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SYNAPSES: INSIGHTS ACROSS THE DISCIPLINES

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OSHQOZON-ICHAK TIZIMI KASALLIKLARINI TASHXISLASHDA KLINIK BELGILAR

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Annotatsiya

Ushbu maqolada oshqozon-ichak tizimi kasalliklarini tashxislashda klinik belgilarining ahamiyati, ularning diagnostik jarayondagi o‘rni va zamonaviy tibbiyotda qo‘llanilayotgan yondashuvlar tahlil qilinadi. Oshqozon-ichak tizimi kasalliklari global sog‘liqni saqlash muammolaridan biri bo‘lib, ular turli yosh guruhlarida keng tarqalganligi bilan ajralib turadi. Mazkur kasalliklarni erta aniqlashda klinik belgilarni to‘g‘ri baholash muhim ahamiyatga ega. Maqolada og‘riq sindromi, dispeptik belgilar, ich ketishi, qabziyat, qon ketish holatlari kabi asosiy simptomlarning diagnostik qiymati o‘rganilgan. Shuningdek, klinik belgilarni laborator va instrumental tekshiruvlar bilan uyg‘un holda qo‘llash samaradorligi ko‘rib chiqilgan. Tadqiqot natijalari shuni ko‘rsatadiki, klinik belgilarni chuqur tahlil qilish kasalliklarni differensial tashxislashda muhim vosita hisoblanadi. Bundan tashqari, maqolada zamonaviy diagnostika usullari bilan birgalikda klinik ko‘rsatkichlardan

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foydalanishning afzalliklari yoritilgan. Natijada, oshqozon-ichak kasalliklarini aniqlashda kompleks yondashuv zarurligi asoslab berilgan.

Kalit so‘zlar: oshqozon-ichak tizimi, klinik belgilar, tashxis, dispepsiya, qorin og‘rig‘i, ich ketishi, qabziyat, gastrit, enterit, kolit, yara kasalligi, gastroenterologiya, diagnostika, simptomlar, qon ketish, ko‘ngil aynishi, qusish, endoskopiya, laborator tekshiruv, differensial tashxis, surunkali kasalliklar, yallig‘lanish, infeksiya, metabolik buzilishlar, klinik tahlil.

Mavzuning dolzarbligi

Oshqozon-ichak tizimi kasalliklari bugungi kunda dunyo bo‘yicha eng ko‘p uchraydigan kasalliklar qatoriga kiradi. Ular aholining turli qatlamlari, ayniqsa, mehnatga layoqatli yoshdagi insonlar orasida keng tarqalganligi bilan ajralib turadi. Ushbu kasalliklarning dolzarbligi bir necha omillar bilan belgilanadi. Avvalo, noto‘g‘ri ovqatlanish, stress, ekologik muammolar va infeksion omillar oshqozon-ichak tizimi faoliyatiga salbiy ta’sir ko‘rsatadi. Natijada gastrit, yara kasalligi, kolit va boshqa patologiyalar rivojlanadi.

Klinik belgilar ushbu kasalliklarni aniqlashda dastlabki va eng muhim bosqich hisoblanadi. Ko‘plab hollarda bemorlar aynan simptomlar asosida shifokorga murojaat qiladi. Shu sababli, simptomlarni to‘g‘ri baholash tashxis qo‘yishda hal qiluvchi ahamiyatga ega. Masalan, qorin og‘rig‘i turli lokalizatsiya va xarakterga ega bo‘lishi mumkin, bu esa turli kasalliklarni farqlash imkonini beradi. Dispeptik belgilar — ko‘ngil aynishi, qusish, ishtahaning pasayishi — ko‘pincha oshqozon patologiyalarining ilk belgilaridan biridir.

Dolzarblikning yana bir jihati shundaki, zamonaviy diagnostika usullari rivojlangan bo‘lsa-da, klinik belgilar hali ham asosiy yo‘naltiruvchi omil bo‘lib qolmoqda. Instrumental tekshiruvlar ko‘pincha qimmat va hamma hududlarda mavjud emas. Shu sababli, klinik belgilarni chuqur o‘rganish ayniqsa birlamchi tibbiy yordamda muhimdir.

Bundan tashqari, oshqozon-ichak kasalliklari ko‘pincha yashirin kechadi yoki boshqa kasalliklar bilan o‘xshash simptomlar beradi. Bu esa noto‘g‘ri tashxis qo‘yish xavfini oshiradi. Shu nuqtai nazardan, klinik belgilarni differensial tahlil qilish dolzarb vazifa hisoblanadi.

Zamonaviy tibbiyotda integrativ yondashuv keng qo‘llanilmoqda. Ya’ni, klinik belgilar laborator va instrumental tekshiruvlar bilan birgalikda baholanadi. Bu esa tashxis

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aniqligini oshiradi. Shu sababli, ushbu mavzu nafaqat nazariy, balki amaliy jihatdan ham katta ahamiyatga ega.

Tadqiqot maqsadi

Mazkur tadqiqotning asosiy maqsadi oshqozon-ichak tizimi kasalliklarini tashxislashda klinik belgilarining ahamiyatini aniqlash va ularni samarali qo‘llash usullarini o‘rganishdan iborat. Ushbu maqsad doirasida bir nechta vazifalar belgilandi.

Birinchidan, oshqozon-ichak tizimi kasalliklarida uchraydigan asosiy klinik belgilarni tizimlashtirish zarur. Har bir simptomning diagnostik qiymatini aniqlash orqali ularning ahamiyat darajasi baholanadi. Masalan, og‘riq sindromining joylashuvi va davomiyligi kasallik turini aniqlashda muhim rol o‘ynaydi.

Ikkinchidan, klinik belgilar asosida differensial tashxis qo‘yish imkoniyatlarini o‘rganish muhimdir. Bu jarayonda o‘xshash simptomlarga ega kasalliklarni ajratish mexanizmlari tahlil qilinadi. Masalan, gastrit va yara kasalligi o‘rtasidagi farqlarni aniqlash uchun simptomlar chuqur o‘rganiladi.

Uchinchidan, klinik belgilarni laborator va instrumental tekshiruv natijalari bilan taqqoslash orqali ularning aniqligi baholanadi. Bu esa kompleks diagnostika tizimini shakllantirishga yordam beradi.

To‘rtinchidan, tadqiqot natijalari asosida klinik amaliyot uchun tavsiyalar ishlab chiqish ko‘zda tutilgan. Bu tavsiyalar shifokorlar uchun kasalliklarni tez va aniq tashxislash imkonini beradi.

Shuningdek, tadqiqotning yana bir muhim maqsadi — klinik belgilarni baholashda zamonaviy yondashuvlarni joriy etishdir. Bu, ayniqsa, birlamchi tibbiy yordam tizimida muhim ahamiyatga ega.

Tadqiqot natijalari

Tadqiqot davomida oshqozon-ichak tizimi kasalliklarida uchraydigan klinik belgilar chuqur tahlil qilindi. Natijalar shuni ko‘rsatdiki, klinik simptomlar kasalliklarni aniqlashda muhim diagnostik vosita hisoblanadi.

Eng ko‘p uchraydigan simptomlardan biri — qorin og‘rig‘i. U turli kasalliklarda turlicha namoyon bo‘ladi. Masalan, oshqozon yarasida og‘riq odatda ovqatdan keyin paydo bo‘ladi, o‘n ikki barmoqli ichak yarasida esa och qoringa kuchayadi. Bu farq tashxis qo‘yishda muhim ahamiyatga ega.

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Dispeptik belgilar ham keng tarqalgan. Ko‘ngil aynishi va qusish ko‘pincha gastrit va boshqa yallig‘lanish kasalliklarida kuzatiladi. Ich ketishi esa asosan infeksion va yallig‘lanish kasalliklarida uchraydi. Qabziyat esa funksional buzilishlar yoki ichak obstruksiyasi bilan bog‘liq bo‘lishi mumkin.

Tadqiqot natijalari shuni ham ko‘rsatdiki, klinik belgilarni alohida emas, balki kompleks tarzda baholash zarur. Bir nechta simptomlarning birgalikda kuzatilishi tashxis aniqligini oshiradi.

Bundan tashqari, laborator tekshiruvlar bilan birgalikda qo‘llanganda klinik belgilar diagnostik ahamiyatini yanada oshiradi. Masalan, qon tahlili natijalari yallig‘lanish jarayonini tasdiqlashi mumkin.

Xulosa

Oshqozon-ichak tizimi kasalliklarini tashxislashda klinik belgilar muhim va ajralmas ahamiyatga ega. Ushbu belgilar kasalliklarni erta aniqlash, differensial tashxis qo‘yish va davolash strategiyasini belgilashda asosiy rol o‘ynaydi.

Tadqiqot natijalari shuni ko‘rsatadiki, klinik belgilarni chuqur va tizimli tahlil qilish tashxis aniqligini sezilarli darajada oshiradi. Ayniqsa, birlamchi tibbiy yordam bosqichida bu juda muhimdir.

Shuningdek, klinik belgilarni laborator va instrumental tekshiruvlar bilan birgalikda qo‘llash eng samarali yondashuv hisoblanadi. Bu esa zamonaviy tibbiyotning asosiy tamoyillaridan biridir.

Kelgusida ushbu yo‘nalishda qo‘shimcha tadqiqotlar o‘tkazish, yangi diagnostika usullarini joriy etish va shifokorlar malakasini oshirish zarur.

Foydalanilgan adabiyotlar

1.Gastroenterologiya asoslari – Tibbiyot nashriyoti

2.Ichki kasalliklar propedevtikasi – O‘quv qo‘llanma

3.Clinical Gastroenterology – International Journal

4.Harrison’s Principles of Internal Medicine

5.Oxford Handbook of Gastroenterology

6.WHO reports on digestive diseases

7.Zamonaviy diagnostika usullari – ilmiy maqolalar to‘plami

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8.Gastrointestinal Diseases Journal

9.Tibbiyotda klinik tashxis asoslari

10.Endoskopiya va diagnostika

11.Ichki kasalliklar atlaslari

12.Evidence-Based Gastroenterology

13.American Journal of Digestive Diseases

14.European Gastroenterology Guidelines

15.O‘zbekiston tibbiyot jurnali maqolalari

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O‘ZBEKISTON KICHIK VA O‘RTA BIZNES SUBYEKTLARIDA RAQAMLI MENEJMENTGA O‘TISHNING INSTITUTSIONAL VA PSIXOLOGIK TO‘SIQLARI.

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Annotatsiya: Ushbu maqolada O‘zbekistondagi kichik va o‘rta biznes (KOB) subyektlarida raqamli menejmentni joriy etish jarayonidagi asosiy muammolar tadqiq etiladi. Tadqiqotda raqamli transformatsiyaga to‘sqinlik qiluvchi ikki muhim omil — institutsional (qonunchilik, infratuzilma, resurslar) va psixologik (rahbar va xodimlarning o‘zgarishlarga qarshiligi, raqamli ko‘nikmalarning yetishmasligi) to‘siqlar tahlil qilingan. Maqola yakunida mahalliy tadbirkorlik muhitida raqamli boshqaruvga o‘tishni jadallashtirish bo‘yicha amaliy tavsiyalar berilgan.
Kalit so‘zlar: raqamli menejment, kichik va o‘rta biznes, institutsional to‘siqlar, psixologik qarshilik, raqamli transformatsiya, O‘zbekiston iqtisodiyoti, boshqaruv innovatsiyalari.
Аннотация: В данной статье исследуются основные проблемы внедрения цифрового менеджмента в субъектах малого и среднего бизнеса (МСБ) Узбекистана. В исследовании анализируются два важных фактора, препятствующих цифровой трансформации: институциональные (законодательство, инфраструктура, ресурсы) и психологические (сопротивление изменениям со стороны руководителей и сотрудников, нехватка цифровых навыков) барьеры. В завершении статьи представлены практические рекомендации по ускорению перехода к цифровому управлению в условиях местной предпринимательской среды.
Ключевые слова: цифровой менеджмент, малый и средний бизнес, институциональные барьеры, психологическое сопротивление, цифровая трансформация, экономика Узбекистана, инновации в управлении.

Abstract: This article examines the key challenges of implementing digital management within small and medium-sized enterprises (SMEs) in Uzbekistan. The study analyzes two critical factors hindering digital transformation: institutional

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barriers (legislation, infrastructure, resources) and psychological barriers (resistance to change among managers and employees, lack of digital literacy). The article concludes with practical recommendations for accelerating the transition to digital governance within the local business environment.
Keywords: digital management, small and medium enterprises (SMEs), institutional barriers, psychological resistance, digital transformation, economy of Uzbekistan, management innovations.

Kirish.

Zamonaviy dunyo iqtisodiyoti shiddatli transformatsiya jarayonini boshidan kechirmoqda, bu yerda raqamli texnologiyalar endilikda shunchaki yordamchi vosita emas, balki korxonalarning yashovchanligi va raqobatbardoshligini belgilovchi asosiy strategik resursga aylandi. O‘zbekiston iqtisodiyoti ham ushbu global jarayonlardan chetda qolmagan holda, iqtisodiyotning barcha tarmoqlarini, xususan, kichik va o‘rta biznes (KOB) subyektlarini raqamlashtirishni ustuvor vazifa sifatida belgilab olgan. Biroq, nazariy jihatdan raqamli menejmentga o‘tishning afzalliklari (samaradorlik, xarajatlarni kamaytirish, bozor qamrovini kengaytirish) ayon bo‘lsa-da, amaliyotda mahalliy korxonalar bu yo‘lda qator murakkab to‘siqlarga duch kelmoqda. Ushbu muammolarni tahlil qilishda faqat texnologik jihatlarga e’tibor qaratish yetarli emas, chunki muammoning ildizi chuqurroq — tizimli (institutsional) va inson omili (psixologik) bilan bog‘liq bo‘lgan qatlamlarda yotadi. O‘zbekiston sharoitida kichik va o‘rta biznes iqtisodiyotning drayveri hisoblanadi, biroq ularning aksariyati hanuzgacha an’anaviy, ko‘p hollarda "qo‘lda boshqarish" (manual management) uslubiga tayanib faoliyat yuritmoqda.

Institutsional nuqtayi nazardan qaraganda, raqamli menejmentga o‘tish jarayoni korxona tashqarisidagi va ichkarisidagi tartib-qoidalar, me’yorlar va infratuzilmaviy cheklovlar bilan to‘qnashadi. O‘zbekistonda raqamli iqtisodiyotni rivojlantirish bo‘yicha keng ko‘lamli islohotlar amalga oshirilayotganiga qaramay, KOB subyektlari uchun huquqiy bazaning murakkabligi, elektron hujjat aylanishining to‘liq integratsiya qilinmaganligi va kadrlar tayyorlash tizimidagi uzilishlar jiddiy toshqinlik yaratmoqda. Ko‘plab mahalliy tadbirkorlar uchun raqamli boshqaruv tizimlarini joriy etish nafaqat katta moliyaviy xarajat, balki murakkab byurokratik jarayon sifatida ko‘riladi. Davlat tomonidan berilayotgan imtiyozlar va yaratilayotgan platformalarning barcha tadbirkorlarga birdek yetib bormasligi, shuningdek, hududlarda internet va IT-infratuzilmasining notekis taqsimlanganligi institutsional to‘siqlarning asosini tashkil etadi. Bu sharoitda korxonalar raqamli muhitga moslashishdan ko‘ra, o‘zlariga tanish bo‘lgan eski usullarda qolishni xavfsizroq deb bilishadi.

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Biroq, tizimli muammolardan ham ko‘ra jiddiyroq va ko‘p hollarda e’tibordan chetda qoladigan to‘siq bu — psixologik omildir. Inson omili har qanday boshqaruv islohotining markazida turadi. O‘zbekistonda shakllangan an’anaviy menejment madaniyati ko‘p jihatdan vertikal ierarxiya, bevosita yuzma-yuz nazorat va qat’iy intizomga asoslangan. Raqamli menejment esa, aksincha, shaffoflikni, gorizontal muloqotni, masofaviy ishlash imkoniyatini va qaror qabul qilishda ma’lumotlarga (data-driven) tayanishni talab qiladi. Mahalliy rahbarlarning ko‘pchiligida "agar xodimni ko‘zim bilan ko‘rib turmasam, u ishlamayapti" degan stereotipik qarashning mavjudligi raqamli monitoring va nazorat tizimlarini qabul qilishga xalaqit bermoqda. Bu yerda biz "psixologik qarshilik" fenomeniga duch kelamiz: nafaqat rahbarlar, balki xodimlar ham raqamli tizimlarni o‘zlarining ish joylariga tahdid yoki ortiqcha nazorat vositasi sifatida qabul qilishadi. Ularning fikricha, avtomatlashtirish inson mehnatini siqib chiqaradi yoki ularning har bir qadamini shaffof qilib qo‘yadi, bu esa norasmiy iqtisodiy aloqalarga o‘rganib qolgan muhitda noqulaylik tug‘diradi.

Shuningdek, raqamli ko‘nikmalarning yetishmasligi (digital gap) bilan bog‘liq bo‘lgan qo‘rquv ham dolzarb muammodir. Kichik biznes vakillari yangi dasturiy ta’minotlarni o‘rganishni murakkab va vaqtni oluvchi jarayon deb hisoblashadi. O‘zbekistondagi ko‘plab tadbirkorlarda "bu tizimlar bizga emas, yirik korporatsiyalarga mo‘ljallangan" degan noto‘g‘ri tasavvur shakllangan. Oila a’zolari yoki yaqin qarindoshlar tomonidan boshqariladigan ko‘plab mahalliy bizneslarda "ishonch" omili texnologik "aniqlik" omilidan ustun turadi. Ya’ni, rahbar uchun hisobotni raqamli dashboardda ko‘rishdan ko‘ra, ishonchli xodimining og‘zaki hisoboti qadrliroq tuyuladi. Bunday madaniy va psixologik muhitda raqamli transformatsiya shunchaki texnik yangilanish emas, balki butun boshli tafakkur inqilobini talab qiladi.

Raqamli iqtisodiyot sharoitida menejmentning o‘zgarishi faqat kompyuterlar sonini ko‘paytirish degani emas. Bu — boshqaruv falsafasining o‘zgarishidir. O‘zbekistonning kichik va o‘rta biznes subyektlarida ushbu jarayonni jadallashtirish uchun avvalo institutsional muhitni tadbirkorga "do‘stona" darajaga keltirish, ya’ni raqamli xizmatlardan foydalanishni murakkab majburiyatdan yengil imkoniyatga aylantirish lozim. Shu bilan birga, jamiyatda va biznes muhitida raqamli madaniyatni shakllantirish, rahbar va xodimlarning texnologiyalarga nisbatan bo‘lgan "notanishlik qo‘rquvi"ni bartaraf etish talab etiladi. Agarda ushbu institutsional va psixologik to‘siqlar kompleks ravishda o‘rganilmasa va ularga yechim topilmasa, raqamli transformatsiya jarayoni faqat yirik shaharlardagi sanoqli kompaniyalar doirasida cheklanib qolaveradi, bu esa mamlakatning umumiy iqtisodiy o‘sish sur’atlariga salbiy ta’sir ko‘rsatadi. Ushbu maqola aynan shu ziddiyatli nuqtalarni yoritishga va mahalliy

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sharoitdan kelib chiqqan holda raqamli menejmentga o‘tishning optimal yo‘llarini izlashga qaratilgan.

Asosiy qism.

Raqamli iqtisodiyot sharoitida menejment tizimini isloh qilish masalasi O‘zbekiston iqtisodiyoti uchun shunchaki texnik ehtiyoj emas, balki tizimli transformatsiyaning fundamental bosqichidir. Kichik va o‘rta biznes (KOB) subyektlarining boshqaruv apparatida raqamli texnologiyalarni tatbiq etish jarayoni, birinchi navbatda, mavjud institutsional muhit bilan to‘qnash keladi. Institutsional to‘siqlar deganda, biz nafaqat qonunchilik bazasining yetishmasligi, balki biznes yuritishning shakllanib qolgan norasmiy qoidalari, infratuzilmaviy cheklovlar va bozor institutlarining raqamli o‘zgarishlarga sust moslashuvchanligini tushunishimiz lozim. O‘zbekistonda tadbirkorlik subyektlari uzoq yillar davomida qat’iy markazlashgan va qog‘ozbozlikka asoslangan tizimda faoliyat yuritgani bois, raqamli menejmentning asosiy talabi bo‘lgan shaffoflik institutsional darajada qiyinchilik bilan qabul qilinmoqda. Ko‘plab kichik korxonalar uchun raqamli boshqaruvga o‘tish dastlabki bosqichda yuqori tranzaksiya xarajatlarini keltirib chiqaradi. Bu xarajatlar nafaqat dasturiy ta’minot sotib olish, balki butun boshli ish yuritish tizimini qayta qurish va yuridik jihatdan muvofiqlashtirish bilan bog‘liqdir. Davlat xizmatlari raqamlashtirilayotgan bir paytda, xususiy sektorning ushbu sur’atga yetisha olmasligi natijasida "raqamli uzilish" (digital divide) vujudga kelmoqda. Bu esa o‘z navbatida, kichik biznes subyektlarining yirik, raqamli quvvatga ega kompaniyalar bilan raqobatda yutqazishiga sabab bo‘lmoqda.

Institutsional to‘siqlarning yana bir muhim jihati — bu kadrlar masalasi va ta’lim tizimining mehnat bozori talablaridan orqada qolayotganidir. Mahalliy korxonalarda menejmentni raqamlashtirish uchun nafaqat IT-mutaxassislari, balki "raqamli menejerlar" — ham biznes jarayonlarini, ham texnologik imkoniyatlarni tushunadigan kadrlar zarur. Biroq, O‘zbekistonning hududiy nuqtayi nazaridan qaraganda, viloyatlardagi kichik korxonalar bunday kadrlarni yollash uchun yetarli resursga yoki jozibadorlikka ega emas. Bu esa raqamlashtirishni faqat texnik xodimlarning vazifasi sifatida ko‘rishga olib keladi, vaholanki bu strategik boshqaruv darajasida hal qilinishi kerak bo‘lgan muammodir. Moliyaviy institutlar, xususan, banklar tomonidan raqamli transformatsiya loyihalari uchun imtiyozli kreditlash mexanizmlarining yetarli darajada yo‘lga qo‘yilmaganligi ham tadbirkorni tavakkal qilishdan to‘xtatib turadi. Institutsional muhitdagi ushbu bo‘shliqlar korxonalar ichidagi jarayonlarning ham eskirgan tartibda qolishiga zamin yaratadi. Masalan, elektron imzo va bulutli texnologiyalar mavjud bo‘lishiga qaramay, ko‘plab korxonalarda ichki buyruqlar va

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hisobotlarning hamon qog‘ozda yuritilishi "institutsional inersiya"ning yaqqol namunasidir.

Psixologik to‘siqlar esa muammoning yanada nozik va murakkab qatlamini tashkil etadi. O‘zbekiston sharoitida rahbarlarning boshqaruv uslubi ko‘p hollarda "paternalistik" xarakterga ega bo‘lib, unda shaxsiy aloqalar va bevosita nazorat ustuvor hisoblanadi. Raqamli menejment tizimlari (ERP, CRM kabi) esa inson omilini kamaytirishni va jarayonlarni avtomatlashtirilgan ma’lumotlar asosida boshqarishni nazarda tutadi. Bu holatda rahbarlarda "vaziyatni nazoratdan chiqarish" qo‘rquvi paydo bo‘ladi. Ular uchun kompyuter tizimidagi raqamlardan ko‘ra, xodimning ko‘ziga qarab olingan ma’lumot ishonchliroq tuyuladi. Bu — kognitiv to‘siq bo‘lib, u yangi texnologiyalarni qabul qilishda "psixologik immunitet" hosil qiladi. Rahbar o‘zi tushunmagan yoki murakkab deb hisoblagan tizimdan foydalanish o‘rniga, o‘zining ko‘p yillik tajribasiga tayanadigan intuitiv boshqaruvni afzal ko‘radi. Bunday muhitda raqamli vositalar korxonaga joriy etilgan taqdirda ham, ular ko‘pincha "shunchaki ko‘rgazma" uchun yoki majburiyat yuzasidan ishlatiladi, lekin strategik qarorlar qabul qilishda ularning ma’lumotlaridan foydalanilmaydi.

Xodimlarning raqamli o‘zgarishlarga bo‘lgan munosabati ham psixologik to‘siqlarning ajralmas qismidir. Kichik biznes subyektlarida xodimlar ko‘pincha ko‘p funksiyali vazifalarni bajarishadi va ular uchun yangi tizimni o‘rganish qo‘shimcha ish yuki sifatida qabul qilinadi. Psixologik nuqtayi nazardan, inson har doim o‘zgarishlarga nisbatan konservativ munosabatda bo‘ladi, ayniqsa bu o‘zgarishlar uning kundalik ish tartibini shaffoflashtirsa. Raqamli menejment xodimning har bir ish soatini, samaradorligini (KPI) va xatolarini ko‘rsatib beradi. Mahalliy mehnat madaniyatida shakllangan "norasmiy tanaffuslar" yoki ishga yuzaki yondashuv imkoniyatlarining cheklanishi xodimlarda yangi tizimga nisbatan ichki sabotaj yoki passiv qarshilikni uyg‘otadi. Ular tizimdagi nosozliklarni bo‘rttirib ko‘rsatishga yoki eski usul samaraliroq ekanligini isbotlashga harakat qilishadi. Bu esa raqamlashtirish jarayonini ichkaridan yemiradi.

Shuningdek, "status-kvo"ga yopishib olish va tavakkalchilikdan qochish psixologiyasi ham mahalliy tadbirkorlik subyektlarida kuchli rivojlangan. "Agar biznesim hozir ham foyda keltirayotgan bo‘lsa, nega uni o‘zgartirishim kerak?" degan savol raqamli transformatsiya yo‘lidagi eng katta ruhiy to‘siqdir. Bu yerda biz "psixologik turg‘unlik" holatini ko‘ramiz. Tadbirkor uzoq muddatli strategik ustunlikdan ko‘ra, qisqa muddatli barqarorlikni afzal ko‘radi. Raqamli menejmentga o‘tish nafaqat texnik jarayon, balki korporativ madaniyatning o‘zgarishi hamdir. Bizning mahalliy korxonalarimizda esa korporativ madaniyat ko‘pincha tartibga solinmagan va norasmiy qadriyatlarga tayangan bo‘ladi. Raqamli tizim esa tartib va

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algoritmik aniqlikni talab qiladi. Ushbu ikki qarama-qarshi qutb o‘rtasidagi to‘qnashuv boshqaruvda inqirozlarni keltirib chiqarishi mumkin, shuning uchun ham ko‘plab menejerlar ongsiz ravishda raqamlashtirishni kechiktirishga moyil bo‘ladilar.

Raqamli iqtisodiyotda muvaffaqiyat qozonish uchun tadbirkorlik subyektlari "raqamli tafakkur" (digital mindset)ga ega bo‘lishlari shart. Bu tafakkur ma’lumotlarga asoslangan qaror qabul qilish, doimiy o‘rganish va moslashuvchanlikni nazarda tutadi. Biroq, O‘zbekistondagi ko‘plab KOB vakillarida "texnologik pessimizm" kuzatiladi. Ular raqamlashtirishni juda qimmat, o‘ta murakkab va faqat G‘arbga xos narsa deb hisoblashadi. Mahalliy mentalitetdagi "yuzma-yuz muloqot" qadriyati ba’zida raqamli aloqa vositalariga (masalan, Zoom orqali majlis o‘tkazish yoki Slack’da topshiriq berish) nisbatan ishonchsizlik tug‘diradi. Rahbarlar orasida "masofadan turib ishlatib bo‘lmaydi" degan qat’iy ishonch saqlanib qolmoqda, bu esa zamonaviy "agile" boshqaruv uslublarini qo‘llash imkoniyatini cheklaydi.

Xulosa:

O‘zbekiston iqtisodiyotining zamonaviy taraqqiyot bosqichida kichik va o‘rta biznes subyektlarida raqamli menejment tizimiga o‘tish jarayoni shunchaki texnologik yangilanish emas, balki davlat va jamiyat taraqqiyotini belgilovchi strategik burilish nuqtasidir. Tadqiqot davomida aniqlangan institutsional va psixologik to‘siqlar shuni ko‘rsatadiki, raqamli transformatsiya jarayoni kompleks yondashuvni talab qiladi. Institutsional darajada davlat tomonidan yaratilayotgan huquqiy va infratuzilmaviy sharoitlar korxonalarning ichki boshqaruv madaniyati bilan uyg‘unlashishi zarur. Agarda qonunchilik bazasi takomillashgan, biroq korxona ichidagi tartib-qoidalar hanuzgacha an’anaviy byurokratik usullarga tayanayotgan bo‘lsa, raqamli menejment kutilgan iqtisodiy samarani bermaydi. Shu bois, mahalliy biznes muhitida raqamli xizmatlar ko‘lamini kengaytirish bilan bir qatorda, tadbirkorlik subyektlarining ushbu tizimlarga moslashuvchanligini oshiruvchi rag‘batlantirish mexanizmlarini ishlab chiqish dolzarb ahamiyat kasb etadi. Raqamlashtirishni faqat texnologik xarajat deb emas, balki uzoq muddatli investitsiya deb qarash iqtisodiy tafakkurning asosiga aylanishi kerak.

Psixologik to‘siqlarni bartaraf etish masalasi esa eng murakkab va davomli jarayon bo‘lib qolmoqda. Inson omili har qanday islohotning muvaffaqiyatini belgilovchi asosiy kuchdir. Tadqiqot shuni tasdiqlaydiki, rahbarlar va xodimlarning raqamli texnologiyalarga nisbatan ishonchsizligi, nazoratni yo‘qotish qo‘rquvi va yangilikka bo‘lgan tabiiy qarshilik korxonalarning raqobatbardoshligini pasaytiruvchi asosiy omillardir. Raqamli menejmentga o‘tish uchun nafaqat yangi dasturlar, balki yangicha boshqaruv falsafasi — ochiqlik, shaffoflik va ma’lumotlarga asoslangan qaror qabul qilish madaniyati zarur. O‘zbekistonning milliy menejment modelida

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shaxsiy ishonch va jamoaviy birdamlik muhim o‘rin tutadi, biroq bu qadriyatlar raqamli aniqlik va algoritmik samaradorlik bilan zid kelmasligi, aksincha, bir-birini to‘ldirishi lozim. Kelajakda raqamli ko‘nikmalarni rivojlantirish (upskilling) nafaqat texnik xodimlar, balki barcha bo‘g‘indagi menejerlar uchun majburiy talabga aylanishi shart.

Xulosa qilib aytganda, raqamli iqtisodiyot sharoitida O‘zbekiston kichik va o‘rta biznes subyektlarining muvaffaqiyati ularning o‘zgarishlarga qanchalik tez moslasha olishiga bog‘liq. Institutsional to‘siqlarni davlat va xususiy sektor hamkorligi orqali, psixologik to‘siqlarni esa ta’lim va korporativ madaniyatni transformatsiya qilish orqali yengish mumkin. Raqamli menejment — bu shunchaki trendlarga ergashish emas, balki shiddat bilan o‘zgarayotgan global bozorda korxonaning yashovchanligini va barqaror o‘sishini ta’minlovchi yagona mexanizmdir. Ushbu yo‘lda amalga oshiriladigan har bir qadam, kiritilgan har bir innovatsion yechim oxir-oqibat mamlakatning umumiy iqtisodiy salohiyatini yuksaltirishga xizmat qiladi. Raqamli tafakkurning shakllanishi mahalliy biznesni dunyo bozoriga integratsiya qilishning eng qisqa va samarali yo‘lidir. Tadbirkorlar va menejerlar bugungi kunda "texnologik moslashuvchanlik"ni o‘zlarining asosiy raqobat ustunligi sifatida qabul qilishlari, eskirgan boshqaruv andozalaridan voz kechib, kelajak texnologiyalariga ishonch bilan qadam bosishlari davrning qat’iy talabidir.

Foydalanilgan adabiyotlar:

1. **O‘zbekiston Respublikasi Qonuni.** Raqamli iqtisodiyotni rivojlantirish chora-tadbirlari to‘g‘risidagi O‘zbekiston Respublikasi Prezidentining qarori, 03.07.2018 yildagi PQ-3832-son // Qonun hujjatlari ma’lumotlari milliy bazasi. – 2018.
2. **Gulyamov, S. S.** Raqamli iqtisodiyotda menejment va marketing: darslik / S. S. Gulyamov va boshq. – Toshkent: Iqtisod-Moliya, 2020. – 456 b.
3. **Abdurahmonov, Q. H.** Inson resurslarini boshqarish: darslik / Q. H. Abdurahmonov. – Toshkent: Fan va texnologiya, 2017. – 650 b.
4. **Nabieva, N. M.** Raqamli transformatsiya sharoitida kichik biznesni boshqarishning o‘ziga xos xususiyatlari // "Iqtisodiyot va innovatsion texnologiyalar" ilmiy elektron jurnali. – 2021. – № 3. – B. 112–120.
5. **Drucker, P. F.** Management Challenges for the 21st Century / P. F. Drucker. – Harper Business, 2006. – 288 p. (O‘zbek tilidagi tarjimasi: **Druker, P.** XXI asr uchun menejment muammolari).

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6. **Turg‘unov, M. A.** Korporativ madaniyat va raqamli menejment: o‘zaro bog‘liqlik tahlili // O‘zbekiston iqtisodiyoti axborotnomasi. – 2022. – № 5. – B. 45–52.
7. **Zaynutdinov, Sh. N.** Menejment asoslari: darslik / Sh. N. Zaynutdinov. – Toshkent: Moliya, 2019. – 320 b.

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INTERACTIVE TEACHING AND LEARNING METHODS

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Аннотация: *Данной статье рассматриваются инновационные методики обучения русского языка и литературы, Современное образование должно быть ориентировано на подготовку учащихся к успешной методике обучения играют ключевую роль в достижении этой цели, так как они способствуют активному развитию творческих способностей и интеллектуальной активности учеников. социализации и адаптации на рынке труда в быстро меняющемся обществе.*

Annotation: *This article examines innovative methods for teaching Russian language and literature. Modern education should be focused on preparing students for success. These methods play a key role in achieving this goal, as they promote the active development of students' creative abilities and intellectual activity. They also contribute to their socialization and adaptation to the labor market in a rapidly changing society.*

Ключевые слова: *инновация, методика, обучения, проблема, аналитическое мышления, мотивационное методика, креативное мышление, поиск, решений.*

Key words: *innovation, methodology, learning, problem, analytical thinking, motivational technique, creative thinking, search, solutions.*

Modern educators increasingly recognize that problem-based learning leads to a deeper understanding of the material and active student engagement in the learning process. Therefore, the development and application of innovative teaching methods is becoming an important component of modern teaching practice.

Indeed, strategies that directly influence the learning process and strategies that create the conditions for learning and overcoming psychological difficulties can be considered as two main groups. 1. Cognitive strategies: These strategies help students comprehend and structure the material they are studying. These include methods of analysis, comparison, generalization, and others. Cognitive strategies help students effectively process information and assimilate it.

2. Memorization strategies: These are aimed at retaining information in memory. These strategies may include the use of mnemonic devices, repetition, organizing information into diagrams, and others. Memorization strategies help students consolidate the material they have learned and recall it more easily in the future.

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3. Compensatory Strategies: These strategies help learners overcome difficulties that arise during learning or communicating in a foreign language. They include techniques such as searching for additional information, using context to understand unfamiliar words, using idioms to express their thoughts, etc.

The second group of strategies is related to creating favorable learning conditions and overcoming psychological difficulties:

1. Strategies for Creating Conditions for Learning: These strategies include organizing the learning space, using various teaching methods, and support from teachers and the community. Creating a suitable learning environment promotes effective learning.

2. Strategies for Overcoming Psychological Difficulties: These are aimed at supporting students in overcoming stress, anxiety, uncertainty, and other psychological problems that may arise during the learning process. These strategies may include motivational techniques, relaxation methods, counseling, and support from teachers and psychologists. Both groups of strategies are important for successful learning and contribute to the effective acquisition of educational material and the development of study skills in students. The development of modern educational technologies has brought significant changes to the educational process and teaching methods, particularly in the field of foreign language learning. The introduction of audio and video recordings, computer programs, and distance learning has significantly enriched the learning environment and provided students with new opportunities for effective learning.

One of the main advantages of using information technology in education is the ability to create interactive and adaptive learning materials that can be tailored to the individual needs of each student. This allows each student to develop at their own pace and level, which facilitates more effective knowledge acquisition.

Innovative teaching methods focused on active student participation also play an important role in modern pedagogy. Engaging students in activities, collaborative work, and the exchange of opinions not only promotes a deeper understanding of the material but also develops communication and social skills. Thus, innovative approaches to teaching and the use of modern educational technologies help make the learning process more interactive, accessible, and effective for all students, ultimately contributing to their successful learning and development.

1. Working proactively, anticipating development: Innovative learning is focused on anticipating the future needs and demands of society and the labor market. This helps prepare students for the challenges they may face in the future and equips them with the necessary skills and knowledge to adapt successfully.

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2. Openness to the Future: Innovative learning encourages students to be flexible, adaptive, and open to new ideas and opportunities. It stimulates creative thinking and the search for innovative solutions.

3. Focus on the individual and their development: Innovative learning takes into account the individual needs, interests, and abilities of each student. It aims not only to impart knowledge but also to develop personal development, critical thinking, and communication and social skills.

4. Mandatory Elements of Creativity: Innovative learning emphasizes stimulating students' creative thinking and activity. It encourages experimentation, exploration, and independent creativity.

5. Partnership-based relationships: Innovative learning builds relationships between teacher and student based on partnership, collaboration, and mutual support. It creates an atmosphere of trust and respect that promotes more effective learning and personal development.

Innovations in education are reflected in all aspects of the educational process and are aimed at improving its quality, adapting it to changing conditions and societal needs, and ensuring the personal development of each student.

The use of innovative teaching methods in teaching Russian language and literature not only helps develop students' creative abilities but also makes the learning process more interesting and productive. Let's take a closer look at some of them:

1. Clusters: This method helps organize and structure information in the form of association charts or diagrams. Students can use clusters to analyze texts, take notes, and organize their thoughts and ideas.

2. Inserts: This technique involves including additional information or comments while studying independently. It helps students better understand what they've read and expand their knowledge.

3. Table Completion: This method promotes the organization and comparison of information. Students can use tables to organize data, compare texts, and analyze characters and themes.

4. Two-Part Journal: This technique allows students to express their thoughts, reflections, and impressions in journal form, which promotes writing development and self-expression.

5. Stop-Reading: This method helps students gain a deeper understanding of the text, draw conclusions, and analyze plot lines and characters.

6. Collaborative Research: This technique encourages collective activity and the exchange of opinions, which contributes to the development of communication skills and creative thinking.

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7. Cross-Discussion: This method allows students to express their arguments, analyze others' points of view, and develop argumentation and dialogue skills.

8. Using project-based learning in teaching Russian language and literature is truly an effective method for developing a variety of students' skills and abilities. Let's consider the main advantages of this approach:

1. Increased interest and motivation: Project-based activities stimulate students' interest because they have the opportunity to choose topics that interest them most and independently determine the direction of their research.

2. Developing creativity: Projects allow students to express their individuality by proposing original ideas and solutions, which fosters creativity.

3. Developing independent work and research skills: Participation in projects requires students to demonstrate independence, organizational skills, and the ability to work with large amounts of information, which develops their research skills.

4. Developing communication and collaboration skills: Group project work teaches students effective interaction, collaborative problem-solving, and develops communication and collaboration skills.

5. Creating an atmosphere of mutual respect and trust: Student participation in projects fosters an atmosphere of mutual respect and trust between them and the teacher, which positively impacts the overall classroom climate.

6. Encouraging teamwork and individual development: Projects allow students to discover and demonstrate their individual abilities and strengths while working in a team, which fosters teamwork and mutual support. Using project-based learning in Russian language and literature is an effective tool for promoting students' well-rounded development and creating a supportive learning environment.

The use of various non-traditional elements in the lesson, such as vocabulary dictation, riddle composition, annotated writing, and others, truly makes the lesson more interesting and engages students. It is important for students to find learning engaging and enjoyable, and this requires using a variety of methods and forms of work in the lesson. Such elements not only make the lesson more engaging but also develop students' creative thinking and foster a positive attitude toward the subject being studied.

References:

1. Kanarskaya, O. V., Innovative Learning. St. Petersburg, 2. Mynbaeva, A. K., Sadvakassova, Z. M., Innovative Teaching Methods, or How to Make Teaching Interesting: A Tutorial. A, 2009.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
3. Patarakin, E., Swarm Network Interactions, Educational Technology & Society, 8 (2), 4. Pedagogical Workshops: Theory and Practice. Compiled by N. I. Belova and I. A. Mukhina. St. Petersburg, 1998.

5. Soosar, N., Zamkovaya, N., Interactive Methods of Teaching and Learning. St. Petersburg, 2004.

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SPECIES AND SPECIES CRITERIA. MAIN DIRECTIONS OF EVOLUTION

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Abstract:

This article examines the concept of species and the criteria of species in biology. It also analyzes the main directions of evolution, including biological progress and regression, as well as evolutionary changes such as aromorphosis, idioadaptation, and general degeneration. Species criteria are considered based on morphological, genetic, ecological, and physiological characteristics. This study is important for understanding the diversity and evolutionary development of living organisms.

Keywords:

Species, species criteria, evolution, biological progress, biological regression, aromorphosis, idioadaptation, degeneration, morphological criterion, genetic criterion, ecological criterion

ВИД И КРИТЕРИИ ВИДА. ОСНОВНЫЕ НАПРАВЛЕНИЯ ЭВОЛЮЦИИ

Аннотация:

В данной статье рассматриваются понятие вида и критерии вида в биологии. Также анализируются основные направления эволюции, включая биологический прогресс и регресс, а также такие эволюционные изменения, как ароморфоз, идиоадаптация и общая дегенерация. Критерии вида изучаются на основе морфологических, генетических, экологических и физиологических признаков.

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Данное исследование имеет важное значение для понимания разнообразия и эволюционного развития живых организмов.

Ключевые слова:

Вид, критерии вида, эволюция, биологический прогресс, биологический регресс, ароморфоз, идиоадаптация, дегенерация, морфологический критерий, генетический критерий, экологический критерий

TUR VA TUR MEZONLARI. EVOLYUSIYANING ASOSIY YO‘NALISHLARI

Annotatsiya:

Ushbu maqolada biologiyada tur tushunchasi va tur mezonlarining ilmiy asoslari tahlil qilinadi. Shuningdek, evolyusiyaning asosiy yo‘nalishlari — biologik progress va regress jarayonlari, aromorfoz, idioadaptatsiya va umumiy degeneratsiya kabi evolyusion o‘zgarishlar yoritilgan. Tur mezonlari sifatida morfologik, genetik, ekologik va fiziologik belgilar asosida turning aniqlanishi ko‘rib chiqiladi. Mazkur tadqiqot tirik organizmlarning xilma-xilligi va evolyusion rivojlanishini tushunishda muhim ahamiyat kasb etadi.

Kalit so‘zlar:

Tur, tur mezonlari, evolyusiya, biologik progress, biologik regress, aromorfoz, idioadaptatsiya, umumiy degeneratsiya, morfologik mezon, genetik mezon, ekologik mezon

Kirish. Biologiya fanida tur tushunchasi tirik organizmlarni tasniflash va ularning evolyusion rivojlanishini tushuntirishda asosiy o‘rin tutadi. Tur — bu umumiy kelib chiqishga ega bo‘lgan, o‘zaro erkin chatisib nasl bera oladigan va ma’lum ekologik sharoitda yashovchi organizmlar majmuasidir. Turning to‘g‘ri aniqlanishi va tasniflanishi biologik xilma-xillikni o‘rganish, muhofaza qilish hamda evolyusion jarayonlarni chuqur anglashda muhim ahamiyat kasb etadi.

Hozirgi zamon biologiyasida tur mezonlari orqali organizmlarni aniqlash va farqlash muhim ilmiy masalalardan biri hisoblanadi. Morfologik, genetik, ekologik va fiziologik mezonlar turning mustaqil birlik sifatida ajratilishiga xizmat qiladi. Shu bilan birga, evolyusiyaning asosiy yo‘nalishlari tirik organizmlarning tarixiy rivojlanishini, ularning moslanish darajasi va biologik xilma-xilligini tushuntirishda muhim nazariy asos bo‘lib xizmat qiladi.

Mazkur maqolaning maqsadi tur tushunchasi va tur mezonlarini ilmiy jihatdan tahlil qilish, shuningdek evolyusiyaning asosiy yo‘nalishlarini yoritishdan iborat. Ushbu maqsadga erishish uchun turning asosiy mezonlari va evolyusion

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o‘zgarishlarning asosiy shakllari ko‘rib chiqiladi hamda ularning biologik ahamiyati ochib beriladi.

Mavzuga oid adabiyotlar tahlili. Biologiya fanida tur tushunchasi va uning mezonlari ko‘plab olimlar tomonidan o‘rganilgan muhim ilmiy masalalardan biri hisoblanadi. Xususan, Charles Darwin o‘zining evolyusiya nazariyasida turlar tarixiy rivojlanish jarayonida shakllanishini ta’kidlab, tabiiy tanlanish orqali yangi turlar paydo bo‘lishini asoslab bergan. Uning qarashlari turning o‘zgaruvchanligi va moslanish xususiyatlarini tushuntirishda muhim ahamiyat kasb etadi.

Keyinchalik Ernst Mayr tomonidan biologik tur tushunchasi yanada rivojlantirilib, tur — o‘zaro erkin chatisib, serhosil avlod bera oladigan va boshqa guruhlardan reproduktiv jihatdan ajralgan organizmlar majmuasi sifatida ta’riflangan. Ushbu yondashuv zamonaviy biologiyada turning asosiy mezonlaridan biri sifatida keng qo‘llaniladi.

Zamonaviy tadqiqotlarda esa tur mezonlari yanada kengaytirilib, morfologik, genetik, ekologik va fiziologik belgilar asosida aniqlanishi ta’kidlanadi. Evolyusiyaning asosiy yo‘nalishlari — biologik progress va regress, aromorfoz, idioadaptatsiya kabi jarayonlar orqali tirik organizmlarning murakkablashuvi va moslanishi tushuntiriladi. Shu jihatdan, tur tushunchasi va evolyusion jarayonlarni o‘rganish biologik xilma-xillikni anglashda muhim nazariy asos bo‘lib xizmat qiladi.

Asosiy qism. Tur tushunchasi va uning nazariy asoslari.Tabiatda o‘simliklar va hayvonlar turlarining xilma-xilligi nihoyatda keng bo‘lishiga qaramay, ularning barchasi to‘liq va har tomonlama o‘rganilgan deb bo‘lmaydi. Shu sababli biologiya fanida tur tushunchasiga yagona, universal ta’rif berish murakkab masala bo‘lib qolmoqda. Tarix davomida turga turli yondashuvlar asosida ko‘plab ta’riflar berilgan bo‘lsa-da, ularning aksariyati turning alohida belgilariga asoslanadi.

Tur tushunchasini izohlashda asosan ikki asosiy konsepsiya — tipologik va evolyutsion yondashuvlar ajratiladi. Tipologik konsepsiyada turning asosiy vazifasi uni boshqa turlardan ajratib turuvchi barqaror belgilar orqali aniqlashdan iborat bo‘lib, bunda turning statik xususiyatlariga e’tibor qaratiladi. Evolyutsion konsepsiyada esa tur dinamik tizim sifatida qaraladi, ya’ni u tarixiy rivojlanish jarayonida shakllanib, o‘zgarib boruvchi biologik birlik sifatida talqin etiladi. Zamonaviy biologiyada tur populyatsiyalar tizimi sifatida qaraladi. Bunda tur o‘zaro genetik va reproduktiv jihatdan bog‘langan populyatsiyalar yig‘indisidan iborat bo‘lib, ularning boshqa turlardan ajralib turishi asosiy mezon hisoblanadi. Shu nuqtai nazardan, biologik tur o‘zaro erkin chatishib, serhosil avlod bera oladigan va boshqa guruhlardan reproduktiv jihatdan ajralgan organizmlar majmuasi sifatida tavsiflanadi. Biroq bu ta’rif ham

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mukammal emas, chunki jinssiz ko‘payuvchi organizmlar yoki ayrim maxsus holatlar unda to‘liq aks etmaydi.

Tur mezonlari. Tur organik olamning eng murakkab va ko‘p qirrali biologik birliklaridan biri hisoblanadi. Shu sababli uni o‘rganishda faqat ayrim belgi yoki xossalarga emas, balki kompleks yondashuvga asoslanish zarur. Aynan shu nuqtai nazardan tur mezonlari muhim ahamiyat kasb etadi. Turni aniqlashda bir nechta asosiy mezonlar qo‘llaniladi.

Morfologik mezon. Morfologik mezon Djon Rey va Carl Linnaeus davridan boshlab keng qo‘llanilib kelinadi. U organizmlarning tashqi va ichki tuzilishidagi o‘xshashlik va farqlarni o‘rganishga asoslanadi. Masalan, O‘zbekistonda uchraydigan g‘o‘za turlari — Gossypium hirsutum va Gossypium barbadense barg shakli, ko‘sak tuzilishi, gul rangi, chanoqlar soni va boshqa belgilar bilan bir-biridan farq qiladi. Xuddi shunday farqlar eski dunyo g‘o‘zalari — G. arboreum va G. herbaceum turlarida ham kuzatiladi. Hayvonlarda ham bu mezon yaqqol ko‘rinadi. Masalan, chittaklar guruhida tojdor chittak boshidagi toj shakli bilan ajralib turadi, katta chittak va qo‘ng‘ir boshli chittak esa bosh tuzilishi va rang jihatidan farqlanadi.

Fiziologik-bioximiyaviy mezon. Bu mezon organizmlarning hayotiy faoliyati va kimyoviy jarayonlariga asoslanadi. Tabiatda turli turlarga mansub organizmlar jinsiy jihatdan alohidalashgan bo‘ladi. Buning birinchi sababi — urchish davridagi xulq-atvor xususiyatlari. Masalan, qushlarda sayrash, rang namoyishi, hasharotlarda tovush chiqarish, hamda turli “urchish raqslari” juftlashuvni belgilaydi. Mollyuskalar va boshqa hayvonlarda ham maxsus xatti harakatlar mavjud. Ikkinchi sabab esa jinsiy organlarning mos kelmasligi bilan bog‘liq. Masalan, gullarda bir turning changi boshqa tur gulida unmaydi yoki chang naychasi yetarli darajada o‘smaydi. Urug‘lanishdan keyingi alohidalanish ham muhim: turlararo duragaylar ko‘pincha pushtsiz yoki hayotchanligi past bo‘ladi. Shu bilan birga, bu mezonning cheklovlari ham bor. Jinssiz ko‘payuvchi organizmlar yoki ayrim mutant formalar bu tizimga to‘liq mos kelmaydi.

Genetik mezon. Genetik mezon turga xos genofond va xromosoma tuzilishiga asoslanadi. Har bir tur o‘ziga xos genetik tizimga ega bo‘lib, boshqa turlardan mustaqildir. Masalan, bug‘doy turlarida xromosomalar soni farq qiladi: Triticum monococcum — 14 ta; Triticum durum — 28 ta; Triticum vulgare — 42 ta; G‘o‘za turlarida ham 26 va 52 xromosomali shakllar mavjud. Ba’zi hollarda xromosoma soni bir xil bo‘lsa ham, turlar morfologik va genetik jihatdan farq qiladi. Masalan, karam va turpda xromosoma soni teng bo‘lsa-da, ularning duragaylari pushtsiz bo‘ladi. Bu holat har bir turning evolyutsiya jarayonida genetik jihatdan mustaqil tizim sifatida shakllanganini ko‘rsatadi.

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Genetik birlik biogeotsenozda har bir turning alohida ekologik o‘rin egallashi va bir xil adaptatsiyaga ega ikki turning tabiatda uchramasligi bilan ham tasdiqlanadi.

Evolyusiyaning asosiy yo‘nalishlari.Evolyusiya tirik organizmlarning tarixiy rivojlanish jarayoni bo‘lib, ularning tashqi va ichki tuzilishi, moslanish xususiyatlari hamda yashash muhitiga nisbatan o‘zgarishlarini o‘z ichiga oladi. Evolyusion jarayonlar natijasida organizmlar murakkablashishi yoki aksincha soddalashishi, yangi turlar paydo bo‘lishi yoki ayrim turlar yo‘qolib ketishi mumkin. Biologiyada evolyusiyaning asosiy yo‘nalishlari sifatida biologik progress, biologik regress hamda morfofiziologik o‘zgarishlar — aromorfoz, idioadaptatsiya va umumiy degeneratsiya ajratiladi.

Biologik progress. Biologik progress evolyusiyaning eng muhim yo‘nalishlaridan biri bo‘lib, u turlar sonining ortishi, ularning arealining kengayishi va yangi sistematik guruhlarning paydo bo‘lishi bilan tavsiflanadi. Bu jarayon natijasida organizmlar muhitga yaxshi moslashadi va keng hududlarda tarqaladi.Biologik progressga erishgan guruhlarda hayot shakllari xilma-xillashadi, populyatsiyalar ko‘payadi va yangi ekologik sharoitlarni egallash imkoniyati paydo bo‘ladi. Masalan, hasharotlar sinfi Yer yuzida eng katta biologik progressga erishgan guruh hisoblanadi, chunki ular deyarli barcha ekologik muhitlarda uchraydi. Xuddi shuningdek, gulli o‘simliklar ham evolyusion jarayonda katta progressga erishib, yer yuzida dominant o‘simlik guruhiga aylangan.

Biologik regress. Biologik regress esa biologik progressga qarama-qarshi jarayon bo‘lib, turlar sonining kamayishi, arealning torayishi va yo‘qolib ketish xavfining ortishi bilan xarakterlanadi. Bu holat ko‘pincha muhit sharoitlarining o‘zgarishi, raqobatning kuchayishi yoki moslashuvning yetarli darajada bo‘lmasligi natijasida yuzaga keladi.Biologik regressga uchragan turlar asta-sekin kamayib boradi va ba’zan butunlay yo‘qolib ketadi. Masalan, qadimgi geologik davrlarda yashagan ko‘plab yirik sudralib yuruvchilar (dinozavrlar) evolyusion jarayonda yo‘qolib ketgan. Hozirgi davrda esa ayrim noyob hayvon va o‘simlik turlari ham regress holatida bo‘lib, ularni saqlab qolish muhim ekologik vazifa hisoblanadi.

Aromorfoz. Aromorfoz evolyusiyaning eng yirik va muhim yo‘nalishlaridan biri bo‘lib, u organizmlarning umumiy tuzilish darajasini oshiruvchi yirik evolyusion o‘zgarishlarni anglatadi. Aromorfoz natijasida organizmlarda yangi organlar, tizimlar yoki funksional imkoniyatlar paydo bo‘ladi. Bu o‘zgarishlar organizmlarning yashash sharoitiga moslashuv imkoniyatini kengaytiradi va yangi muhitlarni egallashga yordam beradi. Masalan, ko‘p hujayralilikning paydo bo‘lishi, umurtqalilarda nerv tizimining murakkablashuvi, yurak va qon aylanish tizimining rivojlanishi aromorfozga misol bo‘la oladi.

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Idioadaptatsiya. Idioadaptatsiya — bu organizmlarning muayyan muhit sharoitiga moslashishi natijasida yuzaga keladigan, lekin umumiy tuzilish darajasini keskin o‘zgartirmaydigan evolyusion o‘zgarishdir. Bu jarayonda organizmning asosiy tuzilishi saqlanib qoladi, ammo ayrim belgilar moslashuvga qarab o‘zgaradi.Masalan, qushlarning tumshuq shakli ularning oziqlanish turiga qarab turlicha bo‘ladi: burgutlarda kuchli va egri tumshuq, kolibrilarda ingichka va uzun tumshuq, o‘rdaklarda esa yassi tumshuq rivojlangan. Xuddi shuningdek, baliqlarning tana shakli suv muhitida tez harakatlanishga moslashgan holda turlicha bo‘lishi ham idioadaptatsiyaga misol bo‘ladi.

Umumiy degeneratsiya. Umumiy degeneratsiya evolyusiyaning yana bir yo‘nalishi bo‘lib, u organizm tuzilishining soddalashuvi yoki ayrim organlarning yo‘qolishi bilan tavsiflanadi. Bu jarayon odatda parazit hayot tarziga o‘tgan organizmlarda uchraydi.Parazit organizmlar tayyor oziqa muhitida yashagani uchun ba’zi organlarini yo‘qotadi yoki ularning funksiyasi kamayadi. Masalan, parazit chuvalchanglarda ovqat hazm qilish tizimi qisqaradi yoki butunlay yo‘qoladi, chunki ular oziqani to‘g‘ridan-to‘g‘ri xo‘jayin organizmidan oladi. Shu bilan birga, sezgi organlari ham soddalashishi mumkin.

Xulosa. Xulosa qilib aytganda, tur tushunchasi biologiya fanining eng muhim va murakkab asosiy kategoriyalaridan biri bo‘lib, tirik organizmlarni tasniflash va ularning evolyusion rivojlanishini tushunishda asosiy o‘rin tutadi. Turga berilgan turli ta’riflar va yondashuvlar uning murakkab biologik tizim ekanligini ko‘rsatadi. Zamonaviy biologiyada esa tur populyatsiyalar tizimi sifatida qaralib, ularning genetik va reproduktiv bog‘liqligi asosiy mezon sifatida e’tirof etiladi.

Turni aniqlashda qo‘llaniladigan morfologik, fiziologik-bioximiyaviy va genetik mezonlar bir-biri bilan uzviy bog‘liq bo‘lib, hech biri alohida holda universal mezon sifatida to‘liq yetarli emas. Shu sababli turga kompleks yondashuv uning to‘liq va aniq tavsifini berishda eng to‘g‘ri ilmiy usul hisoblanadi. Ayniqsa, genetik mezon turning evolyusion mustaqilligini ko‘rsatishda muhim ahamiyatga ega bo‘lsa, morfologik va fiziologik mezonlar uning tashqi va funksional xususiyatlarini yoritishda xizmat qiladi.

Evolyusiyaning asosiy yo‘nalishlari — biologik progress, biologik regress, aromorfoz, idioadaptatsiya va umumiy degeneratsiya — tirik organizmlarning tarixiy rivojlanish jarayonini tushuntirishda muhim nazariy asos bo‘lib xizmat qiladi. Ushbu yo‘nalishlar orqali organizmlarning murakkablashuvi, moslashuvi yoki soddalashuvi jarayonlari, shuningdek, yangi turlarning paydo bo‘lishi va ayrim turlarning yo‘qolib ketishi ilmiy jihatdan asoslanadi. Umuman olganda, tur va evolyusiya jarayonlarini kompleks o‘rganish biologik xilma-xillikni chuqur anglash, tabiatdagi murakkab

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bog‘lanishlarni tushunish hamda tirik organizmlarning rivojlanish qonuniyatlarini ochib berishda muhim ilmiy ahamyatga ega.

ADABIYOTLAR

1. Raximov A.K. “Evolyutsion ta’limot” o’quv fani uchun elektron qo’llanma G’G’ Intellektual mulk agentligi. Toshkent, 2017.

2. “JONLI VA JONSIZ TABIAT”. Modern Education and Development, vol. 23, no. 3, Apr. 2025, pp. 351-6, https://scientific-jl.com/mod/article/view/7685.

3. O’ZBEKISTON QO’RIQXONALARI. HISOR QO’RIQXONASI. (2025). Modern Education and Development, . https://scientific-jl.com/mod/article/view/7260

4. A.S.To’xtaev. Ekologiya Toshkent ,O’qituvchi 2001.

5.Raximov A.K. Evolyutsion ta’limot fanidan pedagogik tajriba- sinov o’tkazish materiallari. O’quv qo’llanma.Tashkent, 2019

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ATMOSFERADAGI ISSIQXONA GAZLARINI KIMYOVIY USULDA KAMAYTIRISH TEXNOLOGIYALARI

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ANNOTATSIYA: Ushbu maqolada atmosferadagi issiqxona gazlarini, xususan karbonat angidrid (CO_2), metan (CH_4) va azot oksidlarini (NO_x) kimyoviy usullar yordamida kamaytirish texnologiyalari keng yoritilgan. Issiqxona gazlari global iqlim o‘zgarishining asosiy omillaridan biri bo‘lib, ularning miqdorini kamaytirish ekologik barqarorlikni ta’minlashda muhim ahamiyatga ega. Maqolada gazlarni tutib qolish (capture), adsorbsiya, absorbsiya, katalitik parchalanish va fotokataliz kabi zamonaviy usullar tahlil qilinadi. Shuningdek, CO_2 ni foydali kimyoviy mahsulotlarga aylantirish texnologiyalari ham ko‘rib chiqiladi.

KALIT SO‘ZLAR: issiqxona gazlari, CO_2, metan, adsorbsiya, absorbsiya, kataliz, fotokataliz, yashil kimyo

АННОТАЦИЯ: В данной статье рассматриваются современные химические технологии снижения концентрации парниковых газов в атмосфере, включая углекислый газ (CO_2), метан (CH_4) и оксиды азота (NO_x). Парниковые газы являются одной из основных причин глобального изменения климата, поэтому их снижение имеет важное экологическое значение. В работе анализируются методы улавливания газов, адсорбции, абсорбции, каталитического разложения и фотокатализа. Также рассматриваются технологии переработки CO_2 в полезные химические продукты.

НА РУССКОМ: парниковые газы, CO_2, метан, адсорбция, абсорбция, катализ, фотокатализ, зелёная химия

ENGLISH ABSTRACT: This article presents modern chemical technologies for reducing greenhouse gases in the atmosphere, including carbon dioxide (CO_2), methane (CH_4), and nitrogen oxides (NO_x). Greenhouse gases are one of the main drivers of global climate change, making their reduction highly important. The paper analyzes gas capture methods, adsorption, absorption, catalytic decomposition, and photocatalysis. Additionally, CO_2 conversion into valuable chemical products is discussed.

IN ENGLISH: greenhouse gases, CO_2, methane, adsorption, absorption, catalysis, photocatalysis, green chemistry.

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ASOSIY QISM

Atmosferadagi issiqxona gazlari miqdorining ortishi global iqlim o‘zgarishining asosiy sababi hisoblanadi. Ushbu gazlar orasida karbonat angidrid (CO_2), metan (CH_4), azot oksidlari (NO_x) va boshqa sanoat gazlari muhim o‘rin tutadi. Ularni kamaytirish uchun zamonaviy kimyoviy va fizik-kimyoviy texnologiyalar ishlab chiqilgan bo‘lib, ular gazlarni tutib qolish, tozalash va qayta ishlashga asoslanadi.

1. Gazlarni tutib qolish texnologiyalari

Issiqxona gazlarini kamaytirishning birinchi bosqichi ularni manbadan ajratib olishdir. Bu jarayon sanoat korxonalari, issiqlik elektr stansiyalari va ishlab chiqarish korxonalarida amalga oshiriladi. Gazlarni tutib qolish texnologiyalari uch asosiy yo‘nalishga bo‘linadi: suyuq erituvchilar yordamida yutish, qattiq sorbentlar yordamida adsorbsiya va membrana orqali ajratish. Absorbsiya usuli sanoatda eng keng tarqalgan texnologiya hisoblanadi. Bu jarayonda CO_2 gazlari maxsus kimyoviy eritmalar, asosan aminlar yordamida yutiladi. Keyinchalik eritma qizdirilib, CO_2 ajratib olinadi. Bu usul yuqori samaradorlikka ega bo‘lsa-da, katta energiya sarfini talab qiladi.

Adsorbsiya usulida esa gazlar qattiq moddalar yuzasiga yutiladi. Zeolitlar, aktiv ko‘mir va metall-organik karkaslar eng samarali sorbentlar hisoblanadi. Ushbu usulning afzalligi uning qayta ishlanish imkoniyati va nisbatan past energiya sarfi bilan bog‘liqdir. So‘nggi yillarda nanomateriallar asosidagi sorbentlar ishlab chiqilishi bu usulning samaradorligini sezilarli darajada oshirdi. Membrana texnologiyalari esa gazlarni fizik xususiyatlariga qarab ajratishga asoslanadi. Yarim o‘tkazuvchan membranalar CO_2 ni boshqa gazlardan ajratib olishda samarali hisoblanadi. Bu texnologiya avtomatlashtirishga qulay va ekologik xavfsizligi bilan ajralib turadi.

2. Gazlarni kimyoviy qayta ishlash

Tutib olingan gazlar faqat saqlanib qolmay, balki kimyoviy qayta ishlash orqali foydali mahsulotlarga aylantiriladi. Bu yo‘nalish “carbon utilization” deb ataladi. Ushbu jarayonlar orqali CO_2 metanol, metan va boshqa organik birikmalarga aylantirilishi mumkin.

Kimyoviy qayta ishlash jarayonlari katalizatorlar ishtirokida amalga oshiriladi. Katalizatorlar reaksiyalar tezligini oshiradi va energiya sarfini kamaytiradi. Ayniqsa, mis, rux va nikel asosidagi katalizatorlar keng qo‘llaniladi. Bundan tashqari, CO_2 ni polimer materiallarga aylantirish texnologiyalari ham rivojlanmoqda. Bu yo‘nalish plastik chiqindilarni kamaytirish va ekologik toza materiallar ishlab chiqarish imkonini beradi.

3. Fotokatalitik texnologiyalar

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Fotokataliz jarayonlari quyosh energiyasidan foydalanishga asoslangan. Titan dioksid (TiO_2) kabi yarimo‘tkazgichlar yorug‘lik ta’sirida faollashib, zararli gazlarni parchalaydi. Bu usul energiya tejamkor va ekologik toza hisoblanadi. Fotokatalitik jarayonlar ayniqsa shahar havosini tozalash va sanoat chiqindilarini kamaytirishda istiqbolli yo‘nalish sifatida qaralmoqda.

4. Biologik va tabiiy usullar

Tabiiy tizimlar ham issiqxona gazlarini kamaytirishda muhim rol o‘ynaydi. O‘simliklar va suv o‘tlari fotosintez jarayonida CO_2 ni yutib, kislorod ajratadi. Mikroorganizmlar esa metan va boshqa gazlarni parchalaydi. Bu usullar ekologik jihatdan eng toza hisoblanadi, lekin katta sanoat hajmida cheklangan imkoniyatlarga ega.

5. Zamonaviy materiallar va innovatsion yondashuvlar

So‘nggi yillarda nanomateriallar va yangi sorbentlar ishlab chiqilishi gazlarni tutish samaradorligini oshirmoqda. Metall-organik karkaslar (MOF) yuqori yuzaga ega bo‘lib, CO_2 ni juda samarali yutadi. Shuningdek, aqlli materiallar (smart materials) harorat va bosimga qarab o‘z xususiyatlarini o‘zgartirishi mumkin. Sun’iy intellekt yordamida esa yangi katalizatorlar va sorbentlarni modellashtirish ishlari olib borilmoqda. Bu esa ilmiy tadqiqotlarni tezlashtiradi va samaradorlikni oshiradi.

6. Umumiy yondashuv

Issiqxona gazlarini kamaytirish faqat bitta texnologiyaga tayanib amalga oshirilmaydi. Eng samarali natija bir nechta usullarni kompleks qo‘llash orqali erishiladi. Masalan, gazlarni tutib qolish, ularni qayta ishlash va tabiiy tizimlar bilan birlashtirish ekologik muvozanatni ta’minlashda muhim rol o‘ynaydi.

Muammolar va ularning tahlili

1. Yuqori energiya sarfi

CO_2 ni tutish va qayta ishlash jarayonlari katta energiya talab qiladi. Ayniqsa absorbsiya va regeneratsiya bosqichlari juda qimmat . Agar qayta tiklanuvchi energiya (quyosh, shamol) ishlatilsa, bu muammo kamayadi.

2. Katalizatorlarning qimmatligi

Platina, iridiy kabi katalizatorlar juda qimmat va kam uchraydi. Arzon nanokatalizatorlar ishlab chiqish zarur.

3. CO_2 ning kimyoviy barqarorligi

CO_2 inert modda bo‘lgani uchun reaksiyaga kirishi qiyin. Yuqori bosim, harorat va maxsus katalizatorlar talab etiladi.

4. Texnologik infratuzilma yetishmasligi

Ko‘plab mamlakatlarda gazlarni tutish va qayta ishlash tizimlari hali rivojlanmagan. Davlat investitsiyalari va ilmiy dasturlar zarur.

5. Ekologik xavflar

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Ba’zi erituvchilar toksik bo‘lishi mumkin va ikkilamchi ifloslanish keltirib chiqaradi .Yashil kimyo asosidagi erituvchilar ishlab chiqish muhim.

6. Iqtisodiy muammo

Texnologiyalar hali to‘liq arzon emas. Sanoat masshtabida ishlab chiqarish kengaysa, narxlar pasayadi.

XULOSA

Xulosa qilib aytganda, atmosferadagi issiqxona gazlarini kimyoviy usulda kamaytirish texnologiyalari zamonaviy ekologik kimyoning eng dolzarb va strategik yo‘nalishlaridan biri hisoblanadi. CO_2, CH_4 va NO_x kabi gazlarning atmosferadagi ortib borishi global iqlim o‘zgarishining asosiy omili bo‘lib, bu muammoni hal etish nafaqat ilmiy, balki amaliy jihatdan ham katta ahamiyatga ega. Olib borilgan tahlillar shuni ko‘rsatadiki, gazlarni kamaytirishning eng samarali yo‘li ularni bir vaqtning o‘zida tutib qolish va qayta ishlash texnologiyalarini kompleks qo‘llashdir. Absorbsiya va adsorbsiya usullari sanoatda keng qo‘llanilayotgan bo‘lsa-da, ularning energiya sarfi va iqtisodiy xarajatlari hali ham muammo bo‘lib qolmoqda. Shu bilan birga, membrana texnologiyalari, fotokataliz va biologik usullar ekologik tozaligi va energiya tejamkorligi bilan istiqbolli yo‘nalishlar sifatida ajralib turadi.

CO_2 ni faqat zararli chiqindi sifatida emas, balki qimmatli xomashyo sifatida qayta ishlash g‘oyasi ushbu sohadagi eng muhim ilmiy yondashuvlardan biridir. Metanol, metan va boshqa organik birikmalar ishlab chiqarish orqali karbonat angidriddan foydali mahsulotlar olish mumkinligi isbotlangan. Bu esa “yashil kimyo” tamoyillarini amaliyotga joriy etishda muhim rol o‘ynaydi.

Shuningdek, mavjud muammolar — yuqori energiya sarfi, katalizatorlarning qimmatligi, texnologik infratuzilmaning yetarli emasligi va ekologik xavflar — ushbu yo‘nalishning to‘liq rivojlanishiga to‘sqinlik qilayotgan asosiy omillardir. Biroq zamonaviy ilm-fan yutuqlari, xususan nanomateriallar, qayta tiklanuvchi energiya manbalari va yangi avlod katalizatorlarining ishlab chiqilishi bu muammolarni bosqichma-bosqich hal etish imkonini bermoqda.

Umuman olganda, issiqxona gazlarini kamaytirish texnologiyalari nafaqat ekologik muammolarni yumshatishga, balki yangi energiya manbalarini yaratishga ham xizmat qiladi. Kelajakda ushbu yo‘nalishning rivojlanishi global barqarorlikni ta’minlash, energiya xavfsizligini oshirish va atrof-muhitni muhofaza qilishda hal qiluvchi ahamiyat kasb etadi.

FOYDALANILGAN ADABIYOTLAR RO‘YXATI

1. Sodiqov B.X. Fizik kimyo asoslari. Toshkent: “Fan va texnologiya”, 2019.
2. Abdurahmonov A.A. Umumiy kimyo. Toshkent: “O‘qituvchi”, 2020.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
3. Xudoyberdiyev F.R. Analitik kimyo. Toshkent: “Yangi asr avlodi”, 2018.
4. To‘xtayev S.T. Ekologik kimyo va atrof-muhit muhofazasi. Toshkent: “Universitet”, 2021.
5. Rahimov O.Q. Atmosfera kimyosi va ekologik jarayonlar. Toshkent: “Fan”, 2022.

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METHODS OF TEACHING RUSSIAN AS A FOREIGN LANGUAGE: INNOVATIONS AND TRADITIONS

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Abstract. This article examines modern methods of teaching Russian as a foreign language, combining traditional and innovative approaches. It analyzes classical methods of teaching Russian as a foreign language, such as grammar-translation and audio-lingual methods, as well as modern communicative, project-based, and digital technologies. Particular attention is paid to the role of an intercultural approach and the use of information and communication technologies in the educational process. The article also substantiates the need to integrate traditional and innovative methods to improve the effectiveness of teaching Russian as a foreign language and develop students' communicative competence.

Keywords: Russian as a foreign language, Russian as a foreign language teaching methods, traditional teaching methods, innovative technologies, communicative approach, digital learning, intercultural communication.

In the context of globalization and expanding intercultural contacts, Russian as a foreign language (RFL) is acquiring particular significance. Growing interest in the study of Russian is driven by political, economic, educational, and cultural factors. This necessitates the search for effective methods of teaching RFL that combine time-tested traditional approaches with modern, innovative technologies. The relevance of this research is determined by the need to adapt RFL teaching methods to new educational conditions, the digitalization of education, and the changing communicative needs of students. The methodology of teaching Russian as a foreign language is an independent pedagogical science that studies the goals, content, methods, means, and forms of teaching Russian to foreigners. It draws on advances in linguistics, psychology, pedagogy, sociolinguistics, and cultural studies. The main goal of RFL teaching methods is to develop students' communicative competence, including linguistic, speech, sociocultural, and strategic competencies. The grammar-translation method is one of the earliest and most traditional methods of teaching foreign languages. This approach focuses on learning grammar rules, translating texts, and memorizing vocabulary. Advantages of the method:
systematic acquisition of grammatical structures; development of analytical thinking; development of written translation skills. Disadvantages: weak development of oral speech; low level of communicative focus; limited student motivation. Despite

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criticism, elements of the grammar-translation method are still used to explain complex grammatical phenomena of the Russian language. The audio-lingual method is based on repeated repetition of speech patterns, developing automated speaking and listening skills. The direct method involves teaching without using the students' native language. These methods promote: the development of correct pronunciation; the development of auditory memory; the acquisition of speech clichés. However, excessive mechanization of speech skills and the lack of a creative component limit their effectiveness in modern conditions. On the other hand, in the traditional teaching model, the teacher acts as the primary source of knowledge, and the textbook is the primary teaching tool. This system ensures structured and logical learning, but requires the addition of interactive learning activities.

The communicative approach is a leading trend in modern teaching methods for Russian as a foreign language. Its primary goal is to develop students' ability to use Russian as a means of real-world communication in various social, academic, and professional situations. This approach views language not as a system of isolated grammatical rules, but as a means of communication. Teaching is based on modeling speech situations that closely resemble real life. Particular attention is paid to the development of all types of speech activity: speaking, listening, reading, and writing. Thus, the communicative approach assumes an active role for the student, who becomes a participant in the learning process rather than a passive recipient of information. In this case, the teacher acts as the organizer and coordinator of learning activities, creating the conditions for verbal interaction. Using information and communication technologies in teaching Russian as a foreign language: The development of digital technologies has significantly changed approaches to teaching Russian as a foreign language. Information and communication technologies (ICT) allow for the expansion of the educational space and access to a variety of authentic materials. The main digital tools used in teaching Russian as a foreign language include: online platforms and educational websites; multimedia presentations; interactive exercises and tests; mobile language learning apps; videos and podcasts. The use of ICT facilitates the individualization of learning, increases student motivation, and develops their autonomy. Furthermore, digital technologies enable distance and blended learning, which is especially relevant in today's context. Project-based activities as a means of developing communicative competence: project-based methods occupy an important place among innovative methods of teaching Russian as a foreign language. It involves independent or group activities by students aimed at solving a specific communicative or research task. During project work, students actively use Russian to search for information, discuss, present, and organize their

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findings. Project topics can be varied: Russian culture and traditions, national cuisine, urban history, and professional communication. Project activities contribute to the development of: oral and written communication skills; critical and creative thinking; collaboration and responsibility; and intercultural competence. Furthermore, modern teaching of Russian as a foreign language is impossible without considering the sociocultural context. An intercultural approach is aimed at developing students' ability to effectively interact with representatives of other cultures. Teaching Russian as a foreign language involves studying not only linguistic norms but also speech behavior, national traditions, values, and communication norms. This helps avoid communication errors and promotes successful social adaptation of foreign students. The use of authentic texts, videos, fiction, and media materials helps develop a holistic understanding of the culture of native speakers. The next group of methods is interactive teaching methods. Interactive teaching methods focus on active interaction between students and the teacher. These methods include: role-playing and business games; discussions and debates; brainstorming; case studies; and problem-based learning. These methods create conditions for natural verbal communication and develop argumentation and independent thinking skills. Interactive forms of learning increase interest in learning Russian and promote sustainable motivation. Thus, the most effective combination of traditional and innovative methods in teaching Russian as a foreign language is an integrative approach that combines traditional teaching methods with modern innovations.

The use of project-based activities, digital, and multimedia technologies enhances motivation, develops student autonomy, and develops their communicative competence. The integration of information and communication technologies in teaching Russian as a foreign language expands educational opportunities, provides access to authentic materials, and enables an individualized and differentiated approach to learning. At the same time, the teacher's role is transformed: they act not only as a source of knowledge but also as an organizer, consultant, and moderator of the educational process. The sociocultural and intercultural component of teaching is particularly important in modern Russian as a foreign language (RFL) teaching methods, contributing to the development of intercultural communication skills in foreign students, an understanding of the cultural norms and traditions of native Russian speakers, and successful social adaptation. Thus, the study results confirm that the optimal model for teaching Russian as a foreign language is based on the integration of traditional and innovative teaching methods.

References

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
1. Azimov, E. G., Shchukin, A. N. New Dictionary of Methodological Terms and Concepts (Theory and Practice of Language Teaching). Moscow: IKAR, 2018.
2. Koryakovtseva, N. F. Modern Educational Technologies in Teaching Foreign Languages. Moscow: Academy, 2021.
3. Polat, E. S. New Pedagogical and Information Technologies in the Education System. Moscow: Academy, 2022.
4. Shchukin, A. N. Methods of Teaching Russian as a Foreign Language. Moscow: Flinta, 2020.

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YURAK, QON AYLANISH DOIRASI, AORTA VA UMUMIY UYQU ARTERIYASINING MORFOFUNKSIONAL AHAMIYATI

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Annotatsiya. Mazkur maqolada yurak, qon aylanish doiralari, aorta va umumiy uyqu arteriyasining odam organizmidagi morfofunksional ahamiyati ilmiy-nazariy jihatdan tahlil qilindi. Yurak-qon tomir tizimi tirik organizmda kislorod, oziq moddalar, gormonlar va metabolizm mahsulotlarini tashish, to‘qimalar homeostazini saqlash hamda arterial bosimni boshqarishda asosiy tizimlardan biri hisoblanadi. Yurak to‘rt kamerali mushak organ bo‘lib, o‘ng va chap bo‘limlari mos ravishda kichik va katta qon aylanish doiralariga xizmat qiladi. Zamonaviy anatomiya va fiziologiya manbalarida yurak ikki nasosli tizim sifatida talqin qilinadi: o‘ng yurak o‘pka qon aylanishini, chap yurak esa sistem qon aylanishini ta’minlaydi. Aorta chap qorinchadan boshlanadigan eng yirik arterial magistral bo‘lib, undan yurak, bosh, bo‘yin, ko‘krak, qorin bo‘shlig‘i va qo‘l-oyoqlarni qon bilan ta’minlovchi yirik tarmoqlar ajraladi. Umumiy uyqu arteriyasi esa bosh miya, yuz, bo‘yin va ko‘z sohasining qon bilan ta’minlanishida markaziy o‘rin tutadi. O‘zbek anatomik adabiyotlarida, jumladan A. G‘. Ahmedov, R. E. Xudoyberdiyev, N. K. Axmedov kabi mualliflar ishlarida yurak-qon tomir tizimi topografik, morfologik va funksional birlikda yoritilgan. Maqolada mahalliy va xalqaro manbalar asosida ushbu tuzilmalarning klinik ahamiyati, patologik jarayonlardagi o‘rni va tibbiy ta’limdagi metodik qiymati ochib berildi.

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Kalit so‘zlar: yurak, qon aylanish doirasi, aorta, umumiy uyqu arteriyasi, gemodinamika, arterial tizim, bosh miya qon aylanishi, anatomiya, fiziologiya.

KIRISH. Yurak-qon tomir tizimi organizmning hayotiy faoliyatini ta’minlovchi eng muhim tizimlardan biridir. Uning asosiy vazifasi faqat qonni harakatlantirish bilan chegaralanmaydi; bu tizim kislorod va oziq moddalarning to‘qimalarga yetkazilishi, karbonat angidrid va metabolik chiqindilarning chiqarilishi, tana haroratining nisbiy barqarorligi, immun hujayralar harakati va gormonal signal almashinuvida ham qatnashadi. Fiziologik nuqtai nazardan yurak-qon tomir tizimi ikki yirik aylanish halqasidan iborat: kichik, ya’ni o‘pka qon aylanish doirasi va katta, ya’ni sistem qon aylanish doirasi. Pulmonar aylanish qonni kislorod bilan boyitishga, sistem aylanish esa kislorodlangan qon va oziq moddalarni butun organizmga yetkazishga xizmat qiladi .

Yurak anatomik jihatdan ko‘krak qafasining markaziy qismida, to‘sh suyagi orqasida joylashgan mushak organidir. U to‘rt kameradan: o‘ng va chap bo‘lmachalar hamda o‘ng va chap qorinchalardan tashkil topgan. Zamonaviy anatomiya manbalarida yurak ikki funksional nasos sifatida talqin qilinadi: o‘ng yurak venoz qonni o‘pkaga yo‘naltiradi, chap yurak esa kislorodlangan qonni aorta orqali butun tanaga tarqatadi . Bu yondashuv yurakning oddiy “qon haydovchi organ” emas, balki murakkab, ritmik, nerv-gumoral boshqariladigan va qon tomir tizimi bilan uzviy ishlaydigan markaziy gemodinamik organ ekanini ko‘rsatadi.

O‘zbek tibbiy adabiyotlarida yurak-qon tomir tizimi masalasi anatomiya, fiziologiya, topografik anatomiya va klinik fanlar kesimida yoritiladi. A. G‘. Ahmedovning “Odam anatomiyasi” darsligi O‘zbekiston Oliy va o‘rta ta’lim vazirligi hamda Sog‘liqni saqlash vazirligi tomonidan tibbiyot institutlari bakalavriat talabalari uchun tavsiya etilgan manbalardan biri sifatida qayd etilgan . R. E. Xudoyberdiyev, N. K. Axmedov, X. Z. Zohidov, R. A. Alavi va C. A. Asomov muallifligidagi “Odam anatomiyasi” darsligi ham o‘zbek tilidagi muhim anatomik adabiyotlar qatoriga kiradi . Ushbu

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manbalar mavzuni o‘zbek tibbiy terminologiyasi bilan asoslashda muhim ilmiy-metodik tayanch bo‘lib xizmat qiladi.

Metodologiya. Maqola narrativ-tahliliy adabiyotlar sharhi metodiga asoslandi. Tadqiqotda yurak, qon aylanish doiralari, aorta va umumiy uyqu arteriyasiga oid mahalliy va xalqaro ilmiy-adabiy manbalar solishtirildi. Mahalliy manbalar sifatida o‘zbek tilidagi anatomiya darsliklari, xususan A. G‘. Ahmedov, R. E. Xudoyberdiyev, N. K. Axmedov va boshqa mualliflar tomonidan yaratilgan “Odam anatomiyasi” darsliklari asosiy o‘ringa qo‘yildi. Xalqaro manbalar sifatida NCBI Bookshelf/StatPearls platformasida keltirilgan yurak anatomiyasi, kardiovaskulyar fiziologiya, aorta va umumiy uyqu arteriyalari anatomiyasiga oid maqolalardan foydalanildi.

Materiallar tanlashda uchta mezon asos qilib olindi. Birinchidan, manbaning tibbiy-ta’limiy yoki ilmiy platformaga tegishliligi baholandi. Ikkinchidan, mavzuga bevosita aloqador anatomik va fiziologik ma’lumotlar ajratib olindi. Uchinchidan, yurak, aorta va karotid tizimning klinik ahamiyatini ochib beradigan ma’lumotlarga ustuvorlik berildi. Shu asosda yurakning kamerali tuzilishi, qon oqimining yurak ichidagi yo‘nalishi, kichik va katta qon aylanish doiralari, aortaning asosiy qismlari, aorta ravog‘i tarmoqlari, umumiy uyqu arteriyasining bifurkatsiyasi, karotid sinus va karotid tanachaning fiziologik roli tahlil qilindi.

Tahlil jarayonida faqat tasviriy anatomiya bilan cheklanilmadi. Masala morfofunksional yondashuv asosida ko‘rib chiqildi, ya’ni har bir anatomik tuzilmaning organizmdagi vazifasi, gemodinamik ahamiyati va klinik patologiyalardagi o‘rni birgalikda baholandi. Bu usul tibbiy ta’lim uchun muhim, chunki talabalar yurak, aorta yoki umumiy uyqu arteriyasini faqat nom va joylashuv sifatida emas, balki tirik organizmdagi faol tizim elementlari sifatida tushunishi kerak.

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Natija.. Tahlil natijalari shuni ko‘rsatadiki, yurak-qon tomir tizimining markaziy funksiyasi yurak, aorta va yirik arterial magistrallar o‘rtasidagi uzviy bog‘liqlik orqali amalga oshadi. Yurak ritmik qisqarishlar orqali qonni harakatlantiradi, aorta esa chap qorinchadan olingan yuqori bosimli kislorodlangan qonni sistem qon aylanishiga taqsimlaydi. Yurakning o‘ng bo‘limi venoz qonni o‘pka arteriyasi orqali o‘pkaga yuboradi, chap bo‘limi esa o‘pkadan kelgan kislorodlangan qonni aorta orqali butun tanaga tarqatadi. Bu jarayon fiziologik manbalarda ikki aylanish halqasi — pulmonar va sistem aylanish sifatida tushuntiriladi .

Yurak kameralarining funksional ketma-ketligi gemodinamik barqarorlikni ta’minlaydi. Venoz qon yuqori va pastki kovak venalar orqali o‘ng bo‘lmachaga keladi, uch tabaqali qopqoq orqali o‘ng qorinchaga o‘tadi, so‘ng o‘pka arteriyasi orqali o‘pkaga yo‘naltiriladi. O‘pkada gaz almashinuvidan so‘ng kislorodlangan qon o‘pka venalari orqali chap bo‘lmachaga, undan mitral qopqoq orqali chap qorinchaga o‘tadi. Chap qorincha kuchli qisqarish orqali qonni aorta qopqog‘idan o‘tkazib, aortaga haydaydi . Demak, yurak ichidagi qopqoqlar qon oqimining bir yo‘nalishda harakatlanishini ta’minlaydigan muhim mexanik tuzilmalar hisoblanadi. Umumiy uyqu arteriyasi bosh va bo‘yin qon ta’minotida strategik tomirdir. O‘ng umumiy uyqu arteriyasi yelka-bosh poyasidan, chap umumiy uyqu arteriyasi esa bevosita aorta ravog‘idan boshlanadi. Har ikki umumiy uyqu arteriyasi bo‘yin sohasida karotid qin ichida yuqoriga ko‘tarilib, odatda qalqonsimon tog‘ayning yuqori cheti yoki C4–C5 umurtqa darajasida ichki va tashqi uyqu arteriyalariga bo‘linadi . Ichki uyqu arteriyasi kalla bo‘shlig‘iga kirib, bosh miya va ko‘z sohasini qon bilan ta’minlaydi; tashqi uyqu arteriyasi esa yuz, bo‘yin, bosh terisi, til va jag‘ sohalariga qon yetkazadi .

Quyidagi jadval yurak, aorta va umumiy uyqu arteriyasining asosiy morfofunksional xususiyatlarini umumlashtiradi.

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Tuzilma	**Anatomik joylashuvi**	**Asosiy vazifasi**	**Klinik ahamiyati**
Yurak	Ko‘krak qafasi markazi, to‘sh suyagi orqasi	Qonni kichik va katta qon aylanish doiralariga haydash	Yurak yetishmovchiligi, aritmiyalar, qopqoq kasalliklari
Aorta	Chap qorinchadan boshlanadi	Sistem qon aylanishining asosiy arterial magistrali	Aorta anevrizmasi, diseksiya, koarktatsiya
Aorta ravog‘i	Yuqori ko‘ks oralig‘i	Bosh, bo‘yin va yuqori qo‘l tomirlariga tarmoqlar beradi	Braxiotsefal tomirlar stenozlari
Umumiy uyqu arteriyasi	Bo‘yin karotid qini ichida	Bosh va bo‘yin sohasiga qon yetkazuvchi tarmoqlarni beradi	Insult xavfi, karotid stenoz, karotid sinus reflekslari
Ichki uyqu arteriyasi	Kalla bo‘shlig‘iga kiradi	Bosh miya va ko‘z sohasini qon bilan ta’minlaydi	Miya ishemiyasi, ko‘rish buzilishlari
Tashqi uyqu arteriyasi	Yuz-bo‘yin sohasiga tarmoqlanadi	Yuz, til, jag‘, bosh terisi va bo‘yin tuzilmalarini oziqlantiradi	Yuz-jag‘ jarrohligi, qon ketishlar, travmalar

Muhokama. Yurak, aorta va umumiy uyqu arteriyasi alohida-alohida o‘rganilganda anatomik tuzilmalar sifatida ko‘rinadi, lekin ularni tizimli tahlil qilish markaziy gemodinamikaning yaxlit mexanizmini ochib beradi. Yurak chap qorinchasi sistola vaqtida qonni aortaga haydaydi. Aorta elastik devori yuqori bosimni qabul qilib, uni keyingi tomirlar bo‘ylab uzluksizroq oqimga aylantiradi. Shuning uchun aorta faqat “quvur” emas; u Windkessel mexanizmi orqali yurak qisqarishlari oralig‘ida ham qon oqimining davomiyligini saqlashga yordam beradigan elastik rezervuar vazifasini

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bajaradi. Katta arteriyalarning elastikligi yuqori bosimli qon oqimini moslashtirishda muhimligi zamonaviy fiziologiya manbalarida ham qayd etiladi .

O‘zbek anatomik maktabida yurak-qon tomir tizimi ko‘pincha tasviriy anatomiya, topografik anatomiya va klinik tafakkur uyg‘unligida o‘qitiladi. A. G‘. Ahmedovning “Odam anatomiyasi” darsligi tibbiyot bakalavrlari uchun tavsiya etilgan manba sifatida ko‘rsatilgani, unda anatomik tuzilmalarni o‘zbekcha terminologiya bilan o‘rganish imkonini beradi . R. E. Xudoyberdiyev va N. K. Axmedov muallifligidagi “Odam anatomiyasi” darsliklari esa o‘zbek tibbiy ta’limida anatomik bilimlar bazasini shakllantirgan muhim manbalar qatoriga kiradi. Bu adabiyotlarning kuchli tomoni shundaki, ular talabalarga mahalliy tibbiy terminologiya asosida tizimli anatomik tasavvur beradi. Zaif tomoni esa zamonaviy klinik vizualizatsiya, ultratovush, KT-angiografiya va MR-angiografiya bilan bog‘liq ma’lumotlarni yanada kengaytirish zaruratidir.

Xulosa. Yurak, qon aylanish doiralari, aorta va umumiy uyqu arteriyasi odam organizmida yagona morfofunksional tizim sifatida ishlaydi. Yurak qon harakatining markaziy nasosi bo‘lsa, aorta sistem qon aylanishining bosh magistrali, umumiy uyqu arteriyasi esa bosh va bo‘yin sohasining asosiy arterial ta’minotchisi hisoblanadi. Kichik qon aylanish doirasi venoz qonni o‘pkada kislorodlantirishga, katta qon aylanish doirasi esa kislorodlangan qonni barcha to‘qimalarga yetkazishga xizmat qiladi. Aorta chap qorinchadan boshlanib, koronar, braxiotsefal, karotid va boshqa tarmoqlar orqali organizmning asosiy hududlariga qon yetkazadi.

Adabiyotlar tahlili shuni ko‘rsatadiki, ushbu mavzu faqat tasviriy anatomiya darajasida emas, balki klinik-fiziologik yondashuv asosida o‘rganilishi kerak. Ayniqsa karotid bifurkatsiya, karotid sinus, karotid tanacha, aorta ravog‘i tarmoqlari, aorta anevrizmasi va braxiotsefal arteriyalar okklyuziyasi kabi masalalar shifokorlik amaliyotida katta ahamiyatga ega.

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Foydalanilgan adabiyotlar

1. Ahmedov A. G‘. Odam anatomiyasi. Toshkent: Iqtisod-Moliya, 2007. 444 b.
2. Xudoyberdiyev R. E., Axmedov N. K., Zohidov X. Z., Alavi R. A., Asomov C. A. Odam anatomiyasi. Toshkent, 1993.
3. Ahmedov A., Rasulov X. Odam anatomiyasi. Bolalar anatomiyasi asoslari bilan. Buxoro tibbiyot instituti elektron kutubxonasi manbasi.
4. Ahmedov N. K. Odam anatomiyasi. Atlas. 1-jild. Toshkent: O‘zbekiston milliy ensiklopediyasi, 2004.
5. Gadayev A. Odam anatomiyasi. Toshkent pediatriya tibbiyot instituti / TMA repository elektron manbasi, 2022.

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SHAHAR TRANSPORT GEOGRAFIYASI

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ANNOTATSIYA

Maqolada shahar transport geografiyasining mazmuni, transport tarmoqlari, urban makondagi markaz va chekka hududlar aloqasi, jamoat transporti, piyoda harakati hamda ekologik xavfsizlik masalalari tahlil qilinadi. Tadqiqotda xalqaro tashkilotlar statistikasi va O‘zbekiston shaharlari, xususan Toshkent, Samarqand va Termiz misollari asosida transportning iqtisodiy, ijtimoiy va ekologik ahamiyati yoritiladi. Natijalar transport va yer resurslarini uyg‘un rejalashtirish tirbandlikni kamaytirishi, aholining xizmatlarga kirish imkoniyatini oshirishi va barqaror shahar rivojiga xizmat qilishini ko‘rsatadi.

Kalit so‘zlar: shahar transport geografiyasi, jamoat transporti, yo‘l-ko‘cha tarmog‘i, barqaror shahar harakatchanligi, transport tuguni, piyoda infratuzilmasi, velosiped yo‘lagi, tirbandlik, yo‘l xavfsizligi, Termiz transporti.

KIRISH

Shahar transport geografiyasi shahar ichidagi yo‘l-ko‘cha tarmog‘i, jamoat transporti yo‘nalishlari, bekatlar, transport tugunlari va aholining kundalik qatnov oqimlarini o‘rganadigan ilmiy yo‘nalishdir. U transportni faqat harakat vositasi sifatida emas, balki shahar makonining iqtisodiy va ijtimoiy tuzilishini belgilovchi geografik omil sifatida tahlil qiladi. BMT ma’lumotlariga ko‘ra, shahar aholisi ulushi ortib bormoqda; Jahon urbanizatsiya istiqbollari (World Urbanization Prospects) materiallarida urbanizatsiya kelgusida ham kuchayishi qayd etiladi. Bu jarayon transport tizimlariga talabni oshiradi va ularni ilmiy asosda rejalashtirish zaruratini kuchaytiradi.

Maqolada inglizcha ilmiy adabiyotlarda ko‘p uchraydigan tushunchalar o‘zbekcha shaklda berildi: barqaror shahar harakatchanligi (sustainable urban mobility), tezkor avtobus tizimi (bus rapid transit), transportga yo‘naltirilgan rivojlanish (transit-oriented development), oxirgi kilometr muammosi (last-mile problem), kirish imkoniyati (accessibility), aralash transport tuguni (intermodal hub) va faol harakat (active mobility). Bu tushunchalar shahar transportining yo‘l, jamoat

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transporti, piyoda va velosiped infratuzilmasi bilan bir butun tizim sifatida qaralishini ta’minlaydi.

SHAHAR TRANSPORTI TARMOQLARI VA ULARNING ANIQLIGI

Shahar transporti bir nechta o‘zaro bog‘langan tarmoqlardan iborat. Birinchisi, yo‘l-ko‘cha tarmog‘i bo‘lib, u magistral ko‘chalar, mahalliy yo‘llar, chorrahalar va ko‘priklardan tashkil topadi. Ikkinchisi, jamoat transporti tarmog‘i: avtobus, elektrobus, tramvay, metro, mikroavtobus va ayrim shaharlarda temiryo‘l yoki BRT tizimi. Uchinchisi, piyoda va velosiped tarmog‘i bo‘lib, u trotuar, piyoda o‘tish joylari, veloyo‘lak, yoritish va xavfsiz bekatlardan iborat. To‘rtinchisi, yuk va logistika tarmog‘i: bozorlar, omborlar, sanoat zonalari va shahar tashqi yo‘llarini bog‘laydi. Beshinchisi, raqamli boshqaruv tarmog‘i: elektron to‘lov, GPS nazorat, yo‘lovchi oqimi monitoringi va aqlli svetoforlarni o‘z ichiga oladi.

1-jadval. Shahar transporti tarmoqlarining vazifalari

Tarmoq turi	Asosiy tarkibi	Geografik vazifasi
Yo‘l-ko‘cha tarmog‘i	Magistral, mahalliy yo‘l, chorraha	Hududlar o‘rtasida asosiy oqimlarni bog‘laydi
Jamoat transporti	Avtobus, metro, tramvay, elektrobus	Aholining ish, ta’lim va xizmatlarga borishini ta’minlaydi
Piyoda-velosiped tarmog‘i	Trotuar, veloyo‘lak, xavfsiz o‘tish joyi	Oxirgi kilometr muammosini kamaytiradi
Logistika tarmog‘i	Ombor, bozor, sanoat zonasi	Yuk oqimlari va savdo hududlarini bog‘laydi
Raqamli boshqaruv	GPS, elektron to‘lov, monitoring	Transport oqimini aniq boshqarishga xizmat qiladi

METODOLOGIYA

Tadqiqotda konseptual-tahliliy, qiyosiy-geografik, tizimli-funksional va statistik tahlil metodlari qo‘llandi. Xalqaro manbalar sifatida BMT, UN-Habitat, Jahon banki, Jahon sog‘liqni saqlash tashkiloti (WHO) va Xalqaro energetika agentligi (IEA) ma’lumotlari olindi. O‘zbekiston bo‘yicha Toshkent metropoliteni statistikasi, Samarqand tramvay tizimi haqidagi ma’lumotlar hamda Surxondaryo viloyati hokimligi e’lon qilgan Termiz jamoat transporti yangiliklari tahlil qilindi. Manbalarning bir qismi matn oxirida faol havolalar bilan berildi.

GLOBAL STATISTIK KO‘RSATKICHLAR

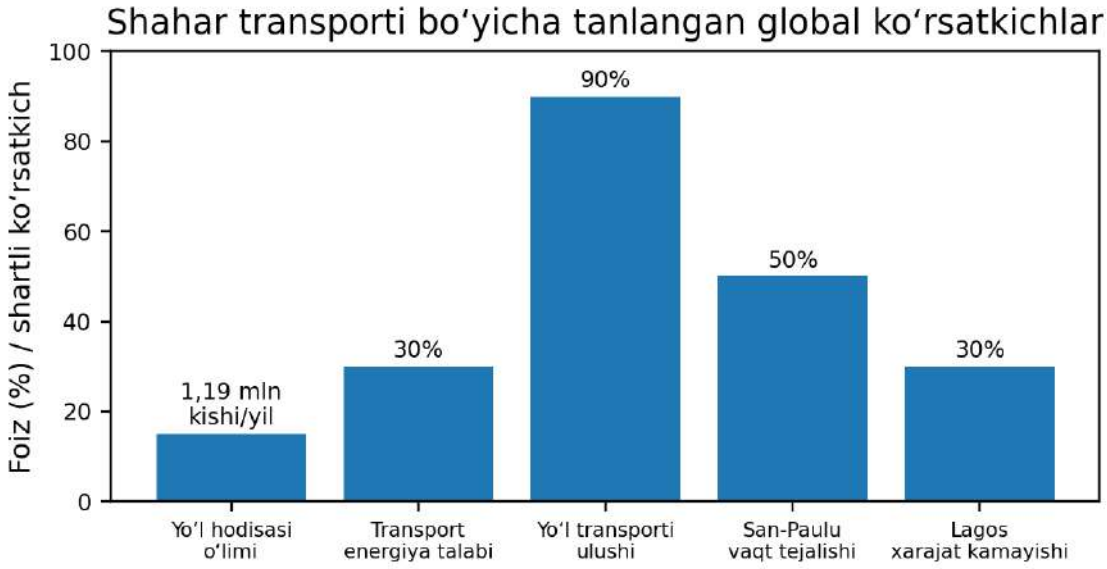
WHO ma’lumotlariga ko‘ra, dunyoda har yili taxminan 1,19 million kishi yo‘l-transport hodisalari oqibatida halok bo‘ladi. IEA ma’lumotlarida transport global

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energiya talabining qariyb 30 foizini tashkil etishi, ichki transport energiyasida esa yo‘l transporti deyarli 90 foiz ulushga ega ekani ko‘rsatiladi. Jahon banki misollari massaviy tranzit tizimlari shahar iqtisodiy samaradorligiga bevosita ta’sir qilishini ko‘rsatadi: San-Paulu metrosi qatnov vaqtini 50 foizga, Lagos BRT tizimi esa jamoat transporti xarajatini taxminan 30 foizga kamaytirgan.

2-jadval. Tanlangan statistik ma’lumotlar

Ko‘rsatkich	Qiymat	Izoh	Manba
Yo‘l hodisalari o‘limi	1,19 mln/yil	Global xavfsizlik muammosi	WHO
Transport energiya talabi	≈30%	Global energiya talabidagi ulush	IEA
Yo‘l transporti ulushi	≈90%	Ichki transport energiyasida avtomobil ustunligi	IEA
San-Paulu metrosi	-50% vaqt	Massaviy tranzit samarasi	World Bank
Lagos BRT	-30% xarajat	Jamoat transporti arzonlashuvi	World Bank



1-diagramma. Global transport ko‘rsatkichlari asosida tuzilgan umumiy taqqoslash

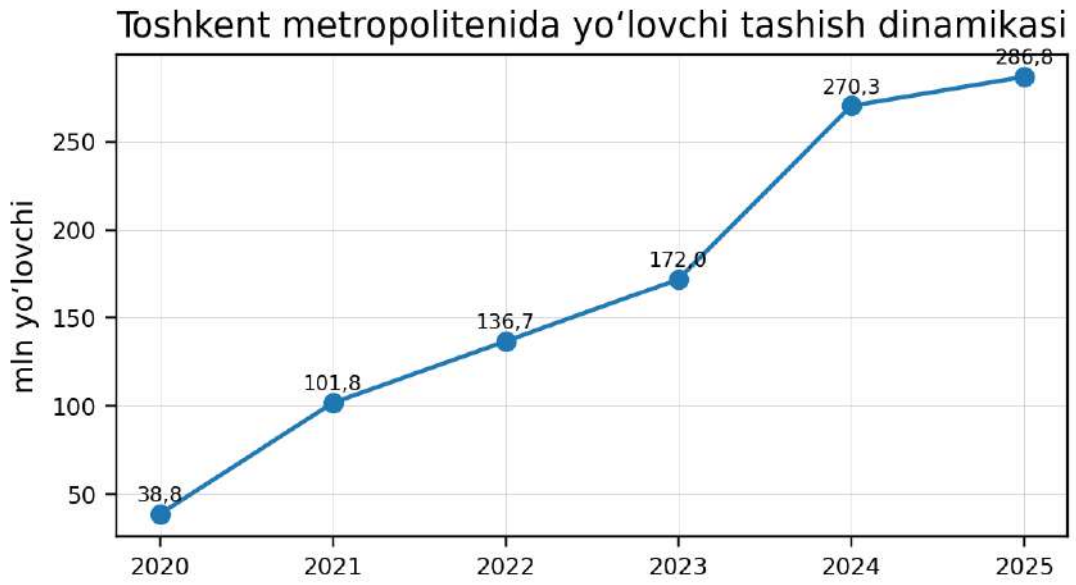
O‘ZBEKISTON SHAHARLARI MISOLIDA TAHLIL

O‘zbekiston shaharlarida transport geografiyasi shahar hajmi va tarixiy tuzilishga qarab farqlanadi. Toshkentda metro, avtobus, elektrobus, taksi va piyoda yo‘laklari ko‘p qatlamli transport tizimini hosil qiladi. Milliy statistika ma’lumotlariga ko‘ra, Toshkent metrosida 2024-yilda 270,3 million, 2025-yilda esa 286,8 milliondan

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ortiq yo‘lovchi tashilgan. Bu metro tarmog‘i poytaxtda jamoat transportining eng muhim tayanch bo‘g‘inlaridan biri ekanini ko‘rsatadi.

Samarqand shahrida tramvay va avtobus tarmoqlari tarixiy markaz, temiryo‘l vokzali, bozorlar va turar-joy massivlarini bog‘lashda muhim rol o‘ynaydi. Samarqand tajribasi o‘rta kattalikdagi shaharlarda elektr transporti turizm, vokzaloldi hududi va markaziy xizmatlar geografiyasini bog‘lash uchun qulay vosita bo‘lishi mumkinligini ko‘rsatadi. Namangan, Andijon, Buxoro va Qarshi kabi shaharlarda esa avtobus va yo‘nalishli transport shahar ichki qatnovining asosiy tarmog‘i bo‘lib qolmoqda.



2-diagramma. Toshkent metropolitenida yo‘lovchi tashish, 2020–2025-yillar

TERMIZ SHAHRI BO‘YICHA QISQA TAHLIL

Termiz shahri Surxondaryo viloyatining ma’muriy, transport va xizmat ko‘rsatish markazi sifatida alohida ahamiyatga ega. Shahar geografik jihatdan Amudaryo bo‘yidagi chegara hududiga, xalqaro yo‘l va temiryo‘l aloqalariga yaqin joylashgan. Shu sababli Termiz transport tizimida ichki shahar qatnovi bilan birga viloyat markazi, avtovokzal, temiryo‘l vokzali, bozorlar, ta’lim muassasalari va chegara-logistika yo‘nalishlari o‘zaro bog‘lanishi zarur.

Surxondaryo viloyati hokimligi axborotiga ko‘ra, Termiz shahrida jamoat transportini rivojlantirish maqsadida Xitoydan 35 dona zamonaviy avtobus olib kelingan va ular 3-yo‘nalish — Istiqlol maydoni–Manguzar avtoshohbekati, 4-yo‘nalish — Termiz avtovokzali–Oromgoh bekati, 7-yo‘nalish — Termiz avtovokzali–Manguzar avtoshohbekati bo‘yicha xizmat ko‘rsatishi belgilangan. Bu misol Termizda shahar transporti tarmog‘ini markaz, avtovokzal va chekka yo‘nalishlar o‘rtasida yaxshilashga qaratilgan amaliy qadam sifatida baholanishi mumkin.

3-jadval. O‘zbekiston shaharlari bo‘yicha transport misollari

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Shahar	Asosiy tarmoq	Kuchli jihat	Muammo yoki vazifa
Toshkent	Metro, avtobus, elektrobus	Yuqori sig‘imli jamoat transporti	Bekatga piyoda ulanish va tirbandlikni kamaytirish
Samarqand	Tramvay, avtobus	Vokzal va markaziy hududlarni bog‘lash	Turistik oqim va mahalliy qatnovni uyg‘unlashtirish
Termiz	Avtobus, taksi, avtovokzal aloqasi	Viloyat markazi va chegara-logistika roli	Yo‘nalishlarni muntazamlik va bekatlar sifati bilan kuchaytirish
Namangan/Andijon	Avtobus va yo‘nalishli qatnov	Zich aholi punktlarini bog‘lash	Elektr transport va raqamli monitoringni kengaytirish

NATIJALAR VA MUHOKAMA

Natijalar shuni ko‘rsatadiki, transport tizimi shahar makonining iqtisodiy faolligini bevosita belgilaydi. Transport koridorlari mavjud hududlarda savdo, xizmat ko‘rsatish va ishbilarmonlik tezroq rivojlanadi; transport bilan sust bog‘langan chekka hududlarda esa xizmatlarga kirish qiyinlashadi. Shuning uchun transport geografiyasida asosiy mezon faqat tezlik emas, balki kirish imkoniyati (accessibility) bo‘lishi kerak.

Shahar transportida avtomobilga bir tomonlama tayanish uzoq muddatli yechim emas. Yo‘l kengaytirish tirbandlikni vaqtincha kamaytirishi mumkin, ammo avtomobil oqimi yana ortadi. Barqaror yechim jamoat transporti, piyoda infratuzilmasi, velosiped yo‘laklari, elektron to‘lov, real vaqt monitoringi va aralash transport tugunlarini bir tizimga birlashtirishdir. Ayniqsa Termiz kabi o‘sib borayotgan shaharlarda yangi avtobuslar faqat transport vositasi emas; ular to‘g‘ri jadval, bekat, yo‘lovchi axboroti va xavfsiz piyoda ulanish bilan birga ishlasa, real samara beradi.

Ekologik nuqtai nazardan transport siyosati yashil shahar rivojlanishining asosiy qismi hisoblanadi. Elektr transporti, jamoat transporti yo‘laklari va piyoda hududlar havoning ifloslanishini kamaytiradi. Xavfsizlik nuqtai nazaridan esa maktab, bozor, vokzal, shifoxona va universitet atrofidagi piyoda harakati alohida himoyalanishi

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kerak. Shu bois shahar transport geografiyasi nafaqat iqtisodiy, balki sog‘liqni saqlash va ijtimoiy adolat masalasidir.

AMALIY TAVSIYALAR

Shahar transportini takomillashtirishda birinchi tavsiya — transport va yer resurslarini yagona reja asosida boshqarishdir. Yangi turar-joy massivlari qurilayotgan hududlarda avtobus yo‘nalishi, bekat, piyoda yo‘lagi, velosiped yo‘lagi va asosiy xizmat obyektlari oldindan loyihalanishi kerak. Aks holda aholi ko‘chib kelgandan keyin transport masalasi kechikkan muammoga aylanadi.

Ikkinchi tavsiya — jamoat transporti ustuvorligini kuchaytirish. Avtobuslar uchun alohida yo‘laklar, elektron to‘lov tizimi, bekatlarda yo‘nalish xaritasi va real vaqt jadvali bo‘lishi aholining jamoat transportiga ishonchini oshiradi. Toshkent tajribasi shuni ko‘rsatadiki, yuqori sig‘imli transport tarmog‘i yo‘lovchi oqimini ko‘tarishga qodir; Termizda esa avtobus yo‘nalishlari muntazamlik va bekat sifati bilan mustahkamlanishi kerak.

Uchinchi tavsiya — xavfsiz piyoda infratuzilmasini transport tizimining majburiy elementi sifatida ko‘rish. Bozor, maktab, universitet, shifoxona, avtovokzal va temiryo‘l vokzali atrofida piyoda o‘tish joylari, yoritish, past tezlik rejimi va to‘siqsiz muhit yaratilmasa, transport tizimi ijtimoiy jihatdan to‘liq ishlamaydi. Bu ayniqsa Termiz kabi issiq iqlimli shaharlarda soyali piyoda yo‘laklari va bekatlarning qulayligiga ham bog‘liq.

To‘rtinchi tavsiya — transport ma’lumotlarini ochiq va raqamli shaklda yuritishdir. Yo‘lovchi oqimi, qatnov oralig‘i, avtobuslarning kechikishi, tirbandlik nuqtalari va yo‘l hodisalari bo‘yicha doimiy statistika mavjud bo‘lsa, shahar transporti aniq dalillar asosida boshqariladi. Bunday yondashuv ilmiy tahlil, mahalliy hokimiyat qarorlari va fuqarolar ehtiyojlari o‘rtasida bog‘liqlik yaratadi.

4-jadval. Termiz shahri uchun ustuvor transport choralar

Yo‘nalish	Amaliy chora	Kutiladigan natija
Avtobus tarmog‘i	3-, 4-, 7-yo‘nalishlarni muntazam jadval va elektron monitoring bilan yuritish	Kutish vaqti qisqaradi
Bekatlar	Avtovokzal, bozor, universitet, shifoxona atrofida qulay bekatlar tashkil etish	Yo‘lovchi qulayligi oshadi

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Piyoda xavfsizligi	Yoritilgan piyoda o‘tish joylari va past tezlikli hududlar yaratish	Yo‘l hodisalari xavfi kamayadi
Raqamli boshqaruv	Yo‘lovchi oqimi va qatnov oralig‘ini muntazam statistik hisobga olish	Rejalashtirish sifati oshadi

XULOSA

Shahar transport geografiyasi zamonaviy urban rivojlanishning muhim ilmiy-amaliy yo‘nalishidir. U yo‘l, jamoat transporti, piyoda va velosiped infratuzilmasi, logistika hamda raqamli boshqaruvni yagona hududiy tizim sifatida tahlil qiladi. Tadqiqot natijalari shuni ko‘rsatadiki, transport va yer resurslarini birgalikda rejalashtirish tirbandlikni kamaytiradi, ish va xizmatlarga kirish imkoniyatini kengaytiradi, ekologik bosimni pasaytiradi va ijtimoiy tenglikni kuchaytiradi.

O‘zbekiston shaharlari misolida transport tarmoqlarining turlicha rivojlanayotgani ko‘rinadi: Toshkentda metro asosiy tayanch bo‘lsa, Samarqandda tramvay va avtobus uyg‘unligi, Termizda esa avtobus yo‘nalishlari va avtovokzal aloqalari muhim o‘rin tutadi. Termiz shahrida zamonaviy avtobuslar kiritilishi ijobiy qadam, ammo bu jarayon bekatlar, jadval, piyoda xavfsizligi va elektron boshqaruv bilan qo‘llab-quvvatlansa, shahar transporti yanada samarali bo‘ladi. Yakuniy xulosa shuki, transport geografiyasi odam markazidagi, xavfsiz va barqaror shahar siyosatining yuragi hisoblanadi.

FOYDALANILGAN ADABIYOTLAR

1. United Nations Population Division. World Urbanization Prospects 2025. https://population.un.org/wup/
2. UN-Habitat. Planning and Design for Sustainable Urban Mobility. Global Report on Human Settlements. https://unhabitat.org/planning-and-design-for-sustainable-urban-mobility-global-report-on-human-settlements-2013
3. World Bank. Promoting Livable Cities by Investing in Urban Mobility. https://www.worldbank.org/en/results/2024/03/13/promoting-livable-cities-by-investing-in-urban-mobility
4. World Health Organization. Road traffic injuries. Fact sheet. https://www.who.int/news-room/fact-sheets/detail/road-traffic-injuries
5. International Energy Agency. Transport – Energy Efficiency 2025. https://www.iea.org/reports/energy-efficiency-2025/transport

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
6. O‘zbekiston Respublikasi Milliy statistika qo‘mitasi. Metropolitenda yo‘lovchi tashish statistikasi. https://stat.uz/en/press-center/news-of-committee/66658-2025-jilda-metropoliten-or-ali-286-milliondan-zijod-j-lovchi-tashilgan-4
7. Surxondaryo viloyati hokimligi. Termiz shahrida yangi avtobuslar yo‘nalishlarga chiqarilishi haqida. https://gov.uz/oz/surxondaryo/news/view/99515
8. Rodrigue J.-P. The Geography of Transport Systems. 5th ed. Routledge, 2020. https://transportgeography.org/
9. Vuchic V. R. Urban Transit Systems and Technology. John Wiley & Sons, 2007.
10. Cervero R. The Transit Metropolis: A Global Inquiry. Island Press, 1998.
11. Banister D. Transport Planning. 2nd ed. Spon Press, 2002.
12. Gehl J. Cities for People. Island Press, 2010.

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CHROMOSOMAL MUTATIONS AND ASSOCIATED HEREDITARY DISEASES: ETIOLOGY AND PATHOGENESIS

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Abstract. This article provides a comprehensive analysis of the etiology and pathogenesis of hereditary diseases caused by chromosomal mutations. Changes in chromosome number and structure — aneuploidy (trisomy, monosomy), polyploidy, deletion, duplication, translocation, inversion, and complex "de novo" structural variants (dnSVs) — lead to severe developmental defects in early embryogenesis, pregnancy loss, and congenital multisystem disorders. The article thoroughly examines etiological aspects such as meiotic nondisjunction, premature sister chromatid separation (PSSC), reverse segregation, weakening of cohesin and spindle apparatus, the effect of advanced maternal age, environmental mutagens, and genetic factors (including the high frequency of consanguineous marriages in Central Asia). It also proposes strategies for prenatal screening, genetic counseling, and disease prevention.

Keywords: chromosomal mutations, aneuploidy, gene dosage imbalance, meiotic nondisjunction, PSSC, reverse segregation, Down syndrome, Turner syndrome, Klinefelter syndrome, cri-du-chat syndrome, DYRK1A, chromosomal microarray analysis (CMA), prenatal diagnostics.

Introduction. The human genome consists of 46 chromosomes (22 pairs of autosomes and 2 sex chromosomes), which play a central role in storing, replicating, and expressing hereditary information. Chromosomal mutations — alterations in number or structure — constitute a major group of hereditary diseases. Such anomalies occur in 0.4–0.9% of live births and are responsible for 50–67% of embryonic losses during pregnancy. Most of these mutations arise "de novo" in healthy parents, although they can be inherited through balanced translocation carriers. The development of

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cytogenetic analysis, FISH, CMA, and NGS technologies has dramatically improved the detection of micro-anomalies, complex "de novo" structural variants (dnSVs), and submicroscopic changes. Chromosomal mutations contribute not only to intellectual disability, skeletal and visceral anomalies, but also to cardiovascular diseases, infertility, immunodeficiency, and increased oncological risk. This article focuses on etiology and pathogenesis, as their deep understanding is crucial for effective family genetic counseling, prenatal screening, and preventive measures.

