va innovatsion faollikka ijobiy ta’siri qayd etilgan.

Tadqiqot metodologiyasi

Tadqiqotda sifat usulidan foydalanildi. Ilmiy maqolalar, monografiyalar, darsliklar va statistik hisobotlar tahlil qilindi.

Tadqiqot quyidagi bosqichlarda amalga oshirildi:

1. Strategik menejment bo‘yicha nazariy manbalarni o‘rganish.
2. Korxonalarda strategik boshqaruv amaliyotini tahlil qilish.
3. Strategik menejment va biznes samaradorligi o‘rtasidagi bog‘liqlikni aniqlash.
4. Olingan natijalarni umumlashtirish.

Mazkur tadqiqotda tahlil, taqqoslash, sintez va umumlashtirish usullaridan foydalanildi.

Strategik rejalashtirishning biznes samaradorligiga ta’siri

Tahlillar shuni ko‘rsatadiki, strategik rejalashtirish korxonalarga bozor talablarini oldindan baholash va resurslardan samarali foydalanish imkonini beradi. Strategik reja mavjud bo‘lgan korxonalarda maqsadlarga erishish darajasi yuqori bo‘ladi.

Strategik rejalashtirish quyidagi afzalliklarni ta’minlaydi:

- Maqsadlarning aniq belgilanishi;
- Resurslarning oqilona taqsimlanishi;

- Xatarlarni kamaytirish;
- Qaror qabul qilish sifatining oshishi.

Liderlik va inson resurslarini boshqarish

Korxona muvaffaqiyatida liderlik muhim o‘rin tutadi. Kuchli liderlar xodimlarni umumiy maqsadlarga yo‘naltira oladi va tashkilot ichida sog‘lom korporativ madaniyatni shakllantiradi.

Tadqiqotlar ko‘rsatishicha, xodimlarni rag‘batlantirish va ularning malakasini oshirish biznes natijalariga bevosita ta’sir qiladi. Malakali kadrlar korxonaning innovatsion salohiyatini oshiradi.

Innovatsiyalar va raqobatbardoshlik

Zamonaviy biznesda innovatsiyalar raqobat ustunligini ta’minlovchi asosiy omillardan biridir. Innovatsion faoliyat mahsulot va xizmatlar sifatini oshirishga yordam beradi.

Korxonalar quyidagi yo‘nalishlarda innovatsiyalarni joriy etishi mumkin:

- Mahsulot innovatsiyasi;
- Jarayon innovatsiyasi;
- Marketing innovatsiyasi;
- Tashkiliy innovatsiyalar.

Innovatsiyalarni strategik boshqaruv tizimiga integratsiya qilgan korxonalar bozorda yuqori natijalarga erishadi.

Raqamli transformatsiyaning ahamiyati

Raqamli texnologiyalar biznes boshqaruvida yangi imkoniyatlar yaratmoqda. Sun’iy intellekt, katta ma’lumotlar (Big Data), bulutli texnologiyalar va avtomatlashtirish vositalari menejment samaradorligini oshirmoqda.

Korxonalarda raqamli texnologiyalardan foydalanish:

- Xarajatlarni kamaytiradi;
- Ishlab chiqarish samaradorligini oshiradi;
- Qaror qabul qilishni tezlashtiradi;
- Mijozlar bilan munosabatlarni yaxshilaydi.
-

Muhokama

Tadqiqot natijalari strategik menejmentning biznes samaradorligiga sezilarli ta’sir ko‘rsatishini tasdiqladi. Ayniqsa, strategik rejalashtirish va samarali liderlik korxona muvaffaqiyatining muhim omillari hisoblanadi.

O‘zbekiston iqtisodiyotida ham strategik menejmentning ahamiyati ortib bormoqda. Kichik biznes va xususiy tadbirkorlik subyektlari raqobatbardoshligini oshirish uchun zamonaviy boshqaruv texnologiyalarini joriy etishi zarur.

Raqamli iqtisodiyot sharoitida strategik menejment an'anaviy boshqaruv yondashuvlaridan farqli ravishda ma'lumotlarga asoslangan qarorlar qabul qilishni talab etadi. Shu sababli korxonalar menejerlarining strategik fikrlash ko'nikmalarini rivojlantirish muhim hisoblanadi.