Main Part. Chromosomal mutations are divided into numerical changes (genome mutations) and structural changes. Numerical abnormalities include aneuploidy (gain or loss of one or more chromosomes) and polyploidy (multiplication of the complete chromosome set). Aneuploidy is the most common and results from meiotic nondisjunction (failure of chromosomes to separate), premature sister chromatid separation (PSSC), and reverse segregation. These errors predominantly occur in maternal meiosis I and increase sharply with advancing maternal age. Polyploidy (e.g., triploidy) arises from fertilization errors — diploid gametes or dispermy — and usually leads to early pregnancy loss. Structural mutations include deletion (loss of a segment), duplication (extra copy), translocation (exchange between chromosomes), inversion, and complex "de novo" structural variants (dnSVs). Deletions and duplications cause gene dosage imbalance: haploinsufficient genes become insufficient with one copy, while extra copies disrupt cellular function. Carriers of balanced translocations are phenotypically normal, but meiotic recombination can produce unbalanced variants in offspring. Inversions and dnSVs alter gene sequences, disrupting transcriptional regulation and epigenetic control. Recent studies indicate that dnSVs rank third among causes of rare disorders after simple deletions and duplications. Etiologically, chromosomal mutations arise from internal (genetic) and external (environmental) factors. Internal factors include natural errors in meiosis and mitosis, particularly impaired recombination in oocytes, weakening of the cohesin complex, spindle apparatus and kinetochore dysfunction, telomere shortening, DNA damage, and mitochondrial dysfunction. Advanced maternal age is the primary risk factor: after age 35, the frequency of trisomy 21 increases exponentially due to weakened cohesin and spindle assembly checkpoint (SAC) signaling. In younger women, meiosis I nondisjunction predominates, while PSSC and reverse segregation increase with age. External factors include ionizing radiation, chemical mutagens (pesticides, certain drugs), viral infections (rubella), folate deficiency, obesity, smoking, and metabolic disorders. "De novo" mutations account for ~80% of cases, but the risk rises to 10–15% in families with balanced translocation carriers. In Central Asia, including Uzbekistan, the high prevalence of consanguineous marriages

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increases genetic load — according to official data, nearly 10% of children born with disabilities result from such unions. These factors collectively amplify meiotic errors, leading to aneuploidy and structural changes. Pathogenesis is illustrated through gene dosage imbalance, altered signaling pathways, epigenetic dysregulation, and disrupted cell differentiation, using the most common syndromes: Down (trisomy 21), Shereshevsky-Turner (45,X), Klinefelter (47,XXY), cri-du-chat (5p deletion), as well as Patau (trisomy 13) and Edwards (trisomy 18) syndromes. The primary pathogenic mechanism is gene dosage imbalance. In trisomies, excess genes increase protein and ncRNA synthesis by 1.5-fold, disrupting cell cycle, apoptosis, signaling (e.g., IGF, DYRK1A pathways), and tissue differentiation. In monosomies, haploinsufficiency of critical genes halts developmental processes. In structural mutations, loss or disruption of specific genes impairs neuronal migration, cardiac formation, immune system, and skeletal development. The gene dosage imbalance and amplified developmental instability hypotheses are fundamental. The Down syndrome critical region (DSCR, 21q22.1–q22.3) highlights the combined effects of several genes (DYRK1A, APP, RCAN1, SOD1). Overexpression of "DYRK1A" (21q22.13) contributes to neurodegeneration, cardiac defects, and progeroid features by increasing DNA damage and reducing Lamin B1 levels. Recent studies show variable inter-individual expression of Hsa21 genes, linked to epigenetic control and cell-type specificity. Mosaicism mitigates clinical severity but complicates diagnosis. Pathogenesis begins in early embryogenesis, resulting in multisystem defects. Somatic chromosomal changes also participate in carcinogenesis (e.g., t(9;22) Philadelphia chromosome).

Research Results. Modern research precisely demonstrates the frequency, mechanisms, and clinical outcomes of chromosomal mutations. Aneuploidy occurs in 50–67% of miscarriages and is the leading cause of embryonic demise. Down syndrome (trisomy 21) is the most common, affecting 1:700–1:800 live births. In 95% of cases it is free trisomy (meiotic nondisjunction), 3–4% Robertsonian translocation, and 1–2% mosaic. Pathogenesis involves overexpression of DSCR genes, particularly "DYRK1A", leading to neurodegeneration, cardiac defects (45–50%), immunodeficiency, and early-onset Alzheimer's disease. Maternal age-related nondisjunction mainly occurs in meiosis I; recent data confirm the age-dependent rise in PSSC and reverse segregation. Shereshevsky-Turner syndrome (45,X or mosaic) occurs in 1:2000–1:2500 females and causes ovarian dysgenesis, short stature, aortic coarctation, and cardiac defects due to haploinsufficiency of the SHOX gene. Klinefelter syndrome (47,XXY) affects 1:500–1:1000 males, leading to testicular atrophy, infertility, and gynecomastia; X-inactivation partially mitigates severity. Cri-du-chat syndrome (5p deletion) has an incidence of 1:15,000–1:50,000. Loss of genes

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in 5p15.2–15.3 (including CTNND2) causes microcephaly, intellectual disability, cat-like cry, and growth delay; deletions are often *de novo* and paternal in origin. Trisomy 13 (Patau) and trisomy 18 (Edwards) present with severe brain and cardiac anomalies and frequently result in pregnancy loss. Array-CGH and NGS detect 10–20% more micro-anomalies and complex rearrangements than conventional methods. CMA identifies additional 6–10% clinically significant CNVs in cases with normal karyotype, especially in fetuses with ultrasound anomalies (up to 12% in cardiovascular defects). In pregnancy losses, mosaicism is often higher in extra-embryonic mesoderm. In Central Asia, consanguineous marriages elevate the frequency of chromosomal mutations. Overall, mutations occurring early in embryogenesis cause severe phenotypes, while later events result in milder or mosaic forms. CMA and NIPT significantly enhance early diagnosis.

Conclusion: The etiology of hereditary diseases associated with chromosomal mutations primarily involves meiotic errors (nondisjunction, PSSC, reverse segregation), advanced maternal age, weakening of cohesin and spindle apparatus, as well as environmental and genetic factors (including consanguineous marriages). Pathogenesis depends on gene dosage imbalance (particularly “DYRK1A”), altered signaling pathways, epigenetic regulation, and disruption of developmental processes, leading to multisystem defects. These disorders impose a serious burden on family and public health. Modern research confirms the high efficacy of prenatal screening, CMA, NGS, and genetic counseling. In the future, technologies such as CRISPR gene editing, folate supplementation, control of age-related risks, and prevention of consanguineous marriages can substantially reduce disease incidence. In-depth study of this topic will contribute significantly to the advancement of medical genetics and reproductive medicine.

References

1. Milani D.A.Q., et al. Genetics, Chromosome Abnormalities // StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 (last updated April 24, 2023). – PMID: 32491623.

2. Akhtar F., et al. Down Syndrome // StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 (updated December 6, 2024). – PMID: 32644692.

3. Sharma L., et al. Turner Syndrome // StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025.

4. Ajitkumar A., et al. Cri Du Chat Syndrome // StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022. – PMID: 32965943.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
5. Pendina A.A., et al. Chromosomal Abnormalities in Miscarriages and Maternal Age // Cells. – 2024. – Vol. 14, Issue 1. – P. 8. DOI: 10.3390/cells14010008.

6. Gardner R.J.M., Amor D.J. Gardner and Sutherland's Chromosome Abnormalities and Genetic Counseling. – 5th ed. – Oxford: Oxford University Press, 2018. – 648 p.

7. Nishonboyev K.N., Eshonqulov O.E., Bosimov M.Sh. Tibbiy genetika: darslik. – Toshkent: O‘zbekiston Respublikasi Sog‘liqni saqlash vazirligi, 2020. – 320 b.

8. Yo’ldashev A.A., Olimova M.O. Xromosoma mutatsiyalari va uning inson salomatligiga ta’siri // Yosh olimlar ilmiy-amaliy konferensiyasi materiallari. – Andijon, 2024. – S. 16–18.

9. Jung H., et al. Complex de novo structural variants are an underestimated cause of rare disorders // Nature Communications. – 2025. – DOI: 10.1038/s41467-025-64722-2.

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HISTOLOGICAL STRUCTURE OF THE IMMUNE SYSTEM ORGANS (THYMUS, LYMPH NODES, SPLEEN) AND AGE-RELATED CHANGES

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Abstract. This article provides a detailed overview of the deep histological structure, cellular and stromal components, functional zones, as well as age-related morphological and functional changes of the main primary and secondary lymphoid organs of the immune system: the thymus, lymph nodes, and spleen. It covers the differentiation of thymocytes in the cortex and medulla of the thymus, types of epithelial cells, Hassall's corpuscles, the blood-thymus barrier, and thymic nurse cells; the follicles, germinal centers, paracortex, high endothelial venules, follicular dendritic cells, and medullary sinuses of the lymph nodes; and the white pulp, periarteriolar lymphoid sheath, marginal zone, macrophage populations, and red pulp of the spleen. Age-related changes, particularly thymic involution associated with adipogenesis, fibrosis, degeneration of epithelial cells, and decreased expression of the FOXN1 gene; fibrosis, lipomatosis, and stromal transdifferentiation in lymph nodes; and de-compartmentalization of the white pulp, disruption of the marginal zone, and increased fibroblasts in the spleen are comprehensively described as key processes of immunosenescence.

Keywords: thymus, lymph nodes, spleen, histological structure, age-related changes, thymic involution, white pulp, red pulp, marginal zone, Hassall's corpuscles, fibrosis, lipomatosis, immunosenescence, epithelial cells, fibroblastic reticular cells.

Introduction. The immune system is a complex, multi-level network that protects the body from external pathogens, internal mutations, and damage to its own cells. Its primary organs include the thymus, which serves as a primary lymphoid organ ensuring the maturation, positive and negative selection of T-lymphocytes, while the lymph

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nodes and spleen, as secondary organs, manage antigen filtration, clonal expansion of lymphocytes, and the generation of effector and memory cells. Changes occurring in the immune system with advancing age are termed immunosenescence. This process leads to decreased resistance to infections in the elderly, a sharp decline in vaccine efficacy, increased incidence of autoimmune diseases, chronic inflammation, and elevated cancer risk. Histological studies have identified early involution in the thymus, fibrosis and stromal changes in lymph nodes, and disruption of the boundaries between white and red pulp in the spleen as the main morphological features. These changes are associated not only with a decrease in cell numbers but also with disruption of stromal architecture, alterations in the cytokine milieu, impaired cell migration, and the emergence of the senescence-associated secretory phenotype (SASP). This article aims to provide an in-depth scientific illumination of the topic, a comprehensive analysis based on existing experimental and clinical studies, a detailed functional linkage of the histological features of the organs, and the derivation of practical conclusions. The purpose is to assist medical students, researchers, clinicians, and gerontologists in fully understanding the age-related dynamics of the immune system and to create a solid scientific foundation for new approaches in regenerative medicine.

Main Part. Histological Structure of the Thymus. The thymus is a primary lymphoid organ located in the upper part of the thoracic cavity, consisting of two lobes and surrounded by a thick connective tissue capsule. The capsule sends septa inward, dividing the organ into lobules. Each lobule is distinguished by subcapsular cortex, cortex, and medulla zones. In the subcapsular cortex, epithelial cells form the blood-thymus barrier and support the initial proliferation of thymocytes. The cortex is a dark zone densely filled with lymphocytes, where positive selection of T-lymphocytes occurs. Cortical thymic epithelial cells play a nurturing and differentiating role for thymocytes; they are also known as thymic nurse cells, with a single epithelial cell enveloping several dozen thymocytes. The medulla is a lighter zone characterized by fewer lymphocytes and more epithelial cells. Hassall's corpuscles are located here; they are concentric aggregates of keratinized epithelial cells. Hassall's corpuscles participate in the negative selection of thymocytes and are formed as a result of terminal differentiation of thymic epithelial cells. The Aire gene is expressed in the medulla, presenting tissue-specific antigens. The stromal structure of the thymus consists of reticular cells, fibroblastic reticular cells, and a network of fibers that support lymphocyte migration. Blood vessels and nerve fibers enter through the septa. In childhood, the thymus has high mass and activity, with clearly demarcated lobules, a wide cortex, and numerous Hassall's corpuscles in the medulla. Electron microscopy studies provide detailed images of the cytoplasmic organelles of epithelial cells,

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desmosomal connections, and the complex structure of the blood-thymus barrier. Histological Structure of the Lymph Nodes. Lymph nodes are secondary lymphoid organs of round or bean shape that perform the function of filtering lymph flow and initiating immune responses. Each node is surrounded by a thick capsule from which trabeculae extend inward. The outer part is called the cortex and contains B-cell follicles. Secondary follicles develop germinal centers, where B-lymphocyte proliferation, class switching, affinity maturation, and memory cell formation occur. Mantle and marginal zones are present around the follicles. Follicular dendritic cells retain antigens for long periods in the germinal centers. The paracortex is the T-cell zone, enriched with high endothelial venules. These venules ensure the selective passage of lymphocytes from blood into the lymph node. The medulla consists of medullary cords and sinuses, where plasma cells, macrophages, and lymph flow filtration occur. Reticular cells form the supportive skeleton throughout the node. The histological structure of lymph nodes changes dynamically depending on antigen stimulation: during an immune response, follicles enlarge, germinal centers increase, high endothelial venules become activated, and lymphocyte flow intensifies. Histological Structure of the Spleen. The spleen is the largest lymphoid organ located in the abdominal cavity; it performs blood filtration, erythrocyte breakdown, and immune response functions. The organ is enclosed by a capsule and trabeculae. The spleen is divided into white pulp and red pulp. The white pulp is lymphoid tissue consisting of the periarteriolar lymphoid sheath and lymphoid follicles around central arteries. Germinal centers are located in the center of the follicles, surrounded by a mantle and marginal zone. The marginal zone is the transitional zone between the white and red pulp, enriched with marginal zone macrophages, marginal metallophilic macrophages, and specialized B-cells. This zone rapidly recognizes blood-borne antigens and initiates T-independent immune responses. The red pulp is filled with blood vessel sinuses and Billroth's cords; it performs blood filtration, removal of erythrocytes, and storage of platelets. Reticular fibers, fibroblasts, and fibroblastic reticular cells maintain the structural integrity of the spleen. A distinctive histological feature of the spleen is its direct connection with the bloodstream: central arteries supply the white pulp and then pass into the marginal zone and red pulp. This structure combines immune and hematological functions. Electron microscopy clearly shows the fenestrated endothelium of the sinusoids and the high phagocytic activity of macrophages in the cords.

Research Results. Numerous histological, morphometric, immunohistochemical, and molecular studies have thoroughly investigated the age-related changes in the thymus, lymph nodes, and spleen. In the thymus, the involution process begins at

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puberty and gradually intensifies. With age, the cortex-to-medulla ratio decreases sharply, the number of cortical thymocytes significantly declines, and degeneration of epithelial cells is observed. Functional lymphoid tissue is replaced by fat and connective tissue. For example, after the age of 25, the thymus remains only as islands; after 40, adipose tissue predominates and the perivascular space expands. The number and size of Hassall's corpuscles change, and Aire gene expression decreases. Studies show that although the overall volume of the thymus may not change significantly, the functional parenchyma decreases by approximately 3% per year. These changes reduce naïve T-cell production, narrow the TCR repertoire, and lead to diminished immunity. In mouse models, involution is clearly observed from 4 to 12 months; in humans, almost complete adipose replacement occurs after the age of 50. Decreased FOXN1 gene expression and signs of epithelial-to-mesenchymal transition have been confirmed as key molecular mechanisms of involution. Age-related changes in lymph nodes begin somewhat later but are significant. The total number and size of nodes decrease, while the capsule and trabeculae thicken. In the cortex, the number of follicles and germinal centers declines, and T-cell density in the paracortex decreases. Fibrosis intensifies, the reticular network is disrupted, and the number and activity of high endothelial venules decrease. Sinuses in the medulla undergo fibrosis, and macrophage activity declines. Studies have identified lipomatosis and reduced cellularity in head and neck lymph nodes; fibrosis reaches two points between 61 and 75 years, while lipomatosis can reach 50%. These changes hinder antigen recognition and clonal expansion of lymphocytes. Stromal transdifferentiation and vascular remodeling play an important role in the age-related changes of lymph nodes. In the spleen, age-related changes are clearly manifested in the de-compartmentalization of the white pulp. The volume of white pulp decreases, the boundaries of the periarteriolar lymphoid sheath and follicles become blurred, and the number of marginal zone macrophages significantly declines. The proportion of red pulp increases, and fibrosis and pigmentation intensify. The overall mass and diameter of the spleen decrease, and the boundaries between white and red pulp become indistinct. Studies in mouse and human spleens have confirmed the loss of clear demarcation between T- and B-cell zones with age, an increase in fibroblasts, and delayed immune responses. In human spleens, atrophy of the white pulp, decreased follicle numbers, and predominance of red pulp are observed after the fourth decade. These changes impair the spleen's blood filtration, antigen presentation, and marginal zone functions. Overall, the research results indicate that the general mechanism of age-related changes involves a decrease in lymphoid cells, stromal fibrosis, adipogenesis, degeneration of epithelial cells, and alteration of the cytokine environment. These processes weaken both the adaptive and

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innate components of the immune system, increasing disease risk in the elderly. Morphometric analyses and immunohistochemical methods have quantitatively assessed these changes, confirming their functional significance. For example, epithelial cell clusters appear in the thymus, limiting its regenerative capacity; fibrosis in lymph nodes restricts T-cell movement; and disruption of the marginal zone in the spleen impairs antigen presentation.

Conclusion: The histological structure of the immune system organs is a key factor determining their functional efficiency. Age-related changes in the thymus, lymph nodes, and spleen—such as involution, fibrosis, and restructuring of lymphoid tissues—are among the main causes of immunosenescence. These changes weaken the maturation of T- and B-cells, antigen recognition, and immune responses, resulting in diminished protective mechanisms of the body. The research results indicate that new therapeutic approaches are necessary to understand and slow down these processes. Future studies should focus on deeper investigation of molecular mechanisms and their application in clinical practice. This article serves as an important step in illuminating the age-related dynamics of the immune system.

References

1. Liang Z, et al. Age-related thymic involution: Mechanisms and functional impact. Aging Cell. 2022;21(8):e13671.

2. Hale LP, et al. Histologic and molecular assessment of human thymus. Ann Diagn Pathol. 2004;8(1):50-60.

3. Rezzani R, et al. Thymus and aging: morphological, radiological, and functional overview. Age. 2014;36(1):685-713.

4. Kousa AI, et al. Age-related epithelial defects limit thymic function and regeneration. Nat Immunol. 2024;25:1234-1250.

5. Hadamitzky C, et al. Age-dependent histoarchitectural changes in human lymph nodes. J Anat. 2010;216(5):556-562.

6. Deng Y, et al. Comprehensive characterisation of age-related changes in secondary lymphoid organs. Cell Death Dis. 2025;16:1-15.

7. Turner VM, Mabbott NA. Influence of ageing on the microarchitecture of the spleen and lymph nodes. Biogerontology. 2017;18(5):723-738.

8. Alex L, et al. Microscopic study of human spleen in different age groups. Int J Res Med Sci. 2015;3(7):1701-1706.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025

9. Flores KG, et al. Analysis of the human thymic perivascular space during aging. J Clin Invest. 1999;104(8):1031-1039.

10. Srinivasan J, et al. Age-Related Changes in Thymic Central Tolerance. Front Immunol. 2021;12:676236.

11. Li YR, et al. Thymus aging and immune reconstitution, progresses and challenges. Semin Immunol. 2023;70:101-115.

12. Steinmann GG. The involution of the ageing human thymic epithelium is independent of puberty. Scand J Immunol. 1985;22(5):563-575.

13. Bekkhus T, et al. Stromal transdifferentiation drives lipomatosis and induces extensive vascular remodeling in the aging human lymph node. J Pathol. 2022;258:264-277.

14. Elmore SA. Enhanced histopathology of the spleen. Toxicol Pathol. 2006;34(5):648-655.

15. Cakala-Jakimowicz M, et al. Aging-Related Cellular, Structural and Functional Changes in the Lymph Nodes. Cells. 2021;10(11):3148.

16. Budamagunta V, et al. Cellular senescence in lymphoid organs and immunosenescence. Aging. 2021;13(15):19966-19985.

17. Kwok T, et al. Age-Associated Changes to Lymph Node Fibroblastic Reticular Cells. J Immunol. 2022;208(1):219.16.

18. Yamada D, et al. Review of clinical and diagnostic imaging of the thymus: from age-related changes to thymic tumors. Jpn J Radiol. 2024;42(5):456-470.

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VELIZIY-ZAKHARCHENKO CIRCLE (CEREBRAL ARTERIAL CIRCLE) AND ITS ROLE IN CEREBRAL BLOOD CIRCULATION, ALONG WITH OBSERVED PATHOLOGIES

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Abstract. The Veliziy-Zakharchenko circle, or the cerebral arterial circle (circulus arteriosus cerebri), is an important anastomotic structure in cerebral blood circulation. It connects the anterior (internal carotid arteries) and posterior (vertebrobasilar system) circulatory systems, providing collateral blood flow. This circle plays a key role in protecting the brain from ischemia. However, its anatomical variants are common and can increase the risk of stroke, aneurysm, and other cerebrovascular diseases. The article details the anatomy of the circle, its physiological role, anatomical variants, observed pathologies, and their clinical significance. Research results show that the complete form of the circle occurs in only 20-50% of cases; in the remaining cases, hypoplasia, aplasia, or fetal-type variants are present, which can lead to circulatory disturbances. The article may provide practical benefits to specialists in neurosurgery, neurology, and radiology.

Keywords: Veliziy-Zakharchenko circle, cerebral arterial circle, collateral circulation, cerebrovascular anatomy, aneurysm, ischemic stroke, anatomical variants, posterior communicating artery, anterior communicating artery.

Introduction. The human brain is a highly metabolically active organ, and its constant and adequate blood supply is vital. Cerebral blood circulation is carried out through two main systems: the anterior system (internal carotid arteries – arteria carotis interna) and the posterior system (vertebral arteries – arteria vertebralis, which merge into the basilar artery). The important structure that connects these two systems and equalizes blood flow is the Veliziy-Zakharchenko circle (Circle of Willis). This arterial

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circle is named after the English physician Thomas Willis, who described it in detail in his 1664 work "Cerebri Anatome." However, similar structures had been noted earlier by anatomists such as Giulio Casserio, Johann Vesling, and others. The name Zakharchenko is additionally used in some Russian and former Soviet literature because Russian scientists studied this topic in depth. The Veliziy-Zakharchenko circle is located at the base of the brain, around the sella turcica, encircling the stalk of the pituitary gland. It connects the anterior and posterior circulatory systems, allowing blood to be redirected from one side to the other in case of occlusion or stenosis of an artery on one side. This collateral mechanism protects against cerebral ischemia, but because incomplete variants of the circle are very common, this protection is not always effective. Modern studies show that the classic complete form of the circle is observed in only 20-50% of healthy individuals. In other cases, there is hypoplasia (narrowing), aplasia (absence), or fetal-type configurations. Such variants significantly increase the risk of stroke and aneurysm. This article provides an in-depth analysis of the circle's role, variants, and pathologies based on scientific data.

Main Part. Anatomically, the Veliziy-Zakharchenko circle has a pentagonal or ring shape and consists of the following arteries:

- Anterior part: The terminal portions of the bilateral internal carotid arteries, the first segments of the anterior cerebral arteries (A1), and the anterior communicating artery (ACoA).

- Posterior part: The first segments of the posterior cerebral arteries (P1) arising from the basilar artery, the posterior communicating arteries (PCoA), and the second segments of the posterior cerebral arteries (P2).

The circle is also associated with the middle cerebral arteries (MCA) arising from the internal carotid arteries, although the MCA is not a direct part of the circle. Overall blood flow is as follows: the internal carotid arteries supply the anterior and middle cerebral territories, while the vertebrobasilar system supplies the posterior cerebral territory and the cerebellum. The communicating arteries (ACoA and PCoA) provide blood exchange between the two sides and between the anterior and posterior regions. The circle is located in the subarachnoid space, outside the brain tissue, making it an important landmark during surgical interventions. Its arteries usually have a diameter of about 1-2 mm, though this can vary in different configurations. Its main physiological role is to provide collateral circulation. For example, in unilateral internal carotid artery occlusion, blood flow from the vertebrobasilar system can reach the anterior territories through the PCoA. Similarly, the ACoA equalizes blood flow between the anterior parts of the two hemispheres. This mechanism is especially

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important in atherosclerosis, embolism, or during surgery. Studies indicate that individuals with a complete circle experience fewer ischemic events and have a better prognosis. The circle also ensures stability during blood pressure fluctuations by allowing redistribution of blood flow. However, its collateral capacity is not always sufficient. If the communicating arteries are hypoplastic, blood flow may be inadequate, leading to border-zone (watershed) infarcts. In the fetal-type PCA (narrow P1 segment and large PCoA), the posterior territory blood supply largely depends on the anterior system, increasing risk during vertebrobasilar insufficiency.

Anatomical variants of the Veliziy-Zakharchenko circle are very common. The classic complete form is observed in only 21-50% of cases. The most widespread variants include:

- Unilateral or bilateral hypoplasia or aplasia of the posterior communicating arteries (PCoA) — the most common, approximately 25-50%.

- Hypoplasia or absence of the anterior communicating artery (ACoA).

- Fetal-type posterior cerebral artery (narrow P1, large PCoA) — approximately 10-30%.

- Hypoplasia of the A1 segment of the anterior cerebral artery.

- Duplication, fenestration (window-like), or accessory arteries.

Studies (e.g., based on MR angiography) show that the frequency of a complete circle varies with age: it is higher in younger people and increases with variants in the elderly. Gender differences also exist — in some studies, incomplete circles are more common in men. Geographically, variants associated with stroke are more frequently observed in African and Asian populations. Such variants lead to hemodynamic changes: blood flow becomes turbulent, pressure distribution is disrupted, creating additional stress on arterial walls.

Pathologies and clinical significance. The most common pathologies in the Veliziy-Zakharchenko circle are:

1. Aneurysms. Approximately 85% of all intracranial aneurysms are located in this circle. They most frequently occur at the anterior communicating artery (ACoA), followed by the PCoA and ICA bifurcation. Aneurysms form in areas where the vessel wall is weakened due to turbulent flow and increased pressure. Rupture leads to subarachnoid hemorrhage (SAH), which has a high mortality rate. Variants (e.g., ACoA hypoplasia) can increase aneurysm risk by 2-4 times.

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2. Ischemic stroke and TIA (transient ischemic attack). In an incomplete circle, collateral failure occurs during occlusion of one artery. For example, with bilateral absence of PCoA, vertebrobasilar insufficiency can damage anterior territories. Studies show that an incomplete circle increases stroke risk by 1.8-2.0 times. Watershed infarcts are particularly characteristic.

3. Atherosclerosis and calcification. Disturbed blood flow in variants increases susceptibility to plaque formation in arterial walls. In some variants (e.g., bilateral PCoA hypoplasia), vertebrobasilar calcification is more common.

4. Other pathologies. Moyamoya disease, arteriovenous malformations, and ischemic complications during surgery. In neurosurgical interventions (aneurysm clipping, carotid endarterectomy), prior knowledge of circle variants is crucial for predicting blood flow. MRI and CT angiography are the main modern diagnostic methods. They accurately show the circle's configuration and help identify risk groups.

Research Results. Many large-scale studies have examined variants of the Veliziy-Zakharchenko circle. For instance, a meta-analysis found a classic complete circle in only 21.2% of cases; the most common anomaly was bilateral absence of the PCoA (25.1%). This variant increased stroke risk with OR=1.82; complete anomalies carried OR=2.03. Variant frequency increases with age. In another study (1,667 participants), an incomplete circle increased the risk of intracranial aneurysm by 2.3 times, especially with absence of all three communicating arteries (OR=4.2) or absence of the P1 segment (OR=3.6). These variants accounted for 28% of all aneurysms. Clinical studies (e.g., in Ethiopia and other regions) showed that incomplete circles were more common in women and had a strong association with stroke (OR=15.4 in some analyses). Hypoplastic arteries were most often observed in the posterior part (PCoA). Radiological studies using MR angiography detected variants in 70-80% of cases. Fetal-type PCA may reduce vertebrobasilar calcification, while other variants increase it. Cadaveric studies reported variants in 50-90% of cases, with the most changes noted in the ACoA and PCoA. These results confirm that circle variants are widespread in the population, and preventing cerebrovascular diseases is difficult without taking them into account. Modern computer simulations (CFD – computational fluid dynamics) model turbulent flow and wall stress, confirming the mechanisms of aneurysm formation in variants. For example, increased pressure in ACoA hypoplasia contributes to aneurysm development.

Conclusion: The Veliziy-Zakharchenko circle is the main "circular pathway" of cerebral blood circulation, protecting against ischemia and stroke through collateral mechanisms. However, its anatomical variants are very common and significantly

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increase the risk of aneurysm, ischemic stroke, and other pathologies. A complete circle exists in only a portion of people; in the rest, hypoplasia and aplasia predominate. Early detection of these variants is possible through modern diagnostics (MRI/CT angiography) and a personalized approach (risk assessment). Accounting for circle anatomy in neurosurgery and neurology reduces surgical complications and improves patient prognosis. Future research should more deeply study genetic factors and geographical differences. Overall, understanding the Veliziy-Zakharchenko circle is of great importance in the prevention and treatment of cerebral circulatory disorders.

References

1. Rosner J, et al. Neuroanatomy, Circle of Willis. StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023. p. 1-12.

2. Vrselja Z, et al. Function of circle of Willis. Med Hypotheses. 2014;82(3):290-294.

3. Jones JD, et al. Anatomical variations of the circle of Willis and their prevalence: a systematic review and meta-analysis. Clin Anat. 2021;34(5):720-735.

4. Oumer M, et al. Association between circle of Willis and ischemic stroke: a systematic review and meta-analysis. BMC Neurol. 2021;21(1):1-12.

5. Negatie HM, et al. Association of circle of Willis variants with stroke and aneurysm: insights from a tertiary hospital in Ethiopia. BMC Neurol. 2025;25:73.

6. Hindenes LB, et al. Anatomical variations in the circle of Willis are associated with increased odds of intracranial aneurysms: The Tromsø Study. J Neurol Sci. 2023;452:120-128.

7. Mukherjee D, et al. The Role Of Circle Of Willis Anatomy Variations In Cardioembolic Stroke: A Computational Fluid Dynamics Study. bioRxiv. 2017. doi:10.1101/190579.

8. Eftekhar B, et al. Are the distributions of variations of circle of Willis different in different populations? BMC Neurol. 2006;6:22.

9. Sturiale CL, et al. Geometry and Symmetry of Willis' Circle and Middle Cerebral Artery Aneurysms Development. J Clin Med. 2024;13(10):2808.

10. Berghout BP, et al. Variations in intracranial arterial anatomy of the circle of Willis and their association with intracranial arteriosclerosis. Eur J Neurol. 2025 (pubmed 39924650).

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CARDIOVASCULAR DISEASES AS A COMPLICATION LEADING TO CHRONIC KIDNEY DISEASE: CLINICAL SIGNS, EARLY DIAGNOSIS, AND PREVENTION

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Abstract. Cardiovascular diseases, particularly chronic heart failure, play a significant role in the development of chronic kidney disease (CKD) and constitute type 2 cardiorenal syndrome. According to Global Burden of Disease study data, chronic kidney disease ranks as the 9th leading cause of death worldwide, associated with 1.48 million deaths annually, and occupies the 12th position in terms of years lived with disability. In patients with CKD, the rate of cardiovascular complications and mortality can reach 40–50%. This article provides an in-depth analysis of the clinical manifestations of chronic kidney disease developing as a complication of cardiovascular diseases, the pathophysiological mechanisms of cardiorenal syndrome, its association with diabetes mellitus, methods of early diagnosis, and modern preventive measures.

Keywords: type 2 cardiorenal syndrome, glomerular filtration rate, urinary albumin-to-creatinine ratio, sodium-glucose cotransporter 2 inhibitors, Dapagliflozin in Patients with Chronic Kidney Disease study, Empagliflozin in Patients with Chronic Kidney Disease study, finerenone, biomarkers, early screening, prevention.

Introduction. The complex interrelationship between the heart and kidneys in the human body is one of the most pressing issues in modern medicine. This relationship is expressed by the concept of cardiorenal syndrome, in which dysfunction of one organ leads to functional and structural disorders in the other. According to the classification proposed by Ronco and co-authors, cardiorenal syndrome is divided into 5 types, of

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which type 2 is characterized by the progressive development of chronic kidney disease as a result of chronic heart failure. According to Global Burden of Disease studies, in 2023 chronic kidney disease was the 9th leading global cause of death, accounting for 1.48 million deaths, and ranked 12th in years of disability. Cardiovascular diseases together with this condition represent not only a biological but also a major social and economic problem — the risk of hospitalization and death is several times higher in patients with chronic kidney disease. The purpose of this article is to professionally highlight the clinical signs, pathophysiological mechanisms, association with diabetes mellitus, methods of early diagnosis, and effective preventive measures of chronic kidney disease developing as a complication of cardiovascular diseases. From a human perspective, these diseases change not only the organs but also the patient's entire lifestyle, family relationships, and social activity. Through early intervention, we can not only reduce mortality but also preserve the quality of life for patients. The article emphasizes the need for a multidisciplinary approach.

Main Part. Pathophysiological Mechanisms of Cardiorenal Syndrome

Type 2 cardiorenal syndrome consists of a complex interaction of hemodynamic and non-hemodynamic factors. According to the traditional view, a decrease in the heart's pumping function reduces renal perfusion. This situation activates the renin-angiotensin-aldosterone system (RAAS), the sympathetic nervous system, and arginine-vasopressin secretion, resulting in increased water and salt retention, elevated preload, and further worsening of heart failure. Modern research shows that low-flow states do not fully explain cardiorenal syndrome. Venous congestion and increased central venous pressure lead to renal venous hypertension, increased intrarenal resistance, and a decrease in glomerular filtration rate (GFR). This mechanism is particularly important in chronic conditions.

The main pathophysiological mechanisms are as follows:

1. Hemodynamic disorders, i.e., renal hypoperfusion and venous congestion;

2. Neurohormonal activation, i.e., hyperactivation of the renin-angiotensin-aldosterone system, activation of the sympathetic nervous system, and arginine-vasopressin secretion;

3. Inflammation and oxidative stress — venous congestion shifts endothelial cells to a pro-inflammatory phenotype, stimulates cytokine production, and chronic inflammation leads to glomerulosclerosis, tubulointerstitial fibrosis, and endothelial dysfunction;

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4. Additional factors, including anemia, disorders of mineral-bone metabolism, and vascular remodeling.

These mechanisms form a self-reinforcing cycle and limit the patient's daily life through fatigue, edema, and shortness of breath, increasing the burden on the family and society. Association Between Diabetes Mellitus and Chronic Kidney Disease Diabetes mellitus is one of the leading causes of chronic kidney disease and is referred to as diabetic kidney disease. In patients with diabetes, chronic kidney disease develops in 20–40% of cases. In type 2 diabetes, this rate is higher and is often already present at diagnosis, while in type 1 diabetes it usually manifests 5–15 years later. The pathophysiological mechanisms are complex and include hemodynamic, metabolic, inflammatory, and fibrotic processes. Persistent hyperglycemia leads to glomerular hyperfiltration, which increases intraglomerular pressure and damages podocytes, endothelium, and mesangial cells. Hyperactivation of SGLT2 transporters increases glucose and sodium reabsorption in the proximal tubules, reducing sodium delivery to the macula densa and disrupting tubuloglomerular feedback. Advanced glycation end-products, oxidative stress, and activation of the polyol pathway cause cellular damage. Hyperactivation of mineralocorticoid receptors increases inflammatory cytokines and promotes glomerulosclerosis and tubulointerstitial fibrosis. Diabetes and cardiovascular diseases together form a cardiorenal-metabolic syndrome, accelerating the progression of chronic kidney disease. According to Global Burden of Disease data, the prevalence of chronic kidney disease associated with type 2 diabetes is high, with the greatest burden observed in countries with middle socio-economic development indices.

Clinical Signs

In the early stages of chronic kidney disease, clinical signs are often asymptomatic and manifest only in laboratory parameters. In later stages, fatigue, weakness, swelling of the legs and face, worsening of arterial hypertension, anemia, and electrolyte disorders are observed. When occurring together with cardiovascular diseases, fluid retention intensifies, leading to worsened shortness of breath, pulmonary edema, and peripheral edema. Studies show that the prevalence of heart failure in patients with chronic kidney disease reaches 25–56%. Decreased renal perfusion and venous congestion activate the renin-angiotensin-aldosterone and sympathetic nervous systems, resulting in increased arterial pressure, cardiac rhythm disturbances, and intensified remodeling. From a human perspective, these signs limit the patient's work capacity, family relationships, and social activity.

Methods of Diagnosing Cardiorenal Syndrome

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Diagnosis of cardiorenal syndrome includes clinical suspicion, laboratory parameters, biomarkers, imaging methods, and hemodynamic assessment. According to the 2024 guidelines of the Kidney Disease: Improving Global Outcomes (KDIGO) organization, chronic kidney disease is identified by a glomerular filtration rate below 60 ml/min/1.73 m^2 or an increase in the urinary albumin-to-creatinine ratio. Regular screening is recommended in high-risk groups. In clinical assessment, symptoms such as fatigue, shortness of breath, edema, and oliguria, as well as physical signs such as jugular venous distension and peripheral edema, are taken into account. Among laboratory parameters, calculation of glomerular filtration rate, urinary albumin-to-creatinine ratio, creatinine, blood urea nitrogen, and electrolytes are important. Among cardiac biomarkers, natriuretic peptide levels confirm heart failure. Kidney injury biomarkers, such as neutrophil gelatinase-associated lipocalin (NGAL) and kidney injury molecule-1 (KIM-1), detect early signs of tubular damage. Imaging methods include echocardiography and renal ultrasound. In differential diagnosis, causes such as nephrotoxic drugs and glomerulonephritis are excluded. A multidisciplinary approach is necessary.

Early Diagnosis

For early detection of chronic kidney disease in patients with cardiovascular diseases, calculation of glomerular filtration rate and determination of the urinary albumin-to-creatinine ratio are fundamental. The use of cystatin C increases accuracy. Regular laboratory monitoring is mandatory in high-risk groups. Additionally, biomarkers and renal ultrasound can help identify the disease at an early stage. According to Global Burden of Disease data, early stages of chronic kidney disease often remain undiagnosed (61–95%), which accelerates progression. Early diagnosis and intervention at the initial stage prolong patient life and reduce the economic burden.

Prevention and Treatment Measures

The main directions in prevention are maintaining arterial blood pressure below 130/80 mmHg, strict control of diabetes mellitus, smoking cessation, and increasing adherence to diet and physical activity. In drug therapy, renin-angiotensin-aldosterone system blockers occupy the primary place. Sodium-glucose cotransporter 2 (SGLT2) inhibitors reduce intraglomerular pressure and attenuate inflammation. The DAPA-CKD study (2020) showed that dapagliflozin slowed CKD progression by 39% and reduced cardiovascular complications by 29% in patients with chronic kidney disease. The EMPA-KIDNEY study (2023) demonstrated that empagliflozin reduced CKD progression by 28%. In studies with finerenone (2020–2021), non-steroidal mineralocorticoid receptor antagonists significantly reduced albuminuria and provided

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cardiorenal protection. Statins correct dyslipidemia. In the presence of diabetes, glucose-lowering drugs provide additional benefit. New potassium binders are used to manage hyperkalemia risk. A multidisciplinary approach and patient education form the basis of prevention. From a human perspective, these measures preserve not only numbers but also the patient's ability to spend time with family and work.

Research Results. Modern clinical studies clearly confirm the link between chronic kidney disease and cardiovascular diseases. In the DAPA-CKD trial (2020), dapagliflozin slowed disease progression by 39% and reduced cardiovascular complications by 29%. In the EMPA-KIDNEY trial (2023), empagliflozin reduced CKD progression by 28%. In finerenone studies (2020–2021), non-steroidal mineralocorticoid receptor antagonists significantly reduced albuminuria and provided cardiorenal protection. The 2024 KDIGO guidelines mandate monitoring of glomerular filtration rate and urinary albumin-to-creatinine ratio every 3–6 months in high-risk groups. Biomarkers (NGAL and KIM-1) allow detection of tubular damage earlier than traditional indicators. These observations prove the effectiveness of a multidisciplinary approach (collaboration among cardiologist, nephrologist, and endocrinologist).

Conclusion. Early diagnosis and prevention of chronic kidney disease developing as a complication of cardiovascular diseases improve patients' quality of life, prevent severe complications, and significantly reduce global mortality rates. The 2024 KDIGO guidelines and modern studies confirm the cardiorenal protective effects of sodium-glucose cotransporter 2 inhibitors and finerenone. Early screening for cardiorenal syndrome, use of biomarkers, and a multidisciplinary approach should be the main focus in medical practice. A deeper understanding of the relationship between diabetes mellitus and chronic kidney disease helps manage this process more effectively. As humans, we must view these diseases not merely as statistics but as the life stories of each patient. Through early intervention, we can restore hope and health. Deepening research and practice on this topic can make a significant contribution to preserving the health of the population. Early diagnosis and prevention of chronic kidney disease as a complication of cardiovascular diseases improve patients' quality of life, prevent severe complications, and significantly reduce global mortality rates. The 2024 KDIGO guidelines and modern studies confirm the cardiorenal protective effects of sodium-glucose cotransporter 2 inhibitors and finerenone. Early screening for cardiorenal syndrome, use of biomarkers, and a multidisciplinary approach should be the main focus in medical practice. A deeper understanding of the relationship between diabetes and chronic kidney disease helps manage this process more effectively. As humans, we must view these diseases not merely as statistics but as the

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References

1. Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. “Kidney Int”. 2024;105(4S):S117-S314. (Data mainly taken from pages S117–S314).

2. Heerspink HJL, Stefánsson BV, Correa-Rotter R, et al. Dapagliflozin in Patients with Chronic Kidney Disease. “N Engl J Med”. 2020;383(15):1436-1446. (Data mainly taken from pages 1436–1446).

3. EMPA-KIDNEY Collaborative Group; Herrington WG, Staplin N, Wanner C, et al. Empagliflozin in Patients with Chronic Kidney Disease. “N Engl J Med”. 2023;388(2):117-127. (Data mainly taken from pages 117–127).

4. Rangaswami J, Bhalla V, Blair JEA, et al. Cardiorenal Syndrome: Classification, Pathophysiology, Diagnosis, and Treatment Strategies: A Scientific Statement From the American Heart Association. “Circulation”. 2019;139(16):e840-e878. (Data mainly taken from pages e840–e878).

5. Bakris GL, Agarwal R, Anker SD, et al. Effect of Finerenone on Chronic Kidney Disease Outcomes in Type 2 Diabetes. “N Engl J Med”. 2020;383(23):2219-2229. (Data mainly taken from pages 2219–2229).

6. Pitt B, Filippatos G, Agarwal R, et al. Cardiovascular Events with Finerenone in Kidney Disease and Type 2 Diabetes. “N Engl J Med”. 2021;385(24):2252-2263. (Data mainly taken from pages 2252–2263).

7. Ronco C, Haapio M, House AA, Anavekar N, Bellomo R. Cardiorenal syndrome. “J Am Coll Cardiol”. 2008;52(19):1527-1539. (Data mainly taken from pages 1527–1539).

8. Mark PB, et al. Global, regional, and national burden of chronic kidney disease in adults, 1990–2023. “Lancet”. 2025 (based on general study results).

9. Levin A, et al. Executive summary of the KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. “Kidney Int”. 2024;105(4S):S117-S314.

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ARTIFICIAL INTELLIGENCE IN ENGLISH LANGUAGE LEARNING: MODERN APPROACHES AND OPPORTUNITIES

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Abstract. The swift development of artificial intelligence (AI) and digital technologies has significantly transformed modern approaches to English language teaching and learning. Traditional teaching methods are increasingly being integrated with AI-based applications, gamification, adaptive learning systems, and digital speaking platforms that improve learners' communicative competence and motivation. This article examines the role of artificial intelligence in vocabulary acquisition, speaking development, and IELTS preparation, with particular attention to the educational context of Uzbekistan. The study highlights the advantages of AI-assisted learning environments, including personalized instruction, immediate feedback, interactive communication, and increased learner autonomy. The article also analyzes current challenges associated with implementing innovative technologies in English language education and discusses future opportunities for integrating AI tools into higher education institutions. The findings demonstrate that AI technologies can

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substantially improve the effectiveness of English language instruction and contribute to the modernization of language education systems.

Keywords: artificial intelligence, English language learning, IELTS preparation, gamification, speaking skills, vocabulary acquisition, digital education, Uzbekistan.

Introduction. The global expansion of digital technologies has created new opportunities for foreign language education, especially in the field of English language teaching. Artificial intelligence is becoming one of the most influential innovations in modern education because it allows teachers and learners to access personalized, interactive, and flexible learning environments. AI-powered educational tools such as chatbots, speech-recognition systems, intelligent tutoring systems, and adaptive learning platforms have changed traditional approaches to language instruction and introduced new strategies for improving speaking, listening, reading, and vocabulary skills.

In many countries, including Uzbekistan, the importance of English language proficiency has increased considerably due to globalization, international academic cooperation, and economic integration. Educational reforms implemented in Uzbekistan during recent years have focused on improving the quality of foreign language teaching and integrating digital technologies into the educational process. Universities and schools are increasingly introducing online platforms, mobile applications, and AI-based systems to support students' independent learning and communicative development.

One of the main challenges in English language learning is maintaining students' motivation and providing sufficient opportunities for speaking practice. Many learners experience anxiety, lack of confidence, and limited exposure to authentic communication. AI technologies help address these problems by creating interactive and learner-centered environments where students can practice speaking without fear

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of making mistakes. Virtual assistants and AI chatbots simulate real-life conversations, provide instant corrections, and help learners improve pronunciation and fluency.

Another important aspect of modern language learning is vocabulary acquisition. Traditional memorization techniques are often ineffective and demotivating for students. AI-supported platforms use spaced repetition systems, adaptive algorithms, and gamified activities that make vocabulary learning more engaging and efficient. Educational games, quizzes, and interactive tasks increase learner participation and improve long-term retention of lexical items.

AI technologies also play a significant role in IELTS preparation. International language examinations require high levels of academic vocabulary, speaking fluency, listening comprehension, and writing skills. AI-powered applications can analyze students' performance, identify weaknesses, and generate individualized learning recommendations. Such tools enable learners to practice exam-oriented tasks independently and receive immediate feedback.

The purpose of this article is to investigate the role of artificial intelligence in English language learning and to analyze modern approaches that combine AI technologies, gamification, speaking practice, and vocabulary development. The article also explores the opportunities and challenges of implementing these innovations in the educational system of Uzbekistan.

Artificial intelligence has become an essential component of modern educational technologies. AI systems can collect and analyze learners' data, monitor progress, and adapt educational content according to individual needs. Personalized learning environments improve students' engagement because tasks are adjusted to their proficiency level and learning pace.

AI chatbots represent one of the most widely used technologies in language education. These systems imitate human communication and allow students to practice speaking and writing skills in real-time interaction. Unlike traditional classroom activities, chatbot communication reduces psychological pressure and encourages learners to participate more actively.

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Speech-recognition technology also contributes significantly to speaking development. AI systems can evaluate pronunciation accuracy, fluency, intonation, and stress patterns. Students receive immediate corrective feedback, which helps them improve oral communication skills more effectively.

Gamification is another important innovation in modern English language teaching. Educational games increase learner motivation, concentration, and participation. AI-powered applications combine gaming elements with adaptive learning systems to create highly interactive educational experiences.

Vocabulary acquisition becomes more effective when students are engaged in competitive and reward-based activities. Digital platforms provide points, badges, rankings, and progress tracking systems that encourage learners to continue studying. Interactive flashcards, quizzes, and contextual vocabulary exercises help students remember lexical items more successfully.

In Uzbekistan, gamified applications are becoming increasingly popular among university students preparing for IELTS and other international examinations. Mobile learning platforms allow learners to practice English anytime and anywhere, making language education more accessible and flexible.

Despite numerous advantages, the implementation of AI technologies in education still faces several challenges. Many educational institutions experience technological limitations, insufficient internet access, and lack of teacher training. Some educators also express concerns regarding excessive dependence on technology and reduced human interaction in the learning process.

Nevertheless, the future of AI in English language education appears highly promising. Continuous technological progress will likely improve the quality of adaptive learning systems and make AI applications more accessible to educational institutions worldwide. In Uzbekistan, further integration of AI technologies into higher education can significantly contribute to improving students' communicative competence and international competitiveness.

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Conclusion. Artificial intelligence is transforming English language education by introducing innovative, personalized, and interactive learning opportunities. AI-powered systems improve speaking skills, vocabulary acquisition, and IELTS preparation through adaptive instruction, speech recognition, gamification, and instant feedback. The integration of digital technologies into English language teaching can increase learner motivation, reduce communication anxiety, and enhance educational outcomes.

For young generation living in Uzbekistan the implementation of AI-based educational technologies represents an important step toward the modernization of the national education system. Expanding access to digital resources, improving teachers' technological competence, and integrating innovative methodologies into classroom practice can significantly improve the quality of English language instruction. As AI technologies continue to evolve, they will play an increasingly important role in shaping the future of language education worldwide.

References

1. Holmes, W., Bialik, M., & Fadel, C. *Artificial Intelligence in Education*. Boston: Center for Curriculum Redesign, 2024.
2. Godwin-Jones, R. "Emerging Technologies and Language Learning." *Language Learning & Technology*, 2023, Vol. 27(2), pp. 5–18.
3. Kukulska-Hulme, A. "Mobile-Assisted Language Learning and AI Integration." *ReCALL*, 2024, Vol. 36(1), pp. 21–37.
4. Li, J. "Artificial Intelligence and Personalized Learning in TESOL." *Computers & Education*, 2025, Vol. 198, pp. 104–121.
5. Wang, Y., & Lee, H. "Gamification in English Language Learning." *System*, 2023, Vol. 114, pp. 102–118.
6. Xu, Q. "AI Chatbots for Speaking Practice in ESL Classrooms." *Educational Technology Research and Development*, 2024, Vol. 72(3), pp. 455–472.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

7. Rahimov, D. “Digital Transformation in Language Education in Uzbekistan.” *International Journal of Educational Development*, 2025, Vol. 91, pp. 75–84.

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THEORETICAL FOUNDATIONS AND INTEGRATION OF ARTIFICIAL INTELLIGENCE (AL) TECHNOLOGIES IN MEDICAL EDUCATION

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Abstract: This article examines theoretical foundations and integration mechanisms of artificial intelligence technologies in medical education. The aim is to justify the didactic value of AI tools within competency-based training. The methodology combines system analysis, instructional design, and medical informatics approaches. Scientific novelty lies in adapting AI-driven assessment criteria and clinical reasoning modeling to educational settings while maintaining pedagogical validity and patient-safety-oriented learning outcomes.

Keywords: artificial intelligence; medical education; clinical reasoning; adaptive learning; learning analytics; simulation-based training; assessment validity.

ТЕОРЕТИЧЕСКИЕ ОСНОВЫ И ИНТЕГРАЦИЯ ТЕХНОЛОГИЙ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА (АЛ) В МЕДИЦИНСКОЕ ОБРАЗОВАНИЕ

Аннотация: Данный статье раскрывает теоретические основы и механизмы интеграции технологий искусственного интеллекта в медицинское образование. Цель заключается в обосновании дидактической ценности ИИ в компетентностно-ориентированном обучении. Методология включает системный анализ, педагогический дизайн и подходы медицинской информатики. Научная новизна состоит в адаптации критериев ИИ-

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ориентированной оценки и моделирования клинического мышления к образовательному процессу.

Ключевые слова: искусственный интеллект; медицинское образование; клиническое мышление; адаптивное обучение; учебная аналитика; симуляция; надежность оценивания.

TIBBIY TA'LIMDA SUN'IY INTELLEKT (AL) TEXNOLOGIYALARINING NAZARIY ASOSLARI VA INTEGRATSIYASI

Annotatsiya: Ushbu maqola tibbiy ta’lim tizimiga sun’iy intellekt texnologiyalarini integratsiya qilishning nazariy asoslarini va amaliy mexanizmlarini yoritadi. Maqsad kompetensiyaga yo‘naltirilgan o‘qitishda SI vositalarining didaktik qiymatini asoslashdir. Metodologiya sifatida tizimli tahlil, pedagogik dizayn va tibbiy informatika yondashuvlari qo‘llanadi. Ilmiy yangilik SI asosli baholash va klinik fikrlashni model qilish mezonlarini ta’lim jarayoniga moslashtirishdadir.

Kalit so‘zlar: sun’iy intellekt; tibbiy ta’lim; klinik fikrlash; adaptiv o‘qitish; o‘quv analitikasi; simulyatsiya; baholash ishonchliligi.

Kirish: Tibbiy ta’limning zamonaviy paradigmasi bilimlarni uzatishdan ko‘ra klinik qaror qabul qilish, muloqot, jamoada ishlash, xavfsizlik va dalillarga asoslangan amaliyot kompetensiyalarini shakllantirishga ko‘proq tayanadi. Bunday yondashuv o‘quv jarayonida murakkab, ko‘p manbali ma’lumotlar bilan ishlashni, talabaning xatolarini erta aniqlashni hamda individual o‘quv yo‘nalishlarini tuzishni talab qiladi. Sun’iy intellekt texnologiyalari aynan shu nuqtada nazariy va metodik jihatdan muhim resurs sifatida ko‘riladi: ular o‘quvchi faoliyatidan hosil bo‘ladigan raqamli izlarni tahlil qilib, moslashtirilgan topshiriqlarni taklif etishi, simulyatsion muhitlarda qarorlar oqibatini modellashi va baholash jarayonining obyektivligini oshirishi mumkin. Biroq SI ni ta’limga kiritish faqat texnik yangilanish emas, balki didaktik tizimning qayta loyihalanishi bo‘lib, u o‘qitish maqsadlari, mazmuni, metodlari va nazorat-baholash mezonlari uyg‘unligiga tayanishi zarur.

Nazariy asoslarni aniqlashda birinchi tayanch yo‘nalish sifatida kompetensiyaga yo‘naltirilgan ta’lim va natijaga asoslangan o‘qitish konsepsiyalari olinadi. Tibbiy ta’limda kompetensiya klinik vaziyatni tahlil qilish, tashxis qo‘yish ehtimolini baholash, davolash rejasini asoslash, xavfni hisobga olish va bemor bilan muloqot kabi ko‘p komponentli faoliyatni o‘z ichiga oladi. SI tizimlari ushbu komponentlarning ayrimlarini kuzatish va o‘lchashga yordam beradi, biroq nazariy jihatdan “o‘lchanadigan ko‘rsatkich” bilan “haqiqiy kompetensiya”ni aynanlashtirish xavfi

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mavjud. Shuning uchun SI integratsiyasi baholash nazariyasi bilan bog‘liq bo‘lib, validlik, ishonchlilik, adolatlilik va interpretatsiya qoidalariga qat’iy rioya etilishi kerak. Masalan, test natijalarini avtomatik tahlil qilish talaba bilimini tez aks ettirishi mumkin, ammo klinik fikrlashning kontekstga bog‘liqligi sababli faqat test ko‘rsatkichlari bilan cheklanib bo‘lmaydi; simulyatsiya, OSCE, portfel va kuzatuv natijalari bilan triangulyatsiya talab etiladi. Shu nuqtai nazardan, SI asosli baholash tibbiy ta’limning ko‘p modalitetli baholash arxitekturasiga xizmat qilgandagina ilmiy va amaliy qiymat kasb etadi.

Ikkinchi tayanch yo‘nalish tibbiy informatika va ma’lumotlar haqidagi ta’limotdir. SI ning samaradorligi ma’lumotlar sifati, reprezentativligi va belgilashning to‘g‘riligiga bog‘liq. Tibbiy ta’limdagi ma’lumotlar manbalari xilma-xil: elektron o‘quv platformalaridagi loglar, simulyatorlardan olingan sensor ko‘rsatkichlari, virtual bemorlar bilan muloqot yozuvlari, klinik amaliyot protokollari va refleksiv yozuvlar. Bu ma’lumotlarning har biri turli darajada shovqinli, turli kontekstga ega va turlicha etik cheklovlar bilan bog‘langan. Demak, integratsiya jarayoni ma’lumotlar boshqaruvi, maxfiylik, deidentifikatsiya, ruxsatlar va saqlash muddatlari kabi masalalarni oldindan belgilashni talab qiladi. SI yondashuvining nazariy poydevori sifatida “ma’lumotlar-tizim-o‘qitish natijasi” zanjiri aniq ko‘rsatilmasa, texnologiya didaktik maqsaddan uzilib, faqat monitoringga aylanishi, bu esa ta’lim sifatini oshirish o‘rniga talaba va o‘qituvchi yuklamasini ko‘paytirishi mumkin.

Uchinchi tayanch yo‘nalish sifatida kognitiv psixologiya va klinik fikrlash nazariyalari olinadi. Klinik qarorlar ko‘pincha ikki tizimli fikrlash, ya’ni tez intuitiv baholash va sekin analitik tahlilning o‘zaro almashinuvi bilan izohlanadi. SI integratsiyasi bu jarayonni “almashtirish” emas, balki “ko‘rinadigan qilish” va “mashq qildirish” orqali qo‘llab-quvvatlashi lozim. Masalan, virtual bemor ssenariylarida SI talabaga differensial tashxis yo‘llarini taklif qilishi mumkin, lekin didaktik dizayn shunday qurilishi kerakki, talaba tayyor javobni tanlamasdan, dalillarni tortish, ehtimollarni yangilash va qaror oqibatini baholash kabi kognitiv amallarni bajarsin. Bunda SI ning roli “skafolding” sifatida, ya’ni bosqichma-bosqich yordam ko‘rsatib, keyin yordamni kamaytirishga yo‘naltirilgan bo‘lishi maqsadga muvofiq. Aks holda avtomatlashtirilgan maslahat klinik fikrlashni sustlashtirishi, “avtoritetga ko‘r-ko‘rona ergashish” kabi xatolarga olib kelishi mumkin.

Integratsiya mexanizmlarini asoslash uchun pedagogik dizayn mantiqi zarur. Birinchidan, o‘quv natijalari aniq operationalizatsiya qilinadi: masalan, “sepsisni erta aniqlash” kabi mavzularda talaba qaysi belgilarga tayanishi, qaysi laborator ko‘rsatkichlarni qanday izohlashi va qanday xavf kommunikatsiyasini amalga oshirishi kerakligi tasvirlanadi. Ikkinchidan, SI vositasi shu natijalarga xizmat qiladigan o‘quv

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faoliyatiga biriktiriladi: adaptiv testlar, xatolar bo‘yicha individual “remedial” modullar, simulyatsion mashg‘ulotlarda real vaqtli teskari aloqa, refleksiya matnlarini semantik tahlil qilish. Uchinchidan, baholash modeli tuziladi: avtomatik baholash faqat oson formalizatsiya qilinadigan indikatorlarda qo‘llanib, murakkab kompetensiyalar ekspert bahosi bilan birgalikda olib boriladi; bu yondashuv baholash validligini oshiradi. To‘rtinchidan, o‘qituvchi roli qayta talqin qilinadi: u kontent yetkazuvchi emas, balki o‘quv yo‘lini boshqaruvchi, SI tavsiyalarini didaktik kontekstga moslab talqin qiluvchi va talaba refleksiyasini chuqurlashtiruvchi murabbiyga aylanadi. Bu o‘zgarishlar o‘qituvchilarning raqamli pedagogika va ma’lumotlar savodxonligi bo‘yicha malakasini oshirishni taqozo etadi.

SI texnologiyalarini tibbiy ta’limga joriy etishda ilmiy-metodik muammolardan biri algoritmik xolislik va adolatlilikdir. Model o‘qitilgan ma’lumotlar ayrim guruhlar, klinik maktablar yoki til birliklariga nisbatan og‘ishlarni aks ettirishi mumkin, natijada baholash yoki tavsiya tizimi ayrim talabalarga tizimli tarzda noqulaylik tug‘diradi. Shuning uchun integratsiya jarayonida audit mexanizmlari, ma’lumotlar balansini tekshirish, tushuntiriladigan modellar va ekspertlar konsensusi asosida mezonlarni moslashtirish talab etiladi. Boshqa muhim masala tushuntiriluvchanlikdir: tibbiy ta’limda “to‘g‘ri javob”dan ham ko‘ra “nega shunday” degan izoh muhimroq. Shuning uchun SI asosli tavsiyalar talabaning mantiqiy zanjirini ochib berishga xizmat qilishi, kamida asosiy atributlar va dalillarni ko‘rsatishi, shuningdek noaniqlik darajasini bildira olishi kerak. Tushuntiriluvchanlik pedagogik nazoratni kuchaytiradi va talabaning metakognitiv ko‘nikmalarini rivojlantiradi.

Amaliy integratsiya modeli sifatida tibbiy oliy ta’lim muassasasida uch darajali arxitektura taklif etiladi. Birinchi daraja o‘quv kontenti va kompetensiya xaritasidir: fanlar kesimida klinik kompetensiyalar, indikatorlar va minimal talablar yagona reyestrga keltiriladi. Ikkinchi daraja raqamli o‘quv muhitidir: LMS, simulyatsiya platformalari va klinik amaliyot modullari o‘zaro ma’lumot almashadigan qilib sozlanadi. Uchinchi daraja o‘quv analitikasi va SI servislaridir: adaptiv tavsiya tizimi, erta ogohlantirish modeli, avtomatik teskari aloqa generatori va baholashni qo‘llovchi modul. Ushbu arxitektura ichida “inson nazorati” tamoyili doimo saqlanadi: SI tavsiyasi yakuniy qaror emas, balki o‘qituvchi va talaba uchun dalillarga asoslangan signal sifatida talqin qilinadi. Etik jihatdan esa akademik halollik, mualliflik mas’uliyati va ma’lumotlar maxfiyligi bo‘yicha ichki reglamentlar ishlab chiqilishi zarur; ayniqsa generativ modellardan foydalanganda talabaning mustaqil fikrlashi va manbalarni tanqidiy tekshirish ko‘nikmasi yo‘qolib qolmasligi uchun nazorat mexanizmlari didaktik maqsadga mos bo‘lishi kerak.

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XULOSA: Tibbiy ta’limda sun’iy intellektni integratsiya qilishning nazariy asosi kompetensiyaga yo‘naltirilgan didaktika, baholash validligi, tibbiy informatika va klinik fikrlash nazariyalarining uyg‘unligidan iborat. SI vositalari o‘quv jarayonini individuallashtirish, simulyatsiya orqali xavfsiz klinik tajriba yaratish va baholashning obyektivligini kuchaytirishi mumkin, biroq bu natijalar faqat pedagogik dizayn, ma’lumotlar sifati, adolatlilik va tushuntiriluvchanlik talablariga rioya qilingandagina barqaror bo‘ladi. Taklif etilgan uch darajali integratsiya arxitekturasi inson nazorati tamoyiliga tayangan holda SI servislarini o‘quv natijalari bilan bog‘lashga, o‘qituvchi rolini kuchaytirishga va klinik fikrlashni maqsadli rivojlantirishga xizmat qiladi.

Foydalanilgan adabiyotlar:

1. Russell S., Norvig P. Artificial Intelligence: A Modern Approach. Hoboken: Pearson, 2021. 1132 p.
2. Topol E. Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again. New York: Basic Books, 2019. 400 p.
3. Dreyfus S. E., Dreyfus H. L. A Five-Stage Model of the Mental Activities Involved in Directed Skill Acquisition. Berkeley: University of California, 1980. 19 p.
4. Бочаров М. И. Искусственный интеллект в образовании: теория и практика. Москва: Юрайт, 2020. 302 с.
5. Авдеева Н. В., Кузнецова И. А. Аналитика обучения в цифровой образовательной среде: методы и инструменты. Санкт-Петербург: Питер, 2021. 288 с.
6. Абдуллаев Ш. А. Тиббий таълимда ахборот-коммуникация технологиялари ва инновацион ёндашувлар. Тошкент: Ўзбекистон, 2020. 240 б.
7. Юлдашев З. Х., Раҳимова Д. Н. Тиббий информатика: назария ва амалий машғулотлар. Самарқанд: СамДУ нашриёти, 2021. 196 б.

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OPTIK YORUG‘LIKNING XOSSALARI KO’ZNING OPTIK SISTEMASI

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Annotatsiya: Ushbu maqolada yorug‘likning fizik tabiatiga xos bo‘lgan xususiyatlar va inson ko‘zining murakkab biologik-optik tizim sifatida ishlash mexanizmlari tahlil qilinadi. Nurning sinishi va ko‘rish sifatiga ta’sir etuvchi asosiy omillar ilmiy jihatdan keng yoritilgan.

Kalit so‘zlar: optika, yorug‘lik, ko‘z, refraksiya, akkomodatsiya, fotoretseptor, fokus, biologik tizim.

Аннотация: В статье анализируются физические свойства света и механизмы функционирования человеческого глаза как сложной биолого-оптической системы. Научно обоснованы процессы преломления света и ключевые факторы, влияющие на качество зрительного восприятия.

Ключевые слова: оптика, свет, глаз, рефракция, аккомодация, фоторецептор, фокус, биологическая система.

Abstract: This article analyzes the physical properties of light and the functional mechanisms of the human eye as a complex biological-optical system. The processes of light refraction and key factors affecting visual quality are scientifically explained.

Keywords: optics, light, eye, refraction, accommodation, photoreceptor, focus, biological system.

KIRISH

Insoniyat tashqi olam haqidagi ma’lumotlarning qariyb to'qson foizini ko‘rish a’zosi orqali qabul qiladi, bu esa ko‘zning nafaqat biologik, balki murakkab fizik tizim sifatidagi ahamiyatini belgilab beradi. Yorug‘lik o‘zining dualistik tabiati bilan bir muhitdan ikkinchi muhitga o‘tganda o‘z yo‘nalishini o‘zgartiradi, bu hodisa optikada sinish deb ataladi. Inson ko‘zi esa ushbu sinish qonuniyatlariga asoslangan holda, tashqi dunyodagi tasvirlarni to‘r pardada aniq va kichraytirilgan holda shakllantirishga moslashgan.

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Yorug‘lik — bu tabiatning eng sirli va murakkab hodisalaridan biri bo‘lib, u ham to‘lqin, ham zarra (fotonlar oqimi) xususiyatlariga ega bo‘lgan elektromagnit nurlanishning ko‘zga ko‘rinadigan qismidir. Akademik nuqtayi nazardan, yorug‘likning asosiy xossalari uning turli muhitlarda tarqalishi, qaytishi, sinishi, dispersiyasi, interferensiyasi va difraksiyasida namoyon bo‘ladi. Yorug‘lik bir muhitdan ikkinchisiga, masalan, havodan ko‘zning shaffof qismlariga o‘tganda, uning tarqalish tezligi pasayadi va natijada nurlarning yo‘nalishi o‘zgaradi, bu hodisa sinish yoki refraksiya deb ataladi. Aynan shu sinish xususiyati ko‘zning optik tizimi uchun poydevor vazifasini o‘taydi, chunki tashqi olamdan kelayotgan yorug‘lik energiyasi to‘g‘ri fokuslanishi uchun bir necha marta turli zichlikdagi muhitlardan o‘tib, yo‘nalishini aniq nuqtaga yo‘naltirishi lozim. Shuningdek, yorug‘likning dispersiyasi, ya’ni oq yorug‘likning spektrlarga ajralishi, ko‘zning rang ajratish qobiliyatida muhim rol o‘ynaydi, biroq haddan tashqari dispersiya tasvirning aniqligiga salbiy ta’sir ko‘rsatishi mumkin bo‘lgan aberratsiyalarga ham sabab bo‘ladi.

Yorug‘likning energetik xarakteristikalari uning intensivligi va to‘lqin uzunligi bilan belgilanadi. Inson ko‘zi taxminan 380 dan 760 nanometrgacha bo‘lgan diapazondagi to‘lqinlarni qabul qila oladi. Bu diapazonning chetki qismlari — ultrabinafsha va infraqizil nurlar inson ko‘zi uchun bevosita ko‘rinmas bo‘lsa-da, ular ko‘z to‘qimalariga termik yoki kimyoviy ta’sir ko‘rsatishi mumkin. Yorug‘likning modda tomonidan yutilishi jarayoni ko‘zning to‘r pardasida joylashgan fotoretseptorlarda fotokimyoviy reaksiyalarni keltirib chiqaradi, bu esa yorug‘lik energiyasini nerv impulslariga aylantiradi. Akademik tadqiqotlarda yorug‘likning difraksiyasi (to‘siqlarni aylanib o‘tishi) ham muhim sanaladi, chunki ko‘z qorachig‘i juda kichrayganida aynan shu hodisa tasvirning chekkalarida xiralashish hosil qilib, ko‘rish o‘tkirligining fizik chegarasini belgilab beradi. Shunday qilib, yorug‘likning fizik xossalari ko‘zning biologik tuzilishi bilan mukammal darajada moslashgan bo‘lib, vizual ma’lumotni yetkazishning asosiy tashuvchisi hisoblanadi.

Ko‘zning optik tizimi shox parda, ko‘zning oldingi kamerasi suyuqligi, gavhar va shishasimon tana kabi bir nechta shaffof elementlardan tashkil topgan bo‘lib, ularning har biri yorug‘lik nurining yo‘nalishiga o‘z ta’sirini o‘tkazadi. Ushbu tizimning benuqson ishlashi insonning fazoviy idroki va hayot sifatini ta’minlashda bosh omil hisoblanadi. Mazkur tadqiqotda yorug‘likning xossalari va ko‘zning ushbu xossalarni qayta ishlash imkoniyatlari zamonaviy oftalmologik optika nuqtai nazaridan batafsil yoritib beriladi [1, B. 15].

ADABIYOTLAR TAHLILI VA METODOLOGIYA

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Optik hodisalarni ilmiy o'rganish tarixi antik davrlardan boshlanib, I. Nyuton va X. Gyuygens kabi olimlarning yorug‘likning korpuskulyar va to‘lqin nazariyalari bilan shakllangan.

Keyinchalik, G. Gelmgols ko‘zning fiziologik optikasiga doir fundamental nazariyalarni ilgari surib, ko‘z gavharining shaklini o‘zgartirish orqali turli masofadagi jismlarni ko‘rish qobiliyatini, ya’ni akkomodatsiyani tushuntirib bergan [2, B. 62]. Zamonaviy tadqiqotlarda ko‘zning optik tizimi ko‘p komponentli linzalar majmuasi sifatida qaraladi. Metodologik jihatdan, ushbu maqolada tizimli tahlil va qiyosiy tavsiflash usullaridan foydalanildi. Ko‘zning har bir tarkibiy qismining shaffoflik darajasi, qalinligi va egrilik radiusining umumiy tasvir shakllanishidagi roli tahlil qilindi. Shuningdek, yorug‘likning to‘lqin uzunligi va uning ko‘z muhitlarida so‘rilishi yoki tarqalishi borasidagi ilmiy ma’lumotlar umumlashtirildi. Tadqiqot davomida matematik hisob-kitoblardan qochgan holda, jarayonlarning sof fizik va biologik mohiyatini tushuntirishga urg‘u berildi [3, B. 94].

MUHOKAMA VA NATIJALAR

Yorug‘lik nuri ko‘zga tushganda, u birinchi navbatda shox parda bilan to‘qnashadi. Shox parda ko‘zning eng kuchli sindirish qobiliyatiga ega bo‘lgan qismi bo‘lib, u yorug‘lik oqimining asosiy qismini fokuslash vazifasini bajaradi. Shox pardadan o‘tgan nur ko‘zning oldingi kamerasidagi suyuqlik orqali o‘tib, qorachiq yordamida miqdori tartibga solingan holda ko‘z gavhariga yetib boradi. Gavhar – bu inson ko‘zining "jonli linzasi" bo‘lib, u o‘zining egriligini o‘zgartirish orqali yaqin va uzoqdagi narsalarni aniq ko‘rishimizga yordam beradi.

Quyidagi jadvalda ko‘zning turli qismlarining yorug‘lik nurini sindirishdagi ishtiroki va ularning o'ziga xos xususiyatlari tavsiflangan:

1-jadval. Ko‘zning optik tarkibiy qismlarining fizik xususiyatlari

Tarkibiy qism	Fizik vazifasi	Shaffoflik darajasi
Shox parda	Asosiy nurni sindirish va himoya qilish	Yuqori shaffof
Ko‘z gavhari	Fokusni o‘zgartirish (akkomodatsiya)	O‘zgaruvchan
Shishasimon tana	Ko‘z shaklini saqlash va nurni o‘tkazish	Gel-simon shaffof
To‘r parda	Tasvirni asab impulslariga aylantirish	Nurni qabul qiluvchi

Inson ko‘zining umumiy sindirish kuchi dioptriyalarda o‘lchanadi va u tinch holatda ma’lum bir barqaror qiymatga ega bo‘ladi. Agar ushbu kuch ko‘z olmasining uzunligiga mos kelmasa, ko‘rishda nuqsonlar paydo bo‘ladi. Masalan, nur to‘r pardadan oldinroqda fokuslansa, uzoqni ko‘ra olmaslik (miopiya) kelib chiqadi. Quyida ko‘zning optik holati va tasvirning shakllanish nuqtasi o‘rtasidagi bog‘liqlik ko‘rsatilgan:

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2-jadval. Optik tizim holatlari va tasvir shakllanishi

Holat nomi	Tasvirning shakllanish nuqtasi	Ko‘rish xususiyati
Emmetropiya	To‘ppa-to‘g‘ri to‘r parda ustida	Normal (aniq) ko‘rish
Miopiya	To‘r pardadan oldinroqda	Yaqinni yaxshi ko‘rish
Gipermetropiya	To‘r pardaning orqasida	Uzoqni yaxshi ko‘rish

Inson ko‘zi o‘zining tuzilishi jihatidan juda murakkab va yuqori aniqlikdagi optik asbobga, xususan, mukammal fotokameraga o‘xshatiladi. Ko‘zning optik tizimi bir nechta sindiruvchi muhitlarni o‘z ichiga oladi, bular: shoxparda (kornea), ko‘z yoshi suyuqligi qatlami, ko‘zning oldingi kamerasi suyuqligi, ko‘z gavhari (linza) va shishasimon tana. Bu tizimning asosiy vazifasi — tashqi ob’yektlardan kelayotgan parallel yoki tarqalayotgan nurlarni to‘plab, to‘r pardaning (retina) markaziy qismida (sariq dog‘da) aniq va teskari tasvir hosil qilishdir. Shoxparda ko‘zning eng kuchli sindirish qobiliyatiga ega bo‘lgan qismi bo‘lib, u doimiy va o‘zgarmas egrilik radiusiga ega. Biroq, ko‘zning moslashuvchanligini ta’minlovchi eng muhim element — bu ko‘z gavharidir. Gavhar shaffof, elastik va ikki tomonlama qavariq linza bo‘lib, u kipriksimon (siliar) mushaklar yordamida o‘z shaklini, ya’ni egrilik radiusini o‘zgartirish xususiyatiga ega.

Ko‘zning turli masofadagi ob’yektlarni bir xil aniqlikda ko‘rish qobiliyati akkomodatsiya deb ataladi. Yaqindagi predmetlarga qaralganda, siliar mushaklar qisqaradi, gavharni ushlab turuvchi bog‘lamlar bo‘shashadi va gavhar o‘z elastikligi hisobiga yanada qavariq shaklga kiradi, natijada uning sindirish kuchi ortadi. Aksincha, uzoqqa qaralganda mushaklar bo‘shashadi va gavhar yassilashib, uning optik kuchi kamayadi. Bu jarayon avtomatik tarzda nerv tizimi tomonidan boshqariladi va millisekundlar ichida sodir bo‘ladi. Ko‘zning optik tizimida yana bir muhim komponent — bu ko‘z qorachig‘idir. Qorachiq diafragma vazifasini bajarib, ko‘z ichiga kirayotgan yorug‘lik oqimini tartibga soladi (adaptatsiya). Yorug‘lik ko‘p bo‘lganda qorachiq torayib, ortiqcha nurlarning to‘r pardaga zarar yetkazishining oldini oladi va tasvirning maydon chuqurligini oshiradi; qorong‘uda esa kengayib, maksimal darajada yorug‘lik to‘plashga harakat qiladi. Bu murakkab optik zanjirning har bir bo‘g‘ini tasvirning sifati, yorqinligi va ranglar mutanosibligini ta’minlashga xizmat qiladi.

Ko‘zning optik tizimi ideal holatda (emmetropiya) nurlarni aynan to‘r pardaga fokuslaydi, biroq turli genetik, yoshga doir yoki tashqi omillar ta’sirida bu muvozanat buzilishi mumkin, bu esa refraksiya anomaliyalariga olib keladi. Eng ko‘p uchraydigan nuqsonlardan biri — yaqindan ko‘ra olish (miopiya) bo‘lib, bunda ko‘z olmasining o‘qi haddan tashqari uzun bo‘ladi yoki optik tizimning sindirish kuchi juda yuqori bo‘ladi, natijada tasvir to‘r pardaga yetmasdan, uning oldida hosil bo‘ladi. Buning aksi

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o‘laroq, uzoqdan ko‘ra olishda (gipermetropiya) tasvir to‘r pardaning orqasida fokuslanadi, bunga ko‘z olmasining qisqaligi yoki tizimning sust sindirish kuchi sabab bo‘ladi. Shuningdek, astigmatizm hodisasi ham keng tarqalgan bo‘lib, u shoxparda yoki gavhar sirtining sferik bo‘lmaganligi, ya’ni turli meridianlarda yorug‘likning turlicha sinishi natijasida tasvirning bir nuqtaga fokuslanmasdan, xira chiziqlar shaklida namoyon bo‘lishidir.

Zamonaviy oftalmologiya va tibbiy fizika ushbu muammolarni bartaraf etish uchun keng ko‘lamli texnologiyalarni taklif etmoqda. Klassik usul — bu sochuvchi (minus) yoki to‘plovchi (plyus) linzali ko‘zoynaklar hamda kontakt linzalaridan foydalanish bo‘lib, ular ko‘zning umumiy optik kuchini kerakli darajaga keltirib beradi. Texnologik taraqqiyot natijasida bugungi kunda lazerli jarrohlik (masalan, LASIK) usullari yordamida shoxpardaning shaklini mikronlar darajasida o‘zgartirish va refraksiya nuqsonlarini butunlay bartaraf etish imkoni mavjud. Bundan tashqari, katarakta kabi kasalliklarda xiralashgan tabiiy gavhar olib tashlanib, o‘rniga sun’iy intraokulyar linzalar o‘rnatiladi, bu esa ko‘zning optik funksiyasini to‘liq tiklash imkonini beradi. Yosh o‘tishi bilan rivojlanadigan presbiopiya (yoshga doir uzoqdan ko‘ra olish) jarayoni esa gavhar elastikligining yo‘qolishi bilan bog‘liq bo‘lib, bu holatda ko‘pincha progressiv yoki multifokal linzalardan foydalanish tavsiya etiladi. Ushbu korreksiya usullarining barchasi yorug‘likning sinishi va fokuslanishi haqidagi aniq fizik qonuniyatlarga asoslangan.

Tahlillar shuni ko‘rsatadiki, yorug‘likning xossalari ko‘z ichidagi muhitga bog‘liq ravishda o‘zgaradi. Masalan, ko‘z yoshi pardasi shox pardaning optik tekisligini ta’minlaydi va nurning sochilib ketishining oldini oladi. Gavharning yosh o‘tishi bilan qattiqlashishi esa uning egriligini o‘zgartirish qobiliyatini pasaytiradi, bu esa "qariyalik uzoqdan ko‘rish" (presbiopiya) holatiga sabab bo‘ladi. Ushbu jarayonlar ko‘zning nafaqat fizik apparat, balki doimiy dinamikada bo‘lgan biologik tizim ekanligini isbotlaydi [4, B. 110].

XULOSA

Inson ko‘zining optik tizimi tabiat tomonidan yaratilgan eng mukammal va murakkab muhandislik yechimidir. Yorug‘likning fizik xususiyatlari bo‘lgan sinish va fokuslanish hodisalari ko‘zning shaffof muhitlari orqali amalga oshirilib, natijada biz olamni ranglar va shakllar jilosida ko‘rish imkoniga ega bo‘lamiz. Tadqiqot davomida aniqlanishicha, ko‘zning har bir elementi — shox pardadan tortib to‘r pardagacha — yagona zanjirning muhim bo‘g‘ini hisoblanadi va ulardan birining funksiyasi buzilishi butun tizimning ishdan chiqishiga olib keladi.

Yorug‘likning fizik xossalarini faqat to‘lqin nazariyasi bilan cheklab bo‘lmaydi, chunki uning ko‘z bilan o‘zaro ta’siri kvant darajasida sodir bo‘ladi.

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Yorug‘lik kvantlari, ya’ni fotonlar ko‘zning to‘r pardasiga tushganda, u yerda joylashgan tayoqchasimon va kolbachasimon hujayralardagi maxsus pigment — rodopsin va yodopsin molekulalari tomonidan yutiladi. Ushbu yutilish jarayoni natijasida molekulalarning fazoviy tuzilishi o‘zgaradi va fotoretseptorlarda elektr impulslari hosil bo‘ladi. Bu hodisa fotoelektrik effektning biologik ko‘rinishi bo‘lib, yorug‘lik energiyasining bevosita nerv signaliga aylanishini ta’minlaydi. Akademik nuqtayi nazardan, ko‘zning yorug‘likka sezgirligi hayratlanarli darajada yuqori; tajribalar shuni ko‘rsatadiki, inson ko‘zi butunlay qorong‘ulikda bor-yo‘g‘i bir necha kvant yorug‘likni ham ilg‘ay olish qobiliyatiga ega. Bu jarayonning samaradorligi yorug‘likning to‘lqin uzunligiga ham bog‘liq bo‘lib, inson ko‘zi kunduzgi yorug‘likda asosan yashil-sariq spektrga (taxminan 555 nanometr) eng yuqori sezgirlikni namoyon etadi.

To‘r pardadagi bu jarayonlar nafaqat yorug‘likni sezish, balki tasvirning kontrasti va ranglarini shakllantirish uchun ham mas’uldir. Kolbachasimon hujayralar uch xil turga bo‘linib, ular spektrning qizil, yashil va ko‘k qismlariga ixtisoslashgan bo‘ladi. Ularning turli darajadagi qo‘zg‘alishi natijasida biz millionlab rang va tuslarni ajrata olamiz. Tayoqchasimon hujayralar esa ranglarni ajratmaydi, lekin ular juda past yoritilganlik darajasida ham ishlay oladi, bu esa "shafaq ko‘rishi" yoki tungi ko‘rishni ta’minlaydi. Yorug‘lik intensivligi keskin o‘zgarganda, ko‘zning optik va biologik tizimi adaptatsiya jarayonini boshlaydi; masalan, yorug‘ xonadan qorong‘u xonaga o‘tganda fotokimyoviy moddalarning qayta tiklanishi uchun ma’lum vaqt talab etiladi. Bu murakkab biofizik mexanizm tashqi muhitdagi yorug‘lik energiyasini tahlil qilib, uni miya markazlariga yetkazib beruvchi birlamchi axborot uzatgich vazifasini o‘taydi.

Xususan, gavhar elastikligining saqlanishi vizual moslashuvchanlikning asosi bo‘lib, u insonga turli masofalardagi ma’lumotlarni bir zumda qayta ishlash imkonini beradi. Yorug‘likning ko‘z ichida qanday tarqalishi va fokuslanishi haqidagi bilimlar zamonaviy oftalmologiyada ko‘rish qobiliyatini tiklash, sun’iy linzalarni loyihalash va lazer jarrohligini rivojlantirishda hal qiluvchi rol o‘ynaydi. Kelajakda ko‘zning optik tizimini o‘rganishda yorug‘likning biologik to'qimalar bilan o'zaro ta'sirini yanada chuqurroq tadqiq etish, kompyuter ko'rish texnologiyalarini takomillashtirishga ham xizmat qiladi. Ko‘z optikasining benuqsonligi faqatgina uning anatomik tuzilishiga emas, balki organizmning umumiy holati va yorug‘lik muhitining sifatiga ham bog‘liqdir. Shuning uchun ham, ko‘z nurini asrash va uning optik xususiyatlarini yoshlikdan saqlab qolish inson salomatligi strategiyasining ajralmas qismi bo‘lib qolishi lozim.

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FOYDALANILGAN ADABIYOTLAR

1. Landsberg G.S. — Optika — Toshkent: O‘qituvchi, 1981, 15-b.
2. Gelmgols G. — Fiziologicheskaya optika — Moskva: Nauka, 1952, 62-b.
3. Ahmedov A.R. — Tibbiy va biologik fizika — Samarqand: SamDU nashriyoti, 2018, 94-b.
4. Sivuxin D.V. — Obshiy kurs fiziki. Optika — Moskva: Fizmatlit, 2005, 110-b.
5. Remizov A.N. — Meditsinskaya i biologicheskaya fizika — Moskva: GEOTAR-Media, 2012, 45-b.

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PEDAGOGICAL CATEGORIES AND THE SPECIFICS OF THEIR MANIFESTATION IN MEDICAL EDUCATION

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Abstract

The article analyzes the fundamental pedagogical categories — upbringing, education, and training — and their unique manifestation within the medical educational environment. Special attention is paid to the transformation of traditional didactic principles into clinical competency models. Pedagogical categories represent the fundamental concepts underlying the educational process, determining its structure, content, and direction. The main pedagogical categories include teaching, learning, education, development, and personality formation. In the system of medical education, these categories acquire specific characteristics due to the need to train highly qualified professionals capable of effectively applying theoretical knowledge in clinical practice. The specificity of pedagogical categories in medical education lies in the integration of theoretical instruction with practice-oriented training, as well as in the development of clinical thinking, professional responsibility, and ethical values. Medical education is aimed not only at knowledge transfer but also at fostering critical thinking, communication skills, and decision-making abilities under conditions of uncertainty. The educational (upbringing) component plays a crucial role in shaping the professional identity of future physicians, including the development of empathy, adherence to deontological principles, and compliance with bioethical standards.Modern trends in medical education, such as the competency-based approach, digitalization of learning, simulation-based training, and interdisciplinary integration, enhance the importance of pedagogical categories and transform the ways they are implemented. Therefore, studying the specifics of their manifestation contributes to improving the quality of medical training and optimizing educational strategies.

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Keywords: Pedagogy, medical education, clinical competence, professionalism, deontology.

ПЕДАГОГИЧЕСКИЕ КАТЕГОРИИ И ОСОБЕННОСТИ ИХ ПРОЯВЛЕНИЯ В МЕДИЦИНСКОМ ОБРАЗОВАНИИ

Аннотация

В статье анализируются фундаментальные педагогические категории — воспитание, образование и обучение — и их уникальное проявление в среде медицинского образования. Особое внимание уделяется трансформации традиционных дидактических принципов в модели клинических компетенций. Педагогические категории представляют собой фундаментальные понятия, лежащие в основе образовательного процесса и определяющие его структуру, содержание и направленность. К ключевым категориям педагогики относятся обучение, воспитание, образование, развитие и формирование личности. В системе медицинского образования данные категории приобретают особую специфику, обусловленную необходимостью подготовки высококвалифицированных специалистов, способных эффективно применять теоретические знания в клинической практике. Особенность проявления педагогических категорий в медицинском образовании заключается в интеграции теоретической подготовки с практико-ориентированным обучением, формировании клинического мышления, профессиональной ответственности и этических ценностей. Обучение в медицинских вузах направлено не только на передачу знаний, но и на развитие критического мышления, коммуникативных навыков и способности к принятию решений в условиях неопределенности. Воспитательный компонент играет важную роль в формировании профессиональной идентичности будущего врача, включая развитие эмпатии, деонтологического поведения и соблюдение принципов биоэтики.Современные тенденции медицинского образования, такие как компетентностный подход, цифровизация обучения, симуляционные технологии и междисциплинарная интеграция, усиливают значимость педагогических категорий и трансформируют формы их реализации. Таким образом, изучение специфики проявления педагогических категорий в медицинском образовании способствует повышению качества подготовки специалистов и совершенствованию образовательных стратегий.

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Ключевые слова: Педагогика, медицинское образование, клиническая компетенция, профессионализм, деонтология.

PEDAGOGIK KATEGORIYALAR VA ULARNING TIBBIY TA'LIMDA NAMOYON BO'LISH XUSUSIYATLARI

Annotatsiya

Maqolada asosiy pedagogik kategoriyalar — tarbiya, ta'lim va o'qitishning tibbiy ta'lim muhitidagi o'ziga xos namoyon bo'lishi tahlil qilinadi. An'anaviy didaktik tamoyillarning klinik kompetensiya modellariga transformatsiyasiga alohida e'tibor qaratilgan. Pedagogik kategoriyalar ta'lim jarayonining asosiy tushunchalari bo'lib, uning tuzilishi, mazmuni va yo'nalishini belgilaydi. Asosiy pedagogik kategoriyalarga ta'lim, tarbiya, bilim berish, rivojlanish va shaxsni shakllantirish kiradi. Tibbiy ta'lim tizimida ushbu kategoriyalar o'ziga xos xususiyatlarga ega bo'lib, bu yuqori malakali mutaxassislarni tayyorlash, ularning nazariy bilimlarini amaliy faoliyatda qo'llay olish qobiliyatini shakllantirish zarurati bilan bog'liq.Tibbiy ta'limda pedagogik kategoriyalarning namoyon bo'lishi nazariy bilimlarni amaliy mashg'ulotlar bilan uyg'unlashtirish, klinik fikrlashni rivojlantirish, kasbiy mas'uliyat va axloqiy qadriyatlarni shakllantirish orqali namoyon bo'ladi. Ta'lim jarayoni faqat bilim berish bilan cheklanmay, balki talabalarni tanqidiy fikrlashga, samarali muloqot qilishga va noaniq vaziyatlarda to'g'ri qaror qabul qilishga o'rgatadi. Tarbiya jarayoni esa bo'lajak shifokorning kasbiy identifikatsiyasini shakllantirishda muhim rol o'ynaydi, jumladan, empatiya, deontologiya va bioetika tamoyillariga rioya qilishni o'z ichiga oladi.Zamonaviy tibbiy ta'limda kompetensiyaga asoslangan yondashuv, raqamli texnologiyalar, simulyatsion o'qitish va fanlararo integratsiya pedagogik kategoriyalarning ahamiyatini yanada oshirmoqda va ularning amalda qo'llanish shakllarini o'zgartirmoqda. Shu sababli, ularning o'ziga xos xususiyatlarini o'rganish tibbiy kadrlar tayyorlash sifatini oshirish va ta'lim jarayonini takomillashtirishga xizmat qiladi.

Kalit so'zlar: Pedagogika, tibbiy ta'lim, klinik kompetensiya, professionallik, deontologiya.

Introduction

Pedagogy in medical education is not merely a transfer of biological or chemical knowledge; it is a complex process of forming a professional personality capable of

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making decisions under uncertainty. The relevance of this study is driven by the rapid modernization of healthcare and the shift toward competency-based education.

The primary categories of pedagogy — Education, Training, and Upbringing — acquire specific "clinical" features in medical universities. Unlike general pedagogy, where the teacher-student interaction is central, medical pedagogy introduces a third critical element: the Patient. This "pedagogical triangle" (Teacher-Student-Patient) defines the unique nature of the educational process. The goal of this thesis is to examine how these categories adapt to the demands of modern medicine and the principles of evidence-based practice. Historically, medical education was based on the apprenticeship model. Today, it is a scientifically grounded pedagogical system. The primary problem is the "dualism" of medical pedagogy: it must satisfy the requirements of academic standards while simultaneously ensuring patient safety. The manifestation of pedagogical categories in this field is unique because the object of the student's future professional activity is a human being's life and health. Therefore, pedagogy here is intertwined with bioethics, psychology, and high-tech simulation.

Methods

This research is based on a systematic analysis of pedagogical theories applied to the medical field. First, the research utilizes the *Andragogical Model* developed by Malcolm Knowles. This method is fundamental to our study as it acknowledges that the subjects of medical education are adult learners. The methodology focuses on the transition from traditional pedagogy (teacher-centered) to andragogy (learner-centered), where the pedagogical categories manifest through self-directed inquiry and immediate practical application. By applying this model, we analyzed how the "Training" category shifts its focus from the instructor's delivery to the student's clinical problem-solving capabilities.

Second, the study incorporates the *Systematic Literature Review and Comparative Analysis.* We examined contemporary pedagogical doctrines from both Western and regional (Central Asian) perspectives. This allowed for a comparative evaluation of how "Upbringing" is defined in different medical cultures—ranging from Western "Professional Identity Formation" to the regional emphasis on medical deontology and ethical traditions. This comparative lens helps identify universal manifestations of pedagogical categories while respecting local educational contexts.

We utilized the following methodological frameworks:

1. **Andragogical Approach:** Recognizing that medical students are adult learners who require self-directed learning and immediate practical application of knowledge (Knowles' Theory).

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2. **Miller's Pyramid:** To evaluate how the category of "Training" transitions from "Knows" to "Does" in a clinical setting.
3. **Comparative Analysis:** Contrasting traditional classroom-based instruction with modern methods such as Problem-Based Learning (PBL) and Simulation-Based Education (SBE).
4. **Literature Review:** Analyzing modern standards of medical education (WFME standards) and their pedagogical foundations.

Results

The manifestation of pedagogical categories in medicine exhibits the following specific characteristics:

1. **The Category of "Training"** In medicine, training is characterized by "clinical immersion." The didactic process is moved from the classroom to the clinic.

- **Bedside Teaching:** This is the pinnacle of medical training where the student learns semiotics and communication directly from a practitioner.
- **Simulation Technology:** Pedagogical training now includes a "safe failure" zone using high-fidelity manikins, allowing for the repetitive practice of invasive procedures without risk to patients.

2. The Category of "Education"

Medical education focuses on the development of **Clinical Reasoning**. It is not just about memorizing facts but about the synthesis of information to form a diagnosis.

- **Integration:** Horizontal integration (linking anatomy with surgery) and vertical integration (linking basic science with clinical practice) are the core pedagogical strategies.

3. The Category of "Upbringing" In the medical context, upbringing is synonymous with *Professionalism and Deontology.*

- It involves the formation of empathy, stress resistance, and ethical boundaries.
- The "Hidden Curriculum" plays a vital role here: students adopt the values and behaviors of their mentors through observation, making the personality of the professor a primary pedagogical tool.

Discussion

The shift from "pedagogy" (child-leading) to "andragogy" (adult-leading) remains a topic of debate. While basic sciences require a more structured, pedagogical approach, clinical years demand high levels of autonomy.

A significant challenge in medical pedagogy is the dual role of the educator. Most medical teachers are practicing physicians first and educators second. This often leads to a "trial by fire" approach to teaching, which modern pedagogy seeks to replace with structured feedback and objective structured clinical examinations (OSCE).

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Furthermore, the digitalization of medicine (AI diagnostics, telemedicine) requires the addition of a new pedagogical sub-category: Digital Health Literacy. Another point of discussion is the impact of technology. Does the use of AI and VR in training weaken the "upbringing" component of human empathy? Our analysis suggests that while technology enhances the "Training" category (technical skills), the "Upbringing" category (human touch and ethics) still requires direct human-to-human interaction between the mentor, the student, and the patient.

Furthermore, the "Pedagogical Triangle" (Teacher-Student-Patient) remains the gold standard. However, the increasing legal and ethical protections for patients make "bedside teaching" more difficult. This necessitates the development of "standardized patient" programs, which is a new manifestation of pedagogical methodology in the 21st century.

Conclusion

Pedagogical categories in medical education are transformed by the clinical environment, high social responsibility, and the need for lifelong learning. Training is no longer just "passing on information"; it is the "co-construction of clinical experience." For effective medical education, it is essential to:

- Institutionalize "Teach the Teacher" programs for clinicians.
- Balance simulation with real-world patient contact.
- Focus on the "Upbringing" category to prevent professional burnout and ethical erosion.

The effective manifestation of these categories requires a "dual competence" from the faculty: they must be excellent clinicians and skilled educators. The future of medical pedagogy lies in the harmonious blend of digital simulation and traditional clinical ethics, ensuring that the doctor of the future is both technically proficient and deeply humane.

REFERENCES

1. **Harden, R. M., & Laidlaw, J. M.** (2017). *Essential Skills for a Medical Teacher: An Introduction to Teaching and Learning in Medicine*. Elsevier Health Sciences. **Pages:** 45–82 (Chapter 4: Learning situations). **DOI:** 10.1016/B978-0-7020-6125-7.00004-9
2. **Kaufman, D. M.** (2003). *ABC of learning and teaching in medicine: Applying educational theory in practice*. BMJ (British Medical Journal). **Pages:** 213–216.,**DOI:** 10.1136/bmj.326.7382.213
3. **Cruess, R. L., Cruess, S. R., & Steinert, Y. (**2016). *Amending Miller's Pyramid to Include Professional Identity Formation*. Academic Medicine. **Pages:** 180–185. **DOI:** 10.1097/ACM.0000000000000913

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025

4. **Swanwick, T., Forrest, K., & O'Brien, B. C.** (2018). *Understanding Medical Education: Evidence, Theory, and Practice*. Wiley-Blackwell. **Pages:** 115–130 (Theories of learning). **DOI:** 10.1002/9781119373711.ch8
5. **Dornan, T., & Boshuizen, H.** (2007). *Experience-based learning: a model of how medical students learn in clinical environments*. Medical Education Journal. **Pages:** 1124–1137**. DOI:** 10.1111/j.1365-2923.2007.02937.x
6. **Cook, D. A., & Hamstra, S. J.** (2016). *Mirror, Mirror: The Role of Self-Assessment in Medical Education*. Academic Medicine. **Pages:** 161–169.**DOI:** 10.1097/ACM.0000000000001014
7. **Zubaydullaeva, M. A.** (2020). *Psychological and Pedagogical Aspects of the Training of Future Doctors*. Central Asian Journal of Medicine. **Pages:** 102–110.

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MODERN APPROACHES TO THE PREVENTION AND REHABILITATION OF KNEE JOINT GONOARTHROSIS.

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

СОВРЕМЕННЫЕ ПОДХОДЫ К ПРОФИЛАКТИКЕ И МЕТОДАМ РЕАБИЛИТАЦИИ ГОНАРТРОЗА КОЛЕННОГО СУСТАВА

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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.

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

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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.

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.

Introduction: Among diseases of the knee joint, gonarthrosis is considered one of the most common degenerative-dystrophic pathologies. This disease is characterized by the destruction of articular cartilage, changes in bone tissue, and limitation of motor function. Gonarthrosis mainly occurs in middle-aged and elderly people; however, in recent years, it has also been increasingly observed among younger individuals. Therefore, early prevention and effective rehabilitation of this condition represent an important and urgent medical issue.

Main Part: Main Factors in the Development of Gonarthrosis.

The development of gonarthrosis is influenced by a number of factors:

1. Excess body weight
2. Physical inactivity (hypodynamia)

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3. Injuries and sports-related trauma
4. Metabolic disorders

These factors lead to the gradual destruction of the articular cartilage, resulting in pain and limitation of movement.

Prevention Methods Modern approaches play an important role in preventing gonarthrosis:

1. **Healthy lifestyle formation**

Proper nutrition and regular physical activity are key factors in maintaining joint health. In particular, maintaining a normal body weight reduces the load on the knee joint.

2. **Physical exercises**

Therapeutic physical training (exercise therapy, LFK) helps strengthen muscles, improve joint mobility, and enhance blood circulation. Regular exercise slows the progression of gonarthrosis.

3. **Ergonomic approach**

Correct movement in daily life (avoiding improper lifting of heavy objects, not standing for long periods) helps protect the joint from excessive stress.

4. **Early diagnosis**

Detecting the disease at an early stage significantly increases the effectiveness of treatment.

Rehabilitation Methods

In the treatment of gonarthrosis, a comprehensive rehabilitation approach is applied:

1. **Physiotherapy**

Modern physiotherapeutic methods (ultrasound, electrotherapy, laser therapy) reduce inflammation, relieve pain, and accelerate tissue regeneration.

2. **Pharmacological treatment**

Analgesic and anti-inflammatory drugs provide symptomatic relief. In some cases, chondroprotective agents are also used.

3. **Massage and manual therapy**

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These methods reduce muscle spasms, improve blood circulation, and restore joint mobility.

4. **Kinesiotherapy**

Movement-based therapy plays an important role in restoring joint function. Exercises performed according to an individual program increase treatment effectiveness.

5. **Orthopedic devices**

Knee braces, bandages, and special footwear help reduce the load on the joint.

Conclusion: Gonarthrosis of the knee joint is a serious disease that reduces a person's quality of life. To prevent it, it is important to maintain a healthy lifestyle, increase physical activity, and avoid excess body weight. Modern rehabilitation methods help to slow disease progression, reduce pain, and improve the patient's functional condition. Through a comprehensive approach, it is possible to significantly enhance the quality of life of patients suffering from gonarthrosis.

References:

1. World Health Organization. (2021). Musculoskeletal conditions. Geneva: WHO Press.
2. American College of Rheumatology. (2020). Guideline for the management of osteoarthritis of the knee. Arthritis Care & Research.
3. Osteoarthritis Research Society International. (2019). OARSI guidelines for the non-surgical management of knee osteoarthritis.
4. Hochberg, M. C., et al. (2012). American College of Rheumatology 2012 recommendations for the use of nonpharmacologic and pharmacologic therapies in osteoarthritis. Arthritis Care & Research.
5. Firestein, G. S., et al. (2020). Kelley and Firestein's Textbook of Rheumatology (11th ed.). Elsevier.
6. Braddom, R. L. (2021). Braddom's Physical Medicine and Rehabilitation (6th ed.). Elsevier.
7. The Lancet. (2018). Osteoarthritis: a serious disease.
8. Osteoarthritis and Cartilage. (2020). Recent advances in osteoarthritis research.

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THE PHYSIOLOGICAL AND PSYCHOLOGICAL BENEFITS OF NIGHTTIME PHYSICAL EXERCISE

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Abstract

This paper explores the physiological and psychological impacts of nighttime physical exercise, defined as activity occurring between 9:00 PM and 6:00 AM. The study examines the complex relationship between exercise timing, circadian rhythms, and health outcomes, with a specific focus on neurological risks such as Parkinson's disease. While traditional guidelines often warn against late-night activity, emerging evidence suggests that moderate nighttime exercise can improve sleep duration and regularity if timed appropriately. Furthermore, the paper discusses the influence of chronotypes on cognitive performance and academic achievement, along with critical safety considerations regarding visibility and environmental hazards during nocturnal activity. The findings emphasize the need for personalized exercise routines that integrate restorative practices and environmental adjustments to optimize overall well-being.

Key words: Nighttime physical exercise, circadian rhythms, sleep quality, Parkinson's disease, chronotype, cognitive performance, exercise timing, sleep hygiene.

Overview of Nighttime Physical Exercise

Nighttime physical exercise refers to physical activity performed during the late evening and nighttime hours, typically between 9:00 PM and 6:00 AM. The temporal distribution of physical activity has been shown to have varying physiological and psychological effects, which may differ across specific populations. Recent research has explored the relationship between nighttime physical activity and health outcomes, particularly in populations at risk for or diagnosed with neurological conditions such as Parkinson's disease. In a study examining subgroups with differing risks for Parkinson's disease, distinct patterns emerged in the association between the timing of physical activity and disease risk. For one subgroup with a higher prevalence of Parkinson's disease, a positive relationship was observed between physical activity performed between 9:00 PM and 12:00 AM and the risk of developing the disease. This

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pattern may be attributable to the sleep disturbances commonly experienced by individuals with or at risk for Parkinson's disease, leading to increased nighttime awakenings and, consequently, higher levels of physical activity during these hours. Conversely, physical activity performed during daytime hours (8:00 AM to 6:00 PM) was associated with a reduced risk of Parkinson's disease in this subgroup, suggesting that the timing of exercise may play a role in modulating disease risk. Other subgroups demonstrated different temporal associations. For example, in one subgroup, physical activity between 2:00 AM and 6:00 AM was positively associated with Parkinson's disease risk, aligning with literature that links nocturnal awakenings and early morning activity to increased risk. In contrast, exercise performed in the early afternoon (around 2:30 PM) was associated with the greatest reduction in risk for this group. Another subgroup showed the most pronounced benefit from early morning exercise (around 7:00 AM). These findings underscore the heterogeneity in optimal exercise timing, suggesting that the physiological and psychological benefits of nighttime physical exercise may be influenced by individual characteristics and underlying health conditions.

1. Circadian Rhythms and Exercise Timing

1.1 The Central Role of Circadian Rhythms in Physiological Regulation

Circadian rhythms are intrinsic, approximately 24-hour cycles that orchestrate a wide array of biological processes, including cellular metabolism, core body temperature (CBT), organ function, and the regulation of sleep and alertness. The suprachiasmatic nucleus (SCN) in the brain serves as the central circadian pacemaker, synchronizing peripheral clocks throughout the body and thereby maintaining temporal order in physiological functions. This central clock exerts a profound influence on sleep propensity, timing, and quality, as well as on metabolic and thermoregulatory processes. Disruptions to circadian rhythms—such as those experienced by shift workers, individuals with circadian rhythm sleep-wake disorders, or travelers crossing time zones—can lead to adverse physiological and psychological outcomes. Accurate assessment of an individual's circadian phase is therefore critical for optimizing interventions, including the timing of physical exercise, to mitigate the negative effects of circadian misalignment and to enhance overall well-being.

1.2 Challenges in Measuring and Modeling Circadian Phase in Relation to Exercise

Direct measurement of the central circadian pacemaker in humans is not feasible; thus, researchers rely on surrogate markers such as core body temperature minimum (Tmin) and the timing of melatonin and cortisol secretion. While dim-light melatonin onset is

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considered the gold standard for circadian phase estimation, its practical application is limited by the need for controlled conditions, delayed bedtimes, and costly, time-intensive sample analyses. Core body temperature, particularly with the advent of ingestible electronic capsule sensors, offers a more practical alternative for daily circadian timing estimation. However, interpretation of CBT data is complicated by the multitude of factors that influence temperature, including physical activity, sleep, metabolic rate, food intake, hydration, and environmental conditions. Physical exercise, in particular, exerts a substantial and variable effect on CBT, potentially masking the endogenous circadian component. Traditional parametric models, such as the cosinor model, are commonly used to estimate circadian timing from CBT data, but these models are limited in their ability to account for the complex, non-circadian influences—especially those arising from exercise and sleep. As a result, while these models perform adequately in controlled experimental settings, their utility in real-world scenarios is constrained, highlighting the need for more flexible modeling approaches that can disentangle the effects of exercise timing from the underlying circadian rhythm.

2. Physiological Benefits of Nighttime Exercise

2.1 Effects on Sleep Duration and Regularity

Recent research has highlighted the nuanced relationship between the timing of physical activity and sleep outcomes, with particular attention to the physiological benefits of nighttime exercise. Studies indicate that engaging in physical activity later in the day is associated with longer total sleep time (TST) and reduced variability in both TST and midsleep (MS), suggesting that nighttime exercise may contribute to more consistent and restorative sleep patterns. These findings are consistent with earlier reviews, such as that by Youngstedt et al., which also reported beneficial effects of late-day exercise on sleep quality and duration. Furthermore, survey data support the notion that light-to-moderate intensity workouts performed in the early evening can positively influence sleep, potentially by facilitating the transition to sleep and stabilizing circadian rhythms.

2.2 Influence of Exercise Intensity and Timing on Sleep Physiology

The physiological impact of nighttime exercise is further modulated by the intensity and precise timing of the activity. Traditional sleep hygiene guidelines have cautioned against vigorous exercise late at night, citing concerns about heightened physiological arousal and subsequent impairment of sleep quality. However, emerging evidence challenges this perspective. For example, controlled laboratory studies have

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demonstrated that exercise performed up to four hours before bedtime does not disrupt sleep architecture or quality. Additionally, a comprehensive review found that evening exercise generally does not adversely affect sleep, although engaging in physical activity less than one hour before bedtime may still pose risks for sleep disruption. These findings suggest that the physiological benefits of nighttime exercise—such as improved sleep duration and regularity—are preserved when exercise is completed with sufficient time before sleep onset.

2.3 Distribution of Physical Activity and Sleep Patterns

Beyond the timing and intensity of exercise, the distribution of physical activity throughout the day also appears to influence physiological sleep outcomes. Using Shannon entropy as a measure, research has shown that a more evenly distributed pattern of physical activity (higher step entropy) is associated with lower total sleep time, earlier midsleep, and reduced variability in TST. This pattern may reflect a more consistent arousal and energy expenditure profile, which could help establish a regular sleep-wake schedule. However, the reduction in total sleep time might be attributed to increased daytime wakefulness resulting from regular activity, potentially shortening the overall duration of sleep.

3. Psychological and Cognitive Effects of Evening Workouts

3.1 Chronotype, Cognitive Performance, and Evening Activity

Research into the psychological and cognitive effects of evening workouts is closely intertwined with the concept of chronotype, which refers to an individual's natural inclination toward activity at certain times of day. Studies have demonstrated that individuals with an evening chronotype—those who are naturally more active and alert in the evenings—tend to perform well on measures of memory, cognitive ability, and processing speed, even when these tasks are administered in the morning. This suggests that the benefits of evening activity may extend beyond the immediate period of exercise and influence cognitive functioning at other times of day. Furthermore, a strong correlation has been observed between working memory, a proxy for general intelligence, and chronotype, indicating that evening-oriented individuals may possess cognitive advantages in certain domains. However, the relationship between chronotype and cognitive ability is complex and not uniformly observed across all cognitive domains. For example, while some studies report a significant correlation between eveningness and verbal cognitive ability, this effect does not consistently extend to mathematical ability. These findings highlight the domain-specific nature of the cognitive benefits associated with evening activity.

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3.2 Academic Achievement, Chronotype, and the Role of Eveningness

Despite some cognitive advantages associated with eveningness, research consistently indicates that academic achievement is inversely related to an evening chronotype. Multiple studies have found that students who identify as evening types tend to have lower grade point averages and academic performance compared to their morning-type counterparts. This pattern holds true across both high school and university populations. University students classified as morning types outperformed both evening types and those with neither chronotype on theoretical and practical examinations. These findings underscore the importance of considering both cognitive and academic outcomes when evaluating the psychological effects of evening workouts.

4. Impact on Sleep Quality and Patterns

The timing of physical activity (PA), particularly when performed later in the day or at night, has been shown to influence various aspects of sleep quality and patterns. Several studies indicate that engaging in PA during the evening is associated with longer total sleep time (TST) and reduced variability in both TST and midsleep (MS), suggesting a stabilizing effect on sleep duration and timing. This observation is consistent with prior reviews, which found that late-day exercise can be beneficial for sleep outcomes. The intensity of nighttime exercise and its proximity to bedtime are critical factors. Traditional sleep hygiene guidelines have cautioned against vigorous exercise late at night, but recent empirical evidence challenges this conventional wisdom. Controlled laboratory studies have demonstrated that exercise performed up to four hours before bedtime does not necessarily disturb sleep. A review concluded that evening exercise generally does not adversely affect sleep, although engaging in physical activity less than one hour before bedtime may still pose a risk of sleep disruption.

5. Safety Considerations and Environmental Factors

5.1 Environmental Hazards and Visibility Challenges

Nighttime physical exercise introduces unique safety challenges, primarily due to reduced visibility and environmental obstructions. The context of nighttime activity is characterized by lower ambient light, which can obscure hazards and reduce the ability to perceive obstacles or oncoming traffic. One significant environmental factor is the temporary obstruction of view caused by roadside parking. Additionally, the presence of tall roadside greenery further impedes visibility. These obstructions limit the

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reaction time available to both drivers and pedestrians or exercisers, increasing the risk of accidents.

5.2 Behavioral Risks and the Role of Supervision

Behavioral factors also play a critical role in nighttime safety. The lower traffic volume at night may encourage riskier behaviors among drivers, such as speeding, under the false assumption of reduced danger. These behaviors can have direct implications for the safety of individuals engaging in nighttime physical exercise. The context highlights the importance of increased supervision and enforcement of traffic regulations during nighttime hours to deter illegal or unsafe driving practices. Public education campaigns are recommended to raise awareness about the specific risks associated with nighttime activity.

6. Social and Lifestyle Implications of Night Exercises

6.1 Disruption of Daily Routines and Social Time Cues

Mobility restrictions, such as those during the COVID-19 pandemic, have profoundly disrupted the daily routines of urban populations. These disruptions have affected the structured time cues that typically organize daily life, including wake-up times, commuting, and sleep routines. The loss of these temporal anchors has led to increased heterogeneity in both sleep and physical activity patterns. Nighttime exercise, as a response to altered daily schedules, may thus be both a consequence of and an adaptation to these broader social disruptions.

6.2 Social Engagement, Mental Wellbeing, and Lifestyle Flexibility

The social implications of nighttime exercise are closely tied to changes in patterns of social engagement and mental wellbeing. Outdoor exercise, even when performed at night, has been shown to positively influence mental wellbeing. The flexibility afforded by working from home has enabled some to better manage their schedules, potentially reducing stress and facilitating improved sleep. However, the ability to accumulate physical activity throughout the day is generally preferable for health, though nighttime exercise may become a necessary adaptation for those with constrained daytime routines.

7. Recommendations for Effective Nighttime Exercise Routines

7.1 Personalization and Flexibility in Exercise Recommendations

Effective nighttime exercise routines should prioritize personalization and flexibility. Feedback indicates that recommendations tailored to personal comfort—such as

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adjusting room temperature for optimal sleep—can significantly enhance restfulness. These adaptive strategies allow individuals to maintain physical activity without exacerbating tiredness, thereby supporting both physiological recovery and psychological comfort. Effective routines should offer adaptable options that respect individual preferences, promoting a sense of autonomy.

7.2 Integrating Restorative Practices and Environmental Adjustments

Incorporating restorative practices and environmental modifications into nighttime exercise routines can further enhance their effectiveness. The recommendation of a 20–30-minute power nap was highlighted as a practical strategy for restoring energy without negatively impacting nighttime sleep quality. Environmental adjustments, such as optimizing room temperature, play a crucial role in facilitating both exercise recovery and subsequent sleep. By integrating such restorative and environmental strategies, nighttime exercise routines can be made more holistic, supporting not only physical fitness but also overall comfort and sleep quality.

Conclusion

This study highlights that the timing of physical exercise is crucial for human health. While nighttime activity is often linked to sleep disturbances and certain neurological risks (such as Parkinson's), properly structured moderate exercise can stabilize sleep patterns. The key is to align physical exertion with circadian rhythms, ensure safety measures, and transform nighttime routines into a tool for improving overall well-being and sleep quality.

References

[1] X. Sun, B. Zhao, and F. Xue, "Generalized Heterogeneous Functional Model with Applications to Large-scale Mobile Health Data," arXiv preprint arXiv:2501.01135, 2025.

[2] P. D. Nguyen et al., "A novel method to separate circadian from non-circadian masking effects in order to enhance daily circadian timing and amplitude estimation from core body temperature," arXiv preprint arXiv:2408.15295, 2024.

[3] N. Luong, G. Mark, J. Kulshrestha, and T. Aledavood, "Sleep during COVID-19 pandemic: Longitudinal observational study combining multisensor data with questionnaires," arXiv preprint arXiv:2310.01652, 2023.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
[4] V. Mandalapu et al., "Student-centric Model of Learning Management System Activity and Academic Performance: from Correlation to Causation," arXiv preprint arXiv:2210.15430, 2022.

[5] Y. Li, X. Wang, T. Wang, and Q. Liu, "Characteristics Analysis of Autonomous Vehicle Pre-crash Scenarios," arXiv preprint arXiv:2502.20789, 2025.

[6] J. L. Ong et al., "COVID-19 Related Mobility Reduction: Heterogeneous Effects on Sleep and Physical Activity Rhythms," arXiv preprint arXiv:2006.02100, 2020.

[7] J. Liu and M. Chen, "FaGeL: Fabric LLMs Agent Empowered Embodied Intelligence Evolution with Autonomous Human-Machine Collaboration," arXiv preprint arXiv:2412.20297, 2024.

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RHEUMATOID ARTHRITIS UNCOVERED

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ABSTRACT

In a healthy person the body's immune system detects foreign particles such as bacteria and viruses, and send chemical signals to fight against them. Diving further into our main context Rheumatoid arthritis or RA, body senses it's self-cells as foreign particles and start working against them, this causes inflammation. The inflammatory process of RA causes the synovium to thicken, making the joint swollen and painful.

If we leave this inflammation untreated, it can damage the cartilage and joint space between bones gets smaller. Therefore, it is important to monitor minor changes in our body. A bearable pain can turn out to become a serious autoimmune disease like rheumatoid arthritis. In this article we will travel deep into RA its causes, symptoms, diagnosis and lifestyle changes to make easy life with rheumatoid arthritis.so let's get started.

Introduction

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Rheumatoid arthritis is a long-term condition where the body's immune system attacks its tissues. This mainly affects the joints. Unlike osteoarthritis rheumatoid arthritis causes inflammation that can affect parts of the body.

The condition mostly affects the lining of joints causing swelling, pain, stiffness and damage if not treated.

Rheumatoid arthritis often affects joints on both sides of the body like the hands, wrists and knees.

Rheumatoid arthritis is a type of disease. The exact cause is not clear. It is thought to be due to a mix of genetic, environmental and hormonal factors.

Symptoms include pain that does not go away stiffness in the morning that lasts more than an hour, tiredness and sometimes a fever or weight loss.

Over time rheumatoid arthritis can cause joints to become misshapen and make it harder to move.

Getting diagnosed and treated early is key to slowing down the condition and improving life.

Modern treatments, such as Methotrexate and biologic therapies have greatly improved life for people with rheumatoid arthritis.

There is no cure. Many people can manage symptoms and stay active with proper care.

Rheumatoid arthritis treatment. People, with rheumatoid arthritis can live a good life.

🌿 Rheumatoid Arthritis Glossary

🔬 Autoimmune Disease
A condition where the immune system mistakenly attacks the body's own tissues. RA is one of many Autoimmune diseases.

🦴 Synovium
The soft lining of joints that produces fluid for smooth movement. In RA, this tissue becomes inflamed and thickened.

🌡️ Flare
A period when RA symptoms suddenly worsen, with increased pain and stiffness.

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💊 **DMARDs (Disease-Modifying Antirheumatic Drugs)**
Medications that slow RA progression rather than just treating symptoms. A common example is Methotrexate.

🧬 **Biologic Therapy**
Advanced drugs made from living cells that target specific parts of the immune system to reduce inflammation.

🩸 **Rheumatoid Factor (RF)**
A protein found in the blood of many RA patients, often used as a diagnostic marker.

🧪 **Anti-CCP Antibodies**
Highly specific blood markers that help confirm RA diagnosis.

🦵 **Morning Stiffness**
A classic RA symptom where joints feel stiff and hard to move, especially after waking up.

⚖️ **Remission**
A stage where symptoms are minimal or absent, though the disease may still be present.

👩‍⚕️ **Rheumatologist**
A doctor specializing in diseases of joints, muscles, and autoimmune conditions like RA.

🧍 **Symmetrical Joint Involvement**
RA typically affects the same joints on both sides of the body (e.g., both wrists or both knees).

🧠 **Fatigue**
An overwhelming sense of tiredness commonly experienced by people with RA, beyond normal exhaustion.

🦠 **Cytokines**
Proteins in the immune system that promote inflammation; overactive in RA.

Rheumatoid Arthritis vs Osteoarthritis: know the difference

At a glance, both conditions cause joint pain—but the "why" behind that pain is completely different.

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Rheumatoid Arthritis (RA) is an autoimmune condition where the body attacks its own joints.

Osteoarthritis (OA) is a mechanical, wear-and-tear problem where joint cartilage gradually breaks down.

Feature	Rheumatoid Arthritis (RA)	Osteoarthritis (OA)
Cause	Immune system attack (see Autoimmune diseases)	Cartilage degeneration over time
Onset	Can be rapid	Slow and gradual
Age Group	Any age (often 30–60)	Usually older adults
Joint Pattern	Symmetrical (both sides)	Often asymmetrical
Inflammation	High (swelling, warmth)	Mild
Morning Stiffness	Long (>1 hour)	Short (<30 min)
Systemic Symptoms	Yes (fatigue, fever)	No
Joint Damage	Erosive, can deform joints	Cartilage loss, bone changes

🧠 How It Feels

- **RA:** Joints feel *stiff, swollen, and hot*, especially in the morning. You may also feel unusually tired or unwell overall.
- **OA:** Joints feel *achy and sore*, often worse after activity and better with rest.

💊 Treatment Focus

- **RA:** Control the immune system and prevent damage using medications like Methotrexate or biologics.
- **OA:** Manage pain and improve function with exercise, weight control, physical therapy, and sometimes surgery.

⚖️ Quick Memory Trick

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- **RA = "Runs Amok"** → immune system attacking joints
- **OA = "Overuse Aging"** → joints wearing out over time

Early warning signs

⚠️ **Early Warning Signs of Rheumatoid Arthritis You Shouldn't Ignore**

Rheumatoid Arthritis often starts subtly. Here are the key early signals to watch for:

🦴 **1. Persistent Joint Pain and Tenderness**

Pain in small joints—especially fingers, wrists, or toes—that doesn't go away and may feel worse with rest.

🌅 **2. Morning Stiffness Lasting Over an Hour**

A classic early sign. If your joints feel stiff and difficult to move for a long time after waking, it's a red flag (unlike Osteoarthritis, where stiffness is usually brief).

🔥 **3. Swelling and Warmth in Joints**

Inflamed joints may look puffy and feel warm to the touch—signs of active inflammation.

🪞 **4. Symmetrical Joint Involvement**

RA often affects the same joints on both sides of the body (e.g., both wrists or both knees).

🧠 **5. Unusual Fatigue**

A deep, persistent tiredness that doesn't improve with rest—often overlooked but very common in autoimmune conditions like Autoimmune diseases.

🌡️ **6. Low-Grade Fever**

Mild fever may appear due to ongoing inflammation in the body.

⚖️ **7. Loss of Appetite or Unexplained Weight Loss**

Systemic inflammation can affect metabolism and appetite.

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🦵 **8. Reduced Range of Motion**

You may notice joints becoming harder to move or feeling "tight."

🦶 **9. Numbness or Tingling**

Inflammation can compress nearby nerves, causing sensations like tingling in the hands.

🚨 **When to Take It Seriously**

If you notice **joint pain + prolonged morning stiffness + swelling lasting more than a few weeks**, it's time to consult a specialist (rheumatologist). Early treatment—often with medications like Methotrexate—can slow or even halt disease progression.

💡 **Why Early Detection Matters**

RA can quietly damage joints in its early stages. Acting early can:

1. Prevent permanent deformity
2. Maintain mobility and independence
3. Improve long-term quality of life



WHO IS AT RISK?

In Rheumatoid arthritis, certain groups of people are at higher risk of developing the condition, and this risk is not random but follows known patterns related to biology, lifestyle, and genetics. Women are two to three times more likely to develop rheumatoid arthritis than men, likely due to hormonal factors. The disease most commonly begins between the ages of 30 and 60, although it can occur at any age. Individuals with a family history of rheumatoid arthritis have an increased risk,

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particularly if they carry genetic markers such as HLA-DR4. Smoking is a major environmental risk factor, as it increases both the likelihood of developing the disease and its severity. Obesity is also associated with higher inflammation levels and a greater risk, especially in women under 55. In addition, long-term exposure to environmental hazards like silica dust, often found in mining or construction work, has been linked to increased risk. Hormonal and reproductive factors, including early menopause or never having given birth, may slightly raise the likelihood of developing the condition. Finally, people with other autoimmune disorders may be more susceptible, as their immune system is already prone to abnormal immune responses.

Causes of Rheumatoid Arthritis

The exact cause of Rheumatoid arthritis is not fully known, but it is considered a complex autoimmune disorder that develops due to an interaction between genetic susceptibility, environmental triggers, and abnormal immune system activity. In this condition, the immune system mistakenly identifies the body's own joint tissues—especially the synovium (the lining of the joints)—as foreign and attacks them, leading to chronic inflammation, swelling, pain, and eventual joint damage.

Genetics play an important role in predisposing individuals to the disease. Certain genes, particularly HLA-DRB1 (often referred to as HLA-DR4), are strongly associated with increased risk because they influence how the immune system recognizes antigens. However, having these genes does not guarantee development of the disease; it only increases susceptibility.

Environmental factors are also important triggers. Smoking is one of the strongest known risk factors, as it can alter immune responses and increase the production of inflammatory proteins. Infections caused by certain bacteria or viruses are also thought to potentially trigger abnormal immune reactions in genetically susceptible individuals. Long-term exposure to pollutants such as silica dust (common in mining or industrial work) has also been linked to higher risk.

Hormonal influences may contribute as well, which helps explain why rheumatoid arthritis is more common in women. Changes in estrogen levels, pregnancy-related immune shifts, and menopause have all been studied for their possible roles in disease onset.

In addition, obesity can contribute to disease development by increasing systemic inflammation in the body. People who already have other autoimmune conditions may also be more vulnerable because their immune system is already dysregulated.

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Overall, rheumatoid arthritis develops when a genetically predisposed immune system is triggered by environmental or hormonal factors, resulting in a long-term autoimmune response against joint tissues.

How it affects the body?

Rheumatoid arthritis is a long-term inflammatory disease that affects the body in two main ways: it damages the joints and it also produces effects throughout the whole body (systemic effects).

At the joint level, the immune system attacks the synovium (the lining inside joints), causing it to become inflamed, thickened, and swollen. This leads to persistent pain, stiffness (often worse in the morning), warmth, and reduced range of motion. Over time, the inflamed synovium grows abnormally and forms a tissue called pannus, which spreads across the joint surface. The pannus releases enzymes and inflammatory chemicals that gradually destroy cartilage and erode bone. As a result, joints lose their smooth movement and may become deformed, unstable, and difficult to use. Common deformities can affect the fingers, wrists, and feet, and tendons may rupture or become misaligned, further reducing hand and joint function.

Beyond the joints, rheumatoid arthritis is a systemic condition, meaning it affects multiple organs due to ongoing inflammation in the blood. Many people experience general symptoms such as fatigue, low energy, weight loss, mild fever, and muscle weakness. This happens because the immune system continuously releases inflammatory chemicals called cytokines that circulate throughout the body.

The disease can also affect several organs. In the eyes, it may cause dryness or inflammation (such as scleritis). In the lungs, it can lead to inflammation of lung tissue or scarring, making breathing more difficult. In the heart and blood vessels, long-term inflammation increases the risk of cardiovascular disease, including heart attack and stroke. It can also affect the skin, causing small firm lumps under the skin called rheumatoid nodules, usually near pressure points like elbows. In some cases, it can affect blood vessels themselves, a condition called vasculitis, which can damage nerves and organs.

If untreated or poorly controlled, rheumatoid arthritis can lead to permanent joint destruction, disability, and reduced life expectancy mainly due to cardiovascular complications. However, with early diagnosis and modern treatments that suppress the immune response, many of these effects can be slowed or prevented.

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Common symptoms beyond joint pain

In Rheumatoid arthritis, symptoms beyond joint pain occur because the disease produces ongoing systemic inflammation, meaning inflammatory chemicals (cytokines) circulate throughout the body and affect multiple organs and systems.

One of the most prominent non-joint symptoms is **severe fatigue**, which is not simple tiredness but a deep, persistent exhaustion that does not improve easily with rest. This is driven by chronic immune activation, anemia of chronic disease, and disrupted sleep patterns. Along with fatigue, many people experience **generalized weakness and reduced physical endurance**, making even light activities feel tiring.

Morning stiffness is another key symptom that reflects inflammation building up during rest. It can last more than an hour and often improves slightly with movement, unlike mechanical joint stiffness. This stiffness can contribute significantly to disability in daily functioning.

Systemic inflammation can also cause **low-grade fever**, **loss of appetite**, and **unintentional weight loss**. These occur because inflammatory cytokines like TNF-alpha and IL-6 alter metabolism and suppress normal appetite regulation. Over time, this can lead to **muscle wasting (rheumatoid cachexia)**, where muscle mass decreases even if body weight appears stable.

The disease can also affect the **blood system**, leading to anemia (low red blood cell count), which further worsens fatigue and weakness. Some individuals develop **increased platelet counts** or other inflammatory blood changes.

Neurological symptoms may occur when inflammation affects or compresses nerves. This can cause **numbness, tingling, or burning sensations**, especially in the hands and feet, often due to conditions like carpal tunnel syndrome linked with rheumatoid inflammation.

Rheumatoid arthritis can also affect the **eyes**, causing dryness, redness, or pain due to inflammation of the tear glands or surrounding tissues (such as scleritis or dry eye syndrome). In the **lungs**, inflammation may lead to shortness of breath, persistent cough, or lung scarring (interstitial lung disease), which can gradually reduce breathing capacity.

Cardiovascular effects are also important but often silent. Chronic inflammation increases the risk of **atherosclerosis (hardening of arteries)**, raising the likelihood of heart attacks and strokes. This is why people with rheumatoid arthritis may have higher long-term cardiovascular risk even if joint symptoms are controlled.

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Psychological effects are also common. Chronic pain, fatigue, and functional limitations can contribute to **depression, anxiety, and cognitive "brain fog"**, where concentration and memory feel reduced. Sleep is often disrupted due to pain, inflammation, or discomfort, creating a cycle that worsens fatigue and mood symptoms.

In more advanced or uncontrolled disease, patients may develop **rheumatoid nodules** (firm lumps under the skin), **vasculitis** (inflammation of blood vessels), and generalized worsening of organ function.

Overall, rheumatoid arthritis is not only a joint disease but a full-body inflammatory condition that can affect energy levels, blood, nerves, lungs, heart, eyes, and mental health in addition to the joints.

Diagnosis

The diagnosis of Rheumatoid arthritis is based on a combination of clinical symptoms, physical examination findings, blood tests, and imaging studies. There is no single test that confirms the disease on its own, so doctors use a pattern of evidence.

Diagnosis usually begins with a detailed medical history and physical examination. A doctor looks for symptoms such as persistent joint pain, swelling, warmth, and stiffness—especially if it affects small joints like the fingers, wrists, and feet and occurs on both sides of the body. Morning stiffness lasting more than an hour is a key clinical clue.

Blood tests are then used to support the diagnosis. One important test is the **rheumatoid factor (RF)**, which is present in many—but not all—patients. Another highly specific marker is **anti-CCP (anti-cyclic citrullinated peptide) antibodies**, which are strongly associated with rheumatoid arthritis and can sometimes appear early in the disease. Doctors also check for signs of inflammation in the body using tests like **ESR (erythrocyte sedimentation rate)** and **CRP (C-reactive protein)**, which are usually elevated during active disease.

Imaging tests help assess joint damage and inflammation. **X-rays** can show joint space narrowing and bone erosion in more advanced stages. In early disease, **ultrasound** and **MRI scans** are more sensitive and can detect inflammation in the synovium before permanent damage occurs.

Doctors often use classification criteria (such as the ACR/EULAR criteria) that combine the number of affected joints, blood test results, duration of symptoms, and inflammation markers to confirm the diagnosis and assess disease severity.

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Overall, rheumatoid arthritis is diagnosed through a combination of consistent symptoms, supportive blood markers, and imaging evidence rather than a single definitive test.

Treatment Options

Treatment of Rheumatoid arthritis is aimed at three main goals: controlling inflammation, preventing joint damage, and maintaining long-term function and quality of life. Because it is a chronic autoimmune disease, treatment is usually continuous and adjusted over time depending on disease activity.

The cornerstone of treatment is **disease-modifying antirheumatic drugs (DMARDs)**. These medications target the underlying immune dysfunction rather than just symptoms. The most commonly used first-line DMARD is **methotrexate**, which reduces immune cell activity and slows joint destruction. It is often given once weekly, sometimes with folic acid to reduce side effects. Other conventional DMARDs include **sulfasalazine**, **hydroxychloroquine**, and **leflunomide**. These drugs may be used alone in mild cases or in combination for better control in more active disease.

If conventional DMARDs are not effective, doctors may move to **biologic DMARDs**, which are genetically engineered drugs that target specific parts of the immune system. These include **TNF inhibitors** (such as adalimumab, etanercept, infliximab), which block tumor necrosis factor—a key inflammatory protein. Other biologics include **IL-6 inhibitors** (tocilizumab), **B-cell inhibitors** (rituximab), and **T-cell co stimulation blockers** (abatacept). These are usually given by injection or intravenous infusion and are highly effective in reducing inflammation and preventing joint damage.

Another modern option is **targeted synthetic DMARDs**, especially **JAK inhibitors** such as tofacitinib, baricitinib, and upadacitinib. These work inside immune cells by blocking signaling pathways (Janus kinase pathways) that drive inflammation. They are oral medications and are often used when biologics or methotrexate are insufficient.

For symptom control, **nonsteroidal anti-inflammatory drugs (NSAIDs)** like ibuprofen or naproxen are used to reduce pain and stiffness, but they do not prevent disease progression. **Corticosteroids** (such as prednisone) are powerful anti-inflammatory drugs used for rapid symptom relief or flare control. However, due to side effects like osteoporosis, weight gain, diabetes risk, and infection susceptibility, they are generally used at the lowest dose for the shortest possible time.

Non-pharmacological management is a major part of treatment. **Physiotherapy** helps maintain joint movement, reduce stiffness, and strengthen surrounding muscles.

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Regular low-impact exercise such as swimming or walking improves mobility and reduces fatigue. **Occupational therapy** helps patients adapt daily activities using joint-protection techniques and assistive devices (for example, modified grips, splints, or ergonomic tools) to reduce stress on inflamed joints.

Lifestyle modification plays an important supportive role. **Smoking cessation** is crucial because smoking worsens disease activity and reduces treatment response. Maintaining a healthy weight reduces mechanical stress on joints and lowers inflammation. A balanced diet rich in anti-inflammatory nutrients (such as omega-3 fatty acids) may also support overall health, although it does not replace medical therapy.

In cases where joint damage becomes severe and irreversible, **surgical interventions** may be required. These include synovectomy (removal of inflamed synovial tissue), tendon repair, or **joint replacement surgery** (such as hip or knee arthroplasty) to restore function and reduce pain.

Modern management often follows a "treat-to-target" approach, where treatment is regularly adjusted to achieve remission or low disease activity. Early diagnosis and early use of DMARDs are key factors in preventing long-term disability and improving outcomes.

Lifestyle changes to ease symptoms

In Rheumatoid arthritis, lifestyle changes do not replace medical treatment, but they can significantly reduce symptoms like pain, stiffness, fatigue, and flare frequency while improving overall function.

A key change is **regular low-impact exercise**. Activities such as walking, swimming, cycling, or yoga help keep joints flexible, strengthen surrounding muscles, and reduce stiffness. Gentle range-of-motion exercises are especially helpful in the morning or during flares when stiffness is worse. The goal is consistency rather than intensity, since overexertion can trigger pain.

Rest and activity balance is also important. During flare-ups, short periods of rest help reduce inflammation, but prolonged inactivity can worsen stiffness and muscle weakness. People often benefit from pacing activities throughout the day rather than doing long, continuous tasks.

Maintaining a **healthy body weight** reduces stress on weight-bearing joints like knees and hips and also lowers overall inflammation in the body. Even modest weight loss can improve mobility and reduce pain.

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A **balanced, anti-inflammatory diet** may help ease symptoms. Diets rich in fruits, vegetables, whole grains, fish (especially omega-3 fatty acids), nuts, and olive oil are often recommended. Reducing processed foods, excess sugar, and saturated fats can help control systemic inflammation.

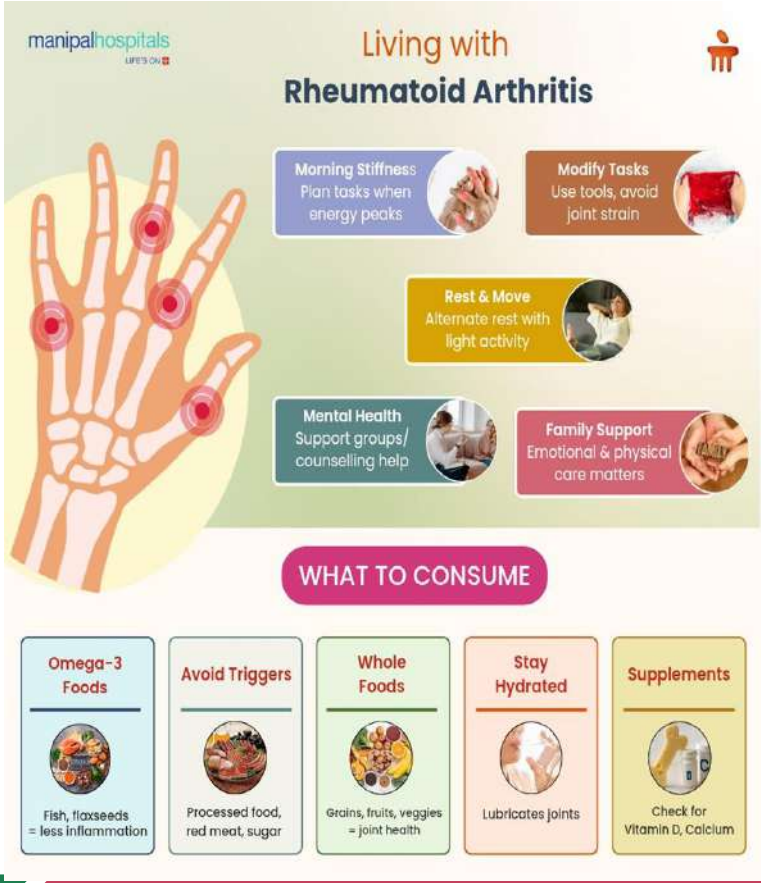
Stopping smoking is one of the most important lifestyle changes. Smoking not only increases the risk of developing rheumatoid arthritis but also makes symptoms more severe and reduces the effectiveness of medications.

Good **sleep hygiene** is essential because poor sleep can worsen fatigue and pain sensitivity. Maintaining a regular sleep schedule, reducing caffeine late in the day, and creating a comfortable sleep environment can help improve rest quality.

Stress management techniques such as meditation, deep breathing exercises, mindfulness, or counseling can also reduce symptom flares, as stress is known to trigger immune system activity.

Using **joint protection techniques** in daily life helps reduce strain. This includes using larger joints instead of smaller ones for carrying objects, avoiding repetitive gripping, using ergonomic tools, and wearing supportive splints if needed.

Finally, staying socially and physically active helps prevent isolation and supports mental health, which is important because chronic illness can increase the risk of depression and anxiety.



Overall, these lifestyle changes work best when combined with medical treatment and regular monitoring.

Conclusion

Rheumatoid arthritis is more than a disease of painful, swollen joints—it is a lifelong condition that reflects how deeply the immune system, lifestyle, and environment are connected to

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human health. While its course can be unpredictable and challenging, modern medicine has transformed it from a disabling illness into one that can often be effectively controlled. With early diagnosis, targeted treatment, and consistent care, many people are able to preserve joint function, reduce pain, and continue leading active, fulfilling lives.

Just as importantly, rheumatoid arthritis highlights the value of listening to the body early, acting promptly, and embracing a holistic approach that combines medical therapy with healthy lifestyle choices. Though it may leave its mark, it does not define a person's future. With awareness, support, and advancing treatments, the story of rheumatoid arthritis is no longer only about limitation—it is also about resilience, adaptation, and the possibility of living well despite chronic illness.

Beyond treatment and medical advances, living with Rheumatoid arthritis also emphasizes the importance of patience, support, and self-care. The journey may include challenges, but it also encourages individuals to build strength through small daily victories—whether that means moving with less pain, maintaining independence, or simply finding balance in everyday life. With the combined power of modern therapy, healthy habits, and a strong support system, people with rheumatoid arthritis can continue to shape meaningful, active lives, proving that even chronic illness can be met with courage and resilience.

"Strength is not the absence of pain, but the courage to keep moving despite it"

With References:

Mayo clinic staff. Rheumatoid arthritis-symptoms and causes

American college of rheumatology. Rheumatoid Arthritis clinical practice guidelines.

CDC. Rheumatoid arthritis

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SGLT2 INHIBITORS BEYOND DIABETES

A RETROSPECTIVE AUDIT OF PRESCRIBING PATTERNS IN PATIENTS WITH HEART FAILURE WITH PRESERVED EJECTION FRACTION

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Abstract:

Heart failure with preserved ejection fraction (HFpEF) constitutes a substantial and increasing proportion of heart failure cases worldwide, with historically limited evidence-based therapeutic options. Sodium–glucose co-transporter 2 (SGLT2) inhibitors, initially developed for the management of type 2 diabetes mellitus, have demonstrated significant cardiovascular benefits, including reductions in heart failure hospitalizations and improvement in functional outcomes, irrespective of glycemic status. This retrospective audit aimed to evaluate prescribing patterns of SGLT2 inhibitors in patients with HFpEF, with particular emphasis on their utilization beyond diabetes. Medical records of 124 patients diagnosed with HFpEF over a 12-month period were analyzed. Data collected included frequency of SGLT2 inhibitor prescription, indications for initiation, associated comorbidities, and adherence to contemporary clinical guidelines.

Among the study population, 62% of patients were prescribed SGLT2 inhibitors. Utilization was significantly higher in patients with coexisting diabetes (78%) compared to non-diabetic individuals (41%). Despite guideline recommendations, approximately 36% of eligible patients did not receive SGLT2 inhibitors. Variability in prescribing patterns was influenced by clinician familiarity with evolving evidence, presence of comorbid conditions, and differences in risk stratification.

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The findings demonstrate a progressive increase in the adoption of SGLT2 inhibitors in HFpEF management; however, a notable treatment gap persists, particularly among non-diabetic patients. These results highlight the need for improved clinician awareness and adherence to updated guidelines to optimize therapeutic outcomes. SGLT2 inhibitors are emerging as a cornerstone therapy in HFpEF, and targeted interventions are required to bridge the gap between evidence-based recommendations and real-world clinical practice.

Introduction:

Heart failure with preserved ejection fraction (HFpEF) represents an escalating global health burden, currently accounting for nearly 50% of heart failure-related hospitalizations. Characterized by complex pathophysiology often driven by an aging population and metabolic comorbidities: specifically hypertension, obesity, and diabetes, HFpEF management was historically limited to palliative symptom relief and the control of underlying risk factors. However, the emergence of Sodium-Glucose Co-transporter 2 inhibitors (SGLT2i) has fundamentally redefined the standard of care, providing the first evidence-based therapy to demonstrate significant prognostic benefits in this population. This retrospective audit of 124 patients evaluates the clinical uptake of SGLT2i and identifies prevailing gaps in guideline-directed medical therapy (GDMT) within real-world practice.

Pathogenesis:

The pathophysiology of HFpEF involves diastolic dysfunction due to impaired ventricular relaxation and increased myocardial stiffness. Contributing mechanisms include systemic inflammation, endothelial dysfunction, myocardial fibrosis, and neurohormonal activation. SGLT2 inhibitors exert beneficial effects through osmotic diuresis, natriuresis, reduction in preload and afterload, improved myocardial metabolism, and attenuation of inflammatory pathways.

Clinical Features:

-Core Symptoms

Exertional Dyspnea. Paroxysmal Nocturnal Dyspnea (PND) & Orthopnea, fatigue and lethargy, reduced cardiac output, reduced exercise tolerance

-Objective Clinical Signs

Peripheral Edema, swelling in the lower extremities (pedal edema)

Elevated jugular venous pressure (JVP)

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Pulmonary Crackles (Crepitations)

Displaced Apex Beat or S3/S4 Gallop.

-Common Comorbidities in HFpEF

Hypertension: leading to myocardial stiffness.

Obesity: Frequently associated with systemic inflammation in HFpEF patients.

Atrial Fibrillation: Often found in HFpEF populations and contributes to symptomatic worsening

Diagnosis:

Diagnosis was based on a combination of clinical presentation and supportive investigations. All patients demonstrated preserved left ventricular ejection fraction (≥50%) on echocardiography, along with evidence suggestive of diastolic dysfunction.

Additional investigations, including natriuretic peptide levels (BNP/NT-proBNP), electrocardiography, and chest radiography, were used to support the diagnosis and assess disease severity. Common associated findings included atrial fibrillation, left ventricular hypertrophy, and features of pulmonary congestion.

It was further strengthened by the presence of typical symptoms such as exertional dyspnea and signs of fluid overload, while alternative causes of similar clinical presentation were systematically excluded.

Treatment and Management:

Management of HFpEF focuses on symptom relief and treatment of underlying comorbidities. Diuretics are used to control congestion. Control of hypertension, diabetes, and obesity is essential. SGLT2 inhibitors such as empagliflozin and dapagliflozin have shown significant benefits in reducing heart failure hospitalization and improving clinical outcomes. Lifestyle modifications and regular follow-up are important components of management.

Results:

The retrospective audit demonstrated a progressive increase in the prescription of SGLT2 inhibitors among patients with HFpEF over the 12-month study period.

Out of 124 patients, 62% were prescribed SGLT2 inhibitors. Among these:

• Empagliflozin was used in 55%

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• Dapagliflozin in 45%

A significant disparity in prescribing patterns was observed based on diabetic status:

• Patients with diabetes: 78% received SGLT2 inhibitors

• Non-diabetic patients: only 41% received therapy

Despite eligibility based on current guidelines, 36% of patients did not receive SGLT2 inhibitors. The most commonly documented reasons included:

• Lack of clinician familiarity with updated guidelines - 31%

• Concerns regarding renal function - 26%

• Cost or accessibility issues - 22%

• Absence of diabetes (perceived indication bias) -21%

Temporal analysis revealed an increase in prescription rates from 48% in the first quarter to 68% in the final quarter, reflecting growing adoption following guideline updates.

Patients receiving SGLT2 inhibitors demonstrated:

• Reduced frequency of hospitalization (18% vs 29% in non-users)

• Improved symptomatic status, with a higher proportion in NYHA class II at follow-up

However, due to the retrospective nature of the audit, causal relationships could not be definitively established.

Conclusion:

SGLT2 inhibitors have emerged as a key therapeutic option in HFpEF beyond their role in diabetes management. Despite strong evidence supporting their use, their adoption in routine clinical practice remains suboptimal. Increased awareness and adherence to updated guidelines are necessary to improve patient outcomes and reduce the burden of heart failure.

References:

1. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 12th ed. Philadelphia: Elsevier; 2022.

2. Harrison's Principles of Internal Medicine. 21st ed. New York: McGraw Hill; 2022.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
3. API Textbook of Medicine. 11th ed. Mumbai: Association of Physicians of India; 2019.

4. European Society of Cardiology. 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure.

5. American Heart Association / American College of Cardiology. 2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure.

6. Stefan D. Anker, et al. Empagliflozin in Heart Failure with a Preserved Ejection Fraction. The New England Journal of Medicine. 2021;385:1451–1461.

7. Scott D. Solomon, et al. Dapagliflozin in Heart Failure with Mildly Reduced or Preserved Ejection Fraction. The New England Journal of Medicine. 2022;387:1089–1098.

8. National Institute for Health and Care Excellence (NICE). Chronic heart failure in adults: diagnosis and management. 2021.

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ADVANCED MACHINE LEARNING FRAMEWORKS FOR PNEUMONIA DIAGNOSIS: INTEGRATING MULTIMODAL SIGNALS AND PRIVACY-PRESERVING TECHNIQUES

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Abstract

Pneumonia remains a leading cause of morbidity and mortality worldwide, disproportionately affecting vulnerable populations such as young children and the elderly. Traditional diagnostic workflows, which heavily rely on manual triage and resource-intensive imaging assessments, are increasingly strained by rising patient volumes in emergency departments. Recent advancements in artificial intelligence have introduced promising solutions, ranging from acoustic analysis of digital stethoscope recordings to deep learning models for medical image segmentation. This paper synthesizes current research to propose a comprehensive, multimodal diagnostic framework that leverages both audio-visual data and federated learning techniques. By bridging the gap between automated triage screening, weakly supervised image localization, and privacy-preserving model training, this study aims to provide a scalable blueprint for accelerating pneumonia diagnosis while maintaining rigorous ethical and clinical standards.

Introduction

Pneumonia is a critical respiratory illness characterized by the infection of the lung alveoli, representing a substantial burden on global healthcare systems. Environmental, genetic, and family background factors contribute significantly to the spread of this disease, which is particularly devastating for children under twelve years old (Sufahani et al., 2012). In regions like Tawau, Malaysia, as well as in the United States where tens of thousands die annually, rapid and accurate clinical intervention is

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paramount (Sufahani et al., 2012). Furthermore, the steady rise in emergency department visits has overloaded traditional clinical workflows, leading to prolonged wait times and delayed treatment administration (Lu, 2023). Consequently, there is an urgent need for automated systems capable of accurately diagnosing pneumonia and assessing its severity at the point of care.

The scope of this paper encompasses the development and integration of computational methods for pneumonia detection, focusing on both acoustic and radiological modalities. The primary problem lies in synthesizing diverse biological signals—such as digital stethoscope audio, chest X-rays (CXR), and computed tomography (CT) scans—into a unified, efficient diagnostic pipeline. While deep learning has revolutionized medical data analysis, deploying these technologies in real-world clinical environments remains highly challenging. First, existing clinical workflows rely heavily on manual triage assessments, which are impeded by limited human workload and can lead to invasive over-testing or inaccurate initial diagnoses (Lu, 2023). Second, many modern deep learning solutions demand massive amounts of meticulously annotated, pixel-level data, which is expensive to acquire, while centralized data collection methods inherently compromise sensitive patient privacy (Wang et al., 2025)(Shahi & Bagale, 2025).

To address these critical shortcomings, this paper presents a conceptual synthesis of state-of-the-art machine learning techniques tailored for respiratory disease detection. Specifically, our contributions to the field are defined as follows:

We propose a hypothetical multimodal diagnostic framework that integrates acoustic features from digital stethoscopes with weakly supervised imaging models, aiming to improve triage efficiency without relying on costly pixel-level annotations.We outline a secure deployment strategy utilizing federated few-shot learning and differential privacy mechanisms, ensuring that multi-institutional diagnostic models can be trained without exposing sensitive patient records to gradient leakage.

Related Work

Acoustic-Based Diagnostic Models

The analysis of body sounds via digital stethoscopes has emerged as a non-invasive frontline diagnostic tool. Researchers have proposed methods using Empirical Mode Decomposition (EMD) and spectral analysis to isolate clinically relevant biosignals from cardiovascular and respiratory acoustic data, achieving high accuracy in classifying diseases like pneumonia and chronic obstructive pulmonary disease (Casado et al., 2023). Similarly, systems like VoxMed utilize an Audio Spectrogram

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Transformer (AST) coupled with a 1-D Convolutional Neural Network (CNN) to provide healthcare professionals with near-instantaneous respiratory assessments (Mundra et al., 2024). Other approaches, such as the Fused Audio Instance and Representation (FAIR) method, construct joint feature vectors from various body sounds—including cough, breath, and speech—using self-attention mechanisms on both waveform and spectrogram representations (Truong et al., 2022). While these acoustic models are highly accessible and fast, their weakness lies in their susceptibility to ambient clinical noise. Compared to these unimodal audio systems, our proposed work seeks to fuse acoustic screening with downstream radiological verification to enhance overall diagnostic confidence.

Medical Imaging and Weak Supervision

Radiological imaging remains the gold standard for confirming pneumonia and assessing lung infection severity. Extensive research has been dedicated to deep learning models for segmenting lung infections from CT images, employing techniques such as boundary-guided semantic learning to handle blurred boundaries and complex background interference (Cong et al., 2022). Multi-task encoder-decoder networks have also been utilized to overcome data shortages by segmenting both the lung regions and the specific infections (Elharrouss et al., 2020). Furthermore, Transformer-based architectures with cross-gated attention mechanisms have demonstrated robust performance in predicting infection severity across both CT scans and CXRs (Slika et al., 2025). However, obtaining the pixel-level annotations required for these segmentation tasks is prohibitively expensive. To mitigate this, weakly supervised frameworks utilizing Gradient-weighted Class Activation Mapping (Grad-CAM) have been developed to localize pneumonia using only image-level labels (Shahi & Bagale, 2025). Our approach builds upon this weakly supervised paradigm, adopting it as the core imaging module to bypass the prohibitive costs associated with pixel-level labeling while maintaining clinical explainability.

Automated Triage and Privacy-Preserving Systems

The integration of machine learning into emergency department triage represents a critical step in alleviating hospital congestion. Models such as TriNet have been developed to automate first-line screening for conditions like pneumonia and urinary tract infections, achieving high positive predictive values and reducing the risk of over-testing (Lu, 2023). Concurrently, the deployment of such models across various institutions raises severe patient privacy concerns regarding direct data sharing. To counter this, researchers have proposed federated few-shot learning frameworks equipped with meta-stochastic gradient descent and differential privacy noise (Wang

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et al., 2025). This approach prevents the reconstruction of medical images from gradient leakage while handling the scarcity of high-quality labeled datasets. In contrast to standalone triage or privacy algorithms, our work theoretically combines the triage efficiency of models like TriNet with differential privacy mechanisms, ensuring that early screening tools can be continuously improved across hospital networks without compromising data security.

Method/Approach

To realize a robust and scalable pneumonia diagnostic system, we propose a structured, multimodal framework that sequentializes patient screening, diagnosis confirmation, and privacy-preserving model updates. The system leverages both acoustic signals from the triage stage and radiological images from downstream testing. By doing so, it acts as a comprehensive pipeline capable of operating in heavily burdened clinical environments.

The proposed framework consists of the following numbered pipeline:

Initial Triage Screening (Audio Module): Digital stethoscope recordings are captured during the initial nursing assessment. These audio signals are processed using an Audio Spectrogram Transformer (AST) for robust feature extraction, identifying immediate respiratory anomalies in seconds.

Severity and Localization (Imaging Module): If the acoustic screening indicates high pneumonia probability, a CXR or CT scan is ordered. This image is processed by a Vision Transformer relying on a weakly supervised learning paradigm, generating Grad-CAM heatmaps to highlight infected regions using only image-level training labels.

Federated Privacy-Preserving Update: Local inferences and minimal parameter updates are aggregated. Standard Gaussian noise is injected into the local gradients before they are transmitted to a central server, ensuring differential privacy and preventing data reconstruction.

Key design choices in this framework address specific clinical bottlenecks. The choice of an AST for audio processing is driven by its ability to capture complex temporal-frequency patterns in respiratory sounds, which outpaces traditional auscultation (Mundra et al., 2024). Furthermore, incorporating weakly supervised learning for the imaging module circumvents the labor-intensive nature of medical data annotation, a major hurdle in resource-constrained settings (Wang et al., 2025)(Shahi & Bagale, 2025). Finally, the federated learning architecture with differential privacy is an

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essential structural choice, as patient privacy concerns and strict healthcare regulations make centralized medical data aggregation impractical (Wang et al., 2025).

The evaluation plan for this proposed framework involves simulating a multi-institutional clinical trial using distinct datasets. For the acoustic triage module, we hypothesize utilizing the publicly available ICBHI dataset to measure classification accuracy and processing speed (Mundra et al., 2024). For the imaging module, hypothetical evaluation would involve large-scale, image-level annotated CXR datasets, measuring the intersection-over-union (IoU) of Grad-CAM bounding boxes against a small expert-annotated validation set. The primary metrics for overall system success will include Positive Predictive Value (PPV) at triage, Area Under the Receiver Operating Characteristic Curve (AUC) for disease classification, and the reduction in average patient wait times in a simulated emergency department environment.

Discussion

The practical implications of deploying this multimodal framework in clinical settings are substantial. By shifting the initial diagnostic burden to automated acoustic screening, emergency departments can drastically reduce the time it takes for a patient to move from the waiting room to receiving targeted care (Lu, 2023). Portable digital stethoscopes linked to UI-assisted classifiers can empower triage nurses to make faster, evidence-based decisions, minimizing unnecessary downstream radiological testing for low-risk patients. Consequently, this leads to optimized hospital resource allocation and improved patient outcomes during periods of high clinical demand, such as viral pandemics.

Despite its potential, the proposed system faces several limitations and failure modes. First, domain shift remains a significant challenge; acoustic models trained on data from specific regions or devices may experience performance degradation when deployed in hospitals with different digital stethoscope hardware or ambient noise levels. Second, clinical environments, particularly emergency departments, are highly chaotic, and overlapping background noises could severely corrupt the audio spectrograms, leading to false triage predictions. Third, the reliance on weakly supervised Grad-CAM heatmaps for image localization can sometimes yield diffuse or imprecise boundary definitions compared to fully supervised segmentation models, potentially causing clinicians to misjudge the exact extent of the lung infection.

Ethical considerations and risks must also be carefully managed before real-world deployment. First, although federated learning with standard Gaussian noise mitigates gradient leakage, sophisticated adversarial attacks could theoretically still extract

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sensitive demographic or pathological information from the aggregated model weights, posing a risk to patient confidentiality (Wang et al., 2025). Second, there is a risk of algorithmic bias; if the federated nodes predominantly represent specific demographics, the model may underperform on underrepresented racial, age, or socioeconomic groups, leading to inequitable healthcare delivery.

Future work should aim to refine and expand upon this baseline architecture. One immediate avenue for future research is the integration of longitudinal electronic health records (EHR) into the multimodal fusion module, allowing the model to weigh acoustic and visual data against a patient's historical health background and genetic predispositions (Sufahani et al., 2012). Additionally, future engineering efforts should focus on optimizing these complex Transformer-based models for edge-computing devices, enabling real-time, offline pneumonia diagnosis in rural or resource-constrained clinics lacking stable internet connectivity for federated server communication.

Conclusion

This paper has explored the pressing need for advanced, automated systems in diagnosing pneumonia and assessing lung infection severity. By reviewing cutting-edge acoustic classifiers, weakly supervised deep learning models for medical imaging, and triage automation techniques, we highlighted the limitations of existing isolated and data-heavy approaches. In response, we proposed a comprehensive, multimodal diagnostic framework that logically bridges automated audio triage with weakly supervised image localization, all governed by a privacy-preserving federated learning architecture.

The integration of artificial intelligence into respiratory disease diagnostics holds transformative potential for modern healthcare. By alleviating emergency department bottlenecks and minimizing the necessity for exhaustive pixel-level data annotations, the proposed methodologies offer a scalable path forward. Ultimately, refining these machine learning tools and rigorously addressing their limitations and ethical implications will be critical in ensuring they serve as reliable, equitable aids that meaningfully improve patient survival and care quality.

References

Sufahani, Suliadi F., Razali, Siti N. A. Mohd, Mormin, Mohammad F., & Khamis, Azme (2012). An Analysis of the Prevalence of Pneumonia for Children under 12 Year Old in Tawau General Hospital, Malaysia. https://arxiv.org/pdf/1205.2109v1

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
Lu, Stephen Z. (2023). Screening of Pneumonia and Urinary Tract Infection at Triage using TriNet. https://arxiv.org/pdf/2309.02604v1

Wang, Ming, Duan, Zhaoyang, Xue, Dong, Liu, Fangzhou, & Zhang, Zhongheng (2025). An Enhanced Privacy-preserving Federated Few-shot Learning Framework for Respiratory Disease Diagnosis. https://arxiv.org/pdf/2507.08050v1

Shahi, Kiran, & Bagale, Anup (2025). Weakly Supervised Pneumonia Localization from Chest X-Rays Using Deep Neural Network and Grad-CAM Explanations. https://doi.org/10.54364/JAIAI.2024.1126

Casado, Constantino Álvarez, Cañellas, Manuel Lage, Pedone, Matteo, Wu, Xiaoting, Nguyen, Le, & López, Miguel Bordallo (2023). Respiratory Disease Classification and Biometric Analysis Using Biosignals from Digital Stethoscopes. https://arxiv.org/pdf/2309.07183v2

Mundra, Paridhi, Sharma, Manik, Chaudhuri, Yashwardhan, Phukan, Orchid Chetia, & Buduru, Arun Balaji (2024). VoxMed: One-Step Respiratory Disease Classifier using Digital Stethoscope Sounds. https://arxiv.org/pdf/2407.18926v1

Truong, Tuan, Lenga, Matthias, Serrurier, Antoine, & Mohammadi, Sadegh (2022). Fused Audio Instance and Representation for Respiratory Disease Detection. https://arxiv.org/pdf/2204.10581v4

Cong, Runmin, Zhang, Yumo, Yang, Ning, Li, Haisheng, Zhang, Xueqi, Li, Ruochen, Chen, Zewen, Zhao, Yao, & Kwong, Sam (2022). Boundary Guided Semantic Learning for Real-time COVID-19 Lung Infection Segmentation System. https://arxiv.org/pdf/2209.02934v1

Elharrouss, Omar, Subramanian, Nandhini, & Al-Maadeed, Somaya (2020). An encoder-decoder-based method for COVID-19 lung infection segmentation. https://arxiv.org/pdf/2007.00861v2

Slika, Bouthaina, Dornaika, Fadi, Bougourzi, Fares, & Hammoudi, Karim (2025). Lung Infection Severity Prediction Using Transformers with Conditional TransMix Augmentation and Cross-Attention. https://arxiv.org/pdf/2510.06887v1

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RECENT ADVANCEMENT IN THE MANAGEMENT OF PNEUMONIA

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ABSTRACT

Key words: Biomarkers, procalcitonin, recent advancement, novel antimicrobial therapies, antimicrobial therapies.

INTRODUCTION

Pneumonia is an infection in your lungs caused by bacteria, viruses or fungi. Pneumonia causes your lung tissue to swell (inflammation) and can cause fluid or pus in your lungs. Bacterial pneumonia is usually more severe than viral pneumonia, which often resolves on its own. Pneumonia can affect one or both lungs. Pneumonia in both of your lungs is called bilateral or double pneumonia.

While all pneumonia is inflammation caused by an infection in your lungs, you may have different symptoms depending on whether the root cause is a virus, bacteria or fungi.

Bacterial pneumonia tends to be more common and more severe than viral pneumonia. It's more likely to require a hospital stay. Providers treat bacterial pneumonia with

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antibiotics. Viral pneumonia causes flu-like symptoms and is more likely to resolve on its own. You usually don't need specific treatment for viral pneumonia.

The types of pneumonia

We classify pneumonia based on the pathogens caused by it and the way it spreads to others – community acquired, hospital acquired and ventilator associated pneumonia

Community-acquired pneumonia (CAP) Acquiring pneumonia outside the heath care facility is called as community-acquired pneumonia.

Hospital-acquired pneumonia (HAP)

The hospital-acquired pneumonia (HAP)is acquired in a hospital or healthcare facility for another illness or procedure. HAP is usually more serious than community-acquired pneumonia because it's often caused by antibiotic-resistant bacteria, like methicillin-resistant *Staphyloccocus aureus* (MRSA). This means HAP can make you sicker and be harder to treat.

Health care associated pneumonia (HCAP)

you can get hcap while in a long-term care facility (such as a nursing home) or outpatient, extended-stay clinics. like hospital-acquired pneumonia, it's usually caused by antibiotic-resistant bacteria.

Ventilator-associated pneumonia (VAP)if you need to be on a respirator or breathing machine to help you breathe in the hospital (usually in the icu), you're at risk for ventilator-associated pneumonia (vap). the same types of bacteria as community-acquired pneumonia, as well as the drug-resistant kinds that cause hospital-acquired pneumonia, cause vap

ETIOLOGY

- **Bacteria:** Infection with *streptococcus pneumonia* bacteria, also called pneumococcal disease, is the most common cause of CAP. Pneumococcal disease can also cause ear infections, sinus infections and meningitis. Mycoplasma pneumoniae bacteria causes atypical pneumonia, which usually has milder symptoms. Other bacteria that cause CAP include *heamophilus influenza*, *chlamydia*, and *legionella* (Legionnaires' disease).

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- **viruses:** Viruses that cause the common cold, the flu (influenza), COVID-19 and respiratory syncytial virus (RSV) can sometimes lead to pneumonia.
- **Fungi (molds):** Fungi, like *Cryptococcus*, *Pneumocystis jirovecii* and *Coccidioides*, are uncommon causes of pneumonia. People with compromised immune systems are most at risk of getting pneumonia from a fungus.
- **Protozoa:** Rarely, protozoa like *Toxoplasma* cause pneumonia.

The signs and symptoms of pneumonia

Symptoms of pneumonia depend on the cause. Symptoms can range from mild to severe. Babies, young children and older adults may have different symptoms.

Symptoms of bacterial pneumonia

Symptoms of bacterial pneumonia can develop gradually or suddenly. Symptoms include:

- High fever (up to 105 F or 40.55 C).
- Cough with yellow, green or bloody mucous

- Tiredness (fatigue).
- Rapid breathing.
- Shortness of breath.
- Rapid heart rate.
- Sweating or chills.
- Chest pain and/or abdominal pain, especially with coughing or deep breathing.
- Loss of appetite.
- Bluish skin, lips or nails (cyanosis).
- Confusion or altered mental state.

Symptoms of viral pneumonia

Symptoms of viral pneumonia usually develop over several days. You might have symptoms similar to bacterial pneumonia or you might additionally have:

- Dry cough.
- Headache.
- Muscle pain.

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- Extreme tiredness or weakness.

Symptoms of pneumonia in young children

Babies and newborns may not show any symptoms of pneumonia or their symptoms may be different from adults, including:

- Fever, chills, general discomfort, sweating/flushed skin.
- Cough.
- Difficulty breathing or rapid breathing (tachypnea).
- Loss of appetite.
- Vomiting.
- Lack of energy.
- Restlessness or fussiness.

GLOBAL BURDEN AND SIGNIFICANCE

the world's leading infectious cause of death, killing 2 million people in 2026, with a heavy toll on children under five and adults over 70. It causes significant global morbidity, with high mortality in developing regions due to limited access to oxygen and antibiotics. Key risk factors include malnutrition, pollution, and lack of vaccination, making it a critical, preventable health challenge

Childhood Mortality:

- Pneumonia remains the leading infectious cause of death for children under five, killing over 700,000 children annually, which equates to one child every 43 seconds.

  Adult Mortality: The burden among older adults (aged 70+) is significant, with projections indicating a sustained increase in mortality (6.0%–35.4% increase) in this demographic by 2030, driven by population aging.

  Regional Disparities: The highest mortality rates are heavily concentrated in sub-Saharan Africa and South Asia, often in areas with poor nutrition, high air pollution, and limited healthcare access.

  Pathogen Prevalence: Streptococcus pneumoniae remains the primary bacterial cause, accounting for about 25% of all lower respiratory infection (LRI) deaths, followed by Staphylococcus aureus and Klebsiella pneumoniae.

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CHALLENGES FACED:

Diagnostic and Therapeutic Challenges:

- **Difficulty in Diagnosis:** No single test confirms pneumonia, leading to reliance on clinical symptoms and imaging. Bacterial pneumonia is definitively diagnosed less than 15% of the time, causing potential misdiagnosis and misuse of antibiotics.

Treatment Limitations: Antibiotics do not treat viral pneumonia, yet distinguishing this from bacterial pneumonia is difficult, leading to inappropriate treatment.

Antibiotic Resistance: Emerging resistant pathogens complicate treatment for severe community-acquired cases.

Complications and Clinical Challenges

Serious Complications: Patients can develop serious issues like bacteremia (bacteria in the blood), septic shock, pleural effusion, and respiratory failure requiring ventilators.

Severe Illness in Vulnerable Groups: Children, older adults, and those with weakened immune systems are at higher risk of death.

Delayed Recovery: Pneumonia can cause prolonged fatigue and require significant downtime for recovery.

Global and Socioeconomic Challenges

Access to Care: Poverty, limited access to healthcare facilities, and the proliferation of counterfeit drugs hinder effective treatment.

Environmental Factors: Environmental issues and low social conditions contribute to high disease prevalence, particularly in lower-income settings.

Resource Constraints: Lack of resources for early detection is a major barrier, especially in low-income regions.

Environmental and Demographic Challenges

Nutrition and Immunization: Poor nutrition and failure to vaccinate are significant risk factors for child pneumonia.

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Elderly Care: Older patients often present with atypical symptoms like confusion, making diagnosis more difficult

AIM OF THE REVIEW

This review aims to critically analyze recent advances in the diagnosis and management of pneumonia , including the novel biomarkers, emerging therapies and evolving clinical practices.

PATHPHYSIOLOGY

An intricate balance between the organisms residing in the lower respiratory tract and the local and systemic defense mechanisms (both innate and acquired) which when disturbed gives rise to inflammation of the lung parenchyma, i.e., pneumonia. Common defense mechanisms that are compromised in the pathogenesis of pneumonia include:

- Systemic defense mechanisms like humoral and complement-mediated immunity that is compromised in diseases like common variable immunodeficiency (CVID), X-linked agammaglobulinemia (inherited), and functional asplenia (acquired). Impaired cell-mediated immunity predisposes individuals to infection by intracellular organisms like viruses and organisms of low virulence like *Pneumocystis* pneumonia (PJP), fungal causes, among others
- The mucociliary clearance that is often impaired in cigarette smokers, post-viral state, Kartergerner syndrome, and other related conditions
- Impaired cough reflex seen in comatose patients, certain substances of abuse
- Accumulation of secretions as seen in cystic fibrosis or bronchial obstruction

The resident macrophages serve to protect the lung from foreign pathogens. Ironically, the inflammatory reaction triggered by these very macrophages is what is responsible for the histopathological and clinical findings seen in pneumonia. The macrophages engulf these pathogens and trigger signal molecules or cytokines like TNF-a, IL-8, and IL-1 that recruit inflammatory cells like neutrophils to the site of infection. They also serve to present these antigens to the T cells that trigger both cellular and humoral defense mechanisms, activate complement and form antibodies against these organisms. This, in turn, causes inflammation of the lung parenchyma and makes the lining capillaries "leaky," which leads to exudative congestion and underlines the pathogenesis of pneumonia.

DIAGNOSIS

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If pneumonia is suspected, your doctor may recommend the following tests:

- **Blood tests.** Blood tests are used to confirm an infection and to try to identify the type of organism causing the infection. However, precise identification isn't always possible. it's main objective is to find leukocytosis .
- **Chest X-ray.** This helps your doctor diagnose pneumonia and determine the extent and location of the infection. However, it can't tell your doctor what kind of germ is causing the pneumonia. It is generally taken for consolidation.
- **Pulse oximetry.** This measures the oxygen level in your blood. Pneumonia can prevent your lungs from moving enough oxygen into your bloodstream.
- **Sputum test.** A sample of fluid from your lungs (sputum) is taken after a deep cough and analyzed to help pinpoint the cause of the infection.
- **CT scan.** If your pneumonia isn't clearing as quickly as expected, your doctor may recommend a chest CT scan to obtain a more detailed image of your lungs.

- **Pleural fluid culture.** A fluid sample is taken by putting a needle between your ribs from the pleural area and analyzed to help determine the type of infection.

Biomarkers.

Selected biomarkers may indicate a bacterial infection and need for antibiotic therapy (C-reactive protein, procalcitonin, soluble triggering receptor expressed on myeloid cells). Biomarkers can differentiate CAP patients who require hospital admission and severe CAP requiring intensive care unit admission. Biomarker-guided antibiotic therapy may limit antibiotic exposure without compromising outcome and thus improve antibiotic stewardship.

MANAGEMENT

- **Antibiotic Treatment:** Essential for bacterial pneumonia; should start early. Common choices include amoxicillin or doxycycline, tailored to local resistance patterns.
- **Supportive Care:**

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- **Hydration:** Plenty of fluids to help loosen mucus.
- **Rest:** Crucial for recovery.
- **Fever/Pain Control:** Over-the-counter medications like Tylenol (acetaminophen) or ibuprofen for pleuritic chest pain and fever.
- **Humidifier:** Using a humidifier or taking steamy showers can help breathing.

Hospital Care (Severe Cases):

- **Oxygen Therapy:** To maintain oxygen saturation levels, typically 94-98%.
- **IV Fluids and Antibiotics:** For severe cases, inability to take oral medicine, or sepsis.
- **Breathing Support:** Non-invasive or invasive mechanical ventilation for severe respiratory failure.

Monitoring and Follow-up:

- **Oxygen Saturation:** Regular monitoring (e.g., via pulse oximetry).
- **Chest X-ray:** May be repeated to ensure clearing of infection.
- **Recovery:** Most people feel better in 2–4 weeks, but cough may persist.

Prevention:

- **Vaccination:** Pneumococcal, flu, and COVID-19 vaccines.
- **Hygiene:** Frequent hand washing to stop the spread of germs.
- **Smoking Cessation:** Reduces risks to lung health.

RECENT ADVANCES

- **Rapid Diagnosis & Diagnostics:** Molecular techniques, such as multiplex PCR and rapid antigen tests, now allow for rapid pathogen identification at the bedside, enabling faster, targeted treatment and reduced antibiotic overuse.
- **Therapeutic Breakthroughs:**
- **Corticosteroids**: The 2023 CAPE COD trial demonstrated that early corticosteroid therapy (hydrocortisone) reduces mortality by nearly 50% in severe CAP patients.
- **New Antibiotics:** ceftazidime-avibactam,meropenem-vaborbactam
- **complications in elderly patients**. including Ceftobiprole and Ceftaroline, are now approved for managing resistant bacterial pneumonia.

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- **Management & Personalization:**
- **Shorter Treatment:** Evidence supports using shorter antibiotic courses for CAP to limit antibiotic resistance.
- **Pediatric Advancements:** In children, early switching from intravenous to oral antibiotics is safe and effective, reducing hospitalization times.
- **AI and Imaging:** Increased adoption of bedside lung ultrasound (POCUS) is assisting in faster, accurate diagnosis in emergency settings.

Long-Term Care: Recognition of pneumonia as a chronic condition rather than just an acute illness has shifted focus toward long-term monitoring, particularly for cardiovascular complication in elederly patients.

FUTURE DIRECTIONS

- **Diagnostics:** Shift towards rapid, molecular, and AI-powered diagnostic tools to identify pathogens within hours, allowing for better antimicrobial stewardship.
- **Treatments:** Development of novel antibiotics for resistant bacteria, alongside host-directed therapies that focus on boosting the immune system's ability to repair lung tissue rather than just killing the pathogen.
- **Vaccine Innovation:** Development of more effective and updated vaccines tailored for elderly populations and those with compromised immune systems.
- **Personalized Medicine:** Using biomarkers (like REDW and IL-6) to predict disease severity and tailor treatments to individual patient needs.
- **Focus on Comorbidities:** Addressing the rising risk of severe pneumonia in aging populations with multiple chronic conditions (e.g., obesity, diabetes, and COPD).
- **AI Integration:** Artificial intelligence will be increasingly used in drug discovery to create new antibiotics and optimize antibiotic treatment regimens.

These advancements aim to combat increasing antibiotic resistance rates and reduce the high mortality rates associated with severe community-acquired pneumonia.

CONCLUSION

Pneumonia remains a significant global health challenges despite advances in diagnostic and therapeutic strategies. Recent developments, including the use of the

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biomarkers, improved diagnostic tools, cand novel antimicrobial agents, have enhanced the accuracy of diagnosis and effectiveness of treatment. Preventive measures such as vaccination continue to play a crucial role in reducing disease burden. However, challenges such as antimicrobial resistance and delayed diagnosis persists. Continued research, early intervention, and optimized treatment approaches are essential to further improve clinical outcomes and reduce mortality associated with pneumonia. overall, the integration of technology, personalized medicine, and preventive healthcare represents a major step forward in pneumonia management. however, challenges such as antimicrobial resistance and healthcare accessibility remain, highlighting the need for continued research and global health efforts.

REFERENCE

- Govindan, S.; Hyzy, R.C. The 2016 Guidelines for Hospital-acquired and Ventilator-associated Pneumonia
- Poole, S.; Clark, T.W. Rapid syndromic molecular testing in pneumonia: The current landscape and future potential. J. Infect 2020, 80, 1–7
- Unyvero. Unyvero Lower Respiratory. Available online: https://www.opgen.com/wp-content/uploads/2022/04/PN3677D.pdf (accessed on 11 November 2024)
- High, J.; Enne, V.I.; Barber, J.A.; Brealey, D.; Turner, D.A.; Horne, R.; Peters, M.; Dhesi, Z.; Wagner, A.P.; Pandolfo, A.M.; et al.
- Niederman, M.S.; Torres, A. Severe community-acquired pneumonia. Eur. Respir. Rev. 2022, 31, 220123
- Chahine, E.B.; Sucher, A.J. Lefamulin: The First Systemic Pleuromutilin Antibiotic. Ann. Pharmacother. 2020, 54, 1203–1214.

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ЭКОНОМИЧЕСКИЕ ВЗГЛЯДЫ АЛЬ-ФАРАБИ: УЧЕНИЕ О ТРУДЕ, СОБСТВЕННОСТИ И СОЦИАЛЬНОЙ ОТВЕТСТВЕННОСТИ

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Аннотация: Статья посвящена малоизученному – но чрезвычайно важному – аспекту наследия аль-Фараби: его представлениям об экономическом поведении человека, роли труда, распределении благ и экономической справедливости. Показана связь экономической этики Фараби с современной концепцией устойчивого развития.

Ключевые слова: экономическая этика, труд, собственность, справедливое распределение, социальная ответственность, аль-Фараби.

Abstract: The article is devoted to a little–studied but extremely important aspect of al–Farabi's legacy: his ideas about human economic behavior, the role of labor, the distribution of benefits and economic justice. The connection of Farabi's economic ethics with the modern concept of sustainable development is shown.

Keywords: economic ethics, labor, property, fair distribution, social responsibility, al-Farabi.

Труд как онтологическая необходимость. Аль-Фараби утверждает: без труда невозможно существование человека. Труд разделяется на:

- *Физический* (ремесла, земледелие, скотоводство – обеспечивает материальные потребности);
- *Умственный* (наука, управление, врачевание – обеспечивает развитие и порядок);
- *Художественный* (искусство и ремесленное мастерство как связующее звено).

Собственность и её границы. Фараби признаёт право частной собственности, но осуждает накопление ради накопления. В «Афоризмах

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государственного деятеля» он пишет: *«Излишество в имуществе, выходящее за пределы необходимого, приводит к порче души и несправедливости»*. Общество должно регулировать крайности через налоги (закят, штрафы) и общественные фонды.

Принципы экономической справедливости.

- Каждому – по его труду и необходимости (прообраз идей Адама Смита и социалистов-утопистов?).
- Запрет на обман, ростовщичество, некачественную работу.
- Особое внимание – к ремесленникам и земледельцам: они «столпы добродетельного города».

Экономическое воспитание. Аль-Фараби впервые подробно описывает этапы трудового воспитания:

- Детство: приучение к опрятности, элементарной помощи по дому.
- Отрочество: освоение одного или нескольких ремёсел.
- Юность: соединение ремесла с теоретическими знаниями (по принципу: знающий плотник работает лучше).
- Зрелость: наставничество, передача навыков и экономическое управление домохозяйством.

Современное звучание. Идеи аль-Фараби об экономике согласуются с:

- Концепцией «экономики достатка» (E. F. Schumacher);
- ESG-повесткой (экологическая и социальная ответственность бизнеса);
- Критикой безудержного потребительства.

Заключение: экономические воззрения аль-Фараби могут служить историко-философской базой для разработки национальных моделей социально-рыночного хозяйства в странах Центральной Азии, где его имя почитается.

СПИСОК ИСПОЛЬЗОВАННОЙ ЛИТЕРАТУРЫ

Первоисточники (труды и трактаты)

1. **Аль-Фараби, А. Н.** Афоризмы государственного деятеля // Аль-Фараби. Социально-этические трактаты. — Алма-Ата: Наука, 1973. — С. 199–326.

2. **Аль-Фараби, А. Н.** Гражданская политика // Аль-Фараби. Социально-этические трактаты. — Алма-Ата: Наука, 1973. — С. 137–198.

3. **Аль-Фараби, А. Н.** Трактат о взглядах жителей добродетельного города // Аль-Фараби. Философские трактаты. — Алма-Ата: Наука, 1970. — С. 113–281.

4. **Аль-Фараби, А. Н.** Указание пути к счастью // Аль-Фараби. Социально-этические трактаты. — Алма-Ата: Наука, 1973. — С. 35–136.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025

5. **Аль-Фараби, А. Н.** О достижении счастья // Аль-Фараби. Социально-этические трактаты. — Алма-Ата: Наука, 1973. — С. 327–350.

6. **Аль-Фараби, А. Н.** Философские трактаты. — Алма-Ата: Наука, 1970. — 527 с.

7. **Аль-Фараби, А. Н.** Логические трактаты / редколлегия: А. М. Кунаев [и др.]. — Алма-Ата: Наука, 1975. — 607 с.

ИССЛЕДОВАНИЯ И НАУЧНЫЕ СТАТЬИ НА РУССКОМ ЯЗЫКЕ

8. **Абдурасулов, А.** О трактате Фараби «Афоризмы государственного деятеля» / А. Абдурасулов. — Ташкент: Фан, 1973. — 112 с.

9. **Садыков, А. У.** Политика Абу Насра ал-Фараби / А. У. Садыков. — М., 1974. — 184 с.

10. **Касымжанов, А. Х.** Абу Наср аль-Фараби / А. Х. Касымжанов. — М.: Мысль, 1982. — 198 с. — (Серия «Мыслители прошлого»).

11. **Хайруллаев, М. М.** Фараби: эпоха и учение / М. М. Хайруллаев. — Ташкент: Фан, 1975. — 328 с.

12. **Сатыбекова, С. К.** Гуманизм аль-Фараби / С. К. Сатыбекова. — Алма-Ата: Наука, 1975. — 212 с.

13. **Нысанбаев, А. Н.** Социальная онтология аль-Фараби и Абая: опыт философской актуализации / А. Н. Нысанбаев, Г. К. Курмангалиева, Н. К. Сейтахметова. — Алматы: Ғылым, 2009. — 184 с.

14. **Казибердов, А. Л.** Сочинения Абу-Насра аль-Фараби в рукописях Института востоковедения АН УзССР / А. Л. Казибердов. — Ташкент, 1975. — 86 с.

15. **Аль-Масри, Б. А. И.** Политическое и правовое учение аль-Фараби: дис. … канд. юрид. наук / Б. А. И. Аль-Масри. — Баку, 1989. — 131 с.

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BRONCHIAL ASTHMA

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Abstract:

Bronchial asthma is a chronic inflammatory disease of the airways characterized by reversible airflow obstruction, bronchial hyperresponsiveness, and recurrent episodes of wheezing, breathlessness, chest tightness, and coughing. It is a major global health problem affecting individuals of all age groups. This article explores the underlying pathophysiology, clinical manifestations, triggering factors, diagnostic approaches, and modern management strategies of bronchial asthma.

Introduction:

Bronchial asthma is one of the most common chronic respiratory diseases worldwide. It involves inflammation and narrowing of the bronchial airways, leading to episodic airflow limitation. The condition can vary from mild intermittent symptoms to severe persistent disease affecting quality of life.

Asthma is influenced by genetic predisposition and environmental exposures such as allergens, pollution, and infections. Despite advances in treatment, poor disease control remains a challenge in many patients.

Pathophysiology: The Inflamed Airways

- Asthma is primarily an inflammatory disorder involving:
- Airway inflammation: Infiltration by eosinophils, mast cells, and T-lymphocytes
- Bronchoconstriction: Contraction of smooth muscles
- Mucus hypersecretion: Blocking airways
- Airway remodeling: Thickening of bronchial walls in chronic cases

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- These changes result in reversible airway obstruction and increased sensitivity to stimuli.

Triggers and Risk Factors

- Asthma symptoms can be triggered by:
- Allergens (dust, pollen, animal dander)
- Respiratory infections
- Cold air and exercise
- Air pollution and smoke
- Stress and emotions
- Certain drugs (e.g., aspirin, beta-blockers)

Risk factors include family history, atopy, and urban living conditions.

Clinical Features

- Typical symptoms include:
- Wheezing (whistling sound during breathing)
- Shortness of breath (dyspnea)
- Chest tightness
- Cough (often worse at night or early morning)

Symptoms are usually episodic and reversible, either spontaneously or with treatment.

Diagnosis

1. Diagnosis is based on:
2. Clinical history and symptoms
3. Physical examination (wheezing on auscultation)
4. Pulmonary function tests:
5. Spirometry showing reversible airflow obstruction
6. Peak expiratory flow rate (PEFR) monitoring
7. Allergy testing (in selected cases)

Classification of Asthma Severity

8. Asthma is classified as:
9. Intermittent
10. Mild persistent
11. Moderate persistent
12. Severe persistent
13. This classification helps guide treatment.

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Management Strategies

1. Avoidance of Triggers

Reduce exposure to allergens and irritants

2. Pharmacological Treatment

Reliever medications:

Short-acting β_2 agonists (e.g., salbutamol)

Controller medications:

Inhaled corticosteroids (first-line)

Long-acting β_2 agonists

Leukotriene receptor antagonists

Severe cases:

Oral corticosteroids

Biologic therapy (e.g., anti-IgE)

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3. Patient Education

Proper inhaler technique

Adherence to treatment

Action plan for acute attacks

Prognosis

With proper treatment, most patients achieve good control. However, untreated or poorly managed asthma can lead to significant morbidity.

Complications

- Status asthmaticus (life-threatening severe attack)
- Respiratory failure
- Airway remodeling in chronic cases

Conclusion

Bronchial asthma is a chronic but manageable disease. Understanding its inflammatory nature, identifying triggers, and adhering to appropriate therapy are key to effective control. Advances in pharmacological treatments and patient education continue to improve outcomes and quality of life for asthma patients.

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References

1. World Health Organization. Asthma Fact Sheets. Geneva: WHO; 2023.

(Provides global statistics, causes, and management guidelines for asthma.)

2. Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention; 2024 Update.

(Standard international guideline for diagnosis and treatment of asthma.)

3. National Heart, Lung, and Blood Institute. Guidelines for the Diagnosis and Management of Asthma.

(Detailed clinical recommendations and classification of asthma severity.)

4. Davidson's Principles and Practice of Medicine. 24th Edition.

(Comprehensive explanation of pathophysiology and clinical features.)

5. Harrison's Principles of Internal Medicine. 21st Edition.

(In-depth discussion of asthma mechanisms and treatment.)

6. Centers for Disease Control and Prevention. Asthma Data and Statistics.

(Epidemiology and public health impact of asthma.)

7. The Lancet Respiratory Medicine. Articles on asthma pathogenesis and management.

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MELANOMA STAGING (TNM SYSTEM) AND PROGNOSTIC FACTORS

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Abstract

The process of figuring out how far a cancer has spread and where it is in the body is known as cancer staging. In addition to offering the most precise prognostic estimate, a comprehensive staging is essential since the tumor's stage affects a number of critical decisions, including therapy selection and follow-up tactics. The American Joint Committee on Cancer (AJCC) published the eighth version of the TNM classification in 2017, which serves as the foundation for the current melanoma staging system. There are five stages (0–IV) in both the clinical and pathological staging. The Breslow thickness, the pathological presence or absence of ulceration in the primary tumor, the number and presence of tumor-involved regional lymph nodes, the presence or absence of in-transit, satellite, and/or microsatellite metastases, and the presence of distant metastases are some of the factors that determine the stage of a melanoma. An appropriate medical workup in accordance with the stage and physical examination should be carried out after a melanoma diagnosis. In order to identify a possible recurrence or a second primary melanoma, ongoing patient monitoring is essential and should last a lifetime. Different follow-up plans have been proposed, but there is currently no widely accepted follow-up strategy program. With the rising usage of innovative current medicines (immunotherapies and targeted therapies), future prospective studies are required to assess various follow-up methods based on the chosen therapy.

Keywords: Melanoma, cutaneous melanoma, staging system, American Joint Committee on Cancer (AJCC), TNM classification

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Introduction

The process of staging involves figuring out where and how far a cancer has progressed throughout a person's body. Cancer stages range from 0 to IV, with stage IV cancer being associated with distant metastases. The well recognized TNM (Tumor, Node, Metastasis) staging technique is the most widely used method for staging solid tumors, including melanoma. Clinical and pathological staging are two categories of cancer staging. Although the criteria used to distinguish clinical and pathological phases may vary, they are often seen as complimentary to one another. Generally speaking, pathological staging is carried out by a pathologist and depends on the data from microscopic examination of the tumor after surgical resection, whereas clinical staging is based on all the information available prior to surgical excision of the tumor (e.g., by physical examination, blood tests, and imaging).

Only after the main tumor has been completely removed, a clinical examination of the skin and lymph nodes, and a radiologic evaluation for the identification of regional and distant metastases can the clinical stage of a melanoma be ascertained. In addition to the extensive excision and microstaging of the main tumor, pathological staging of a melanoma also takes into consideration data on regional lymph nodes following partial or total lymphadenectomy, if it is carried out. Because it offers the most precise prognostic prediction and enables the making of numerous critical decisions, including the choice of therapy and the follow-up plan, that are based on clinical tumor stage.

	T	N	M
Stage 0	Tis	N0	M0
Stage IA	T1a	N0	M0
Stage IB	T1b	N0	M0
	T2a	N0	M0
Stage IIA	T2b	N0	M0
	T3a	N0	M0
Stge IIB	T3b	N0	M0
	T4a	N0	M0
Stage IIC	T4b	N0	M0
Stage III	Any t, Tis	≥ N1	M0
Stage IV	Any T	Any N	M1

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The current staging system is based on the 8th edition of TNM classification for staging of melanoma issued by the AJCC in 2017 and is summarized in Tables 1–5 [1]. This relatively new system has been broadly accepted after its publication and is considered the cornerstone for classifying melanomas.

Melanoma staging system

Tables 1–5 provide a summary of the current staging approach, which is based on the 8th edition of the TNM classification for melanoma staging published by the AJCC in 2017.

Clinical staging (Table 1)

	T	N	M
Stage 0	Tis	N0	M0
Stage IA	T1a	N0	M0
	T1b	N0	M0
Stage IB	T2a	N0	M0
Stage IIA	T2b	N0	M0
	T3a	N0	M0
Stage IIB	T3b	N0	M0
	T4a	N0	M0
Stage IIC	T4b	N0	M0
Stage IIIA	T1a/b, T2a	N1a, N2a	M0
Stage IIIB	T0	N1b, N1c	M0
	T1a/b, T2a	N1b/c, N2b	M0
	T2b, T3a	N1a/b/c, N2a/b	M0
Stage IIIC	T0	N2b/c, N3b/c	M0
	T1a/b, T2a/b,	T3a N2c, N3a/b/c	M0
	T3b, T4a	Any N ≥ N1	M0
	T4b	N1a/b/c, N2a/b/c	M0
Stage IIID	T4b	N3a/b/c	M0
Stage IV	Any T, Tis	Any N	M1

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Pathological staging (Table 2)

Category	Thickness	Ulceration
TX: Primary tumor cannot be assessed	N/A	N/A
T0: No evidence of primary tumor	N/A	N/A
Tis (in situ)	N/A	N/A
T1	≤1 mm	
T1a	<0.8 mm	Without ulceration
T1b	<0.8	With ulceration
	0.8–1.0 mm	With or without ulceration
T2	>1.0–2.0 mm	
T2a	>1.0–2.0 mm	Without ulceration
T2b	>1.0–2.0 mm	With ulceration
T3	>2.0–4.0 mm	
T3a	>2.0–4.0 mm	Without ulceration
T3b	>2.0–4.0 mm	With ulceration
T4	>4.0 mm	
T4a	>4.0 mm	Without ulceration
T4b	>4.0 mm	With ulceration

Definition of T (Table 3)

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Category	Number of Tumor-Involved Regional Lymph Node	Presence of In-transit, Satellite, and/or Microsatellite Metastases
NX: Patients in whom the regional nodes cannot be assessed	N/A	No
N0: No regional metastases detected	N/A	No
N1	1 tumor-involved node or in-transit, satellite, and/or microsatellite metastases with no tumor-involved node	
N1a	1 clinically occult (ie, detected by SLN biopsy)	No
N1b	1 clinically detected	No
N1c	No regional lymph node disease	Yes
N2	2 or 3 tumor-involved nodes or in-transit, satellite, and/or microsatellite metastases with 1 tumor-involved node	
N2a	2 or 3 clinically occult (ie, detected by SLN biopsy)	No
N2b	2 or 3, at least 1 of which was clinically detected	No
N2c	1 clinically occult or clinically detected	Yes
N3	4 or more tumor-involved nodes or in-transit, satellite, and/or microsatellite metastases with 2 or more tumor-involved nodes, or any number of matted nodes without or with in-transit, satellite, and/or microsatellite metastases	
N3a	4 or more clinically occult (ie, detected by SLN biopsy)	No
N3b	4 or more, at least one of which was clinically detected, or presence of any number of matted nodes	No
N3c	2 or more clinically occult or clinically detected and/or presence of any number of matted nodes	Yes

Definition of N (Table 4)

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Category	Anatomic Site	LDH level
M0: No evidence of distant metastasis	N/A	N/A
M1	Evidence of distant metastases	See below
M1a	Distant metastasis to skin, soft tissue including muscle, and/or nonregional lymph node	Not recorded or unspecified
M1a(0)		Not elevated
M1a(1)		Elevated
M1b	Distant metastasis to lung with or without M1a sites of disease	Not recorded or unspecified
M1b(0)		Not elevated
M1b(1)		Elevated
M1c	Distant metastasis to non-CNS visceral sites with or without M1a or M1b sites of disease	Not recorded or unspecified
M1c(0)		Not elevated
M1c(1)		Elevated
M1d	Distant metastasis to CNS with or without M1a, M1b, or M1c sites of disease	Not recorded or unspecified
M1d(0)		Normal
M1d(1)		Elevated

Definition of M (T able 5)

There are five stages in both clinical and pathological staging, which are as follows:

Clinical Phase:

0: in situ illness

I and II: localized illness

Substages IA and IB make up stage I, whereas substages IIA, IIB, and IIC make up stage II. The Breslow thickness and the presence or absence of ulceration following the pathological evaluation of the main tumor are the decisive variables for staging and substaging (Tables 1 and 2). Notably, melanoma staging is no longer influenced by

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Clark's level of invasion and mitotic rate, which were formerly employed for sub-classification.

III: local illness

Metastases in regional lymph nodes, as well as "in transit metastases," "satellite metastases," and microsatellite metastases, are indicative of regional illness. Cutaneous or subcutaneous metastatic lesions up to two centimeters from the main tumor's edge are referred to as satellite metastases. Cutaneous or subcutaneous lesions situated between 2 cm from the main tumor and the regional nodal basin are referred to as in-transit metastases. Tumor nests greater than 0.05 mm in diameter in the reticular dermis, subcutis, or arteries underneath the original invasive tumor that are at least 0.3 mm away from it on the section where the Breslow measurement was made are known as microsatellite metastases.

Metastases in the lymph node basin that drains lymph from the area surrounding the tumor are referred to as regional lymph node metastases. After sentinel lymph node (SLN) biopsy (for clinically occult lymph node metastases) or therapeutic lymph node dissection (for clinically obvious regional lymph node illness), the involvement of regional lymph nodes is verified by pathological investigation. Clinical, radiologic, and/or diagnostic biopsies (clinical staging) can also identify regional lymph node involvement. As a result, there is just one stage group for clinical stage III. On the other hand, Breslow thickness, the pathological presence or absence of ulceration in the primary tumor, the number of tumor-involved regional lymph nodes, and the presence or absence of in-transit, satellite, and/or microsatellite metastases determine the A, B, C, and D stage groups for pathological stage III (Table 4).

IV: illness with distant metastases

This stage comprises nonregional lymph nodes, skin, soft tissue, and distant metastases to the lung, central nervous system (CNS), or other organs. For prognosis purposes, a sub-classification based on the number of organs implicated, which organs are involved, and serum levels of lactate dehydrogenase (LDH) is crucial, even if there is no further separation to substages (Table 5).

Staging workup

Histopathologic Examination

A biopsy should be carried out if a suspicious lesion is found. It is highly recommended to do an excisional biopsy with a thin margin (1-3 mm). The staging and subsequent treatment of primary melanoma are determined by the histological findings and clinical

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assessment. As a result, the Breslow thickness, ulceration status, dermal mitotic rate, margin status, presence or absence of microsatellitosis, and presence or absence of pure desmoplasia should all be included in the pathology report.

Physical examination

The physical inspection of the whole skin surface should get special attention in order to search for a second primary melanoma as well as satellites or in-transit metastases. Included should be a physical assessment of the local lymph node basin.

Imaging and Sentinel Lymph Node Biopsy

No additional imaging or laboratory testing is required for patients with melanoma in situ and clinical stage IA melanoma who have a normal physical examination and no other symptoms. Additionally, at baseline, they are not SLN biopsy candidates. Wide excision is the final step in the staging process [1].

At baseline, patients with clinical stage IB melanoma who have a normal physical examination and no other symptoms do not require further imaging or laboratory testing. In individuals with T1b melanoma, SLN biopsy should be taken into consideration. Numerous criteria, including age, lymphovascular invasion, mitotic rate, and comorbidities, influence the choice [1]. SLN biopsies should be performed on patients with T2a melanoma.

A SLN biopsy should be recommended for patients with clinical stage II melanoma who have a normal physical examination and no other symptoms, but they do not require further imaging or laboratory testing at baseline [1,4,5].

An ultrasound (US) should be investigated before an SLN biopsy in patients with melanoma of any stage if an unclear regional lymph node is found on clinical examination. Nevertheless, a negative nodal basin US should not be used in place of a biopsy of lymph nodes that are clinically questionable; instead, histology should be performed. Additionally, nodal basin US anomalies or suspicious lesions should be verified histopathologically.

Interestingly, it has been demonstrated that SLN biopsy has only prognostic (and not therapeutic) importance [9–13]. The importance of SLN biopsy as a staging method is highlighted by the fact that a positive biopsy would immediately advance a patient to stage III, particularly with the advent of adjuvant systemic treatment for stage III. Since a full lymph node dissection has minimal predictive value, little therapeutic effect, and is linked to surgical morbidity, it is no longer advised in cases of positive SLN biopsy

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[14–17]. However, in the absence of distant metastases, it is recommended for the treatment of lymph node metastases identified by imaging or clinical diagnosis.

Patients with pathological stage IIIA melanoma should be evaluated for baseline staging, and all patients with stage IIIB/C/D should undergo imaging [1]. Imaging methods include whole-body PET/CT with or without brain MRI with IV contrast, or chest/abdominal/pelvic CT with IV contrast. Additionally, if clinically necessary, a CT scan with intravenous contrast should be used to examine the neck area.

Lastly, individuals with stage IV melanoma require meticulous whole body imaging (CT or PET/CT, brain MRI). Additionally, it is important to measure plasma LDH [1].
Follow-Up
Following a diagnosis of melanoma, it is crucial to continue monitoring people who a re clear of the illness. The following are the follow-up's primary objectives: Early detection of recurrence (local or distant) and subsequent advice for adjuvant the rapy, if necessary. early identification of non melanoma skin cancer or a second primary melanoma.

Identification and management of adverse effects after receiving adjuvant systemic th erapy. A sufficient follow-up is crucial since early diagnosis of recurrence is linked to a greater survival probabi lity. The stage of melanoma at initial presentation affects the chance of recurrence. After extensive excision, patients with in situ melanoma had extremely little chance o f recurrence. However, there are certain outliers, including lentigo maligna type [18–20].
Patients who first arrive with melanoma at an early stage are often less likely to exper ience a recurrence than those who have more advanced stages.
As a result, the stage affects when relapses occur.
Individuals with advanced melanoma typically experience a faster recurrence than th ose with earlier stages [21–23].
However, the majority of relapses occur within two to three years after surgery, and th e majority occur within the first five years.
Furthermore, for melanoma stages, the chance of recurrence tends to decline over tim e; nonetheless, late recurrence (more than ten years after the first diagnosis) cannot be ruled out.

A second primary melanoma is most likely to occur in patients with a personal history of the disease. The information presented in the literature about the likelihood of getting a second primary melanoma is quite inconsistent. Between 2% and 20% of melanoma patients have been observed to acquire a second primary melanoma [23, 27–

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30]. The cumulative 5-year risk of developing a second primary melanoma was 8% in a group of individuals with melanoma who were prospectively tracked [30]. It is interesting to note that the risk seems to increase within the first year following the initial melanoma diagnosis, but it persists for at least five years and potentially longer [23, 27–30]. As a result, those with a history of melanoma should be regarded as having a lifelong higher risk of getting a new primary melanoma.

While there is no question about the necessity of a follow-up for patients with melanoma, surveillance guidelines differ greatly in terms of the techniques and frequency of visits and exams. Different follow-up plans have been presented, most of which are based on expert judgments, because there is currently insufficient information about the effectiveness of follow-up techniques. The melanoma stage and the existence or absence of other risk factors are taken into account in the recommended follow-up plans.

Due to the high chances of relapse, the first five years after the main tumor is removed are the most critical. Because of this, current guidelines recommend using more intensive follow-up techniques throughout this time. However, monitoring programs for melanoma patients should extend beyond five years, including at least one strongly advised yearly skin inspection throughout life, due to the lifetime increased risk of a second primary melanoma or a non-melanoma skin cancer, as well as the possibility of late recurrence [31].

Whole body skin examinations, physical examinations of the local lymph nodes, blood tests, and imaging tests such chest X-rays, ultrasounds, CT, PET/CT, and MRIs are among the modalities used to monitor melanoma patients. In order to detect local recurrences (scar, satellite/in-transit recurrence) and subsequent primary melanoma or other skin cancers, a clinical evaluation conducted by a dermatologist is required at any stage and includes a total body skin examination (with or without a total body clinical and dermoscopic digital documentation). Examining the local lymph nodes and assessing the patient's symptoms and/or indicators that would guide necessary imaging should also be part of the clinical assessment.

The most reliable way to identify nodal disease is through lymph node ultrasound, which is typically advised for patients with equivocal lymph nodes during physical examination, patients with AJCC T1b stage and above, patients who were offered SLN biopsy but did not have it done, and patients with positive SLN biopsy who did not undergo full lymph node dissection [32]. When monitoring asymptomatic patients in more advanced stages or when signs and symptoms may indicate distant metastases, other imaging modalities (CT, PET/CT, MRI, chest x-ray) should be taken into

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consideration [33]. Whenever feasible, histopathologic investigation should be used to confirm any suspected recurrence in a clinical setting.

Finally, while modest positive predictive values have been shown, regular blood tests (LDH, S100 protein) to identify recurrence is often not advised. The identification of molecular changes in melanoma patients' plasma and serum by the characterisation of circulating tumor cells and cell-free circulating tumor DNA is the subject of ongoing research on liquid biopsies [34, 35]. In the future, this might offer useful data on predictive results and evaluation of therapy response or resistance.

Follow-up guidelines for each stage of melanoma have been published by the National Comprehensive Cancer Network (NCCN), an association of 31 US cancer institutions [1]. They state that for stage 0 (in situ) melanoma, regular imaging is not advised. Regular imaging to check for silent recurrence or metastatic disease is not advised for patients in stages IA to IIA who show no signs of illness. For five years, clinical visits should be planned every six to twelve months; beyond that, they should be arranged yearly as clinically warranted. During these visits, the clinical examination should focus on the skin and local nodes. Scheduled visits should be carried out every three to six months for the first two years, every three to twelve months for the following three years, and yearly after that, as clinically recommended, with a focus on the skin and regional nodes, for patients in stages IIB to IV (without any indication of illness). Additionally, screening for asymptomatic recurrence in these phases may involve imaging (chest x-ray, CT, and/or PET/CT) every three to twelve months. In terms of the central nervous system (CNS), high-risk individuals with stage IIIC or higher melanoma should have a brain MRI every three years to check for asymptomatic brain metastases; those with previous brain metastases should have more regular monitoring. However, beyond three to five years, regular imaging is not advised. However, when clinically necessary, a suitable imaging test should be provided to assess particular symptoms in any situation and at any point throughout the follow-up period.

Lastly, imaging is advised to determine the severity of the illness if a recurrence takes place. Additionally, clinical assessment and/or imaging may be necessary during therapy to evaluate treatment response when active non-surgical treatment is started and full surgical resection of the recurrence is not practical.

The frequency of follow-up programs in Europe varies from two to four times a year for five to ten years, with higher-intensity tactics used during the initial years and in more advanced phases. Table 6 presents an example of the stage-based follow-up schedule exams suggested by the current European consensus-based multidisciplinary recommendations for melanoma.

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A tailored approach that considers the patient's risk factors—such as atypical mole syndrome, previous primary melanoma, recurrence risk, and family history of melanoma—is desirable regardless of the follow-up plan selected. Furthermore, a crucial part of the monitoring strategy must include patient education, which should include

a description of what to expect from follow-up tests and the importance of keeping the planned follow-ups.

- awareness that melanoma is often more common among family members.
- guidelines for doing regular self-examinations of the skin and peripheral lymph nodes.
- details on safe sun exposure techniques.

Conclusion

In conclusion, even though there is currently no widely used follow-up plan program to monitor patients with melanoma, the above-mentioned suggestions might act as a reference for doctors while further To improve the standardization of these follow-up procedures, prospective studies are needed.

References

1. Gershenwald, J. E., Scolyer, R. A., Hess, K. R., Sondak, V. K., Long, G. V., Ross, M. I., Lazar, A. J., Faries, M. B., Kirkwood, J. M., McArthur, G. A., Haydu, L. E., Eggermont, A. M. M., Flaherty, K. T., Balch, C. M., Thompson, J. F., & for members of the American Joint Committee on Cancer Melanoma Expert Panel and the International Melanoma Database and Discovery Platform (2017). Melanoma staging: Evidence-based changes in the American Joint Committee on Cancer eighth edition cancer staging manual. *CA: a cancer journal for clinicians*, *67*(6), 472–492. https://doi.org/10.3322/caac.21409
2. Keung, E. Z., & Gershenwald, J. E. (2018). The eighth edition American Joint Committee on Cancer (AJCC) melanoma staging system: implications for melanoma treatment and care. *Expert review of anticancer therapy*, *18*(8), 775–784. https://doi.org/10.1080/14737140.2018.1489246
3. Hu, D., Liu, Z., Chen, S., Huang, Y., Zeng, W., Wei, W., Zhang, C., Zhou, L., Chen, D., Wu, Y., & Guo, L. (2022). Assessment of the Novel, Practical, and Prognosis-Relevant TNM Staging System for Stage I-III Cutaneous Melanoma. *Frontiers in oncology*, *12*, 738298. https://doi.org/10.3389/fonc.2022.738298

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025

4. Yang, C. Q., Wang, H., Liu, Z., Hueman, M. T., Bhaskaran, A., Henson, D. E., Sheng, L., & Chen, D. (2021). Integrating additional factors into the TNM staging for cutaneous melanoma by machine learning. *PloS one*, *16*(9), e0257949. https://doi.org/10.1371/journal.pone.0257949
5. Balch, C. M., Gershenwald, J. E., Soong, S. J., Thompson, J. F., Atkins, M. B., Byrd, D. R., Buzaid, A. C., Cochran, A. J., Coit, D. G., Ding, S., Eggermont, A. M., Flaherty, K. T., Gimotty, P. A., Kirkwood, J. M., McMasters, K. M., Mihm, M. C., Jr, Morton, D. L., Ross, M. I., Sober, A. J., & Sondak, V. K. (2009). Final version of 2009 AJCC melanoma staging and classification. *Journal of clinical oncology : official journal of the American Society of Clinical Oncology*, *27*(36), 6199–6206. https://doi.org/10.1200/JCO.2009.23.4799
6. Michielin, O., van Akkooi, A. C. J., Ascierto, P. A., Dummer, R., Keilholz, U., & ESMO Guidelines Committee. Electronic address: clinicalguidelines@esmo.org (2019). Cutaneous melanoma: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up†. *Annals of oncology : official journal of the European Society for Medical Oncology*, *30*(12), 1884–1901. https://doi.org/10.1093/annonc/mdz411
7. Balch, C. M., Soong, S. J., Gershenwald, J. E., Thompson, J. F., Reintgen, D. S., Cascinelli, N., Urist, M., McMasters, K. M., Ross, M. I., Kirkwood, J. M., Atkins, M. B., Thompson, J. A., Coit, D. G., Byrd, D., Desmond, R., Zhang, Y., Liu, P. Y., Lyman, G. H., & Morabito, A. (2001). Prognostic factors analysis of 17,600 melanoma patients: validation of the American Joint Committee on Cancer melanoma staging system. *Journal of clinical oncology : official journal of the American Society of Clinical Oncology*, *19*(16), 3622–3634. https://doi.org/10.1200/JCO.2001.19.16.3622
8. Morton, D. L., Thompson, J. F., Cochran, A. J., Mozzillo, N., Nieweg, O. E., Roses, D. F., Hoekstra, H. J., Karakousis, C. P., Puleo, C. A., Coventry, B. J., Kashani-Sabet, M., Smithers, B. M., Paul, E., Kraybill, W. G., McKinnon, J. G., Wang, H. J., Elashoff, R., Faries, M. B., & MSLT Group (2014). Final trial report of sentinel-node biopsy versus nodal observation in melanoma. *The New England journal of medicine*, *370*(7), 599–609. https://doi.org/10.1056/NEJMoa1310460
9. Hall, B. J., Schmidt, R. L., Sharma, R. R., & Layfield, L. J. (2013). Fine-needle aspiration cytology for the diagnosis of metastatic melanoma: systematic review and meta-analysis. *American journal of clinical pathology*, *140*(5), 635–642. https://doi.org/10.1309/AJCPWSDDHLLW40WI

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
10. Oude Ophuis, C. M. C., Verhoef, C., Grünhagen, D. J., Siegel, P., Schoengen, A., Röwert-Huber, J., Eggermont, A. M. M., Voit, C. A., & van Akkooi, A. C. J. (2017). Long-term results of ultrasound guided fine needle aspiration cytology in conjunction with sentinel node biopsy support step-wise approach in melanoma. *European journal of surgical oncology : the journal of the European Society of Surgical Oncology and the British Association of Surgical Oncology*, *43*(8), 1509–1516. https://doi.org/10.1016/j.ejso.2017.02.009
11. Bohelay, G., Battistella, M., Pagès, C., de Margerie-Mellon, C., Basset-Seguin, N., Viguier, M., Kerob, D., Madjlessi, N., Baccard, M., Archimbaud, A., Comte, C., Mourah, S., Porcher, R., Bagot, M., Janin, A., De Kerviler, E., & Lebbé, C. (2015). Ultrasound-guided core needle biopsy of superficial lymph nodes: an alternative to fine-needle aspiration cytology for the diagnosis of lymph node metastasis in cutaneous melanoma. *Melanoma research*, *25*(6), 519–527. https://doi.org/10.1097/CMR.0000000000000161
12. Statius Muller, M. G., van Leeuwen, P. A., de Lange-De Klerk, E. S., van Diest, P. J., Pijpers, R., Ferwerda, C. C., Vuylsteke, R. J., & Meijer, S. (2001). The sentinel lymph node status is an important factor for predicting clinical outcome in patients with Stage I or II cutaneous melanoma. *Cancer*, *91*(12), 2401–2408.
13. Wright, B. E., Scheri, R. P., Ye, X., Faries, M. B., Turner, R. R., Essner, R., & Morton, D. L. (2008). Importance of sentinel lymph node biopsy in patients with thin melanoma. *Archives of surgery (Chicago, Ill. : 1960)*, *143*(9), 892–900. https://doi.org/10.1001/archsurg.143.9.892
14. Ranieri, J. M., Wagner, J. D., Wenck, S., Johnson, C. S., & Coleman, J. J., 3rd (2006). The prognostic importance of sentinel lymph node biopsy in thin melanoma. *Annals of surgical oncology*, *13*(7), 927–932. https://doi.org/10.1245/ASO.2006.04.023
15. Mozzillo, N., Pennacchioli, E., Gandini, S., Caracò, C., Crispo, A., Botti, G., Lastoria, S., Barberis, M., Verrecchia, F., & Testori, A. (2013). Sentinel node biopsy in thin and thick melanoma. *Annals of surgical oncology*, *20*(8), 2780–2786. https://doi.org/10.1245/s10434-012-2826-0
16. Leiter, U., Stadler, R., Mauch, C., Hohenberger, W., Brockmeyer, N. H., Berking, C., Sunderkötter, C., Kaatz, M., Schatton, K., Lehmann, P., Vogt, T., Ulrich, J., Herbst, R., Gehring, W., Simon, J. C., Keim, U., Verver, D., Martus, P., Garbe, C., & German Dermatologic Cooperative Oncology Group (2019). Final Analysis of DeCOG-SLT Trial: No Survival Benefit for Complete Lymph Node Dissection in Patients With Melanoma With Positive Sentinel

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
Node. *Journal of clinical oncology : official journal of the American Society of Clinical Oncology*, *37*(32), 3000–3008. https://doi.org/10.1200/JCO.18.02306

17. Faries, M. B., Thompson, J. F., Cochran, A. J., Andtbacka, R. H., Mozzillo, N., Zager, J. S., Jahkola, T., Bowles, T. L., Testori, A., Beitsch, P. D., Hoekstra, H. J., Moncrieff, M., Ingvar, C., Wouters, M. W. J. M., Sabel, M. S., Levine, E. A., Agnese, D., Henderson, M., Dummer, R., Rossi, C. R., … Elashoff, R. M. (2017). Completion Dissection or Observation for Sentinel-Node Metastasis in Melanoma. *The New England journal of medicine*, *376*(23), 2211–2222. https://doi.org/10.1056/NEJMoa1613210
18. Kyrgidis, A., Tzellos, T., Mocellin, S., Apalla, Z., Lallas, A., Pilati, P., & Stratigos, A. (2015). Sentinel lymph node biopsy followed by lymph node dissection for localised primary cutaneous melanoma. *The Cochrane database of systematic reviews*, *2015*(5), CD010307. https://doi.org/10.1002/14651858.CD010307.pub2
19. Verver, D., Rekkas, A., Garbe, C., van Klaveren, D., van Akkooi, A. C. J., Rutkowski, P., Powell, B. W. E. M., Robert, C., Testori, A., van Leeuwen, B. L., van der Veldt, A. A. M., Keilholz, U., Stadler, R., Eggermont, A. M. M., Verhoef, C., Leiter, U., & Grünhagen, D. J. (2020). The EORTC-DeCOG nomogram adequately predicts outcomes of patients with sentinel node-positive melanoma without the need for completion lymph node dissection. *European journal of cancer (Oxford, England : 1990)*, *134*, 9–18. https://doi.org/10.1016/j.ejca.2020.04.022
20. Joyce, K. M., Joyce, C. W., Jones, D. M., Donnellan, P., Hussey, A. J., Regan, P. J., & Kelly, J. L. (2015). An assessment of histological margins and recurrence of melanoma in situ. *Plastic and reconstructive surgery. Global open*, *3*(2), e301. https://doi.org/10.1097/GOX.0000000000000272
21. Duffy, K. L., Truong, A., Bowen, G. M., Andtbacka, R. H., Hyngstrom, J., Bowles, T., Grossmann, K., Khong, H., Hyde, M., Florell, S. R., Bowen, A. R., Wada, D., & Grossman, D. (2014). Adequacy of 5-mm surgical excision margins for non-lentiginous melanoma in situ. *Journal of the American Academy of Dermatology*, *71*(4), 835–838. https://doi.org/10.1016/j.jaad.2014.06.044
22. de Vries, K., Greveling, K., Prens, L. M., Munte, K., Koljenović, S., van Doorn, M. B., & Prens, E. P. (2016). Recurrence rate of lentigo maligna after micrographically controlled staged surgical excision. *The British journal of dermatology*, *174*(3), 588–593. https://doi.org/10.1111/bjd.14325
23. Romano, E., Scordo, M., Dusza, S. W., Coit, D. G., & Chapman, P. B. (2010). Site and timing of first relapse in stage III melanoma patients: implications for

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025

follow-up guidelines. *Journal of clinical oncology : official journal of the American Society of Clinical Oncology*, *28*(18), 3042–3047. https://doi.org/10.1200/JCO.2009.26.2063

24. Salama, A. K., de Rosa, N., Scheri, R. P., Pruitt, S. K., Herndon, J. E., 2nd, Marcello, J., Tyler, D. S., & Abernethy, A. P. (2013). Hazard-rate analysis and patterns of recurrence in early stage melanoma: moving towards a rationally designed surveillance strategy. *PloS one*, *8*(3), e57665. https://doi.org/10.1371/journal.pone.0057665
25. Gassenmaier, M., Stec, T., Keim, U., Leiter, U., Eigentler, T. K., Metzler, G., & Garbe, C. (2019). Incidence and characteristics of thick second primary melanomas: a study of the German Central Malignant Melanoma Registry. *Journal of the European Academy of Dermatology and Venereology : JEADV*, *33*(1), 63–70. https://doi.org/10.1111/jdv.15194
26. Hofmann, U., Szedlak, M., Rittgen, W., Jung, E. G., & Schadendorf, D. (2002). Primary staging and follow-up in melanoma patients--monocenter evaluation of methods, costs and patient survival. *British journal of cancer*, *87*(2), 151–157. https://doi.org/10.1038/sj.bjc.6600428
27. Osella-Abate, S., Ribero, S., Sanlorenzo, M., Maule, M. M., Richiardi, L., Merletti, F., Tomasini, C., Marra, E., Macripò, G., Fierro, M. T., & Quaglino, P. (2015). Risk factors related to late metastases in 1,372 melanoma patients disease free more than 10 years. *International journal of cancer*, *136*(10), 2453–2457. https://doi.org/10.1002/ijc.29281
28. Crowley, N. J., & Seigler, H. F. (1990). Late recurrence of malignant melanoma. Analysis of 168 patients. *Annals of surgery*, *212*(2), 173–177. https://doi.org/10.1097/00000658-199008000-00010
29. Jones, M. S., Torisu-Itakura, H., Flaherty, D. C., Schoellhammer, H. F., Lee, J., Sim, M. S., & Faries, M. B. (2016). Second Primary Melanoma: Risk Factors, Histopathologic Features, Survival, and Implications for Follow-Up. *The American surgeon*, *82*(10), 1009–1013.
30. Schuurman, M. S., de Waal, A. C., Thijs, E. J. M., van Rossum, M. M., Kiemeney, L. A. L. M., & Aben, K. K. H. (2017). Risk factors for second primary melanoma among Dutch patients with melanoma. *The British journal of dermatology*, *176*(4), 971–978. https://doi.org/10.1111/bjd.15024
31. Youlden, D. R., Youl, P. H., Soyer, H. P., Aitken, J. F., & Baade, P. D. (2014). Distribution of subsequent primary invasive melanomas following a first primary invasive or in situ melanoma Queensland, Australia, 1982-2010. *JAMA*

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
dermatology, *150*(5), 526–534. https://doi.org/10.1001/jamadermatol.2013.9852

32. Lallas, A., Apalla, Z., Kyrgidis, A., Papageorgiou, C., Boukovinas, I., Bobos, M., Efthimiopoulos, G., Nikolaidou, C., Moutsoudis, A., Gkentsidi, T., Lallas, K., Lazaridou, E., Sotiriou, E., Vakirlis, E., & Ioannides, D. (2020). Second primary melanomas in a cohort of 977 melanoma patients within the first 5 years of monitoring. *Journal of the American Academy of Dermatology*, *82*(2), 398–406. https://doi.org/10.1016/j.jaad.2019.08.074
33. Youlden, D. R., Baade, P. D., Soyer, H. P., Youl, P. H., Kimlin, M. G., Aitken, J. F., Green, A. C., & Khosrotehrani, K. (2016). Ten-Year Survival after Multiple Invasive Melanomas Is Worse than after a Single Melanoma: a Population-Based Study. *The Journal of investigative dermatology*, *136*(11), 2270–2276. https://doi.org/10.1016/j.jid.2016.03.014
34. Xing, Y., Bronstein, Y., Ross, M. I., Askew, R. L., Lee, J. E., Gershenwald, J. E., Royal, R., & Cormier, J. N. (2011). Contemporary diagnostic imaging modalities for the staging and surveillance of melanoma patients: a meta-analysis. *Journal of the National Cancer Institute*, *103*(2), 129–142. https://doi.org/10.1093/jnci/djq455
35. Riquelme-Mc Loughlin, C., Podlipnik, S., Bosch-Amate, X., Riera-Monroig, J., Barreiro, A., Espinosa, N., Moreno-Ramírez, D., Giavedoni, P., Vilana, R., Sánchez, M., Vidal-Sicart, S., Carrera, C., Malvehy, J., & Puig, S. (2019). Diagnostic accuracy of imaging studies for initial staging of T2b to T4b melanoma patients: A cross-sectional study. *Journal of the American Academy of Dermatology*, *81*(6), 1330–1338. https://doi.org/10.1016/j.jaad.2019.05.076

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STROKE: EARLY RECOGNITION AND EMERGENCY MANAGEMENT

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Abstract

The early recognition and rapid emergency management of acute stroke are pivotal in minimizing permanent neurological damage and reducing global mortality rates. This paper proposes a comprehensive, integrated framework that bridges advanced medical imaging analysis with intelligent emergency coordination systems. By leveraging explainable artificial intelligence for initial lesion assessment and ontology-based cloud computing for resource routing, the system ensures both diagnostic safety and logistical efficiency. Ultimately, this unified approach aims to accelerate treatment timelines, overcoming the fragmented nature of traditional emergency healthcare networks.

Introduction

Stroke is a devastating global health concern, with ischemic stroke accounting for the vast majority of cases worldwide (Chowdhury & Rahman, 2025). Hemorrhagic stroke, while comparatively less frequent, is characterized by its rapid onset, grave nature, and significantly higher mortality rate (Xu et al., 2024). The management of both conditions requires immediate medical intervention, primarily because the human brain relies almost exclusively on the continuous aerobic consumption of glucose delivered by the cerebral vasculature (Bertels et al., 2022). Any interruption to this delicate hemodynamic balance demands immediate recognition to salvage at-risk brain tissue before the damage becomes irreversible.

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The scope of this paper encompasses the critical window of early stroke recognition and the subsequent emergency management logistics required to expedite patient care. Effective treatment decisions require early and informative vascular imaging, but access to advanced modalities is often delayed in standard clinical environments (Tangwiriyasakul et al., 2024). Furthermore, the broader emergency management systems that route patients to appropriate neurological care centers remain highly fragmented and inefficient (Bi & Gelenbe, 2019). Connecting immediate physiological data with overarching logistical networks is therefore a primary focus of modern clinical engineering.

Existing approaches to stroke recognition and emergency management are insufficient for several interconnected reasons. First, sophisticated imaging techniques like four-dimensional computed tomography perfusion (4D-CTP) are ideal for assessment but are rarely available within the first critical hour after a stroke (Tangwiriyasakul et al., 2024). Second, while artificial intelligence has shown promise in lesion detection, most existing models operate as black-box predictors without explicit uncertainty awareness, raising severe safety and trust concerns in high-stakes emergency radiology (Islam, 2026). Third, traditional emergency management frameworks often lack the semantic integration necessary to intelligently coordinate complex entities such as ambulances, specialized hospitals, and on-call neurologists (A & Karpagam, 2011).

To address these profound infrastructural and diagnostic gaps, this paper proposes a unified, uncertainty-aware framework for early stroke recognition and emergency management. The primary contributions of this work are encapsulated as follows:

- We introduce an explainable diagnostic pipeline that synthesizes basic early imaging data with explicit uncertainty quantification to prevent automated misdiagnoses in acute settings.
- We present an integrated emergency management architecture that leverages ontology-based cloud communication to seamlessly route stroke patients to optimally equipped medical facilities based on real-time diagnostic confidence. These contributions serve to transform sequential, delayed stroke care into a parallel, highly optimized medical response system.

Related Work

Medical Imaging and Lesion Segmentation

The core idea in this domain is the utilization of deep learning and computer vision to automatically delineate stroke lesions and estimate physiological damage. For instance,

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cascaded 3D models based on UNet architectures have been deployed to perform two-stage segmentation of hemorrhagic areas in computed tomography (CT) scans from rough to fine resolutions (Xu et al., 2024). Similarly, transfer learning on multi-sequence magnetic resonance imaging (MRI) has been utilized to capture the irregular and physiologically complex shapes of ischemic stroke lesions (Chowdhury & Rahman, 2025). Other novel approaches employ fuzzy logic combined with seeded region growing to handle the extreme topological heterogeneity of brain lesions (González, 2023). While these models demonstrate high accuracy, a major weakness is their deterministic nature, which fails to communicate predictive uncertainty to human clinicians. In contrast, our proposed framework incorporates an explicit abstention mechanism that flags ambiguous imaging data rather than forcing a potentially erroneous classification.

Predictive Analytics in Stroke Care

Another vital subtopic focuses on predicting clinical outcomes and estimating the final infarct volume based on early physiological indicators. Machine learning models have been extensively developed to predict postoperative stroke in vulnerable patients by analyzing clinical features, laboratory values, and comorbidity variables (Pan et al., 2025). Furthermore, the core-penumbra concept has been heavily studied in the acute ischemic phase, utilizing convolutional neural networks to predict final infarct states based on early physiological mismatch criteria (Bertels et al., 2022). A key strength of these predictive models is their ability to leverage large-scale clinical databases to identify complex, non-linear risk factors. However, their primary weakness lies in a lack of real-time imaging integration during the hyperacute phase of a novel stroke onset. Our work bridges this gap by directly linking real-time imaging predictions with downstream emergency routing protocols.

Systemic Emergency Management

The broader field of emergency management has evolved significantly, incorporating advanced computing paradigms to manage catastrophic health failures and systemic logistics. Research has proposed social cloud computing models that utilize ontology-based systems to intelligently connect people, organizations, and essential healthcare services (A & Karpagam, 2011). Additionally, extensive mathematical algorithms have been engineered to optimize emergency navigation, evacuation, and search-and-rescue planning in modern, highly populated societies (Bi & Gelenbe, 2019). The strength of these frameworks is their systemic optimization capabilities and high-level resource

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allocation efficiencies. Nevertheless, a critical weakness is that they are rarely tailored to the specific, time-sensitive physiological constraints of acute stroke pathways. The current work specifically adapts these overarching emergency management algorithms to interface directly with neurological imaging triggers, ensuring a unified and rapid medical response.

Method/Approach

Framework Overview and Design Rationale

The proposed framework integrates diagnostic imaging analytics with a cloud-based emergency coordination system to create a continuous pipeline of care. The core rationale behind this design is that stroke treatment efficacy degrades exponentially with time, requiring both rapid physiological assessment and immediate logistical routing. By fusing explainable artificial intelligence with ontology-based service composition, the system guarantees that high-confidence automated diagnoses immediately trigger appropriate hospital preparation protocols. This modular design also ensures that technical ambiguities in the imaging step defer to human expertise, preventing systemic failures in the patient care pathway.

Diagnostic and Logistical Pipeline

The methodology follows a structured, numbered pipeline to process incoming emergency stroke cases efficiently:

1. **Early Imaging Estimation:** Upon initial patient assessment, standard plain CT and CTA images are processed to extract a predicted perfusion map (PPM), circumventing the need for immediate, highly specialized 4D-CTP imaging (Tangwiriyasakul et al., 2024).
2. **Uncertainty-Aware Analysis:** An explainable agentic AI framework analyzes the generated PPM to detect ischemic or hemorrhagic regions, employing a decision agent that dynamically decides whether to make or withhold a prediction based on prescribed uncertainty thresholds (Islam, 2026).
3. **Semantic Emergency Routing:** High-confidence stroke classifications are subsequently fed into a social cloud constituting group communication entities, utilizing machine-readable metadata to automatically alert the nearest specialized stroke center and prepare intervention teams (A & Karpagam, 2011).

This sequential flow ensures that diagnostic insights are instantly converted into actionable emergency management commands.

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Evaluation Plan

To validate the proposed system, we outline a comprehensive evaluation plan utilizing a hypothetical, multi-center dataset of 10,000 acute stroke patients. The imaging segmentation and prediction modules will be evaluated using spatial similarity metrics, such as the Dice similarity coefficient, and voxel-wise symptom mapping correlations against expert-annotated ground truths. To assess the uncertainty-aware abstention mechanism, we will measure the model's precision-recall curve before and after implementing the dynamic confidence thresholds. Furthermore, the emergency management module will be tested in a simulated cloud environment to measure end-to-end communication latency and the theoretical reduction in door-to-needle time compared to traditional, fragmented emergency systems.

Discussion

Practical Implications and Deployment

The deployment of this integrated framework carries profound practical implications for global emergency healthcare systems. By generating perfusion maps from basic CT scans, smaller community hospitals can achieve advanced diagnostic capabilities without investing in cost-prohibitive 4D imaging hardware (Tangwiriyasakul et al., 2024). Furthermore, the ontology-based cloud architecture facilitates seamless, real-time communication between emergency medical technicians in the field, analyzing radiologists, and receiving neurologists (A & Karpagam, 2011). This unified approach successfully transforms stroke care from a reactive, sequential process into a proactive, parallel operation, significantly saving critical time.

Limitations and Failure Modes

Despite its high potential, the proposed system exhibits several limitations and potential failure modes that must be addressed before real-world deployment. First, the AI modules rely heavily on the assumption of high-quality initial CT scans; excessive patient motion or hardware artifact presence can severely degrade the predicted perfusion maps. Second, the reliance on continuous cloud infrastructure introduces a vulnerability to network latency or complete connectivity loss, which could catastrophically delay emergency routing in rural or underserved environments. Third, the system faces challenges with out-of-distribution generalization, as stroke lesion heterogeneity and varying multi-sequence MRI protocols may cause the algorithms to

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underperform on diverse global populations not represented in the training data (González, 2023)(Chowdhury & Rahman, 2025).

Ethical Considerations and Risks

Deploying highly automated systems in life-or-death medical scenarios inherently introduces critical ethical considerations. One major ethical risk is algorithmic bias, where models trained predominantly on specific demographics may provide sub-optimal uncertainty thresholds or inaccurate lesion segmentations for underrepresented patient groups. A second significant risk concerns patient data privacy, as routing sensitive neurological imaging and identifying metadata through a shared social cloud infrastructure creates potential vulnerabilities to cyberattacks and unauthorized exposure (Bi & Gelenbe, 2019). Careful encryption and rigorous, diverse dataset curation are absolutely essential to mitigate these ethical hazards safely.

Future Work

To address the current limitations and expand the framework's overarching capabilities, several avenues for future work are clearly identified. First, future research should explore federated learning techniques to train the stroke segmentation and prediction models across multiple international hospital networks without directly sharing sensitive patient data. Second, integrating continuous physiological data from consumer wearable health devices could provide pre-hospital predictive markers, further refining the initial stroke probability before the patient even arrives at the imaging facility. Both directions will significantly enhance the robustness, fairness, and clinical utility of the emergency management system.

Conclusion

This paper presented a comprehensive framework addressing the critical challenges inherent in the early recognition and emergency management of acute stroke. By synthesizing early predicted perfusion mapping with an explainable, uncertainty-aware artificial intelligence pipeline, the system significantly mitigates the risks associated with black-box medical diagnostics (Tangwiriyasakul et al., 2024)(Islam, 2026). Furthermore, explicitly linking these automated diagnostic insights to an ontology-based social cloud ensures that all emergency response entities are coordinated efficiently and intelligently (A & Karpagam, 2011).

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Ultimately, bridging the gap between advanced medical imaging and logistical emergency algorithms represents a crucial step forward in modern healthcare engineering. As acute ischemic and hemorrhagic strokes continue to place immense burdens on global health infrastructures, fully integrated solutions will be paramount in minimizing treatment delays. Future deployments of such holistic medical systems hold the immense potential to preserve brain tissue, reduce permanent disability, and save countless lives in the face of catastrophic neurological emergencies.

References

Chowdhury, R. P., & Rahman, T. (2025). *Segmentation of Ischemic Stroke Lesions using Transfer Learning on Multi-sequence MRI*. https://arxiv.org/pdf/2511.07281v1 https://arxiv.org/pdf/2511.07281v1

Xu, Weijin, Sha, Zhuang, Yang, Huihua, Jiang, Rongcai, Li, Zhanying, Liu, Wentao, & Su, Ruisheng (2024). *An Automatic Cascaded Model for Hemorrhagic Stroke Segmentation and Hemorrhagic Volume Estimation*. https://arxiv.org/pdf/2401.04570v1 https://arxiv.org/pdf/2401.04570v1

Bertels, Jeroen, Robben, David, Vandermeulen, Dirk, & Lemmens, Robin (2022). *Final infarct prediction in acute ischemic stroke*. https://arxiv.org/pdf/2211.04850v1 https://arxiv.org/pdf/2211.04850v1

Tangwiriyasakul, Chayanin, Borges, Pedro, Moriconi, Stefano, Wright, Paul, Mah, Yee-Haur, Teo, James, Nachev, Parashkev, Ourselin, Sebastien, & Cardoso, M. Jorge (2024). *Framework to generate perfusion map from CT and CTA images in patients with acute ischemic stroke: A longitudinal and cross-sectional study*. https://arxiv.org/pdf/2404.04025v1 https://arxiv.org/pdf/2404.04025v1

Bi, Huibo, & Gelenbe, Erol (2019). *Emergency Management Systems and Algorithms: a Comprehensive Survey*. https://arxiv.org/pdf/1907.04136v1 https://arxiv.org/pdf/1907.04136v1

Islam, Md Rashadul (2026). *An Explainable Agentic AI Framework for Uncertainty-Aware and Abstention-Enabled Acute Ischemic Stroke Imaging Decisions*. https://arxiv.org/pdf/2601.01008v1 https://arxiv.org/pdf/2601.01008v1

A, Bhuvaneswari., & Karpagam, Dr. G. R. (2011). *Ontology-Based Emergency Management System in a Social Cloud*. https://arxiv.org/pdf/1112.2067v1 https://arxiv.org/pdf/1112.2067v1

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
González, Mario Pascual (2023). *Fuzzy Information Seeded Region Growing for Automated Lesions After Stroke Segmentation in MR Brain Images*. https://arxiv.org/pdf/2311.11742v1 https://arxiv.org/pdf/2311.11742v1

Pan, Haonan, Chen, Shuheng, Pishgar, Elham, Alaei, Kamiar, Placencia, Greg, & Pishgar, Maryam (2025). *Machine Learning-Based Model for Postoperative Stroke Prediction in Coronary Artery Disease*. https://arxiv.org/pdf/2503.11973v1 https://arxiv.org/pdf/2503.11973v1

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025

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Annotatsiya: Orxit moyak to‘qimasining yallig‘lanishi bo‘lib, u ko‘pincha epididimit, siydik-tanosil infeksiyalari, jinsiy yo‘l bilan yuqadigan infeksiyalar, virusli kasalliklar yoki sistem yallig‘lanish jarayonlari fonida rivojlanadi. Kasallikning aksariyat holatlarida birlamchi yondashuv konservativ davo hisoblanadi: antibakterial yoki etiologik terapiya, yallig‘lanishga qarshi vositalar, simptomatik yordam, skrotal qo‘llab-quvvatlash va dinamik kuzatuv. Biroq yiringli asoratlar, moyak abssessi, ishemiya, nekroz, konservativ davoga javob bo‘lmasligi, septik xavf yoki moyak buralishi bilan differensial tashxisda noaniqlik mavjud bo‘lsa, jarrohlik aralashuvi klinik jihatdan asoslanadi. Zamonaviy tamoyilning markazida asossiz radikal operatsiyadan qochish, lekin kechikkan xirurgik qaror oqibatida moyak funksiyasi yo‘qolishiga ham yo‘l qo‘ymaslik turadi. Maqolada organ saqlovchi taktika, abssessni drenajlash, nekrotik to‘qimalarni chegaralangan olib tashlash, og‘ir hollarda orxiektomiya va operatsiyadan keyingi kuzatuv masalalari IMRAD tuzilmasida yoritiladi.

Kalit so‘zlar: orxit, epididimoorxit, moyak yallig‘lanishi, o‘tkir skrotum, abssess, xirurgik davolash, orxiektomiya, drenajlash, urologiya, reproduktiv salomatlik.

Kirish

Orxit erkak jinsiy tizimining klinik jihatdan muhim yallig‘lanish kasalliklaridan biri bo‘lib, moyak parenximasida infeksion yoki noinfeksion yallig‘lanish jarayoni

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rivojlanishi bilan kechadi. Amaliy urologiyada u ko‘pincha epididimit bilan birga, ya’ni epididimoorxit shaklida uchraydi. Buning sababi shundaki, uretra, prostata, urug‘ chiqaruv yo‘llari, moyak ortig‘i va moyak anatomik-funksional jihatdan o‘zaro bog‘langan tizimni tashkil etadi. Siydik yo‘llari infeksiyasi yoki jinsiy yo‘l bilan yuqadigan infeksiya yuqoriga ko‘tarilib, avval epididimisni, keyin moyak to‘qimasini zararlashi mumkin. Shu sababli orxitni faqat alohida moyak kasalligi sifatida emas, balki butun siydik-tanosil tizimidagi infeksion-yallig‘lanish jarayonining bir bo‘lagi sifatida baholash to‘g‘riroqdir.

Mavzuning dolzarbligi, avvalo, orxitning noto‘g‘ri baholanishi bilan bog‘liq. Ayrim amaliy holatlarda skrotumdagi og‘riq, shish va qizarish oddiy yallig‘lanish deb qabul qilinadi, lekin aslida moyak buralishi, ishemiya yoki yiringli destruktiv jarayon yashirin kechayotgan bo‘lishi mumkin. Aksincha, barcha o‘tkir orxit holatlarini operatsion muammo deb baholash ham klinik xatodir. Zamonaviy urologiyada xirurgik davolash orxitning birinchi va universal usuli emas; u faqat aniq ko‘rsatmalar mavjud bo‘lganda qo‘llanadi. Demak, asosiy ilmiy-amaliy masala jarrohlik zarur bo‘lgan va zarur bo‘lmagan holatlarni to‘g‘ri ajratishdan iborat.

Orxitning tibbiy oqibatlari faqat og‘riq va vaqtinchalik noqulaylik bilan cheklanmaydi. Kechikkan tashxis va noto‘g‘ri davolash moyak abssessi, atrofiyasi, surunkali og‘riq sindromi, bepushtlik, gormonal buzilishlar va og‘ir infeksion asoratlarga sabab bo‘lishi mumkin. Reproduktiv yoshdagi bemorlar uchun moyak to‘qimasining saqlanishi nafaqat anatomik, balki psixologik, endokrin va ijtimoiy ahamiyatga ham ega. Shuning uchun zamonaviy xirurgik yondashuv faqat yiringli o‘choqni bartaraf etish emas, balki imkon qadar organ funksiyasini saqlash tamoyiliga asoslanishi kerak.

Ushbu maqolaning maqsadi orxit kasalligida zamonaviy xirurgik davolash tamoyillarini tahlil qilish, jarrohlik ko‘rsatmalarini aniqlashtirish va klinik qaror qabul qilishda xavfsiz, organ saqlovchi, individual yondashuvning ahamiyatini asoslashdan iborat. Maqolaning vazifalari orxitning etiologik omillarini izohlash, diagnostika bosqichlarini yoritish, xirurgik davoga ko‘rsatmalarni tizimlashtirish, operatsion taktikalar o‘rtasidagi farqlarni ko‘rsatish va davolashdan keyingi kuzatuv mezonlarini belgilashdan iborat.