Bundan tashqari, korxonalarda innovatsion muhit yaratish va xodimlarni yangi g'oyalarni ilgari surishga rag'batlantirish strategik maqsadlarga erishishda muhim ahamiyat kasb etadi.

Xulosa

Tadqiqot natijalari strategik menejment biznes samaradorligini oshirishning muhim vositasi ekanligini ko'rsatdi. Strategik rejalashtirish, samarali liderlik, innovatsiyalar va raqamli texnologiyalarni joriy etish korxonalarning raqobatbardoshligini oshiradi.

Korxonalar uzoq muddatli muvaffaqiyatga erishish uchun:

- strategik rejalashtirish tizimini takomillashtirishi;
- xodimlar salohiyatini rivojlantirishi;
- innovatsion faoliyatni qo'llab-quvvatlashi;
- raqamli texnologiyalarni keng joriy etishi zarur.

Mazkur chora-tadbirlar korxonalarning barqaror rivojlanishiga va milliy iqtisodiyotning raqobatbardoshligini oshirishga xizmat qiladi.

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KARBONAT ANGIDRIDNI YUTUVCHI NANOSTRUKTURALI AEROGOLLAR OLISH TEXNOLOGIYASI

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ANNOTATSIYA: Mazkur maqolada karbonat angidridni yutuvchi nanostrukturali aerogellarni olish texnologiyasi, ularning tuzilishi, fizik-kimyoviy xossalari hamda adsorbsion samaradorligi tahlil qilingan. Aerogellar sol-gel texnologiyasi asosida sintez qilinib, yuqori g‘ovaklilik, katta solishtirma sirt maydoni va rivojlangan nanostrukturaga ega materiallar sifatida o‘rganildi. Tadqiqot davomida aerogellarni modifikatsiyalash usullari, quritish texnologiyalari hamda CO_2 adsorbsiyasiga ta’sir etuvchi omillar ko‘rib chiqildi.

KALIT SO‘ZLAR: Karbonat angidrid, nanostrukturali aerogel, sorbent, sol-gel texnologiyasi, adsorbsiya, yuqori g‘ovaklilik, CO_2 yutilishi, amin modifikatsiyasi, ekologik texnologiyalar, nanomateriallar.

ABSTRACT: This article discusses the technology for producing nanostructured aerogels capable of carbon dioxide adsorption, as well as their structure, physicochemical properties, and adsorption efficiency. The aerogels were synthesized using sol-gel technology and investigated as materials with high porosity, large specific surface area, and developed nanostructure. The study examined aerogel modification methods, drying technologies, and factors affecting CO_2 adsorption. Aerogels modified with amino functional groups demonstrated high carbon dioxide adsorption efficiency. The obtained results indicate that these materials are promising sorbents for reducing atmospheric pollution, gas purification, and the development of environmentally safe technologies.

KEYWORDS: Carbon dioxide, nanostructured aerogel, sorbent, sol-gel technology, adsorption, high porosity, CO_2 capture, amino modification, environmental technologies, nanomaterials.

АННОТАЦИЯ: В данной статье рассмотрена технология получения наноструктурированных аэрогелей, поглощающих углекислый газ, а также их структура, физико-химические свойства и адсорбционная эффективность. Аэрогели синтезированы методом золь-гель технологии и исследованы как

материалы с высокой пористостью, большой удельной поверхностью и развитой наноструктурой. В ходе исследования изучены методы модификации аэрогелей, технологии сушки и факторы, влияющие на адсорбцию CO_2. Установлено, что аэрогели, модифицированные аминогруппами, эффективно поглощают углекислый газ.

КЛЮЧЕВЫЕ СЛОВА: Углекислый газ, наноструктурированный аэрогель, сорбент, золь-гель технология, адсорбция, высокая пористость, поглощение CO_2, аминная модификация, экологические технологии, наноматериалы.

ASOSIY QISM

Hozirgi kunda atmosfera tarkibida karbonat angidrid gazining ortib borishi global ekologik muammolarning asosiy sabablaridan biri hisoblanadi. Sanoat korxonalari, issiqlik elektr stansiyalari va transport vositalaridan ajralib chiqayotgan CO_2 miqdorining ko‘payishi issiqxona effekti kuchayishiga olib kelmoqda. Natijada global iqlim o‘zgarishi, haroratning oshishi va ekologik muvozanatning buzilishi kuzatilmoqda. Shu sababli karbonat angidridni samarali ushlab qoluvchi va adsorbsiyalovchi yangi materiallarni yaratish bo‘yicha ilmiy tadqiqotlar jadal rivojlanmoqda. Ana shunday istiqbolli materiallardan biri nanostrukturali aerogel sorbentlar hisoblanadi.

Nanostrukturali aerogellar yuqori g‘ovaklilikka ega bo‘lgan, juda kichik zichlikli va katta solishtirma sirt maydoniga ega materiallar sinfiga kiradi. Ularning ichki tuzilishi nanometr o‘lchamdagi g‘ovaklardan tashkil topgan bo‘lib, bu xususiyat gaz molekulalarining material ichiga oson kirib borishini ta’minlaydi. Aerogellar ko‘pincha kremniy dioksid, uglerod yoki polimer asosida sintez qilinadi. Ayniqsa kremniy dioksid asosidagi aerogellar yuqori termik barqarorligi, kimyoviy inertligi va adsorbsiya xossalari bilan alohida ahamiyat kasb etadi.

Karbonat angidridni yutuvchi nanostrukturali aerogellarni olishning eng samarali usullaridan biri sol-gel texnologiyasi hisoblanadi. Ushbu usulda dastlab kremniy alkoksidlari yoki natriy silikat asosidagi eritmalar tayyorlanadi. Keyinchalik gidroliz va kondensatsiya reaksiyalari natijasida kolloid sistema hosil bo‘ladi. Ushbu sistema asta-sekin uch o‘lchamli g‘ovakli gel strukturasiga aylanadi. Gel hosil bo‘lish jarayonida muhit pH qiymati, harorat va reagentlar konsentratsiyasi katta ahamiyatga ega. Chunki ushbu omillar g‘ovaklarning o‘lchami va materialning yakuniy xossalariga bevosita ta’sir ko‘rsatadi.

Aerogel sintezining asosiy bosqichlari sol tayyorlash, gel hosil qilish, qaritish, erituvchini almashtirish va quritishdan iborat. Qarish jarayonida gel strukturasi mustahkamlanadi va ichki bog‘lanishlar kuchayadi. Shundan so‘ng erituvchi modda kamroq sirt tarangligiga ega suyuqlik bilan almashtiriladi. Bu keyingi quritish bosqichida strukturaning yemirilishini kamaytiradi.

Aerogellarni olishdagi eng muhim bosqichlardan biri quritish hisoblanadi. Oddiy quritish usullarida kapillyar kuchlar ta’sirida g‘ovakli struktura buzilishi mumkin. Shu sababli superkritik quritish texnologiyasi keng qo‘llaniladi. Superkritik holatda suyuqlik va gaz fazalari orasidagi chegara yo‘qoladi, natijada sirt tarangligi hosil bo‘lmaydi va aerogelning nanostrukturasi saqlanib qoladi. Ayrim hollarda muzlatib quritish usuli ham qo‘llaniladi. Bu usul iqtisodiy jihatdan nisbatan arzon bo‘lsa-da, hosil bo‘lgan materialning g‘ovaklilik darajasi superkritik quritishda olingan aerogellarga nisbatan pastroq bo‘lishi mumkin.

Karbonat angidridni samarali adsorbsiyalash uchun aerogellar ko‘pincha kimyoviy modifikatsiyaga uchratiladi. Ayniqsa amin funksional guruhlari bilan modifikatsiyalangan aerogellar CO_2 molekulalarini faol bog‘lash qobiliyatiga ega. Amin guruhlari karbonat angidrid bilan kimyoviy ta’sirlashib karbamat birikmalarini hosil qiladi. Shu sababli bunday aerogellar yuqori adsorbsiya sig‘imi bilan tavsiflanadi. Modifikatsiya qilish uchun etilendiamin, polietilenimin va boshqa amin tutuvchi birikmalar ishlatiladi.

CO_2 adsorbsiyasi jarayoniga bir qator omillar ta’sir qiladi. Haroratning oshishi adsorbsiya samaradorligini pasaytirishi mumkin, chunki adsorbsiya jarayoni ko‘pincha ekzotermik xarakterga ega. Bosimning ortishi esa karbonat angidrid molekulalarining sorbent sirtiga ko‘proq yutilishiga olib keladi. Bundan tashqari aerogelning g‘ovak hajmi, sirt maydoni va funksional guruhlar soni ham adsorbsiya jarayonida muhim rol o‘ynaydi.