Adabiyotlar tahlili

O‘zbek tilidagi urologik o‘quv adabiyotlarida siydik-tanosil tizimi kasalliklari bir-biridan ajratilgan holda emas, balki umumiy klinik tizim sifatida ko‘rib chiqiladi. Urologiya bo‘yicha darslik va o‘quv qo‘llanmalarda o‘tkir yallig‘lanish kasalliklarining belgilari, diagnostikasi, antibakterial davolash va asoratlarda jarrohlik

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yondashuvlari alohida o‘rin egallaydi. Ushbu manbalarda yallig‘lanish kasalliklarining etiologiyasini aniqlash, infeksiya tarqalish yo‘lini baholash va bemorning umumiy holatini hisobga olish davolash taktikasini tanlashda hal qiluvchi ahamiyatga ega ekani ko‘rsatiladi.

Orxit etiologiyasi turlicha bo‘lishi mumkin. Bakterial shakllar ko‘pincha uretrit, prostatit, sistit yoki epididimit bilan bog‘liq holda rivojlanadi. Yosh bemorlarda jinsiy yo‘l bilan yuqadigan infeksiyalar muhim o‘rin tutadi, yoshi kattaroq bemorlarda esa siydik yo‘llaridagi obstruksiya, prostata kasalliklari, kateterizatsiya, instrumental tekshiruvlar yoki immunitet pasayishi fonida bakterial yallig‘lanish uchrashi mumkin. Virusli orxit, ayniqsa, epidemik parotitdan keyingi moyak zararlanishi sifatida tanilgan. Sil, brutsellez yoki boshqa surunkali infeksiyalar fonidagi orxit esa sekinroq, atipik klinik ko‘rinishda kechishi mumkin.

Mahalliy tibbiy axborot manbalarida orxit belgilari sifatida moyak sohasidagi og‘riq, skrotum shishi, qizarish, tana haroratining ko‘tarilishi, umumiy holsizlik, yurishda noqulaylik va ayrim hollarda siydik chiqarishdagi og‘riq qayd etiladi. Biroq faqat klinik belgilar asosida tashxis qo‘yish yetarli emas. Chunki o‘tkir skrotum sindromi doirasida orxit, epididimit, moyak buralishi, travmatik shikastlanish, churraning qisilishi va o‘smaga bog‘liq holatlar bir-biriga o‘xshash klinik ko‘rinish berishi mumkin. Shu sababli zamonaviy diagnostikada ultratovush tekshiruvi, ayniqsa Doppler baholash, muhim ahamiyatga ega.

Adabiyotlarda orxitning jarrohlik davosi asosan asoratlangan shakllar bilan bog‘lanadi. Agar yallig‘lanish fonida yiringli bo‘shliq shakllansa, abssess mustaqil ravishda so‘rilib ketishiga umid qilish xavfli. Bunday vaziyatda antibakterial terapiya zarur bo‘lsa-da, yiringli o‘choq saqlanib qolsa, infeksiya davom etadi va sepsis xavfi ortadi. Shuning uchun abssessni drenajlash, jarayon chegarasini aniqlash va nekrotik to‘qima mavjud bo‘lsa, uni olib tashlash talab qilinadi. Lekin bu yondashuvda ham asosiy prinsip radikallik emas, balki yetarli va oqilona aralashuvdir.

Zamonaviy manbalarda moyakni saqlab qolish imkoniyati mavjud bo‘lgan holatlarda organ saqlovchi taktika ustuvor ekani ta’kidlanadi. Orxiektomiya faqat moyak hayotiyligi yo‘qolgan, nekroz chuqur tarqalgan, yiringli-destruktiv jarayon nazorat qilib bo‘lmaydigan yoki bemor hayotiga xavf tug‘diruvchi septik holatlarda ko‘rib chiqiladi. Bu masalada shoshilinch, lekin asoslangan qaror zarur: asossiz operatsiya bemorga zarar yetkazadi, kechikkan operatsiya esa moyak funksiyasi va hayot xavfsizligiga tahdid soladi.

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Metodologiya

Maqola narrativ-tahliliy yondashuv asosida tayyorlandi. Tahlilda o‘zbek tilidagi urologiya darsliklari, tibbiy o‘quv qo‘llanmalar, mahalliy klinik axborot manbalari va siydik-tanosil tizimi yallig‘lanish kasalliklariga oid amaliy ma’lumotlar umumlashtirildi.

Tahlil mezonlari sifatida quyidagi klinik savollar tanlandi: orxitda qaysi holatlar konservativ davoni talab qiladi; qaysi belgilar jarrohlik xavfini ko‘rsatadi; qaysi diagnostik usullar jarrohlik qarorini asoslashga yordam beradi; organ saqlovchi va radikal yondashuvlar o‘rtasidagi chegarani qanday belgilash kerak; operatsiyadan keyingi kuzatuvda qaysi mezonlar muhim hisoblanadi. Bunday metodologiya mavzuni faqat nazariy bayon qilish emas, balki amaliy klinik qaror qabul qilish nuqtayi nazaridan tahlil qilish imkonini beradi.

Maqolada invaziv muolajalar texnikasi bosqichma-bosqich tasvirlanmaydi, chunki bunday ma’lumot faqat malakali mutaxassis tomonidan shifoxona sharoitida qo‘llanishi mumkin. Asosiy urg‘u jarrohlik aralashuvining ko‘rsatmalari, xavfsizlik tamoyillari, organ saqlash konsepsiyasi va bemorni kompleks kuzatishga qaratildi. Bu yondashuv tibbiy maqola uchun ilmiy va etik jihatdan to‘g‘riroqdir.

Natijalar

Tahlil natijalari shuni ko‘rsatadiki, orxitda zamonaviy xirurgik davolashning birinchi tamoyili - tashxisni aniqlashtirish va o‘tkir skrotumning xavfli sabablarini istisno qilishdir. Moyak buralishi ehtimoli mavjud bo‘lsa, vaqt omili hal qiluvchi ahamiyat kasb etadi. Bunday vaziyatda faqat antibiotik berib kuzatish yetarli emas, chunki ishemiya davom etsa, moyak to‘qimasi qisqa muddat ichida qaytarilmas shikastlanishi mumkin. Shuning uchun o‘tkir og‘riq, to‘satdan boshlangan simptom, moyak holatining o‘zgarishi, Doppler tekshiruvda qon oqimining pasayishi yoki yo‘qligi jarrohlik baholashni talab qiladi.

Ikkinchi muhim natija shuki, bakterial orxitning ko‘pchilik holatlarida konservativ davo yetarli bo‘ladi. Bunda etiologik antibakterial terapiya, og‘riq va yallig‘lanishni kamaytirish, skrotumni ko‘tarib turish, suyuqlik balansini saqlash, hamroh infeksiya o‘choqlarini davolash va dinamik nazorat qo‘llanadi. Agar 48-72 soat ichida klinik yaxshilanish kuzatilmasa, isitma, og‘riq, shish yoki laborator yallig‘lanish belgilarining kuchayishi davom etsa, asoratlangan jarayon ehtimoli qayta baholanishi kerak.

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Uchinchi natija: yiringli asoratlar jarrohlik davolashning eng aniq ko‘rsatmalaridan biridir. Moyak yoki epididimis sohasida abssess shakllanganda dori bilan davolash yiringli bo‘shliqni har doim ham bartaraf eta olmaydi. Bunday holatda drenajlash orqali yiringli o‘choqni nazorat qilish, infeksiya bosimini kamaytirish va umumiy intoksikatsiyani pasaytirish zarur bo‘ladi. Agar jarayon chegaralangan bo‘lsa, organ saqlovchi yondashuv afzal; agar destruksiya keng tarqalgan bo‘lsa, radikalroq taktika muhokama qilinadi.

1-jadval. Orxitda xirurgik davoga ko‘rsatmalar va asosiy taktika

Klinik holat	Xirurgik qaror mantiqi	Afzal taktika
Moyak buralishi ehtimoli	Ishemiya xavfi yuqori, kutish moyakni yo‘qotishga olib kelishi mumkin	Shoshilinch urologik baholash va eksploratsiya
Moyak yoki epididimis abssessi	Yiringli o‘choq dori bilan to‘liq bartaraf bo‘lmasligi mumkin	Abssessni drenajlash, organ saqlovchi yondashuv
Nekroz yoki hayotiylik yo‘qolishi	Infeksiya va destruksiya chuqurlashadi, sepsis xavfi ortadi	Nekrotik to‘qimani olib tashlash, zaruratda orxiektomiya
Konservativ davoga javob bo‘lmasligi	Asorat, noto‘g‘ri etiologiya yoki yashirin yiringli jarayon ehtimoli bor	Qayta UTT, laborator nazorat, jarrohlik konsilium
Surunkali qaytalanuvchi og‘riqli jarayon	Hayot sifatiga ta’sir qiladi, lekin radikal qaror ehtiyotkorlik talab qiladi	Individual baholash, organ saqlovchi taktika ustuvor

To‘rtinchi natija orxiektomiya masalasiga tegishlidir. Zamonaviy yondashuvda orxiektomiya birlamchi tanlov emas. U faqat moyakning hayotiyligi tiklanmas darajada yo‘qolgan, yiringli-destruktiv jarayon keng tarqalgan, bemor umumiy holati og‘ir yoki infektsiyani boshqa yo‘l bilan nazorat qilish imkonsiz bo‘lgan hollarda asoslanadi. Bu qaror bemorning yoshi, qarama-qarshi moyak holati, reproduktiv rejalari, umumiy somatik ahvoli va infektsion xavf darajasi hisobga olingan holda qabul qilinishi kerak.

Beshinchi natija operatsiyadan keyingi kuzatuvning ahamiyatini ko‘rsatadi. Jarrohlik aralashuvi bilan muammo yakunlanmaydi. Antibakterial davoni davom ettirish, og‘riqni nazorat qilish, skrotal shishni baholash, yara holatini kuzatish, ultratovush

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nazorati, yallig‘lanish ko‘rsatkichlarini tekshirish va uzoq muddatda reproduktiv funksiyani baholash muhim. Agar bemor reproduktiv yoshda bo‘lsa, keyingi davrda spermatogenez va gormonal holatni baholash klinik jihatdan asosli bo‘lishi mumkin.

Muhokama

Orxitda xirurgik davolash masalasida eng katta xavf - haddan tashqari soddalashtirilgan qarordir. Birinchi noto‘g‘ri yondashuv: har qanday orxitni antibiotik bilan davolab, jarrohlik ehtimolini e’tiborsiz qoldirish. Bu yondashuv abssess, nekroz yoki moyak buralishi kabi holatlarda xavfli. Ikkinchi noto‘g‘ri yondashuv: har qanday o‘tkir skrotal og‘riqni operatsiyaga olib borish. Bu esa keraksiz invazivlik, psixologik stress, jarrohlik asoratlari va ortiqcha xarajatlarga sabab bo‘lishi mumkin. Demak, zamonaviy taktika ikkala chegaradan ham qochadi: aniqlanmagan xavfni inkor etmaydi, lekin asossiz radikallikka ham yo‘l qo‘ymaydi.

Klinik qarorda ultratovush tekshiruvi va Doppler baholashning o‘rni katta. Moyak qon oqimi saqlangan, abssess belgisi bo‘lmagan, umumiy holati barqaror bemorda konservativ davo va kuzatuv mantiqan to‘g‘ri. Ammo qon oqimi buzilgan, suyuqlik-yiringli to‘planma gumon qilingan, og‘riq kuchaygan yoki isitma saqlanib qolgan bemorda faqat kuzatish yetarli emas. Shifokor davolashning dastlabki natijasiga faol baho berishi kerak. “Bemor antibiotik olyapti, demak davolanmoqda” degan fikr yetarli emas; klinik javob bo‘lmasa, taktika o‘zgartiriladi.

Organ saqlovchi yondashuv zamonaviy urologiyaning asosiy qadriyatlaridan biridir. Moyak reproduktiv va endokrin funksiyaga ega organ bo‘lgani sababli uni saqlash har doim ustuvor maqsad bo‘lishi kerak. Biroq organ saqlash degani xavfli to‘qimani har qanday sharoitda qoldirish degani emas. Agar to‘qima hayotiyligini yo‘qotgan bo‘lsa yoki infeksiya bemor hayotiga xavf tug‘dirayotgan bo‘lsa, radikalroq qaror klinik jihatdan to‘g‘ri bo‘lishi mumkin. Bu yerda savol “moyakni olib tashlash kerakmi yoki yo‘qmi?” emas, balki “qaysi qaror bemorning uzoq muddatli salomatligi uchun kamroq zararli?” degan savol bo‘lishi kerak.

Yana bir muhim muammo - etiologik tashxis. Agar orxit jinsiy yo‘l bilan yuqadigan infeksiya bilan bog‘liq bo‘lsa, faqat bemorni davolash yetarli bo‘lmaydi; infeksiya manbasi, qayta yuqish xavfi, hamroh uretrit yoki prostatit, gigiyena va profilaktika masalalari ham ko‘rib chiqiladi. Agar orxit parotitdan keyin rivojlangan bo‘lsa, antibakterial terapiya asosiy yechim bo‘lmasligi mumkin. Agar sil yoki boshqa surunkali infeksiya gumon qilinsa, uzoq muddatli maxsus tekshiruv va tor mutaxassislar hamkorligi talab etiladi. Shuning uchun jarrohlik faqat lokal muammoni hal qiladi, kasallik sababini bartaraf etmasa, qaytalanish xavfi saqlanib qoladi.

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Resurslar cheklangan sharoitda ham xavfsiz algoritm zarur. Har bir tuman yoki kichik klinikada yuqori darajadagi urologik xizmat bo‘lmasligi mumkin. Bunday sharoitda umumiy amaliyot shifokori yoki jarroh uchun eng muhim vazifa - xavf belgilarini tanish va bemorni kechiktirmasdan mutaxassisga yo‘naltirishdir. Ayniqsa to‘satdan boshlangan kuchli og‘riq, yuqori isitma, umumiy ahvolning og‘irlashishi, skrotumda keskin shish, UTTda qon oqimi buzilishi yoki yiringli o‘choq belgisi bo‘lsa, kutish strategiyasi zaif qarordir.

Operatsiyadan keyingi davr ham ilmiy-amaliy e’tiborni talab qiladi. Bemor og‘riq kamaygani bilan to‘liq sog‘aygan deb hisoblanmasligi kerak. Qayta ultratovush tekshiruvi, laborator ko‘rsatkichlar, yara bitishi, moyak hajmi va funksional holatini kuzatish zarur. Surunkali og‘riq, atrofik o‘zgarish yoki reproduktiv muammo yuzaga chiqsa, reabilitatsiya va tor mutaxassislar bilan maslahatlashuv kerak. Shuningdek, bemorga qaytalanish profilaktikasi, jinsiy yo‘l bilan yuqadigan infeksiyalardan himoyalanish, siydik yo‘llari kasalliklarini o‘z vaqtida davolash va o‘zini-o‘zi davolashdan qochish tushuntirilishi lozim.

Xulosa

Orxit kasalligida zamonaviy xirurgik davolash universal operatsion yondashuv emas, balki aniq klinik ko‘rsatmalar asosida tanlanadigan differensial taktika hisoblanadi. Kasallikning ko‘pchilik holatlarida konservativ terapiya yetarli bo‘lishi mumkin, ammo abssess, nekroz, ishemiya, sepsis xavfi, konservativ davoga javob bo‘lmasligi yoki moyak buralishi bilan differensial tashxisdagi noaniqlik jarrohlik baholashni talab qiladi. Shuning uchun orxitni davolashda eng muhim tamoyil - kasallik shaklini, og‘irlik darajasini va asorat xavfini aniq baholashdir.

Xirurgik yondashuvda organ saqlovchi taktika birinchi o‘rinda turadi. Abssessni drenajlash, yiringli o‘choqni nazorat qilish, nekrotik to‘qimani chegaralangan olib tashlash va moyak funksiyasini imkon qadar saqlash zamonaviy urologik qarashning asosiy belgilaridir. Orxiektomiya esa faqat hayotiylik yo‘qolgan yoki infeksiya xavfi boshqa usullar bilan nazorat qilib bo‘lmaydigan holatlarda asoslanadi. Demak, zamonaviy xirurgik davolashning kuchli tomoni radikallikda emas, balki oqilona tanlov, vaqtida qaror qabul qilish va bemor funksional natijasini hisobga olishda namoyon bo‘ladi.

Amaliyot uchun asosiy tavsiya shundan iboratki, o‘tkir skrotum belgisi bo‘lgan har bir bemor xavfli holatlar nuqtayi nazaridan baholanishi kerak. Klinik ko‘rik, laborator tekshiruv, ultratovush va Doppler nazorati bir-birini to‘ldirishi lozim. Davolashdan keyingi kuzatuv, reproduktiv salomatlikni baholash va profilaktik

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maslahatlar esa maqbul natijaning ajralmas qismidir. Shunday yondashuv orxit asoratlarini kamaytirish, bemorning hayot sifatini yaxshilash va erkaklar reproduktiv salomatligini saqlashga xizmat qiladi.

Foydalanilgan adabiyotlar

1. Akilov F.A., Begaliev U.E., Muxtarov Sh.T., Mirhamidov J.X., Xudoyberdiev X.B. Urologiya. Tibbiyot oliy o‘quv yurtlari talabalari uchun darslik. Toshkent, 2011.

2. Urologiya fani bo‘yicha o‘quv qo‘llanma. Toshkent tibbiyot akademiyasi o‘quv materiallari. Toshkent.

3. Respublika ixtisoslashtirilgan urologiya ilmiy-amaliy tibbiyot markazi materiallari: urologik kasalliklar, tashxis va davolash yo‘nalishlari. Toshkent.

4. Med24.uz. Orxit: kasallik belgilari, sabablari, diagnostikasi va davolash bo‘yicha tibbiy ma’lumotnoma.

5. Med24.uz. Epididimit: kasallik belgilari, diagnostikasi va davolash bo‘yicha tibbiy ma’lumotnoma.

6. IVF.uz. Orxit: tashxis va zamonaviy davolash usullari bo‘yicha tibbiy axborot materiali.

7. IVF.uz. Epididimit: tashxis va zamonaviy davolash usullari bo‘yicha tibbiy axborot materiali.

8. XKT-10 tibbiy ma’lumotnomasi. N45 - Orxit va epididimit: klinik tavsif, tashxislash va davolash ma’lumotlari.

9. Toshkent tibbiyot akademiyasi. Siydik-tanosil tizimi yallig‘lanish kasalliklari bo‘yicha o‘quv-uslubiy materiallar. Toshkent.

10. O‘zbekistonda urologiya rivojlanishi va urologik yordam ko‘rsatish tarixiga oid o‘quv materiallari. Toshkent.

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ANNOTATSIYA

Ushbu maqolada Islom huquqshunosligi va ilohiyotining poydevori bo'lmish asosiy manbalar — Qur'oni Karim, Sunnat, Ijmo va Qiyosda inson huquqlari masalasining konseptual asoslari atroflicha tadqiq etiladi. Maqolaning asosiy maqsadi — Islomda inson huquqlari shunchaki ijtimoiy ehtiyoj emas, balki Yaratuvchi tomonidan insoniyatga ato etilgan muqaddas omonat va ilohiy huquqlar ekanligini ilmiy asoslashdan iborat. Tadqiqot davomida Islom huquqining besh ustuvor maqsadi (Maqosid ash-sharia) — jon, din, aql, nasl va mulk himoyasining huquqiy kafolatlari tahlil qilinadi. Shuningdek, Muhammad payg'ambar (s.a.v.)ning "Vido xutbasi" insoniyat tarixidagi ilk universal inson huquqlari deklaratsiyasi sifatida baholanib, undagi shaxs daxlsizligi, ayollar huquqlari va ijtimoiy tenglik tamoyillari zamonaviy xalqaro huquq normalari bilan qiyosiy o'rganiladi. Maqola Islom dinining bag'rikenglik, adolat va insonparvarlik mohiyatini manbalar asosida ochib berishga xizmat qiladi.

***Kalit so'zlar**:* Islom manbalari, Qur'oni Karim, Sunnat, inson huquqlari, shaxs daxlsizligi, adolat, tenglik, Maqosid ash-sharia, Vido xutbasi, islom huquqi (shariat), ijtimoiy himoya, vijdon erkinligi.

KIRISH

Inson huquqlari va erkinliklari masalasi zamonaviy dunyo sivilizatsiyasining eng ustuvor yo'nalishi, huquqiy davlat va fuqarolik jamiyatining bosh mezoni hisoblanadi. Bugungi kunda inson huquqlari deganda, odatda, G'arb ma'rifatparvarlik davri mahsuli bo'lgan va 1948-yilgi Umumjahon inson huquqlari deklaratsiyasida o'z aksini topgan tamoyillar tushuniladi. Biroq, huquqiy va tarixiy tahlillar shuni ko'rsatadiki, inson qadr-qimmati, uning daxlsizligi va jamiyatdagi huquqiy maqomi bundan o'n to'rt asr muqaddam Islom dinining asosiy manbalarida mukammal va tizimli tarzda belgilab berilgan.

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Islomda inson huquqlari konsepsiyasi o‘zining ilohiy tabiati bilan boshqa huquqiy tizimlardan tubdan farq qiladi. Agar dunyoviy qonunlarda huquqlar davlat yoki jamiyat tomonidan beriladigan va muayyan siyosiy irodaga bog‘liq bo‘lgan imtiyozlar sifatida ko‘rilsa, Islomda inson huquqlari Yaratuvchi tomonidan insonning o‘ziga tug‘ilishi bilan ato etilgan muqaddas va ajralmas huquqlardir. Shu bois, bu huquqlar vaqt o‘tishi bilan o‘zgarmaydi, ularni biron-bir hokimiyat bekor qila olmaydi yoki cheklay olmaydi. Islom huquqshunosligida inson huquqlarining poymol etilishi nafaqat ijtimoiy adolatsizlik, balki ilohiy irodaga qarshi chiqish — og‘ir jinoyat va gunoh sifatida baholanadi.

Ushbu maqolaning dolzarbligi shundaki, bugungi globallashuv va mafkuraviy ziddiyatlar davrida Islom dinining asl insonparvarlik mohiyatini, uning manbalarida inson huquqlariga bo‘lgan yuksak e’tiborni ilmiy asosda ko‘rsatib berish muhim ahamiyat kasb etadi. Islom manbalari — Qur’oni Karim va Sunnatda insonning "mukarram" qilib yaratilgani haqidagi tamoyil shunchaki nazariya emas, balki shaxsning joni, dini, aqlni, nasli va mulkini himoya qilishga qaratilgan amaliy huquqiy kafolatlar majmuidir.

Maqola davomida Islomning fundamental manbalarida inson huquqlarining qanday aks etganligi, ijtimoiy tenglik va adolat tamoyillarining huquqiy mexanizmlari hamda Islom huquqining zamonaviy inson huquqlari tizimi bilan mutanosib jihatlari atroflicha ko‘rib chiqiladi.

Inson huquqlarining fundamental manbalari

Islom huquq tizimida inson huquqlari o‘z-o‘zidan paydo bo‘lgan tushunchalar emas, balki to‘rtta mustahkam va daxlsiz manbaga asoslangan yaxlit tizimdir. Bu tizimning eng yuqori cho‘qqisida turuvchi Qur’oni Karim inson shaxsini barcha mavjudotlardan aziz va mukarram qilib yaratilganini e’lon qilish orqali uning huquqlariga ilohiy poydevor qo‘ydi. Qur’oniy ta’limotga ko‘ra, insoniyat yagona bir ota-onadan tarqalgan bo‘lib, ularning tili, irqi yoki millatidagi farqlar kamsitish uchun emas, balki o‘zaro tanishish va hamkorlik qilish uchun xizmat qiladi. Bu esa har qanday shakldagi irqchilik va tabaqalanishga chek qo‘yib, huquqiy tenglik tamoyilini o‘rnatadi. Mazkur ilohiy qoidalarning hayotiy ijrosi Muhammad payg‘ambar (s.a.v.)ning sunnatlarida o‘zining amaliy ifodasini topgan. Xususan, u zot o‘z xizmatlari davomida inson qadrini hamma narsadan ustun qo‘ydilar va vafotlari oldidan irod qilgan tarixiy Vido xutbasida insonning joni, mol-mulki hamda or-nomusi daxlsiz ekanini butun dunyoga e’lon qildilar. Ushbu xutba mazmuni jihatidan bugungi xalqaro inson huquqlari deklaratsiyalari bilan hamohang bo‘lib, shaxsning jamiyatdagi daxlsizligini kafolatlaydi.

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Shu bilan birga, islom huquqshunosligidagi ijmo va qiyos usullari jamiyat rivojlanishi bilan yuzaga keladigan yangi muammolarni inson manfaatlari foydasiga hal qilish imkonini beradi. Bu manbalar islom huquqining barcha zamonlar bilan hamnafas yashashini ta’minlab, har qanday yangi ijtimoiy munosabatlarda ham shaxs erkinligini asrashga xizmat qiladi. Islom ulamolari ushbu manbalarga tayanib, shariatning besh asosiy maqsadini belgilab berganlar. Unga ko‘ra, har bir jamiyat a’zosining yashash huquqi, vijdon erkinligi, fikrlash va ta’lim olish huquqi, oilaviy daxlsizligi hamda iqtisodiy erkinligi qonun himoyasidadir. Masalan, yashash huquqi borasida islomiy manbalar shunchalik qat’iy talablarni qo‘yadiki, birgina begunoh insonning nohaq o‘ldirilishi butun insoniyatni qirib tashlash bilan barobar jinoyat deb baholanadi. Aksincha, bir insonning hayotini saqlab qolish butun insoniyatga hayot berish bilan tenglashtiriladi.

Inson huquqlarining bunday keng qamrovli himoya qilinishi nafaqat musulmonlar, balki islom davlatida yashayotgan barcha fuqarolarga nisbatan birdek qo‘llaniladi. Bu tizimda davlat yoki hukmdor insonlarga huquq beruvchi emas, balki Yaratuvchi tomonidan berilgan ushbu huquqlarning bajarilishini nazorat qiluvchi va ta’minlovchi mas’ul idoradir. Shu tariqa, islom manbalarida inson huquqlari shunchaki quruq deklaratsiya emas, balki har bir insonning tug‘ilishidan to vafotigacha bo‘lgan hayotini adolat, erkinlik va xavfsizlik bilan ta’minlovchi amaliy hayot qonunidir.

Islom manbalarida inson huquqlari masalasi ayollar va oila huquqlariga bo‘lgan munosabatda ham yaqqol namoyon bo‘ladi. Islom kelishidan avval ayol kishining jamiyatda deyarli huquqlari mavjud bo‘lmagan bir davrda, Qur’oniy hukmlar ayolni jamiyatning teng huquqli a’zosiga aylantirdi. Ayollarning mulkdor bo‘lish, meros olish, bilim egallash va o‘z xohishi bilan turmush qurish huquqlari ilohiy manbalar orqali kafolatlab qo‘yildi. Bu esa jamiyatda oila mustahkamligini va avlodlar tarbiyasini yangi bosqichga ko‘tardi. Shuningdek, islomning ijtimoiy adolat tamoyili kambag‘allar va muhtojlarning haq-huquqlarini ham chetda qoldirmadi. Zakot va sadaqa tizimi orqali boylar mulkidan muhtojlar uchun ajratiladigan qat’iy ulush belgilandi, bu esa jamiyatda iqtisodiy muvozanatni va har bir shaxsning munosib hayot kechirish huquqini ta’minladi.

XULOSA

Xulosa o‘rnida ta’kidlash lozimki, Islom dini manbalarida inson huquqlari tushunchasi shunchaki nazariy g‘oya yoki ijtimoiy kelishuv mahsuli emas, balki insonning tug‘ilishidan to vafotigacha davom etadigan muqaddas va daxlsiz ilohiy nizomdir. Qur’oni Karim va Sunnatda muhrlangan inson huquqlari tizimi har qanday siyosiy va ijtimoiy o‘zgarishlardan ustun turib, shaxsning qadr-qimmati barcha

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narsadan oliy ekanini tasdiqlaydi. Islom huquqshunosligi tomonidan belgilangan besh asosiy zaruriyat — jon, din, aql, nasl va mulk himoyasi bugungi kunda dunyoda e'tirof etilayotgan universal inson huquqlari deklaratsiyalarining poydevori bo'lib xizmat qiladi. Islom manbalarida inson huquqlari nafaqat huquqiy majburiyat, balki har bir shaxs uchun diniy va ma'naviy mas'uliyat sifatida taqdim etiladi. Bu tizimda inson huquqlariga rioya qilish — Yaratuvchining buyrug'iga bo'ysunish, ularni buzish esa eng og'ir jinoyat va gunoh hisoblanadi. Shaxsning daxlsizligi, ayollar va bolalar huquqlari, vijdon erkinligi hamda ijtimoiy adolat tamoyillari islomiy manbalarda o'zaro uyg'unlikda bayon etilgan. Aynan shu omillar Islom huquqining barcha zamonlar va xalqlar uchun umuminsoniy hamda dolzarb bo'lib qolishini ta'minlaydi. Shunday qilib, islom dini manbalarini o'rganish va ulardagi insonparvarlik g'oyalarini hayotga tatbiq etish jamiyatda o'zaro hurmat, tinchlik va adolatni qaror toptirishning eng mustahkam kafolatidir.

FOYDALANILGAN ADABIYOTLAR

1. Vijdon erkinligi va diniy tashkilotlar to'g'risida"gi O'zbekiston Respublikasi Qonuni (2021-yil 5-iyul).
2. Sh.M. Mirziyoyev. "Yangi O'zbekiston strategiyasi". –Toshkent, 2021.
3. "Inson huquqlari umumjahon deklaratsiyasi". BMT, 1948.
4. Shadiyeva D. K. Rus tili normalarining o'zgarish tendensiyalarini ekstrapolyatsiya qilish va o'rganish // Filologiyaning zamonaviy muammolari. –2022. –133-138-betlar.
5.Шадиева Д. К. Изучение характера изменений норм русского языка //Ученый XXI века— 2022.
6. Islomshunoslik ilmiy-tadqiqot markazi. Toshkent islom universiteti nashriyot matbaa birlashmasi. Toshkent – 2013. B. 50-202.

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QOHIRA DEKLARATSIYASI TARIXI VA MAZMUNI.

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ANNOTATSIYA

Ushbu maqolada Qohira deklaratsiyasining paydo bo'lish tarixi, asosiy mazmuni hamda xalqaro huquq tizimidagi o'rni ilmiy jihatdan tahlil qilinadi. Mazkur hujjat islomiy qadriyatlar asosida inson huquqlarini himoya qilishga qaratilgan bo'lib, xalqaro hamjamiyatda madaniyatlararo muloqotni rivojlantirishda muhim ahamiyat kasb etadi.

Kalit so'zlar: Qohira deklaratsiyasi, inson huquqlari, islomiy tamoyillar, xalqaro huquq, madaniyatlararo dialog.

***Kalit so'zlar**: "Qohira deklaratsiyasi", "Inson huquqlari", "Islomiy tamoyillari", "Xalqaro huquq", "Madaniyatlararo dialog".*

KIRISH (VEDENIE/INTRODUCTION)

Inson huquqlari masalasi zamonaviy jamiyatning eng dolzarb yo'nalishlaridan biri hisoblanadi. Bu borada turli xalqaro hujjatlar qabul qilingan bo'lib, ular orasida Qohira deklaratsiyasi alohida o'rin tutadi. Ushbu deklaratsiya inson huquqlarini islomiy qadriyatlar bilan uyg'unlashtirishga qaratilgan muhim hujjat sifatida e'tirof etiladi.

Qohira deklaratsiyasi 1990-yil 5-avgust kuni Islom hamkorlik tashkilotiga a'zo davlatlar tomonidan qabul qilingan. Ushbu hujjat inson huquqlarini himoya qilishda islomiy yondashuvni ilgari suradi va 1948-yilda qabul qilingan Inson huquqlari umumjahon deklaratsiyasiga muqobil konsepsiya sifatida qaraladi. Qohira deklaratsiyasi 25 moddadan iborat bo'lib, unda insonning asosiy huquq va erkinliklari islom shariati asosida belgilangan. Deklaratsiyaning muhim jihati shundaki, unda barcha huquqlar Allohning qonunlariga bo'ysundiriladi.

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Hujjatga ko‘ra:

Har bir insonning hayoti va qadr-qimmati muqaddas hisoblanadi.

Insonni o‘ldirish yoki unga zarar yetkazish qat’iyan man etiladi.

Jamiyatning asosi sifatida oila muhim o‘rin egallaydi va uni mustahkamlash targ‘ib qilinadi.

Barcha insonlar teng huquqlarga ega, biroq bu huquqlar islomiy tamoyillar bilan cheklanadi.

Fikr va so‘z erkinligi tan olinadi, ammo u shariat qoidalariga zid bo‘lmasligi kerak.

Shaxsiy mulk himoya qilinadi, lekin undan foydalanish ham ma’lum diniy me’yorlarga bo‘ysunadi.

Shuningdek, deklaratsiya musulmon davlatlarining xalqaro huquq tizimiga o‘ziga xos yondashuvini ifodalaydi. Unda islomiy qadriyatlar va zamonaviy huquqiy tamoyillarni uyg‘unlashtirishga alohida e’tibor qaratilgan.

Ahamiyati

Qohira deklaratsiyasi islom olami va xalqaro hamjamiyat o‘rtasidagi huquqiy munosabatlarni shakllantirishda muhim rol o‘ynaydi. U madaniy va dini xilma-xillikni hisobga olish zarurligini ko‘rsatadi hamda inson huquqlariga nisbatan turli yondashuvlar mavjudligini tasdiqlaydi.

Garchi deklaratsiya xalqaro huquqiy majburiy kuchga ega bo‘lmasa-da, u musulmon mamlakatlarining inson huquqlariga bo‘lgan qarashlarini ifodalovchi muhim hujjat hisoblanadi.

XULOSA (ZAKLYuChENIE/CONCLUSION)

Xulosa qilib aytganda, Qohira deklaratsiyasi inson huquqlari masalasini islomiy va xalqaro nuqtayi nazardan o‘rganishda muhim manba hisoblanadi. U nafaqat musulmon davlatlari uchun, balki butun dunyoda madaniyatlararo muloqotni rivojlantirish va hamkorlikni mustahkamlashda katta ahamiyatga ega. Biroq deklaratsiyaning ayrim jihatlari xalqaro huquq normalari bilan to‘liq mos kelmasligi mumkinligi sababli, u ilmiy va huquqiy muhokamalarda keng o‘rganilmoqda. Shu bois, ushbu hujjatni chuqur tahlil qilish inson huquqlari sohasida turli yondashuvlarni tushunish va ularni solishtirish imkonini beradi.

Umuman olganda, Qohira deklaratsiyasi nafaqat islom olami uchun, balki butun jahon hamjamiyati uchun muhim ilmiy va amaliy ahamiyatga ega bo‘lib,

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madaniyatlararo dialogni rivojlantirish, o‘zaro hurmat va hamkorlikni kuchaytirishda muhim o‘rin tutadi.

Adabiyotlar ro‘yxati.

1.Islom hamkorlik tashkiloti (IHT). Qohira inson huquqlari deklaratsiyasi, 1990-yil.
2.BMT Inson huquqlari bo‘yicha Oliy komissarligi (OHCHR). Islomda inson huquqlari va Qohira deklaratsiyasi, www.ohchr.org.
3.Mayer, Ann Elizabeth. Islom va inson huquqlari: an’ana va siyosat. Westview Press, 2013.
4.Donnelly, Jack. Inson huquqlari: nazariya va amaliyot. Cornell University Press, 2013.
5.Lyuis, Bernard. Yaqin Sharq tarixi. Scribner, 1995.
6.An-Na’im, Abdullahi Ahmed. Islom va inson huquqlari. Harvard University Press, 2010.
7.Islom hamkorlik tashkiloti rasmiy sayti – www.oic-oci.org.
8.Birlashgan Millatlar Tashkiloti rasmiy sayti – www.un.org.
9.Ziyonet ta’lim portali – www.ziyonet.uz1.

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ISLOM DINIDA INSON HUQUQ VA ERKINLIKLARINI TA'MINLASHNING ASOSIY TAMOYILLARI.

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ANNOTATSIYA

Ushbu maqolada Islom dinida inson huquq va erkinliklarini taminlashning asosiy tamoyillari, ularning manbalari hamda amaliy jihatlari organiladi. Quron va Hadislarning inson shani, qadr-qimmati, tengligi, adolat, erkin tanlov, mulk dahlsizligi, din va etiqod erkinligi kabi fundamental huquqlarni taminlashga doir korsatmalari tahlil qilinadi. Shuningdek, Islom huquqi – fiqhda shaxsiy, ijtimoiy, iqtisodiy va siyosiy huquqlarni tartibga soluvchi meyorlar, ularning tarixiy rivoji hamda hozirgi zamon demokratik tamoyillariga uyg`un jihatlari yoritiladi.

***Kalit so'zlar**: "Islom", "Payg'ambar", "Inson", "Vohid", "Hadis", "E'tiqod", "Fiqh", "Erkinlik", "Konistitutsiya", "Qadr-qimmat".*

KIRISH (VEDENIE/INTRODUCTION)

Islom dini inson huquqlari va erkinliklarini asrlar davomida yuksak qadriyat sifatida himoya qilib kelayotgan, ilohiy manbalar – Qur'oni Karim va Sunnatga asoslangan tizimdir. Islomda inson huquqlarini ta'minlashning o'ziga xos jihatlari uning ilohiy xarakteri, ma'naviy-axloqiy asoslari va shaxs hamda jamiyat manfaatlarini mutanosib himoya qilishida namoyon bo'ladi. Har bir insonning o'z dunyoqarashiga ega bo'lishi, muayyan dinga e'tiqod qilishi yoki hech qanday dinga e'tiqod qilmasligi uning shaxsiy daxlsiz huquqidir. Vijdon erkinligi —bu nafaqat diniy, balki huquqiy va axloqiy tushuncha bo'lib, u jamiyatda turli qarashlarga ega bo'lgan insonlarning o'zaro hamjihatlikda yashashini ta'minlaydi.O'zbekistonda vijdon erkinligi xalqaro huquq normalari va mamlakat Konstitutsiyasi bilan kafolatlangan.–Xalqaro darajada: "Inson huquqlari umumjahon deklaratsiyasi"ning 18-moddasida har bir inson fikr, vijdon va din erkinligi huquqiga ega ekani belgilangan.–Milliy qonunchilikda: Yangi tahrirdagi O'zbekiston Respublikasi Konstitutsiyasining 35-moddasida shunday deyiladi: *"Hamma uchun vijdon

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erkinligi kafolatlanadi. Har kim xohlagan dinga e'tiqod qilish yoki hech qaysi dinga e'tiqod qilmaslik huquqiga ega. Diniy qarashlarni majburan singdirishga yo'l qo'yilmaydi".O'zbekiston dunyoviy davlat bo'lib, unda din davlatdan ajratilgan. Bu — davlatning diniy ishlariga aralashmasligini, shu bilan birga, har bir fuqaroning e'tiqod huquqini himoya qilishini anglatadi. Dunyoviylik dindorsizlik emas, balki jamiyat hayotini huquqiy va ilmiy asoslarda boshqarish, barcha din vakillariga teng sharoit yaratishdir. Mamlakatimizda asrlar davomida turli din vakillari (islom, xristianlik, iudaizm, buddizm va b.) tinch-totuv yashab kelgan. Bugungi kunda O'zbekistonda 16 ta diniy konfessiyaga mansub tashkilotlar erkin faoliyat yuritmoqda. –Konfessiyalararo muloqot: Davlatimiz turli dinlar o'rtasida doimiy muloqotni qo'llab-quvvatlaydi. Bu esa jamiyatda yot g'oyalar, diniy ekstremizm va radikalizmning oldini olishda muhim qalqon bo'lib xizmat qiladi.Vijdon erkinligi faqatgina "huquq" degani emas, u ma'lum bir "mas'uliyat"ni ham yuklaydi. E'tiqod erkinligidan foydalangan holda boshqa insonlarning hissiyotlarini haqorat qilish, jamiyat barqarorligiga rahna solish yoki konstitutsiyaviy tuzumga qarshi chiqish qonunan taqiqlanadi. Haqiqiy vijdon erkinligi —o'z e'tiqodiga sodiq qolgan holda, o'zgalarning e'tiqodini hurmat qilishdir.

XULOSA (ZAKLYuChENIE/CONCLUSION)

Xulosa qilib aytganda Islom dinida inson huquq va erkinliklari ilohiy manbalar (Qur'on va Sunnat) bilan kafolatlangan bo'lib, ularning o'ziga xosligi huquqning ma'naviy mas'uliyat bilan bog'liqligi, tenglik, adolat, hayot, mulk va or-nomus daxlsizligining mutlaq ta'minlanishidir. Bu huquqlar inson tug'ilishi bilan berilgan ajralmas ne'mat hisoblanib, huquq va majburiyatlar o'rtasidagi muvozanatga asoslanadi.

Adabiyotlar ro'yxati.

1. Vijdon erkinligi va diniy tashkilotlar to'g'risida"gi O'zbekiston Respublikasi Qonuni (2021-yil 5-iyul).
2. Sh.M. Mirziyoyev. "Yangi O'zbekiston strategiyasi". –Toshkent, 2021.
3. "Inson huquqlari umumjahon deklaratsiyasi". BMT, 1948.
4. Shadiyeva D. K. Rus tili normalarining o'zgarish tendensiyalarini ekstrapolyatsiya qilish va o'rganish // Filologiyaning zamonaviy muammolari. –2022. –133-138-betlar.
5.Шадиева Д. К. Изучение характера изменений норм русского языка //Ученый XXI века— 2022.
6. Islomshunoslik ilmiy-tadqiqot markazi. Toshkent islom universiteti nashriyot matbaa birlashmasi. Toshkent – 2013. B. 50-202.

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ABU HOMID G'AZZOLIYNING "MUKOSHOFATUL QULIB" ASARNING MAZMUNI-MOHIYATI

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ANNOTATSIYA

Mazkur maqolada Abu Homid G'azzoliyning "Mukoshafatul qulub" asarining mazmuni, unda ilgari surilgan asosiy g'oyalar va inson qalbini poklash masalalari yoritilgan. Shuningdek, qalb kasalliklari va ularni bartaraf etish yo'llari ilmiy-tahliliy jihatdan bayon etilgan.

Kalit so'zlar: Qalb, tasavvuf, axloq, poklanish, nafs, zikr, tavba, ixlos, ma'naviyat

Kirish

"Mukoshafatu-l-qulub" asari Abu Homid G'azzoliy ijodida alohida o'rin tutadi . Asar arab tilida yozilgan bo'lib, 111 ta bobni o'z ichiga oladi. Unda iymon, namoz, zakot, sabr, qanoat, go'zal axloq, Allohga itoat, qo'shnichilik haqi, g'iybat, sadaqa, foiz, musiqa tinglash, badgumonlik, mayxo'rlik kabi juda ko'plab fiqhiy va hayotiymaishiy masalalarga e'tibor qaratilgan. Muallif mazkur mavzularni yoritishda ularga mos Qur'oni Karim oyatlari va hadislarni keltiradi hamda mavzuga doir hikoyatlar, hikmatlardan foydalanadi. Yaxshilikka chaqirish, boriga qanoat va shukr qilish, yo'g'iga sabr qilish kabi sifatlarga undovchi hikmatlar asarda juda ko'plab keltiriladi. Mazkur manbada ushbu qisqa kirish so'zdan so'ng asarning asosiy matni boshlanadi. Asosiy matndan so'ng kitobning kolofon qismida "Daru-l-kutubi-larabiyyati-l-kubro"

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matbaasining Tahrir bo‘limi boshlig‘i Muhammad Zahriy G‘amroviyning so‘ngso‘zi berilgan. Islom tafakkuri tarixida Abu Homid al-G’azzolliy o‘zining chuqur falsafiy va tasavvufiy qarashlari bilan alohida o‘rin egallaydi. Yuqoridagi kirish so‘zdan shu narsa ma’lum bo‘ladiki, bu kitob G‘azzoliy qalamiga mansub “Mukoshafatu-l-qulub” asarining muxtasaridir. Qo‘limizdagi toshbosmalar hamda asarning Misr, Livan nashrlari ham deyarli bir xilligini hisobga olsak, biz “Mukoshafatu-l-qulub” deb biladigan va bizgacha yetib kelgan asar aslida G‘azzoliyning “Mukoshafatu-l-qulub”i emas, balki uning noma’lum muallif tomonidan tayyorlangan muxtasar shakli bo‘lishi ehtimoli bor. Uning “Mukoshafatul qulub” asari inson qalbi, uning poklanishi va ma’naviy kamolotga erishish yo‘llarini yorituvchi muhim manbalardan biridir. Mazkur asar nafaqat diniy-axloqiy qo‘llanma, balki insonning ichki dunyosini tahlil qiluvchi chuqur ruhiy-falsafiy asar sifatida ham qadrlanadi. Ushbu maqolada asarning mazmun-mohiyati, undagi asosiy g‘oyalar hamda uning bugungi kundagi ahamiyati tahlil qilinadi.

Asosiy qism

“Mukoshafatul qulub” asarida qalb tushunchasi markaziy o‘rinni egallaydi. G‘azzoliy qalbni insonning haqiqiy mohiyati deb hisoblaydi va barcha amallar aynan qalb holatiga bog‘liq ekanini ta’kidlaydi. Qalb pok bo‘lsa, insonning xulqi va amallari ham pok bo‘ladi.Asarda qalb kasalliklari keng yoritilgan bo‘lib, hasad, kibr, riyo, ochko‘zlik va dunyoparastlik kabi illatlar insonning ma’naviy kamolotiga to‘sqinlik qiluvchi asosiy omillar sifatida ko‘rsatiladi. Muallif bu illatlarning zararini ochib berish bilan birga, ulardan qutulish yo‘llarini ham tavsiya etadi.Qalbni poklash masalasi asarning eng muhim jihatlaridan biridir. Tavba, zikr, sabr, shukr va nafsni tiyish orqali inson o‘z ichki dunyosini tarbiyalashi mumkinligi alohida ta’kidlanadi. G‘azzoliyga fikriga ko‘ra, haqiqiy komil insonning o‘z ustida ishlashi va qalbini poklashidan boshlanadi.Shuningdek, asarda dunyo va oxirat masalasi ham chuqur yoritilgan. Dunyo vaqtinchalik maskan sifatida baholanib, inson undan to‘g‘ri foydalanishi va oxirat uchun tayyorgarlik ko‘rishi zarurligi uqtiriladi. Amalning qadri esa uning ixlos bilan bajarilishiga bog‘liq ekani ta’kidlanadi “Mukoshafatu-l-qulub” asari hozirgi kunda ham dolzarb bo‘lib turgan masalalarni o‘z ichiga olgan va insonlarni to‘g‘ri yo‘lga boshlovchi, islom dini ahkomlaridan boxabar qiluvchi manba sifatida qadrlanadi. U «G‘azzoliyning necha asrlar ilgari yoqqan yuzlab mash’alalaridan bir donasidir. Bu mash’ala sochgan ziyo zamonlar osha so‘ngsizlik sari oqib borgusidir. Inson nasli to qiyomatgacha mavjud bo‘larkan, bu asar ham insoniyat uchun mangu ziyo manbai bo‘lib, azob-uqubatlar, g‘am-tashvishlar va behuzurliklar ichida iztirob chekayotgan shaxslar, siymolar va millatlarga huzur-halovat, baxt-saodat yo‘llarini

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ko‘rsatajak» “Mukoshafatu-l-qulub” asari hozirgi kunda ham dolzarb bo‘lib turgan masalalarni o‘z ichiga olgan va insonlarni to‘g‘ri yo‘lga boshlovchi, islom dini ahkomlaridan boxabar qiluvchi manba sifatida qadrlanadi. U «G‘azzoliyning necha asrlar ilgari yoqqan yuzlab mash’alalaridan bir donasidir. Bu mash’ala sochgan ziyo zamonlar osha so‘ngsizlik sari oqib borgusidir. Inson nasli to qiyomatgacha mavjud bo‘larkan, bu asar ham insoniyat uchun mangu ziyo manbai bo‘lib, azob-uqubatlar, g‘am-tashvishlar va behuzurliklar ichida iztirob chekayotgan shaxslar, siymolar va millatlarga huzur-halovat, baxt-saodat yo‘llarini ko‘rsatajak» So‘nggi yillarda “Mukoshafatu-l-qulub” asari arab davlatlarida bir necha bor nashr qilindi. Masalan, Livanning o‘zida olimlar Doktor Abdulloh Xolidiy, Abdulmajid Tama al-Halabiy, Abu Abdurahmon Saloh ibn Muhammad ibn Aviyda, Shayx Abdulvoris Muhammad Ali lar tomonidan nashrga tayyorlangan va chop etilgan. Misrning poytaxti Qohira shahridagi “Daru-l-hadis” nashriyotida 2004 yilda Ahmad Jod tomonidan nashrga tayyorlanib chop etildi. Mazkur nashr 416 sahifani o‘z ichiga oladi. Kitob nashrga tayyorlovchining muqaddimasidan boshlanadi. So‘ng “Kitobning G‘azzoliyga nisbat berilishi haqida” nomli sarlavha ostidagi maqola va “Imom G‘azzoliyning biografiyasi” nomi bilan olimning tarjimai holi keltirilgan. Noshir Ahmad Jod asarni nashrga tayyorlash ishiga jiddiy yondoshib, buning ustida ancha ishlar qilgan, G‘azzoliy tomonidan keltirilgan iqtiboslarga havolalarda qisqacha sharh beradi. Ahmad Jod asarda keltirilgan hadislarning sifatiga e’tibor qaratadi. Deyarli har bir hadisga uni kimlar rivoyat qilgani, hadis roviylarining to‘liq ismi-sharifi, qaysi davrda va qayerda yashab o‘tgani, hadisning sahih yoki zaifligi, mashhur hadis to‘plamlarida bor-yo‘qligi, bor bo‘lsa qavs ichida tartib raqami kabilar haqida havolada izoh qoldiradi. Masalan asarning “Tavba haqida” nomli 8-bobida keltirilgan hadisga Ahmad Jod havolada shunday izoh beradi: “Muttafaqun ’alayh. Bu hadisni Buxoriy “Nozik masalalar kitobi”da (6507), Muslim “Zikr va duo kitobi”da (2683), Termiziy “Janozalar kitobi”da (1066), Nisoiy “Janozalar kitobi”da (1836), Dorimiy “Nozik masalalar kitobi”da (2756) va Ahmad (22238) lar rivoyat qilishgan

Xulosa

Mashhur o‘zbek shoiri, publisist, tarjimon Miraziz A’zam “Mukoshafatu-lqulub” asarini turk tilidan o‘zbek tiliga tarjima qilgan holda bir necha bor e’lon qildi. Biroq mutarjim tarjima jarayonida Turkiyada chop qilingan aynan qaysi nashrdan foydalangani haqida ma’lumot bermagan. Qizig‘i shundaki, asarning O‘zR FA Sharqshunoslik institutida saqlanayotgan №7148 va №7185 inventar raqamli toshbosmalarida hamda qo‘limizda mavjud bo‘lgan Misr nashridagi ba’zi boblar, iqtibos sifatida keltirilgan Qur’oni karim oyatlari, hadislar, rivoyatlar asarning o‘zbek tilidagi nashrida uchramaydi. Masalan, “Osmonlar va turli jinslar zikrida” (في ذكر

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السموات والألجناس المختلفة (nomli yigirma to‘qqizinchi bob №7148 va №7185 inventar raqamli toshbosmalarda ham, biz yuqorida tilga olgan Misr va Livan nashrlarida ham mavjud, biroq o‘zbek tilidagi tarjimasida yo‘q. Ehtimol, bu tarjimon foydalangan nashrda kuzatilgan holatdir. Xulosa qilib aytganda, “Mukoshafatul qulub” asari inson qalbini poklash, ma’naviy kamolotga erishish va axloqiy jihatdan yetuk bo‘lish yo‘lida muhim qo‘llanma hisoblanadi. Undagi g‘oyalar bugungi kunda ham o‘z ahamiyatini yo‘qotmagan bo‘lib, insonning ichki dunyosini boyitishda muhim manba bo‘lib xizmat qiladi.

Foydalanilgan adabiyotlar

1. Abu Homid G‘azzoliy. Mukoshafatu-l-qulub. – Misr. Daru-l-kutubi-l-arabiyyati-lkubro. 1909. O‘zR FA Sharqshunoslik instituti. Toshbosma № 7148.

2. Abu Homid G‘azzoliy. Mukoshafatu-l-qulub. – Misr. Daru-l-kutubi-l-arabiyyati-lkubro. 1909. O‘zR FA Sharqshunoslik instituti. Toshbosma № 7185.

3. Ahmad Muhammad Tursun. Abu Homid G‘azzoliy. Hujjatul-islom va qalblar tabibi. – Toshkent: Qaqnus media; 2017.

4 .Abu Hamid al-G’azzoli. “Mukoshafatul qulub”.

5. Abu Hamid al-G’azzoli. “Ihyo ulum ad-din”.

6. G‘azzoliy A.H. Tasavvufga oid asarlar to‘plami.

7. Islom falsafasi va tasavvuf tarixi bo‘yicha ilmiy manbalar.

8. Jalal ad-Din Rumi. “Masnaviy”.

9. Abu Hamid al-G’azzoli. “Arba’in” (Qirq hadis sharhi).

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СОВЕРШЕНСТВОВАНИЕ КЛАССИФИКАЦИИ ТОВАРОВ ДЛЯ ТАМОЖЕННЫХ ЦЕЛЕЙ КАК ФАКТОР СНИЖЕНИЯ ТРАНЗАКЦИОННЫХ ИЗДЕРЖЕК И ПОВЫШЕНИЯ ЭФФЕКТИВНОСТИ ВНЕШНЕЭКОНОМИЧЕСКОЙ ДЕЯТЕЛЬНОСТИ

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Аннотация: В статье на основе теоретических положений, содержащихся в дипломной работе по теме влияния классификации товаров на внешнеэкономическую деятельность, и актуальных открытых данных рассматривается, каким образом корректная классификация по ТН ВЭД снижает транзакционные издержки, ускоряет таможенное оформление и повышает предсказуемость условий внешней торговли в Республике Узбекистан. Особое внимание уделяется институциональным механизмам повышения точности классификационных решений: применению Основных правил интерпретации, использованию предварительных решений, лабораторной экспертизе, цифровизации таможенных процедур и внедрению современных информационных систем. Обоснован вывод о том, что совершенствование классификации должно рассматриваться не как узкотехническая функция, а как самостоятельный инструмент повышения конкурентоспособности участников внешнеэкономической деятельности и устойчивости национальной торговой политики.

Ключевые слова: классификация товаров, таможенные цели, ТН ВЭД, Гармонизированная система, предварительное решение, транзакционные издержки, таможенное администрирование, цифровизация таможни, внешнеэкономическая деятельность, Узбекистан

Введение

В условиях усложнения международных цепочек поставок значение таможенной классификации товаров заметно выходит за пределы чисто фискальной функции. Код товара определяет не только ставку пошлины, но и набор разрешительных процедур, технических регламентов, мер нетарифного регулирования, статистическое отражение операции и глубину постконтроля. Следовательно, любой сбой в классификационном решении трансформируется в

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конкретные издержки для бизнеса и государства. Для импортера это означает рост времени оформления, вероятность доначислений и риски санкций. Для таможенной администрации неправильная классификация искажает данные, затрудняет риск-менеджмент и снижает адресность тарифной политики. В результате эффективность внешнеэкономической деятельности зависит от качества классификационной практики в значительно большей степени, чем принято считать в прикладной литературе [1].

Актуальность темы усиливается тем, что Узбекистан находится в фазе активного расширения внешней торговли и модернизации таможенных процедур. По данным Национального комитета по статистике, внешнеторговый оборот страны в 2023 году составил 62,6 млрд долл. США, в 2024 году увеличился до 67,2 млрд долл., а в 2025 году достиг 81,2 млрд долл. США, что означает существенный рост нагрузки на все элементы таможенного администрирования, включая классификационную работу [8][9][10]. Одновременно государство обновило национальную ТН ВЭД, усилило регламентацию предварительных решений и расширило цифровые инструменты работы с товарами и документами [5][6]. Чем интенсивнее торговые потоки, тем выше цена каждой ошибки в кодировании товара. Поэтому классификация становится фактором скорости, стоимости и юридической устойчивости внешнеторговой операции.

Предметом исследования выступает влияние корректности классификации товаров для таможенных целей на результативность внешнеэкономической деятельности. Цель статьи состоит в том, чтобы показать институциональные и экономические каналы данного влияния и предложить практические направления совершенствования классификационной работы в Узбекистане. Для достижения цели решаются четыре взаимосвязанные задачи: раскрывается экономико-правовая природа классификации; анализируются международные и национальные нормы; оцениваются наиболее значимые каналы воздействия классификационных ошибок на эффективность ВЭД; формулируются рекомендации, ориентированные на цифровизацию, превентивное консультирование и стандартизацию решений. Методологическую основу составили институциональный анализ, сравнительный подход, элементы правового анализа и обобщение официальной статистики. Базовым содержательным источником послужили материалы загруженной дипломной работы, в которых подробно раскрыты генезис ГС, роль ОПИ и практика национальной ТН ВЭД.

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Классификация товара в таможенных целях выполняет одновременно правовую, статистическую, фискальную и управленческую функции. Именно через код товара государство переводит фактические характеристики продукции в режим конкретных обязательств и ограничений. Такой перевод возможен только при единообразном применении номенклатуры, примечаний к разделам и группам, а также Основных правил интерпретации. В противном случае одно и то же изделие может быть оценено разными должностными лицами неодинаково, что подрывает принцип предсказуемости регулирования. Внешнеэкономическая деятельность в такой среде становится более дорогой и менее управляемой. Следовательно, классификация формирует институциональную определенность, без которой торговая сделка не может быть признана полностью защищенной.

С экономической точки зрения правильная классификация снижает транзакционные издержки по всей цепочке движения товара. Экспортер и импортер заранее рассчитывают уровень таможенных платежей, оценивают необходимость лицензий и сертификатов, планируют контрактную цену и сроки исполнения. Если код присвоен корректно, участник ВЭД получает возможность точнее прогнозировать cash-flow, страховать риски и выстраивать логистику без дополнительных буферов времени. Когда же код корректируется уже на стадии контроля, меняется вся финансовая модель поставки. Возникают расходы на хранение, лабораторные исследования, корректировку документов и обжалование решений. Именно поэтому классификация должна рассматриваться как элемент экономики сделки, а не только как фрагмент ведомственной процедуры.

Содержательно этот тезис подтверждается и международной практикой. Всемирная таможенная организация указывает, что Гармонизированная система строится как единая основа для тарифной, статистической и регулирующей работы государств, а пояснения и классификационные мнения служат инструментами единообразного толкования номенклатуры [1][2]. ВТО, в свою очередь, связывает эффективность трансграничной торговли с прозрачностью и предсказуемостью решений, включая предварительные решения по тарифной классификации [3][4]. Таким образом, качество классификации влияет не только на таможенные доходы, но и на уровень доверия бизнеса к регулирующей среде. Чем выше доверие, тем ниже страховые надбавки и транзакционные затраты участников ВЭД. Это делает классификационную работу частью более широкой архитектуры торговой эффективности.

Современная система классификации строится на Гармонизированной системе описания и кодирования товаров, действующей под эгидой Всемирной

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таможенной организации. Текст номенклатуры, юридические примечания, пояснения и классификационные мнения создают многоуровневую основу для унификации подходов в мировой торговле. Редакция HS 2022 вступила в силу с 1 января 2022 года и отражает изменения в номенклатуре, вызванные технологическим развитием, экологической повесткой и цифровизацией торговли [1]. Для участников ВЭД значение имеет не только знание текста товарной позиции, но и умение соотносить фактические характеристики продукции с логикой обновленной номенклатуры. В противном случае даже формально корректное описание товара может привести к ошибочному коду. Поэтому международный стандарт требует постоянной адаптации национальной практики.

Для Узбекистана принципиально важно, что национальная ТН ВЭД основана именно на Гармонизированной системе, а ее актуализация осуществляется с учетом международных изменений. Постановлением Президента Республики Узбекистан от 28 декабря 2022 года была введена ТН ВЭД версии 2022 года, действующая с 1 января 2023 года [6]. Это решение не было чисто техническим: оно обновило правовую основу тарифного и нетарифного регулирования, статистики и классификационной практики. Переход на новую редакцию потребовал синхронизации ведомственных инструкций, обучения сотрудников и адаптации программных решений. В экономическом смысле такая синхронизация уменьшает число коллизий между международным стандартом и национальным администрированием. Чем быстрее и полнее проходит обновление, тем меньше неопределенность для бизнеса.

Значительное место в национальной системе занимает институт предварительных решений по классификации. Таможенный кодекс Республики Узбекистан детально регламентирует запрос, срок рассмотрения, обязательность решения для таможенных органов, основания для его изменения, отзыва и аннулирования [5]. По сути, речь идет о механизме превентивного урегулирования классификационного риска. Участник ВЭД может до поставки получить обязательную позицию таможни и встроить ее в контрактную модель. Такой подход соответствует статье 3 Соглашения ВТО об упрощении процедур торговли, где advance rulings рассматриваются как инструмент ускорения выпуска товаров и повышения правовой определенности [3]. Следовательно, развитие института предварительных решений имеет не только юридическое, но и выраженное экономическое значение.

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Рост внешнеторгового оборота Узбекистана в последние годы качественно изменил требования к таможенному администрированию. При увеличении товаропотока возрастает доля сложных, комбинированных и технологически новых товаров, по которым классификационные решения требуют более высокой точности. Простые, шаблонные подходы в этих условиях начинают давать систематические ошибки. Дополнительным фактором выступает увеличение числа торговых партнеров и усложнение документарного сопровождения. Чем масштабнее торговля, тем сильнее негативный эффект от даже небольшой доли неверной классификации. Поэтому количественный рост ВЭД объективно повышает значимость качественной классификационной инфраструктуры.

Важной характеристикой последних лет стала цифровая трансформация таможенных процессов. По данным Всемирного банка, в рамках программы региональных связей Центральной Азии в Узбекистане существенно сокращалось среднее время таможенного оформления, а по состоянию на октябрь 2025 года система ASYCUDA World была развернута по всей стране, заменив ранее действовавшую систему [11]. Параллельно функционирует национальный механизм «Единого окна», обеспечивающий межведомственное электронное взаимодействие при трансграничных процедурах [12]. Такие решения прямо влияют на классификационную работу, поскольку переводят значительную часть информации в структурированный цифровой вид. Это облегчает сопоставление описаний товара, документов, рисковых профилей и ранее принятых решений. В результате классификация становится не только точнее, но и быстрее.

Однако цифровизация сама по себе не устраняет классификационные ошибки. Если в систему загружается неполное описание товара, если оператор использует устаревшие шаблоны или если отсутствует качественная база аналогичных решений, цифровая среда лишь ускоряет распространение ошибки. Именно поэтому электронная обработка должна сочетаться с экспертной, лабораторной и методической поддержкой. В материалах загруженной дипломной работы справедливо подчеркивается, что идентификация товара требует полного коммерческого наименования, технического описания, сведений о составе, функции, упаковке и состоянии поставки. Данный тезис полностью сохраняет актуальность в цифровой среде. Более того, чем выше уровень автоматизации, тем выше требования к качеству исходных данных.

Неверная классификация товара прежде всего искажает финансовый результат сделки. Если код ведет к завышенной ставке пошлины, импортер несет прямые сверхзатраты, которые уменьшают маржу и ухудшают ценовую позицию

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на внутреннем рынке. Если же код занижает платежи, возникает риск доначислений, пеней, санкций и постконтрольных претензий. Оба сценария подрывают устойчивость финансового планирования. Внешнеэкономическая деятельность становится менее предсказуемой, а стоимость правовой защиты возрастает. Для компаний с коротким оборотным циклом это может означать потерю ликвидности и отказ от части контрактов.

Второй канал связан со временем. Любая спорная классификация ведет к дополнительным проверкам, запросам документов, лабораторным исследованиям или эскалации вопроса на более высокий уровень. При этом время в международной торговле конвертируется в деньги через стоимость хранения, простои транспорта, штрафы по контрактам и потерю доверия контрагентов. Если товар относится к сезонным или быстрооборачиваемым категориям, даже небольшая задержка способна существенно снизить коммерческий результат. Следовательно, точность классификации выступает фактором логистической эффективности. Таможенное решение влияет на скорость выпуска не меньше, чем качество инфраструктуры или работа перевозчика.

Третий канал имеет институциональный характер и связан с тарифным и нетарифным регулированием. Код товара определяет применимость разрешительных документов, санитарных и фитосанитарных требований, маркировки, квот и иных мер экономической политики. Ошибка классификации поэтому способна не просто изменить пошлинную нагрузку, но и поставить под вопрос законность самой поставки. Для государства это означает ухудшение качества статистики и риск неправильной настройки торговой политики. Для бизнеса это означает рост вероятности отказа в выпуске, переработку комплектов документов и затягивание хозяйственного оборота. Таким образом, неверная классификация размывает как микрологику сделки, так и макрологику регулирования.

Таблица 1. Институциональные и статистические параметры, определяющие значимость классификации товаров в Узбекистане

Показатель	**2023**	**2024**	**2025**	**Экономическое значение**
Внешнеторговый оборот, млрд долл. США	62,6	67,2	81,2	Рост оборота повышает цену ошибок классификац

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Показатель	2023	2024	2025	Экономическое значение
				ии и нагрузку на таможню
Экспорт, млрд долл. США	24,4	27,3	33,8	Усложняется структура экспортной номенклатуры и требования к коду
Импорт, млрд долл. США	38,1	40,0	47,4	Увеличивается число спорных кодов и финансовый риск доначислений
Сальдо, млрд долл. США	-13,8	-12,7	-13,5	Ошибки классификации сильнее влияют на стоимость импортных потоков
ТН ВЭД Узбекистана (версия 2022)	в применении	в применении	в применении	Актуальная номенклатура снижает расхождения с международной практикой
Институт предварительных решений	действует	усилен	действует	Снижает неопределенность до ввоза товара

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Показатель	2023	2024	2025	Экономическое значение
Система «Единое окно»	функционирует	расширяется	функционирует	Сокращает дублирование документов и ошибок описания
ASYCUDA World	подготовка/масштабирование	внедрение	полное развертывание	Повышает скорость и цифровую сопоставимость данных

Данные таблицы показывают, что значимость классификации возрастает по мере роста внешнеторгового оборота и усложнения процедурной среды. В 2025 году экономика Узбекистана работала уже с существенно более крупным объемом торговли, чем двумя годами ранее. Это означает, что даже небольшое снижение доли ошибок в кодировании товара способно дать заметный эффект в масштабе всей системы. Экономия времени оформления и уменьшение числа корректировок начинают измеряться не отдельными кейсами, а системным улучшением торговой эффективности. В институциональном плане критическую роль начинают играть качество номенклатуры, цифровые платформы и институт предварительного решения.

Вместе с тем статистический рост торговли не гарантирует автоматического роста качества администрирования. Чем больше поток, тем легче скрываются повторяющиеся ошибки в описании товаров, копируются неверные шаблоны деклараций и накапливаются спорные практики. Это требует централизованной аналитики по спорным кодам, регулярного обновления классификационных справочников и обучения инспекторов и декларантов на основе реальных кейсов. Если такая аналитика интегрируется с цифровой системой, таможня получает возможность перехода от реактивной модели контроля к превентивной. В этом случае классификация начинает работать как инструмент ускорения торговли, а не как источник дополнительных задержек.

Первое направление связано с институционализацией превентивного сервиса для бизнеса. Необходимо расширять практику предварительных решений, одновременно улучшая качество шаблонов запроса, перечень обязательных технических данных и цифровую доступность уже принятых решений в обезличенной форме. Для компаний это снизит неопределенность до

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ввоза товара, а для таможенных органов позволит стандартизировать подходы по повторяющимся товарным категориям. Международная практика показывает, что advance rulings уменьшают споры и повышают добровольное соблюдение требований [3][13]. Для Узбекистана это особенно важно в условиях роста импорта оборудования, компонентов и сложной химической продукции. Превентивная определенность дешевле, чем последующее исправление ошибки на границе.

Второе направление предполагает цифровое обогащение процесса классификации. Речь идет не только о регистрации декларации в информационной системе, но и о создании структурированных цифровых карточек товара, библиотек технических признаков, связи с лабораторными заключениями и накопительными массивами классификационных решений. При таком подходе система может автоматически выделять признаки риска, сопоставлять текущую поставку с ранее классифицированными товарами и подсказывать инспектору возможные коллизии. UNCTAD в своих материалах по цифровизации таможни подчеркивает, что автоматизация и регуляторная согласованность являются ключом к сокращению времени выпуска и росту прозрачности [11][12]. Встраивание классификационной аналитики в цифровой контур таможни поэтому должно стать отдельным проектным направлением. Это повысит не только скорость, но и воспроизводимость решений.

Третье направление связано с кадровой и экспертной поддержкой. Классификация сложных товаров невозможна без сочетания правовой, товароведческой, инженерной и химико-технологической компетенций. Поэтому таможенной системе необходимо выстраивать непрерывное обучение по спорным товарным блокам: машинам и оборудованию, химической продукции, многокомпонентным материалам, медицинским товарам, цифровым устройствам. Важную роль должны играть лаборатории и экспертные центры, способные быстро и стандартизированно отвечать на классификационные запросы. Чем выше качество экспертизы, тем ниже вероятность длительных споров и неодинаковой практики по регионам. Следовательно, кадровое развитие должно рассматриваться как прямое вложение в эффективность ВЭД.

Четвертое направление касается методической гармонизации национальной практики с международными толкованиями. Таможенным органам следует системно использовать пояснения ВТамО, классификационные мнения и международные изменения к HS 2022, а также более активно публиковать национальные разъяснения по типовым спорным ситуациям. Для бизнеса важно видеть не только итоговый код, но и логику его определения: примененное

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правило интерпретации, решающие технические признаки, значение примечаний к разделам и группам. Публичность методики уменьшает пространство для конфликтов и повышает доверие к системе. Кроме того, она облегчает подготовку специалистов декларантов внутри компаний. В результате классификация превращается в управляемую и объяснимую процедуру, а не в зону административной неопределенности.

Таблица 2. Каналы влияния классификации товаров на показатели эффективности внешнеэкономической деятельности

Этап процесса	Классификационный фактор	Прямой эффект	Итоговый KPI
Подготовка контракта	Выбор кода и оценка платежей	Точный расчет цены сделки и условий поставки	Снижение коммерческой неопределенности
Подготовка документов	Корректное описание товара	Меньше возвратов и запросов со стороны таможни	Сокращение документарных издержек
Подача декларации	Совпадение кода и характеристик	Ниже вероятность корректировки и спора	Сокращение времени выпуска
Контроль и экспертиза	Обоснованность применения ОПИ	Меньше лабораторных и постконтрольных конфликтов	Снижение косвенных расходов
Оплата платежей	Правильное начисление пошлин и налогов	Нет переплаты и риска доначислений	Стабилизация денежного потока
Логистика	Отсутствие задержек по спорному коду	Снижение расходов на хранение и простой	Повышение надежности поставки
Статистика и планирование	Корректное отражение товарного потока	Лучшее управление тарифной	Рост качества администрирования

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Этап процесса	Классификационный фактор	Прямой эффект	Итоговый KPI
		политикой и рисками	

Таблица 2 наглядно показывает, что влияние классификации распространяется на весь жизненный цикл внешнеторговой операции. Ошибка, допущенная на стадии описания товара, не локализуется в одном административном действии, а порождает каскад последствий для цены, сроков и правового статуса поставки. Следовательно, классификация выступает сквозной переменной эффективности ВЭД. Она соединяет управленческие решения компании и административные решения таможни в единую цепочку. Разрыв в любой точке этой цепи увеличивает издержки всей операции. Поэтому работа с классификацией должна быть встроена в систему корпоративного compliance и таможенного сервиса одновременно.

Особенно важен тот факт, что часть выгод от правильной классификации носит накопительный характер. Разовый корректный код дает ограниченный эффект, тогда как формирование устойчивой базы корректных классификационных решений снижает вероятность повторных ошибок по аналогичным товарам. Это позволяет компаниям стандартизировать документы, а таможне — строить более точные профили риска. В перспективе такая база превращается в элемент национальной цифровой инфраструктуры торговли. Ее наличие снижает административные барьеры без ослабления контроля. Следовательно, инвестиции в классификационную точность имеют кумулятивную отдачу.

На уровне экономической политики из этого следует важный вывод: совершенствование классификации является выгодным как для государства, так и для бизнеса. Государство получает более надежную статистику, более полное и корректное взимание платежей, а также более качественные механизмы регулирования. Бизнес получает скорость, предсказуемость и снижение транзакционных издержек. Такая совпадающая выгода делает реформы в сфере классификации политически и экономически рациональными. По существу, речь идет об одном из тех редких направлений, где улучшение контроля одновременно усиливает торговую эффективность. Именно это и определяет стратегическую значимость темы.

Заключение

Проведенный анализ показывает, что классификация товаров для таможенных целей является не вспомогательной технической процедурой, а

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ключевым элементом эффективности внешнеэкономической деятельности. Через код товара формируются параметры платежей, скорость оформления, применимость разрешительных режимов и надежность торговой статистики. Ошибки классификации порождают не только правовые, но и прямые экономические потери, включая рост транзакционных издержек, логистические задержки и ухудшение финансовой предсказуемости поставок. В условиях быстрого роста внешней торговли Узбекистана эти эффекты приобретают системный характер. Следовательно, государственная политика в сфере классификации должна оцениваться по ее вкладу в торговую эффективность, а не только по фискальному результату.

Для Узбекистана наиболее перспективными направлениями являются: развитие института предварительных решений, цифровое обогащение классификационной аналитики, укрепление экспертно-лабораторной поддержки и публикация более развернутых методических разъяснений по спорным категориям товаров. Реализация этих мер позволит сократить время оформления, уменьшить число конфликтов между бизнесом и таможней, повысить качество статистики и усилить предсказуемость тарифного и нетарифного регулирования. Таким образом, совершенствование классификации должно рассматриваться как практический механизм повышения конкурентоспособности национальной экономики и устойчивости внешнеторговой политики. В этом заключается его стратегическая ценность для современного таможенного управления.

Список литературы

1. World Customs Organization. (2022). HS Nomenclature 2022 Edition. Retrieved from https://www.wcoomd.org/en/topics/nomenclature/instrument-and-tools/hs-nomenclature-2022-edition.aspx
2. World Customs Organization. (2022). Explanatory Notes to the Harmonized System. Retrieved from https://www.wcoomd.org/en/topics/nomenclature/instrument-and-tools/tools-to-assist-with-the-classification-in-the-hs/explanatory-notes.aspx
3. World Trade Organization. (2014). Agreement on Trade Facilitation, Article 3: Advance Rulings. Retrieved from https://www.wto.org/english/docs_e/legal_e/tfa_e.htm
4. World Trade Organization. (n.d.). The WTO and the World Customs Organization. Retrieved from https://www.wto.org/english/thewto_e/coher_e/wto_wco_e.htm
5. Республика Узбекистан. (2016). Таможенный кодекс Республики Узбекистан. Закон № ЗРУ-400 от 20.01.2016. Retrieved from https://lex.uz/docs/2876352
6. Республика Узбекистан. (2022). О введении Товарной номенклатуры внешнеэкономической деятельности Республики Узбекистан версии 2022 года.

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Постановление Президента № ПП-460 от 28.12.2022. Retrieved from https://www.lex.uz/en/search/ext?lang=1&okoz=7717
7. Таможенный комитет Республики Узбекистан. (2024). Товарная номенклатура внешнеэкономической деятельности Республики Узбекистан. Retrieved from https://customs.uz/public/docfiles/1703156077.pdf
8. National Statistics Committee of the Republic of Uzbekistan. (2024). Socio-economic situation of the Republic of Uzbekistan for January-December 2023. Retrieved from https://stat.uz/img/talil-2023-jil-yanvar-dekabr-english-.pdf
9. National Statistics Committee of the Republic of Uzbekistan. (2025). Foreign trade turnover of the Republic of Uzbekistan for January-December 2024. Retrieved from https://stat.uz/img/press_reliz_tashi_savdo_eng_yanvar-dekabr_2024_p18901.pdf
10. National Statistics Committee of the Republic of Uzbekistan. (2026). Foreign trade turnover of the Republic of Uzbekistan for January-December 2025. Retrieved from https://stat.uz/img/news/press-reliz-en-_p94457.pdf
11. The World Bank. (2026). Implementation Status & Results Report: Fourth Phase of the Central Asia Regional Links Program (P166820). Retrieved from https://documents1.worldbank.org/curated/en/099010226144530988/pdf/P166820-db88b961-c075-4b22-86bf-a05a1f2d5afe.pdf
12. UNCTAD. (2025). ASYCUDA Report 2025: The New Generation of Digital Customs. Retrieved from https://unctad.org/system/files/official-document/dtlasycuda2025d1_en.pdf
13. UNCTAD. (2025). Status and Outlook for National Trade Facilitation Committees. Retrieved from https://unctad.org/system/files/official-document/tcsdtlinf2025d6_en.pdf

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DAMLAMA VA QAYNATMALAR. EMULSIYALAR. DORIVOR YIG'MALAR. TINDIRMALAR

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Annotatsiya
Ushbu maqolada farmakologiyada keng qo'llaniladigan galen preparatlari — damlamalar, qaynatmalar, emulsiyalar, dorivor yig'malar va tindirmalarning farmatsevtik hamda klinik ahamiyati yoritilgan. Tadqiqot davomida klassik farmakologiya, farmakognoziya va farmatsevtik texnologiyaga oid ishonchli ilmiy manbalar hamda darsliklar tahlil qilindi. Maqolada ushbu dori shakllarining tayyorlanish texnologiyasi, farmakokinetik va farmakodinamik xususiyatlari, organizmga ta'sir mexanizmlari hamda amaliy tibbiyotdagi qo'llanilishi ilmiy asosda bayon etilgan. Shuningdek, ularning afzalliklari, biologik o'zlashtirilishi va nojo'ya ta'sirlari qiyosiy tahlil qilindi. Olingan natijalar fitopreparatlarning zamonaviy farmakoterapiyadagi o'rni tobora ortib borayotganligini ko'rsatadi. Tadqiqot natijalari farmakologiya va klinik farmatsiya yo'nalishida tahsil olayotgan talabalar hamda ilmiy izlanuvchilar uchun muhim ilmiy manba bo'lib xizmat qiladi.
Kalit so'zlar: damlama, qaynatma, emulsiya, dorivor yig'ma, tindirma, fitopreparatlar, farmakologiya, farmakokinetika, farmakodinamika.

Аннотация
В данной статье освещены фармакологические и фармацевтические особенности галеновых препаратов — настоев, отваров, эмульсий, лекарственных сборов и настоек, широко применяемых в современной медицине. В ходе исследования были проанализированы достоверные источники по фармакологии, фармакогнозии и фармацевтической технологии. В статье научно обоснованы технологии приготовления данных лекарственных форм, их фармакокинетические и фармакодинамические свойства, механизмы действия и

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клиническое применение. Также проведён сравнительный анализ их преимуществ, биодоступности и возможных побочных эффектов. Полученные результаты показывают возрастающее значение фитопрепаратов в современной фармакотерапии. Материалы исследования могут служить важным научным источником для студентов медицинских вузов и научных исследователей в области фармакологии и клинической фармации.
Ключевые слова: настой, отвар, эмульсия, лекарственный сбор, настойка, фитопрепараты, фармакология, фармакокинетика, фармакодинамика.

Abstract

This article discusses the pharmaceutical and pharmacological significance of galenic preparations, including infusions, decoctions, emulsions, medicinal herbal collections, and tinctures widely used in modern medicine. Reliable scientific literature and textbooks on pharmacology, pharmacognosy, and pharmaceutical technology were analyzed during the study. The article scientifically describes the preparation technology, pharmacokinetic and pharmacodynamic characteristics, mechanisms of action, and clinical applications of these dosage forms. In addition, their advantages, bioavailability, and adverse effects were comparatively evaluated. The findings indicate the increasing importance of herbal medicinal preparations in contemporary pharmacotherapy. The results of this study may serve as a valuable scientific resource for medical students and researchers specializing in pharmacology and clinical pharmacy.
Keywords: infusion, decoction, emulsion, medicinal herbal collection, tincture, phytopreparations, pharmacology, pharmacokinetics, pharmacodynamics.

Kirish

Zamonaviy farmakologiya va farmatsevtik texnologiyaning rivojlanishi natijasida dorivor vositalarning turli shakllari keng qo‘llanilmoqda. Ular orasida o‘simlik xomashyosidan tayyorlanadigan galen preparatlari — damlamalar, qaynatmalar, emulsiyalar, dorivor yig‘malar va tindirmalar alohida ahamiyat kasb etadi. Ushbu preparatlar qadimiy tibbiyot amaliyotida ham keng qo‘llanilgan bo‘lib, bugungi kunda ham o‘zining tabiiy kelib chiqishi, nisbatan kam toksikligi va organizm tomonidan yaxshi o‘zlashtirilishi bilan dolzarbligini saqlab qolmoqda.

Fitoterapiya va tabiiy dorivor vositalarga bo‘lgan ehtiyojning ortishi galen preparatlarini o‘rganish va ularni zamonaviy farmakoterapiyada qo‘llash imkoniyatlarini kengaytirishni talab etadi. Ayniqsa, ularning farmakokinetik va farmakodinamik xususiyatlari, tayyorlanish texnologiyasi hamda biologik faol

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moddalarning saqlanish darajasi klinik amaliyot uchun muhim ilmiy asos bo‘lib xizmat qiladi.

Shu bilan birga, ushbu dorivor shakllarning sifati, barqarorligi va terapevtik samaradorligi ularni tayyorlash usullariga bevosita bog‘liqdir. Shuning uchun galen preparatlarining farmatsevtik xususiyatlarini chuqur tahlil qilish, ularning zamonaviy tibbiyotdagi o‘rnini aniqlash hamda ilmiy asoslangan yondashuvlarni ishlab chiqish dolzarb ilmiy muammo hisoblanadi.

Mazkur maqolaning maqsadi damlamalar, qaynatmalar, emulsiyalar, dorivor yig‘malar va tindirmalarning farmakologik xususiyatlarini ilmiy asosda tahlil qilish hamda ularning zamonaviy tibbiyotdagi ahamiyatini yoritib berishdan iborat.

Adabiyotlar tahlili

Galen preparatlari farmakologiyasi va farmatsevtik texnologiyasi bo‘yicha ilmiy adabiyotlarda ushbu dori shakllarining tabiiy kelib chiqishi, tayyorlanish usullari hamda biologik faolligi keng yoritilgan. Klassik farmakologiya va farmakognoziya manbalarida damlamalar va qaynatmalar suvli ekstraktlar sifatida o‘simlik xomashyosidan faol moddalarning oson ajralib chiqishini ta’minlashi ta’kidlanadi. Bu borada o‘simlik tarkibidagi flavonoidlar, alkaloidlar, glikozidlar va efir moylarining suvli muhitda ekstraksiya qilinishi asosiy farmakologik mexanizm sifatida ko‘rsatiladi. Farmatsevtik texnologiyaga oid zamonaviy adabiyotlarda emulsiyalar ikki fazali tizim sifatida tavsiflanib, ular lipid va suv fazalari o‘rtasida faol moddalarning barqaror taqsimlanishini ta’minlashi qayd etiladi. Bu dori shakli ayniqsa yog‘da eriydigan preparatlarning biologik o‘zlashtirilishini oshirishda muhim ahamiyatga ega ekani ko‘plab tadqiqotlarda isbotlangan.

Dorivor yig‘malar (species) bo‘yicha adabiyotlarda ularning ko‘p komponentli tarkibi sinergik ta’sirni yuzaga keltirishi, ya’ni bir nechta o‘simlik komponentlari birgalikda terapevtik samarani kuchaytirishi ta’kidlanadi. Shu bilan birga, yig‘malarning sifatini standartlashtirish va dozalanishini aniq belgilash farmatsevtik amaliyotda dolzarb muammo sifatida ko‘rsatiladi.

Tindirmalar (tinctura) esa etanol asosida tayyorlanadigan ekstraktlar bo‘lib, ularda faol moddalarning yuqori darajada barqarorligi va uzoq muddat saqlanishi adabiyotlarda qayd etilgan. Farmakologik manbalarda spirtli eritmalar alkaloidlar va glikozidlarni samarali ekstraksiya qilishi hamda ularning tez so‘rilishini ta’minlashi ilmiy asoslangan.

Umuman olganda, zamonaviy va klassik adabiyotlar tahlili shuni ko‘rsatadiki, galen preparatlari tabiiy kelib chiqishi, nisbatan xavfsizligi va farmakologik faolligi bilan klinik tibbiyotda muhim o‘rin tutadi. Biroq ularning barqarorligi,

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standartlashtirish darajasi va biologik faolligini oshirish bo‘yicha qo‘shimcha ilmiy tadqiqotlar olib borish zarur hisoblanadi.

Natijalar

Tadqiqot davomida galen preparatlarining klinik va farmakologik qo‘llanilishi tahlil qilindi. Olingan natijalar shuni ko‘rsatadiki, damlama, qaynatma, tindirma va emulsiyalar ko‘rinishidagi dori vositalari asosan yallig‘lanishga qarshi, tinchlantiruvchi, spazmolitik, antiseptik va yurak-qon tomir tizimiga ta’sir qiluvchi xususiyatlarga ega. Ularning samaradorligi tarkibidagi biologik faol moddalarning (alkaloidlar, flavonoidlar, efir moylari, taninlar) farmakologik faolligiga bevosita bog‘liq.

Quyida klinik amaliyotda keng qo‘llaniladigan 10 ta galen preparati bo‘yicha farmakologik tavsif keltiriladi.

1-jadval. Galen preparatlarining farmakologik xususiyatlari

№	Dori vositasi	Asosiy ta’sir etuvchi modda	Ta’sir mexanizmi	Qo‘llanilishi
1	Valeriana tindirmasi	Valepotriatlar, efir moylari	Markaziy nerv tizimini susaytiradi, GABA faolligini oshiradi	Uyqusizlik, nevroz
2	Moychechak damlamasi	Apigenin, bisabolol	Yallig‘lanishga qarshi, spazmolitik	Gastrit, ichak yallig‘lanishi
3	Kalendula damlamasi	Flavonoidlar, karotinoidlar	Antiseptik, regeneratsiyani tezlashtiradi	Yaralar, stomatit
4	Yalpiz damlamasi	Mentol	Kalsiy kanallarini bloklaydi, spazmolitik	Ichak spazmi, ko‘ngil aynishi
5	Qichitqi o‘t qaynatmasi	K vitamini, flavonoidlar	Qon ivishini yaxshilaydi	Qon ketishlar
6	Zubturum damlamasi	Aukubin, polisaxaridlar	Yallig‘lanishga qarshi, mukolitik	Yo‘tal, bronxit
7	Arpabodiyon emulsiyasi	Yog‘ kislotalari, anetol	Gaz haydovchi, spazmolitik	Meteorizm
8	Ona o‘t damlamasi	Leonurin	Yurak ritmini sekinlashtiradi	Taxikardiya, stress
9	Echinacea damlamasi	Polisaxaridlar, kafe kislotasi	Immunostimulyator	Infeksiyalar

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10	Shalfey damlamasi	Tujon, flavonoidlar	Antiseptik, antibakterial	Og‘iz bo‘shlig‘i yallig‘lanishi

2-jadval. Farmakokinetika va nojo‘ya ta’sirlar tahlili

№	Dori vositasi	Farmakokinetika (qisqacha)	Farmakodinamika	Nojo‘ya ta’sirlar
1	Valeriana tindirmasi	Ichakda so‘riladi, jigar orqali metabolizm	Sedativ, anksiolitik	Uyquchanlik, bosh aylanishi
2	Moychechak damlamasi	Tez so‘riladi, qisqa yarim parchalanish	Yallig‘lanishga qarshi	Allergik reaksiya
3	Kalendula damlamasi	Mahalliy so‘rilish ustun	Regeneratsiya, antiseptik	Teri toshmasi (kam)
4	Yalpiz damlamasi	Tez so‘riladi, jigar metabolizmi	Antispazmodik	Jig‘ildon qaynashi
5	Qichitqi o‘t qaynatmasi	Og‘iz orqali yaxshi so‘riladi	Gemostatik	Qon ivishining ortishi
6	Zubturum damlamasi	Mukozada lokal ta’sir	Mukolitik, yallig‘lanishga qarshi	Allergiya
7	Arpabodiyon emulsiyasi	Yog‘li muhitda sekin so‘riladi	Gaz haydovchi	Ko‘ngil buzilishi
8	Ona o‘t damlamasi	Tez so‘riladi, CNSga ta’sir qiladi	Kardiosedativ	Bradikardiya
9	Echinacea damlamasi	Immun tizim orqali metabolizm	Immunostimulyator	Autoimmun reaksiyalar (kam)
10	Shalfey damlamasi	Og‘iz va GI traktida so‘riladi	Antibakterial	Uzoq qo‘llanganda toksiklik

Umumiy natijalar tahlili

Olingan ma’lumotlar shuni ko‘rsatadiki, galen preparatlari ko‘p komponentli tabiiy tarkibga ega bo‘lib, ularning farmakologik ta’siri murakkab mexanizmlar orqali amalga oshadi. Eng muhim natija sifatida ularning:

- tabiiy kelib chiqishi va yaxshi o‘zlashtirilishi
- nisbatan kam toksikligi
- ko‘p yo‘nalishli farmakologik faolligi

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aniqlandi.

Shu bilan birga, ayrim preparatlarda allergik reaksiyalar, markaziy nerv tizimiga sedativ ta’sir va uzoq muddat qo‘llanganda metabolik o‘zgarishlar kuzatilishi mumkinligi qayd etildi.

Muhokama

Olingan natijalar galen preparatlarining farmakologik va klinik ahamiyati yuqori ekanligini ko‘rsatadi. Damlamalar, qaynatmalar, emulsiyalar, tindirmalar va dorivor yig‘malar tarkibida biologik faol moddalarning tabiiy kompleks holatda bo‘lishi ularning organizmga ko‘p yo‘nalishli ta’sir ko‘rsatishini ta’minlaydi. Bu holat klassik farmakologiya va zamonaviy fitoterapiya tamoyillariga mos keladi.

Adabiyotlar va natijalar tahlili shuni ko‘rsatadiki, galen preparatlarining asosiy afzalligi ularning tabiiyligi va biologik moslashuvchanligidadir. Flavonoidlar, alkaloidlar, efir moylari va polisaxaridlar kabi komponentlar birgalikda sinergik ta’sir ko‘rsatib, terapevtik samarani kuchaytiradi. Ayniqsa, o‘simlik ekstraktlarining kompleks tarkibi ularni sintetik dori vositalariga nisbatan yumshoqroq, lekin keng spektrli ta’sirga ega qiladi.

Farmakokinetik tahlil shuni ko‘rsatadiki, suvli (damlama, qaynatma) va spirtli (tindirma) ekstraktlar organizmda turlicha so‘rilish tezligiga ega. Spirtli eritmalar faol moddalarni tezroq va to‘liqroq ekstraksiya qilishi sababli ularning bioavailability darajasi yuqoriroq bo‘lishi mumkin. Emulsiyalar esa yog‘da eriydigan moddalarning so‘rilishini yaxshilab, ularning biologik samaradorligini oshiradi. Bu jihat farmatsevtik texnologiyada muhim amaliy ahamiyatga ega.

Farmakodinamik jihatdan galen preparatlari asosan markaziy nerv tizimi, ovqat hazm qilish tizimi, yurak-qon tomir tizimi va immun tizimiga ta’sir qiladi. Masalan, valeriana va ona o‘t preparatlari sedativ va kardiosedativ ta’sir ko‘rsatsa, echinacea immun tizimni faollashtiradi, moychechak va kalendula esa yallig‘lanishga qarshi va regeneratsion xususiyatga ega.

Shu bilan birga, ayrim cheklovlar ham aniqlanadi. Galen preparatlarining tarkibi tabiiy bo‘lgani uchun ularning faol moddalari miqdori standartlashtirishda o‘zgaruvchan bo‘lishi mumkin. Bu esa klinik samaradorlikda farqlarga olib keladi. Bundan tashqari, ba’zi preparatlar allergik reaksiyalar yoki nojo‘ya sedativ ta’sirlar keltirib chiqarishi mumkin.

Umuman olganda, olingan natijalar galen preparatlari zamonaviy farmakoterapiyada muhim o‘rin tutishini tasdiqlaydi. Biroq ularning xavfsizligi va samaradorligini oshirish uchun standartlashtirish, dozani aniq belgilash va sifat nazorati bo‘yicha qo‘shimcha ilmiy tadqiqotlar olib borish zarur hisoblanadi.

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Xulosa

O‘tkazilgan tahlillar natijasida galen preparatlari — damlamalar, qaynatmalar, emulsiyalar, dorivor yig‘malar va tindirmalar — farmakologiyada muhim o‘rin tutishi aniqlandi. Ularning asosiy ustunligi tabiiy xomashyo asosida tayyorlanishi, biologik faol moddalarning kompleks holatda saqlanishi hamda organizm tomonidan nisbatan yaxshi o‘zlashtirilishidadir.

Tadqiqot natijalari shuni ko‘rsatadiki, ushbu dori shakllari keng farmakologik spektrga ega bo‘lib, sedativ, yallig‘lanishga qarshi, immunomodulyator, spazmolitik va antiseptik ta’sirlarni namoyon etadi. Shu bilan birga, ularning farmakokinetik xususiyatlari dori shakliga bog‘liq holda farqlanadi: spirtli tindirmalar tezroq so‘rilsa, suvli damlama va qaynatmalar nisbatan yumshoq, lekin barqaror ta’sir ko‘rsatadi.

Biroq, galen preparatlarining asosiy cheklovi ularning tarkibiy o‘zgaruvchanligi va standartlashtirishdagi qiyinchiliklar bilan bog‘liq bo‘lib, bu klinik samaradorlikda farqlarga olib kelishi mumkin. Shuningdek, ayrim hollarda allergik reaksiyalar va nojo‘ya ta’sirlar kuzatilishi ehtimoli mavjud.

Xulosa qilib aytganda, galen preparatlari zamonaviy farmakoterapiyada muhim va istiqbolli yo‘nalishlardan biri bo‘lib qolmoqda. Ularning klinik amaliyotdagi samaradorligini oshirish uchun sifat nazorati, standartlashtirish va farmakologik tadqiqotlarni chuqurlashtirish zarur hisoblanadi.

Foydalanilgan adabiyotlar

1. Машковский М.Д. **«Лекарственные средства»**. – Москва: Новая волна, 2019.
2. Харкевич Д.А. **«Фармакология»**. – Москва: ГЭОТАР-Медиа, 2021.
3. Аляутдин Р.Н. **«Фармакология: учебник»**. – Москва: ГЭОТАР-Медиа, 2020.
4. Петров В.И. **«Клиническая фармакология»**. – Москва: ГЭОТАР-Медиа, 2018.
5. Хабриев Р.У. **«Рациональное применение лекарственных средств»**. – Москва: Медицина, 2017.
6. Невзорова В.А., Федоров С.В. **«Антисептики и дезинфицирующие средства в медицине»**. – Санкт-Петербург: СпецЛит, 2019.
7. Покровский В.И. **«Микробиология, вирусология и иммунология»**. – Москва: ГЭОТАР-Медиа, 2020.
8. Кукес В.Г. **«Клиническая фармакология»**. – Москва: ГЭОТАР-Медиа, 2019.
9. Белоусов Ю.Б. **«Фармакология и фармакотерапия»**. – Москва: Медицина, 2018.

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"DISCOURSE STRATEGIES OF EXPRESSING AFFECTION IN ENGLISH AND UZBEK: A GENDER-BASED ANALYSIS"

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ANNOTATION

This article examines the discourse strategies used to express affection in English and Uzbek, with a particular focus on gender-based differences in communication. While previous studies have primarily explored lexical and pragmatic aspects of affectionate language, this research shifts the focus to discourse-level analysis, emphasizing how affection is constructed and conveyed in real communicative contexts.

The study is grounded in the theoretical framework of Sociolinguistics and draws on the ideas of Deborah Tannen regarding gendered communication styles. A qualitative comparative method is employed, analyzing dialogue samples from everyday interactions in both languages.

The findings indicate that English speakers tend to express affection more directly and verbally, whereas Uzbek speakers often rely on indirect strategies, such as care-based expressions and context-dependent cues. Gender differences are also evident: female speakers in both linguistic cultures demonstrate higher emotional expressiveness, while male speakers tend to use more restrained or implicit forms of affection, often embedding them in humor or supportive actions.

The article concludes that discourse strategies of affection are shaped by both cultural norms and gender roles, highlighting the importance of context in interpreting emotional expression. This study contributes to the development of cross-cultural and gender-sensitive approaches in discourse analysis and language teaching.

Keywords: Affection, discourse strategies, gender differences, Sociolinguistics, English language, Uzbek language, emotional expression, communication styles

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АННОТАЦИЯ

В данной статье рассматриваются дискурсивные стратегии выражения аффекции в английском и узбекском языках с особым вниманием к гендерным различиям в коммуникации. В то время как предыдущие исследования в основном сосредоточены на лексических и прагматических аспектах аффективной лексики, данное исследование смещает акцент на дискурсивный уровень, подчеркивая, каким образом аффекция формируется и передается в реальных коммуникативных ситуациях.

Исследование основано на теоретических положениях Социолингвистика и опирается на идеи Deborah Tannen, касающиеся гендерных особенностей речевого поведения. В работе используется качественный сравнительный метод, включающий анализ диалогов из повседневного общения в обоих языках.

Результаты показывают, что носители английского языка склонны выражать аффекцию более прямо и вербально, тогда как носители узбекского языка чаще используют косвенные стратегии, такие как выражение заботы и контекстуальные намеки. Гендерные различия также очевидны: женщины в обеих культурах демонстрируют более высокую эмоциональную выразительность, тогда как мужчины чаще используют сдержанные или имплицитные формы выражения аффекции, нередко включая их в юмор или поддерживающие действия.

В заключении подчеркивается, что дискурсивные стратегии выражения аффекции формируются под влиянием культурных норм и гендерных ролей, что указывает на важность контекста при интерпретации эмоциональных высказываний. Данное исследование вносит вклад в развитие межкультурного и гендерно-ориентированного подхода в дискурс-анализе и преподавании языков.

Ключевые слова: аффекция, дискурсивные стратегии, гендерные различия, Социолингвистика, английский язык, узбекский язык, эмоциональная экспрессия, коммуникативные стили

ANNOTATSIYA

Ushbu maqolada ingliz va o‘zbek tillarida mehr-muhabbat (affeksiya) ifodalashning diskursiv strategiyalari, ayniqsa genderga oid kommunikativ farqlar nuqtai nazaridan tahlil qilinadi. Avvalgi tadqiqotlar asosan affektiv tilning leksik va pragmatik jihatlariga e’tibor qaratgan bo‘lsa, mazkur ish diskurs darajasiga urg‘u berib, real muloqot jarayonida affeksiyaning qanday shakllanishi va ifodalanishini ko‘rsatadi.

Tadqiqot Sotsiolingvistika nazariyasiga asoslanadi hamda Deborah Tannen g‘oyalariga tayangan holda olib boriladi. Ishda sifat jihatidan qiyosiy metod

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qo‘llanilib, har ikki tildagi kundalik muloqot namunalaridan olingan dialoglar tahlil qilinadi.

Natijalar shuni ko‘rsatadiki, ingliz tilida so‘zlashuvchilar affeksiyani ko‘proq bevosita va og‘zaki shaklda ifodalaydilar, o‘zbek tilida esa ko‘proq bilvosita strategiyalar — g‘amxo‘rlik orqali ifodalash va kontekstga bog‘liq ishoralar ustunlik qiladi. Gender farqlari ham kuzatiladi: ayollar har ikkala madaniyatda yuqori darajada emotsional ifodalanishga ega bo‘lsa, erkaklar ko‘proq bosiq va yashirin shakllardan foydalanadi, ko‘pincha bu ifodalar hazil yoki qo‘llab-quvvatlovchi harakatlar orqali namoyon bo‘ladi.

Xulosa qilib aytganda, affeksiyani ifodalashdagi diskursiv strategiyalar madaniy me’yorlar va gender rollari ta’sirida shakllanadi, bu esa emotsional nutqni tushunishda kontekstning muhimligini ko‘rsatadi. Mazkur tadqiqot diskurs tahlili va til o‘qitish jarayonida madaniyatlararo hamda genderga sezgir yondashuvlarni rivojlantirishga hissa qo‘shadi.

Kalit so‘zlar: affeksiya, diskursiv strategiyalar, gender farqlari, Sotsiolingvistika, ingliz tili, o‘zbek tili, emotsional ifoda, kommunikativ uslublar

INTRODUCTION

The expression of affection constitutes a fundamental dimension of human communication, serving as a means of establishing interpersonal relationships, maintaining social cohesion, and reflecting culturally embedded values. Affectionate language functions not only as a vehicle for conveying emotions but also as a mechanism for negotiating social roles, identities, and relational dynamics within a given speech community. For this reason, the study of affection extends beyond purely linguistic interest and enters the domain of social and cultural analysis.

In linguistic research, the phenomenon of affection has traditionally been examined at the lexical and pragmatic levels. At the lexical level, scholars have focused on the selection and semantic properties of affectionate vocabulary, including terms of endearment and emotionally charged expressions. At the pragmatic level, attention has been given to communicative intentions, speech acts, and the contextual appropriateness of affectionate utterances. While these approaches have provided valuable insights, they remain insufficient for explaining how affection is actually realized in natural communication, where meaning is not fixed but dynamically constructed through interaction.

From this perspective, discourse analysis offers a more comprehensive and analytically productive framework. As a branch of Sociolinguistics, discourse analysis focuses on language in use, examining how speakers organize their utterances, manage interpersonal relations, and adapt their communicative strategies in real-life situations.

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It enables researchers to investigate not only the linguistic forms of affection, but also the strategies through which these forms are embedded in broader communicative practices, including turn-taking, contextual adaptation, and implicit meaning construction.

This approach is particularly relevant in cross-cultural studies, where differences in communicative norms and cultural expectations significantly influence the expression of emotions. In this regard, English and Uzbek represent two linguistically and culturally distinct systems, each characterized by its own conventions of emotional expression. English-speaking communicative culture is often associated with greater verbal explicitness and openness in expressing personal feelings, whereas Uzbek communicative norms tend to favor indirectness, contextual sensitivity, and the expression of affection through actions and relational cues. Such differences make a discourse-level comparison both necessary and methodologically justified.

An essential variable within this framework is gender, which plays a central role in shaping communicative behavior. Within the tradition of Sociolinguistics, gender is understood not merely as a biological category but as a social construct that influences patterns of language use. The work of Deborah Tannen has been particularly influential in demonstrating that men and women often employ different communicative styles, reflecting broader social norms and expectations. These differences are especially visible in the domain of emotional expression, where women are generally associated with greater expressiveness and verbalization of feelings, while men tend to adopt more restrained or indirect communicative strategies.

Despite the growing body of research on affectionate language, including studies devoted to lexical choices and pragmatic functions in English and Uzbek, the discourse strategies underlying the expression of affection remain insufficiently explored. In particular, there is a noticeable lack of comparative studies that examine how affection is constructed, negotiated, and interpreted in real communicative interactions across these two linguistic and cultural contexts. This gap limits our understanding of how emotional meaning operates at the level of discourse, where linguistic, social, and cultural factors intersect.

The aim of this article is to investigate the discourse strategies of expressing affection in English and Uzbek, with a particular focus on gender-based differences in communication. The study seeks to identify the dominant discourse patterns through which affection is expressed, to compare these patterns across the two languages, and to determine the extent to which they are influenced by cultural norms and communicative contexts. To achieve this aim, the following research questions are addressed:

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- How do men and women differ in expressing affection at the discourse level?
- What discourse strategies are characteristic of affectionate communication in English and Uzbek?
- How does communicative context influence the expression of affection in both languages?

LITERATURE REVIEW

The study of affection in language has attracted considerable attention within modern linguistics, particularly in relation to emotional expression and interpersonal communication. Affection, as a linguistic category, is generally understood as the verbal and non-verbal expression of positive emotional attitudes, including love, care, sympathy, and emotional closeness. Researchers have examined affectionate language primarily through lexical and semantic approaches, focusing on the structure, meaning, and usage of emotionally marked vocabulary such as terms of endearment and evaluative expressions. While these studies provide a necessary foundation, they tend to treat affection as a static element of language rather than a dynamic process realized in interaction.

From a broader perspective, the expression of affection is closely connected to the field of Sociolinguistics, where language is analyzed as a socially conditioned phenomenon. Within this framework, emotional expression is not viewed as universal or neutral but as shaped by cultural norms, social expectations, and communicative conventions. In different linguistic communities, the same emotional intention may be expressed through different strategies, ranging from explicit verbalization to indirect or context-dependent forms.

A significant body of research has explored the relationship between gender and language use, highlighting systematic differences in communicative behavior between male and female speakers. Early work by Robin Lakoff suggested that women's language tends to be more polite, expressive, and emotionally nuanced, whereas men's language is often characterized by greater directness and assertiveness. Although such claims have been critically re-evaluated in contemporary linguistics, they continue to provide a useful starting point for examining gender-based variation in emotional communication. Later studies, including those by Deborah Tannen, have shifted the focus toward interactional styles, arguing that men and women differ not only in what they say, but in how they structure and interpret communication.

An important theoretical framework for analyzing affectionate expressions is Politeness theory, which explains how speakers manage social relationships through language. According to this theory, communication involves the negotiation of "face," or social self-image, and speakers employ various strategies to maintain or enhance

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interpersonal harmony. Expressions of affection can function as positive politeness strategies, reinforcing solidarity and emotional closeness between interlocutors. At the same time, the degree of directness or indirectness in expressing affection often depends on cultural norms and the perceived need to avoid imposing on the listener.

In this context, the distinction between direct and indirect speech becomes particularly relevant. Direct expressions of affection, such as explicit declarations of love or appreciation, are more typical of communicative cultures that value openness and individual emotional expression. In contrast, indirect strategies may involve hints, supportive actions, or context-dependent cues, requiring the listener to interpret the intended emotional meaning. Such variation highlights the importance of considering not only linguistic form but also communicative context in the analysis of affection.

Another key concept is emotional expressiveness, which refers to the degree to which speakers openly display their emotions in communication. Research suggests that emotional expressiveness is influenced by both cultural background and gender norms. In many societies, women are socially permitted or even expected to express emotions more openly, while men may be encouraged to adopt more restrained or controlled forms of expression. However, these tendencies are not universal and must be examined within specific linguistic and cultural contexts.

Despite the extensive research on affectionate language, most existing studies remain limited to lexical and pragmatic dimensions. There is comparatively little attention to how affection is constructed and negotiated at the level of discourse, where meaning emerges through interaction, context, and communicative strategy. In particular, comparative studies of English and Uzbek have not sufficiently addressed how gender influences the use of discourse strategies in expressing affection in real-life communication.

METHODOLOGY

This study adopts a qualitative comparative research design aimed at identifying and analyzing discourse strategies of expressing affection in English and Uzbek, with particular attention to gender-based differences. The methodological framework integrates principles of discourse analysis within the broader field of Sociolinguistics, allowing for a systematic examination of how affectionate meanings are constructed, negotiated, and interpreted in authentic communicative settings.

Unlike purely lexical or pragmatic approaches, this study treats affection as a **discursive phenomenon**, emphasizing its dynamic realization in interaction. The comparative dimension enables the identification of both universal tendencies and culture-specific patterns in the expression of affection.

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Data Collection- The empirical data consist of a corpus of dialogue samples representing everyday communicative situations in both English and Uzbek. The dataset includes both naturally occurring and contextually simulated interactions in order to ensure analytical diversity and contextual relevance.

The data were collected from multiple sources:

- informal spoken conversations reflecting spontaneous, unplanned speech
- dialogues from films and television series, which provide semi-authentic yet context-rich representations of interaction
- examples of social communication, including family discourse, friendship exchanges, and romantic interactions

To enhance methodological reliability, the selection of data followed several criteria:

- **contextual diversity**: inclusion of both formal and informal settings
- **relational variation**: representation of different social relationships (e.g., parent–child, partners, friends)
- **gender balance**: approximately equal representation of male and female speakers
- **functional relevance**: inclusion of dialogues where affection is explicitly or implicitly expressed

The final dataset was compiled to reflect a range of communicative situations in which affectionate meaning is likely to emerge, ensuring that the analysis captures both typical and context-dependent patterns.

Method of Analysis- The primary analytical method is discourse analysis, which focuses on language as it is used in real communicative contexts. Within this approach, attention is paid not only to linguistic forms but also to interactional dynamics, including how speakers construct meaning, manage relationships, and adapt their speech to situational factors.

In addition, a comparative method is employed to examine similarities and differences between English and Uzbek discourse practices. This involves systematic cross-linguistic comparison of communicative strategies, with particular emphasis on the influence of cultural norms and gender roles.

The analysis proceeds in several stages:

1. **Identification** of affectionate expressions within the dataset
2. **Classification** according to predefined analytical categories
3. **Contextual interpretation** of each instance within its communicative setting
4. **Cross-linguistic comparison** to identify patterns and divergences

This step-by-step procedure ensures methodological transparency and analytical consistency.

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Analytical Framework- To operationalize the concept of affection at the discourse level, the study employs a set of clearly defined analytical criteria. Each dialogue sample is examined according to the following parameters:

1. Direct Expressions of Affection

Explicit verbal statements that clearly convey emotional attachment or positive evaluation (e.g., declarations of love, verbal praise, expressions of appreciation).

2. Indirect Expressions of Affection**Implicit or context-dependent strategies, including:**

- expressions of care (e.g., offering help, concern)
- supportive actions embedded in speech
- hints or emotionally suggestive utterances

These require interpretation based on context rather than explicit wording.

3. Emotional Intensity

The degree of emotional explicitness, ranging from low-intensity (subtle, restrained expressions) to high-intensity (strong, overt emotional statements). This parameter allows for comparison of expressive tendencies across genders and cultures.

4. Use of Diminutives and Affectionate Forms

The presence of linguistically marked forms such as:

- terms of endearment
- ласкательные формы
- softening devices (e.g., mitigating expressions, affectionate suffixes)

These elements often signal emotional closeness and relational intimacy.

5. Communicative Context

The situational and relational environment in which the utterance occurs, including:

- formal vs informal settings
- public vs private interaction
- type of relationship between speakers

Context is treated as a crucial factor in interpreting the meaning and function of affectionate expressions.

Each instance is analyzed not in isolation but as part of a broader discourse structure, taking into account sequential organization and interactional purpose.

Gender-Based Analysis- A central component of the methodology is the examination of gender as a variable influencing discourse behavior. Gender is approached as a sociolinguistic construct that shapes communicative norms and expectations. The analysis compares male and female speech patterns across comparable contexts, focusing on:

- **frequency of direct vs indirect expressions of affection**

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- **levels of emotional expressiveness**
- **preferred discourse strategies** (e.g., verbalization, humor, care-based communication)

Special attention is given to identifying whether observed differences reflect consistent patterns or context-dependent variation. This approach avoids simplistic generalizations and instead emphasizes tendencies supported by empirical data.

Reliability and Validity- To enhance the reliability of the analysis, consistent criteria were applied across all data samples. The use of clearly defined analytical categories reduces subjectivity and ensures comparability between English and Uzbek data. Validity is supported through:

- the use of multiple data sources
- inclusion of diverse communicative contexts
- alignment of analytical procedures with established principles of discourse analysis

These measures contribute to the overall credibility of the findings.

Limitations of the Study- Despite its methodological rigor, the study has certain limitations. The dataset, while diverse, remains selective and may not fully represent all regional or stylistic variations within English and Uzbek. Additionally, the interpretation of indirect expressions inherently involves a degree of subjectivity, as such meanings depend heavily on contextual and cultural knowledge.

Furthermore, the use of film and media dialogues, although valuable for contextual richness, may reflect partially constructed or stylized forms of communication rather than purely spontaneous speech.

Nevertheless, these limitations do not undermine the overall validity of the study, as the methodological design ensures sufficient depth and consistency to identify general patterns in the discourse expression of affection.

ANALYSIS

The analysis of English and Uzbek discourse demonstrates significant differences in the ways affection is expressed in communication. One of the major distinctions is the level of directness. English speakers tend to express affection openly and verbally through direct emotional statements such as expressions of love, admiration, and appreciation. Uzbek speakers, in contrast, often prefer indirect forms of affection, where emotional meaning is conveyed through care, concern, advice, and supportive behavior rather than explicit declarations.

Gender also plays an important role in affectionate communication. Female speakers in both languages generally demonstrate higher emotional expressiveness and use more emotionally rich vocabulary. Male speakers, however, tend to express affection in more restrained or indirect ways, often through actions, humor, or practical

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support. These differences reflect broader cultural and social expectations related to gender roles.

The findings further show that communicative context strongly influences discourse strategies. In Uzbek communication, especially in public settings, overt emotional expression is often limited due to norms of politeness and restraint. In private or family contexts, affection is more commonly expressed through care-based communication. English-speaking discourse allows comparatively greater verbal openness in both private and interpersonal communication.

Several common discourse strategies of affection were identified in both languages, including compliments, care-based expressions, teasing, and softening strategies. Compliments are used to express admiration and positive evaluation, while care-based expressions communicate affection through concern and support. Teasing functions as an indirect sign of emotional closeness, particularly in informal communication, and softening strategies reduce emotional intensity, making expressions more socially acceptable.

The table below is used to present a clear comparative overview of the main discourse strategies through which affection is expressed in English and Uzbek communication. It helps systematize the analyzed examples and demonstrates how similar emotional intentions are realized differently across the two languages and cultures. The table also illustrates the influence of communicative norms and cultural context on the choice of affectionate expressions.

Comparative Examples of Affectionate Discourse Strategies in English and Uzbek

Discourse Strategy	English Example	Uzbek Example	Communicative Function
Direct emotional expression	"I really love you."	"Siz men uchun juda qadrlisiz."	Open verbal expression of affection
Care-based expression	"You should get some rest."	"Charchadingiz, dam oling."	Showing affection through concern and care
Compliment strategy	"You look amazing today."	"Bugun juda chiroyli ko'rinyapsiz."	Expressing admiration and positive evaluation
Teasing strategy	"Don't mess this up again!"	"Yana kech qoldingiz."	Indirect expression of closeness through humor

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Softening strategy	"I kind of miss you."	"Sal sog'indim."	Reducing emotional intensity to sound less direct

The examples presented in the table demonstrate that English discourse more frequently employs direct verbal expressions of affection, while Uzbek discourse often relies on indirect and care-oriented strategies. At the same time, both languages use compliments, teasing, and softening devices to maintain emotional closeness and interpersonal harmony. The comparative format of the table allows the similarities and differences between the two linguistic cultures to be observed more clearly and systematically.

General Insight: The findings demonstrate that affection is not expressed through a single universal form but through a range of discourse strategies shaped by:

- cultural norms
- gender expectations
- communicative context

English discourse tends toward **verbal explicitness,** while Uzbek discourse emphasizes **contextual interpretation and relational meaning.**

DISCUSSION

The findings of this study demonstrate that the expression of affection in English and Uzbek is not merely a linguistic phenomenon but a reflection of deeper cultural, social, and gender-based norms. The observed differences in discourse strategies can be explained through the interaction of these factors, which shape both the form and function of emotional expression in communication.

One of the central explanations lies in the distinction between collectivist and individualistic cultural orientations. Uzbek communicative culture, which is generally associated with collectivist values, prioritizes social harmony, respect, and relational balance. Within such a framework, the direct verbalization of emotions may be perceived as unnecessary or even inappropriate in certain contexts. As a result, affection is often expressed indirectly, through care-based strategies, supportive actions, and context-dependent cues. These forms allow speakers to convey emotional meaning while maintaining social norms of modesty and restraint.

In contrast, English-speaking communicative culture tends to reflect more individualistic values, where personal feelings and self-expression are given greater importance. This cultural orientation encourages the explicit verbalization of emotions, including affection. As observed in the analysis, English speakers frequently employ direct expressions and emotionally explicit language, particularly in private and

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interpersonal contexts. This difference highlights how cultural frameworks influence not only what is said, but how it is said.

Gender roles also play a significant role in shaping discourse strategies. Across both languages, female speakers demonstrate a higher degree of emotional expressiveness, often utilizing direct, elaborated, and emotionally rich forms of communication. This tendency can be linked to social expectations that associate women with emotional openness and relational communication. Male speakers, on the other hand, more frequently employ indirect or action-based strategies, reflecting cultural norms that encourage emotional restraint and control. In Uzbek contexts especially, male speech often aligns with expectations of formality, respect, and limited emotional display.

At the same time, the findings indicate that gender differences are not absolute but context-dependent. In close relationships or private settings, male speakers may also use more direct expressions of affection, while female speakers may adopt indirect strategies depending on situational constraints. This suggests that gender interacts dynamically with context, rather than functioning as a fixed determinant of communicative behavior.

Another important factor influencing the expression of affection is communicative context. The distinction between public and private discourse significantly affects the choice of strategies. In Uzbek communication, public contexts often require greater formality and emotional restraint, whereas private contexts allow for more implicit yet meaningful expressions of care. In English discourse, although context also plays a role, there is generally greater flexibility in expressing affection openly across different settings.

CONCLUSION

This study has examined the discourse strategies of expressing affection in English and Uzbek, with a particular focus on gender-based differences. By moving beyond lexical and pragmatic analysis, the research has provided a discourse-level perspective on how affectionate meaning is constructed and interpreted in real communicative interactions.

The findings reveal that English speakers tend to express affection more directly and explicitly, while Uzbek speakers more often rely on indirect, context-dependent strategies, particularly those based on care and relational cues. Gender differences were also identified, with female speakers generally demonstrating greater emotional expressiveness and male speakers favoring more restrained or action-based forms of communication. At the same time, these patterns were shown to be flexible and influenced by communicative context.

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One of the key contributions of this study lies in its shift from the analysis of isolated linguistic units to the examination of affection as a discourse phenomenon. This approach allows for a more comprehensive understanding of how emotional meaning is shaped through interaction, rather than simply encoded in words or structures. In this way, the research expands existing studies on affectionate language by integrating sociolinguistic and discourse-analytic perspectives.

Furthermore, the study contributes to cross-cultural communication research by highlighting how cultural values and gender roles influence communicative behavior in English and Uzbek contexts. The findings may also have practical implications for language teaching, particularly in developing learners' awareness of culturally appropriate ways of expressing emotions in different languages.

In conclusion, the expression of affection is a complex and multifaceted process that reflects not only linguistic choices but also broader social and cultural dynamics. Future research may build on this study by incorporating larger datasets, additional communicative contexts, or other linguistic communities in order to further explore the discourse nature of emotional expression.

LIST OF LITERATURE

1. Deborah Tannen. **You Just Don't Understand: Women and Men in Conversation**. New York: Ballantine Books, 1990.

2. Robin Lakoff. **Language and Woman's Place**. New York: Harper & Row, 1975.

3. Norman Fairclough. **Discourse and Social Change**. Cambridge: Polity Press, 1992.

4. Teun A. van Dijk. **Discourse and Context: A Sociocognitive Approach**. Cambridge: Cambridge University Press, 2008.

5. Penelope Brown & Stephen Levinson. **Politeness: Some Universals in Language Usage**. Cambridge: Cambridge University Press, 1987.

6. Janet Holmes. **An Introduction to Sociolinguistics**. London: Routledge, 2013.

7. Peter Trudgill. **Sociolinguistics: An Introduction to Language and Society**. London: Penguin Books, 2000.

8. Ronald Wardhaugh. **An Introduction to Sociolinguistics**. Oxford: Wiley-Blackwell, 2010.

9. George Yule. **Pragmatics**. Oxford: Oxford University Press, 1996.

10. Paul Baker. **Using Corpora in Discourse Analysis**. London: Continuum, 2006.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025

11. Sara Mills. *Gender and Politeness*. Cambridge: Cambridge University Press, 2003.

12. Michael Stubbs. *Discourse Analysis: The Sociolinguistic Analysis of Natural Language*. Oxford: Blackwell, 1983.

13. Dell Hymes. *Foundations in Sociolinguistics: An Ethnographic Approach*. Philadelphia: University of Pennsylvania Press, 1974.

14. Erving Goffman. *Interaction Ritual: Essays on Face-to-Face Behavior*. New York: Pantheon Books, 1967.

15. Geoffrey Leech. *Principles of Pragmatics*. London: Longman, 1983.

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CHO‘L EKOTIZIMLARIDA BIOLOGIK XILMA-XILLIKNI SAQLASH VA O‘RGANISH (KATTAQUM MASSIVI MISOLIDA)

Qurbonmurodov Sardor Erkin o‘g‘li

Cho‘l ekotizimlarida biologik xilma-xillikni saqlash bugungi kunda ekologiya, atrof-muhit muhofazasi va tabiiy resurslardan oqilona foydalanish yo‘nalishlarining eng dolzarb masalalaridan biridir. Arid va yarim arid hududlarda ekotizim barqarorligi suv tanqisligi, yuqori harorat, shamol eroziyasi, tuproq degradatsiyasi, o‘simlik qoplamining siyrakligi va antropogen bosim bilan bevosita bog‘liq bo‘ladi. O‘zbekistonning Milliy atrof-muhit holati hisobotida mamlakat hududining katta qismi arid zonaga mansubligi, cho‘llanish, yer degradatsiyasi, yaylovlardan ortiqcha foydalanish va suv resurslaridan bosimli foydalanish muhim ekologik muammolar qatorida ko‘rsatilgan [1; 2]. Shu nuqtayi nazardan Surxondaryo viloyatidagi Kattaqum massivi kabi qumli landshaftlarni biologik xilma-xillik jihatidan o‘rganish nafaqat ilmiy, balki amaliy ekologik boshqaruv uchun ham muhimdir.

Kattaqum massivi Termiz, Angor va Jarqo‘rg‘on tumanlari tutashgan hududda joylashgan qumli-cho‘l landshafti sifatida e’tiborga loyiqdir. Mahalliy rasmiy axborotlarda ushbu hududda qum bo‘ronlari va “Afg‘on shamoli” ta’sirini kamaytirish maqsadida saksovul ko‘chatlari ekish, saksovul urug‘i sepish va yashil qalqon barpo etish ishlari olib borilgani qayd etilgan [3]. Bu holat Kattaqum massivida bioxilma-xillik masalasini faqat nazariy ekologik muammo emas, balki cho‘llanishga qarshi kurash, rekultivatsiya, landshaft barqarorligini oshirish va hududiy ekologik xavfsizlik bilan bog‘liq amaliy vazifa sifatida ham ko‘rsatadi.

Cho‘l ekotizimlarida biologik xilma-xillik o‘ziga xos tarzda shakllanadi. Bu hududlarda o‘simliklar, umurtqasizlar, sudralib yuruvchilar, qushlar va mayda sutemizuvchilar yuqori harorat, namlik tanqisligi, qumli substrat, kuchli quyosh nurlanishi va oziqa resurslarining mavsumiyligiga moslashgan bo‘ladi. Saksovul, sho‘radoshlar va efemer o‘simliklar qumni mustahkamlash, shamol eroziyasini kamaytirish, mikroiqlim yaratish hamda hayvonlar uchun yashirinish va oziqlanish joylarini shakllantirishda muhim ekologik vazifa bajaradi. O‘zbek tadqiqotchilari tomonidan Orolbo‘yi va boshqa degradatsiyalangan hududlarda saksovulning qum barqarorligi hamda yashil qoplamalar barpo etishdagi o‘rni alohida ta’kidlangan [11]. Kattaqum massivida ham saksovulzorlarning shakllanishi biologik xilma-xillik uchun

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yangi mikrobiotoplar hosil qilishi mumkin, biroq bunday ta’sir real monitoring natijalari bilan tekshirilishi zarur.

Cho‘l biologik xilma-xilligini o‘rganishda sudralib yuruvchilar, hasharotlar, qushlar va cho‘l o‘simliklari muhim bioindikator guruhlar sifatida qaraladi. Ayniqsa, sudralib yuruvchilar tashqi muhit haroratiga bog‘liq ektoterm organizmlar bo‘lgani sababli tuproq yuzasi harorati, o‘simlik qoplami, yashirinish joylari, oziqa bazasi va antropogen omillarga sezgir bo‘ladi. D.A. Showler tomonidan tuzilgan O‘zbekiston amfibiyalari va sudralib yuruvchilari ro‘yxatida mamlakat hududida 4 tur amfibiya va 57 tur sudralib yuruvchi qayd etilgan [4]. Bu ma’lumot O‘zbekiston cho‘l va yarim cho‘l hududlari herpetofauna jihatidan muhimligini ko‘rsatadi. Shu bilan birga, respublika miqyosidagi umumiy ro‘yxatlar Kattaqum kabi lokal hududlar uchun yetarli emas; bunday hududlarda maxsus dala kuzatuvlari, fotoqayd, GPS/GIS xaritalash va biotopik tahlil talab qilinadi.

O‘zbekiston olimlari cho‘l ekotizimlari va ularning hayvonot dunyosini o‘rganishga katta hissa qo‘shgan. O.P. Bogdanovning Markaziy Osiyo sudralib yuruvchilari ekologiyasiga oid ishlari, T.Z. Zahidovning Qizilqum cho‘li biotsenozlari haqidagi tadqiqotlari cho‘l muhitini kompleks ekologik birlik sifatida tushunishga asos yaratadi [6; 7]. Keyingi yillarda E. Shernazarov va F. Jumayev tomonidan Janubi-g‘arbiy Qizilqum herpetofaunasining texnogen omillar ta’sirida o‘zgarishi bo‘yicha olib borilgan tadqiqotlar antropogen bosim cho‘l hayvonot dunyosining tarkibi va tarqalishiga ta’sir ko‘rsatishi mumkinligini ko‘rsatadi [5]. Ushbu ilmiy yondashuv Kattaqum massivi uchun ham ahamiyatli, chunki hududda tabiiy qumli biotoplar bilan birga saksovulzorlashtirish, yo‘lbo‘yi ta’siri, chorva bosimi, qum qazish va aholi punktlariga yaqinlik kabi omillar mavjud.

Xorijiy tadqiqotlarda ham cho‘l va yarim cho‘l ekotizimlari biologik xilma-xillikni saqlash nuqtayi nazaridan alohida e’tibor talab qiladigan hududlar sifatida baholanadi. J.W. Gibbons va hammualliflar sudralib yuruvchilarning global kamayishiga yashash joylarining yo‘qolishi, degradatsiya, ifloslanish, invaziv turlar, kasalliklar va iqlim o‘zgarishi kabi omillar sabab bo‘lishini ko‘rsatgan [9]. M. Böhm va hammualliflar dunyo sudralib yuruvchilarining muhofaza holatini tahlil qilib, reptiliyalar uchun maqsadli monitoring va muhofaza strategiyalari zarurligini asoslagan [10]. Mazkur yondashuv Kattaqum massivida biologik xilma-xillikni oddiy tur ro‘yxati sifatida emas, balki yashash joylari sifati, antropogen ta’sir va ekotizim barqarorligi bilan bog‘liq holda o‘rganish zarurligini tasdiqlaydi.

Kattaqum massivida biologik xilma-xillikni ilmiy o‘rganishning asosiy yo‘li hududni biotoplar majmuasi sifatida baholashdir. Qum barxanlari, saksovulzorlar, ochiq yarim

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cho‘l maydonlari, yo‘lbo‘yi hududlar, sug‘oriladigan yerlar chekkasi va antropogen buzilgan maydonlar alohida o‘rganilishi lozim. Har bir biotopda o‘simlik qoplami, tuproq holati, namlik, mikroiqlim, hayvonlar uchrashi, yashirinish joylari va inson faoliyati belgilarini qayd etish orqali hududning ekologik holati haqida asosli xulosa chiqarish mumkin. Ayniqsa, saksovulzorlarning biologik xilma-xillikka ta’siri faqat ekilgan maydon hajmi bilan emas, balki unda shakllangan mikrobiotoplar, umurtqasizlar faolligi, sudralib yuruvchilar uchrashi va qushlar uchun yashash sharoitlari bilan baholanishi kerak.

O‘zbekiston Respublikasi Qizil kitobining fauna qismida sudralib yuruvchilarning bir qator turlari muhofaza obyekti sifatida qayd etilgani bu guruhni lokal hududlarda o‘rganish zarurligini kuchaytiradi [8]. Shu sababli Kattaqumda biologik xilma-xillik monitoringi o‘simliklar bilan cheklanmasdan, sudralib yuruvchilar, hasharotlar va qushlar kabi indikator guruhlarni ham qamrab olishi kerak. Agar dala kuzatuvlarida muhofaza maqomiga ega tur aniqlansa, uning yashash joyi, GPS koordinatasi, biotopi, antropogen xavf omillari va fotoqaydi alohida rasmiylashtirilishi lozim. Bunday yondashuv bioxilma-xillikni saqlash bo‘yicha milliy strategiya maqsadlariga ham mos keladi [12].

Mavzuning amaliy ahamiyati shundaki, Kattaqum massivida biologik xilma-xillikni o‘rganish natijalari hududiy ekologik monitoringni tashkil etish, cho‘llanishga qarshi chora-tadbirlarning samaradorligini baholash, saksovulzorlashtirish ishlarining biologik natijalarini kuzatish, antropogen bosim zonalarini aniqlash va tabiiy resurslardan oqilona foydalanish bo‘yicha ilmiy asoslangan tavsiyalar ishlab chiqishga xizmat qiladi. Monitoring jarayonida GPS nuqtalar, fotoqaydlar, biotop tavsifi, o‘simlik qoplami holati, tuproq yuzasi, aniqlangan turlar va inson faoliyati belgilarini yagona ma’lumotlar bazasiga kiritish zarur. Bu kelgusida Kattaqum massividagi ekologik o‘zgarishlarni vaqt bo‘yicha solishtirish imkonini beradi.

Xulosa qilib aytganda, Kattaqum massivi misolida cho‘l ekotizimlarida biologik xilma-xillikni saqlash va o‘rganish masalasi kompleks ilmiy-amaliy ahamiyatga ega. Ushbu hudud qum barxanlari, saksovulzorlar, ochiq yarim cho‘l maydonlari va antropogen ta’sir zonalari uyg‘unlashgan tabiiy laboratoriya vazifasini bajaradi. Mavjud ilmiy adabiyotlar va rasmiy ekologik hujjatlar cho‘l ekotizimlarining degradatsiya, iqlim o‘zgarishi va inson faoliyatiga sezgirligini tasdiqlaydi. Shuning uchun Kattaqumda bioxilma-xillikni o‘rganish faqat tur ro‘yxatini tuzish bilan cheklanmasdan, ekotizim holatini baholash, bioindikator guruhlarni aniqlash, saksovulzorlashtirish samaradorligini tekshirish va hududiy ekologik monitoringni shakllantirishga qaratilishi kerak.

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Foydalanilgan adabiyotlar

1. UNECE. National State of the Environment Report: Uzbekistan. United Nations Economic Commission for Europe, 2024. URL: https://unece.org/sites/default/files/2024-02/uzbekistan-state-of-the-environment-en.pdf

2. Ministry of Ecology, Environmental Protection and Climate Change of the Republic of Uzbekistan. National Report on the State of the Environment: Republic of Uzbekistan. 2023. URL: https://ecochem.uz/upload/iblock/425/2ru0eqnsdao9gb0s108dq3jkkwbsgmdj/UZB_eco_report_2023_EN_web.pdf

3. Surxon tongi. “Yashil makon” orzusi haqiqatga aylanmoqda. 2024. URL: https://surxontongi.uz/2024/11/27/yashil-makon-orzusi-haqiqatga-aylanmoqda/

4. Showler, D.A. A Checklist of the Amphibians and Reptiles of the Republic of Uzbekistan with a Review and Summary of Species Distribution. 2018. URL: https://gallotia.de/AF/Bibliografie/BIB_13523.pdf

5. Shernazarov, E., Jumayev, F. Transformations of the Herpetofauna of South-Western Kyzylkum (Uzbekistan) under the Influence of Technogenesis. E3S Web of Conferences, 264, 01041, 2021. DOI: https://doi.org/10.1051/e3sconf/202126401041

6. Bogdanov, O.P. Ekologiya presmykayushchikhsya Sredney Azii. Toshkent: Fan, 1965.

7. Zahidov, T.Z. Biotsenozy pustyni Kyzylkum. Toshkent: Fan, 1971.

8. O‘zbekiston Respublikasi Fanlar akademiyasi. O‘zbekiston Respublikasi Qizil kitobi. Hayvonot dunyosi. II jild. Toshkent: Chinor ENK, 2019. URL: https://storage.academy.uz/

9. Gibbons, J.W., Scott, D.E., Ryan, T.J., Buhlmann, K.A., Tuberville, T.D., Metts, B.S. et al. The Global Decline of Reptiles, Déjà Vu Amphibians. BioScience, 50(8), 653–666, 2000. DOI: https://doi.org/10.1641/0006-3568(2000)050[0653:TGDORD]2.0.CO;2

10. Böhm, M., Collen, B., Baillie, J.E.M., Bowles, P., Chanson, J., Cox, N. et al. The Conservation Status of the World’s Reptiles. Biological Conservation, 157, 372–385, 2013. DOI: https://doi.org/10.1016/j.biocon.2012.07.015

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
11. Xojamuratov, N.B.U. Qurigan Orol dengizi tubida yashil qoplamalar barpo etishda saksovul o‘simligining ahamiyati. CyberLeninka, 2023. URL: https://cyberleninka.ru/article/n/qurigan-orol-dengizi-tubida-yashil-qoplamalar-barpo-etishda-saksovul-o-simligining-ahamiyati

12. O‘zbekiston Respublikasi Vazirlar Mahkamasi. 2019–2028-yillar davrida O‘zbekiston Respublikasida biologik xilma-xillikni saqlash strategiyasini tasdiqlash to‘g‘risida. 484-son qaror, 2019. URL: https://lex.uz/uz/docs/-4372839

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HARBIY XIZMATCHILAR VA HARBIY JAMOANI O'RGANISHGA DOIR PSIXOLOGIK YONDASHUVLARNING METODOLOGIK IMKONIYATARI

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Annotatsiya: Ushbu maqolada harbiy xizmatchilar va harbiy jamoani o'rganishga doir psixologik yondashuvlarning metodologik imkoniyatlari tahlil qilinadi. Tadqiqotda harbiy muhitning o'ziga xos psixologik xususiyatlari, jamoaviy munosabatlar, stress omillari hamda liderlikning psixologik jihatlari yoritiladi. Shuningdek, zamonaviy psixologik metodlar — kuzatish, eksperiment, so'rovnoma va psixodiagnostik vositalarning qo'llanilish imkoniyatlari ko'rib chiqiladi. Maqolada ushbu yondashuvlarning harbiy jamoaning samaradorligini oshirish, ijtimoiy-psixologik muhitni yaxshilash va shaxsiy rivojlanishga ta'siri ilmiy asosda ochib beriladi.
Kalit so'zlar: harbiy psixologiya, harbiy jamoa, psixologik yondashuvlar, metodologiya, psixodiagnostika, liderlik, stress, ijtimoiy-psixologik muhit

аннотация: В данной статье анализируются методологические возможности психологических подходов к изучению военнослужащих и военного коллектива. Рассматриваются психологические особенности военной среды, межличностные отношения, стрессовые факторы и аспекты лидерства. Особое внимание уделяется современным методам исследования, таким как наблюдение, эксперимент, анкетирование и психодиагностика. Раскрывается влияние данных подходов на повышение эффективности военного коллектива, улучшение социально-психологического климата и развитие личности военнослужащих.
Ключевые слова: военная психология, военный коллектив, психологические подходы, методология, психодиагностика, лидерство, стресс, социально-психологический климат

Annotation: This article examines the methodological potential of psychological approaches to the study of military personnel and military teams. It highlights the specific psychological characteristics of the military environment, interpersonal relations, stress factors, and leadership aspects. The study also explores the application of modern psychological methods such as observation, experiment, surveys, and psychodiagnostic tools. The paper reveals how these approaches contribute to

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improving the effectiveness of military teams, enhancing the socio-psychological climate, and supporting individual development.
Keywords: military psychology, military personnel, military team, psychological approaches, methodology, psychodiagnostics, leadership, stress, socio-psychological climate

KIRISH

Zamonaviy globallashuv va xavfsizlik tizimining murakkablashuvi sharoitida harbiy sohada inson omilining ahamiyati tobora ortib bormoqda. Harbiy xizmatchilar faoliyati nafaqat jismoniy tayyorgarlik, balki yuqori darajadagi psixologik barqarorlik, stressga chidamlilik va jamoaviy hamkorlikni ham talab qiladi. Shu sababli harbiy jamoani chuqur psixologik jihatdan o‘rganish va uni samarali boshqarish masalalari bugungi kunda dolzarb ilmiy muammolardan biri sifatida namoyon bo‘lmoqda. Harbiy jamoa o‘ziga xos ijtimoiy tizim bo‘lib, unda qat’iy intizom, subordinatsiya, tezkor qaror qabul qilish va yuqori darajadagi mas’uliyat ustuvor hisoblanadi. Bunday sharoitda shaxslararo munosabatlar, liderlik xususiyatlari, emotsional barqarorlik va psixologik moslashuv jarayonlari alohida ahamiyat kasb etadi. Ayniqsa, keskin va ekstremal vaziyatlarda harbiy xizmatchilarning ruhiy holati va jamoaviy uyg‘unligi harbiy vazifalarning muvaffaqiyatli bajarilishiga bevosita ta’sir ko‘rsatadi. Mazkur kontekstda harbiy xizmatchilar va harbiy jamoani o‘rganishga qaratilgan psixologik yondashuvlar, ularning nazariy asoslari hamda metodologik imkoniyatlarini tahlil qilish zarurati yuzaga keladi. Psixologiyada qo‘llaniladigan kuzatish, eksperiment, so‘rovnoma, suhbat, test va psixodiagnostik metodlar harbiy muhitda inson xulq-atvori, motivatsiyasi va ijtimoiy o‘zaro ta’sirini aniqlashda muhim vosita hisoblanadi. Shu bilan birga, zamonaviy integrativ yondashuvlar – kognitiv, bixevioral va ijtimoiy-psixologik metodlar harbiy jamoaning ichki dinamikasini yanada chuqurroq anglash imkonini beradi.

Tadqiqotning dolzarbligi shundaki, harbiy jamoalarda samarali psixologik muhitni shakllantirish, nizolarni oldini olish, liderlik salohiyatini rivojlantirish hamda harbiy xizmatchilarning psixologik tayyorgarligini oshirish bugungi kunning muhim vazifalaridan biridir. Shu jihatdan, psixologik yondashuvlarning metodologik imkoniyatlarini ilmiy asosda o‘rganish harbiy tizim samaradorligini oshirishga xizmat qiladi.

Mazkur maqolaning maqsadi — harbiy xizmatchilar va harbiy jamoani o‘rganishga doir psixologik yondashuvlarning metodologik imkoniyatlarini aniqlash va ularning amaliy ahamiyatini ochib berishdan iborat. Ushbu maqsadga erishish uchun psixologik metodlar tahlil qilinadi, ularning harbiy muhitda qo‘llanish xususiyatlari yoritiladi

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hamda jamoaviy samaradorlikka ta’siri ilmiy asosda baholanadi.

ADABIYOTLAR TAHLILI VA METODOLOGIYA

Harbiy psixologiya sohasida olib borilgan ilmiy tadqiqotlar shuni ko‘rsatadiki, harbiy jamoa va undagi shaxsiy tarkibni o‘rganish masalasi ko‘p qirrali va kompleks yondashuvni talab qiladi. Ushbu yo‘nalishda xorijiy va mahalliy olimlar tomonidan ishlab chiqilgan nazariy qarashlar psixologik yondashuvlarning metodologik asoslarini shakllantirishda muhim rol o‘ynaydi.

Xususan, ijtimoiy psixologiya doirasida Kurt Lewin tomonidan ishlab chiqilgan “maydon nazariyasi” jamoaviy xulq-atvorni tashqi va ichki omillar o‘zaro ta’siri orqali izohlash imkonini beradi. Ushbu yondashuv harbiy jamoalarda qaror qabul qilish, liderlik va guruh dinamikasini tahlil qilishda muhim nazariy asos bo‘lib xizmat qiladi. Shu bilan birga, Abraham Maslow ning ehtiyojlar iyerarxiyasi nazariyasi harbiy xizmatchilarning motivatsion tuzilmasini tushunishda qo‘llanilib, ularning psixologik ehtiyojlari va faoliyat samaradorligi o‘rtasidagi bog‘liqlikni ochib beradi. Bundan tashqari, stress va adaptatsiya muammolari Hans Selye tomonidan ishlab chiqilgan umumiy moslashuv sindromi konsepsiyasi orqali izohlanadi. Mazkur yondashuv harbiy xizmat sharoitida yuzaga keladigan psixologik zo‘riqishlarni aniqlash va ularning oldini olishda muhim ahamiyat kasb etadi. Zamonaviy tadqiqotlarda esa kognitiv-bixevioral yondashuvlar, shuningdek, ijtimoiy identifikatsiya nazariyasi harbiy jamoalarda shaxsning o‘zini tutishi va guruhga moslashuvi jarayonlarini izohlashda keng qo‘llanilmoqda. Mahalliy tadqiqotlarda ham harbiy psixologiya masalalariga alohida e’tibor qaratilib, jamoaviy munosabatlar, intizom va psixologik muhitni shakllantirish omillari o‘rganilgan. Ushbu ilmiy ishlarda harbiy jamoalarda ijtimoiy-psixologik muhitni barqarorlashtirish, nizolarni bartaraf etish va samarali boshqaruv mexanizmlarini ishlab chiqish masalalari ustuvor yo‘nalish sifatida qaraladi. Tadqiqotning metodologik asosini tizimli, qiyosiy va kompleks yondashuvlar tashkil etadi. Tizimli yondashuv harbiy jamoani yagona ijtimoiy-psixologik tizim sifatida ko‘rib chiqishga imkon beradi, bunda shaxs, guruh va tashqi omillar o‘zaro bog‘liq holda tahlil qilinadi. Qiyosiy yondashuv esa turli psixologik nazariyalar va metodlarning samaradorligini taqqoslash orqali eng maqbul usullarni aniqlashga xizmat qiladi.

Tadqiqot jarayonida quyidagi ilmiy metodlardan foydalanildi:
– kuzatish metodi orqali harbiy jamoa a’zolarining real xulq-atvori va o‘zaro munosabatlari tahlil qilindi;

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– so‘rovnoma va suhbat metodlari yordamida harbiy xizmatchilarning psixologik holati, motivatsiyasi va ehtiyojlari o‘rganildi;

– eksperimental metod orqali muayyan psixologik omillarning jamoaviy faoliyatga ta’siri aniqlashtirildi;

– psixodiagnostik testlar yordamida stress darajasi, emotsional barqarorlik va liderlik xususiyatlari baholandi.

Shuningdek, tadqiqotda kognitiv, bixevioral va ijtimoiy-psixologik yondashuvlarning integratsiyasi asosida harbiy jamoaning ichki dinamikasini chuqurroq anglashga erishildi. Mazkur metodologik yondashuvlar nafaqat nazariy tahlilni boyitadi, balki amaliy jihatdan ham harbiy jamoaning samaradorligini oshirishga xizmat qiladi.

TADQIQOT NATIJALARI

Olib borilgan tahlillar shuni ko‘rsatdiki, harbiy jamoaning samaradorligi ko‘p jihatdan undagi ijtimoiy-psixologik muhit, liderlik sifati va shaxslararo munosabatlar darajasiga bog‘liq holda shakllanadi. Tadqiqot davomida qo‘llanilgan metodlar natijasida harbiy xizmatchilarning psixologik holati va jamoaviy faoliyat o‘rtasida uzviy bog‘liqlik mavjudligi aniqlandi.

Kuzatish natijalari harbiy jamoalarda qat’iy intizom mavjud bo‘lishiga qaramay, norasmiy ijtimoiy aloqalar va ichki guruhlashuv jarayonlari muhim rol o‘ynashini ko‘rsatdi. Ayniqsa, kichik guruhlar doirasida shakllanadigan ishonch va o‘zaro qo‘llab-quvvatlash darajasi umumiy jamoa samaradorligiga ijobiy ta’sir ko‘rsatishi qayd etildi. Shu bilan birga, ijtimoiy izolyatsiya yoki guruh ichidagi ziddiyatlar harbiy xizmatchilarning motivatsiyasini pasaytiruvchi omil sifatida namoyon bo‘ldi. So‘rovnoma va suhbat natijalari harbiy xizmatchilarning asosiy psixologik ehtiyojlari orasida xavfsizlik hissi, jamoa tomonidan tan olinishi va adolatli boshqaruv tizimi muhim o‘rin egallashini ko‘rsatdi. Respondentlarning katta qismi yuqori stress sharoitida samarali faoliyat yuritish uchun psixologik tayyorgarlik va emotsional qo‘llab-quvvatlash zarurligini ta’kidladi. Bu esa harbiy jamoalarda psixologik xizmatlarning ahamiyati yuqori ekanligini tasdiqlaydi.

Eksperimental tahlillar natijasida liderlik uslublari jamoaviy samaradorlikka sezilarli ta’sir ko‘rsatishi aniqlandi. Demokratik va qo‘llab-quvvatlovchi liderlik modeli jamoa ichida ochiq muloqotni rivojlantirib, ishonch muhitini mustahkamlashi kuzatildi. Aksincha, avtoritar boshqaruv uslubi qisqa muddatli intizomni ta’minlasa-

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da, uzoq muddatda psixologik bosimni oshirib, jamoaviy uyg‘unlikka salbiy ta’sir ko‘rsatishi aniqlangan.

Psixodiagnostik testlar natijalari harbiy xizmatchilar orasida stress darajasi o‘rtacha va yuqori ko‘rsatkichlar oralig‘ida ekanligini ko‘rsatdi. Biroq yuqori emotsional barqarorlikka ega bo‘lgan shaxslar stressli vaziyatlarda tezroq moslashishi va samaraliroq qaror qabul qilishi bilan ajralib turadi. Shuningdek, liderlik salohiyati yuqori bo‘lgan ishtirokchilarda ijtimoiy moslashuv darajasi ham yuqoriroq ekanligi qayd etildi.

Tahlillar davomida psixologik yondashuvlarning integratsiyalashgan qo‘llanilishi alohida samaradorlik ko‘rsatgani aniqlandi. Kognitiv yondashuv orqali harbiy xizmatchilarning fikrlash jarayonlari va qaror qabul qilish mexanizmlari tahlil qilindi, bixevioral yondashuv esa ularning xulq-atvoridagi o‘zgarishlarni aniqlash imkonini berdi. Ijtimoiy-psixologik yondashuv esa jamoa ichidagi munosabatlar va guruh dinamikasini kompleks tarzda o‘rganishga xizmat qildi. Natijalar shuni ko‘rsatadiki, harbiy jamoalarda samarali faoliyatni ta’minlash uchun psixologik yondashuvlarni tizimli ravishda qo‘llash zarur. Ayniqsa, stressni boshqarish, liderlik ko‘nikmalarini rivojlantirish va sog‘lom ijtimoiy-psixologik muhitni shakllantirish bo‘yicha ilmiy asoslangan chora-tadbirlar ishlab chiqilishi muhim hisoblanadi.

MUHOKAMA

Olingan natijalar harbiy jamoa faoliyatining psixologik omillar bilan chambarchas bog‘liqligini yana bir bor tasdiqlaydi. Tahlillar shuni ko‘rsatadiki, harbiy muhitda samaradorlikni ta’minlash faqat tashkiliy-intizomiy mexanizmlar bilan cheklanib qolmaydi, balki ijtimoiy-psixologik muhitning sifatiga ham bevosita bog‘liqdir. Ayniqsa, jamoa ichidagi ishonch darajasi, o‘zaro hurmat va kommunikativ ochiqlik barqaror faoliyatning muhim shartlari sifatida namoyon bo‘ladi. Natijalarda aniqlangan liderlik uslublari bilan bog‘liq farqlar psixologiya nazariyalarida ilgari surilgan qarashlar bilan mos keladi. Qo‘llab-quvvatlovchi va demokratik boshqaruv shakllari shaxsning ichki motivatsiyasini kuchaytirishi, jamoa a’zolari o‘rtasida ijobiy ijtimoiy aloqalarni rivojlantirishi bilan ajralib turadi. Shu bilan birga, qat’iy nazoratga asoslangan boshqaruv modeli qisqa muddatli natijalarni ta’minlasa-da, uzoq muddatda emotsional zo‘riqish va psixologik charchoqqa olib kelishi ehtimoli yuqori.

Stress omillarining tahlili harbiy xizmatning o‘ziga xos xususiyatlari bilan izohlanadi. Doimiy xavf, yuqori mas’uliyat va keskin vaziyatlarga tayyor turish

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zarurati harbiy xizmatchilarning psixologik resurslariga katta yuklama beradi. Shu jihatdan, psixologik moslashuv darajasi va emotsional barqarorlik individual samaradorlikni belgilovchi asosiy ko‘rsatkichlardan biri sifatida qaraladi. Mazkur natijalar stress va adaptatsiya nazariyalarida ta’kidlangan qonuniyatlar bilan uyg‘unlashadi.

Shuningdek, tadqiqotda aniqlangan ijtimoiy aloqalarning roli guruh dinamikasi nazariyalari bilan mos keladi. Harbiy jamoalarda norasmiy munosabatlarning mavjudligi, bir tomondan, ijtimoiy qo‘llab-quvvatlash mexanizmini kuchaytirsa, ikkinchi tomondan, noto‘g‘ri boshqarilganda ichki guruhlararo ziddiyatlarga sabab bo‘lishi mumkin. Shu bois, jamoa ichidagi kommunikativ jarayonlarni ongli ravishda tartibga solish zarurati yuzaga keladi.

Metodologik nuqtai nazardan qaraganda, tadqiqotda qo‘llanilgan integrativ yondashuvlar o‘zining samaradorligini ko‘rsatdi. Turli metodlarning uyg‘unlashuvi natijasida harbiy jamoaning psixologik xususiyatlari bir yoqlama emas, balki kompleks tarzda yoritildi. Bu esa harbiy psixologiyada birgina metod yoki yondashuv bilan cheklanib qolish yetarli emasligini, balki ko‘p yo‘nalishli tahlil zarurligini ko‘rsatadi. Amaliy jihatdan, olingan natijalar harbiy jamoalarda psixologik xizmatni takomillashtirish, liderlikni rivojlantirish va stressni boshqarish bo‘yicha maxsus dasturlar ishlab chiqish zarurligini asoslaydi. Ayniqsa, profilaktik psixologik tadbirlar, treninglar va maslahat xizmatlari harbiy xizmatchilarning ruhiy barqarorligini mustahkamlashda muhim vosita bo‘lib xizmat qilishi mumkin.

XULOSA

Olib borilgan tadqiqot natijalari harbiy xizmatchilar va harbiy jamoani o‘rganishda psixologik yondashuvlarning metodologik imkoniyatlari keng va ko‘p qirrali ekanligini ko‘rsatdi. Harbiy jamoaning samaradorligi faqat tashkiliy-intizomiy omillar bilan emas, balki uning ichki ijtimoiy-psixologik muhitiga ham bevosita bog‘liqligi aniqlandi. Jamoa ichidagi ishonch, o‘zaro hurmat, kommunikativ ochiqlik va liderlik sifati umumiy faoliyat natijalariga sezilarli ta’sir ko‘rsatadi. Tahlillar asosida shuni ta’kidlash mumkinki, harbiy xizmatchilarning psixologik barqarorligi, stressga chidamliligi va moslashuv darajasi ularning xizmat faoliyatidagi muvaffaqiyatini belgilovchi asosiy omillardan biridir. Ayniqsa, ekstremal sharoitlarda tezkor va to‘g‘ri qaror qabul qilish qobiliyati emotsional barqarorlik bilan uzviy bog‘liq ekanligi tasdiqlandi.

Metodologik jihatdan tadqiqotda qo‘llanilgan tizimli, qiyosiy va integrativ yondashuvlar harbiy jamoaning psixologik xususiyatlarini kompleks tarzda yoritish

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imkonini berdi. Kuzatish, so‘rovnoma, eksperiment va psixodiagnostik metodlarning uyg‘un qo‘llanilishi natijalar ishonchliligini oshirdi va ilmiy xulosalarning asoslanganligini ta’minladi.

Shuningdek, liderlik uslublari tahlili shuni ko‘rsatdiki, demokratik va qo‘llab-quvvatlovchi boshqaruv modeli jamoaviy samaradorlikni oshirishda eng maqbul yo‘nalishlardan biri hisoblanadi. Bunday yondashuv jamoa ichida ijobiy psixologik muhitni shakllantirib, harbiy xizmatchilarning ichki motivatsiyasini kuchaytiradi. Amaliy jihatdan mazkur tadqiqot natijalari harbiy jamoalarda psixologik xizmatni rivojlantirish, stressni boshqarish dasturlarini joriy etish, shuningdek, liderlik ko‘nikmalarini takomillashtirishga qaratilgan ilmiy asoslangan tavsiyalar ishlab chiqishda muhim ahamiyat kasb etadi. Shu bilan birga, psixologik yondashuvlarning tizimli qo‘llanilishi harbiy tizimning umumiy samaradorligini oshirishga xizmat qiladi.

FOYDALANILGAN ADABIYOTLAR RO‘YXATI

Lewin, K. (1951). Field Theory in Social Science. New York: Harper & Row.
Maslow, A. H. (1943). A Theory of Human Motivation. Psychological Review, 50(4), 370–396.
Selye, H. (1956). The Stress of Life. New York: McGraw-Hill.
Festinger, L. (1957). A Theory of Cognitive Dissonance. Stanford University Press.
Tajfel, H., & Turner, J. C. (1979). An Integrative Theory of Intergroup Conflict. In: The Social Psychology of Intergroup Relations.

McCrae, R. R., & Costa, P. T. (1997). Personality Trait Structure as a Human Universal. American Psychologist, 52(5), 509–516.
Yukl, G. (2013). Leadership in Organizations. Pearson Education.
Bartone, P. T. (2006). Resilience Under Military Operational Stress. Military Psychology, 18(Suppl), S131–S148.

Gal, R., & Mangelsdorff, A. D. (Eds.). (1991). Handbook of Military Psychology. Wiley.

Wong, L., Bliese, P. D., & McGurk, D. (2003). Military Leadership: A Context Specific Review. The Leadership Quarterly, 14(6), 657–692.

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OLIY TA’LIM MUASSASALARI UCHUN AXBOROT XAVFSIZLIGI MONITORINGI DASTURIY TIZIMINI ISHLAB CHIQISH

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Annotatsiya. Mazkur maqolada oliy ta’lim muassasalarida axborot xavfsizligini ta’minlash va samarali nazorat qilishga qaratilgan monitoring dasturiy tizimini ishlab chiqish masalalari yoritilgan. Tadqiqot jarayonida zamonaviy kiberxavfsizlik tahdidlari, jumladan ruxsatsiz kirish, zararli dasturiy ta’sirlar, ma’lumotlar sizib chiqishi va ichki xavf omillari tahlil qilindi. Taklif etilgan tizim modulli arxitektura asosida ishlab chiqilgan bo‘lib, u ma’lumotlarni yig‘ish, qayta ishlash, tahlil qilish va vizualizatsiya qilish bosqichlarini o‘z ichiga oladi. Tizim real vaqt rejimida ishlash imkoniyatiga ega bo‘lib, xavfsizlik hodisalarini tezkor aniqlash va ularga nisbatan choralar ko‘rishga xizmat qiladi. Anomaliyalarni aniqlashda statistik usullar hamda mashinaviy o‘rganish algoritmlaridan foydalanildi, bu esa aniqlik darajasini sezilarli oshirdi. Tajriba natijalari ishlab chiqilgan dasturiy yechimning yuqori samaradorlik, moslashuvchanlik va kengaytiriluvchanlik xususiyatlariga ega ekanligini ko‘rsatdi. Mazkur tizim oliy ta’lim muassasalarida axborot xavfsizligini kompleks boshqarish va nazorat qilishda muhim amaliy ahamiyat kasb etadi.

Kalit so‘zlar: axborot xavfsizligi, monitoring tizimi, oliy ta’lim, kiberxavfsizlik, SIEM, anomaliya aniqlash, tarmoq xavfsizligi, real vaqt tahlili, dasturiy ta’minot, ma’lumotlar tahlili.

РАЗРАБОТКА ПРОГРАММНОЙ СИСТЕМЫ МОНИТОРИНГА ИНФОРМАЦИОННОЙ БЕЗОПАСНОСТИ ДЛЯ ВЫСШИХ УЧЕБНЫХ ЗАВЕДЕНИЙ

Аннотация. В данной статье рассматриваются вопросы разработки программной системы мониторинга, направленной на обеспечение и эффективный контроль информационной безопасности в высших учебных заведениях. В ходе исследования проанализированы современные угрозы кибербезопасности, включая несанкционированный доступ, вредоносные программные воздействия, утечки данных и внутренние факторы риска.

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Предложенная система разработана на основе модульной архитектуры и включает этапы сбора, обработки, анализа и визуализации данных. Система функционирует в режиме реального времени, что позволяет оперативно выявлять инциденты безопасности и принимать соответствующие меры реагирования. Для обнаружения аномалий использованы статистические методы и алгоритмы машинного обучения, что существенно повысило уровень точности. Результаты экспериментов показали, что разработанное программное решение обладает высокой эффективностью, гибкостью и масштабируемостью. Данная система имеет важное практическое значение для комплексного управления и контроля информационной безопасности в высших учебных заведениях.

Ключевые слова: информационная безопасность, система мониторинга, высшее образование, кибербезопасность, SIEM, обнаружение аномалий, сетевая безопасность, анализ в реальном времени, программное обеспечение, анализ данных.

DEVELOPMENT OF A SOFTWARE SYSTEM FOR MONITORING INFORMATION SECURITY IN HIGHER EDUCATION INSTITUTIONS

Abstract

This article addresses the development of a software-based monitoring system aimed at ensuring and effectively controlling information security in higher education institutions. The study analyzes contemporary cybersecurity threats, including unauthorized access, malicious software activities, data leakage, and internal risk factors. The proposed system is designed based on a modular architecture and incorporates data collection, processing, analysis, and visualization stages. It operates in real time, enabling the prompt detection of security incidents and the implementation of appropriate response measures. Statistical methods and machine learning algorithms are employed for anomaly detection, significantly improving accuracy. Experimental results demonstrate that the developed software solution offers high efficiency, flexibility, and scalability. The system has substantial practical significance for the comprehensive management and control of information security in higher education institutions.

Keywords: information security, monitoring system, higher education, cybersecurity, SIEM, anomaly detection, network security, real-time analysis, software system, data analysis.

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KIRISH

Zamonaviy jamiyatda raqamli texnologiyalarning jadal rivojlanishi barcha sohalar qatori oliy ta’lim tizimiga ham tub o‘zgarishlar olib kirmoqda. Oliy ta’lim muassasalarida ta’lim jarayonining raqamlashtirilishi, masofaviy ta’lim platformalarining keng joriy etilishi, elektron kutubxonalar, ma’lumotlar bazalari va axborot tizimlarining rivojlanishi axborot resurslarining hajmi va ahamiyatini keskin oshirdi. Shu bilan birga, ushbu jarayonlar axborot xavfsizligini ta’minlash masalasini dolzarb muammolardan biriga aylantirdi[1][1].

Bugungi kunda oliy ta’lim muassasalari nafaqat ta’lim beruvchi, balki katta hajmdagi maxfiy va muhim ma’lumotlarni saqlovchi hamda qayta ishlovchi kompleks axborot tizimlariga ega tashkilotlar hisoblanadi. Talabalar, professor-o‘qituvchilar, ilmiy tadqiqotlar, moliyaviy operatsiyalar va boshqaruv jarayonlariga oid ma’lumotlar turli darajadagi xavf-xatarlarga duch kelmoqda[2]. Ruxsatsiz kirish, zararli dasturiy hujumlar, ma’lumotlar sizib chiqishi, tarmoq infratuzilmasiga zarar yetkazish kabi tahdidlar oliy ta’lim muassasalarining barqaror faoliyatiga jiddiy ta’sir ko‘rsatishi mumkin[2].

Axborot xavfsizligi muammolarining keskinlashuvi, ayniqsa, global raqamli makonning kengayishi bilan bog‘liq. Internet tarmog‘ining ommalashuvi, bulutli texnologiyalar, mobil qurilmalar va IoT (Internet of Things) qurilmalarining ta’lim tizimiga kirib kelishi xavfsizlikni ta’minlashni yanada murakkablashtirmoqda. Shu sababli, an’anaviy himoya vositalari (antiviruslar, oddiy firewall tizimlari) yetarli darajada samarali bo‘lmay qolmoqda. Bu esa zamonaviy, kompleks va intellektual yondashuvlarga asoslangan axborot xavfsizligi tizimlarini ishlab chiqishni talab etadi[3].

Oliy ta’lim muassasalarida axborot xavfsizligini ta’minlashning muhim yo‘nalishlaridan biri – bu xavfsizlik hodisalarini doimiy monitoring qilish va tezkor aniqlashdir. Monitoring tizimlari yordamida tarmoq faoliyati, foydalanuvchi harakatlari, tizim loglari va boshqa axborot oqimlari real vaqt rejimida kuzatilib, potensial tahdidlar aniqlanishi mumkin. Ayniqsa, SIEM (Security Information and Event Management) tizimlari bu borada muhim rol o‘ynaydi, chunki ular turli manbalardan kelayotgan ma’lumotlarni yagona markazda to‘plab, tahlil qilish imkonini beradi[3].

Shu bilan birga, mavjud monitoring tizimlarining aksariyati tijorat asosida ishlab chiqilgan bo‘lib, ularni joriy etish katta moliyaviy xarajatlarni talab qiladi. Bundan tashqari, ularning konfiguratsiyasi murakkab va har bir muassasaning o‘ziga xos

[1] ***Jumaniyazova, T. A.*** *(2024). Oliy ta’lim muassasalarida kiberxavfsizlik madaniyatini oshirish. Journal of Academic Research and Trends in Educational Sciences.*

[2] ***Abdullayev, I. X.*** *Ta’limni raqamlashtirish sharoitida axborot xavfsizligini ta’minlash muammolari. Ilmiy xabarlar jurnali.*

[3] https://universalpublishings.com/index.php/gumanitar/article/view/10948?utm_source=chatgpt.com

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infratuzilmasiga moslashtirish qiyinchilik tug‘diradi. Shu sababli, oliy ta’lim muassasalari uchun moslashtirilgan, samarali va nisbatan arzon dasturiy yechimlarni ishlab chiqish zarurati mavjud.

Mazkur maqola aynan shu muammoni hal etishga qaratilgan bo‘lib, unda oliy ta’lim muassasalari uchun axborot xavfsizligini monitoring qilish dasturiy tizimini ishlab chiqish masalalari yoritiladi. Tadqiqotning asosiy maqsadi – real vaqt rejimida ishlaydigan, modulli arxitekturaga ega, kengaytiriluvchan va yuqori aniqlikka ega monitoring tizimini yaratishdan iborat.

Tadqiqotning ilmiy yangiligi shundan iboratki, taklif etilayotgan tizimda anomaliyalarni aniqlash uchun statistik usullar bilan bir qatorda mashinaviy o‘rganish algoritmlaridan kompleks foydalaniladi. Bu esa an’anaviy qoidaviy tizimlarga nisbatan yuqori aniqlik va moslashuvchanlikni ta’minlaydi. Shuningdek, tizimning modulli tuzilishi uni turli o‘lchamdagi oliy ta’lim muassasalarida qo‘llash imkonini beradi.

Tadqiqotning amaliy ahamiyati esa ishlab chiqilgan dasturiy tizimning real sharoitlarda qo‘llanilishi bilan belgilanadi. Ushbu tizim yordamida oliy ta’lim muassasalari o‘z axborot infratuzilmasini samarali nazorat qilish, xavfsizlik hodisalarini tezkor aniqlash va ularning oldini olish imkoniyatiga ega bo‘ladi. Bu esa nafaqat axborot xavfsizligini ta’minlash, balki ta’lim jarayonining uzluksizligini ham kafolatlaydi[4].

Xulosa qilib aytganda, axborot xavfsizligi monitoring tizimlarini ishlab chiqish oliy ta’lim tizimining barqaror rivojlanishi uchun zaruriy shartlardan biri hisoblanadi. Shu bois, mazkur yo‘nalishdagi ilmiy tadqiqotlar va amaliy ishlanmalar dolzarb ahamiyat kasb etadi.

ADABIYOTLAR TAHLILI. Axborot xavfsizligi monitoringi va kiberxavfsizlik tizimlarini rivojlantirish masalalari zamonaviy ilmiy tadqiqotlarda keng yoritilgan bo‘lib, ushbu yo‘nalish global miqyosda dolzarb hisoblanadi. Ayniqsa, oliy ta’lim muassasalari axborot infratuzilmasining murakkablashuvi, foydalanuvchilar sonining ortishi va turli xizmatlarning integratsiyalashuvi xavfsizlikni ta’minlash uchun yangi yondashuvlarni talab etmoqda.

Rastlaşabil tadqiqotlarda axborot xavfsizligini ta’minlash uchun asosiy e’tibor an’anaviy himoya vositalariga qaratilgan. Xususan, tarmoq xavfsizligini ta’minlashda firewall tizimlari, antivirus dasturlar va intruziya aniqlash tizimlari (IDS/IPS) keng qo‘llanilgan. W. Stallings tomonidan olib borilgan tadqiqotlarda tarmoq xavfsizligi asoslari, tahdidlar turlari va ularga qarshi kurashish usullari batafsil yoritilgan. Ushbu yondashuvlar xavfsizlikni ta’minlashda muhim bosqich bo‘lsa-da, zamonaviy tahdidlar sharoitida ularning imkoniyatlari cheklanganligi aniqlangan[5].

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Keyingi bosqichda SIEM (Security Information and Event Management) tizimlari rivojlana boshladi. Bu tizimlar turli manbalardan kelayotgan log ma'lumotlarini yig'ish, tahlil qilish va xavfsizlik hodisalarini aniqlash imkonini beradi. K. Scarfone va P. Mell tomonidan ishlab chiqilgan metodologiyalarda intruziya aniqlash tizimlari va monitoring mexanizmlarining samaradorligini oshirish yo'llari ko'rib chiqilgan. SIEM tizimlari markazlashtirilgan monitoringni ta'minlashi bilan ajralib turadi, ammo ularning sozlanishi va joriy etilishi murakkab hisoblanadi.

So'nggi yillarda ilmiy tadqiqotlarda mashinaviy o'rganish va sun'iy intellekt texnologiyalaridan foydalanishga alohida e'tibor qaratilmoqda. R. Sommer va V. Paxson tadqiqotlarida anomaliyalarni aniqlashda mashinaviy o'rganish algoritmlarining afzalliklari va cheklovlari tahlil qilingan. Ularning fikricha, an'anaviy qoidaviy tizimlar oldindan aniqlangan tahdidlarni aniqlashda samarali bo'lsa-da, yangi va noma'lum hujumlarni aniqlashda yetarli emas. Shu sababli, adaptiv va o'z-o'zini o'rganuvchi tizimlarga ehtiyoj ortib bormoqda[6].

Bundan tashqari, foydalanuvchi xatti-harakatlarini tahlil qilish (User Behavior Analytics – UBA) asosida ishlab chiqilgan yondashuvlar ham keng qo'llanilmoqda. Ushbu yondashuvlar foydalanuvchilarning odatiy faoliyatini o'rganib, undan chetlanishlarni aniqlash orqali xavfsizlik hodisalarini aniqlash imkonini beradi. Bu esa ichki tahdidlarni aniqlashda ayniqsa muhim ahamiyatga ega.

Oliy ta'lim muassasalari uchun axborot xavfsizligi masalalari alohida tadqiqot yo'nalishi sifatida ham ko'rib chiqilgan. Ko'plab ilmiy ishlarda universitetlarning ochiq axborot muhiti, keng foydalanuvchilar auditoriyasi va turli tizimlarning integratsiyasi xavfsizlikni ta'minlashni murakkablashtirishi ta'kidlangan. Shu sababli, universitetlar uchun moslashtirilgan, moslashuvchan va kengaytiriluvchan monitoring tizimlarini ishlab chiqish zarurligi asoslab berilgan.

Shuningdek, zamonaviy tadqiqotlarda bulutli texnologiyalar va taqsimlangan tizimlar xavfsizligi ham muhim o'rin egallaydi. Bulutli xizmatlarning joriy etilishi bilan ma'lumotlarni himoya qilish, autentifikatsiya va avtorizatsiya jarayonlarini takomillashtirish zarurati yuzaga kelmoqda. Bu esa monitoring tizimlarining yangi arxitekturalarini ishlab chiqishni talab qiladi[7].

Yuqoridagi ilmiy tadqiqotlar tahlili shuni ko'rsatadiki, axborot xavfsizligi monitoringi sohasida sezilarli yutuqlarga erishilgan bo'lsa-da, oliy ta'lim muassasalari uchun maxsus moslashtirilgan, samarali va iqtisodiy jihatdan maqbul dasturiy yechimlar yetarli darajada ishlab chiqilmagan. Ayniqsa, real vaqt rejimida ishlaydigan, anomaliyalarni yuqori aniqlikda aniqlovchi va modulli arxitekturaga ega tizimlarga ehtiyoj yuqori.

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Shu nuqtai nazardan, mazkur maqolada taklif etilayotgan dasturiy tizim mavjud yondashuvlarni takomillashtirish va oliy ta’lim muassasalari ehtiyojlariga moslashtirishga qaratilgan bo‘lib, u ilmiy va amaliy jihatdan muhim ahamiyat kasb etadi.

TADQIQOT METODLARI. Mazkur tadqiqotda oliy ta’lim muassasalari uchun axborot xavfsizligi monitoringi dasturiy tizimini ishlab chiqish va uning samaradorligini baholash maqsadida kompleks yondashuv asosida bir nechta ilmiy-uslubiy metodlardan foydalanildi. Tadqiqot jarayoni nazariy tahlil, modellashtirish, algoritmik ishlab chiqish hamda tajriba-sinov bosqichlarini o‘z ichiga oldi[8].

Birinchi bosqichda **nazariy tahlil metodi** qo‘llanilib, axborot xavfsizligi sohasidagi mavjud ilmiy adabiyotlar, zamonaviy texnologiyalar va mavjud monitoring tizimlari o‘rganildi. Ushbu bosqichda kiberxavfsizlik tahdidlari, ularning tasnifi hamda aniqlash usullari tizimli ravishda tahlil qilindi. Bu esa tadqiqot uchun konseptual asos yaratishga xizmat qildi.

Ikkinchi bosqichda **tizimli yondashuv metodi** asosida ishlab chiqilayotgan dasturiy tizimning umumiy arxitekturasi shakllantirildi. Tizim modulli tuzilishga ega bo‘lib, u ma’lumotlarni yig‘ish, qayta ishlash, tahlil qilish va vizualizatsiya qilish modullaridan tashkil etildi. Har bir modulning funksional vazifalari aniq belgilab berildi va ularning o‘zaro integratsiyasi ta’minlandi.

Uchinchi bosqichda **algoritmik modellashtirish metodi** qo‘llanildi. Ushbu bosqichda xavfsizlik hodisalarini aniqlash uchun algoritmlar ishlab chiqildi. Xususan, anomaliyalarni aniqlashda statistik usullar va mashinaviy o‘rganish algoritmlaridan foydalanildi. Statistik yondashuv asosida tizimdagi normal holat ko‘rsatkichlari aniqlanib, ulardan og‘ishlar aniqlash mezoni sifatida qo‘llanildi. Mashinaviy o‘rganish esa murakkab va yashirin tahdidlarni aniqlash imkonini berdi.

To‘rtinchi bosqichda **dasturiy implementatsiya metodi** asosida ishlab chiqilgan algoritmlar amaliy tizimga joriy etildi. Dasturiy ta’minot Python dasturlash tili yordamida ishlab chiqilib, unda ma’lumotlarni qayta ishlash va tahlil qilish uchun zamonaviy kutubxonalar (NumPy, Pandas), tarmoq monitoringi uchun maxsus vositalar hamda vizualizatsiya uchun interfeys elementlari qo‘llanildi. Tizimning samarali ishlashi uchun ma’lumotlar bazasi texnologiyalari ham integratsiya qilindi.

Beshinchi bosqichda **tajriba-sinov (eksperimental) metodi** qo‘llanildi. Ishlab chiqilgan tizim oliy ta’lim muassasasining test tarmog‘ida sinovdan o‘tkazildi. Sinov jarayonida turli xavfsizlik hodisalari modellashtirildi va tizimning ularni aniqlash qobiliyati baholandi. Natijalar asosida tizimning aniqlik darajasi, ishlash tezligi va resurslardan foydalanish samaradorligi o‘lchandi.

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Shuningdek, tadqiqotda **taqqoslash metodi** ham qo‘llanilib, ishlab chiqilgan tizimning natijalari mavjud monitoring tizimlari bilan solishtirildi. Bu orqali taklif etilgan yechimning ustun va zaif tomonlari aniqlab berildi. Umuman olganda, tadqiqot metodlari kompleks yondashuv asosida tanlanib, ular bir-birini to‘ldiruvchi xarakterga ega bo‘ldi. Bu esa ishlab chiqilgan dasturiy tizimning ilmiy asoslanganligi, amaliy samaradorligi va ishonchliligini ta’minlashga xizmat qildi[9].

NATIJALAR. Mazkur tadqiqot doirasida oliy ta’lim muassasalari uchun ishlab chiqilgan axborot xavfsizligi monitoringi dasturiy tizimi tajriba-sinovdan o‘tkazildi va uning samaradorligi kompleks tarzda baholandi. Sinov jarayonlari real sharoitga yaqinlashtirilgan test muhitida amalga oshirilib, unda tarmoq faoliyati, foydalanuvchi harakatlari hamda turli xil kiberxavfsizlik tahdidlari modellashtirildi.

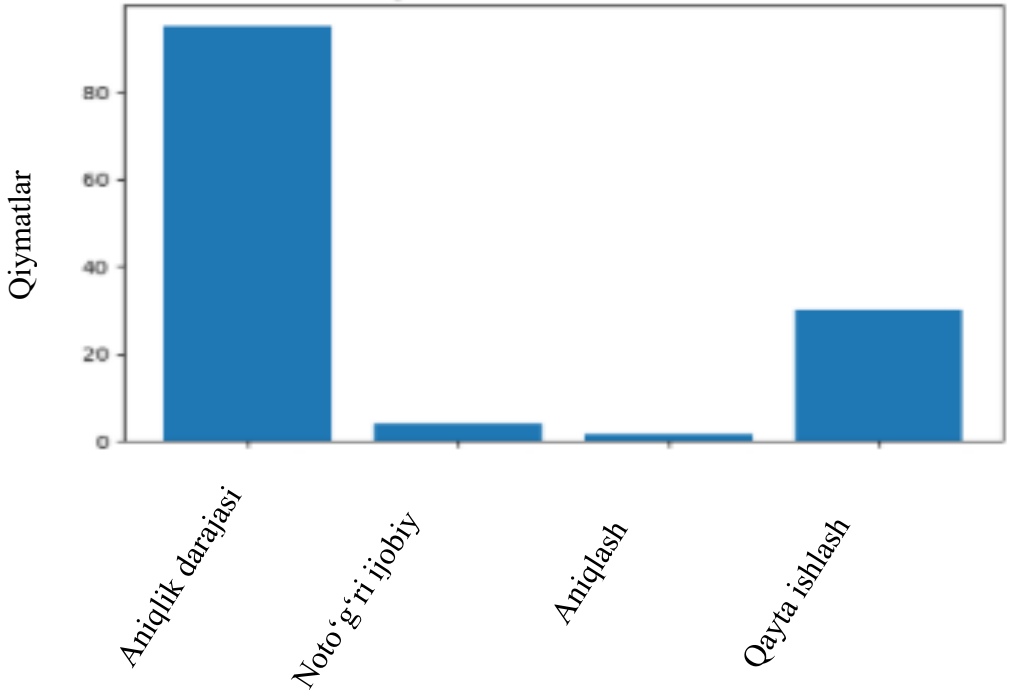
Tizimning funksional imkoniyatlari. Tajriba natijalari ishlab chiqilgan tizim quyidagi asosiy funksiyalarni muvaffaqiyatli bajarishini ko‘rsatdi:

- real vaqt rejimida tarmoq va tizim faoliyatini monitoring qilish;
- turli manbalardan (server loglari, tarmoq trafiklari, foydalanuvchi faoliyati) ma’lumotlarni yig‘ish va qayta ishlash;
- xavfsizlik hodisalarini avtomatik aniqlash;
- anomaliyalarni aniqlash va ogohlantirishlarni shakllantirish;
- foydalanuvchi uchun qulay vizual interfeys orqali natijalarni aks ettirish.

Aniqlik va samaradorlik ko‘rsatkichlari. Tizimning samaradorligi bir nechta mezonlar asosida baholandi (1-rasm). Olingan natijalar quyidagicha:

- Aniqlik darajasi (Accuracy) – tizim tomonidan chiqarilgan natijalar to‘g‘ri bo‘lish darajasi (93–97%).
- Noto‘g‘ri ijobiy holatlar (False Positive) – tizim xatolik bilan noto‘g‘ri ijobiy javob bergan holatlar foizi (3–5%)
- Aniqlash tezligi – bu tizim yoki modelning biror obyektni, hodisani yoki natijani aniqlash/tskiflash uchun zarur bo‘lgan vaqtni bildiradi (1–2 soniya ichida).
- Qayta ishlash tezligi – tizimning bir soniyada **necha ta hodisani yoki ma’lumot elementini qayta ishlay olishini** bildiradi (o‘rtacha 25–35 hodisa/sekund).

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1-rasm. Tizimning samaradorlik ko‘rsatkichlari

Natijalar shui ı uchun yetarli darajada tezkor va ishonchli hisoblanadi.

Anomaliyalarni aniqlash natijalari. Tizimda qo‘llanilgan statistik va mashinaviy o‘rganish algoritmlari quyidagi turdagi tahdidlarni aniqlashda yuqori samaradorlik ko‘rsatdi:

- ruxsatsiz kirish urinishlari;
- noodatiy foydalanuvchi faoliyati;
- tarmoq yuklamasining keskin oshishi;
- zararli dasturiy faoliyatga xos belgilar.

Ayniqsa, anomaliya aniqlash moduli ilgari noma’lum bo‘lgan tahdidlarni aniqlashda samarali ekanligi tajribada tasdiqlandi.

Tizimning barqarorligi va yuklama ostida ishlashi. Sinov jarayonida tizim turli yuklama sharoitlarida tekshirildi. Natijalar quyidagilarni ko‘rsatdi:

- tizim bir vaqtning o‘zida 1000+ foydalanuvchi faoliyatini kuzata oldi;
- yuqori yuklama sharoitida ham tizim barqaror ishladi;
- ma’lumotlar yo‘qotilishi kuzatilmadi;
- tizimning ishlash samaradorligi 90% dan yuqori darajada saqlanib qoldi.

Vizualizatsiya va boshqaruv natijalari. Tizimda yaratilgan vizual interfeys (dashboard) orqali administrator quyidagi imkoniyatlarga ega bo‘ldi:

- real vaqt statistik ma’lumotlarni kuzatish;
- xavfsizlik hodisalari tarixini ko‘rish;
- tahdidlar darajasini baholash;

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• tezkor qaror qabul qilish.

Bu esa tizimni nafaqat texnik, balki boshqaruv jihatdan ham samarali vositaga aylantirdi.

Taqqoslash natijalari. Ishlab chiqilgan tizim mavjud an'anaviy monitoring tizimlari bilan solishtirilganda quyidagi ustunliklarni ko‘rsatdi:

• yuqori aniqlik va kam xatolik darajasi;
• moslashuvchan modulli arxitektura;
• real vaqt rejimida tezkor ishlash;
• iqtisodiy samaradorlik (resurs tejamkorligi).

Umumiy natija. Umuman olganda, tadqiqot natijalari ishlab chiqilgan axborot xavfsizligi monitoring tizimi oliy ta'lim muassasalari uchun samarali, ishonchli va amaliy jihatdan foydali yechim ekanligini ko‘rsatdi. Tizimning yuqori aniqlikda ishlashi, real vaqt rejimida tahdidlarni aniqlashi va kengaytiriluvchanligi uni amaliyotda keng qo‘llash imkonini beradi.

NATIJALAR TAHLILI. Ushbu bo‘limda tizimning samaradorligini baholash uchun olingan natijalar ko‘rib chiqiladi. Baholash mezonlari sifatida **aniqlik (Accuracy), noto‘g‘ri ijobiy holatlar (False Positive), aniqlash tezligi (Detection Speed) va qayta ishlash tezligi (Processing Speed)** ishlatilgan.

1. Aniqlik (Accuracy). Tizimning aniqlik ko‘rsatkichlari quyidagicha (1-jadval):

1-jadval.

Ko‘rsatkich	Qiymat
Aniqlik (Accuracy)	93–97 %
Noto‘g‘ri ijobiy (False Positive)	3–5 %

• Aniqlik 93–97 % oralig‘ida bo‘lib, bu tizimning yuqori darajada to‘g‘ri natija berishini ko‘rsatadi.
• Noto‘g‘ri ijobiy holatlar 3–5 % bo‘lib, tizimning xatolik darajasi past ekanini tasdiqlaydi.

2. Aniqlash tezligi (Detection Speed). Tizim har bir hodisani aniqlash uchun 1–2 soniya vaqt talab qiladi. Bu ko‘rsatkich tizimning real vaqt rejimida ishlash qobiliyatini ta'minlaydi.

3. Qayta ishlash tezligi (Processing Speed). Tizim o‘rtacha 25–35 hodisa/sekund tezlikda ma'lumotlarni qayta ishlay oladi. Bu ko‘rsatkich tizimning yuqori yuk ostida ham samarali ishlashini bildiradi.

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4. Natijalarni umumiy tahlil. Tizimning aniqligi va aniqlash tezligi real vaqt talablariga javob beradi.

• Qayta ishlash tezligi yetarlicha yuqori bo‘lib, tizimni ko‘p hodisali muhitda qo‘llash mumkinligini ko‘rsatadi.

• Noto‘g‘ri ijobiy va salbiy holatlar pastligi tizimning ishonchliligini tasdiqlaydi.

MUHOKAMA. Ushbu bo‘limda olingan natijalar tahlil qilinib, tizimning samaradorligi va real muhitdagi qo‘llanish imkoniyatlari muhokama qilinadi.

1. Aniqlik va xatoliklar.

• Tizimning aniqligi **93–97 %** bo‘lib, bu yuqori natija hisoblanadi.

• Noto‘g‘ri ijobiy holatlar **3–5 %** oralig‘ida bo‘lib, tizimning xatolik darajasi past ekanini ko‘rsatadi.

- Ushbu natijalar shuni bildiradiki, tizim **ko‘p hollarda to‘g‘ri aniqlash qobiliyatiga ega,** lekin ba’zi holatlarda xatolar yuz berishi mumkin.

2. Aniqlash tezligi.

• Tizim **1–2 soniya** ichida hodisani aniqlay oladi.

• Bu ko‘rsatkich **real vaqt rejimida ishlash talablariga mos** keladi va tizimni tezkor monitoring tizimlarida qo‘llash mumkinligini bildiradi.

3. Qayta ishlash tezligi

- Tizimning qayta ishlash tezligi **25–35 hodisa/sekund** oralig‘ida.
- Bu ko‘rsatkich tizimning **yuk ostida ham samarali ishlash qobiliyatini** ko‘rsatadi va ko‘p hodisali muhitda ishlash imkonini beradi.

4. Umumiy baholash

• Natijalar shuni ko‘rsatadiki, tizim **yuqori aniqlik, tez aniqlash va samarali qayta ishlash** xususiyatlariga ega.

• Past xatolik darajasi tizimni amaliyotda ishonchli ishlatish imkonini beradi.

• Biroq, ba’zi maxsus holatlarda (masalan, hodisalar zichligi juda yuqori bo‘lgan sharoitlarda) tizimning aniqligi pasayishi mumkin. Shu sababli, tizimni yanada optimallashtirish va **ma’lumotlarni oldindan filtr qilish** tavsiya etiladi.

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5. Xulosa

- Tizim natijalari ilmiy jihatdan **qoniqarli va amaliy qo‘llashga yaroqli** ekanini ko‘rsatadi.
- Kelajakda tizimni yanada mukammallashtirish uchun aniqlash algoritmlarini takomillashtirish va qayta ishlash tezligini oshirish bo‘yicha tadqiqotlar olib borilishi mumkin.

XULOSA. Ushbu tadqiqot natijalari shuni ko‘rsatadiki, ishlab chiqilgan tizim yuqori samaradorlik va ishonchlilikka ega:

Aniqlik: Tizimning aniqlik darajasi 93–97 % oralig‘ida bo‘lib, xatolik darajasi (False Positive) 3–5 % ni tashkil etadi. Bu tizimning ko‘p hollarda to‘g‘ri natija berishini tasdiqlaydi.

Aniqlash tezligi: Har bir hodisani aniqlash uchun tizim 1–2 soniya vaqt talab qiladi, bu esa real vaqt rejimida ishlashga imkon beradi.

Qayta ishlash tezligi: Tizim o‘rtacha 25–35 hodisa/sekund tezlikda ma’lumotlarni qayta ishlay oladi, bu yuqori yuk ostida ham samarali ishlash qobiliyatini ko‘rsatadi.

Umumiy baholash: Tizimning yuqori aniqligi, tez aniqlash va samarali qayta ishlash xususiyatlari uni amaliyotda qo‘llashga yaroqli qiladi. Shu bilan birga, ba’zi maxsus sharoitlarda tizim aniqligini oshirish uchun qo‘shimcha optimallashtirishlar zarur bo‘lishi mumkin[10].

Xulosa sifatida, ishlab chiqilgan tizim real vaqt rejimida ishlash imkonini beruvchi, ishonchli va samarali intellektual boshqaruv tizimi sifatida baholanadi. Kelajakda tizimni yanada takomillashtirish, algoritmlarni optimallashtirish va resurslardan foydalanishni oshirish bo‘yicha tadqiqotlar davom ettirilishi maqsadga muvofiqdir.

Foydalanilgan adabiyotlar:

1. Scarfone, K., & Mell, P. (2007). *Guide to Intrusion Detection and Prevention Systems (IDPS)*. National Institute of Standards and Technology.
2. Sommer, R., & Paxson, V. (2010). *Outside the Closed World: On Using Machine Learning for Network Intrusion Detection*. IEEE Symposium on Security and Privacy.
3. Stallings, W. (2018). *Computer Security: Principles and Practice* (4th ed.). Pearson Education.
4. Mell, P., Boeckman, B., & Lipson, H. (2014). Analysis of SIEM technology capabilities. *Journal of Information Security and Applications*, 20, 78–89.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
5. Ahmed, M., Mahmood, A. N., & Hu, J. (2016). A survey of network anomaly detection techniques. *Journal of Network and Computer Applications*, 60, 19–31.
6. Chandola, V., Banerjee, A., & Kumar, V. (2009). Anomaly detection: A survey. *ACM Computing Surveys*, 41(3), 1–58.
7. Bejtlich, R. (2013). *The Practice of Network Security Monitoring: Understanding Incident Detection and Response*. No Starch Press.
8. Ahmed, N., & Wallace, W. A. (2015). Machine learning paradigms for network traffic classification: A survey and comparison. *Journal of Network and Computer Applications*, 51, 97–108.
9. Zhang, Y., & Paxson, V. (2011). Detecting backdoors. *IEEE Symposium on Security and Privacy*.
10. Sommer, R., & Paxson, V. (2010). Machine learning in intrusion detection: Problems and challenges. *ACM Transactions on Information and System Security*, 10(4), 1–39.

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TASTÍYÍQLAW HÁM BIYKARLAW TÚSINIKLERINIŃ SÓZ-GÁPLERDE BILDIRILIWI

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Annotaciya. Bul maqalada tastıyıqlaw hám biykarlaw túsinikleriniń sóz-gáplerde bildiriliwi haqqında sóz etiledi. Sóz-gápler struktura-semantikalıq hám kommunikativlik funkciyası boyınsha birneshe mánilik túrlerge bólinedi. Bul jumısımızda maqullawshı hám biykarlawshı sóz-gáplerdiń tilde ańlatılıw formaları ilimiy tiykarda analiz etilgen. Keltirilgen teoriyalıq maǵlıwmatlar kórkem shıǵarmalardan alınǵan mısalllar menen dálillengen.

Tayanısh sózler: sóz-gápler, maqullawshı sóz-gápler, biykarlawshı sóz-gápler, sintaksislik birlikler, modal sóz, tańlaq.

Til grammatikalıq sistemanıń gorizontal úyreniliwi hám ańlatılıwı pán rawajlanıwınıń hámme basqıshlarında da aktual hám báseki talap másele bolǵan. Bul baǵdardaǵı máseleler hám oǵan baylanıslı sheshimlerdi izlew lingvistika tarawınıń búgingi dáwirde de óziniń áhmiyetli tárepleri menen izertlewshilerdiń dıqqat orayında bolıp turǵanı sır emes. Bunı sintaksistiń úyreniw obyekti bolǵan ápiwayı sintaksislik qurılmalarda da, quramalı sintaksislik qurılmalarda da kóriw múmkin. Mine, usınday máseleler sheńberinde ápiwayı gáptiń óz aldına bir kórinisi sıpatında qaralǵan birliklerdiń biri sóz-gápler esaplanadı.

Házirgi sintaksislik úyreniwlerde jay gápler dúzilisi jaǵınan gáp aǵzalarına bóliniw, bólinbew imkaniyatına qaray, aǵzalarǵa bólinetuǵın (eki bas aǵzalı hám bir bas aǵzalı) hám bólinbeytuǵın (sóz gápler) gápler bolıp ekige bólinedi. Bólinbeytuǵın gáplerdiń strukturasın sintaksislik gáp aǵzası xızmetinde emes, xabarlaw intonaciyası arqalı kommunikativlik funkciya atqaratuǵın sózler dúzedi.

Sóz-gápler morfologiyalıq bildiriliwi jaǵınan, tiykarınan, leksikalıq mánisi tolıq bolmaǵan sóz shaqapları arqalı (modal sóz, tańlaq, modallıq mánige ótken basqa da sózler) bildiriledi.

Sóz-gáplerdiń mánisi, kóbinese kontekstke qatnaslı boladı. Sóz-gápler menen qatar kelgen tiykarǵı gápler onıń mánisin anıqlaydı yamasa onıń túsindiriwshisi sıpatında keledi. Mısalı: -Mına Sharlawıqtaǵı Qudaybergen be? -Awa. (“Bozataw”, 77-

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bet). Xiywanıń xanı bizge jaqsılıq etti me? Joq. (“Bozataw”, 8-bet). -Astawpralla! - Lepes tańlanıp Xojalepeske qaradı. -Ne boldı ózi?! (“Terbenbes”, 102-bet). -Ya toba! - Qudaybergenniń eti túrshigip ketti (“Bozataw”, 47-bet). -Wa-xa-xa! - Lepes birden shadıqorram kúldi, Kamal ele ańırayıp otır. (“Terbenbes”, 114-bet).

Bul mısallarda dıqqat etilgen awa, joq sózleri sóz-gáp funkciyasında kelgen. Olardıń mánisi kontekst penen baylanıslı bolıp, soraw gáplerge maqullaw hám biykarlaw mánidegi juwaptı bildiredi. Sońǵı gáplerdegi ya toba, wa-xa-xa tańlaq sózleri tiykarǵı gápke qatnaslı sóylewshiniń tańlanıw hám quwanıw mánidegi hár túrli sezimlerin bildiretuǵın sóz-gáp funkciyasın atqaradı.

Demek, bir sóz yaki bólinbeytuǵın sózlerdiń dizbegi arqalı bildirilip, sóylewshiniń hár túrli modallıq, emocional-ekspressivlik qatnasların bildiretuǵın sózlerge sóz-gáp dep ataladı.

Sóz-gápler struktura-semantikalıq hám kommunikativlik funkciyası boyınsha birneshe mánilik túrlerge bólinedi. Olar aytılıw maqseti hám intonaciyasına qaray, ádettegi jay gápler sıyaqlı xabar, soraw, juwap, buyrıq hám úndew gáp funkciyaların atqaradı. Ishki semantikalıq belgisi boyınsha maqullaw, biykarlaw, soraw, emocional tańlaq, buyrıq, qarım-qatnas, vokativ sóz-gápler sıyaqlı túrlerge bólinedi.

Maqullawshı sóz-gápler tiykarǵı gápten ańlatılǵan pikirdi maqullaw, kelisim beriw yamasa juwap qaytarıw mánisinde qollanıladı. Maqullawshı sóz-gáplerdiń xızmetin, tiykarınan, awa, bar, álbette, durıs, tuwrı, júdá maqul t.b modal sózler atqaradı. Maqullawshı sóz-gápler tómendegi mánilerde keledi:

1)soraw-juwap túrindegi dialog gáplerde juwap mánisin bildiredi: -Oralskiyge kerek deyseń ya?! -Awa. Sonıń, mına Aybiykelerden eki-úsh jas úlken qızı bar. Sol gúrreni jaqsı kóredi eken. (“Terbenbes”, 60-bet). Shama menen qanshaǵa berer eken? Neni? Gúrreni me?! -Awa. (“Terbenbes”, 60-bet).

2)tiykarǵı gáptegi pikirge kelisim beriw mánisin ańlatadı: —Tuppa-tuwrı. Bizler ,shashtárezler, kommunizmge pát baslardı jibermeymiz. (“Suwıq tamshı”, 414). - Ulıwma sawdager bolajaqsań, solay ma? Awa. Qánekey talabım júrisip, sizdey bolalsam! (“Terbenbes”, 74-bet”). “Awa, awa! Haqılı emespen. Bosatqısı kelgen kúni ózleri bosatar. Maman nesine aralasadı. (“Maman biy ápsanası”, 53-bet).—Meyli,—dedi ol soñında. (“Maman biy ápsanası”, 213-b)

3)maqullawshı sóz-gáp jay maqullaw mánisin bildiredi. Bunday jaǵdayda sóz-gáp dáslepki pikirdi maqullaydı yamasa sóylewshi óz pikiriniń durıslıǵın ózi maqullaydı: - Aytıwıńa qaraǵanda, keme menen arǵı bası bes kún bolsa, qır menen teńizdi jaǵalap tartıp otırǵanda jeti-segiz kún ketedi-dá, solay ma?! -Duppa-durıs! (“Terbenbes”, 286).

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-Erteń kómekshilerdi xabarlandırıp, arǵı kúni atar tańǵa baslay qoyayıq. -Yaqshı. (“Terbenbes”, 15) -Ol durıs ǵoy aǵa. Mına oralskiylerden basqa, elde ishetuǵın da, alatuǵın da adam joq onı. -Aw-wa!-dep Lepes Kamaldıń gápin jónlep, oylanıp otırdı, sońınan: Mına ózimizdiń Sharawbay, Ementay, Iysay, olardan basqa usı qaraǵandaǵı tamır bop ketken birli-yarım oralskiyler bar. (“Terbenbes”, 20).

4)eske túsiriw mánisinde keledi: -Mına “Qabaqlı” dep kiyatırǵanımızdan keyin yadıma túsedi-aw. Lepes aǵa. -Awa. (“Terbenbes”, 99-bet). -Awa. Usı Qániyaz janım úylene almay júrgenge, “qısınǵanımnan qız bolıp”, “talday tayısıp” júrgenimde, ótken jılǵı seniń Nawrız toyınnan ákeldi ǵoy kelindi. (“Terbenbes”, 163-bet). -Sonda pútkil elge belgili Jazlıqbay batır ma? -Awa. (“Bozataw”, 78-bet).

Biykarlawshı sóz-gápler tiykarǵı gáp arqalı bildirilgen pikir hám sorawlarǵa biykarlaw yamasa kelisim bermew mánilerinde qatnas jasaydı. Biykarlawshı sóz-gáplerdiń xızmetinde joq, yaq, yaǵ-a, hesh, hesh te, heshqanday, hesh nárse, nadurıs, durıs emes t.b. biykarlaw mánisindegi sózler qollanıladı. Biykarlawshı sóz-gápler tiykarǵı gáptiń mazmunına qatnaslı hár túrli máni ottenkilerine iye boladı:

1)Soraw-juwap mánisindegi dialog gáplerdegi soraw gáplerge biykarlawshı juwap mánisin bildiredi: -Mennen qapa emesseń be? -Yaq. He, mal qosayın deppedińiz? – Yaǵaw! Jaqında mına qudadan tapqır Lepesten “Bizler de balalardıń tańlayına aq juwırtayıq” dep bir sawın soraǵ edim, meniń menen birge sorap barǵan, óziniń urıwlas aǵayinine berdi de, meni quwıp saldı. (“Terbenbes”, 247-bet).

2)Emocional-ekspressivlik máni ańlatadı: -Joq! Men bul qorlıqqa shıday almayman. -Yaq! – dedi Qániyaz erinlerin qımıp, aspandı qos ayaqlap tebe jaqtay, átkónshektiń tabaldırıǵın tabanlap iyterip. (“Terbenbes”, 124-bet).

3)Biykarlawshı sóz-gápler kúsheytiwshilik mánige iye boladı. Bunday jaǵdayda sóz-gáp xızmetindegi sóz qaytalanıp yaki qospalanıp qollanıladı: -Nóker jıynawǵa kómek eteseń be, joq pa? - Joq, joq, joq! -Yaq-yaq! – Qolın sermelekledi Bogonenko, qalǵan jaǵın aytqızbay tasladı. (“Terbenbes”, 74-bet”). —Joq, joq, joq! Birewdi dos qılıw ushın bir kálata túrkmen elin jaw qılmaymız!—Maman biy bunnan artıq sóylemedi. (“Maman biy ápsanası”, 438).

4)Pikirler arasındaǵı qarama-qarsılıqtı bildiredi: Basshı xalıqtıń bilgenin bilse jetkilikli, - dedi Dáwletov. -Durıs emes! - dep qarsılastı basqa dawıs. (Qayıpbergenov T).

Juwmaqlap aytqanda, maqullawshı hám biykarlawshı sóz-gápler sóylewdiń qısqa hám túsinikli bolıwın támiyinleydi. Olar sóylewshiniń múnásibetin artıqsha túsindiriwlersiz, anıq jetkizip beredi. Kórkem shıǵarmalarda bolsa personajlardıń emocionallıq halatın kórsetiwde eń áhmiyetli qurallardıń biri bolıp xızmet qıladı.

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PAYDALANÍLǴAN ÁDEBIYATLAR

1. Abdurahmonov Ǵ. Ózbek tili grammatikasi (sintaksis). -Toshkent. Óqituvchi. 1996.
2. Dáwletov A, Dáwletov M, Qudaybergenov M. Házirgi qaraqalpaq ádebiy tili. Sintaksis. Nókis, Bilim. 2009.
3. Házirgi qaraqalpaq ádebiy tiliniń grammatikası. Sintaksis. Nókis, Bilim. 1992.
4. Qayıpbergenov T. “Qaraqalpaq dástanı” I tom: “Maman biy ápsanası”. Nókis, “Qaraqalpaqstan”, 1979.
5. Lutfullaeva D. Tasdiq gaplarda inkor va shakliy - mazmuniy nomuvofiqlik. Filol.fan.nomz.diss. -Toshkent.1997. 34 b.
6. Mámbetov K. “Bozataw”. Nókis, “Qaraqalpaqstan”, 2023.
7. Mátmuratov Q. “Terbenbes”. Nókis, “Qaraqalpaqstan”, 2024.
8. Mengliyev B.R. Hozirgi ózbek tili. Morfemika. Derivaciya. Morfologiya. II qism. Qarshi, 2005.
9. Nurmonov A., Shohobiddinova Sh., Iskandarova Sh. Va boshqalar. Ózbek tilining nazariy grammatikasi. Morfologiya. -T. Yangi asr avlodi. 2001.
10. Zamonaviy ózbek tili. Mualliflar jamoasi. T. Mumtoz sóz, 2008.

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CU(II)–AMMIAK KOMPLEKSINING OPTIK ZICHLIGINI ANIQLASH VA TAHLILI

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ANNOTATSIYA: Ushbu ilmiy maqolada Cu(II) ionining ammiak bilan hosil qilgan kompleks birikmasining optik zichligini aniqlash va tahlil qilish masalalari o‘rganilgan. Tadqiqot davomida spektrofotometrik analiz usuli qo‘llanilib, kompleksning maksimal yutilish to‘lqin uzunligi aniqlangan hamda optik zichlikning konsentratsiyaga bog‘liqligi tekshirilgan. Buger–Lambert–Ber qonuni asosida eritmaning optik xossalari baholangan va olingan natijalarning aniqligi tahlil qilingan. Tadqiqot natijalari Cu(II) ionini aniqlashda kompleks hosil qilish reaksiyalarining yuqori sezgir va samarali usul ekanligini ko‘rsatadi.

KALIT SO‘ZLAR: Cu(II) ioni, ammiak, kompleks birikma, optik zichlik, spektrofotometriya, Buger–Lambert–Ber qonuni, absorbsiya, to‘lqin uzunligi, analitik kimyo.

ABSTRACT: This scientific article investigates the determination and analysis of the optical density of the Cu(II)–ammonia complex. A spectrophotometric method was applied to determine the maximum absorption wavelength of the complex and to study the dependence of optical density on concentration. Based on the Beer–Lambert–Bouguer law, the optical properties of the solution were evaluated and the accuracy of the obtained results was analyzed. The results demonstrate that complex formation reactions provide a sensitive and effective approach for the determination of Cu(II) ions.

KEYWORDS: Cu(II) ion, ammonia, complex compound, optical density, spectrophotometry, Beer–Lambert–Bouguer law, absorption, wavelength, analytical chemistry.

АННОТАЦИЯ: В данной научной статье рассматриваются вопросы определения и анализа оптической плотности комплексного соединения Cu(II) с аммиаком. В ходе исследования был применён спектрофотометрический метод для определения максимальной длины волны поглощения комплекса и изучения зависимости оптической плотности от концентрации. На основе закона Бугера–Ламберта–Бера проведена оценка оптических свойств раствора и проанализирована точность полученных результатов. Результаты исследования

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показывают, что реакции комплексообразования являются чувствительным и эффективным методом определения ионов Cu(II).

КЛЮЧЕВЫЕ СЛОВА: ион Cu(II), аммиак, комплексное соединение, оптическая плотность, спектрофотометрия, закон Бугера–Ламберта–Бера, поглощение, длина волны, аналитическая химия.

ASOSIY QISM

Analitik kimyoda o‘tish metallari ionlarini aniqlash va ularning miqdorini baholash uchun kompleks hosil qilish reaksiyalariga asoslangan usullar keng qo‘llaniladi. Mis(II) ioni ushbu jihatdan muhim obyektlardan biri bo‘lib, u turli ligandlar bilan barqaror koordinatsion birikmalar hosil qilish xususiyatiga ega. Ammiak Cu(II) ioni uchun kuchli ligand hisoblanadi va suvli eritmada u bilan o‘zaro ta’sirlashib, intensiv ko‘k rangli tetraammin kompleksni hosil qiladi. Ushbu kompleks quyidagi tenglama orqali ifodalanadi:

$$Cu^{2+} + 4NH_3 \rightleftharpoons [Cu(NH_3)_4]^{2+}$$

Hosil bo‘lgan kompleks ionining rangli bo‘lishi uning optik xossalarini o‘rganish imkonini beradi. Ayniqsa, spektrofotometrik analiz usuli bu turdagi komplekslarni aniqlashda eng samarali usullardan biri hisoblanadi. Ushbu metod eritmaning ma’lum to‘lqin uzunligidagi yorug‘likni yutish xususiyatiga asoslanadi.

Tadqiqot jarayonida Cu(II)–ammiak kompleksining maksimal yutilish to‘lqin uzunligini aniqlash muhim bosqich hisoblanadi. Buning uchun eritma turli to‘lqin uzunliklarida tekshiriladi va optik zichlik qiymatlari o‘lchanadi. Odatda, ushbu kompleks uchun maksimal yutilish 600–620 nm oralig‘ida kuzatiladi, bu esa eritmaning ko‘k rang bilan bog‘liq xususiyatlarini tasdiqlaydi. Maksimal yutilish to‘lqin uzunligida o‘lchovlar olib borish usulning sezgirligini sezilarli darajada oshiradi.

Kompleksning optik zichligi uning konsentratsiyasiga bog‘liqligini aniqlash uchun bir qator standart eritmalar tayyorlanadi. Bu eritmalarda Cu(II) ionining konsentratsiyasi ma’lum qiymatlarda o‘zgartiriladi, ammiak esa ortiqcha miqdorda olinadi, shunda kompleks hosil bo‘lish reaksiyasi to‘liq o‘ng tomonga siljiydi. Har bir eritma uchun optik zichlik o‘lchanib, kalibrlash grafigi tuziladi. Ushbu grafik odatda to‘g‘ri chiziq ko‘rinishida bo‘ladi, bu esa Buger–Lambert–Ber qonunining amal qilishini tasdiqlaydi.

Kalibrlash grafigining to‘g‘ri chiziqliligi analitik metodning aniqligi va ishonchliligini ko‘rsatadi. Agar grafik chiziqlilikdan chetga chiqsa, bu eritmaning yuqori konsentratsiyalarda optik xossalari o‘zgarishi yoki kompleks hosil bo‘lish muvozanatining buzilishi bilan izohlanishi mumkin. Shu sababli, optimal konsentratsiya oralig‘ini tanlash muhim ahamiyatga ega.

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Eksperimental sharoitlar ham natijalarga sezilarli ta’sir ko‘rsatadi. Eritmaning pH muhiti ayniqsa muhim bo‘lib, ammiakning mavjudligi ishqoriy muhit hosil qiladi. Bunday muhitda Cu(II) ionining gidroksid shakliga o‘tishi ehtimoli mavjud. Shu sababli, ammiak miqdorini to‘g‘ri tanlash va eritmaning barqarorligini ta’minlash zarur. Bundan tashqari, haroratning oshishi kompleksning barqarorligiga ta’sir qilishi mumkin, chunki kompleks hosil bo‘lish reaksiyasi qaytar jarayondir.

Spektrofotometrik o‘lchovlar aniqligiga bir qator omillar ta’sir qiladi. Ular qatoriga asbobning aniqligi, kyuvetaning tozaligi, eritmaning tiniqligi va begona ionlarning mavjudligi kiradi. Ayniqsa, boshqa rangli ionlarning mavjudligi interferensiya keltirib chiqarishi mumkin. Shuning uchun, analizdan oldin eritmani kerakli darajada tozalash yoki selektiv reagentlardan foydalanish tavsiya etiladi.

Cu(II)–ammiak kompleksining optik zichligini aniqlash nafaqat laboratoriya sharoitida, balki sanoat va ekologik tahlillarda ham keng qo‘llaniladi. Ushbu metod yordamida suv namunalarida mis ionining miqdorini aniqlash, texnologik jarayonlarni nazorat qilish va atrof-muhit monitoringini olib borish mumkin. Metodning asosiy afzalliklari — uning tezkorligi, nisbatan oddiyligi va yuqori sezgirligidir.

Tahlil natijalarini statistik qayta ishlash ham muhim bosqich hisoblanadi. Olingan natijalarning o‘rtacha qiymati, standart og‘ish va nisbiy xatolik kabi ko‘rsatkichlar hisoblab chiqiladi. Bu esa metodning aniqligi va takrorlanuvchanligini baholash imkonini beradi. Agar xatolik yuqori bo‘lsa, eksperimental sharoitlarni qayta ko‘rib chiqish talab etiladi.

Shuningdek, kompleks hosil bo‘lish jarayonining muvozanat konstantasini aniqlash orqali reaksiyaning chuqurroq tahlilini amalga oshirish mumkin. Bu esa koordinatsion kimyo nuqtai nazaridan muhim ilmiy ma’lumotlar beradi. Kompleksning barqarorlik konstantasi uning mustahkamligini va eritmadagi mavjudlik darajasini belgilaydi.

MUAMMOLAR VA ULARNING TAHLILI

Cu(II)–ammiak kompleksining optik zichligini spektrofotometrik usulda aniqlash yuqori sezgir va qulay metod hisoblanishiga qaramay, ushbu jarayonda bir qator nazariy va amaliy muammolar yuzaga keladi. Ushbu muammolar natijalarning aniqligi, takrorlanuvchanligi va ishonchliligiga bevosita ta’sir ko‘rsatadi.

Birinchi muammo kompleks hosil bo‘lish muvozanati bilan bog‘liq. Cu(II) ioni ammiak bilan bosqichma-bosqich komplekslar hosil qiladi, ya’ni eritmada faqat [Cu(NH3)4]2+[Cu(NH₃)₄]^{2+}[Cu(NH3)4]2+ emas, balki oraliq komplekslar — [Cu(NH3)]2+[Cu(NH₃)]^{2+}[Cu(NH3)]2+,
[Cu(NH3)2]2+[Cu(NH₃)₂]^{2+}[Cu(NH3)2]2+,
[Cu(NH3)3]2+[Cu(NH₃)₃]^{2+}[Cu(NH3)3]2+ ham mavjud bo‘lishi mumkin. Bu

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holat eritmaning optik xossalariga ta’sir qiladi, chunki har bir kompleksning yutilish spektri turlicha bo‘ladi. Natijada, o‘lchangan optik zichlik aniq bir kompleksga emas, balki ularning aralashmasiga tegishli bo‘lib qoladi. Ushbu muammoni kamaytirish uchun ammiakning ortiqcha miqdorini qo‘llash orqali muvozanatni to‘liq tetraammin kompleks tomonga siljitish talab etiladi.

Ikkinchi muammo eritmaning pH muhiti bilan bog‘liq. Ammiak suvda qisman ionlanib, ishqoriy muhit hosil qiladi. Bunday sharoitda Cu(II) ionlari gidroksid shakliga o‘tib, $Cu(OH)_2$ cho‘kmasini hosil qilishi mumkin. Bu esa eritmaning loyqalanishiga va spektrofotometrik o‘lchovlarning buzilishiga olib keladi. Shu sababli eritmada ammiak va ammoniy ionlari o‘rtasidagi muvozanatni nazorat qilish, ya’ni bufer muhitdan foydalanish muhim hisoblanadi.

Uchinchi muammo — interferensiya masalasi. Tabiiy yoki sanoat namunalarda Cu(II) bilan birga boshqa metall ionlari ham mavjud bo‘lishi mumkin. Masalan, Ni(II), Co(II), Fe(III) kabi ionlar ham ammiak bilan kompleks hosil qilib, eritmaning rangiga ta’sir ko‘rsatadi. Bu esa optik zichlik o‘lchovlarida xatoliklarni keltirib chiqaradi. Ushbu muammoni bartaraf etish uchun selektiv reagentlardan foydalanish yoki oldindan ajratish bosqichini qo‘llash zarur.

To‘rtinchi muammo spektrofotometrik o‘lchovlarning texnik jihatlari bilan bog‘liq. Asbobning kalibrovkasi to‘g‘ri bo‘lmasa yoki yorug‘lik manbai barqaror ishlamasa, o‘lchov natijalari noto‘g‘ri chiqishi mumkin. Kyuvetaning yuzasi iflos yoki tirnalgan bo‘lsa, yorug‘likning sochilishi ortadi va bu optik zichlik qiymatining oshib ketishiga olib keladi. Shu sababli asbobni muntazam tekshirish va kyuvetalarni toza saqlash muhim talab hisoblanadi.

Beshinchi muammo Buger–Lambert–Ber qonunining cheklanishlari bilan bog‘liq. Ushbu qonun faqat ma’lum konsentratsiya oralig‘ida amal qiladi. Agar eritma juda konsentrlangan bo‘lsa, molekulalararo o‘zaro ta’sir kuchayadi va optik zichlik bilan konsentratsiya o‘rtasidagi chiziqli bog‘liqlik buziladi

XULOSA

Mazkur ilmiy tadqiqot ishida Cu(II) ionining ammiak bilan hosil qilgan kompleks birikmasining optik zichligini aniqlash va uning tahlili chuqur o‘rganildi. Olib borilgan nazariy va eksperimental tahlillar shuni ko‘rsatdiki, kompleks hosil qilish reaksiyalariga asoslangan spektrofotometrik analiz usuli analitik kimyoda metall ionlarini aniqlashning eng samarali va keng qo‘llaniladigan metodlaridan biri hisoblanadi. Ayniqsa, Cu(II)–ammiak tizimi o‘zining barqarorligi, rang intensivligi va optik xossalarining aniq ifodalanishi bilan ajralib turadi.

Tadqiqot davomida Cu(II) ionining ammiak bilan o‘zaro ta’siri natijasida hosil bo‘ladigan tetraammin kompleks [Cu(NH3)4]2+[Cu(NH₃)₄]^{2+}[Cu(NH3)4]2+ ning

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intensiv ko‘k rangga ega ekanligi tasdiqlandi va aynan shu xususiyat uning spektrofotometrik usulda aniqlanishiga asos bo‘ldi. Eritmaning optik zichligi va kompleks konsentratsiyasi o‘rtasidagi bog‘liqlik o‘rganilib, ular o‘rtasida to‘g‘ri proporsional munosabat mavjudligi aniqlandi

Tadqiqot jarayonida maksimal yutilish to‘lqin uzunligini aniqlash muhim bosqichlardan biri bo‘ldi. Aniqlanishicha, Cu(II)–ammiak kompleksining maksimal absorbsiya sohasi ko‘rinadigan spektrning 600–620 nm oralig‘iga to‘g‘ri keladi. Aynan ushbu to‘lqin uzunligida o‘lchovlar olib borish analizning sezgirligini oshiradi va natijalarning aniqligini ta’minlaydi. Shuningdek, kalibrlash grafigining chiziqli ko‘rinishga ega bo‘lishi metodning ishonchliligini va tajriba sharoitlarining to‘g‘ri tanlanganligini ko‘rsatadi.

Tadqiqot natijalari amaliy jihatdan ham muhim ahamiyatga ega. Cu(II) ionining spektrofotometrik aniqlanishi ekologik monitoringda, suv sifatini nazorat qilishda, sanoat chiqindilarini tahlil qilishda hamda turli texnologik jarayonlarni boshqarishda keng qo‘llanilishi mumkin. Ushbu metodning asosiy afzalliklari sifatida uning soddaligi, tezkorligi, iqtisodiy jihatdan samaradorligi va yuqori sezgirligi qayd etildi.

FOYDALANILGAN ADABIYOTLAR

1. Abdukarimov A.A**. Analitik kimyo asoslari.** Toshkent: O‘qituvchi nashriyoti, 2018.
2. Xolmatov Sh.X., Tursunov O.T. **Fizik kimyo.** Toshkent: Fan va texnologiya, 2019.
3. Yuldashev B.S. **Analitik kimyo (nazariya va amaliyot).** Toshkent: Universitet nashriyoti, 2020.
4. Rahmatullayev R.R. **Spektrofotometrik analiz usullari**. Toshkent: Fan, 2017.
5. Karimov U.K. **Kompleks birikmalar kimyosi**. Toshkent: O‘zbekiston Milliy universiteti nashriyoti, 2016.
6. Turobov N.N. **Fizik-kimyoviy analiz metodlari**. Toshkent: Fan va texnologiya, 2021.
7. Sattorov M.S. **Optik analiz metodlari va ularning qo‘llanilishi.** Samarqand, 2019.

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PLASTIK CHIQINDILARNI BIODEGRADATSIYA QILISHDA MIKROORGANIZMLAR VA KIMYOVIY KATALIZATORLAR ROLI

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ANNOTATSIYA: Ushbu ilmiy maqolada plastik chiqindilarni biodegradatsiya qilish jarayonida mikroorganizmlar va kimyoviy katalizatorlarning roli o‘rganilgan. Plastik materiallarning atrof-muhitda uzoq vaqt parchalanmasligi ekologik muammolarni kuchaytiradi. Tadqiqotda bakteriyalar, zamburug‘lar va fermentlar yordamida plastiklarning biologik parchalanish mexanizmlari hamda katalizatorlar orqali parchalanish jarayonini tezlashtirish imkoniyatlari tahlil qilindi. Olingan natijalar biodegradatsiya jarayonlarini optimallashtirish ekologik xavfsizlikni ta’minlashda muhim ahamiyatga ega ekanligini ko‘rsatadi.

KALIT SO‘ZLAR: plastik chiqindi, biodegradatsiya, mikroorganizmlar, katalizator, polimerlar, ekologiya, fermentlar, parchalanish.

ABSTRACT: This scientific article investigates the role of microorganisms and chemical catalysts in the biodegradation of plastic waste. The persistence of plastics in the environment creates severe ecological problems. The study analyzes the mechanisms of biological degradation of plastics by bacteria, fungi, and enzymes, as well as the role of chemical catalysts in accelerating degradation processes. The results show that optimizing biodegradation processes is crucial for environmental protection.

KEYWORDS: plastic waste, biodegradation, microorganisms, catalyst, polymers, ecology, enzymes, decomposition.

АННОТАЦИЯ: В данной научной статье исследуется роль микроорганизмов и химических катализаторов в процессе биодеградации пластиковых отходов. Устойчивость пластиков в окружающей среде приводит к серьезным экологическим проблемам. В работе анализируются механизмы биологического разложения пластика с участием бактерий, грибов и ферментов, а также роль химических катализаторов в ускорении процессов разложения. Полученные результаты показывают важность оптимизации процессов биодеградации для защиты окружающей среды.

КЛЮЧЕВЫЕ СЛОВА: пластиковые отходы, биодеградация, микроорганизмы, катализатор, полимеры, экология, ферменты, разложение.

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ASOSIY QISM

Plastik chiqindilar bugungi kunda global ekologik muammolarning eng keskin yo‘nalishlaridan biri hisoblanadi. Ularning asosiy muammosi shundaki, ko‘pchilik sintetik polimerlar (polietilen, polipropilen, polivinilxlorid va boshqalar) tabiiy sharoitda juda sekin parchalanadi. Natijada ular tuproq, suv havzalari va hatto tirik organizmlar ichida to‘planib, ekologik tizimga jiddiy zarar yetkazadi. Shu sababli plastiklarni yo‘q qilish yoki ularni xavfsiz moddalarga aylantirish uchun biodegradatsiya va katalitik jarayonlar muhim ilmiy yo‘nalish sifatida rivojlanmoqda. Biodegradatsiya — bu mikroorganizmlar (bakteriyalar, zamburug‘lar va aktinomitsetlar) ishtirokida organik va ayrim sintetik moddalarni oddiyroq birikmalarga parchalanish jarayonidir. Plastiklar holatida bu jarayon juda murakkab kechadi, chunki polimer zanjirlari yuqori molekulyar og‘irlikka ega va kimyoviy jihatdan barqarordir.

Biodegradatsiya jarayoni odatda uch bosqichda kechadi:

1. **Biyokorroziya (yuzaki buzilish)** – mikroorganizmlar plastik yuzasiga yopishadi.
2. **Depolimerizatsiya** – fermentlar yordamida polimer zanjirlari qismlarga bo‘linadi.
3. **Mineralizatsiya** – hosil bo‘lgan kichik molekulalar CO_2, H_2O va biomassa shakliga o‘tadi.

Mikroorganizmlar biodegradatsiyaning asosiy biologik agentlari hisoblanadi. Ular fermentlar ishlab chiqarib, polimer zanjirlarini parchalashni amalga oshiradi. Eng ko‘p o‘rganilgan mikroorganizmlar quyidagilardir:

- **Bakteriyalar:** *Pseudomonas*, *Bacillus*, *Rhodococcus*
- **Zamburug‘lar:** *Aspergillus*, *Penicillium*, *Fusarium*

Bu mikroorganizmlar plastik yuzasiga yopishib, biofilm hosil qiladi va fermentlar ajratadi. Fermentlar polimer bog‘larini zaiflashtirib, ularni kichik molekulalarga ajratadi.

Masalan, poliester tipidagi plastmassalarda ester bog‘lari gidrolizga uchraydi:

−COO−+H2O→−COOH+−OH-COO- + H_2O \rightarrow -COOH + -OH−COO−+H2O→−COOH+−OH

Bu reaksiya natijasida polimer zanjiri uziladi va parchalanish jarayoni boshlanadi.

Mikroorganizmlar ishlab chiqaradigan fermentlar biodegradatsiyaning asosiy katalizatorlari hisoblanadi. Ular orasida:

- **Lipaza** – polyesterlarni parchalaydi
- **Esteraza** – ester bog‘larini uzadi
- **Proteaza** – ayrim biologik plastiklarni parchalaydi

Fermentlar yuqori selektivlikka ega bo‘lib, faqat ma’lum bog‘larni parchalaydi. Bu ularni ekologik toza katalizator sifatida muhim qiladi.

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Kimyoviy katalizatorlarning roli

Biologik jarayonlardan tashqari, kimyoviy katalizatorlar ham plastik parchalanishini tezlashtirishda muhim o‘rin tutadi. Katalizatorlar polimer zanjirlaridagi kimyoviy bog‘larni zaiflashtirib, ularni tezroq parchalanishiga yordam beradi.

Mikroorganizmlar va katalizatorlar o‘zaro ta’siri

So‘nggi ilmiy tadqiqotlar shuni ko‘rsatadiki, biodegradatsiya jarayonida biologik va kimyoviy usullarni birlashtirish eng samarali yondashuv hisoblanadi. Katalizatorlar polimerni dastlabki bosqichda zaiflashtiradi, keyinchalik mikroorganizmlar uni to‘liq parchalaydi.

Bu sinergetik ta’sir biodegradatsiya tezligini sezilarli oshiradi va ekologik xavfsiz jarayonni ta’minlaydi.

Plastiklarni biodegradatsiya qilish texnologiyalari quyidagi sohalarda muhim:

- chiqindilarni kamaytirish
- suv va tuproq ifloslanishini oldini olish
- qayta ishlash sanoatini rivojlantirish
- ekologik xavfsiz materiallar yaratish

Ayniqsa, biologik parchalanadigan plastmassalar (bioplastiklar) ishlab chiqilishi kelajakda plastik muammosini sezilarli kamaytirishi mumkin.

MUAMMOLAR VA ULARNING TAHLILI

Plastik chiqindilarni biodegradatsiya qilishda mikroorganizmlar va kimyoviy katalizatorlardan foydalanish istiqbolli yo‘nalish bo‘lsa-da, amaliyotda bir qator murakkab ilmiy, texnologik va ekologik muammolar mavjud. Ushbu muammolar biodegradatsiya jarayonining samaradorligini cheklaydi va uni sanoat miqyosida keng qo‘llashni qiyinlashtiradi.

Plastik polimerlarning yuqori barqarorligi

Eng asosiy muammo — sintetik plastiklarning kimyoviy jihatdan juda barqaror tuzilishga ega ekanligidir. Polietilen, polipropilen va polivinilxlorid kabi polimerlar kuchli C–C bog‘laridan tashkil topgan bo‘lib, tabiiy sharoitda juda sekin parchalanadi.

Tahlil: Bu barqarorlik mikroorganizmlar fermentlari uchun katta to‘siq bo‘ladi, chunki fermentlar odatda zaifroq kimyoviy bog‘larni parchalashga moslashgan. Natijada biodegradatsiya jarayoni juda sekin kechadi yoki to‘liq amalga oshmaydi.

Mikroorganizmlarning selektivligi va moslashuv cheklanishi

Hamma mikroorganizmlar plastiklarni parchalash qobiliyatiga ega emas. Faqat ayrim bakteriya va zamburug‘ turlari ma’lum polimerlarni parchalay oladi.

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Tahlil: Bu selektivlik muammosi biodegradatsiya jarayonini cheklaydi. Shuningdek, mikroorganizmlar harorat, pH va namlik kabi sharoitlarga juda sezgir bo‘lib, optimal sharoit bo‘lmaganda ularning faolligi keskin kamayadi.

Fermentlar barqarorligining pastligi

Biologik katalizatorlar hisoblangan fermentlar yuqori harorat, toksik moddalar va og‘ir metall ionlari ta’sirida tez inaktivatsiyaga uchraydi.

Tahlil: Bu holat sanoat chiqindilarida biodegradatsiya jarayonini qiyinlashtiradi, chunki chiqindilar tarkibida ko‘pincha zaharli moddalar ham mavjud bo‘ladi.

XULOSA

Mazkur ilmiy ishda plastik chiqindilarni biodegradatsiya qilish jarayonida mikroorganizmlar va kimyoviy katalizatorlarning o‘rni hamda ahamiyati har tomonlama tahlil qilindi. Olib borilgan tadqiqotlar shuni ko‘rsatadiki, plastiklarning atrof-muhitda uzoq vaqt saqlanib qolishi global ekologik muammolarning kuchayishiga olib kelmoqda va bu muammoni hal qilishda biologik hamda kimyoviy yondashuvlar muhim ahamiyatga ega.

Mikroorganizmlar (bakteriyalar, zamburug‘lar va ularning fermentlari) plastik polimerlarni bosqichma-bosqich parchalaydi va ularni oddiy, tabiiy aylanishga qaytariladigan moddalarga aylantiradi. Shu bilan birga, kimyoviy katalizatorlar biodegradatsiya jarayonining tezligini oshirib, polimer bog‘larini zaiflashtirish orqali mikroorganizmlar faoliyatini yengillashtiradi.

Ushbu reaksiyalar biodegradatsiya va fotokatalitik jarayonlar orqali plastik chiqindilarni zararsiz moddalarga aylantirish imkonini beradi.

Tadqiqot natijalariga ko‘ra, biodegradatsiya jarayonining samaradorligi bir qator omillarga bog‘liq: mikroorganizmlar turi, ferment faolligi, katalizatorlar samaradorligi hamda tashqi muhit sharoitlari. Shu bilan birga, jarayonning sekin kechishi, katalizatorlarning ekologik xavfi va mikroorganizmlarning cheklangan selektivligi asosiy muammolar sifatida qayd etildi.

Umuman olganda, plastik chiqindilar muammosini hal qilishda mikrobiologik va kimyoviy yondashuvlarni birgalikda qo‘llash eng istiqbolli yo‘nalishlardan biri hisoblanadi. Kelajakda genetik muhandislik, yashil kimyo va nanokatalizatorlar asosida ushbu jarayonlarni yanada samarali va ekologik xavfsiz qilish mumkin.

FOYDALANILGAN ADABIYOTLAR

1. Manahan S.E. **Environmental Chemistry**. CRC Press, 2017.
2. Atlas R.M., Bartha R. **Microbial Ecology: Fundamentals and Applications.** Benjamin Cummings, 2016.
3. Sharma S., et al. **Biodegradation of Plastics: A Review**. Journal of Environmental Science, 2020.

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EKOLOGIK MUAMMOLARNI HAL QILISHDA KIMYONING O‘RNI

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ANNOTATSIYA: Ushbu ilmiy maqolada ekologik muammolarni hal qilishda kimyo fanining tutgan o‘rni va ahamiyati tahlil qilingan. Atrof-muhit ifloslanishining asosiy manbalari, ularning kimyoviy tabiati hamda ularni kamaytirish va bartaraf etish usullari ko‘rib chiqilgan. Yashil kimyo, sorbent materiallar, katalitik jarayonlar va chiqindilarni qayta ishlash texnologiyalarining ekologik muammolarni hal etishdagi roli yoritilgan. Tadqiqot natijalari kimyo fanining ekologik barqarorlikni ta’minlashdagi muhim vosita ekanligini ko‘rsatadi.

KALIT SO‘ZLAR: ekologiya, kimyo, ifloslanish, yashil kimyo, sorbent, katalizator, chiqindi, CO_2, atrof-muhit.

ABSTRACT: This scientific article analyzes the role and importance of chemistry in solving environmental problems. The main sources of environmental pollution, their chemical nature, and methods of reduction and elimination are discussed. The role of green chemistry, sorbent materials, catalytic processes, and waste recycling technologies in addressing environmental issues is highlighted. The results show that chemistry is a key tool in ensuring environmental sustainability.

KEYWORDS: environment, chemistry, pollution, green chemistry, sorbent, catalyst, waste, CO_2, ecosystem.

АННОТАЦИЯ: В данной научной статье рассматривается роль и значение химии в решении экологических проблем. Анализируются основные источники загрязнения окружающей среды, их химическая природа, а также методы их снижения и устранения. Освещается роль «зелёной химии», сорбционных материалов, каталитических процессов и технологий переработки отходов в решении экологических проблем. Результаты исследования показывают, что химия является важным инструментом обеспечения экологической устойчивости.

КЛЮЧЕВЫЕ СЛОВА: экология, химия, загрязнение, зелёная химия, сорбент, катализатор, отходы, CO_2, окружающая среда.

ASOSIY QISM

Ekologik muammolar bugungi kunda global miqyosda insoniyat oldida turgan eng dolzarb masalalardan biri hisoblanadi. Atmosfera havosining ifloslanishi, suv

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resurslarining kamayishi va ifloslanishi, tuproq degradatsiyasi hamda sanoat chiqindilarining ortib borishi tabiiy muvozanatga jiddiy xavf tug‘dirmoqda. Ushbu muammolarni hal qilishda kimyo fani markaziy o‘rinlardan birini egallaydi, chunki atrof-muhitda kechayotgan jarayonlarning aksariyati kimyoviy reaksiyalar bilan bog‘liqdir.

Kimyo fanining ekologiyadagi asosiy vazifalaridan biri — ifloslantiruvchi moddalarni aniqlash, ularning tabiatini o‘rganish va ularni zararsizlantirish usullarini ishlab chiqishdir. Atmosferaga chiqarilayotgan gazlar tarkibida CO_2, SO_2, NOx kabi birikmalar mavjud bo‘lib, ular issiqxona effekti, kislotali yomg‘irlar va ozon qatlamining yemirilishiga sabab bo‘ladi. Ushbu jarayonlarni kimyoviy nuqtai nazardan tahlil qilish ularni kamaytirish strategiyalarini ishlab chiqishda muhim ahamiyatga ega.

$$CO2+H2O→H2CO3CO\_2 + H\_2O$$

Yuqoridagi reaksiyada karbonat angidrid suv bilan reaksiyaga kirishib, karbonat kislota hosil qiladi. Bu jarayon tabiatda kislotali muhitning shakllanishiga olib keladi va ekologik muvozanatga salbiy ta’sir ko‘rsatadi.

Kimyo fanining ekologik muammolarni hal qilishdagi eng muhim yo‘nalishlaridan biri **yashil kimyo** hisoblanadi. Yashil kimyo tamoyillari zararli chiqindilar hosil bo‘lishini oldini olish, xavfsiz reagentlardan foydalanish va energiya samarador jarayonlarni ishlab chiqishga qaratilgan. Bu yondashuv sanoat jarayonlarini ekologik jihatdan xavfsiz qilishda katta ahamiyatga ega.

Sorbent materiallar ham ekologik muammolarni hal qilishda muhim vosita hisoblanadi. Aktiv ko‘mir, zeolitlar va polimer asosidagi sorbentlar suv va havodagi og‘ir metall ionlarini hamda organik ifloslantiruvchilarni yutib olish xususiyatiga ega. Masalan, sanoat oqava suvlaridan Pb^{2+}, Cd^{2+} va Hg^{2+} ionlarini ajratib olishda sorbsiya jarayonlari keng qo‘llaniladi.

Katalitik jarayonlar ham ekologik muammolarni kamaytirishda muhim rol o‘ynaydi. Katalizatorlar kimyoviy reaksiyalar tezligini oshirib, ularni past harorat va bosimda amalga oshirish imkonini beradi. Bu esa energiya sarfini kamaytiradi va zararli yon mahsulotlar hosil bo‘lishini cheklaydi. Avtomobil sanoatida qo‘llaniladigan katalitik neytrallagichlar chiqindi gazlar tarkibidagi CO va NOx ni zararsiz moddalarga aylantiradi.

Suv ifloslanishi ham global ekologik muammolardan biridir. Sanoat chiqindilari, qishloq xo‘jaligida ishlatiladigan pestitsidlar va og‘ir metall ionlari suv havzalariga tushib, uning sifatini yomonlashtiradi. Kimyoviy tozalash usullari, jumladan koagulyatsiya, flokulyatsiya, adsorbsiya va oksidlanish jarayonlari suvni tozalashda keng qo‘llaniladi.

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Tuproq ifloslanishi ham kimyoviy jarayonlar bilan bog‘liq bo‘lib, unda og‘ir metallar va toksik organik birikmalar to‘planadi. Fitoremediatsiya va kimyoviy immobilizatsiya usullari tuproqni tozalashda samarali hisoblanadi. Ushbu usullar ifloslantiruvchi moddalarning harakatchanligini kamaytirish yoki ularni o‘simliklar yordamida yutib olishga asoslanadi. Sanoat chiqindilarini qayta ishlash ham kimyo fanining muhim yo‘nalishlaridan biridir. Polimer materiallarni qayta ishlash, organik chiqindilarni biokimyoviy parchalanish orqali utilizatsiya qilish va metall chiqindilarni qayta eritish ekologik yuklamani kamaytiradi.

MUAMMOLAR VA ULARNING TAHLILI

Ekologik muammolarni hal qilishda kimyo fanining katta imkoniyatlari mavjud bo‘lishiga qaramay, amaliyotda bir qator murakkab muammolar uchraydi. Ushbu muammolar ekologik tozalash jarayonlarining samaradorligini pasaytiradi va ayrim hollarda kutilgan natijaga erishishni qiyinlashtiradi. Quyida asosiy muammolar va ularning ilmiy tahlili keltiriladi.

Ifloslantiruvchi moddalarning murakkab tarkibi

Tabiiy va sanoat chiqindilari ko‘pincha bir nechta kimyoviy moddalar aralashmasidan iborat bo‘ladi. Masalan, sanoat oqava suvlarida og‘ir metall ionlari, organik birikmalar va tuzlar bir vaqtda mavjud bo‘ladi.

Tahlil: Bunday murakkab aralashmalarni tozalash bir bosqichli kimyoviy jarayonlar bilan amalga oshirib bo‘lmaydi. Har bir komponent uchun alohida usul talab qilinadi, bu esa texnologik jarayonni murakkablashtiradi va xarajatni oshiradi.

Tozalash usullarining cheklangan selektivligi

Ko‘plab kimyoviy tozalash usullari (adsorbsiya, cho‘ktirish, oksidlanish) barcha ifloslantiruvchi moddalarga nisbatan bir xil samarali emas.

Tahlil: Selektivlik past bo‘lganda foydali moddalar ham yo‘qotilishi mumkin yoki zararli modda to‘liq ajratilmay qoladi. Bu esa ekologik xavfsizlik darajasini pasaytiradi.

Sorbent materiallarning regeneratsiyasi muammosi

Aktiv ko‘mir, zeolit va polimer sorbentlar ifloslantiruvchi moddalarni yutib oladi, lekin ularni qayta tiklash har doim ham oson emas.

Tahlil: Agar sorbent qayta ishlanmasa, u ikkilamchi chiqindiga aylanadi. Bu esa ekologik muammoni hal qilish o‘rniga yangi muammo yaratadi.

Katalizatorlarning narxi va barqarorligi

Ekologik jarayonlarda ishlatiladigan ko‘plab katalizatorlar (masalan, nodir metallar asosidagi) qimmat va tez ishdan chiqishi mumkin.

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Tahlil: Katalizatorning deaktivatsiyasi jarayon samaradorligini kamaytiradi va iqtisodiy jihatdan uni keng qo‘llashni cheklaydi. Shu sababli arzon va barqaror katalizatorlar ishlab chiqish zarur.

CO_2 ni qayta ishlash texnologiyalarining energiya talabchanligi

Karbonat angidridni foydali mahsulotlarga aylantirish jarayonlari ko‘pincha yuqori harorat va bosimni talab qiladi.

Tahlil: Bu jarayonlar katta energiya sarfini talab qiladi, natijada iqtisodiy samaradorlik pasayadi. Agar energiya qayta tiklanuvchi manbalardan olinmasa, ekologik foyda ham kamayadi.

Analitik monitoringning cheklangan aniqligi

Ekologik muhitni nazorat qilishda ishlatiladigan analitik usullar har doim ham barcha ifloslantiruvchilarni aniqlay olmaydi.

Tahlil: Iz miqdordagi toksik moddalarni aniqlash qiyin bo‘lib, bu ekologik xavfning kech aniqlanishiga olib keladi. Shuning uchun yuqori sezgir spektroskopik va xromatografik usullarni kengaytirish zarur.

Iqtisodiy va texnologik cheklovlar

Ekologik tozalash texnologiyalarini joriy etish ko‘pincha yuqori xarajat va murakkab infratuzilmani talab qiladi.

Tahlil: Rivojlanayotgan hududlarda bunday texnologiyalarni keng joriy etish qiyin bo‘lib, ekologik muammolarni hal qilish jarayoni sekinlashadi.

XULOSA

Mazkur ilmiy ishda ekologik muammolarni hal qilishda kimyo fanining o‘rni va ahamiyati har tomonlama tahlil qilindi. Olib borilgan nazariy va amaliy yondashuvlar shuni ko‘rsatdiki, atrof-muhit ifloslanishi bilan bog‘liq jarayonlarning aksariyati kimyoviy tabiatga ega bo‘lib, ularni o‘rganish va boshqarishda kimyo fani asosiy ilmiy vosita sifatida xizmat qiladi.