Nanostrukturali aerogellarning yuqori samaradorligi ularning katta solishtirma sirt maydoni bilan bog‘liq. Ayrim aerogellarning sirt maydoni 1000 m^2/g dan ham yuqori bo‘lishi mumkin. Bu esa adsorbsiya markazlari sonining ko‘payishiga olib keladi. Shu bilan birga g‘ovaklarning nanoo‘lchamli tuzilishi gaz molekulalarining diffuziyasini tezlashtiradi va adsorbsiya jarayonini jadallashtiradi.

Karbonat angidridni ushlab qoluvchi aerogellar ekologik texnologiyalarda keng istiqbolga ega. Ular issiqlik elektr stansiyalaridan chiqayotgan gazlarni tozalash, sanoat korxonalarida zararli chiqindilarni kamaytirish hamda atmosfera ifloslanishini nazorat qilish tizimlarida qo‘llanilishi mumkin. Bundan tashqari, bunday sorbentlar tabiiy

gazni tozalash va vodorod energetikasi tizimlarida ham muhim ahamiyat kasb etmoqda.

MUAMMOLAR VA UNING TAHLILI

Karbonat angidridni yutuvchi nanostrukturali aerogellar ekologik muammolarni hal qilishda katta istiqbolga ega bo‘lishiga qaramasdan, ularni sintez qilish, sanoat miqyosida ishlab chiqarish va amaliyotga joriy etishda bir qator muammolar mavjud. Ushbu muammolar texnologik, iqtisodiy, mexanik va ekologik omillar bilan bog‘liq bo‘lib, aerogel sorbentlarning keng qo‘llanilish imkoniyatlarini ma’lum darajada cheklaydi.

Asosiy muammolardan biri aerogellarni sintez qilish texnologiyasining murakkabligidir. Sol-gel texnologiyasi bir necha ketma-ket bosqichlardan iborat bo‘lib, har bir bosqich aniq nazoratni talab qiladi. Gidroliz va kondensatsiya reaksiyalarining noto‘g‘ri boshqarilishi g‘ovaklarning notekis hosil bo‘lishiga sabab bo‘ladi. Natijada aerogelning sirt maydoni kamayadi va adsorbsiya samaradorligi pasayadi. Ayniqsa pH muhitining o‘zgarishi, harorat va reagentlar konsentratsiyasi aerogel strukturasiga sezilarli ta’sir ko‘rsatadi. Shu sababli optimal texnologik parametrlarni tanlash muhim ilmiy masala hisoblanadi.

Aerogel ishlab chiqarishda quritish jarayoni ham eng murakkab bosqichlardan biri sanaladi. Oddiy atmosfera sharoitida quritilganda kapillyar bosim ta’sirida g‘ovakli struktura deformatsiyalanadi yoki butunlay buziladi. Shu bois superkritik quritish texnologiyasi qo‘llaniladi. Biroq ushbu usul yuqori bosim va maxsus uskunalarni talab qilgani sababli ishlab chiqarish xarajatlarini sezilarli darajada oshiradi. Bundan tashqari superkritik quritish energiya sarfining yuqoriligi bilan ham tavsiflanadi. Shu sababli iqtisodiy jihatdan arzon va energiya tejamkor quritish usullarini ishlab chiqish dolzarb masalalardan biri hisoblanadi.

Nanostrukturali aerogellarning yana bir muhim kamchiligi ularning mexanik mo‘rtligidir. Yuqori g‘ovaklilik material zichligini kamaytiradi, biroq shu bilan birga uning mustahkamligini pasaytiradi. Aerogellar tashqi bosim yoki mexanik zarba ta’sirida oson sinishi mumkin. Bu esa ularni transportirovka qilish va sanoat uskunalarida uzoq muddat qo‘llashni qiyinlashtiradi. Mazkur muammoni hal qilish maqsadida polimer tolalar, uglerod nanotrubkalari va grafen asosida kompozit aerogellar yaratilmoqda. Bunday materiallar mexanik jihatdan mustahkamroq bo‘lishiga qaramasdan, ularni ishlab chiqarish texnologiyasi yanada murakkablashadi.