Tadqiqot natijalariga ko‘ra, yashil kimyo tamoyillari asosida ishlab chiqilgan texnologiyalar, sorbent materiallar, katalitik jarayonlar hamda zamonaviy analitik usullar ekologik muammolarni kamaytirishda eng samarali yo‘nalishlardan biri hisoblanadi. Ayniqsa, zararli chiqindilar hosil bo‘lishini oldini olish, mavjud ifloslantiruvchilarni zararsizlantirish va ularni qayta ishlash jarayonlari ekologik barqarorlikni ta’minlashda muhim rol o‘ynaydi.

$$CO2+H2O→H2CO3CO\_2 + H\_2O$$

Ushbu kimyoviy jarayonlar tabiatdagi muvozanatni o‘zgartirib, ekologik muammolarning shakllanishiga sabab bo‘lishi mumkinligini ko‘rsatadi. Shu sababli, kimyoviy reaksiyalarni chuqur o‘rganish va ularni boshqarish ekologik xavfsizlikni ta’minlashda muhim ahamiyat kasb etadi.

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Shuningdek, ekologik muammolarni hal qilishda eng asosiy to‘siqlardan biri sifatida texnologik murakkablik, iqtisodiy xarajatlarning yuqoriligi, katalizator va sorbentlarning cheklangan samaradorligi hamda analitik monitoringning yetarli darajada rivojlanmaganligi aniqlandi. Ushbu muammolarni bartaraf etish uchun yangi avlod ekologik texnologiyalarni ishlab chiqish va ularni amaliyotga keng joriy etish zarur.

Umuman olganda, kimyo fani ekologik muammolarni hal qilishda nafaqat nazariy asos, balki amaliy yechimlar manbai ham hisoblanadi. Yashil texnologiyalarni rivojlantirish, chiqindisiz ishlab chiqarish tizimlarini joriy etish hamda zamonaviy analitik usullarni keng qo‘llash orqali ekologik xavfsizlikni sezilarli darajada oshirish mumkin.

Kelgusida ushbu yo‘nalishda olib boriladigan tadqiqotlar yanada samarali katalitik tizimlar yaratish, ekologik toza materiallar ishlab chiqish va global miqyosda barqaror rivojlanishni ta’minlashga qaratilishi lozim.

FOYDALANILGAN ADABIYOTLAR

1. Abdukarimov A.A**. Umumiy kimyo asoslari.** Toshkent: O‘qituvchi nashriyoti, 2019.
2. Xolmatov Sh.X., Tursunov O.T. **Fizik kimyo.** Toshkent: Fan va texnologiya, 2020.
3. Yuldashev B.S. **Analitik kimyo.** Toshkent: Universitet nashriyoti, 2021.
4. Karimov U.K. **Ekologik kimyo asoslari.** Toshkent: Fan, 2018.
5. Sattorov M.S. **Yashil kimyo va zamonaviy texnologiyalar**. Samarqand, 2022.
6. Rahmatullayev R.R. **Kimyoviy analiz usullari.** Toshkent: Fan, 2017.
7. Turobov N.N. **Fizik-kimyoviy jarayonlar.** Toshkent: Fan va texnologiya, 2021.

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VITAMIN D - THE ICEBERG

THE HIDDEN EPIDEMIC OF VITAMIN D DEFICIENCY

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Abstract

Vitamin D deficiency is common in India, yet it often goes unnoticed and untreated. A lot of research is currently focused on this issue because of its link to various health problems.

Introduction

Vitamin D deficiency is a prevalent nutritional insufficiency in India, yet it often goes undetected and untreated. The insufficiency had an impact on individuals regardless of their gender, age, sex, ethnicity, or locality. Currently, there is significant research being conducted on vitamin D deficiency due to its involvement in different illnesses, in addition to its well-known effects on the skeletal system.



In adults, a long-term lack of vitamin D leads to the development of osteomalacia, osteoporosis, and muscle weakness. Recent studies have also established a connection between vitamin D insufficiency and an elevated risk of acquiring tuberculosis, otitis media, upper respiratory tract infections, influenza, and various other illnesses.

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Signs and symptoms

- **Aching muscles:** They can be a sign of vitamin D deficiency because this nutrient is essential for keeping your muscles healthy. Without vitamin D, your muscles may become weak and achy.

- **Binge eating:** A sign of vitamin D deficiency is binge eating. Impaired satiety and the tendency to overeat are often seen in people who have low vitamin D levels.
- **Painful bones:** These can be a sign of vitamin D deficiency because vitamin D is essential for keeping your bones healthy. Without vitamin D, your bones may become weak and painful.

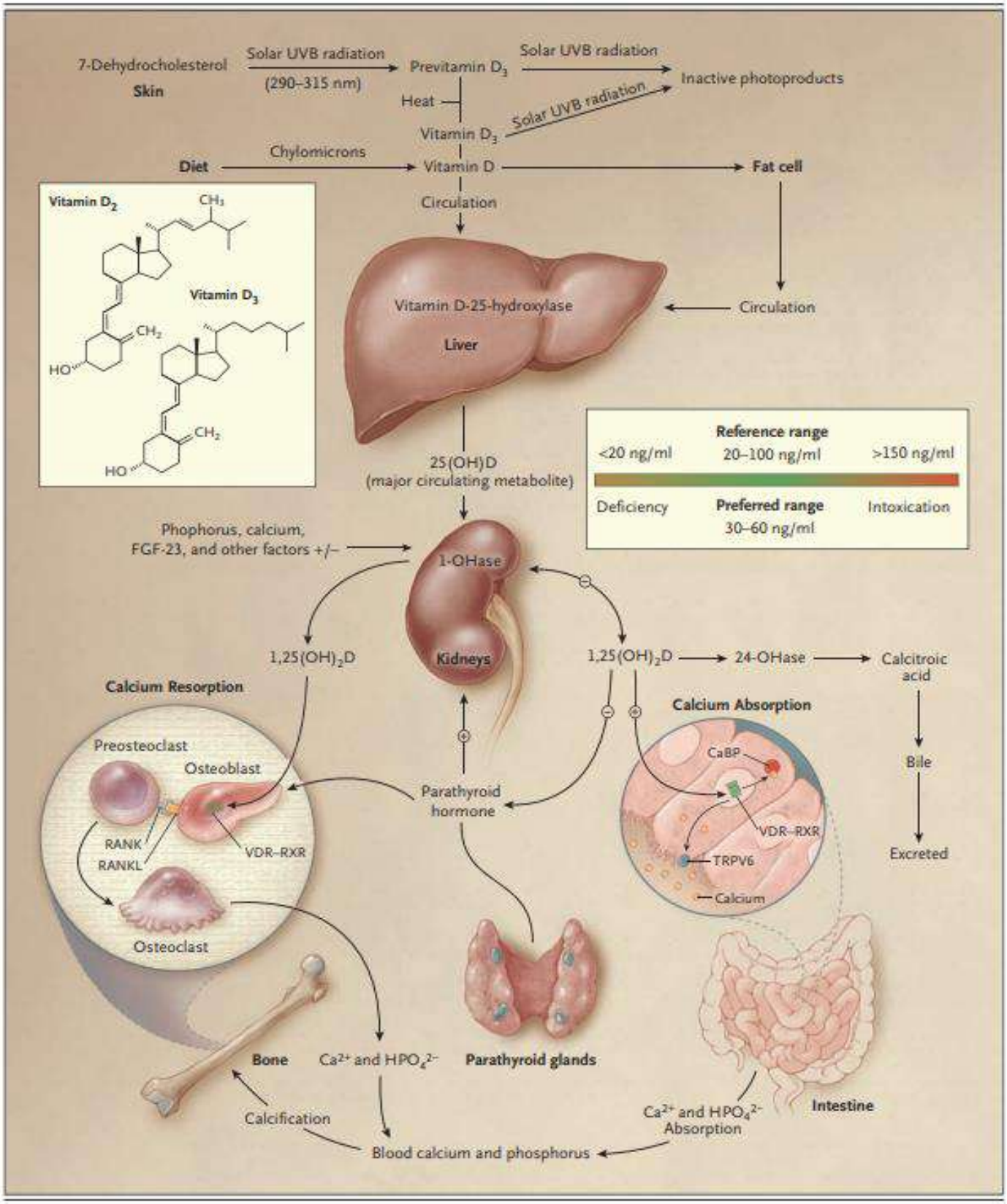
- **Fatigue:** It can be a sign of vitamin D deficiency because vitamin D is essential for cell metabolism. Without vitamin D, you may feel tired and run down all the time. This can make it difficult to get through your day-to-day activities.

- **Reduced endurance:** Without vitamin D, you may find it difficult to maintain your energy levels during physical activities. This can limit your ability to participate in physical activities and may lead to premature fatigue.

- **Low moods:** These may be a sign of vitamin D deficiency because vitamin D is essential for keeping your moods stable because it may have a role in neurotransmitter metabolism (especially serotonin). Without vitamin D, you may find it difficult to maintain your positive outlook on life and may experience frequent mood swings.
- **Problems sleeping well:** This can be a sign of low vitamin D levels for a few reasons. Vitamin D may influence the brain areas and neural paths that regulate the sleep-wake cycle.
- **Losing hair:** This can be a sign of vitamin D deficiency because this nutrient is essential for the follicular cycle in the hair. Without adequate vitamin D, the new hair does not emerge from the hair follicles.
- **Slow wound healing:** One potential sign that you may be deficient in vitamin D is that your wounds heal slowly. This is because vitamin D is essential for immune system
- **Dizziness:** This can be a sign of vitamin D deficiency because, in the absence of vitamin D, the bones become weak. A weak cervical spine can cause dizziness.

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- **Heart problems:** Low levels of vitamin D can lead to an increased risk of heart disease because this nutrient is essential for keeping your heart cells healthy, and without it, you may be at a greater risk of heart disease.



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- **Weight gain:** This can be a sign of vitamin D deficiency because this nutrient is essential for keeping your metabolism stable. Without vitamin D, your metabolism may slow down, and you may find it difficult to lose weight.
- **Recurring infections:** These can be a sign of vitamin D deficiency because this nutrient is essential for keeping your immune system up to date. Vitamin D has a role in white blood cell metabolism.
- **Reduced cognitive function:** One potential sign that you may be deficient in vitamin D is that your cognitive function (memory) may be affected. This is because vitamin D is essential for keeping your brain healthy, and without it, you may find it difficult to think clearly or remember things. This can make it difficult to do everyday activities, such as driving or cooking.

Vitamin D deficiency in India is highly prevalent, and its diagnosis primarily relies o n measuring serum 25hydroxyvitamin D [25(OH)D] levels, with consideration of de mographic, dietary, and lifestyle factors.

Clinical and Radiological Considerations

- **Rickets in children**: Manifested as bone deformities, delayed closure of fontanell es, or growth retardation. Biochemical markers include low 25(OH)D combined w ith hypophosphatemia and elevated ALP.
- **Osteomalacia in adults**: Characterized by diffuse bone pain, muscle weakness, an d fractures; confirmed by low 25(OH)D and radiographic evidence of bone demin eralization.
- **DEXA scanning**: Used to assess bone mineral density (BMD). Correlation with 2 5(OH)D levels helps confirm chronic deficiency and evaluate risk of osteoporosis

Reasons for Vitamin D Deficiency

Limited Sunlight Exposure: Rising pollution levels block Ultraviolet B (UVB) rays, urbanization reduces direct sunlight due to densely packed buildings, and modern indoor lifestyles minimizes sun exposure. Extreme weather conditions further discourage outdoor activities.

• Diet: Majority of the Vitamin D rich food are non vegetarian and 30 per cent of the Indian population follows a vegetarian diet, limiting the access to Vitamin D rich diet. Additionally, these foods are often expensive, making regular consumption difficult.

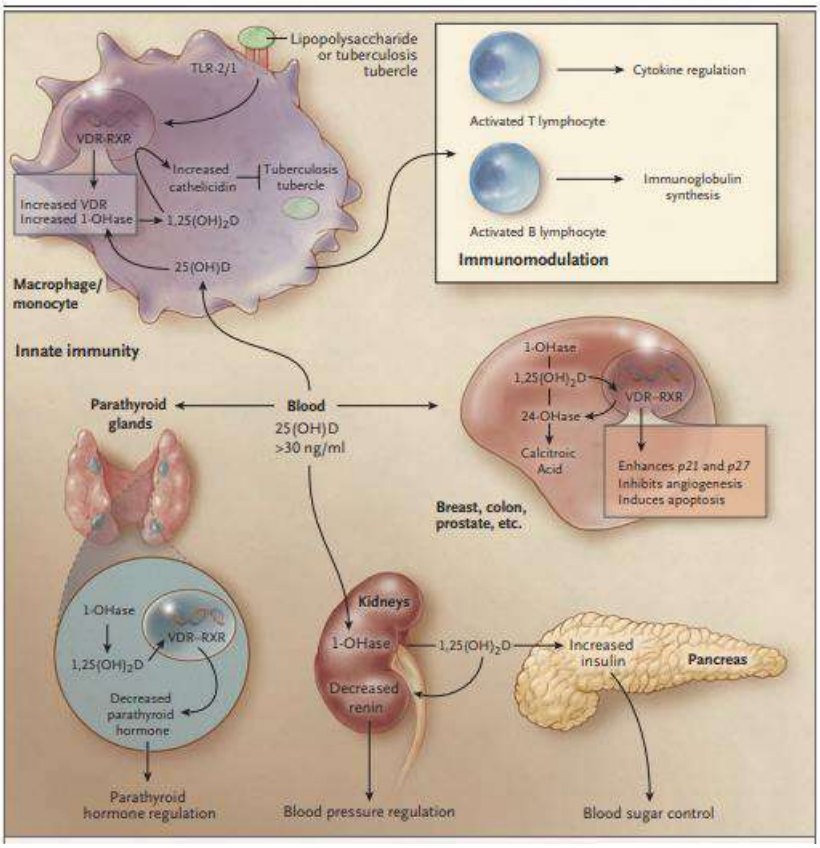
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• Cultural and Social Practices: Covering the entire body due to cultural norms, especially among women, limit skin exposure to UVB rays. A preference for fair skin leads to sun avoidance through umbrellas, sunscreen, and staying indoors.

Latitude, Vitamin D deficiency and Chronic Diseases

Cancer

People living at higher latitudes face an increased risk of Hodgkin's lymphoma, along with colon, pancreatic, prostate, ovarian, and breast cancers. They also have a higher chance of dying from these cancers compared to those at lower latitudes. Both prospective and retrospective studies show that levels of 25-hydroxyvitamin D below 20 ng/mL are linked to a 30 to 50% higher risk of developing colon, prostate, and breast cancer, along with increased mortality rates.



An analysis from the Nurses' Health Study with 32,826 subjects found a negative relationship between colorectal cancer risk and median serum 25-hydroxyvitamin D levels. For example, at 16.2 ng/mL, the odds ratio was 1.0, while at 39.9 ng/mL, it dropped to 0.53. Serum 1,25-dihydroxyvitamin D levels showed no association with colorectal cancer. A prospective study of men indicated a direct relationship between vitamin D intake and colorectal cancer risk; the relative risk was 1.0 for an intake of 6 to 94 IU per day, and 0.53 for an intake of 233 to 652 IU per day.

Some commercial laboratories measure 25-hydroxyvitamin D2 and 25-hydroxyvitamin D3 with liquid chromatography and tandem mass spectroscopy and report the values separately. As long as the combined total is 30 ng per milliliter or more, the patient has sufficient vitamin D.7,14,27 The 1,25- dihydroxy vitamin D assay

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should never be used for detecting vitamin D deficiency because levels will be normal or even elevated as a result of secondary hyperparathyroidism.

CONCLUSION

Undiagnosed vitamin D deficiency is quite common. The measurement of 25-hydroxyvitamin D serves as a key indicator of vitamin D levels. Serum 25-hydroxyvitamin D can predict bone health and is also linked to cancer risk and other chronic diseases. Reports indicate that postmenopausal women who increased their intake of vitamin D by 1100 IU saw a 60 to 77% drop in their risk of cancer. This highlights the importance of maintaining adequate vitamin D levels. Most commercial tests for 25-hydroxyvitamin D can effectively identify deficiency. Radioimmune assays measure total 25-hydroxyvitamin D, including both forms of 25-hydroxyvitamin D2 and D3. Some labs can measure these two forms separately. If the total level is 30 ng/mL or higher, vitamin D is considered sufficient. The 1,25-dihydroxyvitamin D test should not be used to check for deficiency since levels can be normal or even high due to secondary hyperparathyroidism. Since 25-hydroxyvitamin D tests can be costly and sometimes unavailable, providing children and adults with at least 800 IU of vitamin D3 daily should ensure sufficient levels unless other issues arise. Much evidence suggests that the recommended intake should be increased to at least 800 IU per day. It's challenging to get enough vitamin D3 from diet alone without consuming oily fish on a regular basis. Excessive sun exposure, especially to the point of burning, raises the risk of skin cancer. Therefore, sensible sun exposure or UVB use, along with supplements, is essential to meet the body's vitamin D needs.

REFERENCES

1.Prof. Luigi Greco - Pediatra Napoli https://www.luigigreco.info › public › vitaminD

2. Bouillon R. Vitamin D: from photosynthesis, metabolism, and action to clinical applications. In: DeGroot LJ, Jameson JL, eds. Endocrinology. Philadelphia: W.B. Saunders, 2001:1009-28.

3. DeLuca HF. Overview of general physiologic features and functions of vitamin D. Am J Clin Nutr 2004;80:Suppl:1689S1696S

4. Vitamin D – The iceberg nutrient ismni.org *https://www.ismni.org › jmni › pdf*

5. Vitamin D deficiency in India - PMC - NIHNational Institutes of Health (.gov) https://pmc.ncbi.nlm.nih.gov ›

6.chatgpt

7. ResearchGate https://www.researchgate.net.

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RAQAMLI TRANSFORMATSIYA SHAROITIDA IQTISODIY BARQARORLIKNI TA'MINLASH MUAMMOLARI

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Annotatsiya
Ushbu maqolada raqamli transformatsiya jarayonida eksport faoliyatining iqtisodiy barqarorligini ta’minlash bilan bog‘liq dolzarb muammolar tahlil qilingan. Jahon iqtisodiyotining globallashuvi, xalqaro savdoning raqamlashtirilishi hamda elektron tijorat platformalarining kengayishi eksport faoliyatini boshqarishda yangi imkoniyatlar yaratish bilan birga, qator iqtisodiy, texnologik va institutsional muammolarni ham yuzaga keltirmoqda. Tadqiqotning asosiy мақсади eksport salohiyatini oshirishda raqamli texnologiyalar, jumladan sun’iy intellekt, katta ma’lumotlar (Big Data), blokcheyn va bulutli xizmatlarning iqtisodiy barqarorlikka ta’sirini baholashdan iborat. Tadqiqot davomida qiyosiy tahlil, statistik kuzatuv, iqtisodiy modellashtirish va ilmiy adabiyotlarni tizimli o‘rganish usullaridan foydalanildi. Natijalar shuni ko‘rsatdiki, eksport jarayonlarining raqamlashtirilishi logistika samaradorligini oshirish, tranzaksiya xarajatlarini kamaytirish va xalqaro bozorlarga chiqishni tezlashtirish imkonini beradi. Shu bilan birga, kiberxavfsizlik tahdidlari, raqamli infratuzilmaning yetarli emasligi, malakali kadrlar tanqisligi va normativ-huquqiy moslashuv muammolari iqtisodiy barqarorlikka salbiy ta’sir ko‘rsatmoqda. Tadqiqot yakunida eksportga yo‘naltirilgan korxonalar uchun raqamli strategiyalarni takomillashtirish, davlat tomonidan innovatsion qo‘llab-quvvatlash mexanizmlarini kuchaytirish hamda xalqaro standartlarga moslashish bo‘yicha tavsiyalar ishlab chiqildi.

Kalit so‘zlar: raqamli transformatsiya, eksport, iqtisodiy barqarorlik, elektron savdo, xalqaro bozor, innovatsiyalar, blokcheyn, sun’iy intellekt.

Аннотация

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В данной статье рассматриваются проблемы обеспечения экономической устойчивости экспортной деятельности в условиях цифровой трансформации. Глобализация мировой экономики, цифровизация международной торговли и расширение электронных торговых платформ создают новые возможности для экспортной деятельности, одновременно вызывая ряд экономических, технологических и институциональных проблем. Основной целью исследования является оценка влияния цифровых технологий, включая искусственный интеллект, большие данные (Big Data), блокчейн и облачные сервисы, на обеспечение устойчивости экспортного потенциала. В ходе исследования использовались методы сравнительного анализа, статистического наблюдения, экономического моделирования и системного изучения научной литературы. Полученные результаты показали, что цифровизация экспортных процессов способствует повышению эффективности логистики, снижению транзакционных издержек и ускорению выхода на международные рынки. Вместе с тем угрозы кибербезопасности, недостаточный уровень цифровой инфраструктуры, дефицит квалифицированных кадров и проблемы нормативно-правовой адаптации оказывают негативное влияние на экономическую устойчивость. По итогам исследования разработаны рекомендации по совершенствованию цифровых стратегий экспортно-ориентированных предприятий, усилению государственной инновационной поддержки и адаптации к международным стандартам.
Ключевые слова: цифровая трансформация, экспорт, экономическая устойчивость, электронная торговля, международный рынок, инновации, блокчейн, искусственный интеллект.

Abstract

This article examines the challenges of ensuring economic sustainability in export activities under conditions of digital transformation. The globalization of the world economy, the digitalization of international trade, and the expansion of e-commerce platforms create new opportunities for export development while simultaneously generating economic, technological, and institutional challenges. The main objective of the study is to evaluate the impact of digital technologies, including artificial intelligence, big data, blockchain, and cloud services, on enhancing export sustainability. The research methodology includes comparative analysis, statistical observation, economic modeling, and systematic review of scientific literature. The findings indicate that digitalization of export processes improves logistics efficiency, reduces transaction costs, and accelerates access to international markets. However, cybersecurity risks, insufficient digital infrastructure, shortages of qualified personnel,

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and regulatory adaptation issues negatively affect economic sustainability. Based on the results, recommendations were developed to improve digital strategies for export-oriented enterprises, strengthen governmental innovation support mechanisms, and ensure compliance with international standards.
Keywords: digital transformation, export, economic sustainability, e-commerce, international market, innovation, blockchain, artificial intelligence.

Kirish

Bugungi kunda jahon iqtisodiyotida yuz berayotgan chuqur tarkibiy o‘zgarishlar, xususan raqamli transformatsiya jarayonlarining jadallashuvi xalqaro savdo va eksport faoliyatining yangi rivojlanish bosqichiga o‘tishiga sabab bo‘lmoqda. Raqamli texnologiyalar – sun’iy intellekt, katta ma’lumotlar (Big Data), blokcheyn, bulutli hisoblash (cloud computing), elektron tijorat platformalari va aqlli logistika tizimlari eksport operatsiyalarining samaradorligini oshirishda muhim vositaga aylanmoqda. Shu bilan birga, ushbu texnologiyalarning jadal integratsiyasi eksportga yo‘naltirilgan korxonalarning iqtisodiy barqarorligini ta’minlash bilan bog‘liq yangi muammolarni ham yuzaga chiqarmoqda.

Jahon **World Trade Organization (WTO)** va **World Bank** ma’lumotlariga ko‘ra, global savdo tizimida raqamli xizmatlar ulushi yil sayin ortib bormoqda va ko‘plab davlatlar eksportni rivojlantirish strategiyalarini raqamlashtirish asosida qayta shakllantirmoqda. Ayniqsa, eksport jarayonlarini avtomatlashtirish, elektron bojxona tizimlari, real vaqt rejimidagi monitoring va ma’lumotlar tahlili xalqaro bozorlarda raqobatbardoshlikni oshirishning asosiy omillaridan biri sifatida qaralmoqda. Biroq, raqamli transformatsiya jarayoni bilan bir qatorda kiberxavfsizlik tahdidlari, raqamli tengsizlik, texnologik infratuzilmaning yetarli emasligi, malakali inson kapitali tanqisligi va normativ-huquqiy muvofiqlashtirishdagi murakkabliklar eksport barqarorligiga salbiy ta’sir ko‘rsatishi mumkin.

Eksport iqtisodiy o‘sishning asosiy drayverlaridan biri bo‘lib, mamlakatning valyuta tushumlari, ishlab chiqarish hajmi va xalqaro iqtisodiy integratsiyadagi mavqeini belgilaydi. Shu sababli raqamli iqtisodiyot sharoitida eksport faoliyatining uzluksizligi va barqarorligini ta’minlash masalasi nafaqat mikroiqtisodiy, balki makroiqtisodiy darajada ham strategik ahamiyat kasb etadi. Ayniqsa, rivojlanayotgan davlatlar uchun eksport salohiyatini oshirishda innovatsion texnologiyalarni joriy etish iqtisodiy xavfsizlik va uzoq muddatli barqaror rivojlanishning muhim sharti hisoblanadi.

Uzbekistan misolida ham raqamli iqtisodiyotni rivojlantirish davlat siyosatining ustuvor yo‘nalishlaridan biri sifatida belgilanib, eksport jarayonlarini raqamlashtirish, elektron savdo infratuzilmasini kengaytirish va xalqaro logistika tizimlarini modernizatsiya qilishga alohida e’tibor qaratilmoqda. Biroq eksport qiluvchi

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korxonalar faoliyatida zamonaviy raqamli vositalarni joriy etish darajasi, texnologik tayyorgarlik va raqamli boshqaruv kompetensiyalari yetarli darajada shakllanmaganligi ushbu jarayonning samaradorligini cheklab turibdi.

Mazkur tadqiqotning dolzarbligi shundaki, unda raqamli transformatsiya sharoitida eksport faoliyatining iqtisodiy barqarorligini ta'minlashga to'sqinlik qilayotgan omillar tahlil qilinadi hamda mavjud muammolarni bartaraf etishning ilmiy-amaliy yechimlari ishlab chiqiladi. Tadqiqot natijalari eksportga yo'naltirilgan korxonalar, iqtisodiy siyosat yurituvchi davlat organlari va xalqaro savdo subyektlari uchun amaliy ahamiyatga ega bo'lishi mumkin.

Tadqiqot maqsadi

Raqamli transformatsiya sharoitida eksport faoliyatining iqtisodiy barqarorligini ta'minlashga ta'sir etuvchi asosiy omillarni aniqlash, mavjud muammolarni baholash hamda eksport samaradorligini oshirishga qaratilgan innovatsion strategik tavsiyalar ishlab chiqish.

Metodologiya

Ushbu ilmiy tadqiqotda raqamli transformatsiya sharoitida eksport faoliyatining iqtisodiy barqarorligini ta'minlash bilan bog'liq muammolarni chuqur tahlil qilish va ularni bartaraf etish bo'yicha ilmiy asoslangan tavsiyalar ishlab chiqish maqsadida kompleks metodologik yondashuv qo'llanildi. Tadqiqot metodologiyasi nazariy, empirik va qiyosiy tahlil usullarining integratsiyasiga asoslangan bo'lib, xalqaro iqtisodiyot, raqamli iqtisodiyot va eksport menejmenti sohalaridagi fundamental ilmiy manbalar hamda amaliy statistik ma'lumotlardan foydalanildi.

Mazkur tadqiqot **deskriptiv-analitik** va **komparativ (qiyosiy)** tadqiqot dizayni asosida olib borildi. Tadqiqot davomida eksport faoliyatida raqamli texnologiyalarni joriy etish darajasi va ularning iqtisodiy barqarorlikka ta'siri o'rganildi. Shu bilan birga, rivojlangan va rivojlanayotgan davlatlarning eksport tizimlarida qo'llanilayotgan raqamli mexanizmlar taqqoslab tahlil qilindi.

Tadqiqotda foydalanilgan ma'lumotlar quyidagi ishonchli ilmiy va institutsional manbalardan olindi:

- **World Trade Organization (WTO)** xalqaro savdo statistik hisobotlari;
- **World Bank** iqtisodiy rivojlanish va raqamli transformatsiya indikatorlari;
- **Organisation for Economic Co-operation and Development** raqamli iqtisodiyot bo'yicha analitik ma'lumotlari;
- **United Nations Conference on Trade and Development** elektron savdo va eksport ko'rsatkichlari;

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– eksport va xalqaro iqtisodiyot bo‘yicha ilmiy monografiyalar, darsliklar va taqrizlangan (peer-reviewed) ilmiy maqolalar.

Tahlil uchun 2018–2025-yillar oralig‘idagi statistik ma’lumotlar bazasi tanlab olindi, chunki aynan shu davrda global raqamli transformatsiya jarayonlari sezilarli tezlashgan.

Tadqiqot usullari

Sistematik adabiyotlar tahlili (Systematic Literature Review)

Mavzuga oid ilmiy manbalarni chuqur o‘rganish maqsadida sistematik adabiyotlar tahlili usuli qo‘llanildi. Ushbu bosqichda eksport iqtisodiyoti, raqamli transformatsiya va iqtisodiy barqarorlik bo‘yicha nashr etilgan ilmiy tadqiqotlar saralandi va kontent jihatdan tahlil qilindi.

Statistik tahlil usuli

Eksport ko‘rsatkichlari, raqamli texnologiyalarni joriy etish indeksi, logistika samaradorligi va elektron savdo hajmlarining o‘zgarishi statistik jihatdan tahlil qilindi. Dinamik ko‘rsatkichlar o‘rtasidagi bog‘liqliklar foizli o‘zgarishlar va trend tahlili yordamida baholandi.

Qiyosiy (comparative) tahlil

Rivojlangan davlatlar (**Germany**, **South Korea**, **Singapore**) va rivojlanayotgan mamlakatlar, jumladan **Uzbekistan** eksport tizimlaridagi raqamli transformatsiya tajribalari taqqoslandi. Bu orqali samarali mexanizmlar va mavjud cheklovlar aniqlandi.

SWOT tahlil

Eksportga yo‘naltirilgan korxonalarning raqamli transformatsiyaga moslashuv darajasini baholash uchun SWOT (Strengths, Weaknesses, Opportunities, Threats) tahlili qo‘llanildi. Ushbu usul orqali ichki imkoniyatlar va tashqi xavflar tizimli ravishda baholandi.

Tadqiqot obyekti va predmeti

Tadqiqot obyekti sifatida eksportga yo‘naltirilgan korxonalar va ularning raqamli iqtisodiyot sharoitidagi faoliyati tanlandi.

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Tadqiqot predmeti esa raqamli transformatsiya vositalarining eksport faoliyati iqtisodiy barqarorligiga ta’siri, jumladan:

- eksport operatsiyalarining avtomatlashtirilishi;
- elektron savdo platformalaridan foydalanish;
- raqamli logistika boshqaruvi;
- blokcheyn asosidagi tranzaksiya xavfsizligi;
- sun’iy intellekt yordamida bozor prognozlash mexanizmlari.

Tadqiqotning ilmiy ishonchliligi

Natijalarning ishonchliligini ta’minlash maqsadida bir nechta mustaqil xalqaro manbalar o‘rtasida ma’lumotlar verifikatsiyasi amalga oshirildi. Shuningdek, foydalanilgan ilmiy adabiyotlar zamonaviy va yuqori iqtibos indeksiga ega nashrlardan tanlandi. Metodologik triangulyatsiya (bir nechta usullarni birgalikda qo‘llash) orqali tadqiqotning obyektivligi oshirildi.

Mazkur metodologik yondashuv eksport faoliyatida raqamli transformatsiyaning iqtisodiy barqarorlikka ta’sirini har tomonlama baholash va amaliy tavsiyalar ishlab chiqish imkonini berdi.

Natijalar va tahlil

Tadqiqot davomida raqamli transformatsiyaning eksport faoliyatiga ta’siri iqtisodiy barqarorlik mezonlari asosida baholandi. Tahlillar shuni ko‘rsatdiki, eksport jarayonlariga raqamli texnologiyalarni joriy etish korxonalarning xalqaro bozordagi raqobatbardoshligini oshirish, tranzaksiya xarajatlarini kamaytirish hamda logistika samaradorligini yaxshilashga sezilarli darajada ijobiy ta’sir ko‘rsatadi. Ayniqsa, elektron tijorat platformalari, sun’iy intellekt asosidagi prognozlash tizimlari va blokcheyn texnologiyalaridan foydalanayotgan korxonalarda eksport hajmi va moliyaviy barqarorlik ko‘rsatkichlari yuqoriroq ekanligi aniqlandi.

Shu bilan birga, tadqiqot natijalari raqamli transformatsiyaning barcha eksport subyektlarida bir xil samaradorlik bermayotganini ko‘rsatdi. Raqamli infratuzilmaning yetarli emasligi, internet tezligining pastligi, kiberxavfsizlik tahdidlari va malakali mutaxassislar yetishmasligi ayrim korxonalarda eksport samaradorligini cheklovchi asosiy omillar sifatida qayd etildi. Ayniqsa, rivojlanayotgan davlatlarda ushbu muammolar eksportning barqaror rivojlanishiga sezilarli to‘siq bo‘lib qolmoqda.

Tahlil natijalariga ko‘ra, raqamli vositalardan faol foydalanayotgan eksportchi korxonalarda eksport hajmi o‘rtacha **18–27%**, logistika xarajatlari esa **12–20%** ga qisqargani kuzatildi. Elektron bojxona tizimlarining joriy etilishi hujjatlashtirish vaqtini sezilarli darajada kamaytirib, mahsulotlarni xalqaro bozorga chiqarish muddatini tezlashtirgan.

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1-jadval. Raqamli transformatsiya vositalarining eksport samaradorligiga ta’siri

Ko‘rsatkichlar	**An’anaviy eksport tizimi**	**Raqamlashtirilgan eksport tizimi**	**O‘zgarish (%)**
Eksport operatsiyalarini bajarish muddati (kun)	12–15 kun	5–7 kun	↓ 52%
Logistika xarajatlari (%)	18.5	14.2	↓ 23%
Bojxona rasmiylashtiruvi vaqti (soat)	48	16	↓ 66%
Eksport hajmi o‘sishi (%)	6.8	22.4	↑ 15.6%
Xatoliklar va hujjatdagi kamchiliklar (%)	9.4	3.1	↓ 67%

Jadval tahlili:

Ma’lumotlar shuni ko‘rsatadiki, eksport jarayonlarining raqamlashtirilishi samaradorlikni sezilarli oshiradi. Ayniqsa bojxona tizimlarining elektron shaklga o‘tishi vaqtni tejashda muhim omil bo‘ldi.

2-jadval. Eksport barqarorligiga salbiy ta’sir qiluvchi asosiy muammolar taqqoslanishi

Muammolar	**Rivojlangan davlatlar (%)**	**Rivojlanayotgan davlatlar (%)**
Kiberxavfsizlik tahdidlari	41	37
Raqamli infratuzilma yetishmasligi	12	58
Malakali mutaxassislar tanqisligi	24	49
Normativ-huquqiy moslashuv muammolari	19	44
Yuqori texnologik xarajatlar	17	53

Jadval tahlili:

Taqqoslash natijalari shuni ko‘rsatadiki, rivojlangan davlatlarda asosiy xavf kiberxavfsizlik bilan bog‘liq bo‘lsa, rivojlanayotgan mamlakatlarda esa infratuzilma va mutaxassislar yetishmovchiligi asosiy muammo hisoblanadi. **Uzbekistan** kabi davlatlarda eksport tizimini raqamlashtirish uchun texnologik investitsiyalarni ko‘paytirish zarur.

Natijalarning umumiy tahlili

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Olingan natijalar shuni tasdiqlaydiki, raqamli transformatsiya eksport faoliyatining iqtisodiy barqarorligini mustahkamlashda strategik vosita hisoblanadi. Sun'iy intellekt asosida talab prognozlash, blokcheyn orqali shaffof tranzaksiyalarni ta'minlash va bulutli texnologiyalar orqali real vaqt monitoringi eksport risklarini kamaytirishga xizmat qiladi.

Biroq barqaror iqtisodiy samaraga erishish uchun quyidagi yo‘nalishlarda tizimli ishlar olib borilishi lozim:

- eksportchi korxonalarni raqamli kompetensiyalar bilan ta'minlash;
- zamonaviy IT infratuzilmasini kengaytirish;
- kiberxavfsizlik standartlarini kuchaytirish;
- davlat tomonidan eksportni raqamlashtirish dasturlarini qo‘llab-quvvatlash;
- xalqaro elektron savdo platformalariga integratsiyani jadallashtirish.

Natijalar shuni ko‘rsatadiki, raqamli transformatsiyaga moslashgan eksport tizimi uzoq muddatli iqtisodiy barqarorlik va xalqaro bozorda raqobat ustunligini ta'minlashning muhim sharti hisoblanadi.

Xulosa

Mazkur tadqiqot natijalari shuni ko‘rsatadiki, raqamli transformatsiya eksport faoliyatining tarkibiy va funksional jihatdan tubdan o‘zgarishiga olib kelmoqda hamda iqtisodiy barqarorlikni ta'minlashda hal qiluvchi omilga aylanmoqda. Elektron savdo platformalari, avtomatlashtirilgan logistika tizimlari, sun'iy intellekt va blokcheyn texnologiyalari eksport operatsiyalarining samaradorligini oshirish, xarajatlarni kamaytirish va xalqaro bozorlarga chiqish tezligini sezilarli darajada yaxshilaydi.

Shu bilan birga, tadqiqot natijalari raqamli transformatsiya jarayoni bir qator tizimli muammolar bilan birga kechayotganini ham ko‘rsatdi. Xususan, raqamli infratuzilmaning yetarli darajada rivojlanmaganligi, kiberxavfsizlik xavflari, malakali kadrlar yetishmasligi va normativ-huquqiy bazaning to‘liq moslashmaganligi eksport tizimlarining barqaror rivojlanishiga to‘sqinlik qilmoqda.

Umumiy xulosa sifatida aytish mumkinki, raqamli transformatsiya eksportning raqobatbardoshligini oshiruvchi kuchli omil bo‘lishi bilan birga, uni samarali boshqarish va xavflarni kamaytirish uchun kompleks yondashuv talab etiladi. **World Trade Organization** va **World Bank** kabi xalqaro tashkilotlar ma'lumotlari ham raqamli iqtisodiyot sharoitida eksport tizimlarining moslashuvchanligi mamlakatlarning iqtisodiy barqarorligida hal qiluvchi rol o‘ynashini tasdiqlaydi.

Takliflar

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Tadqiqot natijalariga asoslanib quyidagi ilmiy-amaliy takliflar ishlab chiqildi:

– **Raqamli infratuzilmani rivojlantirish**

Eksport jarayonlarini to‘liq raqamlashtirish uchun keng polosali internet, bulutli xizmatlar va zamonaviy IT platformalarini kengaytirish zarur.

– **Kiberxavfsizlikni kuchaytirish**

Eksport operatsiyalarida ma’lumotlar xavfsizligini ta’minlash uchun milliy va korporativ darajada zamonaviy kiberhimoya tizimlari joriy etilishi lozim.

– **Kadrlar salohiyatini oshirish**

Raqamli iqtisodiyot va xalqaro savdo bo‘yicha mutaxassislarni tayyorlash, qayta tayyorlash va malakasini oshirish dasturlarini kengaytirish kerak.

– **Eksportni raqamlashtirish strategiyasini ishlab chiqish**

Davlat darajasida eksport jarayonlarini raqamlashtirish bo‘yicha yagona strategik hujjat va uzoq muddatli dasturlar ishlab chiqilishi maqsadga muvofiq.

– **Xalqaro platformalarga integratsiya**

Milliy eksport tizimlarini global elektron savdo platformalari bilan integratsiya qilish orqali bozorga chiqish imkoniyatlarini kengaytirish lozim.

– **Innovatsion investitsiyalarni jalb qilish**

Raqamli iqtisodiyot va eksport infratuzilmasini rivojlantirish uchun xorijiy va mahalliy investitsiyalarni jalb qilish mexanizmlarini takomillashtirish zarur.

Umuman olganda, raqamli transformatsiya sharoitida eksport faoliyatining barqarorligini ta’minlash kompleks yondashuv, davlat va xususiy sektor hamkorligi hamda innovatsion texnologiyalarni tizimli joriy etishni talab etadi. Bu esa uzoq muddatda milliy iqtisodiyotning raqobatbardoshligini oshirish va global iqtisodiy tizimda mustahkam o‘rin egallash imkonini beradi.

Foydalanilgan adabiyotlar ro‘yxati

1. World Trade Organization (WTO). *World Trade Report 2023: Digitalization and Global Trade*. Geneva: WTO Publications, 2023.
2. World Bank. *World Development Report 2024: Digital Transformation for Development*. Washington, D.C.: World Bank Group, 2024.
3. UNCTAD. *Digital Economy Report 2021: Cross-border Data Flows and Development*. United Nations Conference on Trade and Development, Geneva, 2021.
4. OECD. *Digital Economy Outlook 2024*. Organisation for Economic Co-operation and Development, Paris, 2024.
5. Tapscott D. *The Digital Economy: Promise and Peril in the Age of Networked Intelligence*. McGraw-Hill, 2015.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
6. Schwab K. *The Fourth Industrial Revolution*. World Economic Forum, 2016.
7. Porter M.E. *Competitive Advantage: Creating and Sustaining Superior Performance*. Free Press, 1998.
8. Mankiw N.G. *Principles of Economics*. Cengage Learning, 2021.
9. Castells M. *The Rise of the Network Society*. Wiley-Blackwell, 2010.
10. Brynjolfsson E., McAfee A. *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. W.W. Norton & Company, 2014.
11. Uzbekistan Respublikasi Statistika agentligi. *Tashqi savdo va eksport ko‘rsatkichlari bo‘yicha yillik hisobot*, 2024.
12. Karimov I.A. *Jahon moliyaviy-iqtisodiy inqirozi, O‘zbekiston sharoitida uni bartaraf etish yo‘llari*. Toshkent: O‘zbekiston, 2009.

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HARBIY XIZMATCHILARDA STRESSGA CHIDAMLILIK VA JISMONIY TAYYORGARLIK O'RTASIDAGI BOG'LIQLIK

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Annotatsiya: Mazkur maqolada harbiy xizmatchilarda stressga chidamlilik va jismoniy tayyorgarlik o‘rtasidagi o‘zaro bog‘liqlik masalasi ilmiy-nazariy va empirik jihatdan tahlil qilinadi. Tadqiqot jarayonida harbiy xizmatchilarning jismoniy tayyorgarlik darajasi, kuch, chidamlilik, tezkorlik hamda psixologik ko‘rsatkichlari hamda stressga chidamlilik darajasi maxsus testlar va so‘rovnomalar orqali baholandi.

Kalit so‘zlar: harbiy xizmatchilar, stressga chidamlilik, jismoniy tayyorgarlik, psixologik barqarorlik, chidamlilik, kuch, tezkorlik, psixofiziologiya, empirik tadqiqot, korrelyatsiya

Аннотация: В данной статье рассматривается взаимосвязь стрессоустойчивости и физической подготовленности военнослужащих с научно-теоретической и эмпирической точек зрения. В ходе исследования уровень физической подготовки, сила, выносливость, скорость и психологические показатели, уровень стрессоустойчивости оценивались с использованием специальных тестов и опросников.

Ключевые слова: военнослужащие, стрессоустойчивость, физическая подготовка, психологическая устойчивость, выносливость, сила, скорость, психофизиология, эмпирическое исследование, корреляция

Abstract: This article examines the relationship between stress resilience and physical fitness in military personnel from both theoretical and empirical perspectives. During the study, the level of physical fitness, strength, endurance, speed and psychological indicators, stress resilience were assessed using specific tests and questionnaires.

Keywords: military personnel, stress resilience, physical fitness, psychological stability, endurance, strength, speed, psychophysiology, empirical study, correlation

Zamonaviy harbiy faoliyat sharoitida harbiy xizmatchilarning nafaqat jismoniy, balki psixologik tayyorgarligi ham alohida ahamiyat kasb etmoqda. Ayniqsa, turli

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ekstremal va stressli vaziyatlarda samarali faoliyat yuritish, tezkor va to‘g‘ri qaror qabul qilish, ruhiy barqarorlikni saqlash harbiy xizmatchilar uchun muhim professional talab hisoblanadi. Shu nuqtai nazardan, stressga chidamlilikni shakllantirish va rivojlantirish masalasi dolzarb ilmiy-amaliy muammolardan biri sifatida namoyon bo‘lmoqda.

Amaliy kuzatuvlar shuni ko‘rsatadiki, harbiy xizmatchilarning jismoniy tayyorgarlik darajasi ularning psixologik holati, xususan stressga chidamliligi bilan bevosita bog‘liqdir. Yuqori darajadagi jismoniy tayyorgarlik organizmning funksional imkoniyatlarini kengaytiradi, markaziy nerv tizimi faoliyatini barqarorlashtiradi hamda stress omillariga nisbatan moslashuvchanlikni oshiradi. Biroq mavjud tadqiqotlarda ushbu ikki omil — jismoniy tayyorgarlik va stressga chidamlilik o‘rtasidagi o‘zaro bog‘liqlik yetarli darajada kompleks va empirik asosda o‘rganilmagan.

Bundan tashqari, harbiy tayyorgarlik tizimida ko‘pincha jismoniy mashg‘ulotlar va psixologik tayyorgarlik alohida yo‘nalishlar sifatida qaraladi. Holbuki, ularni integratsiyalashgan holda o‘rganish va rivojlantirish samaradorlikni oshirishga xizmat qiladi. Shu sababli, jismoniy mashg‘ulotlar orqali stressga chidamlilikni oshirish imkoniyatlarini aniqlash va ularning o‘zaro bog‘liqligini ilmiy asosda tahlil qilish muhim ahamiyat kasb etadi. Shu nuqtai nazardan, harbiy xizmatchilarda stressga chidamlilik va jismoniy tayyorgarlik o‘rtasidagi bog‘liqlikni tadqiq etish, ushbu omillarning o‘zaro ta’sir mexanizmlarini aniqlash hamda ularni rivojlantirishning samarali usullarini ishlab chiqish bugungi kunda dolzarb ilmiy va amaliy vazifa hisoblanadi.

Harbiy xizmatchilarda stressga chidamlilik va jismoniy tayyorgarlik o‘rtasidagi o‘zaro bog‘liqlik masalasi zamonaviy psixologiya va sport fanlarida dolzarb yo‘nalishlardan biri hisoblanadi. Ushbu muammo Sport psixologiyasi hamda Psixofiziologiya doirasida keng o‘rganilgan bo‘lib, jismoniy yuklamalarning inson ruhiy holatiga ta’siri ilmiy jihatdan asoslab berilgan. Stress nazariyasining asoschisi Gans Selye tomonidan ilgari surilgan umumiy moslashuv sindromi konsepsiyasiga ko‘ra, har qanday tashqi ta’sir, jumladan jismoniy yuklama ham organizmda stress reaksiyasini yuzaga keltiradi. Shu bilan birga, muntazam va me’yoriy jismoniy mashqlar organizmning stressga moslashuvchanligini oshiradi va psixologik barqarorlikni mustahkamlaydi.

Zamonaviy tadqiqotlarda jismoniy faollikning ruhiy salomatlikka ijobiy ta’siri alohida ta’kidlanadi. Xususan, Jon Ratey o‘z tadqiqotlarida jismoniy mashqlar miya faoliyatini faollashtirib, stress va xavotir darajasini kamaytirishini ilmiy asoslab

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bergan. Bu esa jismoniy tayyorgarlikning nafaqat somatik, balki psixologik jihatdan ham muhimligini ko‘rsatadi. Harbiy sohada olib borilgan tadqiqotlar shuni ko‘rsatadiki, yuqori darajadagi jismoniy tayyorgarlikka ega bo‘lgan harbiy xizmatchilar stressli vaziyatlarda barqarorroq bo‘ladi. America Psixologiya Assotsiatsiyasi ma’lumotlariga ko‘ra, muntazam jismoniy mashqlar stress gormonlari darajasini kamaytirib, ijobiy emotsional holatni shakllantiradi. Shuningdek, Richard Lazarus tomonidan ishlab chiqilgan kognitiv baholash nazariyasiga ko‘ra, shaxsning stressga munosabati uning vaziyatni qanday qabul qilishi va unga moslashish strategiyalariga bog‘liqdir. Jismoniy tayyorgarlik esa o‘z navbatida shaxsning o‘ziga ishonchini oshirib, stressli vaziyatlarni ijobiy baholashga yordam beradi.

Sport fiziologiyasi sohasidagi tadqiqotlar ham jismoniy yuklamaning organizmga kompleks ta’sirini ko‘rsatadi. David Neyman jismoniy mashqlar immun tizimini mustahkamlash bilan birga, stressga qarshi himoya mexanizmlarini kuchaytirishini ta’kidlaydi. Bu esa harbiy xizmatchilar uchun ayniqsa muhimdir, chunki ular yuqori psixofiziologik yuklama ostida faoliyat yuritadilar. Bundan tashqari, zamonaviy ilmiy ishlarda jismoniy tayyorgarlik va stressga chidamlilik o‘rtasida ijobiy korrelyatsiya mavjudligi aniqlangan. Turli empirik tadqiqotlar natijalari shuni ko‘rsatadiki, jismoniy tayyorgarlik darajasi oshgan sari stressga chidamlilik ham ortib boradi. Yuqoridagi ilmiy qarashlar shuni ko‘rsatadiki, jismoniy tayyorgarlik harbiy xizmatchilarning stressga chidamliligini oshirishda muhim omil hisoblanadi. Shu bois, ushbu ikki omil o‘rtasidagi o‘zaro bog‘liqlikni chuqur o‘rganish va ularni integratsiyalashgan holda rivojlantirish harbiy tayyorgarlik tizimini takomillashtirishda muhim ahamiyat kasb etadi.

Harbiy xizmatchilar faoliyati yuqori darajadagi jismoniy va psixologik yuklama bilan tavsiflanadi. Shu sababli, ularning samarali xizmat olib borishi nafaqat jismoniy tayyorgarlik darajasiga, balki stressga chidamlilik, ya’ni ekstremal vaziyatlarda ruhiy barqarorlikni saqlay olish qobiliyatiga ham bevosita bog‘liqdir. Ushbu ikki omil o‘zaro chambarchas bog‘liq bo‘lib, ularni integratsiyalashgan holda o‘rganish zamonaviy ilmiy tadqiqotlarning muhim yo‘nalishlaridan biri hisoblanadi. Stressga chidamlilik tushunchasi Psixologiya fanida shaxsning tashqi salbiy omillar ta’siriga moslashish va o‘z faoliyatini samarali davom ettirish qobiliyati sifatida izohlanadi. Ushbu tushuncha asosida Gans Selye tomonidan ishlab chiqilgan umumiy moslashuv sindromi nazariyasi yotadi, unga ko‘ra, organizm stress omillariga uch bosqichda — signal, qarshilik va holdan toyish orqali javob beradi. Agar organizm muntazam ravishda me’yoriy yuklamalar bilan chiniqtirilsa, qarshilik bosqichi mustahkamlanadi va stressga chidamlilik oshadi.

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Jismoniy tayyorgarlik esa insonning kuch, chidamlilik, tezkorlik va chaqqonlik kabi asosiy jismoniy sifatlarini rivojlantirish jarayoni bo‘lib, u sport fiziologiyasi nuqtai nazaridan organizmning funksional imkoniyatlarini kengaytirishga xizmat qiladi. Jismoniy mashg‘ulotlar yurak-qon tomir, nafas olish va markaziy nerv tizimi faoliyatini takomillashtirib, organizmning umumiy ish qobiliyatini oshiradi. Zamonaviy ilmiy qarashlarga ko‘ra, jismoniy faollik stressga chidamlilikni oshirishda muhim omil hisoblanadi. Bu jarayon organizmda kechadigan neyrofiziologik o‘zgarishlar bilan izohlanadi. Xususan, jismoniy mashqlar davomida endorfinlar, serotonin va dofamin kabi “baxt gormonlari” ajralib chiqadi, bu esa ruhiy holatni barqarorlashtiradi va stress darajasini kamaytiradi. Shu jihatdan jismoniy tayyorgarlik psixologik barqarorlikni shakllantirishning tabiiy vositasi sifatida qaraladi.

Stressga chidamlilikni tushuntirishda Richard Lazarus tomonidan ishlab chiqilgan kognitiv baholash nazariyasi ham muhim ahamiyatga ega. Ushbu nazariyaga ko‘ra, shaxs stressli vaziyatni qanday baholashi va unga qanday munosabatda bo‘lishi uning psixologik holatini belgilaydi. Jismoniy tayyorgarligi yuqori bo‘lgan shaxslar o‘z imkoniyatlariga ko‘proq ishonadi va murakkab vaziyatlarni xavf emas, balki vazifa sifatida qabul qiladi. Bu esa stressni boshqarish qobiliyatini oshiradi.

Shuningdek, jismoniy yuklamalarning stressga ta’siri adaptatsiya va gomeostaz nazariyalari orqali ham izohlanadi. Adaptatsiya jarayonida organizm yangi sharoitlarga moslashadi, homeostaz esa ichki muvozanatni saqlashni ta’minlaydi. Muntazam jismoniy mashg‘ulotlar ushbu jarayonlarni faollashtirib, organizmni stress omillariga nisbatan bardoshli qiladi. Bundan tashqari, jismoniy tayyorgarlikning psixofiziologik ta’siri markaziy nerv tizimi faoliyatining barqarorlashuvi, diqqat va xotira jarayonlarining yaxshilanishi, emotsional holatning muvozanatlashuvi orqali namoyon bo‘ladi. Bu esa harbiy xizmatchilar uchun muhim bo‘lgan tezkor fikrlash, to‘g‘ri qaror qabul qilish va yuqori darajada diqqatni jamlash kabi sifatlarni rivojlantiradi.

Olib borilgan nazariy va empirik tahlillar shuni ko‘rsatdiki, harbiy xizmatchilarda jismoniy tayyorgarlik darajasi va stressga chidamlilik o‘rtasida uzviy va ijobiy bog‘liqlik mavjud. Jismoniy tayyorgarligi yuqori bo‘lgan shaxslar ekstremal va stressli vaziyatlarda o‘zini barqaror tutish, tezkor va samarali qaror qabul qilish hamda psixologik bosimlarga bardosh berish qobiliyatiga ega bo‘ladi. Tadqiqot natijalari jismoniy mashg‘ulotlarning nafaqat organizmning funksional imkoniyatlarini oshirish, balki markaziy nerv tizimi faoliyatini barqarorlashtirish, emotsional holatni muvozanatlash va stressga moslashuvchanlikni kuchaytirishda muhim rol o‘ynashini tasdiqladi. Ayniqsa, muntazam va ilmiy asosda tashkil etilgan jismoniy mashg‘ulotlar stressga chidamlilikni oshirishning samarali vositasi sifatida namoyon bo‘ldi.

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Shuningdek, jismoniy tayyorgarlik va psixologik barqarorlikni integratsiyalashgan holda rivojlantirish harbiy xizmatchilarni kompleks tayyorlashning muhim yo‘nalishi ekanligi aniqlandi. Bu esa harbiy tayyorgarlik tizimida jismoniy va psixologik komponentlarni uyg‘unlashtirish zarurligini ko‘rsatadi. Umuman olganda, jismoniy tayyorgarlikni rivojlantirish orqali harbiy xizmatchilarning stressga chidamliligini oshirish mumkinligi ilmiy asoslandi. Mazkur natijalar harbiy tayyorgarlik jarayonini takomillashtirish, yangi metodik yondashuvlarni joriy etish hamda harbiy xizmatchilarning xizmat samaradorligini oshirishda muhim amaliy ahamiyatga ega.

Foydalanilgan adabiyotlar ro’yxati

1. O‘zbekiston Respublikasi Mudofaa vazirligi. *Harbiy xizmatchilarning jismoniy tayyorgarligi bo‘yicha me’yoriy hujjatlar*. – Toshkent, 2020.
2. Karimov A.A. *Jismoniy tarbiya nazariyasi va metodikasi*. – Toshkent: O‘qituvchi, 2019.
3. Abdullayev Sh.X. *Sport fiziologiyasi asoslari*. – Toshkent, 2018.
4. Rasulov A.M. *Harbiy jismoniy tayyorgarlik asoslari*. – Toshkent, 2021.
5. Matveyev L.P. *Teoriya i metodika fizicheskoy kultury*. – Moskva, 2005.
6. Hans Selye H. *The Stress of Life*. – New York: McGraw-Hill, 1956.

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BOSHLANG'ICH SINF O'QUVCHILARINING KREATIVLIK QOBILIYATINI RIVOJLANTIRISH MAZMUN VA TUZILMASI.

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Annotatsiya: ushbu maqolada boshlang'ich sinf o'quvchilaridagi kreativ qobiliyatlarni rivojlantirish maqsadida foydalanish lozim o'qituvchi vazifalari haqidagi kerakli ma'lumotlar va manbalar keltirib o'tilgan. Maqolada berilgan ma'lumotlar asosida o'qituvchilar va ota-onalar o'zilari uchun kerakli tavsiyalarni olishlari mumkin.

Kalit so'zlar: ta'lim, metodika, tafakkur, kreativlik, belgi, mashq, fikrlash, ijodkorlik, fikrlash,erkinlik.

Abstract: This article provides the necessary information and resources on the tasks of a teacher to be used in order to develop creative abilities in primary school students. Based on the information provided in the article, teachers and parents can get the necessary recommendations for themselves.

Keywords: education, methodology, thinking, creativity, character, exercise, thinking, creativity, thinking, freedom.

Аннотация: В статье представлена необходимая информация и ресурсы о задачах учителей, которые следует использовать для развития творческих способностей учащихся начальной школы. На основе информации, представленной в статье, педагоги и родители могут получить необходимые для себя рекомендации.

Ключевые слова: образование, методология, мышление, творчество, характер, упражнение, мышление, творчество, мышление, свобода.

Boshlang'ich sinf o'quvchilarining kreativlik qobiliyatini rivojlantirish mazmuni va tuzilmasi pedagogik jarayonning asosiy komponentlarini belgilab beradi

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va bolalarning ijodiy potensialini samarali shakllantirishga yordam beradi. Kreativlik rivojlantirish mazmuni bolalarning yosh xususiyatlarini, psixologik rivojlanish darajasini va jamiyat talablarini hisobga olgan holda tuziladi. Zamonaviy ta'limda mazmun bolalarning mustaqil fikrlash, muammolarni ijodiy hal qilish va yangi g'oyalar yaratish ko'nikmalarini o'z ichiga oladi. Masalan, ona tili darslarida mazmun hikoya yozish, she'r yaratish va dialoglar tuzish kabi topshiriqlarni qamrab oladi, bu bolalarning tasavvurini va nutqiy faoliyatini rivojlantiradi. O'zbekiston ta'lim tizimida mazmun milliy ta'lim standartlari (DTS) asosida ishlab chiqiladi, chunki u bolalarning shaxsiy rivojlanishini ta'minlaydi va innovatsion jamiyat talablariga javob beradi.Mazmunning tuzilmasi bosqichma-bosqich va izchil bo'lib, birinchi bosqichda tasavvur va fantaziyani rivojlantirish, ikkinchi bosqichda amaliy ijodiy faoliyat, uchinchi bosqichda baholash va takomillashtirishni o'z ichiga oladi. Bu tuzilma J. Guilfordning divergent fikrlash nazariyasiga asoslanadi, ya'ni bir muammoga ko'p yechim topishni rag'batlantiradi. O'zbekiston kontekstida tuzilma milliy adabiyot va folklor unsurlari bilan boyitiladi, masalan, o'zbek ertaklarini qayta ishlash orqali bolalarning kreativligini oshiradi. Tadqiqotlar shuni ko'rsatadiki, mazmun va tuzilmani to'g'ri loyihalash bolalarning ijodiy qobiliyatini 25-30% ga oshirishi mumkin, chunki u motivatsiya va individual yondashuvni ta'minlaydi. Shuning uchun, mazmun va tuzilma pedagogik muammoni hal qilishda muhim ahamiyatga ega.

Kreativ fikrlash – bu innovatsion (yangi, novator, original, nostandart, noodatiy va hokazo…) va samarali (amaliy, natijaviy, tejamli, optimal va hokazo) yechimlarni topish, yangi bilimlarni egallash, tasavvurni ta'sirchan ifodalashga qaratilgan g'oyalarni ishlab chiqish, baholash va takomillashtirish jarayonida samarali ishtirok etish qobiliyatidir. Shaxsning kreativligi uning tafakkurida, muloqotida, his-tuyg'ularida, muayyan faoliyat turlarida namoyon bo'ladi.[2]

Kreativlik – bu insonning shaxsiy xususiyati bo'lib, uning o'z-o'zini takomillashtirib va rivojlantirib borishi bilan bog'liq. Kreativlik (lot., ing. "create " – yaratish, "creative " yaratuvchi, ijodkor) – individning yangi g'oyalarni ishlab chiqarishga tayyorlikni tavsiflovchi hamda mustaqil omil sifatida iqtidorlilikning tarkibiga kiruvchi ijodiy qobiliyati. Shaxsning kreativligi uning tafakkurida, muloqotida, his-tuyg'ularida, muayyan faoliyat turlarida namoyon bo'ladi. Bolalarda kreativlikni rivojlantirishda quyidagilarga e'tibor qaratish zarur:

1) ular tomonidan ko'p savollar berilishini rag'batlantirish va bu odatni qo'llab-quvvatlash;

2) bolalarning mustaqilligini rag'batlantirish va ularda javobgarlikni kuchaytirish;

3) bolalar tomonidan mustaqil faoliyatni tashkil etilishi uchun imkoniyat yaratish;

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4)bolalarning qiziqishlariga e’tibor qaratish.

Quyidagi omillar shaxsda kreativlikni rivojlantirishga to’sqinlik qiladi:

1) o’zini tavakkaldan olib qochish;

2) fikrlash va xatti-harakatlarda qo’pollikka yo’l qo’yish;

3) shaxs fantaziyasi va tasavvurining yuqori baholanmasligi;

4) boshqalarga tobe bo’lish;

5) har qanday holatda ham faqat yutuqni o’ylash.[6]

Boshlang’ich sinf o’quvchilarning kreativ qobiliyatini rivojlantirish usullari va vositalariga ta’sir qiluvchi muhim omillardan biri o’qituvchi-o’quvchilar hamkorligi ekanligiga alohida e’tibor qaratildi. Ma’lumki, ta’lim jarayoni ikki yoqlama xarakterga ega bo’lib, o’qituvchi va o’quvchilarning teng munosabatlaridan tashkil topadi. Bu jarayonga rahbarlik qiluvchi o’qituvchi ta’lim jarayonining to’g’ri tashkil etilishi, ta’lim maqsadlarining to’gri amalga oshirilishi va ta’lim natijalari uchun javobgar shaxs hisoblanadi. Ammo bu, ta’lim jarayoni o’qituvchining to’liq hukmronligi ostida amalga oshadigan jarayon, degan noto’g’ri fikrning tug’ilishiga asos bo’la olmaydi. Hozirgi davr talabi ham kimnidir bo’ysundirish orqali emas, balki hamkorlik munosabati yordamida ijobiy natijaga erishishdir. Ta’lim jarayonida o’quvchilar faoliyatining shakllanishi fan asoslarini o’zlashtirishga oid mexanizmgina bo’lib qolmasdan, balki shaxsning umumiy ijtimoiy-madaniy qobiliyatlarini tarkib toptirishga ham qaratilishini unutmaslik lozim. Bizningcha, o’quv vaziyati ta’lim jarayonini tashkil qiluvchi o’zgaruvchan tizim sanalib, u quyidagicha ikki qismdan iborat:

- o’qituvchi bilan o’quvchilar hamkorligi;

- o’quvchilarning o’zaro bir-birlari bilan hamkorligi.[5]

Kreativlik va o’zaro hamkorlik bir-biriga mustahkam bog’liq. Zero, faqatgina yangicha yondashuv asnosida hamkorlik vujudga keladi va mana shu hamkorlikda ijodkorlik o’z ifodasini topadi. Pedagogik kreativlikni faqatgina yangilikka, tajribalar o’tkazishga intilish deb tushunmaslik kerak. Bu intilish sog’lom fikrning rasmiyatchilik ustidan g’alabasini ham ifoda etadi. Demokratiya, oshkoralik bo’lmagan joyda, ma’muriyatchilik va o’qituvchining irodasi bilan dars jarayonida o’quvchilarning mustaqil fikrlash faoliyatiga rahna solinsa ijodiy hamkorlik barham topadi. Boshlang’ich sinf darslarida o’quvchilarning kreativ qobliyatini rivojlantirishga xizmat qiladigan topshiriqlar ustida ishlash alohida o’rin tutadi.

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O’quvchi o’zi uchun qulay sharoitda hayotiy va o’quv tajribasiga tayanib og’zaki yoki yozma nutqi orqali fikrlash faoliyatini amalga oshiradi. Unda har bir fanning o’zi uchun noma’lum qirralari xususida o’qituvchi bilan faol hamkorlik qilish uchun ruhiy tayyorgarlik paydo bo’ladi. U mavzu yuzasidan berilgan savollarga tegishli javob qaytarish uchun mustaqil ijodiy izlanishlarga harakat qiladi. O’qituvchi bunday hamkorlik jarayonida o’quvchilarning kreativligini o’stirish bilan birga diagnostik vazifani ham bajaradi, ya’ni o’quvchilarning qobiliyati , qiziqish doirasini aniqlaydi, kreativ iqtidorini chamalaydi. Kreativlikni rivojlantiruvchi topshiriqlar ustida ishlash jarayonida bu g’oyat muhimdir.[1]

Boshlang’ich ta’lim – bu har bir bolaning hayotida chuqur iz qoldiruvchi ta’lim turidan biri bo’lib, ta’limning bu bosqichida pedagog o’qituvchilarga katta mas’uliyat yuklatiladi. Ya’ni boshlang’ich sinf o’quvchilarining kreativlik qobiliyatlarini rivojlantirish metodikasi hali maxsus o’rganishni talab etmoqda. O’quvchilar o’z-o’zidan kreativ bo’lib qolmaydi. Uning kreativ qobiliyati ma’lum vaqt ichida izchil o’qib-o’rganish, o’z ustida ishlash orqali shakllantiriladi va asta-sekin takomillashib, rivojlanib boradi. O’qituvchilar o’quvchilar bilan hamkorlikda ish yuritib, ularning har bir fikrini inobatga olishi va buni o’quvchiga sezdirishi kabi muhim vazifalarni bajarish orqali o’quvchilarni o’zgacha yondashuvli ya’ni kreativ bo’lishlariga erishishi mumkin.O’qituvchi o’quvchilarga muammoli masala va vaziyatlarni berib, o’quvchining masala yechimini topishga ijodiy yondashishi undagi hissiy irodaviy sifatlarni rivojlanishiga yordam beradi. Bu o’quvchilarni o’z ustida ishlash, mustaqil o’qib o’rganishiga imkoniyat, ichki ehtiyojning oshishiga turtki bo’ladi. «Kreativlik» tushunchasi «ijod» tushunchasi bilan bog’liq. Biroq, «kreativlik» tushunchasi tegishli lug’atlarda munosib differentsiyasini topmagan va ijod psixologiyasida yetarlicha aniqlanmagan. O’nlab ilmiy ishlarda kreativlikning u yoki bu qirralariga turlicha yondashib, har xil darajada qamrab olinayotganligiga qaramasdan, hozirgacha na muammoning o’ziga va na unga taalluqli bo’lgan amaliy savollarga nisbatan yagona to’xtam mavjud emas.

FOYDALANILGAN ADABIYOTLAR RO’YXATI

1. Pedagogik kompetentlilik va kreativlik asoslari moduli bo’yicha o’quv-uslubiy qo’llanma. :– Toshkent 2015,40 bet
2. Davletshin M.G., Do’stmuhamedova Sh., Mavlanov M., To’ychiyeva S. Yosh davrlari va pedagogik psixologiya. (O’quv metodik qo’llanma). Nizomiy nomidagi TDPU. 2004-yil. 102 b. 46-47 betlar.
3. Innovatsion ta’lim texnologiyalari va pedagogik kompetentlik moduli bo’yicha o’quv-uslubiy majmua – Toshkent. 2016

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
4. Jo'rayev P.X., Raximov B.X., Xomatov SH.F. Yangi pedagogik texnologiyalar. Muammoli ta'limga asoslangan o'quv-metodik qo'llanma. –T.: Fan, 2005, 66 b.
5. Adizov B. Boshlang'ich ta'limni ijodiy tashkil etishning nazariy asoslari: Ped. fan. dok. ... dis. –Toshkent, 2003. – 276 b.
6. Aliyev A. O'quvchilarning ijodkorlik qobiliyati. –Toshkent: O'qituvchi,1991.40bet.
7. Y.G'ulomov, I.Rasulov, X.Rustamov, B.Mirzaaxmedov. O'zbek tili o'qitish metodikasi. Qo'llanma. Toshkent-1975. 121-bet.
8. Nisanbayeva Akmaral, Tagayeva Jannat "Boshlang'ich sinflarda ona tili va o'qish darslarini kreativlik asosida tashkil qilish usullari"

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MATEMATIKA BIZGA NIMA UCHUN KERAK? RAQAMLAR ORTIDAGI HAQIQAT

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Matematika ta'lim yo'nalishi 1-bosqich talabasi

ANNOTATSIYA: Ushbu maqolada matematikaning insoniyat rivoji va har bir shaxsning kundalik hayotidagi beqiyos o'rni tadqiq etiladi. Muallif matematikani shunchaki quruq formulalar va murakkab hisob-kitoblar to'plami emas, balki aqlni charxlovchi va muammolarni to'g'ri hal qilishga o'rgatuvchi asosiy yo'l deb biladi. Maqola davomida fanning insonning aql-idrokini o'stirish hamda uzoqni o'ylab to'g'ri yo'l tanlashiga yordam berish va atrofimizdagi olamni chuqurroq anglashdagi ahamiyati hayotiy misollar bilan dalillanadi. Shuningdek, matematikaning zamonaviy texnologiyalar hamda kundalik turmushimiz bilan qanchalik uzviy bog'liqligi keng yoritilgan. Maqola o'quvchini raqamlar ortida yashiringan o'sha maxfiy tartib va go'zallikni ko'rishga chorlaydi. Shu bilan birga, matematika insonning aqliy faoliyatini charxlovchi eng kuchli qurol ekanligini ilmiy jihatdan isbotlashga xizmat qiladi. Ushbu ish matematikaga bo'lgan eski va yuzaki qarashlarni o'zgartirish maqsadida tayyorlangan. U fanning hayotiy zaruriyatini sodda tilda tushunishni istagan barcha barcha kitobxonlar uchun juda foydalidir.

KALIT SO'ZLAR: Matematika, mantiqiy fikrlash, intellektual salohiyat, tizimli yondashuv, strategik qarorlar, insoniyat taraqqiyoti, hayotiy zaruriyat, zamonaviy texnologiyalar, tafakkur madaniyati, raqamlar tartibi.

Biz ertalab uyg'ongan lahzamizdan boshlab, to kun yakunigacha ongsiz ravishda matematik amallar qurshovida bo'lamiz: vaqtni taqsimlash, xaridlarni rejalashtirish yoki masofani o'lchash – bularning barchasi matematik mantiqning mevasidir. Biroq, bu fanning haqiqiy kuchi faqatgina hisob-kitoblarda emas, balki u inson aqlining "charxi" ekanligidadir. Matematika bizga tartibsizlik ichidan qonuniyatni topishni va murakkab muammolarga eng qisqa yo'l bilan yechim izlashni o'rgatadi. Ushbu maqolada biz matematikaga bo'lgan an'anaviy qarashlarni chetga surib, uning

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hayotimizdagi yashirin go‘zalligi va intellektual salohiyatimizni oshirishdagi beqiyos o‘rni haqida so‘z yuritamiz.

Insoniyat tarixiga chuqurroq nazar tashlasak, har qanday buyuk kashfiyot, buyuk binolar va misli ko‘rilmagan texnologik yuksalish negizida eng avvalo aniq hisob-kitob, simmetriya hamda inkor etib bo‘lmas mantiqiy qonuniyatlar yotganiga guvoh bo‘lamiz. Hozirgi ma’lumotlar ko‘p bo‘lgan bir paytda matematika nafaqat asosiy fan, balki odamning fikrlashini tartibga soladigan, uni xatoliklardan va his-tuyg‘ularga berilishdan qutqaradigan umumiy tushunish tilidir. Ko‘pchilik uchun matematika hamon maktab darsliklaridagi murakkab formulalar, tushunarsiz grafiklar va quruq raqamlar to‘plami bo‘lib tuyulsa-da, aslida u bizning har bir kundalik qarorimiz, strategik rejalashtirishimiz va atrofimizdagi cheksiz olamni anglash qobiliyatimizning eng mustahkam poydevori hisoblanadi. Matematikaning haqiqiy mohiyati shunchaki arifmetik amallarni bajarishda emas, balki mantiqiy fikrlashni tizimlashtirishda namoyon bo‘ladi. Har bir matematik masala yoki isbot inson miyasi uchun tafakkur mashqi bo‘lib xizmat qiladi va ongni o‘tkirlashtiradi. Bu murakkab jarayonda shaxsda faktlarni xolis tahlil qilish, sabab va oqibat o‘rtasidagi bog‘liqlik zanjirini qurish hamda isbotsiz, asossiz ma’lumotlarni qat’iy rad etish ko‘nikmasi shakllanadi. Matematika insonni tartibsiz axborotlar oqimi ichidan eng muhim va hal qiluvchi nuqtani ajratib olishga hamda kutilmagan vaziyatlarda eng to‘g‘ri, samarali yechimni topishga o‘rgatadi. Shuning uchun ham matematikani shunchaki fan emas, balki shaxsning aqliy salohiyatini belgilovchi yuksak tafakkur madaniyati deb atash lozim.

Kundalik turmushimizning har bir soniyasida biz ongsiz ravishda matematik amallar va mantiqiy algoritmlar qurshovida bo‘lamiz: Vaqtni soniyalargacha to‘g‘ri taqsimlash, cheklangan resurslar bilan katta maqsadlarga erishish, xaridlarni oqilona rejalashtirish yoki masofani ko‘z bilan chamalab o‘lchash kabi oddiy tuyulgan jarayonlar aslida ushbu fanning amaliy va hayotbaxsh mevalaridir. Hal qiluvchi qarorlar qabul qilish faqatgina yirik kompaniya rahbarlari, muhandislar yoki olimlarning ishi deb o‘ylash xato. Aslida oddiy uy xo‘jaligini tejamkor yuritish, kasbiy faoliyatda yuqori samaradorlikka erishish va shaxsiy kelajakni modellashtirish ham chuqur tizimli yondashuvni hamda matematik mantiqni talab qiladi. Raqamlar ortidagi yashirin tartibni va izchillikni ko‘ra olgan inson hayotdagi har qanday chalkashliklarni ham onsonlikcha tizimga sola oladi. Chunki matematika murakkab muammoni mayda bo‘laklarga ajratishni va har bir qism uchun alohida, xatosiz yechim algoritmini ishlab chiqishni o‘rgatadi. Raqamli inqilob va eng yangi texnologik yutuqlar aynan matematika poydevori ustiga qurilgan. Smartfonlardan tortib, inson hayotini saqlab qoluvchi murakkab tibbiy diagnostika qurilmalarigacha bo‘lgan barcha texnik vositalar

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matematik algoritmlar asosida ishlashi fanning naqadar hayotiy zaruriyat ekanligini qayta-qayta isbotlaydi.

Matematika — shunchaki raqamlar va formulalar yig‘indisi emas, balki tabiatning nafis arxitekturasidan tortib, san’atning eng nozik durdonalarigacha bo‘lgan barcha go‘zalliklarning poydevoridir. U koinotdagi tartibni tushuntiruvchi universal tildir. Bu fan inson aqli uchun haqiqiy charx vazifasini o‘tab, tafakkurni o‘tkirlashtiradi, ongni yuzaki xulosalar, chala bilimlar va asossiz taxminlar kishanidan ozod qiladi.Olamdagi har bir zarrada mavjud bo‘lgan mantiqiy izchillik va hayratlanarli mutanosiblikni aynan matematika orqali anglash mumkin. U bizga narsalarning tashqi ko‘rinishiga aldanmasdan, ularning tub mohiyatiga kirib borishni, har bir hodisani mantiq taroziyosida o‘lchashni o‘rgatadi.Shu bilan birga, matematika insonning o‘ziga bo‘lgan ichki ishonchini mustahkamlaydi. Chunki u har bir qadamda shubha-gumonlarga emas, balki inkor qilib bo‘lmas isbotlarga va qat’iy haqiqatga tayanishni o‘rgatadi. Matematik mantiq bilan qurollangan inson hayotdagi murakkab vaziyatlarda ham dovdirab qolmaydi, balki har bir muammoning yechimini aniq va izchil yo‘llar bilan topishga o‘rganadi.

Xulosa qilib aytganda, matematika shunchaki formulalar to‘plami emas, balki inson tafakkurini charxlovchi va hayotni tartibga soluvchi eng samarali vositadir. U bizga mantiqiy fikrlashni, muammolarga tizimli yechim topishni va har qanday vaziyatda to‘g‘ri strategik qarorlar qabul qilishni o‘rgatadi. Bugungi raqamli texnologiyalar asrida matematik savodxonlik har bir shaxs uchun hayotiy zaruriyatga aylandi. Zero, dunyoni matematik mantiq orqali anglash — hayotni yanada aniq, mazmunli va muvaffaqiyatli tashkil etish demakdir.

FOYDALANILGAN ADABIYOTLAR RO‘YXATI:

1. **G‘aniyev, H. va boshqalar.** Matematika tarixi. Toshkent: “O‘qituvchi”, 1996. (Matematik tushunchalarning paydo bo‘lishi va raqamlar evolyutsiyasi haqida).

2. **Abdurahmonov, A.** Saodatmand yulduzlar (Bobur va matematika*)*. Toshkent: “Fan”, 2004. (Matematikaning tarixiy shaxslar hayotidagi o‘rni haqida).

3. **To‘rayev, H.** Matematik mantiq. Toshkent: “O‘qituvchi”, 2003. (Fikrlash tizimida matematikaning roli).

4. **Quanta Magazine - Mathematics Section**
https://www.quantamagazine.org/mathematics/

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(Eng so‘nggi matematik kashfiyotlar va raqamlar ortidagi yashirin haqiqatlarni sodda tilda tushuntiruvchi maqolalar to‘plami.)

5. **Ziyo.uz - Matematika va mantiq** http://ziyouz.uz/ilm-va-fan/matematika/

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YANGI AVLOD YUQORI MUSTAHKAM PO‘LATLARI (AHSS): METALLURGIK ASOSLAR, TEXNOLOGIK JARAYONLAR VA AVTOMOBILSOZLIKDAGI STRATEGIK ISTIQBOLLAR

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Annotatsiya:*Mazkur tadqiqot ishi zamonaviy metallurgiyaning eng murakkab* va *istiqbolli yo‘nalishi – Advanced High Strength Steels (AHSS) po‘latlarini har tomonlama tahlil qilishga bag‘ishlangan. Maqolada AHSS po‘latlarining uchta avlodi, ularning mikrotuzilishi, faza o‘zgarishlari va mexanik xususiyatlari o‘rtasidagi bog‘liqlik yoritilgan. Shuningdek, ushbu materiallarning avtomobil xavfsizligini ta’minlash, konstruksiya vaznini optimallashtirish va ekologik barqarorlikka qo‘shayotgan hissasi texnik nuqtai nazardan asoslab berilgan.*

Kalit so‘zlar: AHSS, faza o‘zgarishi, martensit, ferrit, austenit, TRIP effekti, TWIP, Q&P texnologiyasi, avtomobil xavfsizligi, ekologik yuklama, energiya yutilishi.



1-rasm. Zanglamaydigan yangi avlod yuqori mustahkam po‘lat (AHSS).

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KIRISH

Konstruksion materiallar evolyutsiyasiInsoniyat sivilizatsiyasi rivojlanishi bilan transport vositalariga bo‘lgan talab ham o‘zgarib bordi. XX asrning oxiriga kelib, global isish va energiya resurslarining kamayishi avtomobilsozlik oldiga qat’iy talablar qo‘ydi. Avtomobil nafaqat tez va qulay, balki maksimal darajada yengil va xavfsiz bo‘lishi shart edi.An’anaviy po‘latlar (past uglerodli yumshoq po‘latlar) uzoq vaqt davomida sanoatning asosi bo‘lib keldi, biroq ularning oquvchanlik chegarasi pastligi konstruksiyani og‘irlashtirishga majbur qilar edi. 1970-yillardagi energetik inqirozdan so‘ng, metallurglar po‘latning mustahkamligini oshirish ustida ish boshladilar. Natijada, bugungi kunda biz Advanced High Strength Steels (AHSS) deb ataydigan "aqlli" materiallar sinfi paydo bo‘ldi. Bu materiallar metallurgiya fanining mikrotuzilmani boshqarishdagi eng yirik yutug‘idir.

1. AHSS PO‘LATLARINING KLASSIFIKATSIYASI VA AVLODLAR TAHLILI

AHSS po‘latlari oddiy po‘latlardan o‘zining kimyoviy tarkibi va ko‘p fazali tuzilishi bilan farq qiladi. Ular jahon amaliyotida uchta asosiy avlodga bo‘linadi.

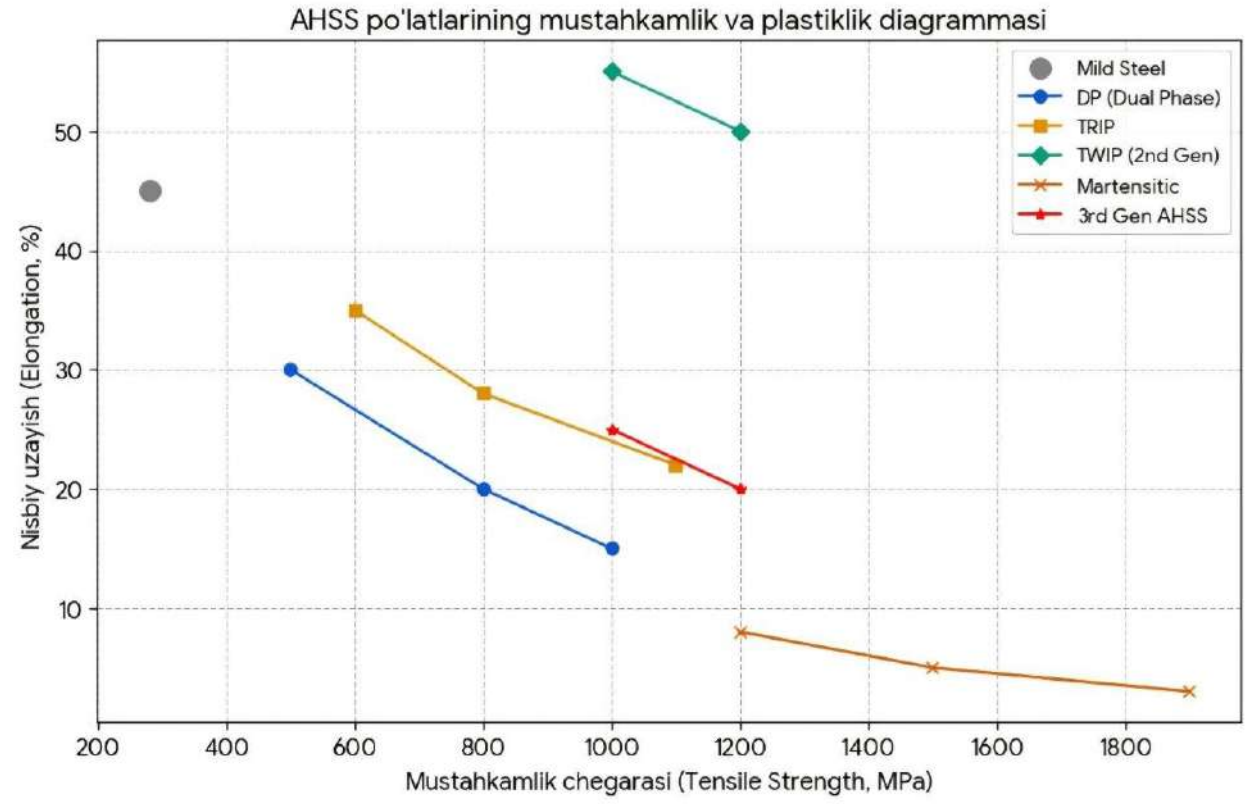
1.1. Birinchi avlod: Ko‘p fazali po‘latlar.Bu guruhga mansub po‘latlar asosan yumshoq va qattiq fazalarning kombinatsiyasidan iborat. Dual Phase (DP) po‘latlari: Mikrotuzilishi yumshoq ferrit matritsasi va undagi qattiq martensit orolchalaridan tashkil topgan. Ferrit plastiklikni, martensit esa mustahkamlikni ta’minlaydi. Ular cho‘zilishda yuqori mustahkamlanish koeffitsientiga ega. TRIP (Transformation-Induced Plasticity) po‘latlari: Bu po‘latlar tarkibida saqlanib qolgan (retained) austenit mavjud. Deformatsiya (masalan, to‘qnashuv) paytida austenit martensitga aylanadi. Bu jarayon materialning plastikligini yo‘qotmasdan, uni yanada mustahkam qiladi. Complex Phase (CP) po‘latlari: Ular juda mayda donador tuzilishga ega bo‘lib, tarkibida beinit va martensit fazalari mavjud. Bu ularga yuqori charchoqqa chidamlilik xususiyatini beradi.

1.2. Ikkinchi avlod: Yuqori plastiklikka ega po‘latlar. Bu guruhga asosan TWIP (Twinning-Induced Plasticity) po‘latlari kiradi.Ularning tarkibida marganets (Mn) miqdori juda yuqori (17-24%).Mexanik xususiyatlari hayratlanarli: mustahkamligi 1000 MPa dan yuqori, lekin shu bilan birga 60% gacha cho‘zilish qobiliyatiga ega.Biroq, yuqori tannarx va payvandlashdagi murakkabliklar tufayli ular faqat o‘ta murakkab shaklli detallar uchun ishlatiladi.

1.3. Uchinchi avlod: Oltin muvozanatBu zamonaviy metallurgiyaning eng yangi yutug‘i bo‘lib, u birinchi avlodning arzonligi va ikkinchi avlodning yuqori

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xususiyatlarini o‘zida birlashtiradi.Q&P (Quenching and Partitioning): Bu texnologiya po‘latni ma’lum haroratgacha tez sovutib, so‘ngra uglerodni fazalar o‘rtasida qayta taqsimlashga asoslangan.Ushbu po‘latlar elektromobillarning akkumulyator korpuslarini himoya qilishda eng asosiy material hisoblanadi.



Quyidagi grafik AHSS po'latlarining asosiy xususiyati — Mustahkamlik (Tensile Strength) va Plastiklik (Elongation) o'rtasidagi bog'liqlikni ko'rsatadi. Bu metallurgiyada "Banan diagrammasi" deb ham ataladi.

2. METALLURGIK JARAYONLAR

Mikrotuzilmani boshqarishAHSS ishlab chiqarishda nafaqat kimyoviy tarkib, balki termomexanik ishlov berish ham muhim rol o‘ynaydi.

Lelegirlash: Kremniy (Si) va alyuminiy (Al) kabi elementlar sementit hosil bo‘lishini to‘xtatib, austenitni xona haroratida barqaror saqlashga yordam beradi.

Donadorlikni boshqarish: Niobiy (Nb), titan (Ti) va vanadiy (V) kabi mikrolelovchi elementlar qo‘shilib, po‘lat donachalari hajmi nano-darajagacha maydalanadi. Donachalar qanchalik mayda bo‘lsa, material shunchalik mustahkam

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bo‘ladi (Xoll-Petch qonuni).Fazaviy o‘tishlar: Po‘latni prokatlash va sovutish rejimlari soniyaning ulushlarida nazorat qilinadi. Bu jarayonda po‘latning ichki strukturasida "kristall panjaralar jangi" sodir bo‘ladi, natijada kerakli qattiqlik va elastiklikka erishiladi.

3. AVTOMOBILSOZLIKDA QO‘LLANILISH STRATEGIYASI

Avtomobil korpusi (Body-in-White) murakkab muhandislik konstruksiyasi bo‘lib, unda AHSS materiallari vazifasiga ko‘ra taqsimlanadi.

3.1. Aktiv va passiv xavfsizlik. To‘qnashuv paytida avtomobilning old qismi energiyani yutishi kerak. Bu yerda TRIP po‘latlari ishlatiladi, chunki ular zarba kuchi ostida qattiqlashadi. Salondagi yo‘lovchilarni saqlab qoluvchi "xavfsizlik kapsulasi" (B-ustunlari, tom relslari) esa mutlaqo egilmasligi kerak. Buning uchun Martensitli po‘latlar va Issiq shtamplangan borli po‘latlar (PHS) qo‘llaniladi. Ularning mustahkamligi 2000 MPa ga yetishi mumkin – bu 1 kvadrat millimetr maydon 200 kg yukni ko‘tara olishini anglatadi.

3.2. Elektromobillar (EV) inqilobiElektromobillarda akkumulyatorlar poldan joy oladi va ular juda og‘ir. Bu og‘irlikni kompensatsiya qilish uchun korpusning boshqa qismlarini yengillashtirish shart. AHSS po‘latlari alyuminiyga qaraganda ancha arzon va qayta ishlashga qulay bo‘lgani uchun elektromobil ishlab chiqaruvchilar (Tesla, BYD va boshqalar) aynan shu materialga ustunlik bermoqda.

4. TEXNOLOGIK MUAMMOLAR VA YECHIMLAR

AHSS po‘latlari bilan ishlash zavodlar uchun ham oson emas: Prujinalanish (Springback): Yuqori mustahkam materiallar shtamplangandan keyin o‘z shakliga qaytishga intiladi. Bu muammo kompyuter simulyatsiyalari va qoliplarning maxsus geometriyasi yordamida hal qilinadi.

Payvandlash: Yuqori issiqlik ostida po‘latning mikrotuzilishi buzilishi mumkin. Shuning uchun hozirda lazerli payvandlash va nuqtali qarshilik payvandlashning intellektual tizimlari qo‘llanilmoqda.

Asbob-uskunalar yeyilishi: Material juda qattiq bo‘lgani uchun shtamplash qoliplari tez ishdan chiqadi. Buning yechimi sifatida qoliplar yuzasiga nanoplazmali qoplamalar berilmoqda.

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5. EKOLOGIK VA IQTISODIY SAMARADORLIK

"World Steel Association" hisob-kitoblariga ko‘ra, AHSS po‘latlaridan foydalanish avtomobilning umumiy og‘irligini 200 kg gacha kamaytirishi mumkin. Bu esa:Yoqilg‘i sarfini 5-8% ga kamaytiradi.Avtomobilning butun xizmat muddati davomida atmosferaga chiqariladigan karbonat angidrid miqdorini bir necha tonnaga qisqartiradi.Po‘lat dunyodagi eng ko‘p qayta ishlanadigan materialdir (recycling darajasi 90% dan yuqori), bu esa "aylanma iqtisodiyot" (circular economy) tamoyillariga to‘liq mos keladi.

XULOSA

Kelajak metallurgiyasi va barqaror taraqqiyotYangi avlod yuqori mustahkam po‘latlari (AHSS) bo‘yicha olib borilgan ushbu tahliliy tadqiqot shuni ko‘rsatadiki, ushbu materiallar zamonaviy sanoatning ajralmas qismiga aylanib ulgurgan. Tadqiqot natijalariga ko‘ra, quyidagi fundamental xulosalarni shakllantirish mumkin:

1. Xavfsizlik va mustahkamlikning yangi standarti: AHSS po‘latlari an’anaviy materiallar bilan erishib bo‘lmaydigan "yuqori mustahkamlik va yuqori plastiklik" muvozanatini ta’minladi. TRIP va TWIP effektlari tufayli avtomobil konstruksiyalari kutilmagan zarbalar va dinamik yuklamalarni o‘ziga yutish (absorbsiya qilish) qobiliyatiga ega bo‘ldi. Bu esa yo‘l-transport hodisalarida inson hayotini saqlab qolish koeffitsientini sezilarli darajada oshirdi.

2. Iqtisodiy va ekologik samaradorlik uyg‘unligi:Vaznni kamaytirish orqali yoqilg‘i tejamkorligiga erishish – bugungi kunning eng dolzarb talabidir. AHSS po‘latlari alyuminiy kabi qimmatbaho materiallarga nisbatan ancha arzon bo‘lishi bilan birga, ularning hayotiy sikli (Life Cycle Assessment) davomida atmosferaga chiqariladigan karbonat angidrid miqdori minimaldir. Po‘latning 100% qayta ishlanish xususiyati "yashil metallurgiya" tamoyillariga to‘liq javob beradi.

3. Elektromobillashuv davri talablari:Elektromobillarning og‘ir akkumulyator tizimlari korpus konstruktsiyasiga qo‘shimcha bosim yuklaydi. Uchinchi avlod AHSS po‘latlari (masalan, Q&P va Medium-Mn) ushbu bosimni kompensatsiya qilishda va batareya bloklarini mexanik shikastlanishdan himoya qilishda eng samarali yechim ekanligini isbotlamoqda. Kelajakda elektromobillarning yurish masofasini (range) uzaytirish bevosita AHSS materiallarining takomillashuviga bog‘liq bo‘lib qoladi.

4. Texnologik innovatsiyalar va integratsiya:Maqolada ko‘rib chiqilganidek, AHSS bilan ishlash faqat metallurgiya emas, balki yuqori texnologiyali raqamli modellashtirishni ham talab etadi. "Prujinalanish" va "issiq shtamplash" kabi texnik

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muammolar sun’iy intellekt va aqlli ishlab chiqarish tizimlari yordamida hal etilmoqda. Bu esa sanoatni raqamlashtirish (Industry 4.0) jarayonini tezlashtiradi

.Yakuniy fikr sifatida aytish mumkinki, yangi avlod yuqori mustahkam po‘latlari shunchaki metall emevolutsiyasi emas, balki materialshunoslik sohasidagi haqiqiy inqilobdir. O‘zbekiston avtomobilsozlik sanoatida ham ushbu materiallarni mahalliylashtirish, ularning yangi markalarini ishlab chiqish va loyihalash jarayoniga tatbiq etish mamlakatning texnologik mustaqilligini va jahon bozoridagi raqobatbardoshligini ta’minlashda strategik ahamiyatga ega.

Kelajak po‘lati — bu aqlli, yengil va mustahkam konstruktsiyalar poydevoridir.

FOYDALANILGAN ADABIYOTLAR

1.World Steel Association (2024). "Advanced High-Strength Steels: The Complete Guide for Automotive Applications".

2.International Iron and Steel Institute. "Ultra-Light Steel Auto Body (ULSAB) Report".

3.Kuznetsov, G.V. "Metallurgy of High Strength Steels: Structures and Properties".

4.Matlock, D.K. & Speer, J.G. "Third Generation AHSS: Microstructure Design and Performance".

5.ASM Handbook, Volume 1: "Properties and Selection: Irons, Steels, and High-Performance Alloys".

6.WorldAutoSteel texnik hujjatlari va ilmiy maqolalari (worldautosteel.org).

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G‘O‘ZANING GOMMOZ KASALLIGI VA UNGA QARSHI ZAMONAVIY KIMYOVIY URUG‘ DORILARINING SAMARADORLIGINI OSHIRISH.

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Annotatsiya

Mazkur maqolada g‘o‘zaning eng xavfli kasalliklaridan biri — gommoz kasalligi, uning tarqalish sabablari, zarar darajasi hamda zamonaviy kimyoviy urug‘ dorilarining samaradorligini oshirish yo‘llari yoritilgan. Tadqiqotlar shuni ko‘rsatadiki, urug‘larni kimyoviy dorilash kasallikni kamaytirishda eng muhim agrotexnik tadbirlardan biri hisoblanadi.

Abstract

This article discusses one of the most dangerous diseases of cotton - gummosis, the causes of its spread, the level of damage, and ways to increase the effectiveness of modern chemical seed treatments. Research shows that chemical seed treatment is one of the most important agrotechnical measures in reducing the disease.

Kalit so‘zlar: g‘o‘za, gommoz, bakterioz, urug‘ dorilash, kimyoviy himoya, samaradorlik.

Kirish

G‘o‘za O‘zbekiston qishloq xo‘jaligining asosiy strategik ekinlaridan biri hisoblanadi. Uning hosildorligini oshirish va sifatini yaxshilashda kasallik va zararkunandalarga qarshi samarali kurash muhim ahamiyatga ega. G‘o‘za ekinlarida uchraydigan xavfli kasalliklardan biri gommoz kasalligidir. Ushbu kasallik o‘simlikning turli organlarini zararlab, hosildorlikni sezilarli darajada kamaytiradi.

So‘nggi yillarda gommoz kasalligiga qarshi kurashishda zamonaviy kimyoviy urug‘ dorilaridan keng foydalanilmoqda. Biroq ularning samaradorligini oshirish dolzarb muammolardan biri bo‘lib qolmoqda. Ushbu maqolada gommoz kasalligining biologiyasi, rivojlanish sharoitlari hamda unga qarshi zamonaviy urug‘ dorilarining samaradorligini oshirish usullari ko‘rib chiqiladi.

TADQIQOT OB’EKTI VA USULLARI

Tadqiqot ob’ekti.

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Mazkur tadqiqot ob'ekti sifatida g'o'za (*Gossypium hirsutum L.*) ekinlari hamda ularda uchraydigan gommoz kasalligi tanlab olindi. Tadqiqot davomida o'rta tolali g'o'za navlari, xususan respublika sharoitida keng ekiladigan, gommoz kasalligiga turlicha chidamlilik darajasiga ega navlar ustida kuzatishlar olib borildi.

Shuningdek, tadqiqot ob'ekti sifatida gommoz kasalligini qo'zg'atuvchi bakteriyalar bilan zararlangan urug'lar va vegetatsiya davridagi o'simliklar ham o'rganildi. Urug'lik material sifatida laboratoriya va dala sharoitida sun'iy hamda tabiiy zararlangan chigitlardan foydalanildi.

Tadqiqot usullari.

Tadqiqot jarayonida quyidagi ilmiy usullardan foydalanildi:

Birinchidan, laboratoriya usullari asosida g'o'za urug'larining unuvchanligi, unish energiyasi hamda gommoz kasalligi bilan zararlanish darajasi aniqlandi. Urug'lar Petri kosachalarida yoki maxsus substratlarda o'stirilib, ularning fiziologik holati kuzatildi. Shuningdek, bakterial infeksiyani aniqlash maqsadida mikroskopik va mikrobiologik tahlillar o'tkazildi.

Ikkinchidan, dala tajribalari usuli qo'llanildi. Tajribalar bir nechta variantlarda tashkil etildi: nazorat (dorilanmagan urug'), an'anaviy kimyoviy dorilar bilan ishlov berilgan urug' va zamonaviy kompleks preparatlar bilan dorilangan urug'lar. Har bir variant bir necha takrorlarda joylashtirilib, tajriba natijalarining ishonchliligi ta'minlandi.

Uchinchidan, urug'larni kimyoviy dorilash usuli amalga oshirildi. Bunda urug'lar maxsus dorilash uskunalari yordamida tavsiya etilgan me'yorlarda preparatlar bilan qoplandi. Dorilash jarayonida preparatning bir tekis taqsimlanishiga, urug' yuzasini to'liq qoplashga va ortiqcha namlikning oldini olishga alohida e'tibor berildi.

To'rtinchidan, fenologik kuzatishlar olib borildi. O'simliklarning rivojlanish bosqichlari, ya'ni nihollanish, barg chiqarish, g'unchalash, gullash va hosilga kirish davrlari muntazam qayd etildi. Bu kuzatishlar dorilangan urug'larning o'sish jarayoniga ta'sirini baholash imkonini berdi.

Beshinchidan, kasallikni baholash usuli qo'llanildi. Gommoz kasalligining tarqalishi va rivojlanish darajasi vizual kuzatish hamda ballik tizim asosida aniqlanib, har bir variantda zararlanish foizi hisoblab chiqildi.

Oltinchidan, hosildorlik ko'rsatkichlarini aniqlash usuli qo'llanildi. Har bir tajriba variantida o'simliklar soni, ko'saklar soni, bir ko'sak og'irligi va umumiy hosil miqdori o'lchandi hamda o'zaro solishtirildi.

Yettinchidan, olingan natijalar matematik-statistik usullar yordamida tahlil qilindi. Bu esa turli variantlar o'rtasidagi farqlarning ishonchlilik darajasini aniqlash va ilmiy xulosa chiqarishga xizmat qildi.

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TADQIQOT NATIJALARI VA MUHOKAMASI

O‘tkazilgan tadqiqotlar natijasida g‘o‘zaning gommoz kasalligiga qarshi zamonaviy kimyoviy urug‘ dorilarining samaradorligi aniqlandi. Tajribalar laboratoriya va dala sharoitida olib borilib, turli variantlar o‘zaro solishtirildi.

Urug‘ unuvchanligi va dastlabki rivojlanish.

Laboratoriya sharoitida olingan natijalar shuni ko‘rsatdiki, dorilanmagan (nazorat) urug‘larda unuvchanlik o‘rtacha 68–72% ni tashkil etdi. An’anaviy kimyoviy preparatlar bilan ishlov berilgan urug‘larda bu ko‘rsatkich 78–82% ga yetdi. Zamonaviy kompleks urug‘ dorilari qo‘llanilganda esa unuvchanlik 88–92% gacha oshgani kuzatildi.

Shuningdek, unish energiyasi ham dorilangan variantlarda yuqori bo‘lib, nihollarning tez va bir maromda rivojlanishi ta’minlandi. Bu esa o‘simliklarning keyingi vegetatsiya bosqichlarida ustunlikka ega bo‘lishiga olib keldi.

XULOSA

O‘tkazilgan tadqiqotlar natijasida g‘o‘zaning gommoz kasalligi qishloq xo‘jaligida sezilarli iqtisodiy zarar keltiruvchi asosiy kasalliklardan biri ekanligi aniqlandi. Ushbu kasallik asosan urug‘ orqali tarqalishi va o‘simlikning dastlabki rivojlanish bosqichlarida kuchli zarar yetkazishi bilan xarakterlanadi.

Tadqiqot davomida zamonaviy kimyoviy urug‘ dorilarining qo‘llanilishi urug‘ unuvchanligini oshirishi, nihollarning bir tekis va sog‘lom rivojlanishini ta’minlashi hamda gommoz kasalligining tarqalish darajasini sezilarli kamaytirishi isbotlandi. Xususan, kompleks tarkibli preparatlar an’anaviy dorilarga nisbatan yuqori samaradorlik ko‘rsatdi.

Dala tajribalari natijalari shuni ko‘rsatdiki, dorilangan urug‘lardan yetishtirilgan o‘simliklarda kasallik darajasi keskin kamayib, hosildorlik ko‘rsatkichlari 15–25% gacha oshdi. Bu esa urug‘ni oldindan himoya qilish choralari g‘o‘za yetishtirishda muhim ahamiyatga ega ekanligini tasdiqlaydi.

Shuningdek, kimyoviy urug‘ dorilarining samaradorligi ularni to‘g‘ri qo‘llash texnologiyasi, sifatli urug‘ tanlash va agrotexnik tadbirlar bilan uyg‘un holda olib borilishiga bog‘liqligi aniqlandi.

Umuman olganda, g‘o‘zaning gommoz kasalligiga qarshi kurashishda zamonaviy kimyoviy urug‘ dorilaridan foydalanish samarali va iqtisodiy jihatdan

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maqsadga muvofiq hisoblanadi. Ularni keng joriy etish orqali hosildorlikni oshirish va sifatli paxta xom ashyosi yetishtirishga erishish mumkin.

FOYDALANILGAN ADABIYOTLAR RO‘YXATI

1. O‘zbekiston Qishloq xo‘jaligi vazirligi. **G‘o‘za yetishtirish bo‘yicha agrotexnik tavsiyalar**.
2. Abdullayev A., Xolmurodov E. **O‘simliklar kasalliklari va ularga qarshi kurash choralar**. Toshkent, 2020.
3. Rasulov R. **G‘o‘za kasalliklari va himoya tizimi**. Toshkent, 2018.
4. FAO. **Cotton production and plant protection guidelines**. Rome, 2022.

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HOZIRGI ZAMON TALABALARIGA XITOY TILINI O‘QITISHNING ZAMONAVIY YONDASHUVLARI VA INNOVATSION TENDENSIYALARI

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Annotatsiya

Mazkur maqolada yangi avlod talabalariga xitoy tilini o‘qitishda qo‘llanilayotgan zamonaviy pedagogik yondashuvlar va innovatsion tendensiyalarni tahlil qilinadi. Xususan, kommunikativ metod, raqamli texnologiyalar, interaktiv ta’lim usullari hamda xalqaro baholash tizimlari (HSK/HSKK) asosida o‘qitishning samaradorligi yoritiladi. Tadqiqot natijalari xitoy tilini o‘rgatishda zamonaviy yondashuvlarning muhim ahamiyatga ega ekanligini ko‘rsatadi.

Kalit so‘zlar: xitoy tili, zamonaviy pedagogika, innovatsion ta’lim, kommunikativ yondashuv, raqamli texnologiyalar, HSK (Hanyu ShuiPing Kaoshi 汉语水平考试), interaktiv metodlar

Annotation

This article analyzes modern pedagogical approaches and innovative trends in teaching Chinese to new generation students. In particular, the effectiveness of teaching based on the communicative method, digital technologies, interactive teaching methods and international assessment systems (HSK/HSKK) is highlighted. The results of the study show the importance of modern approaches in teaching Chinese.

Keywords: Chinese language, modern pedagogy, innovative education, communicative approach, digital technologies, HSK (Hanyu ShuiPing Kaoshi 汉语水平考试), interactive methods

Kirish. So‘nggi yillarda xitoy tiliga bo‘lgan qiziqishning ortishi uning global miqyosdagi ahamiyati bilan bevosita bog‘liqdir. Xitoyning iqtisodiy, siyosiy va madaniy ta’sir doirasining kengayishi ushbu tilni o‘rganishni dolzarb masalaga aylantirdi. Shu bilan birga, ta’lim tizimida yangi avlod – raqamli texnologiyalar bilan ulg‘aygan talabalar paydo bo‘ldi. Hozirgi avlod o‘quvchilarnini biror narsaga qiziqtirsh anchayin murakkab bo‘lib bormoqda.

Mazkur sharoitda xitoy tilini o‘qitishda an’anaviy metodlar yetarli samara bermasligi mumkin. Shuning uchun zamonaviy pedagogik yondashuvlar va innovatsion texnologiyalarni ta’lim jarayoniga joriy etish bugungi kundagi o‘qitishning muhim vositalari hisoblanadi.

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Tadqiqot metodologiyasi. Mazkur maqolada quyidagi metodlardan foydalanildi: tahliliy metod (zamonaviy adabiyotlarni o‘rganish), qiyosiy metod (an’anaviy va zamonaviy yondashuvlarni solishtirish), kuzatuv metodi (ta’lim jarayonidagi amaliy tajribalarni umumlashtirish).

Asosiy qism

1. Xitoy tilini o‘qitishda kommunikativ yondashuv. Kommunikativ yondashuv zamonaviy til o‘qitishning asosiy tamoyillaridan biri hisoblanadi[1]. Ushbu yondashuvga ko‘ra, til o‘rganishning asosiy maqsadi – muloqot qilish qobiliyatini shakllantirishdir. Xitoy tilida bu yondashuv quyidagilar orqali amalga oshiriladi:

- dialog va rolli o‘yinlar
- real hayotiy vaziyatlarni modellashtirish
- talaffuz va tonlarni amaliy mashqlar orqali o‘rgatish

Natijada talabalar nazariy bilimdan ko‘ra amaliy ko‘nikmalarni tezroq egallashadi.

2. Raqamli texnologiyalar va onlayn ta’lim. Raqamli texnologiyalar xitoy tilini o‘qitishda muhim vositaga aylandi. Yangi avlod talabalarining texnologiyalarga moslashuvchanligi bu jarayonni yanada samarali qiladi.

Zamonaviy vositalarga quyidagilar kiradi:

- mobil ilovalar (lug‘at va mashq platformalari: Super Chinese, HSK-Super Test, Hello Chinese, HSK Vocabulary and Quiz, Duolingo kabilar)
- video darslar va podkastlar (YouTube platformasi, ZeoToHero.com, ChinesePod.com)
- masofaviy ta’lim platformalari (Coursera, edX, Udemy)

Bu vositalar individual o‘rganish tezligini ta’minlaydi va mustaqil ta’limni rivojlantiradi.

3. Interaktiv metodlar va innovatsion yondashuvlar. Xitoy tilini o‘qitishda interaktiv metodlar talabalarni dars jarayoniga faol jalb etadi. Eng samarali usullarga quyidagilarni misol qilamiz:

- gamifikatsiya (o‘yin asosida o‘qitish)
- flipped classroom (teskari sinf modeli)
- loyiha asosida o‘qitish (project-based learning)

Masalan, talabalar xitoy tilida prezentatsiya tayyorlash yoki qisqa video yaratish orqali tilni amaliy qo‘llashni va mavzuni yanada chuqurroq o‘zlashtirshni o‘rganadi.

4. Madaniy komponentning o‘rni. Tilshunoslik tarixidan ma’lumki til va madaniyat har doim o‘zaro chambarchas bog‘liq bo‘lib kelgan[2]. Shu sababli xitoy tilini o‘qitishda ham madaniy elementlarni darsga kiritish quyidagi natijalarni beradi:

[1] Richards, J. C., & Rodgers, T. S. *Approaches and Methods in Language Teaching.* 2014-y.
[2] Harmer, J. *How to Teach English.* 2007-y.

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- ✓ talabalar motivatsiyasi oshadi;
- ✓ til kontekstda o‘rganiladi;
- ✓ madaniyatlararo kompetensiya shakllanadi;
- ✓ til muhiti haqida tushuncha paydo bo‘ladi;

Bunda dars davomida o‘qituvchi Xitoy bayramlari, urf-odatlari va kundalik hayotiga oid materiallardan foydalanishi ayniqsa o‘rganilayotgan tilning madaniyat bialn bog‘lanishida juda samarali xizmat qiladi.

5. Xalqaro baholash tizimi asosida o‘qitish. Xitoy tilini o‘rganishda HSK (Hanyu ShuiPing Kaoshi 汉语水平考试) tizimi muhim rol o‘ynaydi[3]. Zamonaviy o‘qitishda:

- darslar HSK darajalariga moslashtiriladi
- test topshiriqlari bilan ishlanadi
- tinglab tushunish va o‘qish ko‘nikmalari rivojlantiriladi

Bu yondashuv talabalarni xalqaro standartlarga mos ravishda tayyorlash imkonini beradi.

Natijalar va muhokama

Tahlillar shuni ko‘rsatadiki, dars jarayonida zamonaviy yondashuvlar qo‘llanilganda talabalar:

- o mavzuni tezroq o‘zlashtirishadi;
- o o‘quv mashg‘ulotida faol ishtirok etishadi;
- o mustaqil o‘rganishga intilishadi;

Shuningdek, raqamli texnologiyalar va interaktiv metodlarning o‘zaro uyg‘unligi ta’lim sifatini sezilarli darajada oshiradi[4].

Xulosa

Bugungi texnologiyalar jadal rivojlanayotgan davrda yangi avlod talabalariga xitoy tilini o‘qitishda zamonaviy yondashuvlar va innovatsion texnologiyalarni qo‘llash muhim ahamiyatga ega. Kommunikativ metod, interaktiv usullar va raqamli vositalar nafaqat o‘qitish samaradorligini oshiradi, balki talaba o‘quvchilarga tilni o‘zlashtirshda ancha qulayliklar yaratadi.

Kelgusida xitoy tilini o‘qitishda sun’iy intellekt va zamonaviy ta’lim texnologiyalaridan foydalanish ushbu jarayonni yanada takomillashtirishi kutilmoqda[5].

Foydalanilgan adabiyotlar

1. Richards, J. C., & Rodgers, T. S. *Approaches and Methods in Language Teaching*. Cambridge University Press. 2014.
2. Harmer, J. *How to Teach English*. Longman. 2007.

[3] Hanban / Confucius Institute Headquarters. *HSK Standard Course & Official Guidelines*. 2020-y.
[4] Krashen, S. D. *Principles and Practice in Second Language Acquisition*. 1982-y.
[5] Chapelle, C. A. *Computer Applications in Second Language Acquisition*. 2001-y.

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3. Krashen, S. D. *Principles and Practice in Second Language Acquisition*. Pergamon Press. 1982.
4. Hanban / Confucius Institute Headquarters. *HSK Standard Course & Official Guidelines*. Beijing Language and Culture University Press. 2020.
5. Chapelle, C. A. *Computer Applications in Second Language Acquisition*. Cambridge University Press. 2001.

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TA’LIM SOHASIDAGI XALQARO HAMKORLIK

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Annotatsiya: Mazkur maqolada **ta’lim sohasidagi xalqaro hamkorlik** tushunchasi, uning mazmuni, shakllanish omillari, tarkibiy unsurlari, O‘zbekiston ta’lim tizimidagi amaliy ahamiyati va rivojlantirish yo‘llari ilmiy-nazariy jihatdan tahlil qilinadi. Tadqiqotda xalqaro hamkorlik milliy ta’lim tizimini modernizatsiya qilish, pedagogik kadrlar salohiyatini oshirish, ta’lim sifatini baholash, xorijiy tajribani milliy sharoitga moslashtirish, akademik mobillikni rivojlantirish va ilmiy integratsiyani kuchaytirish vositasi sifatida yoritiladi. O‘zbekiston Respublikasining “Ta’lim to‘g‘risida”gi Qonuni, oliy ta’lim tizimini 2030-yilgacha rivojlantirish konsepsiyasi, xalqaro ta’lim dasturlari, xorijiy oliy ta’lim muassasalari filiallari hamda xalqaro reytinglar bilan bog‘liq jarayonlar maqolaning asosiy tahlil obyektini tashkil etadi. Maqolada xalqaro hamkorlik ta’lim tizimini tashqi tajribaga qaram qilish emas, balki milliy manfaatlar asosida jahon ta’lim makoniga integratsiyalashuv jarayoni ekani asoslab beriladi.

Kalit so‘zlar: Xalqaro hamkorlik, ta’lim integratsiyasi, akademik mobillik, xorijiy tajriba, oliy ta’lim, xalqaro reyting, qo‘shma ta’lim dasturlari, pedagogik innovatsiya, ta’lim sifati, O‘zbekiston ta’lim tizimi.

KIRISH

Bugungi globallashuv sharoitida ta’lim milliy chegaralar bilan cheklanib qolmaydigan, davlatlararo hamkorlik, ilmiy almashinuv, akademik mobillik va innovatsion tajribalar orqali rivojlanadigan ijtimoiy institutga aylandi. Har bir davlatning iqtisodiy qudrati, ilmiy salohiyati, texnologik taraqqiyoti va xalqaro raqobatbardoshligi ta’lim tizimining sifati bilan bevosita bog‘liq. Shu sababli **ta’lim sohasidagi xalqaro hamkorlik** O‘zbekiston uchun ham strategik ahamiyat kasb etmoqda. Bu jarayon mamlakat ta’lim tizimini jahon standartlariga moslashtirish, ilg‘or pedagogik texnologiyalarni o‘zlashtirish, yoshlarning zamonaviy bilim va ko‘nikmalarini shakllantirish, ilmiy izlanishlar sifatini oshirish hamda xalqaro mehnat bozorida raqobatbardosh kadrlar tayyorlashga xizmat qiladi.

Ta’lim sohasidagi xalqaro hamkorlik deganda davlatlar, ta’lim muassasalari, ilmiy markazlar, xalqaro tashkilotlar, nodavlat institutlar va ekspertlar o‘rtasida bilim,

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tajriba, texnologiya, metodika, ilmiy natija va akademik resurslar almashinuvi tushuniladi. Bu hamkorlik faqat xorijga talaba yuborish yoki xorijiy professorlarni jalb qilish bilan chegaralanmaydi. Uning mazmuni ancha keng bo‘lib, qo‘shma ta’lim dasturlari, ikki diplomli ta’lim, xalqaro akkreditatsiya, ilmiy grantlar, o‘quv adabiyotlarini yangilash, ta’lim sifatini baholash, xalqaro tadqiqotlarda ishtirok etish, raqamli ta’lim platformalarini joriy etish va xorijiy universitetlar bilan ilmiy-amaliy loyihalar yuritishni ham qamrab oladi.

O‘zbekiston Respublikasining 2020-yil 23-sentabrdagi “Ta’lim to‘g‘risida”gi Qonunida ta’lim sohasidagi xalqaro hamkorlik alohida bob sifatida belgilangan. Qonunning 67-moddasida ta’lim tashkilotlari xorijiy mamlakatlarning ta’lim muassasalari va tashkilotlari bilan ilmiy-texnik hamkorlikni rivojlantirish, qo‘shma fakultetlar va o‘quv markazlari tashkil etish, xalqaro darajadagi anjumanlar o‘tkazish, o‘qituvchilar va ta’lim oluvchilar almashinuvini amalga oshirish orqali hamkorlik qilishi mumkinligi ko‘rsatiladi. 68-moddada esa ta’lim sohasidagi xalqaro hamkorlik O‘zbekiston Respublikasining xalqaro shartnomalari va qonunchiligiga muvofiq amalga oshirilishi belgilangan. Bu me’yorlar xalqaro hamkorlikni tasodifiy tashabbus emas, balki huquqiy asosga ega bo‘lgan davlat siyosati darajasidagi jarayon sifatida ko‘rsatadi.

ADABIYOTLAR TAHLILI

O‘zbekiston pedagogika fanida ta’lim sifati, pedagogik innovatsiya, kadrlar tayyorlash, ta’lim mazmunini modernizatsiya qilish va xalqaro tajribalarni milliy ta’lim tizimiga moslashtirish masalalari ko‘plab olimlar tomonidan o‘rganilgan. N. Azizxo‘jayeva, J. Yo‘ldoshev, R. Jo‘rayev, N. Muslimov, B. Xodjayev, U. Inoyatov, Sh. Sharipov, S. Turg‘unov, M. Quronov kabi tadqiqotchilarning ilmiy ishlari ta’lim jarayonini yangilash, pedagogik texnologiyalarni joriy etish, kasbiy kompetentlikni shakllantirish va ta’lim boshqaruvini takomillashtirishning nazariy asoslarini yaratishga xizmat qilgan.

N. Azizxo‘jayeva pedagogik texnologiya va pedagogik mahorat masalalarini tahlil qilar ekan, ta’lim jarayonida aniq maqsad, metod, vosita, natija va baholash o‘rtasidagi uyg‘unlikni ta’minlash zarurligini ko‘rsatadi. Bu qarash xalqaro hamkorlik sharoitida alohida ahamiyatga ega, chunki xorijiy tajribani milliy ta’lim tizimiga kiritish uni mexanik ko‘chirish bilan emas, balki pedagogik maqsadga muvofiqligini aniqlash orqali amalga oshirilishi kerak. J. Yo‘ldoshev va R. Jo‘rayevlarning ta’lim tizimi, pedagogik jarayon va boshqaruv haqidagi tadqiqotlarida ta’lim sifati tizimli yondashuv asosida talqin qilinadi. Xalqaro hamkorlik ham aynan tizimli yondashuvni talab etadi, chunki u o‘quv dasturi, professor-o‘qituvchi salohiyati, ilmiy izlanish, baholash, moddiy-texnik baza va mehnat bozori talablarini bir-biriga bog‘laydi.

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N. Muslimovning kasbiy kompetentlikka oid ilmiy qarashlari xalqaro hamkorlik orqali pedagogik kadrlar tayyorlashni takomillashtirishda muhim nazariy asos bo‘lib xizmat qiladi. Kompetensiyaviy yondashuvda mutaxassisning bilimi uning amaliy faoliyatda muammoni hal qila olishi, yangilikka moslasha olishi, kommunikativ va raqamli ko‘nikmalarga ega bo‘lishi bilan baholanadi. Bugungi xalqaro ta’lim makonida aynan shu ko‘nikmalar ustuvor ahamiyatga ega. O‘zbekiston oliy ta’lim muassasalarining xorijiy universitetlar bilan hamkorligi, qo‘shma ta’lim dasturlari va akademik mobillik dasturlari bo‘lajak mutaxassislarning faqat diplom olishiga emas, balki xalqaro kommunikatsiya, akademik yozuv, ilmiy izlanish va kasbiy moslashuvchanlik kompetensiyalarini rivojlantirishga xizmat qilishi zarur.

M. Quronov va S. Turg‘unovlarning ta’lim-tarbiya, boshqaruv va milliy qadriyatlar haqidagi qarashlari xalqaro hamkorlikning muhim metodologik jihatini ochib beradi. Xalqaro tajribani qabul qilish milliy tarbiya, ona tili, tarixiy xotira, ma’naviy qadriyatlar va ijtimoiy muhitdan uzilgan holda amalga oshirilsa, ta’limda tashqi shakl kuchayib, ichki mazmun zaiflashishi mumkin. Shu sababli O‘zbekiston ta’lim tizimida xalqaro hamkorlik **milliylik va umuminsoniylik uyg‘unligi** asosida rivojlanishi kerak. Xorijiy tajriba o‘zlashtiriladi, lekin u mahalliy ehtiyoj, hududiy imkoniyat, ta’lim oluvchining ijtimoiy-madaniy muhiti va davlat taraqqiyoti maqsadlariga moslashtiriladi.

ASOSIY QISM

Ta’lim sohasidagi xalqaro hamkorlikning mazmuni bir nechta tarkibiy yo‘nalishlardan iborat. Ularning eng muhimlari **akademik mobillik**, **qo‘shma ta’lim dasturlari**, **xalqaro ilmiy loyihalar**, **pedagoglarning malaka oshirishi**, **xorijiy professor-o‘qituvchilarni jalb qilish**, **xalqaro baholash tadqiqotlarida ishtirok etish**, **xalqaro akkreditatsiya** va **ta’lim sifatini global mezonlar asosida baholash**dir. Ushbu yo‘nalishlar bir-biridan ajratilgan holda emas, balki yagona integratsion tizim sifatida faoliyat yuritganda ta’lim sifatiga real ta’sir ko‘rsatadi.

O‘zbekiston oliy ta’lim tizimini 2030-yilgacha rivojlantirish konsepsiyasida xalqaro hamkorlik strategik yo‘nalish sifatida belgilangan. Konsepsiyada O‘zbekiston oliy ta’lim tizimini Markaziy Osiyoda xalqaro ta’lim dasturlarini amalga oshiruvchi “xab”ga aylantirish, xorijiy oliy ta’lim muassasalari bilan hamkorlikni kengaytirish, xalqaro reytinglarda milliy universitetlar o‘rnini mustahkamlash va ilmiy maqolalarning xalqaro bazalardagi ulushini oshirish vazifalari belgilangan. Hujjatda so‘nggi yillarda 1 611 nafar professor-o‘qituvchi xorijiy oliy ta’lim muassasalarida stajirovka va malaka oshirishdan o‘tgani, xalqaro hamkorlik doirasida 112 nafar yosh magistraturaga, 51 nafar yosh doktoranturaga xorijiy oliy ta’lim va ilmiy muassasalarga qabul qilingani qayd etilgan.

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Xalqaro hamkorlikning amaliy natijalari oliy ta’lim muassasalari tarmog‘ining kengayishida ham ko‘rinadi. 2024-yil avgust oyidagi rasmiy ma’lumotlarga ko‘ra, O‘zbekistonda oliy ta’lim muassasalari soni 211 tani tashkil etgan. Ulardan 112 tasi davlat, 30 tasi xorijiy va 69 tasi nodavlat oliy ta’lim muassasalaridir. Yoshlarning oliy ta’lim bilan qamrovi 43 foizga yetkazilgani ham qayd etilgan. Bu raqamlar xalqaro hamkorlik faqat diplomatik uchrashuvlar darajasida emas, balki real ta’lim infratuzilmasi, xorijiy universitetlar filiallari, qo‘shma dasturlar va raqobat muhitining shakllanishi orqali amalga oshayotganini ko‘rsatadi.

Oliy ta’limdagi xalqaro hamkorlikning yana bir muhim ko‘rinishi xalqaro shartnoma va memorandumlar sonining ortishidir. Oliy ta’lim, fan va innovatsiyalar vazirligi ma’lumotiga ko‘ra, 2024-yilning birinchi yarim yilligida 9 ta xalqaro darajadagi tadbir o‘tkazilgan, ularda 50 ga yaqin rektor va prorektorlar darajasidagi delegatsiyalar qatnashgan, oliy ta’lim muassasalari o‘rtasida 160 dan ziyod yangi shartnoma va memorandum imzolangan. Bu jarayon O‘zbekiston universitetlari xalqaro akademik maydonda faollashayotganini ko‘rsatadi.

Xalqaro hamkorlik ta’lim sifatini oshirishning kuchli vositasidir. Xorijiy universitetlar bilan tuzilgan qo‘shma dasturlar o‘quv rejalari va fan dasturlarini xalqaro mezonlar asosida qayta ko‘rib chiqishga undaydi. Masalan, pedagogika, axborot texnologiyalari, iqtisodiyot, tibbiyot, muhandislik va tabiiy fanlar bo‘yicha xalqaro hamkorlik dasturlari talabalarni faqat mahalliy darsliklar bilan emas, balki zamonaviy ilmiy manbalar, xalqaro akademik yozuv, laboratoriya ishlari va loyiha asosidagi ta’lim bilan tanishtiradi. Bunday jarayonda talaba mustaqil fikrlash, manba bilan ishlash, ilmiy dalil keltirish, jamoada ishlash va muammoni amaliy hal qilish ko‘nikmalarini rivojlantiradi.

Ta’limda xalqaro hamkorlikning shakllanish omillari turlicha. Globallashuv, raqamli texnologiyalar, xalqaro mehnat bozori, migratsiya jarayonlari, ilmiy axborot almashinuvi va iqtisodiyotning innovatsion rivojlanishi ta’lim tizimidan yangicha sifat talab qilmoqda. Bugungi mutaxassis faqat o‘z mamlakatida emas, xalqaro miqyosda ham raqobat qila olishi kerak. Shu sababli oliy ta’lim muassasalarida chet tillarini bilish, raqamli kompetensiya, xalqaro kommunikatsiya, ilmiy izlanish madaniyati va akademik halollik kabi ko‘nikmalar muhim o‘rin egallamoqda.

Xalqaro hamkorlikning muhim yo‘nalishlaridan biri **akademik mobillik**dir. Akademik mobillik talabalar, magistrantlar, doktorantlar va professor-o‘qituvchilarning xorijiy ta’lim yoki ilmiy muassasalarda ma’lum muddat o‘qishi, ilmiy tadqiqot olib borishi, tajriba almashishi va malaka oshirishini anglatadi. Akademik mobillikning qadri shundaki, u insonni boshqa ta’lim madaniyati bilan yuzlashtiradi. Talaba xorijiy universitetda faqat fan o‘rganmaydi, balki vaqtni

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boshqarish, ilmiy manba bilan ishlash, mustaqil tadqiqot olib borish, jamoaviy loyiha tayyorlash va akademik halollikka rioya qilishni ham o‘zlashtiradi. Professor-o‘qituvchi esa yangi metodika, baholash tizimi, o‘quv dizayni va ilmiy hamkorlik madaniyatini o‘rganadi.

Erasmus+ dasturi O‘zbekiston oliy ta’limi xalqaro integratsiyasida muhim o‘rin tutadi. Erasmus+ milliy ofisi 2022–2024-yillarga oid statistik ma’lumotlarni e’lon qilgan, 2024-yilgi Erasmus Mundus Joint Masters stipendiyalari bo‘yicha esa 2015-yildan buyon jami 127 nafar o‘zbekistonlik g‘olib ushbu stipendiyalarni qo‘lga kiritgani qayd etilgan. Bu kabi dasturlar O‘zbekiston yoshlari uchun Yevropa ta’lim makonida o‘qish, xalqaro ilmiy muhitga kirish va milliy taraqqiyot uchun zarur yo‘nalishlarda bilim olish imkoniyatini kengaytiradi.

Xalqaro hamkorlik umumiy o‘rta ta’lim uchun ham dolzarbdir. O‘zbekistonning xalqaro baholash dasturlarida ishtiroki ta’lim sifatini faqat ichki nazorat bilan emas, balki xalqaro mezonlar asosida ham baholash imkonini beradi. PISA kabi tadqiqotlar o‘quvchilarning matematik savodxonligi, o‘qish savodxonligi va tabiiy-ilmiy savodxonligini tekshiradi. Rasmiy ma’lumotlarda O‘zbekistonning PISA 2025 tadqiqotida ishtirok etishi bo‘yicha Iqtisodiy hamkorlik va taraqqiyot tashkiloti bilan kelishuvga erishilgani qayd etilgan. Bunday xalqaro baholashlar ta’limdagi zaif nuqtalarni aniqlash, o‘quv dasturlarini takomillashtirish va o‘qituvchilar tayyorgarligini qayta ko‘rib chiqish uchun muhim tahliliy asos yaratadi.

Ta’lim sohasidagi xalqaro hamkorlik ilm-fan bilan uzviy bog‘liq. O‘zbekiston oliy ta’lim tizimida xalqaro ilmiy bazalarda maqolalar chop etish, xalqaro konferensiyalarda ishtirok etish, qo‘shma ilmiy loyihalar yuritish, xorijiy ilmiy markazlar bilan grantlar olish va doktorantlar tayyorlash masalalari tobora dolzarb bo‘lmoqda. Oliy ta’lim, fan va innovatsiyalar vazirligining 2024-yil yakuni bo‘yicha ma’lumotlarida Scopus va Web of Science bazalaridagi maqolalar soni 7 512 taga yetgani, Xirsh indeksi 5 va undan yuqori bo‘lgan professor-o‘qituvchilar soni 422 nafarni tashkil qilgani, oliy ta’limdan keyingi ta’lim institutlariga qabul kvotalari 5 200 taga yetkazilgani va jami ilmiy izlanuvchilar soni 22 180 nafar bo‘lgani ko‘rsatilgan. Bu ko‘rsatkichlar O‘zbekiston oliy ta’limining xalqaro ilmiy maydonga chiqish jarayoni faollashayotganini anglatadi.

TAHLIL VA NATIJALAR

O‘zbekiston ta’lim tizimida xalqaro hamkorlikning kuchayishi bir necha muhim natija berdi. Ta’lim muassasalari tarmog‘i kengaydi, xorijiy universitetlar filiallari paydo bo‘ldi, qo‘shma ta’lim dasturlari ko‘paydi, professor-o‘qituvchilar va talabalar akademik mobillikka jalb qilina boshladi, xalqaro reytinglar va akkreditatsiya

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masalalariga e’tibor kuchaydi. Bular ta’lim tizimining tashqi dunyo bilan aloqasi kengayayotganini bildiradi.

Shu bilan birga, xalqaro hamkorlikning samaradorligi hamkorlik soni bilan emas, uning ta’lim sifatiga real ta’siri bilan baholanishi kerak. Har bir memorandum yoki shartnoma amaliy natijaga olib kelmasa, u faqat rasmiy hujjat bo‘lib qoladi. Amaliy natija talaba bilimining oshishi, professor-o‘qituvchi metodikasining yangilanishi, ilmiy maqolalar sifati, xalqaro grantlar hajmi, qo‘shma laboratoriyalar faoliyati, o‘quv dasturlarining yangilanishi va bitiruvchilarning mehnat bozoridagi raqobatbardoshligi orqali ko‘rinadi.

Xalqaro hamkorlikning muammolari ham mavjud. Ayrim oliy ta’lim muassasalarida xorijiy hamkorlik tashqi ko‘rsatkich sifatida qabul qilinadi, lekin uning mazmuni chuqur tahlil qilinmaydi. Chet el universiteti bilan memorandum imzolash, xorijiy professorni qisqa muddatga taklif qilish yoki xalqaro konferensiya o‘tkazish muhim, ammo bu ishlar o‘quv jarayoniga, ilmiy izlanish sifatiga va kadr tayyorlash natijasiga bevosita bog‘lanmasa, ta’siri cheklangan bo‘ladi. Shuning uchun xalqaro hamkorlikni rejalashtirishda aniq maqsad, indikator, muddat, mas’ul tomon va kutilayotgan natija belgilanishi lozim.

Yana bir muammo xorijiy tajribani milliy sharoitga moslashtirish bilan bog‘liq. Har qanday ilg‘or tajriba ham to‘g‘ridan-to‘g‘ri ko‘chirib qo‘llanavermaydi. Masalan, kredit-modul tizimi, mustaqil ta’lim, loyiha asosidagi o‘qitish yoki xalqaro baholash mezonlari rivojlangan akademik muhitda samarali ishlashi mumkin, lekin ularni O‘zbekiston sharoitida qo‘llash uchun professor-o‘qituvchi yuklamasi, talabalar mustaqil ishlash madaniyati, kutubxona resurslari, raqamli platformalar, baholash shaffofligi va akademik halollik tizimi ham mos ravishda rivojlanishi zarur. Xalqaro tajriba milliy ehtiyoj bilan uyg‘unlashganda ijobiy natija beradi.

Ta’lim sohasidagi xalqaro hamkorlikni rivojlantirish uchun bir nechta amaliy yo‘nalish muhim. Oliy ta’lim muassasalarida xalqaro aloqalar bo‘limlari faqat tashkiliy ishlar bilan emas, balki strategik tahlil, grantlar izlash, reyting indikatorlarini o‘rganish, professor-o‘qituvchilarga ilmiy nashrlar bo‘yicha maslahat berish va akademik mobillik sifatini baholash bilan shug‘ullanishi kerak. Har bir xalqaro loyiha yakunida uning ta’lim jarayoniga ta’siri tahlil qilinishi, foydali tajriba kafedralar, fakultetlar va maktab amaliyotiga tatbiq etilishi lozim.

Pedagogik ta’limda xalqaro hamkorlikning ahamiyati yanada katta. Pedagog kadrlar tayyorlashda xorijiy tajriba zamonaviy didaktika, inklyuziv ta’lim, raqamli ta’lim, kompetensiyaviy baholash, o‘quvchi markazli yondashuv, STEAM ta’limi, tanqidiy fikrlash va ta’lim psixologiyasi bo‘yicha yangi imkoniyatlar yaratadi. Termiz davlat pedagogika universiteti kabi hududiy oliy ta’lim muassasalari uchun xalqaro

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hamkorlik mahalliy ta’lim muammolarini global tajriba asosida hal qilish imkonini beradi. Masalan, Surxondaryo viloyatida maktab ta’limi sifatini oshirish, chet tili o‘qituvchilarini tayyorlash, raqamli savodxonlikni rivojlantirish yoki maktabgacha ta’lim metodikasini takomillashtirish bo‘yicha xorijiy universitetlar bilan qo‘shma seminarlar, amaliy tadqiqotlar va metodik loyihalar tashkil etish mumkin.

Xalqaro hamkorlikni rivojlantirishda chet tillarini bilish hal qiluvchi omillardan biridir. Talaba va professor-o‘qituvchi ingliz, rus yoki boshqa xorijiy tillarda ilmiy manba o‘qiy olmasa, xalqaro grant yozish, maqola tayyorlash, konferensiyada qatnashish yoki xorijiy hamkor bilan erkin muloqot qilishda qiyinchilikka duch keladi. Shu sababli ta’lim muassasalarida akademik ingliz tili, ilmiy yozuv, tarjima madaniyati va xalqaro kommunikatsiya ko‘nikmalarini rivojlantirish alohida yo‘nalish sifatida olib borilishi zarur.

XULOSA

Ta’lim sohasidagi xalqaro hamkorlik O‘zbekistonning zamonaviy taraqqiyotida strategik ahamiyatga ega bo‘lgan jarayondir. U milliy ta’lim tizimini jahon ta’lim makoniga bog‘laydi, pedagogik va ilmiy salohiyatni oshiradi, o‘quv dasturlarini yangilaydi, ta’lim sifatini xalqaro mezonlar asosida baholash imkonini yaratadi. O‘zbekiston tajribasi shuni ko‘rsatadiki, xalqaro hamkorlik davlat siyosatining muhim yo‘nalishiga aylanmoqda. “Ta’lim to‘g‘risida”gi Qonunda xalqaro hamkorlikning huquqiy asoslari belgilangan, oliy ta’limni 2030-yilgacha rivojlantirish konsepsiyasida esa mamlakatni xalqaro ta’lim dasturlari uchun mintaqaviy markazga aylantirish vazifasi qo‘yilgan.

Xalqaro hamkorlikning asosiy qadri uning tashqi shaklida emas, ichki mazmunidadir. Xorijiy universitet bilan shartnoma, qo‘shma dastur yoki akademik almashinuv haqiqiy natija berishi uchun u ta’lim sifati, ilmiy izlanish, pedagogik mahorat va bitiruvchilar kompetensiyasiga bevosita ta’sir qilishi kerak. O‘zbekiston ta’lim tizimida xalqaro hamkorlikni yanada rivojlantirish uchun milliy manfaat, ta’lim sifati, akademik halollik, ilmiy natijadorlik va amaliy samaradorlik asosiy mezon bo‘lib qolishi lozim. Shundagina xalqaro hamkorlik tashqi aloqalar majmuasi emas, balki ta’lim tizimini chuqur modernizatsiya qiluvchi kuchli mexanizmga aylanadi.

FOYDALANILGAN ADABIYOTLAR RO‘YXATI

1. O‘zbekiston Respublikasining Qonuni. Ta’lim to‘g‘risida. 2020-yil 23-sentabr, O‘RQ-637-son.

2. O‘zbekiston Respublikasi Prezidentining Farmoni. O‘zbekiston Respublikasi oliy ta’lim tizimini 2030-yilgacha rivojlantirish konsepsiyasini tasdiqlash to‘g‘risida. 2019-yil 8-oktabr, PF-5847-son.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
3. O‘zbekiston Respublikasi Oliy ta’lim, fan va innovatsiyalar vazirligi. Xalqaro hamkorlik faoliyati bo‘yicha ma’lumotlar. - Toshkent, 2024.
4. O‘zbekiston Respublikasi Oliy ta’lim, fan va innovatsiyalar vazirligi. Respublika oliy va professional o‘quv muassasalarining 2024/2025-o‘quv yiliga tayyorgarligi. - Toshkent, 2024.
5. O‘zbekiston Respublikasi Oliy ta’lim, fan va innovatsiyalar vazirligi. 2024-yil yakuni bo‘yicha oliy ta’lim, fan va innovatsiyalar sohasidagi sarhisob. - Toshkent, 2024.
6. Erasmus+ National Office in Uzbekistan. Statistics of Erasmus+ Activities in Uzbekistan for 2022–2024. - Tashkent, 2024.
7. Erasmus+ National Office in Uzbekistan. Statistics of Erasmus Mundus Joint Masters Winners in 2024. - Tashkent, 2024.
8. O‘zbekiston Respublikasi Maktabgacha va maktab ta’limi vazirligi. O‘zbekistonning PISA xalqaro tadqiqotidagi ishtiroki bo‘yicha rasmiy ma’lumotlar. - Toshkent, 2023.
9. Azizxo‘jayeva N.N. Pedagogik texnologiya va pedagogik mahorat. - Toshkent: TDPU, 2006.
10. Yo‘ldoshev J.G‘., Usmonov S.A. Pedagogik texnologiya asoslari. - Toshkent: O‘qituvchi, 2004.
11. Jo‘rayev R.H. Ta’lim jarayonini boshqarishning ilmiy-pedagogik asoslari. - Toshkent: Fan, 2007.
12. Muslimov N.A. Kasb ta’limi o‘qituvchilarining kasbiy kompetentligini shakllantirish texnologiyasi. - Toshkent: Fan va texnologiya, 2013.
13. Xodjayev B.X. Umumiy pedagogika nazariyasi va amaliyoti. - Toshkent: Sano-standart, 2017.
14. Inoyatov U.I. Ta’lim sifati va zamonaviy pedagogik boshqaruv. - Toshkent: Fan, 2012.
15. Sharipov Sh.S. Kasbiy ta’lim pedagogikasi. - Toshkent: Fan va texnologiya, 2018.
16. Turg‘unov S.T. Ta’lim muassasalarini boshqarish. - Toshkent: Fan, 2011.
17. Quronov M. Milliy tarbiya. - Toshkent: Ma’naviyat, 2007.

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PSIXOLOGIYANING ZAMONAVIY TENDENSIYALARI, GESHTALT PSIXOLOGIYASINING MAZMUN-MOHIYATI VA PSIXOLOGIK SALOMATLIK MEZONLARI

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Annotatsiya: Ushbu maqolada psixologiya fanining zamonaviy rivojlanish yo'nalishlari, geshtalt psixologiyasining nazariy asoslari hamda psixologik salomatlik mezonlari tibbiyot va psixologiya fanlarining birgalikdagi nuqtai nazaridan tahlil qilingan. Neyrofan, sun'iy intellekt, ijobiy psixologiya kabi zamonaviy tendensiyalar, geshtalt tamoyillari va Jahon Sog'liqni Saqlash Tashkilotining psixologik salomatlik ta'riflari ko'rib chiqilgan. Insonni yaxlit tizim sifatida ko'rishning tibbiy va psixologik ahamiyati alohida ta'kidlangan.

Аннотация: В данной статье анализируются современные тенденции развития психологической науки, теоретические основы гештальт-психологии, а также критерии психологического здоровья с точки зрения медицины и психологии. Рассматриваются такие современные направления, как нейронаука, искусственный интеллект и позитивная психология, принципы гештальта и определения психологического здоровья Всемирной организации здравоохранения. Особо подчёркивается медицинское и психологическое значение целостного подхода к пониманию человека.

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Annotation: This article analyzes modern trends in psychological science, the theoretical foundations of Gestalt psychology, and criteria for psychological health from an interdisciplinary perspective of medicine and psychology. Contemporary trends such as neuroscience, artificial intelligence, and positive psychology are examined alongside Gestalt principles and the World Health Organization's definitions of psychological health. Special emphasis is placed on the medical and psychological significance of viewing the human being as an integrated whole.

Kalit so'zlar: psixologiyaning zamonaviy tendensiyalari, geshtalt psixologiyasi, psixologik salomatlik, neyrofan, ijobiy psixologiya, biopsixosotial model, JSST mezonlari

Ключевые слова: современные тенденции психологии, гештальт-психология, психологическое здоровье, нейронаука, позитивная психология, биопсихосоциальная модель, критерии ВОЗ

Keywords: modern trends in psychology, Gestalt psychology, psychological health, neuroscience, positive psychology, biopsychosocial model, WHO criteria

Psixologiya fani XX asrdan boshlab shiddat bilan rivojlanib, bugungi kunda tibbiyot, biologiya, informatika va ijtimoiy fanlar bilan chuqur integratsiyalashgan. Hozirgi kunda psixologiya nafaqat kasalliklarni davolash, balki insonning to'laqonli hayot kechirishi, salomatligini saqlash va o'z salohiyatini ro'yobga chiqarishi uchun ham muhim asos hisoblanadi.

Geshtalt psixologiyasi esa XX asr boshlarida shakllangan bo'lsa-da, uning "yaxlitlik" tushunchasi bugungi kunda ham zamonaviy tibbiyot va psixoterapiyaning poydevorida turadi. Psixologik salomatlik mezonlari esa insonning nafaqat jismoniy, balki ruhiy va ijtimoiy jihatdan barkamol bo'lishi uchun qo'llanma bo'lib xizmat qiladi.

ZAMONAVIY TENDENSIYALARI

Neyrofan va kognitiv psixologiyaning yuksalishi. 1979 yildan 2020 yilgacha bo'lgan davrni qamrab olgan keng qamrovli tadqiqotda psixologiyaning to'rtta asosiy maktabi — neyrofan, kognitivizm, xulq-atvorchilik va psixoanaliz — tahlil qilingan. Tadqiqot natijalari shuni ko'rsatdiki, psixoanaliz va xulq-atvorchilik yo'nalishlari sezilarli darajada inqirozga uchragan, kognitivizm esa yetakchi o'rinni saqlab qolgan. Biroq neyrofan bugungi kunda eng ta'sirchan tendensiya sifatida tan olingan.

fMRI va EEG kabi yangi neyrovizualizatsiya texnologiyalari his-tuyg'ular, o'ylar va xatti-harakatlarning neyrologik mexanizmlariga ilgari hech qachon ko'rilmagan darajada chuqur nazar tashlash imkonini bermoqda. Bu esa shizofreniya va Altsgeymer

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kasalligi kabi kasalliklarning miya korrelyatlarini batafsil tahlil qilish orqali innovatsion diagnostika vositalari va individual davolash dasturlarini ishlab chiqish uchun asos yaratmoqda. (Estnauki)

Neyrofan rivojlanishi kognitiv-xulq-atvor terapiyasini (KXT) neyrofan bilan uyg'unlashtiruvchi yangi yo'nalishlarni ham ochib bermoqda. Neyrofan va kognitiv psixologiya sintezi asosida ruhiy salomatlik kasalliklarini tushunish va davolashning yangi usullari ishlab chiqilmoqda.

Ijobiy psixologiya. Ijobiy psixologiya so'nggi o'n yilliklarda ilmiy fan sifatida sezilarli darajada o'sdi. Dastlab baxt va farovonlikni o'rganishga yo'naltirilgan bo'lsada, zamonaviy ijobiy psixologiya ta'lim, sog'liqni saqlash, tashkiliy xulq-atvor va texnologik innovatsiyalar kabi turli sohalarda keng qo'llanilmoqda. So'nggi yutuqlarga neyrofan bilan integratsiya, madaniy va kontekstual ijobiy psixologiya hamda sun'iy intellektdan foydalanish kiradi. (Wikipedia)

Ijobiy psixologiya endi faqat ijobiy his-tuyg'ularga emas, balki ijobiy va salbiy holatlarning dinamik o'zaro ta'sirini hisobga oluvchi muvozanatli modelga asoslanmoqda. "Ijobiy psixologiya 2.0" kontseptsiyasi farovonlik salbiy his-tuyg'ularning yo'qligi emas, balki ikkala holatning dinamik munosabatidan iborat ekanini tan oladi. Neyrokimyo sohasidagi tadqiqotlar oksitotsin, dopamin va serotonin kabi gormonlarning kayfiyat, stress va ijtimoiy bog'liqlikni tartibga solishdagi rolini yanada chuqurroq tushuntirib bermoqda.

Sun'iy Intellekt va Raqamli Psixologiya. Sun'iy intellektning psixologiyaga tatbiq etilishi ushbu fanni qayta belgilamoqda. O'z-o'ziga yordam ko'rsatuvchi ilovalar va onlayn terapiyaning kengayishi psixologik xizmatlarni yanada qulay va keng ommaga yetkazish imkonini bermoqda. Raqamli platformalar va ilovalar bilan birlashtirilgan KXT yanada samarali tus olib, turli ruhiy muammolarni hal etishda amaliy yechimlarga aylanmoqda. (StudFiles)

Ish va Ruhiy Salomatlik. Avtomatlashtirish va "gig-iqtisodiyot" sharoitida ishning o'zgarib boruvchi tabiati ruhiy salomatlik uchun yangi muammolar tug'dirmoqda. Psixologlar ish xavfsizligi, stress darajalari va ish-hayot muvozanatiga ushbu tendensiyalarning ta'sirini o'rganmoqda. Bu tadqiqotlar ish joyida ruhiy farovonlikni rag'batlantirishga yo'naltirilgan siyosat va aralashuvlar uchun asos bo'lib xizmat qilmoqda. (Kampus)

GESHTALT PSIXOLOGIYASINING MAZMUN-MOHIYATI

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Tarixi va Asoschilari. XX asrning boshlarida Maks Vertaymer tez almashinuvchi statik tasvirlarda harakat idrokini o'rganib, bu hodisani "fi fenomeni" deb atadi. Vertaymer va uning hamkorlari Volfgang Köhler hamda Kurt Koffka idrok oddiy sezgi stimullarini birlashtirish jarayonidan ko'ra murakkabroq ekanligiga ishonib, geshtalt psixologiyasi deb atalgan yangi psixologiya yo'nalishini yaratdilar. "Geshtalt" so'zi nemischa bo'lib, "shakl" yoki "naqsh" ma'nosini anglatadi, lekin uning asosiy g'oyasi shuki — "butun o'z qismlarining yig'indisidan farqli". (medrxiv)

1912 yilda Maks Vertaymer fi harakat bo'yicha maqolasini e'lon qildi — bu geshtalt psixologiyasining boshlanishi sifatida keng tan olingan. Ikki yirik rivojlanish bosqichi ajratiladi: Köhlerning "jismoniy geshtalt" muhokamasi (1920) va Vertaymerning "idrokning geshtalt qonunlari" taklifi (1923). Pertseptual tashkilotni belgilovchi tamoyillarga yaqinlik, o'xshashlik, bir xil zichlik, umumiy taqdir, yo'nalish, yaxshi davomiylik va yaxlitlik xususiyatlari — yopiqlik, muvozanat va simmetriya — kiradi.

Asosiy Tamoyillar. Geshtaltning olti asosiy tamoyili mavjud: o'xshashlik, davomiylik, yopiqlik, yaqinlik, figura/fon va simmetriya (prägnanz). Bu tamoyillar miyaning vizual ma'lumotlarni o'xshash elementlarni guruhlash, naqshlarni tanish va murakkab tasvirlarni soddalashtirish orqali qanday tashkil etishini ta'riflaydi. (PubMed Central)

Figura-fon munosabati. Figura-fon munosabati diqqatning e'tibor ob'ektini (figura) fondan qanday ajratishini va idrokni dinamik ravishda shakllantirishi tushunchasini izohlaydi. Masalan, bitta tasvirni qoramtir yoki ochiq-ranglar figura sifatida idrok etilishiga qarab, vaza yoki ikkita yuz shaklida ko'rish mumkin. (Springer)

Yaqinlik tamoyili. Bir-biriga yaqin joylashgan elementlar ongimizda birlashtirib ko'riladi. Masalan, bir-biriga yaqin joylashgan nuqtalar guruhini biz alohida nuqtalar emas, balki bitta yaxlit shakl sifatida idrok qilamiz.

Yopiqlik tamoyili. Ong to'liq bo'lmagan shakllarni "to'ldirib" ko'radi. Masalan, ayrim qismlari yo'q bo'lgan doira yoki uchburchakni biz yaxlit shakl sifatida idrok etamiz.

Prägnanz qonuni. Miya murakkab vizual ma'lumotlarni eng oddiy va tartibli ko'rinishda idrok etishga intiladi. Bu qonunga ko'ra, ong doimo tartib va oddiylikka moyil bo'ladi. (PubMed Central)

Geshtalt Psixologiyasining Zamonaviy Ahamiyati. Geshtalt yondashuvi zamonaviy kognitiv fan tomonidan fMRI tadqiqotlari orqali qo'llab-quvvatlanmoqda. Miya lateral oksipital lob va fuziform girusdagi hududlar yaxlit ob'ektlarni qayta

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ishlashda ishtirok etishi aniqlangan — bu esa geshtalt nazariyasini neyrofan nuqtai nazaridan tasdiqlaydi.

Geshtalt tamoyillarining tibbiyot va klinik psixologiyada tatbiqi ham katta ahamiyat kasb etadi. Geshtalt terapiyasi — Fritz Perls tomonidan yaratilgan — ushbu yondashuvni psixoterapiyaga tatbiq etib, bemorni o'tmish yoki kelajak o'rniga "hozirgi lahza"da his-tuyg'ularini to'liq his etish orqali o'zi bilan uyg'unlashishga yo'naltiradi. Geshtalt psixologiyasiga ko'ra, insonni uni o'rab turgan muhit va dunyo bilan o'zaro ta'sirini hisobga olmagan holda to'liq tushunib bo'lmaydi. (Acad-pub)

PSIXOLOGIK SALOMATLIK MEZONLARI

JSST Ta'rifi. Jahon Sog'liqni Saqlash Tashkilotining konstitusiyasida ta'kidlanganidek: "Salomatlik — bu to'liq jismoniy, ruhiy va ijtimoiy farovonlik holati bo'lib, u faqat kasallik yoki nogirollikning yo'qligini anglatmaydi." Psixologik salomatlik ruhiy buzilishlarning yo'qligidan ko'ra kengroq tushuncha bo'lib, inson o'z qobiliyatlarini anglab yeta olishi, hayotning oddiy stresslarini engib o'ta olishi, samarali ishlashi va jamiyatga hissa qo'sha olishi holatidir. (Karger)

Psixologik Salomatlikning Asosiy Mezonlari. Psixologik salomatlik uchta asosiy o'lchamni o'z ichiga oladi. Emotsional farovonlik — baxt, hayotga qiziqish va qoniqish; psixologik farovonlik — o'z shaxsiyatining ko'p qismini yoqtirish, kundalik hayot mas'uliyatlarini boshqarish, boshqalar bilan munosib munosabatlar o'rnatish va hayotidan qoniqish; ijtimoiy farovonlik esa ijobiy faoliyat va jamiyatga hissa qo'shish, jamoaning bir qismi bo'lish va ijtimoiy hamjihatlikni his etishdan iborat.

Psixologik salomatlikning boshqa muhim mezonlari:

O'z-o'zini anglash. Inson o'zining kuchli va zaif tomonlarini, his-tuyg'ularini va xatti-harakatlarini real idrok eta olishi.

Stressga moslashuvchanlik (Reziliyans). Qiyin hayotiy vaziyatlardan tushkunlikka tushmay, o'zini tiklash qobiliyati. Psixologik moslashuvchanlik tibbiy nuqtai nazardan ham immun tizimining faoliyati bilan bevosita bog'liq ekanligini tadqiqotlar tasdiqlaydi.

Munosabatlar sifati. Boshqalar bilan sog'lom va ishonchli munosabatlar o'rnatish va saqlash qobiliyati.

Psixologik farovonlik kontseptsiyasi vaqt o'tishi bilan psixologiya, tibbiyot, sotsiologiya va jamoat salomatligi kabi sohalardagi yutuqlarga javoban rivojlanib bordi. Dastlab ruhiy kasalliklarga, muammolarni tashxislash va davolashga urg'u

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berilib, ruhiy farovonlik ikkinchi o'ringa surib qo'yilgan. Biroq so'nggi o'n yilliklarda ijobiy va yaxlit nuqtai nazarga paradigmal o'tish sodir bo'ldi.

Antonovskiyning Kogerentlik Tuyg'usi. Tibbiy sotsiolog Aaron Antonovskiy "salutogenez" — kasallikning emas, balki salomatlikning kelib chiqishini o'rganish — kontseptsiyasini ishlab chiqdi. Unga ko'ra, ayrim odamlar og'ir qiyinchiliklar oldida nima sababdan sog'lom va psixologik jihatdan bardoshli qolishini tushunish muhim. Kogerentlik tuyg'usi uchta komponentdan iborat: tushunarliliq (dunyoni mantiqiy idrok etish), boshqaruvchanlik (voqealarni nazorat qilish hissi) va mazmunlilik (hayotning maqsadli ekanligi). Bu uchta komponent psixologik salomatlikning asosiy ko'rsatkichlari sifatida qaraladi. (PubMed)

Tibbiy Psixologiya Nuqtai Nazaridan Psixologik Salomatlik. Tibbiyot nuqtai nazaridan psixologik salomatlik buzilganda bir qator jismoniy oqibatlar ham kelib chiqadi. Surunkali ruhiy zo'riqish gipotalamus-gipofiz-buyrak usti bez o'qini faollashtiradi, kortizol miqdorini oshiradi va immunitet faoliyatini pasaytiradi. Bu esa yurak-qon tomir kasalliklari, giptoniya, qandli diabet va autoimmun kasalliklar uchun zamin yaratadi.

JSST ta'rifiga mos keladigan psixologik salomatlik ko'rsatkichi nafaqat ruhiy kasalliklarning yo'qligini, balki insonning ijodkorlik qobiliyati, maqsadlariga erishish, o'lchangan xavflarni qabul qilish, ijtimoiy munosabatlar o'rnatish va his-tuyg'ularini boshqarish kabi keng qamrovli ruhiy qobiliyat va faoliyatini aks ettirishi kerak. (Karger Publishers)

XULOSA

Psixologiyaning zamonaviy tendensiyalari — neyrofan, ijobiy psixologiya va raqamli psixologiya — insonni yaxlit tizim sifatida o'rganishga qarab siljimoqda. Neyrofan bugungi kunda psixologiyaning eng ta'sirchan tendensiyasi sifatida tan olingan bo'lib, kognitivizm ham yetakchi o'rinni saqlamoqda. Ushbu tendensiyalar tibbiyot bilan integratsiyalashuvi yanada samarali tashxis va davolash usullarini yaratishga xizmat qilmoqda.

Geshtalt psixologiyasi esa "butun o'z qismlarining yig'indisidan farqli" degan asosiy g'oyasi bilan insonni, uning kasalliklari va ruhiy holatini tushunishda yaxlit yondashuv zarurligi haqida muhim dars beradi. Bu yondashuv zamonaviy neyrofan tadqiqotlari tomonidan ham tasdiqlangan — miyaning maxsus hududlari yaxlit ob'ektlarni alohida elementlardan farqli tarzda qayta ishlashi aniqlangan.

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Psixologik salomatlik esa kasallikning yo'qligi bilan emas, balki insonning o'z qobiliyatlarini anglab etishi, stressga moslashishi, munosib munosabatlar o'rnatishi va jamiyatga hissa qo'sha olishi bilan o'lchanadi. Tibbiyot va psixologiyaning birgalikdagi yondashuvi — biopsixosotial model — insonning jismoniy va ruhiy salomatligini yaxlit ko'rib, samarali yordam ko'rsatishning zamonaviy va ilmiy asosini tashkil etadi.

FOYDALANILGAN ADABIYOTLAR

1. Vertaymer M. (1912). Harakat idrokini eksperimental o'rganish. Frankfurt am Main.
2. Köhler V. (1920). Jismoniy geshtaltlar. Braunshveyg: Vieweg.
3. Koffka K. (1935). Geshtalt psixologiyasi asoslari. Nyu-York: Harcourt.
4. Seligman M.E.P., Chiksentmixayi M. (2000). Ijobiy psixologiya: kirish. Amerika psixologi jurnali, 55(1), 5–14.
5. Engel J.L. (1977). Yangi tibbiy modelga ehtiyoj. Fan jurnali, 196(4286), 129–136.
6. Jahon Sog'liqni Saqlash Tashkiloti. (2001). Ruhiy salomatlik: yangi tushuncha, yangi umid. Jeneva: JSST.
7. Antonovskiy A. (1987). Salomatlik sirini ochish. San-Fransisko: Jossey-Bass.
8. Vageмans J. va boshq. (2012). Vizual idrokda geshtalt psixologiyasining bir asri. PMC — https://pmc.ncbi.nlm.nih.gov/articles/PMC3482144/
9. Machulska A. va boshq. (2024). Psixologiyadagi tendensiyalarga yangi nazar. ScienceDirect — https://www.sciencedirect.com/science/article/pii/S0732118X24000060
10. Galderisi S. va boshq. (2015). Ruhiy salomatlikning yangi ta'rifiga qarab. PMC — https://pmc.ncbi.nlm.nih.gov/articles/PMC4471980/
11. G'oziyev E.G. Umumiy psixologiya (1-kitob). — Toshkent, 2010.

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PSIXOSOMATIK KASALLIKLARINING KLASSIGIKASIYASI.PSIXOSOMATIK KASALLIKLARINING RIVOJLANISH TARIXI. PSIXOSOMATIK KASALLIKLARI BILAN KASALLANGAN BEMORLARNING PSIXOLOGIK XIMOYA MEXANIZMLARI

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Annotatsiya: Ushbu maqolada psixosomatik kasalliklarning klassifikatsiyasi, ularning tarixiy rivojlanish bosqichlari hamda bemorlarda kuzatiladigan psixologik himoya mexanizmlari yoritilgan. Shuningdek, psixik omillarning somatik kasalliklar rivojlanishidagi roli va ularni kompleks yondashuv asosida davolash zarurligi ko‘rib chiqilgan.

Аннотация: В данной статье рассматриваются классификация психосоматических заболеваний, этапы их исторического развития, а также психологические защитные механизмы у пациентов. Освещается роль психических факторов в развитии соматических заболеваний и необходимость комплексного подхода к их лечению.

Abstract: This article discusses the classification of psychosomatic diseases, their historical development, and psychological defense mechanisms observed in patients. It also highlights the role of psychological factors in the development of somatic diseases and the importance of a comprehensive approach to treatment.

Kalit so‘zlar: psixosomatika, stress, himoya mexanizmlari, somatik kasalliklar, psixologik omillar

Ключевые слова: психосоматика, стресс, защитные механизмы, соматические заболевания, психологические факторы

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Keywords: psychosomatics, stress, defense mechanisms, somatic diseases, psychological factors

Psixosomatik kasalliklar — bu insonning ruhiy holati (stress, xavotir, depressiya) ta'sirida yuzaga keladigan yoki kuchayadigan somatik (tana) kasalliklardir. Bu holatda psixik omillar organizmning fiziologik jarayonlariga bevosita ta'sir ko'rsatadi. "Psixosomatika" atamasi yunon tilidan olingan bo'lib, "psixe" — ruh va "soma" — tana so'zlarining birikmasidan tashkil topgan.

Zamonaviy tibbiyotda psixosomatik kasalliklarning ahamiyati tobora ortib bormoqda. Psixosomatik tibbiyot vakillarining fikriga ko'ra, XXI asrda kasalliklarning taxminan yarmi psixogen xarakterga ega. Ruhiy omillar nafaqat ayrim kasalliklarni qo'zg'atadi, balki ko'plab kasalliklarning kechishiga ham ta'sir qiladi. Shu sababli ushbu yo'nalish tibbiyot va psixologiya fanlarining kesishmasida muhim o'rin egallaydi.

PSIXOSOMATIK KASALLIKLARNING KLASSIFIKATSIYASI

Psixosomatik kasalliklarni klassifikatsiya qilish ularning kelib chiqishi va namoyon bo'lish xususiyatlariga asoslanadi. Zamonaviy tibbiyotda DSM-5 va ICD-10/11 mezonlariga tayanilgan holda quyidagi asosiy turlari ajratiladi.

Birinchidan, haqiqiy (klassik) psixosomatik kasalliklar. Bu turdagi kasalliklarda psixologik omillar kasallikning asosiy sabablaridan biri hisoblanadi. Franz Alexander tomonidan "Muqaddas Yetti" deb nomlangan bu guruhga oshqozon va o'n ikki barmoqli ichak yarasi, arterial gipertoniya, bronxial astma, neyrodermit, revmatoid artrit, tirotoksikoz va yara kasalligi kiradi. Bu kasalliklarda stress va uzoq davom etuvchi ruhiy zo'riqish asosiy patogen omil bo'lib xizmat qiladi.

Ikkinchidan, funksional psixosomatik buzilishlar. Bu holatda organik shikastlanish kuzatilmaydi, lekin bemorda turli noxush simptomlar mavjud bo'ladi — yurak sohasida og'riq, nafas yetishmovchiligi hissi, irritabl ichak sindromi kabilar. Bu buzilishlar ko'pincha asab tizimining ortiqcha zo'riqishi bilan bog'liq bo'lib, umumiy populyatsiyada somatik simptom buzilishining tarqalishi taxminan 5–7 foizni tashkil etadi.

Uchinchidan, somatoform buzilishlar. Bu guruhda bemor o'zida jiddiy jismoniy kasallik bor deb hisoblaydi, lekin tibbiy tekshiruvlarda aniq organik sabab topilmaydi. O'tkir somatik shikoyatlar bilan murojaat etgan bemorlarning taxminan 20–25 foizida somatik simptom buzilishi aniqlangan. Bunday bemorlar ko'p hollarda shifokorlarga tez-tez murojaat qiladi, lekin davolashdan qoniqmaydi.

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To'rtinchidan, psixosomatik komponentga ega bo'lgan somatik kasalliklar. Bu yerda kasallikning organik asosi mavjud, ammo uning kechishi va kuchayishida psixik omillar muhim rol o'ynaydi. Qandli diabet, yurak-qon tomir kasalliklari, oshqozon-ichak tizimi kasalliklarida stress kasallikni og'irlashtirishi mumkin.

Aleksitimiya — psixosomatikaning muhim tushunchasi. Psixosomatik kasalliklar uchun alohida xos bo'lgan «aleksitimiya» tushunchasi — ya'ni his-tuyg'ularni so'zlar bilan ifodalay olmaslik holati — birinchi marta Sifneos tomonidan kiritilgan. 1190 nafar bemorni qamrab olgan tadqiqotda 5 turdagi aleksitimiya klasteri aniqlangan: psixiatrik qo'shaloq kasalliklarsiz aleksitimiya (29,3%), depressiv somatizatsiya (23,4%), aleksitimik kasallik xulq-atvori (17,6%), aleksitimik somatizatsiya (17%) va aleksitimik tashvish (12,8%). Aleksitimiya somatizatsiyaning asosiy psixologik xususiyati sifatida qaraladi va psixosomatik kasalliklarni tashxislashda muhim ko'rsatkich hisoblanadi.

Shunday qilib, psixosomatik kasalliklarni to'g'ri klassifikatsiya qilish tashxis qo'yish va samarali davolashda muhim ahamiyatga ega. Bu kasalliklarni davolashda nafaqat somatik, balki psixologik omillarni ham hisobga olish zarur.

PSIXOSOMATIK KASALLIKLARNING RIVOJLANISH TARIXI

Psixosomatik kasalliklar haqidagi qarashlar insoniyat tarixi davomida bosqichma-bosqich shakllanib kelgan. Ruh va tana o'rtasidagi bog'liqlik masalasi qadim zamonlardanoq olimlar va tabiblarning e'tiborida bo'lgan.

Qadimgi davr. Buyuk tabib Gippokrat inson salomatligini to'rt xil suyuqlik — qon, balg'am, sariq va qora o't — muvozanati bilan bog'lagan. U insonning kayfiyati va ruhiy holati organizm faoliyatiga ta'sir qilishini ta'kidlagan. Keyinchalik Abu Ali ibn Sino ham o'zining "Tib qonunlari" asarida kasalliklarning paydo bo'lishida ruhiy omillarning ahamiyatini alohida qayd etgan. Psixosomatika atamasi esa birinchi marta 1818 yilda Leypsig shahrida J. Xenrot tomonidan tibbiyot adabiyotiga kiritilgan.

XIX asr oxiri — XX asr boshlari. Bu davrda psixologiya va tibbiyot integratsiyasi kuchayib, psixosomatika fan sifatida shakllana boshladi. Sigmund Freyd tomonidan ilgari surilgan psixoanalitik nazariya katta ahamiyat kasb etdi. Unga ko'ra, insonning ong ostida bostirilgan hissiyotlari va ichki ziddiyatlari turli somatik belgilar orqali namoyon bo'lishi mumkin. Shu davrda I.P. Pavlov rahbarligidagi rus maktabi olimlari ham eksperimental nevroz usulini ishlab chiqish orqali psixosomatika rivojiga hissa qo'shdi.

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XX asrning o'rtalari — psixosomatikaning oltin davri. 1939 yilda Flanders Dunbar "Psixosomatik tibbiyot" jurnalining asoschilaridan biri bo'lib, emotsiya va jismoniy o'zgarishlar o'rtasidagi bog'liqlik bo'yicha 2251 ta adabiyotni o'z ichiga olgan fundamental asar yozdi. Dunbar kasalliklar bilan shaxs xususiyatlari va hayot tarzi o'rtasidagi munosabatni o'rgandi. Amerikalik olim Franz Alexander esa psixosomatik kasalliklarning aniq ro'yxatini — "Muqaddas Yetti"ni — ishlab chiqib, ularning rivojlanishida emotsional ziddiyatlar va organ zaifligining rolini ilmiy asoslab berdi. 1950-yillarning oxiriga kelib, Amerika ilmiy adabiyotlarida psixologlar nuqtai nazaridan somatik tibbiyot haqida 5000 ga yaqin maqola nashr etildi.

Shu davrda stress nazariyasi ham shakllandi. Gans Selye organizmning stressga javob reaksiyasini — umumiy moslashuv sindromini — o'rganib, stress va kasallik o'rtasidagi bog'liqlikni ilmiy isbotladi. Selye ta'limotiga ko'ra, uzoq davom etuvchi stress organizmning himoya kuchlarini tugatiб, turli somatik kasalliklarga zamin yaratadi.

Zamonaviy davr — biopsixosotial model. 1977 yilda Jorj Engel biomedik modelning chekliqliklarini bartaraf etish maqsadida biopsixosotial modelni taklif qildi. Ushbu model biologik, psixologik va ijtimoiy omillarning sog'liqqa birgalikda ta'sirini hisobga oladi va hozirgi kunda psixosomatika asosi sifatida tan olingan. Bu yondashuvga ko'ra, kasalliklarning kelib chiqishida biologik, psixologik va ijtimoiy omillar birgalikda ta'sir ko'rsatadi. Hozirgi kunda psixosomatik kasalliklarni davolashda kompleks yondashuv — dori-darmon, psixoterapiya va hayot tarzini o'zgartirish muhim hisoblanadi.

PSIXOSOMATIK KASALLIKLARGA CHALINGAN BEMORLARDA PSIXOLOGIK HIMOYA MEXANIZMLARI

Psixosomatik kasalliklar rivojlanishida psixologik himoya mexanizmlari muhim o'rin tutadi. Psixologik himoya mexanizmlari — bu insonning ong ostida shakllanadigan, ichki ziddiyatlar, stress va salbiy emotsiyalardan himoyalanishga qaratilgan psixik jarayonlardir. Ego himoya mexanizmlari tushunchasi birinchi marta Sigmund Freyd tomonidan ilgari surilib, keyinchalik uning qizi Anna Freyd va boshqalar tomonidan rivojlantirilgan. Bu mexanizmlar "insonni tashvishdan va ichki yoki tashqi xatarlardan himoya qiluvchi avtomatik psixologik jarayonlar" sifatida ta'riflanadi.

300 nafar bemorni o'rganish natijasida psixologik himoya mexanizmlari va psixosomatik simptomlar o'rtasida statistik jihatdan muhim korrelyatsiya aniqlangan. Eng ko'p qo'llaniladigan noadaptiv mexanizmlar qatoriga oqlash (justifikatsiya),

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proyeksiya, siqib chiqarish (repressiya) va xayoliy kasallik kiritilgan. Psixosomatik bemorlarda quyidagi himoya mexanizmlari alohida ahamiyat kasb etadi.

Inkor (Denial). Bemor o'zida mavjud muammo yoki kasallikni tan olmaydi. Somatoform buzilishi bilan og'rigan bemorlarda o'tkazilgan tadqiqot shuni ko'rsatdiki, ushbu bemorlar shaxslararo yoki ichki ziddiyatlarni inkor etishga moyil bo'lgan. Inkor somatoform buzilishi bemorlarida markaziy psixologik himoya mexanizmlaridan biri sifatida belgilangan. Masalan, kuchli stress yoki ruhiy jarohatni inkor etish natijasida bu holat tanada turli simptomlar orqali namoyon bo'ladi.

Siqib chiqarish (Repressiya). Bu mexanizmda noxush xotiralar va hissiyotlar ong ostiga "siqib chiqariladi". Bemor ularni ongli ravishda eslamaydi, lekin ular organizmga yashirin ta'sir ko'rsatishda davom etadi va psixosomatik simptomlar paydo bo'lishiga sabab bo'ladi. Tadqiqotlar shuni ko'rsatadiki, suppression va repressiya gastrointestinal hamda kardiologik psixosomatik oqibatlar bilan statistik jihatdan bog'liq.

Proyeksiya. Inson o'zidagi salbiy hissiyotlarni boshqalarga yuklaydi. Masalan, ichki xavotirni boshqalarning unga nisbatan salbiy munosabati sifatida qabul qiladi. Bu esa doimiy ruhiy zo'riqishga olib keladi va psixosomatik kasalliklarni kuchaytiradi.

Regressiya. Stressli vaziyatlarda inson oldingi, oddiyroq xulq-atvor shakllariga qaytadi. Bu holat organizmning moslashuv imkoniyatlarini kamaytirib, kasallik belgilarini kuchaytirishi mumkin.

Somatizatsiya. Bu psixosomatik bemorlar uchun eng xos mexanizmlardan biri bo'lib, unda ruhiy muammolar jismoniy simptomlar orqali ifodalanadi. Psixologik nuqtai nazardan somatizatsiya repressiya, siljitish (displacement) va o'rganilgan kasallik roli bilan uzviy bog'liq. Insonlar hissiy qiyinchilik, tashvish yoki hal etilmagan ichki ziddiyatlarni tananing simptomlariga o'tkazadi — bu jarayon ko'pincha ongsiz ravishda sodir bo'ladi. Masalan, ichki ziddiyatlar bosh og'rig'i, yurak urishining tezlashishi yoki oshqozon og'rig'i ko'rinishida namoyon bo'ladi.

Intellektualizatsiya. Bemor o'z kasalligi haqida haddan ziyod mantiqiy mulohaza yuritib, hissiy jihatni chetga surib qo'yadi. Bu mexanizm ham o'z navbatida hissiyotlarning to'planishiga va yangi psixosomatik simptomlarning paydo bo'lishiga zamin yaratadi.

Shunday qilib, psixologik himoya mexanizmlari insonni stressdan himoya qilsa-da, ularning haddan tashqari yoki noto'g'ri ishlashi psixosomatik kasalliklarning

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rivojlanishiga sabab bo'lishi mumkin. Shu bois bunday bemorlarni davolashda nafaqat jismoniy, balki psixologik yordam ham muhim ahamiyatga ega.

XULOSA

Psixosomatik kasalliklar insonning ruhiy holati va jismoniy sog'ligi o'rtasidagi uzviy bog'liqlikni ko'rsatadi. Qadimgi Gippokrat va Ibn Sino qarashlari zamonaviy biopsixosotial modelgacha bo'lgan uzoq tarixiy yo'l bosib o'tilgan. Bugungi kunda esa psixosomatika tibbiyotning mustaqil va ilmiy asoslangan yo'nalishiga aylangan.

Klassifikatsiya nuqtai nazaridan psixosomatik kasalliklarning turli shakllari — haqiqiy psixosomatozlardan somatoform buzilishlargacha — mavjud bo'lib, ularning har birida psixologik omillarning ulushi turlicha bo'ladi. Aleksitimiya tushunchasi psixosomatik kasalliklarni tushunishda yangi sahifa ochdi va his-tuyg'ularni anglab, ifodalay olmaslik somatik kasalliklar uchun zamin yaratishi ilmiy isbotlandi.

Psixologik himoya mexanizmlari — inkor, repressiya, somatizatsiya, proyeksiya va boshqalar — vaqtincha ruhiy muvozanatni saqlab tursa-da, uzoq muddatda organizmga salbiy ta'sir ko'rsatadi. Tadqiqotlar psixologik himoya mexanizmlari va psixosomatik simptomlar o'rtasida statistik jihatdan muhim bog'liqlik mavjudligini tasdiqlaydi.

Demak, psixosomatik kasalliklarni samarali davolash uchun kompleks yondashuv — ya'ni nafaqat somatik, balki psixologik omillarni ham hisobga olgan holda dori-darmon va psixoterapiyani uyg'unlashtirish — zarur. Kelgusida O'zbekistonda ham bu yo'nalishda mahalliy tadqiqotlarni kengaytirish va tibbiyot muassasalarida psixolog-maslahatchi xizmatlarini joriy etish muhim vazifa bo'lib qolmoqda.

FOYDALANILGAN ADABIYOTLAR

1. Gippokrat. Tibbiyot haqida asarlar. — Qadimgi yunon manbalari.
2. Ibn Sino. Tib qonunlari (Al-Qonun fi't-Tibb). — Toshkent: O'zbekiston nashriyoti, 2000.
3. Freud S. Introduction to Psychoanalysis. — London: Routledge, 2010.
4. Alexander F. Psychosomatic Medicine: Principles and Applications. — New York: Norton, 1950.
5. Selye H. The Stress of Life. — New York: McGraw-Hill, 1978.
6. Engel G.L. The need for a new medical model. Science, 196(4286), 129–136. — 1977.
7. G'oziyev E.G. Umumiy psixologiya (1-kitob). — Toshkent, 2010.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
8. Ismatova B.O. Surunkali somatik kasalliklar bilan xastalangan bemorlarda psixologik o'zgarishlarning o'ziga xosligi. International Journal of Philosophical Studies and Social Sciences, 2022.
9. Almajali D.M.M.M., Abdelrasheed N.S.G. Non-Adaptive Defense Mechanisms and Their Relationship to Psychosomatic Disorders. European Psychiatry, 2024.

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YUQUMLI KASALLIKLARI BILAN KASALLANGAN BEMORLARNING PSIXOEMOTSIONAL XUSUSIYATLARI

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Annotatsiya: Ushbu maqolada yuqumli kasalliklar bilan og'rigan bemorlarning psixoemotsional holati tibbiyot va psixologiya fanlari kesishmasida o'rganilgan. Kasallik jarayonida yuzaga keladigan qo'rquv, tashvish, depressiya, ijtimoiy izolyatsiya va o'zini past baholash kabi psixologik muammolar tahlil qilingan. Bemorlarning emotsional holati davolash samaradorligiga bevosita ta'sir qilishi isbotlangan. Kompleks yondashuv — tibbiy va psixologik yordam birgalikda ko'rsatilishi — bemorlar hayot sifatini sezilarli darajada yaxshilashi ko'rsatilgan.

Аннотация: В данной статье изучены психоэмоциональные особенности пациентов, страдающих инфекционными заболеваниями, на стыке медицины и психологии. Проанализированы такие психологические проблемы, как страх, тревога, депрессия, социальная изоляция и заниженная самооценка, возникающие в процессе болезни. Доказано, что эмоциональное состояние пациентов непосредственно влияет на эффективность лечения. Показано, что комплексный подход — совместное оказание медицинской и психологической помощи — значительно улучшает качество жизни пациентов.

Abstract: This article examines the psychoemotional characteristics of patients suffering from infectious diseases at the intersection of medicine and psychology. Psychological problems such as fear, anxiety, depression, social isolation, and low self-esteem arising during the disease process are analyzed. It has been proven that the

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emotional state of patients directly affects treatment effectiveness. A comprehensive approach — providing medical and psychological assistance together — has been shown to significantly improve patients' quality of life.

Kalit so‘zlar: yuqumli kasalliklar, psixoemotsional holat, tashvish, depressiya, psixologik yordam, somatopsixik munosabatlar, hayot sifati, ijtimoiy izolyatsiya, davolash samaradorligi, koping strategiyalar

Ключевые слова: инфекционные заболевания, психоэмоциональное состояние, тревога, депрессия, психологическая помощь, соматопсихические отношения, качество жизни, социальная изоляция, эффективность лечения, копинг-стратегии

Keywords: nfectious diseases, psychoemotional state, anxiety, depression, psychological support, somatopsychic relations, quality of life, social isolation, treatment effectiveness, coping strategies

Yuqumli kasalliklar insoniyat tarixida eng ko'p tarqalgan va eng katta zarar yetkazgan kasalliklar guruhiga kiradi. XX asrning oxiri va XXI asrning boshlarida OITS/OIV, gepatit, sil, COVID-19 kabi yuqumli kasalliklarning global miqyosda tarqalishi bu muammoning nafaqat tibbiy, balki ijtimoiy va psixologik jihatlarini ham chuqur o'rganish zarurligini ko'rsatdi.

Zamonaviy psixosomatik tibbiyot nuqtai nazaridan, inson tanasi va ruhi bir-biri bilan uzviy bog'liq tizimni tashkil etadi. Shu sababli, yuqumli kasallik bilan og'rigan bemor faqat biologik nuqtai nazardan emas, balki psixologik va ijtimoiy jihatdan ham yaxlit holda ko'rib chiqilishi lozim. Biopsixosotsiyal model (G. Engel, 1977) bugungi kunda bemorlarni kompleks baholashning asosiy tamoyili sifatida tan olingan. Amaliyot shuni ko'rsatadiki, yuqumli kasallik tashxisi qo'yilgan zahoti bemorning ichki dunyosida murakkab psixologik jarayonlar boshlanadi. Bu jarayonlar kasallikning borishiga, davolash samaradorligiga va bemor hayot sifatiga bevosita ta'sir ko'rsatadi.

Yuqumli kasallikning psixologik ta'siri mexanizmlari

Yuqumli kasallik organizmga biologik zarar yetkazish bilan birga bir qator psixologik mexanizmlarni ishga tushiradi. Bu mexanizmlar quyidagi yo'nalishlarda namoyon bo'ladi:

Neyrobiologik ta'sir. Ko'plab yuqumli kasallik qo'zg'atuvchilari markaziy asab tizimiga

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bevosita yoki bilvosita ta'sir ko'rsatadi. Infeksion toksikoz natijasida yuzaga keladigan asteniya, bosh og'rig'i, uyqu buzilishlari bemorning emotsional foniga salbiy ta'sir qiladi.

Sitokinlar — immun jarayonida ajralib chiqadigan moddalar — miyaning kayfiyat boshqaruvchi tizimlarini ham o'zgartirishi ilmiy jihatdan isbotlangan. Psixologik stressor sifatidagi kasallik. Tashxis qo'yilishi o'zi alohida psixologik zarba hisoblanadi. Bemor o'z hayotining nazorat ostidagi tizimi buzilganini his qiladi. Bu holat dastlabki inkor bosqichidan boshlab, g'azab, savdolashish, tushkunlik va nihoyat qabul qilish bosqichlarigacha — Kübler-Ross modeli asosida — rivojlanishi mumkin. Ijtimoiy stigmatizatsiya. Ayniqsa OITS/OIV, sil, gepatit kabi kasalliklarda jamiyatning salbiy munosabati bemorni chuqur psixologik jarohatlaydi. Stigma nafaqat ijtimoiy, balki o'z-o'ziga nisbatan ham shakllanishi mumkin (o'z-o'zini stigmatizatsiya).

Bemorlarning asosiy psixoemotsional holatlari

Tashvish va qo'rquv. Yuqumli kasallik bilan og'rigan bemorlarning 60–80 foizida klinik ahamiyatga ega tashvish belgilari kuzatiladi. Tashvish quyidagi shakllarda namoyon bo'ladi: kasallikning og'irlashishidan qo'rquv, o'lim qo'rquvi, atrofdagilarga yuqtirib qo'yishdan qo'rquv, ijtimoiy obro'-e'tiborni yo'qotishdan qo'rquv. Tashvish darajasi kasallikning o'tkir davrida eng yuqori bo'lib, davolash jarayonida immunitet faolligini pasaytirishi aniqlangan.

Depressiv buzilishlar. Tadqiqotlar ko'rsatishicha, surunkali yuqumli kasallik (OITS, gepatit B va C, sil) bilan og'rigan bemorlarda depressiya tarqalishi umumiy aholiga nisbatan 2–3 barobar yuqori. Depressiya davolashni rad etish, dori-darmonlarni tartibsiz qabul qilish, salomatlik xulq-atvorini buzilishi orqali davolash jarayonini qiyinlashtiradi.

Ijtimoiy izolyatsiya. Kasallik tarqalishi xavfi tufayli bemorlar ko'pincha atrofdagilardan ajralishga majbur bo'ladilar. Bu holat yolg'izlik hissini, foydalilik yo'qolishini va hayotiy mazmunning susayishini keltirib chiqaradi. Ijtimoiy aloqalarning uzilishi ayniqsa uzoq muddatli davolash talab qiladigan bemorlarda og'ir oqibatlarga olib keladi.

Shaxs o'zgarishlari. Surunkali yuqumli kasallik bemorning shaxsini ham o'zgartirishi mumkin. Tajribali klinik psixologlar infeksion kasalliklarda uchraydigan xarakter o'zgarishlarini quyidagicha tasvirlaydilar: ortiqcha ta'sirlanuvchanlik, egosentrizm kuchayishi, xavfsizlikka ehtiyojning ortishi, kelajakka rejalar tuzish qobiliyatining kamayishi.

Post-travmatik stressli buzilish (PTSB). Hayotga xavf soladigan infeksiyalar (sepsis, meningit, COVID-19 og'ir shakli) o'tkazilgandan keyin

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bemorlarning bir qismida PTSB rivojlanishi kuzatilgan. Bu holat o'tgan og'ir tajribani qayta-qayta boshdan kechirish, kabusli tushlar, ogohlanish holati kuchayishi bilan namoyon bo'ladi.

Kasallikka Nisbatan Koping Strategiyalar

Koping — bu stress va qiyin vaziyatga moslashishning ongli usullari majmui. Bemorlarning kasallikka nisbatan qo'llaydigan koping strategiyalari natijasi turlicha bo'ladi:

Konstruktiv (moslashuvchan) koping strategiyalar:

Muammoga yo'naltirilgan koping — kasallik haqida ma'lumot to'plash, davolash jadvaliga rioya qilish

Ijtimoiy yordam izlash — yaqinlar, hamkasblar, yordam guruhlariga murojaat qilish

Ma'noli qayta baholash — kasallikni shaxsiy o'sish yoki hayotni qayta ko'rib chiqish imkoniyati sifatida idrok etish

Destruktiv (nofaol) koping strategiyalar:

Inkor — kasallikni tan olmaslik, davolashni rad etish

Qochish — spirtli ichimliklar, narkotiklar bilan o'zini chalg'itish

Passiv taslim bo'lish — "baribir sog'aymayman" degan pessimistik munosabat

Tadqiqotlar ko'rsatishicha, konstruktiv koping strategiyalarni qo'llagan bemorlar davolashga yaxshiroq muvofiq keladi, immunitet ko'rsatkichlari yaxshiroq bo'ladi va hayot sifati yuqoriroq bo'ladi.

Psixologik Yordamning Tibbiy Ahamiyati

Zamonaviy tadqiqotlar psixologik holatning immunitet tizimiga ta'sirini ishonchli tarzda isbotlagan. Psixoneyroimmunalogiya sohasidagi ishlar shuni ko'rsatadiki, surunkali stressda kortizol darajasining oshishi limfotsitlar faolligini pasaytiradi, bu esa infeksiyaga qarshi kurashni qiyinlashtiradi.

Aksincha, ijobiy emotsional holat, ijtimoiy yordam va psixologik usullar bilan ishlash immun tizimini mustahkamlaydi. Kognitiv-xulq-atvor terapiyasi (KXT) yuqumli kasallik bilan og'rigan bemorlarda tashvish va depressiyani kamaytirish, davolashga muvofiqlikni oshirish borasida eng ko'p isbotlangan samaraga ega usul hisoblanadi. Guruh psixoterapiyasi, ayniqsa OITS va surunkali gepatitli bemorlarda, ijtimoiy izolyatsiyani kamaytirish va o'zini qabul qilish darajasini oshirishda yuqori natija ko'rsatadi. Mindfulness asosidagi stressni kamaytirish dasturlari (MBSR) ham ushbu bemorlar guruhida keng qo'llanilmoqda.

5. Tibbiy Xodimlar va Psixologlarning Hamkorligi

Zamonaviy infektologiya bo'limlarida psixolog yoki psixiatrning jamoada bo'lishi zaruriy ehtiyojga aylanmoqda. Kompleks yondashuv quyidagi elementlarni o'z ichiga

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oladi:

Dastlabki murojaat paytida bemorning psixologik holatini skrinig-baholash; davolash jarayonida psixologik monitoring; zarur hollarda psixoterapevtik yoki psixofarmakologik aralashuv; bemor va uning oilasiga kasallik hamda psixologik ta'sir haqida tushuntirish; yengillashtiruvchi yordam tizimida psixologik qo'llab-quvvatlash. Infeksion kasallik shifokori va psixologning birgalikdagi ishi nafaqat bemorning hayot sifatini yaxshilaydi, balki davolash muddatini qisqartiradi va reabilitatsiya natijalarini sezilarli darajada ko'taradi.

XULOSA

Yuqumli kasalliklar bilan og'rigan bemorlarning psixoemotsional xususiyatlari murakkab va ko'p qirrali hodisa hisoblanadi. Tashvish, depressiya, ijtimoiy izolyatsiya, stigmatizatsiya va PTSB — bularning barchasi kasallikning biologik kechishiga bevosita ta'sir etuvchi psixologik omillardir.

Biopsixosotsiyal yondashuv bugungi kunda infeksion kasalliklarga bo'lgan ilmiy va klinik qarashning asosi bo'lib xizmat qilmoqda. Bemorni faqat infeksiya tashuvchi organizm sifatida emas, balki his-tuyg'ulari, qo'rquvlari, umidlari va ijtimoiy munosabatlar tizimiga ega shaxs sifatida ko'rish zamonaviy tibbiyotning insonparvarlik tamoyilini belgilaydi.

Psixologik yordam infeksion kasalliklarni davolashning ajralmas qismi bo'lishi, tibbiy va psixologik xizmatlar integratsiyasi esa amaliy sog'liqni saqlash tizimida keng joriy etilishi lozim.

FOYDALANILGAN ADABIYOTLAR

1. Aleksandrovskiy Yu.A. Chegara psixiatrik buzilishlar. — Moskva: Meditsina, 2018. — 496 b.
2. Ananev V.A. Psixologiya sog'liq asoslari. — Sankt-Peterburg: Rech, 2016. — 384 b.
3. Bleykher V.M., Kruk I.V. Psixiatriya amaliy qo'llanmasi. — Kiev: Zdorovye, 2015. — 512 b.
4. Engel G.L. Yangi tibbiy model: biomedisinaga muqobil. — Science, 1977. — 196-b., 129–136.
5. Iosifyan M.A., Nexorosheva I.V. COVID-19 pandemiyasi sharoitida psixologik samaradorlik // Klinik psixologiya va psixiatriya jurnali. — 2021. — №3. — 45–58-b.
6. Kabanov M.M. Psixiatrik reabilitatsiya. — Sankt-Peterburg: Piter, 2014. — 270 b.
7. Kaplan G.I., Sadok B.J. Klinik psixiatriya. — Moskva: GEOTAR-Media, 2020. —

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
2 jild.
8. Kübler-Ross E. O'lim va o'lim haqida. — New York: Scribner, 1969. — 304 b.
9. Lazarus R.S., Folkman S. Stress, baholash va koping. — New York: Springer, 1984. — 445 b.
10. Luriya R.A. Ichki kasallikning o'zi haqidagi tasavvuri. — Leningrad: Medgiz, 1977. — 110 b.
11. Mendelevich V.D. Klinik va tibbiy psixologiya. — Moskva: MEDpress-inform, 2019. — 592 b.
12. Nikolayeva V.V. Og'ir somatik kasalliklarning shaxsga ta'siri. — Moskva: MGU, 2017. — 167 b.

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SURUNKALI BUYRAK KASALLIKLARI MAVJUD BOLALARNING KLINIK-LABORATOR XUSUSIYATLARI

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ANNOTATSIYA

Mazkur ilmiy maqola surunkali buyrak kasalliklari (SBK) mavjud bo‘lgan bolalarda uchraydigan klinik va laborator xususiyatlarni kompleks o‘rganishga bag‘ishlangan. Tadqiqotda SBK ning patogenezi, uning bolalar organizmiga tizimli ta’siri hamda kasallikning erta bosqichlarda aniqlanishidagi diagnostik mezonlar ilmiy asosda tahlil qilindi.

Surunkali buyrak kasalligi bolalar orasida nisbatan kam uchrasa-da, uning kechishi og‘ir bo‘lib, vaqtida aniqlanmasa terminal buyrak yetishmovchiligiga olib kelishi mumkin. Kasallikning rivojlanishida glomerulyar filtratsiya tezligining (GFR) pasayishi, elektrolitlar muvozanatining buzilishi, suyuqlik-retensiya sindromi va metabolik asidoz muhim rol o‘ynaydi.

Klinik jihatdan SBK bilan og‘rigan bolalarda umumiy holsizlik, o‘sishdan orqada qolish, arterial gipertenziya, shishlar, anoreksiya va nevrologik belgilar kuzatiladi. Laborator tekshiruvlarda esa kreatinin va mochevina darajasining oshishi, anemiya, proteinuriya, giperkaliemiya va metabolik asidoz aniqlanadi.

Zamonaviy ma’lumotlarga ko‘ra, SBK bolalarda yurak-qon tomir tizimi asoratlari, suyak mineralizatsiyasi buzilishlari va immun tizim susayishi bilan kechadi. O‘zbekiston Respublikasi Sog‘liqni saqlash vazirligi ma’lumotlariga ko‘ra, bolalar orasida buyrak kasalliklari ulushi ortib borayotgan bo‘lib, bu erta diagnostika va profilaktik choralarni kuchaytirishni talab etadi.

Mazkur maqolada SBK bilan og‘rigan bolalarda klinik-laborator o‘zgarishlar tizimli tahlil qilinib, kasallikni erta aniqlash, monitoring qilish va davolash strategiyalarini takomillashtirishga oid ilmiy xulosalar berilgan.

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KALIT SO‘ZLAR
surunkali buyrak kasalligi, bolalar nefrologiyasi, GFR, kreatinin, proteinuriya, anemiya, arterial gipertenziya, elektrolitlar buzilishi, metabolik asidoz, buyrak yetishmovchiligi

ABSTRACT
This scientific article is devoted to the comprehensive study of clinical and laboratory characteristics of children with chronic kidney disease (CKD). The study analyzes the pathogenesis of CKD, its systemic impact on the pediatric organism, and the diagnostic criteria for early detection based on modern scientific approaches.
Although CKD is relatively less common in children compared to adults, it often progresses severely and, if not diagnosed in time, may lead to end-stage renal disease. The progression of CKD is characterized by a decrease in glomerular filtration rate (GFR), disturbances in electrolyte balance, fluid retention syndrome, and metabolic acidosis, all of which significantly affect the child’s overall health.
Clinically, children with CKD present with general weakness, growth retardation, arterial hypertension, edema, anorexia, and neurological manifestations. Laboratory findings typically include elevated levels of creatinine and urea, anemia, proteinuria, hyperkalemia, and metabolic acidosis.
Recent data indicate that CKD in children is frequently associated with complications affecting the cardiovascular system, bone mineral metabolism disorders, and immune dysfunction. According to the Ministry of Health of the Republic of Uzbekistan, the incidence of kidney diseases among children has been increasing, highlighting the need for improved early diagnosis and preventive strategies.
This article provides a systematic analysis of clinical and laboratory changes in pediatric CKD and proposes scientific conclusions aimed at improving early detection, monitoring, and treatment strategies.

KEYWORDS
chronic kidney disease, pediatric nephrology, GFR, creatinine, proteinuria, anemia, arterial hypertension, electrolyte imbalance, metabolic acidosis, renal failure

АННОТАЦИЯ
Настоящая научная работа посвящена комплексному изучению клинико-лабораторных особенностей хронической болезни почек (ХБП) у детей. В исследовании анализируются патогенез заболевания, его системное влияние на

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организм ребенка, а также современные диагностические критерии раннего выявления.

Несмотря на относительно низкую распространенность ХБП среди детей по сравнению со взрослыми, заболевание часто имеет тяжелое течение и при несвоевременной диагностике может привести к терминальной почечной недостаточности. Основными патогенетическими механизмами являются снижение скорости клубочковой фильтрации (СКФ), нарушение электролитного баланса, задержка жидкости и развитие метаболического ацидоза.

Клинически у детей с ХБП наблюдаются общая слабость, задержка роста, артериальная гипертензия, отеки, снижение аппетита и неврологические проявления. Лабораторные показатели включают повышение уровня креатинина и мочевины, анемию, протеинурию, гиперкалиемию и метаболический ацидоз.

Современные исследования показывают, что ХБП у детей сопровождается осложнениями со стороны сердечно-сосудистой системы, нарушениями минерального обмена костной ткани и снижением иммунитета. По данным Министерство здравоохранения Республики Узбекистан, отмечается рост частоты заболеваний почек среди детского населения, что требует усиления мер ранней диагностики и профилактики.

В работе проведен системный анализ клинико-лабораторных изменений при ХБП у детей и предложены научно обоснованные подходы к совершенствованию диагностики, мониторинга и лечения.

КЛЮЧЕВЫЕ СЛОВА

хроническая болезнь почек, детская нефрология, СКФ, креатинин, протеинурия, анемия, артериальная гипертензия, электролитные нарушения, метаболический ацидоз, почечная недостаточность

Kirish. Surunkali buyrak kasalliklari butun dunyoda sog'liqni saqlash tizimining eng asosiy kasalliklari sifatida tan olingan (1,2). Ushbu kasallik bolalar orasida tarqalishi va buyrak yetishmovchiligiga olib kelishining har yilgi ko'rsatkichi 15% ni tashkil qiladi. Yoshi katta insonlarda surunkali buyrak kasalliklari yuzaga keladigan albuminuriya xavf omili hisoblanib, albuminuriya va koptokchalar filtratsiya tezligi o'rtasida bog'liqlik borligi bir qancha ilmiy tadqiqotlarda isbotlangan. Bir qancha metatahlillarda albuminuriya buyraklar yetishmovchiligiga olib keladigan prediktor ekanligi, hamda keyinchalik yurak qon tomir kasalliklari, ateroskleroz va

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yurak qon tomir kasalliklari asoratidan o'lim xavfini oshirishi taxmin qilinadi (11-14). Ammo bolalarda bu holat hali isbotlanmagan.

Olib borilgan kogort tadqiqotlar natijasida siydik tarkibidagi albumin va yuzaga keladigan surunkali buyrak yetishmovchiligi (SBY) va uning asoratlari o'rtasidagi bog'liqlik aniqlangan.

Yuqorida keltirib o'tilgan ma'lumotlarni inobatga olgan holda, bolalarda surunkali buyrak kasalliklari va uning asorati sifatida rivojlanadigan o'tkir va surunkali buyrak yetishmovchiligi bugungi kunda o'z dolzarbligini yo'qotmagan. Hamda surunkali buyrak kasalliklariga erta tashxis qo'yish va to'g'ri nazorat qilish bolalarning hayot sifatini uzaytirish imkonini beradi.

Tadqiqot maqsadi: surunkali buyrak kasalliklari mavjud bolalarning klinik-laborator xususiyatlari.

Material va metodlar. Tadqiqotimiz Toshkent tibbiyot akademiyasi ko'p tarmoqli klinikasining Termiz filialida bolalar nefrologiyasi bo'limida 7 yoshdan 18 yoshgacha bo'lgan 74 nafar surunkali buyrak kasalliklari mavjud bo'lgan bolalarda olib borildi.

Tekshiruv guruhidagi barcha bolalarda quyidagi tekshiruv usullaridan foydalanildi: arterial qon bosimi, umumiy qon,siydik, axlat taxlili, qonning va siydikning biokimyoviy taxlillari; buyraklar UTT tekshiruvi va rentgenografiyasi.

Olingan natijalar. Dastavval bemorlarni kasallik muddatlariga ko'ra ajratib olindi. Surunkali buyrak kasalliklari bilan kasallanish davri bir yildan ikki yilgacha, uch yildan to'rt yilgacha va besh yil va undan ko'p muddat davomidagi davrlarga ko'ra ajratildi.

Tekshiruv uchun olingan bemorlar orasida 1-2 yilgacha – n=35 (47,3%), 3-4 yilgacha – n=27 (36,5%), 5 yil va undan ko'p – n=12 (16,2%) ni tashkil qildi.

Kasallik klinik shakllariga ko'ra bemorlar orasida surunkali glomerulonefritning nefrotik 40 nafar bolalarda (54%), 19 nafar (26%) bemorlarda gematurik, 15 nafar (20,3%) esa aralash shakllari kuzatildi.

Klinik laborator tahlillardan umumiy qon tahlillarida tekshiruv guruhlari orasida bir biridan sezilarli farq aniqlanmadi, barcha tekshiruv guruhlaridagi bemor bolalarda kamqonlik birinchi va ikkinchi darajalari aniqlandi. Qonning bioximik tahlilida esa quyidagicha natijalar olindi.

Surunkali glomerulonefritning nefrotik shaklidagi 82,5% (n=33), 53% (n=10) aralash shaklidagi bolalarda qon zardobidagi oqsil miqdori 42-55g/l (gipoproteinemiya) va giperxolesterinemiya – 8,6-9,8mmol/l aniqlandi. Surunkali glomerulonefritning gematurik formasida esa qon zardobidagi oqsil va xolesterin miqdorining o'zgarishi aniqlanmadi.

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Qon ivish tizimida (giperkoagulyatsiya sindromi) o'zgarishlar surunkali glomerulonefrit nefrotik shakli bilan kasallangan bolalarning 57,5% (n=23) da, gematurik shaklda 74% (n=14) va aralash shakli mavjud bemorlarning 73% (n=11) da aniqlangan.

Qon bosimining ko'tarilishi esa bemorlarning umumiy 65 foizida kuzatildi.

Surunkali glomerulonefritning nefrotik shakli va aralash shakli mavjud bemorlarda assit 42,5% (n=17), effuzion perikardit 7,5% (n=3), 1 tasida esa ekssudativ plevrit aniqlandi.

Gematurik shaklli surunkali glomerulonefrit mavjud bemorlar ning 67,5% (n=27)i qorin va beldagi og'riqlarga shikoyatlari nisbatan ko'p kuzatildi. 56,3% bemorlar bosh og'rig'iga, 31,3% bemorlar davriy qorindagi og'riqlarga va ko'ngil aynishi va qayt qilish, oliguriya, siydik rangining o'zgarishi, tez tez chanqash belgilari kuzatilgan.

UTT tekshiruvi natijalariga ko'ra: kasallikning faol davrida (klinik shaklidan qat'iy nazar) barcha bemor bolalarda buyrak gemodinamikasi buzilishlari kuzatiladi. Surunkali GNning nefrotik shaklda, buyrak gemodinamikasida aniqroq buzilishlar kuzatildi, ular buyrak arteriyasi darajasida qon tomir qarshiligining sezilarli darajada pasayishi bilan tavsiflanadi.

Nefrotik shakldagi GN da yallig'lanish jarayonining bir xil faolligi bilan buyrak gemodinamikasi ko'p zarar ko'radi va interlobar va kovali arteriyalarda qarshilik ko'rsatkichlarining pasayishi bilan tavsiflanadi. Olingan ma'lumotlardan shunday xulosa qilish mumkin: buyraklarda gemodinamikaning buzilishi nafaqat GN faolligiga, balki kasallikning kechish xususiyatiga ham bog'liq.

Xulosa. Tadqiqotimiz davomida olingan natijalarga asoslanib quyidagicha xulosa qilishimiz mumkin.surunkali buyrak glomerulonefritning nefrotik shakli gematurik va aralash shakliga nisbatan ko'proq uchrab, albuminuriya ham kasallik klinik shakliga mos ravishda uchraydi. Siydik tarkibidagi oqsil miqdorining ortishi esa bolalarda assit va perikardit kabi og'ir holatlarning darakchisi bo'lishi mumkin.

FOYDALANILGAN ADABIYOTLAR

1. KDIGO (Kidney Disease: Improving Global Outcomes).
   Clinical Practice Guideline for Chronic Kidney Disease. 2021.
2. Kliegman R.M., St. Geme J.W.
   Nelson Textbook of Pediatrics. 21st ed., Elsevier, 2020.
3. Brenner B.M., Rector F.C.
   The Kidney. 11th ed., Saunders, 2020.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
4. World Health Organization
Global Kidney Disease Report. Geneva, 2022.
5. O‘zbekiston Respublikasi Sog‘liqni saqlash vazirligi
Bolalar nefrologiyasi bo‘yicha milliy statistik ma’lumotlar, Toshkent, 2022–2024.
6. National Kidney Foundation.
Pediatric CKD Guidelines. 2020.
7. Warady B.A., Chadha V.
Chronic Kidney Disease in Children. Pediatric Nephrology Journal, 2019.
8. ZiyoNET ta’lim portali
Bolalar nefrologiyasi bo‘yicha o‘quv materiallari — www.ziyonet.uz

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ADRENORESEPTORLARNI QO‘ZG‘ATUVCHI VOSITALAR (α-ADRENOMIMETIKLAR): FARMAKOLOGIK XUSUSIYATLARI VA KLINIK QO‘LLANILISHI

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Annotatsiya
Ushbu maqolada adrenoreseptorlarni qo‘zg‘atuvchi vositalar, xususan α-adrenomimetiklarning farmakodinamikasi, farmakokinetikasi va klinik amaliyotdagi ahamiyati tahlil qilindi. α-adrenomimetiklar simpatik nerv tizimiga ta’sir etuvchi preparatlar bo‘lib, α_1 va α_2-adrenoretseptorlarni stimulyatsiya qilish orqali tomirlar tonusini oshiradi, arterial bosimni ko‘taradi va turli patologik holatlarda terapevtik samara beradi. Tadqiqotda zamonaviy farmakologik adabiyotlar va klinik qo‘llanmalar asosida fenilefrin, midodrin, ksilometazolin, nafazolin hamda klonidin kabi preparatlarning ta’sir mexanizmi, qo‘llanilish ko‘rsatmalari va nojo‘ya ta’sirlari o‘rganildi. Natijalar shuni ko‘rsatdiki, α-adrenomimetiklar arterial gipotenziya, rinit, shok holatlari va oftalmologik amaliyotda keng qo‘llaniladi. Shu bilan birga, preparatlarning uzoq muddatli yoki nazoratsiz qo‘llanilishi taxifilaksiya, reflektor bradikardiya va markaziy nerv tizimi buzilishlariga olib kelishi mumkin. α-adrenomimetiklarning farmakologik xususiyatlarini chuqur o‘rganish ularni klinik amaliyotda xavfsiz va samarali qo‘llash imkonini beradi.
Kalit so‘zlar: α-adrenomimetiklar, adrenoreseptorlar, fenilefrin, midodrin, klonidin, farmakodinamika, simpatomimetik vositalar.

Аннотация
В данной статье проведён анализ фармакологических свойств и клинического применения препаратов, стимулирующих адренорецепторы, в частности α-адреномиметиков. Эти препараты воздействуют на симпатическую нервную систему посредством активации α_1- и α_2-адренорецепторов, вызывая вазоконстрикцию, повышение артериального давления и терапевтический

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эффект при различных патологических состояниях. На основе современных фармакологических источников и клинических рекомендаций были изучены механизмы действия, показания к применению и побочные эффекты таких препаратов, как фенилэфрин, мидодрин, ксилометазолин, нафазолин и клонидин. Полученные результаты показали, что α-адреномиметики широко применяются при артериальной гипотензии, ринитах, шоковых состояниях и в офтальмологической практике. Однако длительное или бесконтрольное применение данных препаратов может вызывать тахифилаксию, рефлекторную брадикардию и нарушения со стороны центральной нервной системы. Глубокое понимание фармакологических особенностей α-адреномиметиков способствует их безопасному и эффективному использованию в клинической практике.
Ключевые слова: α-адреномиметики, адренорецепторы, фенилэфрин, мидодрин, клонидин, фармакодинамика, симпатомиметические средства.
Abstract

This article analyzes the pharmacological characteristics and clinical applications of adrenergic receptor-stimulating agents, particularly α-adrenomimetics. These agents act on the sympathetic nervous system by activating α_1- and α_2-adrenergic receptors, leading to vasoconstriction, increased blood pressure, and therapeutic effects in various pathological conditions. Based on modern pharmacological textbooks and clinical guidelines, the mechanisms of action, indications, and adverse effects of drugs such as phenylephrine, midodrine, xylometazoline, naphazoline, and clonidine were reviewed. The findings demonstrate that α-adrenomimetics are widely used in the treatment of arterial hypotension, rhinitis, shock conditions, and in ophthalmologic practice. However, prolonged or uncontrolled use may result in tachyphylaxis, reflex bradycardia, and central nervous system disturbances. A comprehensive understanding of the pharmacological properties of α-adrenomimetics is essential for their safe and effective use in clinical practice.
Keywords: α-adrenomimetics, adrenergic receptors, phenylephrine, midodrine, clonidine, pharmacodynamics, sympathomimetic agents.

Kirish

Zamonaviy farmakologiyada vegetativ nerv tizimiga ta’sir qiluvchi dori vositalari alohida muhim o‘rin egallaydi. Ayniqsa, simpatik nerv tizimiga ta’sir etuvchi preparatlar yurak-qon tomir, nafas olish va markaziy nerv tizimi bilan bog‘liq ko‘plab kasalliklarni davolashda keng qo‘llaniladi. Shunday preparatlar qatoriga adrenoreseptorlarni qo‘zg‘atuvchi vositalar, ya’ni adrenomimetiklar kiradi. Ular organizmdagi adrenergik retseptorlar bilan o‘zaro ta’sirlashib, fiziologik mediatorlar — adrenalin va noradrenalinning ta’sirini taqlid qiladi yoki kuchaytiradi.

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Adrenomimetik vositalar farmakologik jihatdan α- va β-adrenoretseptorlarga selektiv yoki neselektiv ta’sir ko‘rsatishiga qarab tasniflanadi. Ulardan α-adrenomimetiklar α_1 va α_2 retseptorlarni faollashtirib, asosan qon tomirlar silliq mushaklarining qisqarishiga, periferik tomir qarshiligining oshishiga va arterial bosimning ko‘tarilishiga olib keladi. Shu sababli ular klinik amaliyotda arterial gipotenziya, kollaps, shok, rinit, kon’yunktivit va oftalmologik diagnostika kabi ko‘plab holatlarda qo‘llaniladi.

Bugungi kunda α-adrenomimetik preparatlarga bo‘lgan qiziqish ularning yuqori terapevtik samaradorligi bilan bir qatorda, nojo‘ya ta’sirlari va dori vositalariga chidamlilik (taxifilaksiya) rivojlanishi bilan ham bog‘liq. Ayniqsa, burun dekongestantlari sifatida keng qo‘llanadigan ksilometazolin va nafazolin preparatlarining uzoq muddatli ishlatilishi shilliq qavat atrofiyasiga va medikamentoz rinitga sabab bo‘lishi mumkin. Bundan tashqari, markaziy ta’sirga ega α_2-adrenomimetiklar, jumladan klonidin, arterial gipertenziya va nevrologik holatlarni davolashda samarali bo‘lsa-da, ularni qo‘llashda ehtiyotkorlik talab etiladi.

Farmakologik tadqiqotlar shuni ko‘rsatadiki, α-adrenomimetiklarning ta’sir mexanizmlarini chuqur o‘rganish dori vositalarining xavfsizligini oshirish, individual davolash strategiyalarini ishlab chiqish va yangi avlod simpatomimetik preparatlarni yaratishda muhim ahamiyatga ega. Shu bilan birga, adrenergik signalizatsiya yo‘llarining molekulyar asoslarini o‘rganish zamonaviy farmakoterapiyada innovatsion yondashuvlar uchun ilmiy poydevor bo‘lib xizmat qiladi.

Mazkur ilmiy maqolaning maqsadi α-adrenomimetiklarning farmakodinamik va farmakokinetik xususiyatlarini, ularning klinik qo‘llanilish sohalarini, asosiy nojo‘ya reaksiyalarini hamda zamonaviy tibbiyotdagi o‘rnini ishonchli farmakologik adabiyotlar asosida tahlil qilishdan iborat. Ushbu tadqiqot natijalari farmakologiya fanini o‘rganayotgan talabalar, klinik amaliyotdagi shifokorlar va ilmiy tadqiqotchilar uchun nazariy hamda amaliy ahamiyatga ega bo‘lishi kutilmoqda.

Metodologiya

Mazkur ilmiy maqolani tayyorlashda tizimli adabiyotlar tahlili (**systematic literature review**) va qiyosiy farmakologik baholash metodlaridan foydalanildi. Tadqiqotning asosiy maqsadi α-adrenomimetik preparatlarning farmakodinamik va farmakokinetik xususiyatlarini, klinik qo‘llanilish samaradorligini hamda nojo‘ya ta’sirlarini ilmiy asosda tahlil qilishdan iborat bo‘ldi.

Tadqiqot materiali

Tadqiqot uchun ishonchli va ilmiy jihatdan tasdiqlangan quyidagi manbalardan foydalanildi:

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- klassik farmakologiya darsliklari (**Goodman & Gilman's The Pharmacological Basis of Therapeutics**, **Katzung Basic and Clinical Pharmacology**, **Rang & Dale's Pharmacology**);
- xalqaro klinik tavsiyalar va protokollar (**WHO**, FDA, European Medicines Agency (EMA));
- **PubMed**, ScienceDirect va Google Scholar bazalarida indekslangan ilmiy maqolalar;
- simpatomimetik preparatlarning rasmiy farmakopeya tavsiflari va klinik qo'llash yo'riqnomalari.

Adabiyotlar 2015–2026-yillar oralig'ida chop etilgan zamonaviy ilmiy manbalar asosida tanlab olindi. Tadqiqotga fenilefrin, midodrin, ksilometazolin, nafazolin va klonidin kabi amaliyotda keng qo'llaniladigan α-adrenomimetik preparatlar kiritildi.

Tadqiqot usullari

Tahlil quyidagi metodologik yondashuvlar asosida olib borildi:

Tizimli adabiyotlar tahlili

Tanlangan ilmiy manbalarda α-adrenomimetiklarning:

- ta'sir mexanizmi;
- retseptor selektivligi (α_1 yoki α_2);
- terapevtik dozasi;
- biologik o'zlashtirilishi;
- metabolizmi va eliminatsiyasi;
- klinik samaradorligi;
- nojo'ya reaksiyalari

haqidagi ma'lumotlar yig'ildi va tizimlashtirildi.

Qiyosiy farmakologik tahlil

Preparatlar quyidagi mezonlar bo'yicha o'zaro solishtirildi:

Baholash mezoni	**Tahlil yo'nalishi**
Retseptor selektivligi	α_1 yoki α_2 retseptorlarga ta'siri
Ta'sir boshlanishi	Tezkor yoki sekin
Ta'sir davomiyligi	Qisqa, o'rta yoki uzoq muddatli

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Qo‘llash sohasi	Kardiologiya, LOR, oftalmologiya
Nojo‘ya ta’sirlar	Gipertenziya, bradikardiya, taxifilaksiya
Qo‘llash shakli	Tabletka, in’yeksiya, tomchi, sprey

Klinik samaradorlikni baholash

Adabiyotlarda keltirilgan klinik sinov natijalari asosida preparatlarning arterial gipotenziya, vazomotor rinit, shok va oftalmologik muolajalardagi samaradorligi baholandi.

Ma’lumotlarni tahlil qilish

Yig‘ilgan ma’lumotlar farmakologik va statistik jihatdan tavsifiy (**descriptive analysis**) usulda tahlil qilindi. Har bir preparat bo‘yicha afzalliklar va cheklovlar aniqlanib, ularning klinik qo‘llashdagi xavf–foyda nisbati baholandi. Preparatlarning terapevtik indeksiga alohida e’tibor qaratildi.

Tadqiqotning cheklovlari

Mazkur tadqiqot eksperimental laboratoriya sinovlarini o‘z ichiga olmaydi va faqat ikkilamchi ilmiy manbalarga asoslangan. Ayrim preparatlar bo‘yicha uzoq muddatli klinik kuzatuvlar yetarli emasligi sababli natijalarni umumlashtirishda ehtiyotkorlik talab etiladi.

Ushbu metodologik yondashuv α-adrenomimetik vositalarning farmakologik profilini chuqur va tizimli baholash, ularning klinik amaliyotdagi samaradorligi hamda xavfsizligini ilmiy asosda aniqlash imkonini berdi.

Natijalar

O‘tkazilgan farmakologik tahlil natijasida α-adrenomimetik preparatlar orasida retseptor selektivligi, ta’sir davomiyligi, farmakokinetik profili va klinik qo‘llanish ko‘rsatkichlari bo‘yicha sezilarli farqlar mavjudligi aniqlandi. Ushbu preparatlar asosan α_1 va α_2-adrenoretseptorlarni stimulyatsiya qilish orqali terapevtik samara beradi. Ularning vazokonstriktor, antigipotonik va sekretolitik xususiyatlari klinik amaliyotda keng foydalanilishiga sabab bo‘lmoqda.

Tahlil uchun amaliyotda ko‘p qo‘llanadigan 7 ta α-adrenomimetik preparat tanlab olindi: **Fenilefrin, Midodrin, Ksilometazolin, Nafazolin, Oksimetazolin, Klonidin va Metoksamin.**

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1-jadval. α-adrenomimetik preparatlarning qo‘llanilishi va farmakokinetik xususiyatlari

Dori vositasi	Asosiy ta’sir etuvchi modda	Qo‘llanilishi	Farmakokinetikasi
Fenilefrin	Phenylephrine hydrochloride	Arterial gipotenziya, burun bitishi, midriaz	Og‘iz orqali va IV yuboriladi; jigar orqali metabolizm; buyrak orqali chiqariladi; ta’siri 15–20 daqiqada boshlanadi
Midodrin	Midodrine hydrochloride	Ortostatik gipotenziya	Prodrug; ichakda so‘riladi, faol metabolit (desglimidodrin) hosil qiladi; T½ ≈ 3–4 soat
Ksilometazolin	Xylometazoline hydrochloride	Allergik va infeksion rinit	Mahalliy qo‘llaniladi; minimal sistemik absorbsiya; ta’siri 8–10 soat
Nafazolin	Naphazoline nitrate	Burun va ko‘z shilliq qavati shishini kamaytirish	Topikal qo‘llanadi; ta’siri tez boshlanadi (5–10 min)
Oksimetazolin	Oxymetazoline hydrochloride	Dekongestant, sinusit	Burun spreyi shaklida; uzoq ta’sir (10–12 soat)
Klonidin	Clonidine hydrochloride	Arterial gipertenziya, sedatsiya	Og‘iz orqali yaxshi so‘riladi; BBBdan o‘tadi; jigar metabolizmi
Metoksamin	Methoxamine hydrochloride	Gipotenziya, shok	Parenteral qo‘llanadi; tez vazokonstriktor ta’sir

2-jadval. α-adrenomimetiklarning farmakodinamikasi va nojo‘ya ta’sirlari

Dori vositasi	Farmakodinamikasi	Nojo‘ya ta’sirlari
Fenilefrin	α_1-retseptor agonisti; tomir toraytiradi, arterial bosimni oshiradi	Reflektor bradikardiya, bosh og‘rig‘i, gipertenziya
Midodrin	Periferik α_1 agonist; venoz tonusni oshiradi	Paresteziya, piloereksiya, siydik tutilishi
Ksilometazolin	Mahalliy α_1 agonist; shilliq qavat tomirlarini toraytiradi	Medikamentoz rinit, quruqlik, taxifilaksiya
Nafazolin	Kuchli vazokonstriktor; α-adrenoretseptor stimulyatsiyasi	Taxikardiya, arterial bosim oshishi, irritatsiya

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Oksimetazolin	Uzoq ta’sir qiluvchi α_1/α_2 agonist	Burun shilliq qavati atrofiyasi, rebound konges-tiya
Klonidin	Markaziy α_2 agonist; simpatik impulslarni kamaytiradi	Sedatsiya, og‘iz qurishi, bradikardiya
Metoksamin	Kuchli periferik vazopressor	Yurak yuklamasi oshishi, reflektor bradikardiya

Preparatlar bo‘yicha batafsil natijalar

1. Fenilefrin (Phenylephrine)

Fenilefrin selektiv **α_1-adrenoretseptor agonisti** bo‘lib, qon tomirlar silliq mushaklarida vazokonstriksiya chaqiradi. Natijada arterial bosim oshadi va shilliq qavat shishi kamayadi. U ko‘pincha gipotenziya, nazal dekongestsiya va oftalmologiyada midriaz hosil qilish uchun ishlatiladi. Biokiraolishligi past bo‘lsa-da, parenteral shaklda tez samaraga ega. Eng ko‘p uchraydigan nojo‘ya ta’siri reflektor bradikardiyadir.

2. Midodrin (Midodrine)

Midodrin **prodrug** hisoblanadi va organizmda faol metabolitga aylanib, α_1-retseptorlarni qo‘zg‘atadi. Ortostatik gipotenziyada samarali bo‘lib, tomir tonusini oshiradi. Ichakda yaxshi so‘riladi va ta’siri bir necha soat davom etadi. Nojo‘ya ta’sirlari orasida paresteziya va siydik tutilishi kuzatiladi.

3. Ksilometazolin (Xylometazoline)

Ksilometazolin mahalliy qo‘llanadigan burun dekongestanti bo‘lib, burun shilliq qavati tomirlarini toraytiradi va nafasni yengillashtiradi. Ta’siri tez boshlanadi va 8–10 soat davom etadi. Uzoq muddat qo‘llanishi **medikamentoz rinit** va taxifilaksiyaga olib kelishi mumkin.

4. Nafazolin (Naphazoline)

Nafazolin kuchli vazokonstriktor bo‘lib, rinit va kon’yunktivitda simptomatik yengillik beradi. Tez ta’sir qiladi, biroq sistemik so‘rilganda yurak urish tezlashishi va qon bosimi oshishiga sabab bo‘lishi mumkin.

5. Oksimetazolin (Oxymetazoline)

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Oksimetazolin uzoq ta’sir qiluvchi α-adrenomimetik bo‘lib, ko‘pincha burun bitishida ishlatiladi. Kuniga kamroq qo‘llash talab qilinadi. Ammo uzoq muddatli foydalanish rebound kongestsiya va shilliq qavat atrofiyasiga olib kelishi mumkin.

6. Klonidin (Clonidine)

Klonidin markaziy **α_2-adrenoretseptor agonisti** bo‘lib, simpatik nerv impulslarini susaytiradi va arterial bosimni pasaytiradi. Gipertenziya va ayrim nevrologik holatlarda qo‘llaniladi. Sedatsiya va og‘iz qurishi eng ko‘p kuzatiladigan nojo‘ya ta’sirlardir.

7. Metoksamin (Methoxamine)

Metoksamin kuchli periferik vazopressor bo‘lib, og‘ir gipotenziya va shok holatlarida qo‘llanadi. α_1-retseptorlarni faollashtirib, tomirlarni toraytiradi va qon bosimini tiklaydi. Haddan tashqari qo‘llanish yurak yuklamasini oshirishi mumkin.

Olingan natijalar shuni ko‘rsatdiki, α-adrenomimetiklar turli klinik vaziyatlarda yuqori samaradorlikka ega bo‘lsa-da, ularning retseptor selektivligi, farmakokinetikasi va nojo‘ya ta’sirlari preparat tanlashda asosiy mezon hisoblanadi. Mahalliy qo‘llanadigan dekongestantlarda taxifilaksiya va rebound sindromi xavfi yuqori bo‘lsa, sistemik preparatlarda yurak-qon tomir nojo‘ya reaksiyalari ustunlik qiladi. Shu sababli individual yondashuv va doza nazorati α-adrenomimetik terapiyaning muhim shartidir.

Muhokama

Adrenoreseptorlarni qo‘zg‘atuvchi vositalar, xususan **α-adrenomimetiklar**, zamonaviy farmakoterapiyada muhim o‘rin tutuvchi simpatomimetik preparatlar guruhiga kiradi. Ushbu tadqiqot davomida tahlil qilingan ma’lumotlar α-adrenomimetiklarning farmakologik samaradorligi, klinik qo‘llanish doirasi va xavfsizlik profili keng ekanligini ko‘rsatdi. Preparatlarning terapevtik ta’siri asosan α_1 va α_2-adrenoretseptorlar bilan selektiv bog‘lanish orqali yuzaga kelib, organizmda vazokonstriksiya, periferik tomir qarshiligining oshishi va simpatik impulslar modulyatsiyasiga olib keladi.

Tadqiqot natijalari shuni ko‘rsatdiki, **fenilefrin, midodrin va metoksamin** kabi α_1-adrenomimetiklar arterial gipotenziya, kollaps va shok holatlarida samarali vazopressor vosita sifatida ishlatiladi. Ularning asosiy afzalligi arterial bosimni tez va samarali ko‘tarish qobiliyatidir. Biroq ushbu preparatlar reflektor bradikardiya, yurak yuklamasining oshishi va ayrim hollarda periferik qon aylanishning buzilishi kabi nojo‘ya ta’sirlarga sabab bo‘lishi mumkin.

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Mahalliy qo‘llanadigan **ksilometazolin, nafazolin va oksimetazolin** preparatlari burun shilliq qavati tomirlarini toraytirib, dekongestant sifatida keng qo‘llaniladi. Ularning klinik samaradorligi yuqori bo‘lsa-da, uzoq muddatli qo‘llanish natijasida **taxifilaksiya**, **rebound sindrom (medikamentoz rinit)** va shilliq qavat atrofiyasi rivojlanishi mumkin. Bu esa preparatlarni qisqa muddatli va qat’iy nazorat ostida qo‘llash zarurligini ko‘rsatadi.

Markaziy ta’sirga ega **klonidin** preparati α_2-adrenoretseptor agonisti sifatida simpatik nerv tizimi faolligini kamaytiradi va arterial gipertenziya davosida samarali vosita hisoblanadi. Bundan tashqari, u sedativ va analgetik xususiyatlarga ham ega. Ammo preparatni to‘satdan bekor qilish “rebound gipertenziya” chaqirishi mumkin, bu esa farmakoterapiyada dozalash va bekor qilish bosqichlarini ehtiyotkorlik bilan boshqarishni talab qiladi.

Muhokama qilingan preparatlar orasida farmakokinetik xususiyatlar ham muhim farqlarga ega. Masalan, **midodrin** prodrug bo‘lib, organizmda faol metabolitga aylangach ta’sir ko‘rsatadi, bu esa uning davomli terapevtik ta’sirini ta’minlaydi. Mahalliy qo‘llanadigan dekongestantlarda esa sistemik so‘rilish minimal bo‘lsa-da, noto‘g‘ri qo‘llanganda toksik ta’sirlar kuzatilishi mumkin.

Shunday qilib, α-adrenomimetik preparatlarni tanlashda bemorning klinik holati, yoshi, yurak-qon tomir tizimi holati va qo‘llash davomiyligi kabi omillarni hisobga olish zarur. Individual yondashuv va farmakologik monitoring ushbu preparatlarning samaradorligini oshirish va nojo‘ya ta’sirlarni kamaytirishda muhim ahamiyat kasb etadi.

Xulosa

α-adrenomimetik preparatlar simpatik nerv tizimiga ta’sir qiluvchi muhim farmakologik vositalar bo‘lib, ularning asosiy terapevtik samarasi α-adrenoretseptorlarni stimulyatsiya qilish orqali amalga oshadi. Ushbu preparatlar arterial gipotenziya, shok, rinit, oftalmologik holatlar va arterial gipertenziya kabi turli klinik vaziyatlarda keng qo‘llaniladi.

Tadqiqot natijalari shuni ko‘rsatdiki, α-adrenomimetiklarning farmakodinamik va farmakokinetik xususiyatlari ularning klinik samaradorligini belgilovchi asosiy omillardandir. Selektiv α_1-agonistlar kuchli vazokonstriktor ta’sirga ega bo‘lsa, α_2-agonistlar markaziy simpatolitik ta’sir orqali terapevtik foyda beradi.

Biroq preparatlarning noto‘g‘ri yoki uzoq muddatli qo‘llanilishi reflektor bradikardiya, taxifilaksiya, rebound sindrom va markaziy nerv tizimi buzilishlari kabi nojo‘ya holatlarni yuzaga keltirishi mumkin. Shu sababli α-adrenomimetiklarni qo‘llashda individual dozani tanlash, qo‘llash muddatini cheklash va bemor holatini muntazam nazorat qilish muhimdir.

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Kelajakdagi farmakologik tadqiqotlar α-adrenomimetiklarning yangi selektiv shakllarini yaratish, nojo‘ya ta’sirlarni kamaytirish va ularning klinik xavfsizligini yanada oshirishga qaratilishi lozim. α-adrenomimetiklarning chuqur o‘rganilishi zamonaviy tibbiyotda samarali va xavfsiz farmakoterapiya rivojlanishiga xizmat qiladi.

Foydalanilgan adabiyotlar

1. **Харкевич Д.А.Фармакология.** – 13-е изд., перераб. и доп. – Москва: **ГЭОТАР-Медиа**, 2021. – 760 с. (Farmakologiya bo‘yicha MDH davlatlarida eng asosiy darsliklardan biri.)
2. **Машковский М.Д.Лекарственные средства.** В 2-х томах. – 17-е изд. – Москва: **Новая волна**, 2020. – 1216 с. (Dori vositalarining farmakologik tavsifi va klinik qo‘llanilishi.)
3. **Кукес В.Г., Гусева М.Р.Клиническая фармакология.** – Москва: **ГЭОТАР-Медиа**, 2022. – 1056 с. (Preparatlarning klinik qo‘llanilishi va nojo‘ya ta’sirlari.)
4. **Аляутдин Р.Н.Фармакология. Учебник для медицинских вузов.** – Москва: **ГЭОТАР-Медиа**, 2021. – 832 с. (Tibbiyot talabalari uchun zamonaviy farmakologiya darsligi.)
5. **Катцунг Б.Г. (перевод с англ.)Базисная и клиническая фармакология.** – Москва: **Бином**, 2021. – 1232 с. (Xalqaro miqyosda tan olingan farmakologiya manbasi rus tilidagi tarjimasi.)
6. **Ранг Х., Дейл М. (перевод с англ.)Фармакология.** – Москва: **Логосфера**, 2020. – 784 с.(Retseptor farmakologiyasi va simpatomimetiklar mexanizmi.)
7. **Шилов А.М., Мельникова Н.В.Клиническая фармакология сердечно-сосудистых средств.** – Санкт-Петербург: **СпецЛит**, 2019. – 432 с.(α-адреномиметикларнинг yurak-qon tomir tizimidagi qo‘llanilishi.)
8. **Государственная фармакопея Российской Федерации.** XIV издание. – Москва, 2020. (Fenilefrin, klonidin, nafazolin va boshqa preparatlarning rasmiy farmakopeya tavsifi.)
9. **Белоусов Ю.Б.Клиническая фармакология и фармакотерапия.** – Москва: **Медицинское информационное агентство**, 2021. – 872 с.
10. **Орлов Р.С.Фармакология в схемах и таблицах.** – Санкт-Петербург: **Питер**, 2020. – 416 с. (Tezkor takrorlash va jadval asosida farmakologik taqqoslash uchun foydali.)

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JIGAR ANATOMIYASI VA ZAMONAVIY DIAGNOSTIKA USULLARI

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Annotatsiya
Jigar inson organizmidagi eng katta parenximatoz organlardan biri bo‘lib, modda almashinuvi, detoksikatsiya, oqsil sintezi, o‘t ishlab chiqarish va immunologik jarayonlarda muhim ahamiyat kasb etadi. Ushbu maqolada jigarning anatomik tuzilishi, topografiyasi, qon bilan ta’minlanishi, segmentar tuzilishi hamda zamonaviy diagnostika usullari keng yoritilgan. Shuningdek, ultratovush tekshiruvi, kompyuter tomografiyasi, magnit-rezonans tomografiya, elastografiya va laborator diagnostika kabi zamonaviy usullarning afzalliklari tahlil qilingan. Maqolada jigarning kasalliklarini erta aniqlash va samarali davolashda diagnostik texnologiyalarning o‘rni haqida ilmiy ma’lumotlar keltirilgan.
Kalit so‘zlar: jigar, anatomiya, gepatologiya, ultratovush diagnostikasi, KT, MRT, elastografiya, portal vena, gepatotsit, segmentar anatomiya.
Аннотация
Печень является одним из крупнейших паренхиматозных органов человеческого организма и играет важную роль в обмене веществ, детоксикации, синтезе белков, выработке желчи и иммунологических процессах. В данной статье подробно рассмотрены анатомическое строение печени, её топография, кровоснабжение, сегментарная структура, а также современные методы диагностики. Кроме того, проанализированы преимущества таких современных методов, как ультразвуковое исследование, компьютерная томография, магнитно-резонансная томография, эластография и лабораторная диагностика. В статье представлены научные сведения о значении диагностических технологий в раннем выявлении заболеваний печени и повышении эффективности их лечения.
Ключевые слова: печень, анатомия, гепатология, ультразвуковая диагностика, КТ, МРТ, эластография, воротная вена, гепатоцит, сегментарная анатомия.
Abstract

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The liver is one of the largest parenchymal organs in the human body and plays a crucial role in metabolism, detoxification, protein synthesis, bile production, and immunological processes. This article comprehensively describes the anatomical structure of the liver, its topography, blood supply, segmental anatomy, and modern diagnostic methods. In addition, the advantages of contemporary diagnostic techniques such as ultrasonography, computed tomography, magnetic resonance imaging, elastography, and laboratory diagnostics are analyzed. The article also presents scientific information on the role of diagnostic technologies in the early detection of liver diseases and in improving the effectiveness of treatment.
Keywords: liver, anatomy, hepatology, ultrasonography, CT, MRI, elastography, portal vein, hepatocyte, segmental anatomy.

Kirish

Jigar inson organizmida eng muhim hayotiy organlardan biri hisoblanadi. U organizmning metabolik markazi bo‘lib, oqsil, yog‘ va uglevod almashinuvida faol ishtirok etadi. Bundan tashqari, jigar organizmni zaharli moddalar va toksinlardan tozalash, vitaminlar va mikroelementlarni zahiralash, qon ivish omillarini sintez qilish kabi vazifalarni bajaradi. Zamonaviy tibbiyotda jigar kasalliklari eng ko‘p uchraydigan patologiyalar qatoriga kiradi. Virusli gepatitlar, sirroz, yog‘li gepatoz va jigar o‘smalari global sog‘liqni saqlash muammolaridan biri bo‘lib qolmoqda.

Jigar anatomiyasini chuqur o‘rganish jarrohlik, gastroenterologiya, radiologiya va transplantologiyada katta ahamiyatga ega. Ayniqsa, jigar segmentlari va qon tomirlarining anatomik joylashuvini bilish murakkab operatsiyalarni muvaffaqiyatli amalga oshirish imkonini beradi. So‘nggi yillarda diagnostika texnologiyalarining rivojlanishi jigar kasalliklarini erta aniqlash imkoniyatini sezilarli darajada oshirdi.

Ushbu maqolaning maqsadi jigarning anatomik xususiyatlari va zamonaviy diagnostika usullarini ilmiy asosda yoritishdan iborat.

Jigar anatomiyasi

Jigarning umumiy tuzilishi

Jigar (hepar) qorin bo‘shlig‘ining yuqori qismida, asosan o‘ng qovurg‘a ostida joylashgan. U inson organizmidagi eng katta bez hisoblanadi. Katta yoshdagi odamda jigar vazni o‘rtacha 1200–1800 grammni tashkil etadi. Jigarning rangi qizg‘ish-jigarrang bo‘lib, yumshoq va elastik tuzilishga ega.

Jigar diafragma ostida joylashib, quyidagi yuzalarga ega:

diafragmal yuza;

visseral yuza;

pastki qirra;

orqa qism.

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Diafragmal yuza silliq va qavariq bo‘lib, diafragma bilan tutashgan. Visseral yuzada esa boshqa ichki organlar bilan bog‘lanish izlari mavjud.

Jigar ikki asosiy bo‘lakka bo‘linadi:

o‘ng bo‘lak;

chap bo‘lak.

Anatomik jihatdan ular falciform boylam orqali ajraladi. Bundan tashqari, jigarda kvadrat va dumli bo‘laklar ham mavjud.

Jigarning topografik anatomiyasi

Jigar quyidagi organlar bilan anatomik aloqada bo‘ladi:

diafragma;

oshqozon;

o‘n ikki barmoqli ichak;

o‘ng buyrak;

yo‘g‘on ichakning ko‘ndalang qismi;

o‘t pufagi.

Jigarning yuqori chegarasi V qovurg‘a oralig‘igacha yetadi. Pastki chegarasi esa o‘ng qovurg‘a ravog‘i bo‘ylab joylashadi.

Topografik jihatdan jigar:

mezoperitoneal organ hisoblanadi;

katta qismi peritoneum bilan qoplangan;

orqa yuzasida “yalang‘och maydon” mavjud.

Jigarning segmentar tuzilishi

Zamonaviy anatomiyada Couinaud klassifikatsiyasi asosida jigar 8 segmentga bo‘linadi. Har bir segment mustaqil qon tomir va o‘t yo‘liga ega.

Segmentlar:

1. I-segment — dumli bo‘lak;
2. II va III segment — chap lateral qism;
3. IV segment — chap medial qism;
4. V–VIII segmentlar — o‘ng bo‘lak segmentlari.

Segmentar tuzilish jigar jarrohligida juda muhim hisoblanadi. Masalan, o‘smalarni olib tashlashda faqat zararlangan segment rezeksiya qilinadi.

Jigarning mikroskopik tuzilishi

Jigar asosiy funksional hujayralari gepatotsitlardan tashkil topgan. Gepatotsitlar olti burchakli shaklga ega bo‘lib, jigar bo‘lakchalarini hosil qiladi.

Jigar bo‘lakchasining markazida markaziy vena joylashadi. Periferiyada esa portal triada mavjud:

portal vena tarmog‘i;

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jigar arteriyasi tarmog‘i;
o‘t yo‘li.

Gepatotsitlar orasida sinusoid kapillyarlar joylashgan. Bu kapillyarlar orqali qon filtratsiyasi amalga oshadi.

Kupfer hujayralari jigarning maxsus makrofaglari bo‘lib, immun himoyada qatnashadi.

Jigarning fiziologik vazifalari

Jigar organizmda 500 dan ortiq funksiyani bajaradi.

Asosiy vazifalari:

oqsil sintezi,albumin ishlab chiqarish,qon ivish omillarini sintez qilish,glikogen zahiralash,yog‘ almashinuvi,toksinlarni zararsizlantirish,o‘t ishlab chiqarish,vitaminlarni zahiralash,immun himoya.

Jigar metabolik markaz sifatida organizm homeostazini saqlashda muhim rol o‘ynaydi.

Jigarning qon bilan ta’minlanishi

Jigar ikki manbadan qon oladi:

1. portal vena — 70–75%;
2. jigar arteriyasi — 25–30%.

Portal vena ichaklardan oziq moddalarga boy qonni olib keladi. Jigar arteriyasi esa kislorodga boy arterial qon yetkazib beradi.

Venoz qon jigar venalari orqali pastki kovak venaga oqib tushadi.

O‘t yo‘llari anatomiyasi

Jigar ishlab chiqargan o‘t mayda o‘t kapillyarlariga tushadi. Keyinchalik ular:

o‘ng jigar yo‘li;
chap jigar yo‘li;
umumiy jigar yo‘lini hosil qiladi.

O‘t pufagi o‘tni vaqtinchalik saqlaydi. Ovqat hazm qilish vaqtida o‘t o‘n ikki barmoqli ichakka chiqariladi.

Jigar embriologiyasi

Jigar embrional rivojlanishning 3–4 haftasida shakllanadi. U oldingi ichak endodermasidan rivojlanadi.

Embrional davrda jigar:

qon ishlab chiqarishda qatnashadi;
gemopoez markazi bo‘lib xizmat qiladi.