Karbonat angidrid adsorbsiyasi jarayonida selektivlik muammosi ham mavjud. Sanoat gazlari tarkibida CO_2 dan tashqari suv bug‘lari, azot oksidlari, oltingugurt birikmalari va boshqa gazlar mavjud bo‘ladi. Ushbu komponentlar aerogel sorbent yuzasidagi faol markazlarni egallab, karbonat angidrid adsorbsiyasi samaradorligini kamaytiradi. Ayniqsa namlikning yuqori bo‘lishi amin modifikatsiyalangan aerogellarning faoliyatiga salbiy ta’sir ko‘rsatadi. Shu sababli yuqori selektivlikka ega va namlikka chidamli sorbentlarni yaratish muhim ilmiy yo‘nalish hisoblanadi.

Nanostrukturali aerogellarni ishlab chiqarishda iqtisodiy omillar ham muhim ahamiyatga ega. Kremniy alkoksidlari, organik erituvchilar va maxsus modifikatorlarning yuqori narxi tayyor mahsulot tannarxini oshiradi. Shu sababli arzon xomashyolar asosida aerogellar olish texnologiyalarini ishlab chiqish bo‘yicha tadqiqotlar olib borilmoqda. Ayniqsa natriy silikat va biopolimer asosidagi aerogellar iqtisodiy jihatdan istiqbolli variant sifatida qaralmoqda.

Ekologik xavfsizlik bilan bog‘liq muammolar ham mavjud. Ayrim sintez jarayonlarida toksik organik erituvchilar va kimyoviy reagentlardan foydalaniladi. Ushbu moddalar ishlab chiqarish chiqindilari tarkibida atrof-muhitga zarar yetkazishi mumkin. Shu sababli ekologik xavfsiz, “yashil kimyo” tamoyillariga asoslangan texnologiyalarni joriy etish muhim ahamiyat kasb etadi. Biologik parchalanadigan materiallar asosidagi aerogellar ushbu muammoni hal qilishning istiqbolli yo‘nalishlaridan biri hisoblanadi.

XULOSA

Karbonat angidridni yutuvchi nanostrukturali aerogellar ekologik xavfsizlikni ta’minlash va atmosfera ifloslanishini kamaytirishda muhim ahamiyatga ega innovatsion materiallar hisoblanadi. Ularning yuqori g‘ovakliligi, katta solishtirma sirt maydoni va rivojlangan nanostrukturasi karbonat angidrid molekulalarini samarali adsorbsiyalash imkonini beradi. Ayniqsa amin funksional guruhlari bilan modifikatsiyalangan aerogellar CO_2 ni yutishda yuqori natijalar ko‘rsatmoqda.
Maqolada nanostrukturali aerogellarni sol-gel texnologiyasi asosida olish usullari, ularning fizik-kimyoviy xossalari hamda adsorbsiya samaradorligiga ta’sir etuvchi omillar tahlil qilindi. Tadqiqotlar aerogellarning adsorbsiya xossalari ularning g‘ovak tuzilishi, sirt maydoni va kimyoviy modifikatsiyasiga bog‘liq ekanligini ko‘rsatdi. Shuningdek, superkritik quritish texnologiyasi aerogelning nanostrukturasini saqlashda muhim rol o‘ynashi aniqlandi.

Tahlillar davomida aerogel sorbentlarning ayrim muammolari ham ko‘rib chiqildi. Jumladan, ishlab chiqarish tannarxining yuqoriligi, mexanik mo‘rtlik, regeneratsiya murakkabligi va namlikka sezgirlik asosiy cheklovchi omillar sifatida qayd etildi. Shu bilan birga kompozit aerogellar yaratish, ekologik xavfsiz texnologiyalarni ishlab chiqish va biopolimer asosidagi sorbentlardan foydalanish ushbu muammolarni bartaraf etishning istiqbolli yo‘nalishlari ekanligi aniqlandi.

Kelgusida karbonat angidridni yutuvchi aerogellarni takomillashtirish, ularning selektivligini oshirish va energiya tejamkor ishlab chiqarish texnologiyalarini yaratish muhim ilmiy vazifalardan biri bo‘lib qoladi. Nanostrukturali aerogellar nafaqat gazlarni tozalash, balki energetika, kimyo sanoati va ekologik muhofaza tizimlarida ham keng qo‘llanilishi mumkin bo‘lgan istiqbolli funksional materiallar qatoriga kiradi.

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