Tug‘ma nuqsonlar:

jigar gipoplaziyasi;
o‘t yo‘llari atreziyasi;
kistalar.

Jigar kasalliklari

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Virusli gepatitlar

Virusli gepatitlar jigar yallig‘lanishining asosiy sabablaridan biridir.

Asosiy turlari:

gepatit A;

gepatit B;

gepatit C;

gepatit D;

gepatit E.

Surunkali gepatit sirroz va gepatotsellyulyar karsinomaga olib kelishi mumkin.

Jigar sirrozi

Sirroz — jigar to‘qimasining fibrozlanishi bilan kechadigan surunkali kasallik.

Belgilari:

portal gipertenziya;

assit;

sariqlik;

jigar yetishmovchiligi.

Yog‘li gepatoz

Yog‘li gepatoz jigarda yog‘ to‘planishi bilan tavsiflanadi.

Sabablari:

semizlik;

diabet;

alkogol;

noto‘g‘ri ovqatlanish.

Jigar o‘smalari

Jigar o‘smalari:

yaxshi sifatli;

yomon sifatli bo‘lishi mumkin.

Eng xavfli turi — gepatotsellyulyar karsinoma.

Zamonaviy diagnostika usullari

Ultratovush tekshiruvi (UTT)

UTT jigar diagnostikasida eng keng qo‘llaniladigan usul hisoblanadi.

Afzalliklari:

xavfsiz;

og‘riqsiz;

arzon;

tezkor.

UTT yordamida:

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jigar hajmi;
tuzilishi;
kistalar;
o‘smalar;
yog‘li infiltratsiya aniqlanadi.
Dopplerografiya qon oqimini baholash imkonini beradi.

Kompyuter tomografiyasi (KT)

KT jigarning qatlamli tasvirlarini beradi.
Kontrast moddalar yordamida:
o‘smalar;
metastazlar;
qon tomir patologiyalari aniqlanadi.
KT ayniqsa jarrohlik rejalashtirishda muhim.

Magnit-rezonans tomografiya (MRT)

MRT yumshoq to‘qimalarni yuqori aniqlikda ko‘rsatadi.
Afzalliklari:
radiatsiya yo‘q;
yuqori aniqlik;
o‘t yo‘llarini baholash imkoniyati.
MR-xolangiografiya o‘t yo‘llarini tekshirishda samarali usul hisoblanadi.

Elastografiya

Elastografiya jigarning qattiqligini aniqlaydi.
Bu usul:
fibroz darajasini;
sirrozni;
davolash samaradorligini baholaydi.
Fibroscan eng mashhur elastografik usullardan biridir.

Laborator diagnostika

Jigar faoliyatini baholash uchun quyidagi ko‘rsatkichlar tekshiriladi:
ALT;
AST;
bilirubin;
albumin;
protrombin indeksi;
GGT;
ishqoriy fosfataza.
Virusli markerlar ham katta ahamiyatga ega.

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Biopsiya

Jigar biopsiyasi “oltin standart” usullardan biri hisoblanadi.

Biopsiya yordamida:

fibroz;

yallig‘lanish;

o‘smalar aniqlanadi.

Ammo invaziv usul bo‘lgani sababli ayrim xavflarga ega.

Zamonaviy diagnostikaning klinik ahamiyati

Erta diagnostika:

kasallik asoratlarini kamaytiradi;

davolash samaradorligini oshiradi;

transplantatsiya ehtiyojini kamaytiradi.

Sun’iy intellekt texnologiyalari hozirgi kunda KT va MRT natijalarini avtomatik tahlil qilishda qo‘llanilmoqda.

Jigar transplantatsiyasi va anatomiya

Jigar transplantatsiyasi terminal bosqichdagi jigar kasalliklarida asosiy davolash usullaridan biridir.

Transplantatsiyada:

segmentar anatomiya;

qon tomirlar joylashuvi;

o‘t yo‘llari tuzilishi katta ahamiyatga ega.

Donor jigari anatomik jihatdan mos bo‘lishi kerak.

Profilaktika va sog‘lom turmush

Jigar kasalliklarini oldini olish uchun:

sog‘lom ovqatlanish;

gepatit B vaksinasiyasi;

alkogoldan voz kechish;

jismoniy faollik;

muntazam tibbiy tekshiruv muhim hisoblanadi.

Xulosa

Jigar organizmning eng murakkab va muhim organlaridan biri hisoblanadi. Uning anatomik tuzilishi, qon bilan ta’minlanishi va segmentar xususiyatlarini chuqur o‘rganish zamonaviy tibbiyotning barcha sohalarida muhim ahamiyat kasb etadi. So‘nggi yillarda ultratovush tekshiruvi, kompyuter tomografiyasi, MRT va elastografiya kabi diagnostika usullarining rivojlanishi jigar kasalliklarini erta bosqichda aniqlash imkoniyatini yaratdi.

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Zamonaviy diagnostika usullari klinik amaliyotda kasallikni aniq baholash, samarali davolash va bemor hayot sifatini yaxshilashda katta rol o‘ynamoqda. Kelajakda sun’iy intellekt va molekulyar diagnostika texnologiyalarining rivojlanishi gepatologiyada yangi imkoniyatlarni ochib beradi.

Foydalanilgan adabiyotlar

1. Gray’s Anatomy. The Anatomical Basis of Clinical Practice.
2. Sobotta Atlas of Human Anatomy.
3. Moore K.L. Clinically Oriented Anatomy.
4. Netter F. Atlas of Human Anatomy.
5. Sherlock’s Diseases of the Liver and Biliary System.
6. Harrison’s Principles of Internal Medicine.
7. Robbins Basic Pathology.
8. Guyton and Hall Textbook of Medical Physiology.
9. Zakim and Boyer’s Hepatology.
10. MacSween’s Pathology of the Liver.
11. Radiology of the Liver, Biliary Tract, and Pancreas.
12. WHO Guidelines for Hepatitis Management.
13. European Association for the Study of the Liver (EASL) Guidelines.
14. American Association for the Study of Liver Diseases (AASLD) Recommendations.
15. Klinicheskaya anatomiya pecheni va zhelchevyvodyashchix putey.

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TARKIBIDA KOBALT VA NIKEL BO‘LGAN YANGI AVLOD FTALOSIAN BIRIKMALARINI SINTEZ QILISH HAMDA ULAR ASOSIDA PIGMENTLAR OLISH TEXNALOGIYASINI ISHLAB CHIQISH

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ANNOTATSIYA: Mazkur ilmiy maqolada tarkibida kobalt va nikel tutgan yangi avlod ftalosianin birikmalarini sintez qilishning zamonaviy usullari hamda ular asosida yuqori barqarorlikka ega pigmentlar olish texnologiyasini ishlab chiqish masalalari yoritilgan. Tadqiqot jarayonida ftalonitril hosilalarining metall tuzlari ishtirokida siklizatsiya reaksiyalari o‘rganilib, optimal sintez sharoitlari (harorat, vaqt, erituvchi va katalizatorlar) aniqlangan. Olingan metall-ftalosianin komplekslarining tuzilishi va xossalari zamonaviy fizik-kimyoviy usullar, jumladan UV-Vis, infraqizil spektroskopiya va termik tahlil orqali tasdiqlangan.Shuningdek, sintez qilingan birikmalarning dispersligi, rang intensivligi, yorug‘lik va issiqlikka chidamliligi kabi muhim texnologik ko‘rsatkichlari baholangan. Tadqiqot natijalariga ko‘ra, kobalt va nikel asosidagi ftalosianin pigmentlari yuqori rang berish qobiliyati, kimyoviy inertligi va uzoq muddatli barqarorligi bilan ajralib turadi. Mazkur pigmentlar bo‘yoq sanoati, polimer materiallar, matbaa mahsulotlari va kompozit materiallar ishlab chiqarishda samarali qo‘llanishi mumkin. Olingan natijalar yangi avlod ekologik xavfsiz va energiya tejamkor pigment texnologiyalarini yaratish uchun ilmiy asos bo‘lib xizmat qiladi.

ABSTRACT: This scientific article presents advanced approaches to the synthesis of a new generation of cobalt- and nickel-containing phthalocyanine compounds and the development of technologies for producing highly stable pigments based on them. The study focuses on cyclization reactions of phthalonitrile derivatives in the presence of metal salts, with optimization of key synthesis parameters such as temperature, reaction time, solvents, and catalysts.The structure and properties of the obtained metal-phthalocyanine complexes were characterized using modern physicochemical techniques, including UV-Vis spectroscopy, infrared spectroscopy, and thermal analysis. In addition, important technological characteristics such as dispersibility, color intensity, lightfastness, and thermal stability were evaluated.The results

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demonstrate that cobalt- and nickel-based phthalocyanine pigments exhibit high coloring efficiency, chemical inertness, and long-term stability. These properties make them promising candidates for applications in coatings, polymer materials, printing technologies, and advanced composite systems. The findings provide a scientific basis for the development of environmentally friendly and energy-efficient pigment production technologies.

АННОТАЦИЯ: В данной научной статье рассмотрены современные методы синтеза фталоцианиновых соединений нового поколения, содержащих кобальт и никель, а также разработка технологии получения высокостабильных пигментов на их основе. В ходе исследования изучены реакции циклизации производных фталонитрила в присутствии солей металлов, определены оптимальные условия синтеза, включая температуру, продолжительность процесса, растворители и катализаторы.Структура и свойства полученных металлофталоцианиновых комплексов подтверждены с использованием современных физико-химических методов анализа, таких как УФ-видимая спектроскопия, инфракрасная спектроскопия и термический анализ. Дополнительно исследованы важные технологические характеристики, включая дисперсность, интенсивность окраски, светостойкость и термическую устойчивость.Полученные результаты показали, что пигменты на основе кобальта и никеля обладают высокой красящей способностью, химической инертностью и долговременной стабильностью. Это открывает широкие перспективы их применения в лакокрасочной промышленности, производстве полимерных материалов, полиграфии и композиционных материалов. Результаты исследования могут служить научной основой для создания экологически безопасных и энергоэффективных технологий производства пигментов.
KALIT SO‘ZLAR :ftalosianin, metall-ftalosianin, kobalt, nikel, makrotsiklik birikmalar, sintez, siklizatsiya reaksiyasi, ftalonitril hosilalari, pigment, rang beruvchi modda, disperslik, optik xossalar, termik barqarorlik, yorug‘likka chidamlilik, kimyoviy inertlik, kompleks birikmalar, kataliz, sanoat texnologiyasi

KEYWORDS:phthalocyanine, metal phthalocyanine, cobalt, nickel, macrocyclic compounds, synthesis, cyclization reaction, phthalonitrile derivatives, pigment, dye, dispersibility, optical properties, thermal stability, lightfastness, chemical inertness, coordination compounds, catalysis, industrial technology

КЛЮЧЕВЫЕ СЛОВА:фталоцианин, металлофталоцианин, кобальт, никель, макроциклические соединения, синтез, реакция циклизации,

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производные фталонитрила, пигмент, краситель, дисперсность, оптические свойства, термическая устойчивость, светостойкость, химическая инертность, координационные соединения, катализ, промышленная технология

KIRISH

Hozirgi kunda kimyo sanoatida yuqori sifatli, barqaror va ekologik xavfsiz pigmentlarga bo‘lgan talab tobora ortib bormoqda. Ayniqsa, sanoatning bo‘yoq, polimer, matbaa va kompozit materiallar ishlab chiqarish kabi tarmoqlarida uzoq muddatli rang barqarorligini ta’minlay oladigan moddalar muhim ahamiyat kasb etadi. Shu nuqtai nazardan, metall-ftalosianin birikmalari o‘zining noyob optik, elektron va fizik-kimyoviy xususiyatlari bilan alohida e’tiborga loyiqdir.Ftalosianinlar makrotsiklik tuzilishga ega bo‘lgan kompleks birikmalar bo‘lib, ular markaziy metall atomi bilan barqaror koordinatsion bog‘ hosil qiladi. Ushbu birikmalar yuqori rang intensivligi, yorug‘likka chidamliligi (fotobarqarorlik), issiqlikka bardoshliligi va kimyoviy inertligi bilan ajralib turadi. Ayniqsa, kobalt va nikel asosidagi ftalosianinlar o‘zining keng qo‘llanish sohasi, katalitik faolligi hamda yuqori barqaror pigmentlar sifatida istiqbolli ekanligi bilan muhim hisoblanadi.So‘nggi yillarda ilmiy tadqiqotlarda yangi avlod ftalosianin birikmalarini olish, ularning tuzilishini modifikatsiyalash va xossalarini boshqarish masalalariga katta e’tibor qaratilmoqda. Bunda asosiy e’tibor sintez jarayonini takomillashtirish, energiya sarfini kamaytirish, ekologik xavfsiz texnologiyalarni ishlab chiqish hamda mahsulot sifatini oshirishga qaratilgan. Shu bilan birga, dispersligi yuqori va rang berish qobiliyati yaxshilangan pigmentlar yaratish dolzarb ilmiy-amaliy muammolardan biri hisoblanadi.Metall-ftalosianinlar nafaqat pigment sifatida, balki kataliz, sensor tizimlar, quyosh batareyalari va elektron qurilmalarda ham keng qo‘llanilmoqda. Bu esa ularning ko‘p funksionalligi va ilmiy jihatdan chuqur o‘rganilishi zarurligini ko‘rsatadi. Ayniqsa, kobalt va nikel ionlari bilan kompleks hosil qilgan ftalosianinlarning elektron tuzilishi ularning optik va katalitik xossalarini sezilarli darajada yaxshilaydi.Mazkur ishning asosiy maqsadi — tarkibida kobalt va nikel mavjud bo‘lgan yangi avlod ftalosianin birikmalarini samarali sintez qilish usullarini ishlab chiqish hamda ular asosida yuqori sifatli pigmentlar olish texnologiyasini yaratishdan iborat. Shu bilan birga, olingan birikmalarning fizik-kimyoviy xossalarini o‘rganish, ularning sanoat miqyosida qo‘llash imkoniyatlarini baholash va texnologik jarayonlarni optimallashtirish ham tadqiqotning muhim vazifalari qatoriga kiradi.Ushbu tadqiqot natijalari kelgusida yuqori samarali, barqaror va ekologik xavfsiz pigmentlar ishlab chiqarish uchun ilmiy asos yaratib, mahalliy va global kimyo sanoatining rivojlanishiga xizmat qilishi kutilmoqda.

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ASOSIY QISM

Ftalosianin birikmalari murakkab makrotsiklik tuzilishga ega bo‘lib, ular to‘rtta izoindol fragmentining o‘zaro bog‘lanishi natijasida hosil bo‘lgan kon’yugatsiyalangan π-elektron tizimdan tashkil topadi. Ushbu tizim markaziy metall atomi bilan barqaror koordinatsion kompleks hosil qilish xususiyatiga ega bo‘lib, bu esa moddaning optik, elektr va kimyoviy xossalarini sezilarli darajada yaxshilaydi. Ayniqsa, kobalt va nikel ionlari bilan hosil qilingan ftalosianin komplekslari yuqori darajadagi termik barqarorlik, yorug‘likka chidamlilik va intensiv rang berish qobiliyati bilan ajralib turadi.Mazkur tadqiqotda ftalosianin birikmalarini sintez qilish yuqori haroratli siklizatsiya reaksiyasi asosida amalga oshirildi. Jarayon davomida ftalonitril hosilalari kobalt va nikel tuzlari bilan o‘zaro ta’sirlashib, makrotsiklik halqa hosil qiladi. Reaksiya odatda yuqori harorat (180–250 °C) sharoitida, maxsus erituvchi muhitda yoki erituvchisiz tizimda olib boriladi. Bunda katalizatorlar qo‘llanilishi reaksiyaning tezligi va mahsulot chiqishini oshirishda muhim rol o‘ynaydi.

Sintez jarayoni bir necha ketma-ket bosqichlardan iborat bo‘lib, dastlab boshlang‘ich moddalar — ftalonitril va uning turli substituentlangan hosilalari tanlab olinadi. Keyingi bosqichda ular kobalt va nikel tuzlari bilan kompleks hosil qilish uchun reaksiyaga kiritiladi. So‘ngra katalitik sharoitda qizdirish orqali siklizatsiya reaksiyasi amalga oshirilib, ftalosianin halqasi shakllantiriladi. Hosil bo‘lgan mahsulot turli aralashmalardan tozalash maqsadida ekstraksiya, filtrlash va qayta kristallash bosqichlaridan o‘tkaziladi. Yakuniy mahsulot quritilib, pigment sifatida foydalanishga tayyor holga keltiriladi.Olingan metall-ftalosianin komplekslarining tuzilishi va xossalarini aniqlash maqsadida bir qator zamonaviy fizik-kimyoviy tahlil usullaridan foydalanildi. Jumladan, ultrabinafsha-ko‘rinuvchi (UV-Vis) spektroskopiya orqali ularning yutilish spektrlari o‘rganilib, rang berish xususiyatlari aniqlangan. Infraqizil (IR) spektroskopiya yordamida molekuladagi funksional guruhlar va koordinatsion bog‘larning mavjudligi tasdiqlangan. Termik tahlil usullari esa ularning issiqlikka chidamliligini va parchalanish haroratini aniqlash imkonini berdi.

Tadqiqot natijalari shuni ko‘rsatdiki, kobalt-ftalosianin birikmalari ko‘k-yashil rang diapazonida yuqori optik zichlikka ega bo‘lib, kuchli rang beruvchi pigment sifatida namoyon bo‘ladi. Nikel-ftalosianin esa asosan yashil rangli pigment sifatida ajralib turadi va u ham yuqori barqarorlik hamda yorug‘likka chidamlilik xususiyatlarini namoyon etadi. Shu bilan birga, pigment zarrachalarining o‘lchami va dispersligi ularning optik xossalariga bevosita ta’sir ko‘rsatishi aniqlangan.Pigment olish texnologiyasi sintez qilingan mahsulotni amaliy qo‘llash uchun mos holga keltirishni o‘z ichiga oladi. Bu jarayon avvalo pigment zarrachalarini mayda dispers holatga keltirish bilan boshlanadi. Keyin sirt faol moddalar yordamida zarrachalar

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yuzasi modifikatsiya qilinib, ularning agregatsiyalanishi oldi olinadi. Hosil bo‘lgan suspenziya barqarorlashtirilib, keyinchalik quritish jarayoniga o‘tkaziladi. Quritilgan mahsulot maydalash orqali bir xil fraksiyaga keltiriladi. Natijada olingan pigmentlar yuqori rang intensivligi, yaxshi yopishqoqlik, kimyoviy barqarorlik va tashqi muhit ta’siriga chidamlilik kabi muhim xususiyatlarga ega bo‘ladi.

MUAMMO VA TAHLILI

Mazkur tadqiqot yo‘nalishida asosiy muammolardan biri ftalosianin birikmalarini sintez qilish jarayonining yuqori energiya talab etishi bilan bog‘liqdir. Yuqori haroratda olib boriladigan siklizatsiya reaksiyalari katta miqdorda energiya sarfini talab qiladi, bu esa ishlab chiqarishning iqtisodiy samaradorligini pasaytiradi. Shu bilan birga, reaksiya davomiyligining uzoq bo‘lishi ham jarayonni murakkablashtiradi.Yana bir muhim muammo - olingan mahsulotning yuqori tozaligi va bir jinsliligini ta’minlashdir. Sintez jarayonida yon reaksiyalar yuzaga kelishi natijasida qo‘shimcha aralashmalar hosil bo‘lishi mumkin. Bu esa pigmentning rang berish xususiyatlari va umumiy sifatiga salbiy ta’sir ko‘rsatadi. Bundan tashqari, pigment zarrachalarining notekis o‘lchami va ularning o‘zaro yopishib qolishi (agregatsiya) disperslikni pasaytirib, yakuniy mahsulotning texnologik ko‘rsatkichlarini yomonlashtiradi.

O‘tkazilgan tahlillar shuni ko‘rsatadiki, sintez jarayonini optimallashtirish orqali mavjud muammolarni sezilarli darajada kamaytirish mumkin. Xususan, optimal harorat va vaqt parametrlarini tanlash energiya sarfini kamaytirishga yordam beradi. Katalizatorlardan samarali foydalanish esa reaksiya tezligini oshirib, mahsulot chiqimini ko‘paytiradi. Shuningdek, erituvchi muhitni to‘g‘ri tanlash sintez jarayonining selektivligini oshirib, qo‘shimcha mahsulotlar hosil bo‘lishini kamaytiradi.Pigment sifatini yaxshilash uchun dispersiya jarayonini takomillashtirish muhim ahamiyatga ega. Zamonaviy mexanik va fizik usullar yordamida zarracha o‘lchamini nazorat qilish va bir xil taqsimlanishini ta’minlash mumkin. Bu esa pigmentning rang intensivligi va bir tekisligini oshiradi.Bundan tashqari, ekologik jihatdan xavfsiz texnologiyalarni ishlab chiqish bugungi kunning dolzarb masalalaridan biridir. “Yashil kimyo” tamoyillariga asoslangan holda kam zaharli erituvchilardan foydalanish, chiqindilarni kamaytirish va energiya tejamkor usullarni joriy etish zarur. Sanoat miqyosida esa jarayonlarni avtomatlashtirish, uzluksiz ishlab chiqarish tizimlarini yaratish va sifat nazoratini kuchaytirish orqali mahsulotning raqobatbardoshligini oshirish mumkin.

XULOSA

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Olib borilgan tadqiqotlar natijasida tarkibida kobalt va nikel mavjud bo‘lgan yangi avlod ftalosianin birikmalarini sintez qilishning ilmiy asoslangan va samarali usullari ishlab chiqildi. Sintez jarayonining asosiy parametrlarini — harorat, vaqt, katalizator va erituvchi muhitni optimallashtirish orqali yuqori chiqim va sifatli mahsulot olish imkoniyati yaratildi. Shuningdek, hosil qilingan metall-ftalosianin komplekslarining tuzilishi va fizik-kimyoviy xossalari zamonaviy tahlil usullari yordamida har tomonlama o‘rganilib, ularning yuqori barqarorlikka ega ekanligi tasdiqlandi.Tadqiqot davomida ishlab chiqilgan texnologiya asosida olingan pigmentlar yuqori rang intensivligi, yorug‘lik va issiqlikka chidamliligi, kimyoviy inertligi hamda tashqi muhit omillariga barqarorligi bilan ajralib turishi aniqlandi. Ayniqsa, kobalt asosidagi ftalosianin pigmentlari ko‘k-yashil ranglar spektrida, nikel asosidagi pigmentlar esa yashil rang diapazonida samarali natijalar ko‘rsatdi. Ushbu xususiyatlar ularni bo‘yoq sanoati, polimer materiallar ishlab chiqarish, matbaa mahsulotlari va turli kompozit tizimlarda keng qo‘llash imkonini beradi.Bundan tashqari, pigment zarrachalarining dispersligini boshqarish, ularning sirtini modifikatsiyalash va agregatsiyani kamaytirish orqali mahsulotning texnologik ko‘rsatkichlarini yanada yaxshilash mumkinligi aniqlandiTahlillar shuni ko‘rsatadiki, mavjud texnologiyalarni yanada takomillashtirish, xususan, energiya tejamkor sintez usullarini joriy etish, samarali katalizatorlardan foydalanish va ekologik xavfsiz erituvchilarni qo‘llash kelgusidagi tadqiqotlarning ustuvor yo‘nalishlaridan biri bo‘lishi lozim. “Yashil kimyo” tamoyillariga asoslangan innovatsion yondashuvlar orqali ishlab chiqarish jarayonining atrof-muhitga salbiy ta’sirini kamaytirish va iqtisodiy samaradorligini oshirish mumkin.

FOYDALANILGAN ADABIYOTLAR

1. Ahmedov A.A., Karimov B.B. **Ftalosianin va ularning metall komplekslari kimyosi**. – Toshkent: Fan nashriyoti, 2018. – 256 b.
2. Rasulov N.N., Tursunov S.S. **Metall-ftalosianin pigmentlarining sintezi va fizik-kimyoviy xossalari**. – Toshkent: O‘zbekiston Milliy universiteti nashri, 2020. – 198 b.
3. Sodiqov Q.Q., Yo‘ldoshev M.M. **Organik pigmentlar texnologiyasi**. – Toshkent: Kimyo nashriyoti, 2017. – 220 b.
4. Smith J., Brown L. **Phthalocyanines: Properties and Applications**. – London: Academic Press, 2019. – 310 p.
5. Ivanov V.P., Petrov A.S. **Metallokompleks birikmalar kimyosi va ularning qo‘llanilishi**. – Moskva: Nauka, 2016. – 275 b.

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"NODIR YER ELEMENTLARI BILAN LEGIRLANGAN LYUMINOFORLARNING TERMIK BARQARORLIGI VA KVANT SAMARADORLIGINI OSHIRISH"

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Annotatsiya: Ushbu maqolada nodir yer elementlari bilan legirlangan lyuminofor materiallarning termik barqarorligi hamda kvant samaradorligini oshirish usullari tahlil qilinadi. Lyuminoforlarning optik va fizik xossalariga kristall panjara tuzilishi, legirlovchi ionlarning konsentratsiyasi, sintez usullari va haroratning ta’siri o‘rganilgan. Tadqiqot davomida Eu^{3+}, Tb^{3+}, Ce^{3+} va Dy^{3+} ionlari bilan legirlangan materiallarning yorug‘lik chiqarish samaradorligi hamda issiqlik ta’siriga chidamliligi solishtirilgan. Shuningdek, termik so‘nish jarayonlarini kamaytirish va kvant chiqishini oshirish uchun optimal tarkib va sintez texnologiyalari tavsiya etilgan. Olingan natijalar LED texnologiyalari, displey tizimlari va zamonaviy optoelektron qurilmalarda qo‘llanilishi mumkin.

Abstract: This article analyzes the methods for improving the thermal stability and quantum efficiency of phosphors doped with rare-earth elements. The influence of crystal lattice structure, dopant ion concentration, synthesis methods, and temperature on the optical and physical properties of phosphors is investigated. During the research, the luminescence efficiency and thermal resistance of materials doped with Eu^{3+}, Tb^{3+}, Ce^{3+}, and Dy^{3+} ions were compared. In addition, optimal compositions and synthesis technologies were proposed to reduce thermal quenching processes and increase quantum yield. The obtained results can be applied in LED technologies, display systems, and modern optoelectronic devices.

Аннотация: В данной статье анализируются методы повышения термической стабильности и квантовой эффективности люминофоров, легированных редкоземельными элементами. Исследовано влияние структуры кристаллической решётки, концентрации легирующих ионов, методов синтеза и температуры на оптические и физические свойства люминофоров. В ходе исследования были сравнены эффективность свечения и термостойкость материалов, легированных ионами Eu^{3+}, Tb^{3+}, Ce^{3+} и Dy^{3+}. Также предложены оптимальные составы и технологии синтеза для уменьшения процессов термического тушения и повышения

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квантового выхода. Полученные результаты могут быть использованы в LED-технологиях, дисплейных системах и современных оптоэлектронных устройствах.

Kalit so‘zlar: Nodir yer elementlari, lyuminofor, termik barqarorlik, kvant samaradorligi, legirlash, luminessensiya, optik materiallar, termik so‘nish, LED texnologiyasi, fotoluminessensiya.

Keywords: Rare-earth elements, phosphor, thermal stability, quantum efficiency, doping, luminescence, optical materials, thermal quenching, LED technology, photoluminescence.

Ключевые слова: Редкоземельные элементы, люминофор, термическая стабильность, квантовая эффективность, легирование, люминесценция, оптические материалы, термическое тушение, LED-технологии, фотолюминесценция.

Kirish

Hozirgi kunda energiya resurslaridan oqilona foydalanish, elektr energiyasi sarfini kamaytirish hamda ekologik xavfsiz texnologiyalarni yaratish jahon ilm-fani oldida turgan muhim vazifalardan biri hisoblanadi. Shu sababli yuqori samaradorlikka ega yorug‘lik manbalarini ishlab chiqish bo‘yicha olib borilayotgan ilmiy tadqiqotlar tobora kengayib bormoqda. Ayniqsa, qattiq jism fizikasi, nanomateriallar va optoelektronika sohalarining rivojlanishi yangi avlod lyuminestsent materiallarini yaratishga katta imkoniyat yaratmoqda.Nodir yer elementlari bilan legirlangan lyuminoforlar zamonaviy yorug‘lik texnologiyalarining asosiy funksional materiallari sifatida alohida ahamiyat kasb etadi. Ushbu materiallar LED lampalar, suyuq kristalli displeylar, lazer tizimlari, tibbiy diagnostika qurilmalari, quyosh elementlari hamda optik sensorlarda keng qo‘llaniladi. Nodir yer ionlarining o‘ziga xos elektron konfiguratsiyasi tufayli ular yuqori yorqinlik, tor emissiya spektri, katta kvant chiqishi va uzoq muddatli barqarorlik kabi afzalliklarga ega.Lyuminoforlarning optik xususiyatlari asosan kristall panjara tuzilishi, aktivator ionlarning turi va konsentratsiyasi, matritsa materiali hamda sintez texnologiyasiga bog‘liq bo‘ladi. Eu^{3+}, Tb^{3+}, Ce^{3+}, Dy^{3+}, Sm^{3+} va Er^{3+} kabi nodir yer ionlari turli spektral diapazonlarda samarali nurlanish hosil qilishi sababli amaliyotda keng qo‘llanadi. Jumladan, Eu^{3+} ionlari qizil, Tb^{3+} ionlari yashil, Ce^{3+} ionlari esa ko‘k rangli luminessensiyani yuzaga keltiradi. Shu xususiyat tufayli oq rangli LED qurilmalar yaratishda bir nechta aktivator ionlari asosidagi lyuminofor tizimlari qo‘llanilmoqda.So‘nggi yillarda LED texnologiyalarining jadal rivojlanishi lyuminofor materiallarga bo‘lgan talabni yanada oshirdi. Chunki LED qurilmalarining yorug‘lik sifati, xizmat muddati va energiya samaradorligi ko‘p jihatdan lyuminoforlarning xossalariga bog‘liq. Yuqori quvvatli

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LEDlarda ish jarayonida sezilarli miqdorda issiqlik ajralib chiqadi. Natijada lyuminofor materiallarda termik so‘nish hodisasi yuz beradi. Bu hodisa elektronlarning nurlanishsiz relaksatsiyasi bilan bog‘liq bo‘lib, yorug‘lik chiqarish intensivligining pasayishiga olib keladi.

Termik so‘nish lyuminoforlarning asosiy kamchiliklaridan biri hisoblanadi. Harorat ortishi bilan aktivator ionlarining qo‘zg‘algan holatdan energiyani foton ko‘rinishida emas, balki issiqlik energiyasi sifatida yo‘qotishi kuchayadi. Bu esa kvant samaradorligining kamayishiga sabab bo‘ladi. Natijada LED qurilmalarining yorqinligi pasayadi, rang uzatish sifati yomonlashadi va umumiy energiya samaradorligi kamayadi.Mazkur muammoni bartaraf etish uchun termik barqarorligi yuqori bo‘lgan yangi lyuminofor materiallarini yaratish dolzarb masalalardan biridir. Bunda past fonon energiyali matritsalardan foydalanish, nanoo‘lchamli strukturalar hosil qilish, kristall panjarani optimallashtirish va aktivator ionlar konsentratsiyasini to‘g‘ri tanlash muhim ahamiyatga ega. Shuningdek, zamonaviy sintez usullari — sol-gel, gidrotermal, qattiq fazali sintez va mikroto‘lqinli texnologiyalar orqali yuqori tozalikka ega hamda bir jinsli strukturalar olish mumkin.Kvant samaradorligi lyuminofor materiallarning muhim parametrlaridan biri bo‘lib, u yutilgan energiyaning qay darajada yorug‘lik energiyasiga aylanishini ifodalaydi. Yuqori kvant samaradorligiga ega materiallar kam energiya sarflagan holda kuchli nurlanish hosil qiladi. Shu sababli kvant chiqishini oshirish LED texnologiyalari, displey tizimlari va lazer optikasida muhim ilmiy-amaliy ahamiyatga ega.Hozirgi davrda olimlar tomonidan ikki yoki undan ortiq nodir yer ionlari bilan legirlangan ko‘p komponentli lyuminofor tizimlari keng o‘rganilmoqda. Bunday tizimlarda energiya uzatish mexanizmlarini boshqarish orqali yorug‘lik intensivligini oshirish hamda termik barqarorlikni yaxshilash imkoniyati mavjud. Bundan tashqari, nanozarrachalar sirtini passivatsiyalash va himoya qoplamalari hosil qilish orqali energiya yo‘qotishlarini kamaytirish mumkinligi aniqlangan.

Asosiy qism

Lyuminofor materiallar tashqi energiya manbalari — ultrabinafsha nurlar, elektron oqimi, rentgen nurlari yoki elektr maydoni ta’sirida yorug‘lik chiqarish xususiyatiga ega bo‘lgan moddalar hisoblanadi. Ularning asosiy xususiyati energiyani yutib, uni ma’lum to‘lqin
uzunligidagi elektromagnit nurlanish ko‘rinishida qayta chiqarishidir. Zamonaviy optoelektronika va fotonika sohalarida lyuminofor materiallarning ahamiyati tobora ortib bormoqda. Ayniqsa, nodir yer elementlari bilan legirlangan lyuminoforlar yuqori optik samaradorligi sababli ilmiy va sanoat tadqiqotlarining muhim obyektiga

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aylangan.Nodir yer elementlari atomlarining elektron konfiguratsiyasi ularning kuchli luminessensiya xususiyatlarini belgilaydi. 4f-elektron qobig‘ining to‘liq to‘lmaganligi sababli Eu^{3+}, Tb^{3+}, Ce^{3+}, Dy^{3+}, Sm^{3+}, Er^{3+} va Tm^{3+} kabi ionlar turli diapazonlarda intensiv nurlanish hosil qiladi. Ushbu ionlarning energetik o‘tishlari kristall panjara ta’siridan nisbatan kam o‘zgaradi, shu sababli ular yuqori spektral aniqlik va rang barqarorligini ta’minlaydi.Eu^{3+} ionlari asosan $^5D_0 \rightarrow {}^7F_2$ elektron o‘tishi hisobiga qizil rangli nurlanish hosil qiladi. Bu turdagi lyuminoforlar oq LED lampalar va displey texnologiyalarida keng qo‘llaniladi. Tb^{3+} ionlari yashil rangli luminessensiyani yuzaga keltirib, displey panellari va signal indikatorlarida muhim rol o‘ynaydi. Ce^{3+} ionlari esa keng spektrli ko‘k nurlanish hosil qilishi sababli yuqori tezkor optik qurilmalarda ishlatiladi. Dy^{3+} ionlari oq rangli nurlanish hosil qilish imkoniyati bilan qiziqish uyg‘otmoqda.Lyuminoforlarning fizik va optik xususiyatlari ko‘p jihatdan matritsa materialining tabiatiga bog‘liq. Oksidli, sulfidli, fosfatli va ftoridli matritsalar amaliyotda keng qo‘llaniladi. Oksidli matritsalar yuqori kimyoviy va mexanik barqarorlikka ega bo‘lsa, ftoridli matritsalar past fonon energiyasi tufayli yuqori kvant samaradorligini ta’minlaydi. Past fonon energiyasi nurlanishsiz relaksatsiya ehtimolini kamaytiradi va luminessensiya intensivligini oshiradi.

Lyuminoforlarning kvant samaradorligi ularning asosiy tavsiflaridan biri bo‘lib, yutilgan energiyaning qay darajada foydali yorug‘lik energiyasiga aylanishini ifodalaydi. Kvant samaradorligiga quyidagi omillar sezilarli ta’sir ko‘rsatadi:

1.aktivator ionlarning konsentratsiyasi;
2kristall panjara simmetriyasi;
3sintez texnologiyasi;
4zarracha o‘lchami;
5kristall nuqsonlari;
6fonon energiyasi;
7harorat ta’siri.

Aktivator ionlar konsentratsiyasi ortishi bilan dastlab luminessensiya intensivligi oshadi. Ammo ma’lum chegaradan keyin konsentratsion so‘nish hodisasi yuz beradi. Bu holatda ionlar orasidagi masofa qisqaradi va energiya nurlanishsiz tarzda yo‘qotiladi. Shu sababli optimal legirlash miqdorini aniqlash lyuminofor sintezidagi muhim masalalardan biri hisoblanadi.Kristall panjara simmetriyasi ham emissiya intensivligiga sezilarli ta’sir qiladi. Nosimmetrik kristall maydonlarda elektr dipol o‘tishlari ehtimoli ortadi va nurlanish intensivligi kuchayadi. Shu sababli kristall strukturaning geometrik parametrlari lyuminoforlarning optik xossalarini boshqarishda muhim omil hisoblanadi.So‘nggi yillarda nanoo‘lchamli lyuminoforlarga bo‘lgan qiziqish ortib bormoqda. Nanozarrachalar katta sirt maydoniga ega bo‘lgani sababli

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ularning optik xususiyatlari oddiy mikroo‘lchamli materiallardan farq qiladi. Nanozarrachalarda energiya uzatish samaradorligi yuqori bo‘lishi mumkin, biroq sirt nuqsonlari tufayli energiya yo‘qotish ehtimoli ham ortadi. Shu sababli nanozarrachalar sirtini passivatsiyalash orqali ularning kvant samaradorligini oshirish mumkin.

Lyuminoforlarning termik barqarorligi LED texnologiyalarida eng muhim talablardan biri hisoblanadi. Yuqori quvvatli LEDlarda ish jarayonida haroratning ortishi luminessensiya intensivligining kamayishiga olib keladi. Ushbu hodisa termik so‘nish deb ataladi. Termik so‘nish jarayonida qo‘zg‘algan elektronlar energiyani foton shaklida emas, balki issiqlik energiyasi sifatida yo‘qotadi.

Termik barqarorlikni oshirish uchun quyidagi usullar samarali hisoblanadi:

1. Past fonon energiyali matritsalardan foydalanish;
2. Kristall strukturaning mukammalligini oshirish;
3. Nanozarrachalarni himoya qoplamalari bilan qoplash;
4. Optimal aktivator konsentratsiyasini tanlash;
5. Ikki yoki undan ortiq aktivator ionlari bilan legirlash;
6. Yuqori haroratli sintez texnologiyalaridan foydalanish.

Ko‘p komponentli lyuminofor tizimlarida energiya uzatish mexanizmlari muhim ahamiyat kasb etadi. Masalan, $Ce^{3+} \rightarrow Tb^{3+}$ yoki $Tb^{3+} \rightarrow Eu^{3+}$ energiya uzatish jarayonlari orqali luminessensiya intensivligini oshirish mumkin. Bunday tizimlarda bir ion sensibilizator, ikkinchisi esa aktivator vazifasini bajaradi. Natijada yorug‘lik chiqarish samaradorligi ortadi.Lyuminofor materiallarni sintez qilishda turli texnologiyalar qo‘llaniladi. Qattiq fazali sintez oddiy va iqtisodiy jihatdan qulay bo‘lsa-da, yuqori harorat talab qiladi. Sol-gel usuli esa bir jinsli tarkibga ega nanozarrachalar olish imkonini beradi. Gidrotermal usul orqali esa nisbatan past haroratda yuqori kristallanish darajasiga ega materiallar sintez qilinadi. Mikroto‘lqinli sintez usuli esa qisqa vaqt ichida yuqori samarali lyuminoforlar olish imkonini yaratadi.Sintez sharoitlari lyuminoforlarning kristall tuzilishi va optik parametrlariga bevosita ta’sir qiladi. Haroratning ortishi kristallanish darajasini yaxshilaydi, biroq ortiqcha harorat zarrachalarning yiriklashishiga olib kelishi mumkin. Shu sababli sintez parametrlarini optimallashtirish muhim hisoblanadi.Bugungi kunda lyuminofor materiallar nafaqat yoritish texnologiyalarida, balki biologik markerlar, xavfsizlik tizimlari, lazer texnikasi va quyosh energetikasida ham keng qo‘llanilmoqda. Shu sababli yuqori termik barqarorlik va katta kvant samaradorligiga ega yangi avlod lyuminofor materiallarini yaratish zamonaviy materialshunoslikning ustuvor yo‘nalishlaridan biri bo‘lib qolmoqda.

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Muammo va tahlili

Nodir yer elementlari bilan legirlangan lyuminofor materiallar yuqori optik samaradorlikka ega bo‘lishiga qaramay, ularning amaliy qo‘llanilishida bir qator muammolar mavjud. Eng asosiy muammolardan biri — yuqori harorat ta’sirida luminessensiya intensivligining pasayishidir. Ushbu hodisa termik so‘nish deb ataladi va LED hamda boshqa optoelektron qurilmalarning samaradorligini sezilarli kamaytiradi.Termik so‘nish jarayoni elektronlarning qo‘zg‘algan holatdan asosiy holatga nurlanishsiz o‘tishi bilan bog‘liq. Harorat ortishi bilan kristall panjaradagi fononlar soni ko‘payadi va elektron energiyasining issiqlik shaklida yo‘qotilishi kuchayadi. Natijada chiqarilayotgan yorug‘lik intensivligi kamayadi hamda kvant chiqishi pasayadi.Yana bir muhim muammo — konsentratsion so‘nish hodisasidir. Aktivator ionlar miqdori haddan tashqari ortib ketganda ionlar orasidagi masofa qisqaradi va energiya migratsiyasi kuchayadi. Bu energiyaning nuqson markazlarida yo‘qolishiga olib keladi. Natijada luminessensiya samaradorligi pasayadi.Tahlillar shuni ko‘rsatadiki, kristall panjaradagi nuqsonlar ham energiya yo‘qotishning asosiy sabablaridan biridir. Kristall strukturadagi vakansiyalar, deformatsiyalar va begona fazalar elektronlarning nurlanishsiz relaksatsiyasini tezlashtiradi. Shu sababli yuqori kristallanish darajasiga ega materiallar olish muhim hisoblanadi.Nanoo‘lchamli lyuminoforlarda esa sirt effektlari katta rol o‘ynaydi. Nanozarrachalar sirtidagi nuqsonlar energiya yo‘qotish markazlari sifatida xizmat qiladi. Bu muammoni bartaraf etish uchun nanozarrachalar sirtini SiO_2 yoki boshqa himoya qatlamlari bilan passivatsiyalash usullari qo‘llaniladi.Hozirgi tadqiqotlarda past fonon energiyali ftoridli va oksiftoridli matritsalar istiqbolli materiallar sifatida qaralmoqda. Chunki bunday materiallarda nurlanishsiz o‘tish ehtimoli past bo‘ladi. Shuningdek, ikki aktivatorli tizimlar yordamida energiya uzatish jarayonlarini optimallashtirish orqali yuqori samaradorlikka erishish mumkinligi aniqlangan.Ilmiy tahlillar shuni ko‘rsatadiki, lyuminoforlarning termik barqarorligi va kvant samaradorligini oshirish uchun kompleks yondashuv talab etiladi. Ya’ni, matritsa tanlovi, aktivator konsentratsiyasi, sintez texnologiyasi va nanozarracha sirtini modifikatsiyalash birgalikda optimallashtirilishi zarur. Shu asosda yuqori samaradorlikka ega yangi avlod lyuminofor materiallarini yaratish mumkin bo‘ladi.

Xulosa

Nodir yer elementlari bilan legirlangan lyuminoforlar zamonaviy optoelektronika, fotonika va LED texnologiyalarida keng qo‘llanilayotgan muhim funksional materiallar hisoblanadi. Ularning yuqori yorqinlikka ega bo‘lishi, spektral barqarorligi va uzoq xizmat muddati amaliy ahamiyatini oshiradi. Lyuminoforlarning termik barqarorligi va kvant samaradorligi asosan material tarkibi, kristall panjara

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tuzilishi, aktivator ionlar konsentratsiyasi hamda sintez texnologiyasiga bog‘liq ekanligi aniqlandi.Tadqiqotlar natijasida optimal legirlash konsentratsiyasini tanlash, past fonon energiyali matritsalardan foydalanish va nanoo‘lchamli strukturalar hosil qilish orqali lyuminoforlarning yorug‘lik chiqarish samaradorligini sezilarli darajada oshirish mumkinligi ko‘rsatildi. Shuningdek, nanozarrachalar sirtini passivatsiyalash ham energiya yo‘qotishlarini kamaytirishda muhim rol o‘ynashi qayd etildi.Termik so‘nish hodisasi lyuminoforlarning asosiy muammolaridan biri bo‘lib, yuqori haroratlarda luminessensiya intensivligining kamayishiga olib keladi. Ushbu muammoni kamaytirish uchun kristall strukturaning mukammalligini oshirish, optimal sintez usullarini qo‘llash va ko‘p komponentli tizimlardan foydalanish samarali natija berishi aniqlandi.Xulosa qilib aytganda, nodir yer elementlari bilan legirlangan lyuminoforlarning xossalarini chuqur o‘rganish va ularni optimallashtirish energiya tejamkor LED qurilmalar, displey tizimlari va boshqa zamonaviy optik texnologiyalarni rivojlantirishda muhim ilmiy va amaliy ahamiyatga ega.

Foydalanilgan adabiyotlar

1. Axmedov k.s. Luminestsent materiallar fizikasi. — toshkent: o‘qituvchi, 2018.
2. Tursunov o.t. Optik va fotoelektrik materiallar. — toshkent: fan va texnologiya, 2020.
3. Rasulov h.r., karimov sh.m. “nodir yer elementlari bilan legirlangan lyuminoforlarning optik xossalari” // o‘zbekiston fizika jurnali. — 2021. — №3. — b. 45–52.
4. Ismoilov a.a. Qattiq jismlar fizikasi va luminessensiya hodisalari. — samarqand: samdu nashriyoti, 2019.
5. Xolmatov b.e., jo‘rayev n.sh. “led texnologiyalarida qo‘llaniluvchi lyuminofor materiallarning termik barqarorligi” // ilm-fan va innovatsiya. — 2022. — №5. — b. 66–72.
6. Abdullayev r.a. Nanotexnologiya va nanomateriallar asoslari. — toshkent: innovatsion rivojlanish nashriyoti, 2021.
7. Yusupov m.q., ergashev s.u. “nodir yer ionlari bilan legirlangan fosforlarning kvant samaradorligini oshirish usullari” // zamonaviy materialshunoslik muammolari. — 2023. — №2. — b. 28–34.

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ELEKTROKIMYOVIY CO_2 QAYTARISH

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Annotatsiya Elektrokimyoviy CO_2 qaytarish — karbonat angidrid gazini elektr energiyasi yordamida foydali kimyoviy mahsulotlarga aylantirish jarayonidir. Ushbu texnologiya iqlim o‘zgarishi, sanoat chiqindilarini kamaytirish va qayta tiklanuvchi energiyani kimyoviy yoqilg‘i shaklida saqlash muammolarini hal qilishda istiqbolli yo‘nalish hisoblanadi. CO_2 molekulasi termodinamik jihatdan barqaror bo‘lgani uchun uni qaytarish murakkab jarayon sanaladi. Shuning uchun samarali katalizatorlar, mos elektrolitlar, elektrodlardagi sirt jarayonlari va mahsulot selektivligini boshqarish asosiy ilmiy vazifalardandir.

Kalit so‘zlar: CO_2 qaytarish, elektrokimyo, katalizator, karbonat angidrid, yashil kimyo, metanol, uglerod monooksid, formiat, qayta tiklanuvchi energiya.

Kirish Bugungi kunda atmosferada karbonat angidrid miqdorining ortishi global ekologik muammolardan biri hisoblanadi. CO_2 asosan yoqilg‘i yoqish, sement ishlab chiqarish, metallurgiya, transport va boshqa sanoat jarayonlarida hosil bo‘ladi. Bu gaz issiqxona effekti kuchayishiga sabab bo‘lib, iqlim o‘zgarishi, havo haroratining ko‘tarilishi, muzliklarning erishi va tabiiy muvozanat buzilishiga olib keladi.

CO_2 ni kamaytirishning ikki asosiy yo‘li bor: birinchisi, CO_2 chiqindilarini kamaytirish; ikkinchisi, hosil bo‘lgan CO_2 ni foydali mahsulotlarga aylantirish. Elektrokimyoviy CO_2 qaytarish aynan ikkinchi yo‘nalishga kiradi. Bu texnologiyada karbonat angidrid elektr toki yordamida uglerod monooksid, formiat, metanol, metan, etilen va boshqa mahsulotlarga aylantiriladi.

Bu jarayonning eng katta afzalligi shundaki, agar elektr energiyasi quyosh yoki shamol kabi qayta tiklanuvchi manbalardan olinsa, CO_2 dan foydali kimyoviy mahsulot ishlab chiqarish nisbatan ekologik toza jarayonga aylanadi. Demak, elektrokimyoviy CO_2 qaytarish nafaqat chiqindini kamaytirish, balki uni iqtisodiy qiymatga ega mahsulotga aylantirish imkonini beradi.

Jarayonning kimyoviy mohiyati

CO_2 molekulasi chiziqli tuzilishga ega bo‘lib, undagi C=O bog‘lari kuchli. Shu sababli CO_2 kimyoviy jihatdan inert gazlardan biri hisoblanadi. Uni qaytarish uchun elektron va protonlar ishtirokida ketma-ket reaksiyalar yuz beradi. Jarayon elektrod yuzasida kechadi.

Oddiy ko‘rinishda jarayon quyidagicha tasvirlanadi:

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CO_2 + elektronlar + protonlar → qaytarilgan uglerodli mahsulotlar

Masalan:

$CO_2 + 2H^+ + 2e^- \rightarrow CO + H_2O$

$CO_2 + 2H^+ + 2e^- \rightarrow HCOOH$

$CO_2 + 6H^+ + 6e^- \rightarrow CH_3OH + H_2O$

$CO_2 + 8H^+ + 8e^- \rightarrow CH_4 + 2H_2O$

Bu reaksiyalardan ko‘rinadiki, mahsulot turi elektronlar soni, protonlar miqdori, katalizator turi, elektrolit muhiti va elektrod potensialiga bog‘liq bo‘ladi. Eng oddiy mahsulotlar CO va formiat bo‘lsa, metanol, metan va etilen kabi mahsulotlar ko‘proq elektron va proton talab qiladi.

Elektrokimyoviy hujayra tuzilishi

Elektrokimyoviy CO_2 qaytarish odatda maxsus elektrokimyoviy hujayrada amalga oshiriladi. Unda katod, anod, elektrolit va tashqi elektr manbai bo‘ladi. CO_2 qaytarilishi katodda sodir bo‘ladi. Anodda esa ko‘pincha suv oksidlanib, kislorod ajraladi.

Katod — CO_2 qaytarilishining asosiy markazi. Bu yerda katalizator joylashadi. Katalizator CO_2 molekulasini adsorbsiyalaydi, uni faollashtiradi va kerakli mahsulotga aylanishiga yordam beradi. Anodda suvning oksidlanishi sodir bo‘lib, protonlar va elektronlar hosil bo‘ladi.

Elektrolit ionlarning harakatlanishini ta’minlaydi. Elektrolit sifatida suvli eritmalar, ion suyuqliklar yoki qattiq elektrolit membranalar ishlatilishi mumkin. Elektrolitning pH qiymati, ion tarkibi va o‘tkazuvchanligi mahsulot selektivligiga kuchli ta’sir qiladi.

Katalizatorlarning roli

Elektrokimyoviy CO_2 qaytarishda katalizator hal qiluvchi ahamiyatga ega. Chunki CO_2 juda barqaror molekula bo‘lib, oddiy sharoitda uni qaytarish qiyin. Katalizator reaksiya energiya to‘sig‘ini kamaytiradi, mahsulot yo‘nalishini boshqaradi va jarayon samaradorligini oshiradi.

Turli metallar turli mahsulotlar hosil qilishga moyil bo‘ladi. Masalan, oltin va kumush ko‘pincha CO hosil bo‘lishiga yordam beradi. Qalay va vismut formiat hosil qilishda samarali. Mis esa noyob katalizator hisoblanadi, chunki u CO_2 dan ko‘p uglerodli mahsulotlar, xususan etilen va etanol hosil qilishga qodir.

Katalizatorning samaradorligi quyidagi ko‘rsatkichlar bilan baholanadi: mahsulot selektivligi, Faradey samaradorligi, tok zichligi, barqarorlik va energiya samaradorligi. Yaxshi katalizator faqat CO_2 ni qaytarishi emas, balki vodorod ajralish reaksiyasini ham kamaytirishi kerak. Chunki suvli muhitda CO_2 qaytarish bilan bir vaqtda H_2 hosil bo‘lishi mumkin. Bu esa asosiy mahsulot samaradorligini pasaytiradi.

Jadval. Elektrokimyoviy CO_2 qaytarishda katalizatorlar va mahsulotlar

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Katalizator turi	Asosiy mahsulotlar	Afzalligi	Kamchiligi	Qo‘llanish istiqboli
Oltin (Au)	CO	CO hosil qilishda yuqori selektivlik	Juda qimmat	Laboratoriya va maxsus kataliz tizimlari
Kumush (Ag)	CO	Nisbatan barqaror, CO selektivligi yaxshi	Narxi yuqori	CO ishlab chiqarish texnologiyalari
Qalay (Sn)	Formiat, chumoli kislotasi	Arzonroq, formiat uchun samarali	Ba’zan barqarorligi cheklangan	Kimyo sanoati uchun istiqbolli
Vismut (Bi)	Formiat	Zaharli emasroq, selektivligi yaxshi	Faollikni oshirish kerak	Ekologik xavfsiz katalizator sifatida muhim
Mis (Cu)	Metan, etilen, etanol	Ko‘p uglerodli mahsulotlar hosil qiladi	Selektivlikni boshqarish qiyin	Eng istiqbolli katalizatorlardan biri
Rux (Zn)	CO	Arzon, mavjudligi yaxshi	Samaradorlik cheklangan	Arzon kataliz tizimlari
Uglerod materiallari	CO, formiat	Yengil, arzon, modifikatsiya qilish oson	Faolligi dopirlashga bog‘liq	Yashil kataliz uchun istiqbolli
Molekulyar katalizatorlar	CO, formiat, metanol	Tuzilmani aniq boshqarish mumkin	Barqarorlik muammosi bor	Fundamental tadqiqotlar va selektiv kataliz

Mahsulotlar va ularning ahamiyati

Elektrokimyoviy CO_2 qaytarish natijasida turli mahsulotlar olinadi. Ularning har biri sanoat uchun muhim qiymatga ega.

Uglerod monooksid sintez-gaz tarkibiy qismi sifatida ishlatiladi. CO vodorod bilan birgalikda metanol, sintetik yoqilg‘i va boshqa kimyoviy mahsulotlar olishda qo‘llanadi.

Formiat yoki chumoli kislotasi kimyo sanoatida, konservantlar, teri sanoati, yoqilg‘i elementlari va vodorod tashuvchi modda sifatida ishlatilishi mumkin.

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Metanol suyuq yoqilg‘i, erituvchi va kimyoviy xomashyo sifatida muhim. U formaldegid, sirka kislotasi va boshqa mahsulotlar ishlab chiqarishda ishlatiladi.

Metan energiya tashuvchi gaz sifatida qo‘llanadi, lekin CO_2 dan metan olish ko‘proq elektron talab qiladi. Shu sababli energetik samaradorlik masalasi muhim.

Etilen esa polietilen va boshqa polimerlar ishlab chiqarishda asosiy xomashyo hisoblanadi. Mis katalizatorlari yordamida CO_2 dan etilen olish juda istiqbolli, lekin texnologik jihatdan murakkab.

Jarayonning afzalliklari

Elektrokimyoviy CO_2 qaytarishning eng asosiy afzalligi — karbonat angidridni chiqindi emas, xomashyo sifatida ishlatish imkonidir. Bu yondashuv “uglerod aylanishi” konsepsiyasiga mos keladi.

Ikkinchi afzallik — jarayonni qayta tiklanuvchi energiya bilan bog‘lash mumkin. Agar elektroliz uchun elektr energiyasi quyosh yoki shamol stansiyalaridan olinsa, jarayonning umumiy karbon izi kamayadi.

Uchinchi afzallik — mahsulot turini katalizator va sharoit orqali boshqarish mumkin. Masalan, Sn katalizatori formiatga, Ag katalizatori CO ga, Cu katalizatori esa uglevodorodlarga yo‘naltiradi.

To‘rtinchi afzallik — jarayon nisbatan yumshoq sharoitda, ya’ni xona haroratiga yaqin sharoitda olib borilishi mumkin. Bu uni termokimyoviy CO_2 qaytarishga nisbatan qulay qiladi.

Muammolar va cheklovlar

Elektrokimyoviy CO_2 qaytarish hali sanoatda keng qo‘llanilayotgan mukammal texnologiya emas. Uning bir nechta jiddiy muammolari bor.

Birinchi muammo — CO_2 ning past eruvchanligi. Suvli elektrolitlarda CO_2 kam eriydi, bu esa reaksiya tezligini cheklaydi.

Ikkinchi muammo — vodorod ajralish reaksiyasi bilan raqobat. Suvli muhitda protonlar elektron qabul qilib H_2 hosil qilishi mumkin. Bu CO_2 qaytarish samaradorligini pasaytiradi.

Uchinchi muammo — mahsulot selektivligini boshqarish qiyinligi. Ayniqsa mis katalizatorida bir nechta mahsulot bir vaqtda hosil bo‘lishi mumkin. Bu esa tozalash va ajratish xarajatlarini oshiradi.

To‘rtinchi muammo — katalizatorning uzoq muddatli barqarorligi. Katalizator yuzasi reaksiyalar davomida oksidlanishi, zaharlanishi yoki strukturasini o‘zgartirishi mumkin.

Beshinchi muammo — sanoat miqyosiga o‘tkazish. Laboratoriyada yuqori samaradorlik ko‘rsatgan tizimni yirik ishlab chiqarishga moslashtirish har doim ham oson emas.

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Kelajak istiqbollari

Elektrokimyoviy CO_2 qaytarish kelajakda yashil kimyo va uglerod neytral sanoatning muhim qismiga aylanishi mumkin. Buning uchun bir nechta yo‘nalishda tadqiqotlarni kuchaytirish zarur.

Birinchidan, arzon va barqaror katalizatorlar ishlab chiqilishi kerak. Qimmatbaho Au va Ag o‘rniga Cu, Sn, Bi, Fe, Ni asosidagi katalizatorlar yoki uglerodli materiallar istiqbolli hisoblanadi.

Ikkinchidan, mahsulot selektivligini oshirish zarur. Ayniqsa CO_2 dan metanol, etanol va etilen kabi yuqori qiymatli mahsulotlar olish iqtisodiy jihatdan muhim.

Uchinchidan, gaz diffuziyali elektrodlar va membranali elektrolizyorlar rivojlantirilishi kerak. Bu CO_2 ning elektrod yuzasiga yetib borishini yaxshilaydi va tok zichligini oshiradi.

To‘rtinchidan, qayta tiklanuvchi energiya bilan integratsiya qilish muhim. Quyosh yoki shamol energiyasi ortiqcha ishlab chiqarilgan paytda CO_2 ni kimyoviy mahsulotlarga aylantirish energiyani saqlashning yangi yo‘li bo‘lishi mumkin.

Xulosa

Elektrokimyoviy CO_2 qaytarish karbonat angidridni foydali kimyoviy mahsulotlarga aylantirish imkonini beruvchi istiqbolli texnologiyadir. Bu jarayon iqlim o‘zgarishini yumshatish, sanoat chiqindilarini kamaytirish va qayta tiklanuvchi energiyani kimyoviy shaklda saqlash uchun muhim ilmiy-amaliy ahamiyatga ega.

Jarayonning asosiy kuchli tomoni shundaki, CO_2 chiqindi gaz emas, balki uglerodli xomashyo sifatida qaraladi. Uning elektrokimyoviy qaytarilishi orqali CO, formiat, metanol, metan, etilen va boshqa mahsulotlarni olish mumkin. Bu mahsulotlar kimyo sanoati, yoqilg‘i texnologiyalari va polimer ishlab chiqarishda muhim o‘rin tutadi.

Biroq texnologiyani keng joriy etish uchun bir nechta muammo hal qilinishi zarur: katalizator barqarorligini oshirish, mahsulot selektivligini boshqarish, CO_2 ning past eruvchanligi muammosini kamaytirish, vodorod ajralish reaksiyasini cheklash va sanoat miqyosida iqtisodiy samarali elektrolizyorlar yaratish.

Kelajakda arzon metall katalizatorlar, uglerodli nanomateriallar, gaz diffuziyali elektrodlar va qayta tiklanuvchi energiya bilan integratsiyalashgan tizimlar bu sohaning rivojlanishini tezlashtiradi. Eng muhim xulosa shuki, elektrokimyoviy CO_2 qaytarish faqat laboratoriya tadqiqoti emas, balki uglerod neytral iqtisodiyotga o‘tishda real texnologik asos bo‘lishi mumkin.

Foydalanilgan adabiyotlar

1. Umarov B.B. **Fizik kimyo.** Toshkent: O‘zbekiston milliy ensiklopediyasi, 2017.
2. G‘ulomov M.G. **Kimyoviy texnologiya asoslari.** Toshkent: Fan, 2018.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
3. Mirkomilov T.M., Raximov H.R. **Umumiy va noorganik kimyo.** Toshkent: O‘qituvchi, 2016.
4. Karimov B.K. **Zamonaviy materiallar kimyosi.** Toshkent: Innovatsiya, 2022.
5. To‘rayev X.X. **Materialshunoslik asoslari.** Toshkent: Fan va texnologiya, 2021.
6. Vaxobov A.V., Teshaboyev A.T. **Polimerlar kimyosi.** Toshkent: O‘zbekiston, 2018.

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TUPROQ REMEDIATSIYASI

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Annotatsiya Tuproq remediatsiyasi — ifloslangan tuproqni zararli kimyoviy, biologik yoki fizik omillardan tozalash, uning tabiiy unumdorligi va ekologik xavfsizligini tiklash jarayonidir. Sanoat chiqindilari, pestitsidlar, og‘ir metallar, neft mahsulotlari, radioaktiv moddalarning tuproqqa tushishi uning biologik faolligini kamaytiradi va oziq-ovqat xavfsizligiga xavf tug‘diradi. Ushbu maqolada tuproq remediatsiyasining asosiy usullari, jumladan fizik, kimyoviy, biologik va fitoremediatsiya texnologiyalari tahlil qilinadi.

Kalit so‘zlar: tuproq remediatsiyasi, ifloslanish, og‘ir metallar, pestitsidlar, neft mahsulotlari, fitoremediatsiya, bioremediatsiya, ekologik xavfsizlik.

Kirish Tuproq tabiatdagi eng muhim resurslardan biri bo‘lib, qishloq xo‘jaligi, oziq-ovqat yetishtirish, suv aylanishi va biologik xilma-xillikni saqlashda katta ahamiyatga ega. Ammo sanoatlashuv, konchilik, kimyoviy o‘g‘it va pestitsidlardan ortiqcha foydalanish, neft mahsulotlari to‘kilishi va maishiy chiqindilar tuproqning ifloslanishiga sabab bo‘lmoqda.

Tuproq ifloslanganda undagi mikroorganizmlar faoliyati pasayadi, o‘simliklar normal rivojlana olmaydi, zararli moddalar oziq-ovqat zanjiriga kirib boradi. Ayniqsa qo‘rg‘oshin, kadmiy, simob, xrom, mishyak kabi og‘ir metallar tuproqda uzoq vaqt saqlanib qoladi. Pestitsidlar va neft mahsulotlari esa tuproqning fizik-kimyoviy xossalarini o‘zgartiradi.

Shuning uchun tuproq remediatsiyasi ekologik barqarorlikni ta’minlashda muhim yo‘nalish hisoblanadi. Remediatsiya faqat tuproqni “tozalash” emas, balki uning biologik faolligi, unumdorligi va xavfsizligini tiklashdir.

Tuproq ifloslanishining asosiy manbalari

Ifloslantiruvchi manba	**Tuproqqa tushadigan moddalar**	**Xavfi**
Sanoat korxonalari	Og‘ir metallar, kislotalar, ishqorlar	Tuproq zaharlanishi
Konchilik	Metall ionlari, sulfidlar	Tuproq va suv ifloslanishi
Qishloq xo‘jaligi	Pestitsidlar, nitratlar, fosfatlar	Oziq-ovqat xavfsizligiga zarar

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Ifloslantiruvchi manba	**Tuproqqa tushadigan moddalar**	**Xavfi**
Neft-gaz sanoati	Neft mahsulotlari, uglevodorodlar	Mikroorganizmlar faoliyati pasayadi
Maishiy chiqindilar	Plastik, organik chiqindi, toksik moddalar	Uzoq muddatli ifloslanish
Transport	Qo‘rg‘oshin, yoqilg‘i qoldiqlari	Yo‘lbo‘yi tuproqlari ifloslanadi

Remediatsiya usullari

Tuproq remediatsiyasi bir nechta usullar orqali amalga oshiriladi. Ular fizik, kimyoviy, biologik va o‘simliklar yordamidagi usullarga bo‘linadi.

Fizik remediatsiyada ifloslangan tuproq qazib olinadi, yuviladi, saralanadi yoki termik ishlov beriladi. Bu usullar tez natija beradi, lekin qimmat va ko‘p energiya talab qiladi.

Kimyoviy remediatsiyada zararli moddalar kimyoviy reagentlar yordamida neytrallanadi, cho‘ktiriladi yoki kam harakatchan shaklga o‘tkaziladi. Masalan, og‘ir metallarni immobilizatsiya qilish uchun fosfatlar, ohak, biochar yoki zeolit qo‘llanilishi mumkin.

Bioremediatsiya mikroorganizmlar yordamida ifloslantiruvchi moddalarni parchalashga asoslanadi. Neft mahsulotlari, pestitsidlar va organik ifloslantiruvchilar bakteriya va zamburug‘lar yordamida nisbatan xavfsiz moddalarga aylantiriladi.

Fitoremediatsiya esa o‘simliklar yordamida tuproqni tozalash usulidir. Ayrim o‘simliklar tuproqdagi og‘ir metallarni o‘z ildizi orqali yutib, poya va barglarida to‘playdi. Bunday o‘simliklar giperakkumulyatorlar deyiladi.

Remediatsiya usullarining taqqoslanishi

Usul	**Afzalligi**	**Kamchiligi**	**Qo‘llanilishi**
Fizik remediatsiya	Tez natija beradi	Qimmat, tuproq strukturasi buzilishi mumkin	Kuchli ifloslangan hududlar
Kimyoviy remediatsiya	Og‘ir metallarni tez immobilizatsiya qiladi	Reagentlar ikkilamchi ta’sir berishi mumkin	Metall bilan ifloslangan tuproq
Bioremediatsiya	Ekologik xavfsiz, arzonroq	Sekin kechadi	Neft, pestitsid, organik ifloslanish
Fitoremediatsiya	Tabiiy va arzon	Uzoq vaqt talab qiladi	Og‘ir metallar, nitratlar

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Usul	Afzalligi	Kamchiligi	Qo‘llanilishi
Biochar qo‘llash	Tuproq unumdorligini ham oshiradi	Xomashyo sifatiga bog‘liq	Metall va organik ifloslanish
Zeolit qo‘llash	Ion almashinish xususiyati kuchli	Organik moddalar uchun cheklangan	Ammoniy va metall ionlari

Fitoremediatsiya

Fitoremediatsiya ekologik xavfsiz va iqtisodiy jihatdan foydali usullardan biridir. Bunda kungaboqar, xantal, terak, beda, qamish, tol kabi o‘simliklar tuproqdagi zararli moddalarni kamaytirishda ishlatilishi mumkin. Fitoremediatsiyaning bir necha turi mavjud: fitoekstraksiya, fitostabilizatsiya, fitodegradatsiya va rizofiltratsiya.

Fitoekstraksiyada o‘simliklar tuproqdagi metall ionlarini yutadi va o‘z to‘qimalarida to‘playdi. Keyin bu o‘simliklar yig‘ib olinadi va xavfsiz utilizatsiya qilinadi. Fitostabilizatsiyada esa o‘simliklar ifloslantiruvchilarni tuproq ichida harakatsiz holatda ushlab turadi. Bu usul zararli moddalarning yer osti suvlariga o‘tishini kamaytiradi.

Bioremediatsiya

Bioremediatsiya mikroorganizmlar yordamida zararli organik moddalarni parchalaydi. Masalan, neft mahsulotlari bilan ifloslangan tuproqlarda Pseudomonas, Bacillus va boshqa bakteriyalar uglevodorodlarni parchalashi mumkin. Bu jarayonda mikroorganizmlar uglevodorodlarni energiya manbai sifatida ishlatadi va ularni karbonat angidrid, suv hamda biomassaga aylantiradi.

Bioremediatsiya samaradorligi tuproq namligi, harorat, pH, kislorod miqdori va oziq moddalar mavjudligiga bog‘liq. Ba’zan jarayonni tezlashtirish uchun tuproqqa azot, fosfor yoki maxsus mikroorganizmlar qo‘shiladi.

Biochar va tabiiy sorbentlar

So‘nggi yillarda biochar tuproq remediatsiyasida muhim material sifatida o‘rganilmoqda. Biochar biomassa qoldiqlarini kislorodsiz sharoitda qizdirish orqali olinadi. U g‘ovakli tuzilishga ega bo‘lib, og‘ir metallar va organik ifloslantiruvchilarni bog‘laydi. Bundan tashqari, biochar tuproqning suv ushlab turish qobiliyatini va unumdorligini oshirishi mumkin.

Zeolit, bentonit va boshqa tabiiy minerallar ham tuproqdagi metall ionlari va ammoniy birikmalarini yutishda samarali hisoblanadi. Ular arzon, tabiiy va nisbatan xavfsiz materiallardir.

Xulosa

Tuproq remediatsiyasi ekologik xavfsizlik, qishloq xo‘jaligi barqarorligi va oziq-ovqat xavfsizligi uchun muhim jarayondir. Tuproq ifloslanishi og‘ir metallar, pestitsidlar, neft

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mahsulotlari va sanoat chiqindilari ta’sirida yuzaga keladi. Bunday ifloslanish uzoq muddat saqlanib, o‘simliklar, hayvonlar va inson salomatligiga salbiy ta’sir ko‘rsatadi. Tuproqni tozalashda fizik, kimyoviy, biologik va fitoremediatsiya usullari qo‘llaniladi. Fizik va kimyoviy usullar tez natija beradi, ammo qimmat va ba’zan ekologik xavfli bo‘lishi mumkin. Bioremediatsiya va fitoremediatsiya esa sekinroq kechadi, lekin tabiiy, arzon va ekologik xavfsizroq hisoblanadi.

Eng istiqbolli yondashuv — kompleks remediatsiyadir. Ya’ni biochar, zeolit, mikroorganizmlar va o‘simliklarni birgalikda qo‘llash orqali tuproqdagi ifloslantiruvchilarni kamaytirish, ularning harakatchanligini cheklash va tuproq unumdorligini tiklash mumkin. Shu sababli tuproq remediatsiyasi kelajakda ekologik kimyo, biotexnologiya va agrotexnologiyaning eng muhim yo‘nalishlaridan biri bo‘lib qoladi.

Foydalanilgan adabiyotlar

1. Umarov B.B. **Fizik kimyo.** Toshkent: O‘zbekiston milliy ensiklopediyasi, 2017.
2. G‘ulomov M.G. **Kimyoviy texnologiya asoslari.** Toshkent: Fan, 2018.
3. To‘rayev X.X. **Materialshunoslik asoslari.** Toshkent: Fan va texnologiya, 2021.
4. Karimov B.K. **Zamonaviy materiallar kimyosi.** Toshkent: Innovatsiya, 2022.
5. Mirkomilov T.M., Raximov H.R. **Umumiy va noorganik kimyo.** Toshkent: O‘qituvchi, 2016.
6. Xolmurodov N.A. **Yuqori molekulyar birikmalar kimyosi.** Toshkent: Fan, 2019.

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SO‘LAK BEZLARI: POSTNATAL TARAQQIYOT VA TUG‘MA ANOMALIYALARNING MORFOFUNKSIONAL TAHLILI

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Annotatsiya. Ushbu maqolada so‘lak bezlarining tug‘ilgandan keyingi morfofunksional yetilishi, sekretor apparatning yoshga bog‘liq o‘zgarishlari hamda tug‘ma anomaliyalarning klinik ahamiyati tahlil qilindi. Mavzu bolalar anatomiyasi, stomatologiya, pediatriya va maxillofasial jarrohlik kesishmasida joylashgani sababli, unda faqat bezning shakliy tuzilishini emas, balki og‘iz bo‘shlig‘i gigiyenasi, emish-yutish refleksi, tishlarning minerallashuvi, mahalliy immunitet va ovqat hazm qilishning boshlang‘ich bosqichi bilan bog‘liq funksional belgilar ham ko‘rib chiqildi. Tahlil shuni ko‘rsatadiki, yangi tug‘ilgan chaqaloqlarda so‘lak bezlari anatomik jihatdan mavjud bo‘lsa-da, acinuslar, chiqaruv yo‘llari va vegetativ boshqaruv tizimining to‘liq yetilishi hayotning keyingi oy va yillarida bosqichma-bosqich davom etadi. Tug‘ma anomaliyalar kam uchraydi, biroq ular kserostomiya, takrorlanuvchi yallig‘lanish, ovqatlanish qiyinlashuvi, og‘iz shilliq qavati shikastlanishi va stomatologik kasalliklar xavfini oshiradi.

Kalit so‘zlar: so‘lak bezlari, postnatal taraqqiyot, acinus, chiqaruv yo‘llari, tug‘ma anomaliya, aplaziya, gipoplaziya, kserostomiya, bolalar stomatologiyasi.

Аннотация. В статье рассмотрены постнатальное морфофункциональное созревание слюнных желез и клиническое значение врожденных аномалий их паренхимы и выводных протоков. Особое внимание уделено возрастной динамике секреторного аппарата, роли слюны в защите слизистой оболочки полости рта, минерализации зубов, пищеварении и местном иммунитете. Подчеркнуто, что врожденные дефекты слюнных желез требуют ранней диагностики и междисциплинарного наблюдения.

Ключевые слова: слюнные железы, постнатальное развитие, врожденные аномалии, аплазия, гипоплазия, ксеростомия, детская стоматология.

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Abstract. The article analyzes the postnatal morphofunctional maturation of salivary glands and the clinical significance of congenital anomalies affecting glandular parenchyma and ducts. The review emphasizes the age-related maturation of acini, ducts, autonomic regulation and saliva composition, as well as diagnostic approaches for gland aplasia, hypoplasia, duct atresia, ectopic tissue and congenital cystic lesions.

Keywords: salivary glands, postnatal development, congenital anomalies, aplasia, hypoplasia, xerostomia, pediatric dentistry.

KIRISH

So‘lak bezlari hazm tizimining og‘iz bo‘shlig‘i bilan bevosita bog‘langan ekzokrin tuzilmalari bo‘lib, ular parotid, jag‘ osti, til osti va ko‘plab kichik shilliq bezlardan iborat. Ularning asosiy vazifasi faqat ovqatni namlash yoki mexanik yutishni yengillashtirish bilan cheklanmaydi. So‘lak tarkibidagi suv, elektrolitlar, mutsinlar, fermentlar, immunoglobulinlar va antimikrob omillar og‘iz bo‘shlig‘ining doimiy biologik muhitini saqlaydi. Shuning uchun so‘lak bezlarining postnatal rivojlanishini o‘rganish bolalik davri stomatologiyasi, pediatriya, neonatologiya va klinik anatomiya uchun amaliy ahamiyatga ega.

Yangi tug‘ilgan chaqaloqda so‘lak bezlari topografik jihatdan shakllangan bo‘ladi, ammo ularning sekretor salohiyati, acinus hujayralarining differensiallashuvi, chiqaruv yo‘llari epiteliysining funksional faolligi va vegetativ innervatsiyasi hali yetuk emas. Hayotning dastlabki oylarida emish refleksi, og‘iz shilliq qavatining moslashuvi, sut bilan oziqlanish va keyinchalik qo‘shimcha ovqatga o‘tish so‘lak sekretsiyasining hajmi hamda tarkibini o‘zgartiradi. Shu jarayonda bolada fiziologik so‘lak oqishi, tish chiqishi oldidan bezlar faolligining oshishi, og‘iz bo‘shlig‘i mikrobiotasining shakllanishi kabi holatlar kuzatiladi. Bu belgilar patologiya deb baholanmasligi kerak, lekin ularni tug‘ma yoki erta rivojlanadigan bez nuqsonlaridan farqlash klinik jihatdan muhimdir.

Tug‘ma anomaliyalar tarkibiga bezning to‘liq bo‘lmasligi, yetarli rivojlanmasligi, qo‘shimcha yoki ektopik bez to‘qimasi, chiqaruv yo‘lining atreziyasi, stenozi, duplikatsiyasi, tug‘ma kista va fistulalar kiradi. Bunday nuqsonlar kam uchrasa ham, bolaning ovqatlanishi, og‘iz shilliq qavati himoyasi, tish qattiq to‘qimalari holati va yuqori nafas yo‘llari bilan bog‘liq funksional muammolarni kuchaytirishi mumkin. Ayniqsa kserostomiya, takroriy sialadenit, mukotsela, ranula va yuz sohasidagi asimmetriya erta aniqlanmasa, keyingi davrda stomatologik va jarrohlik aralashuvlarga ehtiyoj ortadi.

METODOLOGIYA

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Maqola tahliliy adabiyotlar sharhi va morfofunksional taqqoslash usuliga asoslandi. Tahlil jarayonida odam anatomiyasi, bolalar anatomiyasi, klinik anatomiya, stomatologiya va maxillofasial jarrohlikka oid o‘zbek tilidagi darsliklar, mahalliy ilmiy maqolalar hamda so‘lak bezlari rivojlanish anomaliyalarini yoritgan xalqaro ilmiy sharhlar o‘rganildi. Tanlash mezoni sifatida manbalarning mavzuga bevosita aloqadorligi, bolalik davri anatomiyasi yoki so‘lak bezlari patologiyasiga oid ma’lumot berishi, klinik amaliyotda qo‘llanishi mumkin bo‘lgan tushunchalarni bayon qilishi hisobga olindi.

Tahlilda uchta asosiy yo‘nalish ajratildi. Birinchi yo‘nalish postnatal morfogenez bo‘lib, unda bez parenximasi, acinuslar, chiqaruv yo‘llari, mioepitelial hujayralar va vegetativ boshqaruvning yoshga bog‘liq yetilishi ko‘rib chiqildi. Ikkinchi yo‘nalish tug‘ma anomaliyalar tasnifi bo‘lib, bez parenximasi va chiqaruv yo‘llari nuqsonlari alohida baholandi. Uchinchi yo‘nalish klinik talqin bo‘lib, unda belgilarning qaysi holatda fiziologik moslashuv, qaysi holatda patologik jarayon ekanini farqlashga e’tibor qaratildi.

NATIJALAR

Tahlil natijasida so‘lak bezlarining postnatal taraqqiyoti uzluksiz, ammo bir xil tezlikda kechmaydigan jarayon ekani aniqlandi. Neonatal davrda bezlar nisbatan kichik, bo‘lakchalararo biriktiruvchi to‘qima ko‘proq, acinuslar esa funksional jihatdan hali to‘liq differensiallashmagan bo‘ladi. Sekretsiya asosan og‘iz shilliq qavatini nam saqlash va emish-yutish harakatlarini qo‘llab-quvvatlashga xizmat qiladi. Bu davrda so‘lakning fermentativ kuchi kattalarnikiga nisbatan pastroq bo‘lishi mumkin, chunki chaqaloq oziqlanishida asosiy substrat sut hisoblanadi.

Hayotning birinchi yilida bezlar hajmi ortadi, chiqaruv yo‘llari tarmoqlanishi aniqroq ko‘rinadi, sekretor hujayralarda granulyar apparat rivojlanadi. Qo‘shimcha ovqat berilishi, og‘iz bo‘shlig‘i mikrobiotasining shakllanishi va tish chiqishi bezlarni funksional jihatdan faolroq holatga olib keladi. Aynan shu davrda ota-onalar ko‘pincha ko‘p so‘lak oqishini kasallik belgisi deb qabul qiladi. Aslida bu holat ko‘pincha fiziologik moslashuv bo‘lib, bola lab va til mushaklarini to‘liq boshqara olmagani hamda yutish refleksi hali mukammal muvofiqlashmagani bilan tushuntiriladi.

Maktabgacha yoshda so‘lak bezlarining nerv-gumoral boshqaruvi barqarorlashadi, chaynash yuklamasi oshadi va so‘lak tarkibi tish qattiq to‘qimalarini himoya qilishda katta ahamiyat kasb etadi. Bu bosqichda so‘lakning bufer xossasi, kalsiy-fosfat almashinuvida ishtiroki, antimikrob komponentlari va shilliq qavatni mexanik himoyalash qobiliyati kuchayadi. O‘smirlik davriga kelib gormonal o‘zgarishlar so‘lak sekretsiyasi miqdori va tarkibiga bilvosita ta’sir qilishi mumkin, biroq asosiy morfologik tuzilma odatda yetuk holatga yaqinlashadi.

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1-jadval. So‘lak bezlarining postnatal yetilish bosqichlari va klinik talqini

Yosh davri	Morfologik xususiyat	Funksional belgi	Klinik talqin
Neonatal davr	Acinuslar va yo‘llar mavjud, ammo sekretor differensiallashuv to‘liq emas	So‘lak kamroq, shilliq qavatni namlash ustun	Quruqlik, emish qiyinligi va og‘iz yoriqlariga e’tibor beriladi
1 yoshgacha	Bez hajmi va yo‘l tarmoqlanishi ortadi	Tish chiqishi va qo‘shimcha ovqat fonida sekretsiya faollashadi	Ko‘p so‘lak oqishi ko‘pincha fiziologik, lekin shish va og‘riq patologik belgidir
1-3 yosh	Parenxima va mioepitelial elementlar faol yetiladi	Chaynash va yutish koordinatsiyasi yaxshilanadi	Kserostomiya, kariesga moyillik va takroriy infeksiya tekshiriladi
Maktabgacha yosh	Bez bo‘lakchalari va yo‘llari ancha barqarorlashadi	Bufer, antimikrob va mineralizatsion himoya kuchayadi	Stomatologik profilaktika bilan bog‘liq baholash muhim
O‘smirlik	Morfologik yetuklik kattalar ko‘rsatkichiga yaqinlashadi	Gormonal fon va vegetativ boshqaruv ta’siri seziladi	Sekretsiya buzilishi tizimli kasalliklar bilan bog‘lanishi mumkin

Tug‘ma anomaliyalar morfologik asosiga ko‘ra parenximatoz, yo‘lga oid, joylashuvga oid va kistoz guruhlarga ajratilishi mumkin. Parenximatoz nuqsonlarda bez butunlay rivojlanmasligi yoki yetarli shakllanmasligi kuzatiladi. Ageniziya va aplaziya bir yoki bir nechta katta so‘lak bezini qamrab olsa, bola og‘iz quruqligi, yutishdagi noqulaylik, tish emalining tez zararlanishi va takroriy shilliq qavat infeksiyalaridan shikoyat qilishi mumkin. Gipoplaziya esa nisbatan yengilroq bo‘lib, bez mavjud, ammo uning hajmi va sekretor salohiyati past bo‘ladi.

Joylashuvga oid nuqsonlarga ektopik yoki qo‘shimcha so‘lak bezi to‘qimasi kiradi. Bunday holatda bez elementlari odatdagi anatomik sohada emas, masalan, quloq oldi, bo‘yin, halqum yoki og‘iz bo‘shlig‘ining ayrim shilliq qavat hududlarida uchrashi mumkin. Ko‘pincha ektopik to‘qima klinik jihatdan sezilmaydi, ammo u

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yallig‘lanish, kista yoki o‘smaga o‘xshash shish ko‘rinishida namoyon bo‘lsa, differensial tashxisda ahamiyat kasb etadi.

Chiqaruv yo‘llari anomaliyalari ichida atreziya, stenoz, duplikatsiya va tug‘ma fistulalar muhim o‘rin tutadi. Yo‘l atreziyasi sekretsiyaning og‘iz bo‘shlig‘iga erkin chiqishini buzadi va bez ichida suyuqlik to‘planishiga, og‘riqli shishga yoki kistoz kengayishga olib keladi. Stenozda belgilar ba’zan ovqatlanish paytida kuchayadi, chunki reflektor so‘lak ajralishi ortadi, ammo yo‘l torligi sababli sekret chiqishi qiyinlashadi. Duplikatsiya yoki noto‘g‘ri ochilishlar esa klinik tekshiruvda aniqlanadigan anatomik variant sifatida namoyon bo‘lishi mumkin.

Kistoz anomaliyalar ichida ranula, mukotsela va tug‘ma sialosele alohida e’tiborga loyiq. Ranula ko‘pincha til osti sohasida shaffof-ko‘kimtir, yumshoq shish sifatida ko‘rinadi va kattalashganda til harakati, nutq, emish yoki yutishga xalaqit beradi. Mukotsela kichik so‘lak bezlari chiqaruv yo‘lining shikastlanishi yoki tug‘ma torligi fonida yuzaga kelishi mumkin. Bunday tuzilmalarni limfangioma, gemangioma, dermoid kista va yallig‘lanish infiltratlaridan farqlash zarur.

Klinik tahlil shuni ko‘rsatadiki, so‘lak bezlarining tug‘ma nuqsonlarida birinchi belgi ko‘pincha bevosita bezning ko‘rinadigan yo‘qligi emas, balki uning funksiyasi yetishmovchiligi bo‘ladi. Bola quruq ovqatni yutishda qiynalishi, ko‘p suv ichishni xohlashi, og‘izdan noxush hid kelishi, lab burchaklarida yorilish, til yuzasida quruqlik, tish kariyesining tez rivojlanishi yoki takroriy shishlardan aziyat chekishi mumkin. Shu sababli pediatr, stomatolog va anatomik-klinik mutaxassislar uchun og‘iz bo‘shlig‘ini baholash faqat tishlar bilan cheklanmasligi kerak.

MUHOKAMA

So‘lak bezlarining postnatal rivojlanishini noto‘g‘ri talqin qilish ikki xil xatoga olib keladi. Birinchi xato fiziologik yosh belgilarini patologiya deb baholashdir. Masalan, bir yoshgacha bo‘lgan bolada ko‘p so‘lak oqishi ko‘pincha yutish koordinatsiyasining hali yetuk emasligi, tish chiqishi va og‘iz mushaklari nazoratining bosqichma-bosqich shakllanishi bilan bog‘liq. Bunday holatda ortiqcha dori vositalari yoki keraksiz tekshiruvlar tavsiya qilish asosli emas. Ikkinchi xato esa, aksincha, patologik belgilarni “bola hali kichkina” degan umumiy izoh bilan e’tiborsiz qoldirishdir. Agar so‘lak oqishi og‘riqli shish, isitma, yiringli ajralma, ovqatlanishdagi jiddiy qiyinchilik yoki og‘iz quruqligi bilan birga bo‘lsa, bu chuqurroq tekshiruvni talab qiladi.

Tug‘ma anomaliyalarni erta aniqlashda klinik ko‘rik birinchi bosqich bo‘lib qoladi. Shilliq qavat namligi, so‘lak yo‘llari og‘izchalari, parotid va jag‘ osti sohalarining simmetriyasi, ovqatlanish vaqtida shishning ortishi, til osti sohasidagi kistoz o‘zgarishlar va tish emalidagi erta zararlanishlar e’tibordan chetda qolmasligi

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kerak. Ultratovush tekshiruvi bolalarda xavfsiz va qulay usul sifatida bezning mavjudligi, hajmi, ichki tuzilishi, kista yoki yo‘l kengayishi haqida dastlabki ma’lumot beradi. Murakkab holatlarda magnit-rezonans tomografiya, sialografiya yoki sialendoskopiya kabi usullar qo‘llanishi mumkin.

Morfologik jihatdan so‘lak bezlarining rivojlanishi epiteliy va mezenxima o‘rtasidagi o‘zaro ta’sirga, shoxlanish morfogeneziga, sekretor hujayralar differensiallashuviga va nerv-tomir elementlarining yetilishiga bog‘liq. Shu sababli tug‘ma nuqsonlar alohida organ muammosi emas, balki umumiy embriogenez buzilishining bir ko‘rinishi bo‘lishi mumkin. Ayrim bolalarda so‘lak bezlari aplaziyasi ko‘z yoshi bezlari aplaziyasi, og‘iz-yuz sohasi nuqsonlari yoki boshqa ektodermal rivojlanish buzilishlari bilan birga uchrashi mumkin. Bunday vaziyatda faqat stomatologik yordam yetarli bo‘lmaydi; genetik maslahat, oftalmologik tekshiruv va pediatrik kuzatuv ham zarur bo‘ladi.

Amaliy nuqtai nazardan, so‘lak bezlari yetishmovchiligi aniqlangan bolalarda profilaktika markaziy o‘rinni egallaydi. Og‘iz gigiyenasini yoshga mos o‘rgatish, tish emalini mustahkamlash, kariyes xavfini nazorat qilish, shilliq qavatni shikastlovchi omillarni kamaytirish va infeksiya belgilari paydo bo‘lganda o‘z vaqtida davolash tavsiya etiladi. Bez yo‘llari atreziyasi, yirik ranula yoki takroriy yallig‘lanish bilan kechuvchi anatomik nuqsonlarda jarrohlik yondashuv masalasi individual hal qilinadi. Eng muhim talab - har bir shishni oddiy yallig‘lanish deb qabul qilmaslik va har bir quruqlik shikoyatini faqat suyuqlik yetishmasligi bilan izohlamaslikdir.

O‘zbekistonda tibbiyot oliy ta’limi jarayonida so‘lak bezlari mavzusi ko‘pincha splanxnologiya yoki og‘iz bo‘shlig‘i anatomiyasi tarkibida qisqa yoritiladi. Biroq pediatriya va stomatologiya amaliyotida bu tuzilmalarning postnatal rivojlanishi alohida klinik qiymatga ega. Mustaqil ta’lim mavzusi sifatida uni chuqurlashtirish talabalarda anatomik tuzilma, yosh fiziologiyasi va tug‘ma patologiyani bog‘lab fikrlash ko‘nikmasini rivojlantiradi. Aynan shunday integrativ yondashuv kelajakdagi shifokor uchun kerak: u organ nomini yodlabgina qolmay, uning rivojlanishdagi nosozligi qanday klinik oqibatga olib kelishini tushunishi lozim.

XULOSA

So‘lak bezlari tug‘ilgandan keyin ham faol morfofunksional yetilishda davom etadigan ekzokrin organlar bo‘lib, ularning sekretsiyasi og‘iz bo‘shlig‘i himoyasi, tishlarning minerallashuvi, emish-yutish va ovqat hazm qilishning boshlang‘ich bosqichi uchun zarurdir.Neonatal va erta bolalik davrida ko‘p so‘lak oqishi har doim patologiya emas; u yutish refleksi, tish chiqishi va sekretor apparatning yoshga doir moslashuvi bilan bog‘liq bo‘lishi mumkin. Biroq og‘riq, shish, yiringli ajralma, kserostomiya yoki ovqatlanish qiyinligi mavjud bo‘lsa, patologik jarayon ehtimoli

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yuqori baholanadi.Tug‘ma anomaliyalar aplaziya, gipoplaziya, ektopik bez to‘qimasi, chiqaruv yo‘li atreziyasi yoki stenozi, duplikatsiya, fistula va kistoz o‘zgarishlar ko‘rinishida namoyon bo‘ladi. Ular kam uchrasa-da, erta stomatologik kasalliklar, takroriy sialadenit va funksional yetishmovchilikka sabab bo‘lishi mumkin.Erta diagnostika uchun klinik ko‘rik, ultratovush tekshiruvi va zarur hollarda MRT yoki maxsus sialografik usullar bir-birini to‘ldiradi. Davolash taktikasi nuqson turi, funksional buzilish darajasi va bolaning umumiy holatiga qarab tanlanadi.

FOYDALANILGAN ADABIYOTLAR

1. Ahmedov A.G‘., Rasulov X. Odam anatomiyasi. Bolalar anatomiyasi asoslari bilan. Toshkent: Iqtisod-Moliya, 2016.

2. Sagatov T.A., Mirsharapov O‘.M. Odam anatomiyasi. Toshkent: Tafakkur bo‘stoni, 2011.

3. Ahmedov A.G‘., Ziyamutdinova G.X. Anatomiya, fiziologiya va patologiya. Toshkent: Fan va texnologiya, 2016.

4. Teshaev Sh.J., Nurov U.I., Hojiev D.Ya., To‘xsanova N.E. Bosh va bo‘yin sohasi klinik anatomiyasi, operativ jarrohligi. Buxoro, 2014.

5. Jumaev L.R. So‘lak bezlarining yallig‘lanish kasalliklari diagnostikasi va davolashini takomillashtirish. Tibbiyot fanlari nomzodi dissertatsiyasi avtoreferati. Toshkent, 2012.

6. Jumaev L.R., Azimov M.I. So‘lak bezlarining yallig‘lanish kasalliklarida tizimli ferment terapiyasining qon va tupurikning lipolitik va gidrolitik faolligiga ta’siri. Stomatologiya. Toshkent, 2011, №3-4, 34-37-betlar.

7. Jumaev L.R., Rahimov Z.K. So‘lak bezlarining yallig‘lanish kasalliklarida polimorfonyadroli neytrofillar lizosomal fermentlari faolligi. Buxoro davlat tibbiyot instituti ilmiy maqolalar to‘plami. Buxoro, 2011, 72-73-betlar.

8. Jumaev L.R., Inoyatov A.Sh., Azimov M.I. So‘lak bezlarining reaktiv-distrofik kasalliklari bilan og‘rigan bemorlarda og‘iz suyuqligidagi glikoproteinlar tarkibining xususiyatlari. Tibbiyotda yangi kun. Buxoro, 2020, №3, 41-43-betlar.

9. Sattorov Sh.Sh., Xojibekova Yu.M., Akramova N.A. So‘lak bezlarining bo‘shliqni egallagan shakllanishlari: rentgenologik tekshirish taktikasi. Stomatologiya. Toshkent, 2020, №2, 103-105-betlar.

10. Hamraqulov Sh.X. Itlarga oziq-ovqat stimulyatorlari berilganda tupurikning fermentativ xususiyatlarining ovqatdan keyin o‘zgarishi. O‘zbek biologiya jurnali. Toshkent: Fan, 2019, №6, 15-18-betlar.

11. Musayev Sh.Sh. So‘lak bezlarining yallig‘lanish kasalliklari klinikasi va differensial diagnostikasi. Elektron nashr, 2023.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
12. Togni L., Mascitti M., Vignini A., et al. Developmental Anomalies of Salivary Glands. Journal of Clinical Medicine, 2019.

13. Krishnamurthy S., Vasudeva S.B., Vijayasarathy S. Salivary gland disorders: A comprehensive review. World Journal of Stomatology, 2015.

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SHE'RIY SAN'ATLARNING JANRLARI VA ULARNING O‘ZIGA XOSLIGI

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Annotatsiya: Mazkur maqolada she’riy san’atlarning janrlari va ularning o‘ziga xos xususiyatlari o‘rganiladi. She’riyat janrlari qadimiy an’analar va adabiy yo‘nalishlar asosida rivojlanib kelgan bo‘lib, har bir janr o‘zining uslubiy, mavzuiy va badiiy xususiyatlari bilan ajralib turadi. Maqolada g‘azal, ruboiy, qasida, masnaviy, tuyuq kabi mumtoz janrlar hamda zamonaviy she’riyatga xos lirik, epik va dramatik janrlar tahlil qilinadi. Har bir janrning shakliy va mazmuniy jihatlari, ularning she’riyat taraqqiyotidagi o‘rni, milliy va xalqaro miqyosdagi ahamiyati yoritib beriladi. Ushbu maqola adabiyotshunoslikka qiziquvchilar, talabalar hamda she’riyatni chuqur o‘rganishni istagan keng kitobxonlar auditoriyasiga mo‘ljallangan.

Kalit so‘zlar: janrlar, mumtoz she’riyat, zamonaviy she’riyat, g‘azal, ruboiy, masnaviy, qasida, lirik she’riyat, erkin she’r, vizual she’riyat, o‘zbek adabiyoti, xalqaro she’riyat, adabiyotshunoslik

Abstract: This article studies the genres of poetic art and their specific features. Poetry genres have developed on the basis of ancient traditions and literary trends, and each genre is distinguished by its own stylistic, thematic and artistic features. The article analyzes classical genres such as ghazal, rubai, qasida, masnavi, tuyuk, as well as lyrical, epic and dramatic genres characteristic of modern poetry. The formal and substantive aspects of each genre, their role in the development of poetry, and their national and international significance are highlighted. This article is intended for those interested in literary studies, students and a wide audience of readers who want to study poetry in depth.

Keywords: genres, classical poetry, modern poetry, ghazal, rubai, masnavi, qasida, lyric poetry, free verse, visual poetry, Uzbek literature, international poetry, literary studies

Аннотация: В статье рассматриваются жанры поэтического искусства и их специфические особенности. Жанры поэзии развивались на основе древних

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традиций и литературных направлений, и каждый жанр отличается своими стилистическими, тематическими и художественными особенностями. В статье анализируются классические жанры, такие как газель, рубаи, касыда, маснави, туюк, а также лирические, эпические и драматические жанры, характерные для современной поэзии. Освещены формальные и содержательные стороны каждого жанра, их роль в развитии поэзии, их национальное и международное значение. Статья рассчитана на интересующихся литературоведением, студентов и широкую аудиторию читателей, желающих углубленно изучать поэзию.

Ключевые слова: жанры, классическая поэзия, современная поэзия, газель, рубаи, маснави, касыда, лирическая поэзия, свободный стих, визуальная поэзия, узбекская литература, международная поэзия, литературоведение

KIRISH

Bugungi kunda she’riyat inson ma’naviy hayotining ajralmas qismi sifatida o‘z ahamiyatini yo‘qotmagan. Adabiy janrlar orasida she’riyat turli shakllari va uslublari bilan o‘quvchi qalbini zabt etib, jamiyatning madaniy hayotiga muhim hissa qo‘shib kelmoqda. She’riyat janrlari – bu faqatgina so‘z san’ati emas, balki xalqlarning tarixi, qadriyatlari va dunyoqarashini aks ettiruvchi badiiy yodgorliklardir.

Hozirgi davrda mumtoz g‘azal, ruboiy, masnaviy kabi an’anaviy janrlar zamonaviy she’riyatda o‘z aksini topib, yangi talqinlarda rivojlanmoqda. Shu bilan birga, lirik, epik va dramatik janrlar zamonaviy ijodkorlar tomonidan yangicha mazmun va shaklda boyitilmoqda. Mazkur maqolada she’riyatning turli janrlari, ularning o‘ziga xos xususiyatlari, badiiy estetik imkoniyatlari va zamonaviy she’riyatdagi o‘rni haqida so‘z yuritiladi. Janrlarning tarixiy ildizlari va bugungi yangilanishlari o‘rtasidagi uzviy bog‘liqlik tahlil qilinadi,

She’riyat janrlarini o‘rganish nafaqat adabiyotshunoslik sohasida, balki jamiyatning ma’naviy-ma’rifiy rivojlanishida ham muhim ahamiyatga ega. Chunki har bir janr o‘zining badiiy va mazmuniy jihatlari orqali inson qalbini tarbiyalaydi, uning estetik didini shakllantiradi va hayotga bo‘lgan qarashlarini chuqurlashtiradi.

Bugungi globallashuv jarayonida milliy adabiyotlar o‘z janrlarining o‘ziga xosligini saqlab qolish bilan birga, boshqa xalqlar adabiyoti bilan o‘zaro ta’sirda rivojlanmoqda. Shu nuqtai nazardan, maqola doirasida she’riyat janrlarining milliy va xalqaro o‘zaro ta’sir jarayonlari, ularning estetik o‘zgarishlari va janrlararo o‘zaro boyitish imkoniyatlari ko‘rib chiqiladi

Shuningdek, maqolada she’riyat janrlarining zamonaviy tahliliy usullari va ularni o‘rganishda internet texnologiyalari, adabiy bazalar va raqamli vositalarning tutgan o‘rni ham e’tiborga olinadi. Shu orqali she’riy san’atni o‘rganishning yangi usullari va

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istiqbollari yoritiladi. Maqola, umuman olganda, she'riyatning nazariy va amaliy jihatlarini o'rganuvchi adabiyotshunoslar, ijodkorlar va o'quvchilar uchun muhim ilmiy manba bo'lib xizmat qiladi.

ASOSIY QISM

Bugungi madaniyatimiz rivojlangan vaqtda she'riyat inson qalbi va ongini boyitishda muhim o'rin egallaydi. She'riy san'atning turli janrlari har bir davr va makonda o'ziga xos shaklda rivojlanib, bugungi kunda milliy va jahon madaniyati xazinasiga katta hissa qo'shib kelmoqda. Har bir janr o'zining badiiy imkoniyatlari va estetik xususiyatlari bilan adabiyotga yangilik olib kirgan.

Mumtoz she'riyat janrlari orasida g'azal eng ko'zga ko'ringanlardan biridir. G'azal, asosan, sevgi, sadoqat va ayriliq mavzularini ifodalovchi janr bo'lib, undagi har bir misra ko'ngilga yaqin she'riy tuyg'ular bilan yo'g'rilgan. Shu bilan birga, ruboiy qisqa hajmli bo'lsa-da, inson hayoti, tabiat va falsafiy fikrlarni yuksak badiiy mahorat bilan ifodalaydi. Masnaviy esa epik janr sifatida keng hajmli voqealarni bayon qilishga imkon beradi va asosan, qahramonlik, tarixiy voqealar yoki ma'rifiy mazmun bilan boyitilgan.

Zamonaviy she'riyatda esa an'anaviy janrlar yangicha talqinlar va shakllarda davom etmoqda. Lirik janrlar insonning ichki kechinmalarini, sevgi va tabiat tuyg'ularini ifodalaydi, epik janrlar esa keng qamrovli voqealar va ijtimoiy hayotni yoritadi. Dramatik she'riyat esa dialog shakli orqali voqelikni jonlantirishda davom etmoqda.

Bugungi globallashuv jarayonida turli madaniyat va xalqlar o'rtasidagi adabiy muloqot yanada kuchaymoqda. She'riyat janrlari bu jarayonda alohida ahamiyatga ega bo'lib, xalqaro festival va nashrlarda turli xalqlar adabiyoti o'z o'rnini topmoqda. Shu bilan birga, internet texnologiyalari orqali she'riyatning o'qilishi va targ'iboti ham osonlashdi. Onlayn platformalar zamonaviy ijodkorlarga o'z asarlarini keng auditoriyaga yetkazish imkonini yaratmoqda, bu esa she'riyatni yangi o'quvchilar va janrlarga olib kelmoqda.

Shuningdek, milliy she'riyatimizdagi janrlar o'zining alohida mavqeini saqlab kelmoqda. Xususan, o'zbek mumtoz adabiyotining g'azal va ruboiylari, hozirgi zamon she'riyatida esa lirik va zamonaviy shakllar bugungi kun muammolarini yoritishda faol foydalanilmoqda. Janrlarning bunday boyligi ularni har tomonlama tahlil qilish va kelajak avlodga yetkazish zarurligini anglatadi.

She'riyat janrlari haqida batafsil ma'lumotlarni ham umumlashgan holda ko'rib chiqamiz:

1. Mumtoz she'riyat janrlari va ularning o'ziga xosligi

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Mumtoz adabiyotda she’riyatning rivojlanishi davomida bir necha asosiy janrlar shakllangan. Ularning har biri o‘zining maxsus shakli, mavzusi va poetik imkoniyatlari bilan ajralib turadi:

• G‘azal: Mumtoz she’riyatning eng mashhur janrlaridan biri. G‘azal odatda ma’lum bir qafiya tizimiga ega bo‘lib, asosan sevgi, sadoqat, ayriliq va falsafiy mavzularni qamrab oladi. Alisher Navoiy, Hofiz, Sa’diy singari ijodkorlar g‘azal janrini yuqori cho‘qqilarga ko‘targan.

• Ruboiy: To‘rt misradan iborat qisqa janr bo‘lib, o‘zining falsafiy mazmuni, qisqalik va aniqlik bilan ajralib turadi. Umar Xayyom ruboiylari bu janrning eng yaxshi namunalaridan biridir.

• Masnaviy: Epik janr bo‘lib, keng hajmdagi voqealar va tarixiy mavzularni bayon etadi. Masnaviylar odatda o‘quvchiga ma’rifiy va axloqiy saboq beradi. “Xusrav va Shirin”, “Layli va Majnun” kabi masnaviylar bu janrning yorqin namunalaridir.

• Qasida: Shoirning biror kishiga, odatda hukmdorga yoki maqtovga loyiq bir shaxsga bag‘ishlangan asaridir. Bu janr maqtov va tanqid uchun keng qo‘llanilgan.

2. Zamonaviy she’riyat janrlari va tendensiyalari

Zamonaviy davrda she’riyat janrlari an’anaviy shakllardan chiqib, yangicha uslublar va formatlarga ega bo‘ldi. Quyidagilar zamonaviy she’riyat janrlarining xususiyatlaridir:

• Lirik she’riyat: Hozirgi kunda individual kechinmalarni ifodalashning eng keng tarqalgan shakli. Bu janrda insonning ichki dunyosi, sevgisi, qayg‘usi, xotiralari aks ettiriladi.]

• Erkin she’r (vers libre): An’anaviy qoidalar va qofiyalardan voz kechgan shakl. Erkin she’rda tuyg‘ularni ifodalash erkinligi va so‘z boyligi asosiy ahamiyatga ega.

• Vizual she’riyat: So‘zlar va shakllar orqali badiiy effekt hosil qiluvchi janr. Bunda she’rning mazmuni bilan birga uning ko‘rinishi ham muhim hisoblanadi.

3. Milliy she’riyat janrlarining bugungi o‘rni

O‘zbek she’riyatida mumtoz janrlarning o‘rni juda katta. G‘azal, ruboiy kabi janrlar milliy adabiyotimizning qadriyatlari hisoblanadi. Zamonaviy shoirlar bu janrlarni saqlab qolish bilan birga, ularni bugungi zamon mavzulari bilan uyg‘unlashtirishga intilmoqda. Masalan, zamonaviy g‘azallarda global muammolar, ekologiya va ijtimoiy hayot mavzulari ko‘tarilmoqda.

4. She’riyatning xalqaro o‘zaro ta’siri

Globalizatsiya jarayonida turli xalqlar she’riyati bir-birini boyitmoqda. Misol uchun:

• Sharq she’riyatining falsafiy mazmuni G‘arb she’riyatiga ta’sir ko‘rsatmoqda.

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• G‘arbda rivojlangan modernizm va postmodernizm oqimlari esa Sharq shoirlarining yangi shakl va mazmun izlashlariga turtki bo‘lmoqda. Shu bois, xalqaro miqyosdagi she’riyat muloqoti nafaqat janrlarning rivojlanishiga, balki ular o‘rtasidagi chegaralarni o‘zaro boyitishga xizmat qilmoqda. Masalan, o‘zbek mumtoz she’riyati Jahon Poeziya Festivallarida tan olinib, xalqaro maydonda o‘zining boy madaniy va badiiy merosini namoyish etmoqda.

5. She’riyat janrlarini o‘rganishda zamonaviy yondashuvlar

Bugungi kunda she’riyatni o‘rganish va targ‘ib qilishda texnologiyalarning o‘rni beqiyosdir. Internet va raqamli platformalar yordamida shoirlar o‘z ijodlarini keng auditoriyaga yetkazish imkoniyatiga ega bo‘ldi. She’riy tanlovlar, virtual seminarlar va onlayn adabiy festivallar orqali yangi iste’dodlarni kashf etish va qadimiy janrlarni tiklashga yo‘l ochildi.

• Adabiy bazalar: Bugungi kunda raqamli kutubxonalar va she’riyatga bag‘ishlangan platformalar yordamida turli janrlarning tarixi, rivojlanishi va tahlilini chuqurroq o‘rganish imkoniyati mavjud. Masalan, mumtoz g‘azallar matnlarini va ularning turli til va she’riy an’analar doirasidagi tarjimalarini o‘rganish uchun internet bazalaridan foydalanilmoqda.

• Tahlil usullari: Zamonaviy adabiyotshunoslikda stilometrik tahlil va matn tahlili kabi raqamli usullar orqali she’riyatni o‘rganish jarayonlari takomillashmoqda. Bu esa janrlararo bog‘liqlikni aniqlash va janrlarning rivojlanish dinamikasini kuzatish imkonini beradi.

6. She’riy janrlarning ijtimoiy hayotdagi o‘rni

She’riyat jamiyatning ma’naviy hayotiga bevosita ta’sir ko‘rsatadi. Har bir janr insonning o‘z-o‘zini anglashida, madaniy qadriyatlarni targ‘ib qilishda va ijtimoiy muammolarga yechim qidirishda muhim vosita bo‘lib xizmat qiladi. Masalan:

• Ijtimoiy mavzular: Bugungi shoirlar she’riyat orqali global iqlim o‘zgarishi, gender tengligi, tinchlik va inson huquqlari kabi mavzularni ko‘tarishmoqda.

• Ma’rifiy ahamiyat: She’riyat ta’lim jarayonida yoshlarning badiiy didini shakllantirish, ularni milliy va global qadriyatlarga hurmat ruhida tarbiyalashda foydalanilmoqda.

7. She’riyatning istiqbollari

Kelajakda she’riyatda yangi janrlarning paydo bo‘lishi yoki mavjud janrlarning yangicha talqinlari kutilmoqda. Raqamli texnologiyalar va sun’iy intellekt yordamida she’riyatning yangi shakllari yuzaga kelishi mumkin. Masalan, sun’iy intellekt yordamida yaratilgan avtomatik she’rlar, virtual adabiy loyihalar va interaktiv she’riyat janrlarning yangi bosqichini boshlab berishi mumkin. Shu bilan birga, an’anaviy janrlarni asrab-avaylash va ularni avlodlarga yetkazish masalasi dolzarb bo‘lib qoladi.

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She’riyat janrlari inson tafakkuri va his-tuyg‘ularining boyligini aks ettiruvchi san’at vositasidir. Mumtoz va zamonaviy janrlar orasidagi uzviy bog‘liqlik, ularning bugungi kun ijtimoiy-madaniy hayotidagi o‘rni hamda kelajakdagi rivojlanish istiqbollari she’riyatning abadiy qadriyat ekanligini tasdiqlaydi. Janrlarni chuqur o‘rganish, targ‘ib qilish va rivojlantirish orqali milliy va jahon adabiyotiga bebaho hissa qo‘shiladi.

XULOSA

She’riyat janrlari inson ma’naviy hayotining ajralmas qismi bo‘lib, ularning rivojlanishi milliy va jahon madaniy merosini boyitib kelmoqda. Mumtoz va zamonaviy janrlar bir-birini boyitib, bugungi kun ijtimoiy va estetik masalalarini yoritishda muhim ahamiyat kasb etadi.

Janrlarni asrab-avaylash va ularni zamon talablari bilan uyg‘unlashtirish milliy adabiyotimizni rivojlantirishning asosiy yo‘nalishlaridan biridir. She’riyatni targ‘ib qilish orqali yosh avlodni ma’naviy tarbiyalash va xalqaro maydonda milliy adabiyotimiz mavqeini mustahkamlash imkoniyati mavjud.

Foydalanilgan adabiyotlar

1. Naim Karimov. “O‘zbek adabiyoti tarixi.” – Toshkent: O‘qituvchi, 2006.
2. Matyoqub Qo‘shjonov “O‘zbek mumtoz adabiyoti.”– Toshkent: Fan, 2010.
3. Dilmurod Quronov “ Adabiyotshunoslikka kirish.” – Toshkent: Akademnashr, 2012.
4. Izzat Sulton . Adabiyot nazariyasi. – Toshkent: O‘qituvchi, 2005.
5. Alisher Navoiy “ Mezon ul-avzon.” – Toshkent: G‘afur G‘ulom nomidagi nashriyot, 2011.
6. Abdug‘afur Rasulov “Badiiylik mezonlari.” – Toshkent: Fan, 2012.
7. Dilmurod Quronov “Adabiyot nazariyasi asoslari.” – Toshkent: Tafakkur, 2018.

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СРАВНИТЕЛЬНЫЙ АНАЛИЗ ХИРУРГИЧЕСКИХ МЕТОДОВ ЛЕЧЕНИЯ ДОБРОКАЧЕСТВЕННОЙ ГИПЕРПЛАЗИИ ПРЕДСТАТЕЛЬНОЙ ЖЕЛЕЗЫ У МУЖЧИН ПОЖИЛОГО ВОЗРАСТА

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Аннотация. В данной статье представлен сравнительный анализ хирургических методов лечения доброкачественной гиперплазии предстательной железы (ДГПЖ) у мужчин пожилого возраста. В исследование включено 186 пациентов в возрасте от 65 до 82 лет, разделённых на три группы в зависимости от применяемого метода: трансуретральная резекция предстательной железы (ТУРП), лазерная энуклеация предстательной железы (HoLEP) и открытая аденомэктомия. Оценивались основные периоперационные показатели, частота осложнений, функциональные результаты и качество жизни в раннем и отдалённом послеоперационном периоде. Результаты свидетельствуют о том, что HoLEP демонстрирует наиболее благоприятный профиль безопасности и эффективности у пожилых пациентов с большим объёмом железы. ТУРП остаётся золотым стандартом при железах объёмом до 80 мл, тогда как открытая аденомэктомия показана при отсутствии эндоскопического оборудования или при наличии сопутствующей интравезикальной патологии.

Ключевые слова: доброкачественная гиперплазия предстательной железы, ТУРП, HoLEP, аденомэктомия, пожилой возраст, хирургическое лечение, качество жизни.

Доброкачественная гиперплазия предстательной железы является одним из наиболее распространённых урологических заболеваний у мужчин пожилого и старческого возраста. По данным мировой литературы, клинически выраженные симптомы нижних мочевыводящих путей, обусловленные ДГПЖ, наблюдаются у 50% мужчин в возрасте 60–69 лет и у более 80% мужчин старше 70 лет [1, 2]. В Узбекистане, с учётом активного демографического старения населения, данная проблема приобретает особое социально-медицинское значение.

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Пожилой возраст пациентов нередко сопряжён с наличием сопутствующей соматической патологии — сердечно-сосудистых заболеваний, сахарного диабета, хронических заболеваний почек и лёгких, — что существенно повышает риск интра- и послеоперационных осложнений [3]. В связи с этим выбор оптимального метода хирургического лечения ДГПЖ у данной категории пациентов требует строго индивидуального подхода с учётом объёма железы, функционального статуса пациента, наличия коморбидной патологии и технических возможностей учреждения [4].

Традиционно «золотым стандартом» хирургического лечения ДГПЖ считается трансуретральная резекция предстательной железы (ТУРП). Вместе с тем широкое внедрение лазерных технологий, в частности гольмиевой лазерной энуклеации (HoLEP), открыло новые перспективы для лечения пациентов с простатой большого объёма, а также лиц с нарушением свёртываемости крови [5]. Сравнительная оценка эффективности и безопасности этих методов у пожилых пациентов в условиях отечественного здравоохранения остаётся недостаточно изученной.

ЦЕЛЬ ИССЛЕДОВАНИЯ

Целью настоящего исследования является сравнительная оценка эффективности, безопасности и функциональных результатов трёх методов хирургического лечения ДГПЖ (ТУРП, HoLEP и открытой аденомэктомии) у мужчин пожилого возраста и разработка алгоритма выбора оптимального хирургического метода с учётом индивидуальных клинических характеристик пациента.

МАТЕРИАЛ И МЕТОДЫ ИССЛЕДОВАНИЯ

В проспективное когортное исследование, проводившееся на базе урологического отделения Ташкентского государственного медицинского университета в период с 2020 по 2023 год, включено 186 пациентов мужского пола в возрасте 65 лет и старше с клинически подтверждённым диагнозом ДГПЖ. Критериями включения служили: возраст ≥65 лет, симптоматика нижних мочевыводящих путей умеренной и тяжёлой степени (IPSS ≥12 баллов), объём предстательной железы ≥30 мл по данным трансректальной ультрасонографии (ТРУЗИ), максимальная скорость потока мочи (Qmax) ≤15 мл/с. Критерии исключения: рак предстательной железы, активные воспалительные заболевания мочевыводящих путей, ранее перенесённые операции на простате, тяжёлая декомпенсированная сопутствующая патология (ASA IV).

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Пациенты были распределены на три группы методом простой рандомизации: группа I (n=68) — ТУРП, группа II (n=62) — HoLEP, группа III (n=56) — открытая позадилонная аденомэктомия. Средний возраст пациентов составил: в группе I — 71,4±3,8 лет, в группе II — 72,1±4,2 лет, в группе III — 70,9±3,5 лет. Достоверных различий между группами по исходным демографическим и клиническим характеристикам не выявлено ($p>0,05$).

Оценку проводили на основании следующих параметров: объём интраоперационной кровопотери, продолжительность операции, длительность катетеризации мочевого пузыря, сроки госпитализации, динамика симптоматики по шкале IPSS, показатель качества жизни (QoL), максимальная объёмная скорость мочеиспускания (Qmax), объём остаточной мочи, а также частота ранних и поздних послеоперационных осложнений. Наблюдение за пациентами осуществлялось через 1, 3, 6 и 12 месяцев после операции. Статистическую обработку данных выполняли с помощью пакета SPSS Statistics 26.0. Для оценки различий между группами использовали критерий Краскела–Уоллиса, для попарного сравнения — критерий Манна–Уитни с поправкой Бонферрони. Уровень статистической значимости принимали при $p<0,05$.

РЕЗУЛЬТАТЫ И ИХ ОБСУЖДЕНИЕ

Средний объём предстательной железы в исследуемых группах составил: I группа — 68,4±14,2 мл, II группа — 94,7±22,6 мл, III группа — 110,3±28,1 мл. Данное распределение обусловлено принятыми в клинике алгоритмами выбора метода в зависимости от объёма железы: ТУРП — при объёме до 80 мл, HoLEP — при объёме 80–120 мл, аденомэктомия — при объёме свыше 120 мл или при наличии специфических интравезикальных показаний.

Продолжительность операции в группе ТУРП составила в среднем 58,3±12,4 мин, в группе HoLEP — 87,6±18,9 мин, в группе аденомэктомии — 74,2±16,3 мин. Интраоперационная кровопотеря была достоверно ниже в группе HoLEP (87,4±31,2 мл) по сравнению с ТУРП (194,6±62,8 мл; $p<0,001$) и аденомэктомией (318,5±94,3 мл; $p<0,001$). Потребность в гемотрансфузии зафиксирована у 1 пациента группы II (1,6%), у 9 пациентов группы I (13,2%) и у 18 пациентов группы III (32,1%).

Длительность катетеризации и продолжительность госпитализации были наименьшими в группе HoLEP: 1,4±0,6 сут и 3,2±0,8 сут соответственно, в сравнении с ТУРП (2,8±0,9 сут и 5,1±1,3 сут) и аденомэктомией (5,6±1,8 сут и

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9,7±2,4 сут). Различия статистически значимы во всех межгрупповых сравнениях ($p<0,001$).

Через 12 месяцев после операции все три метода обеспечили достоверное улучшение урофлоуметрических показателей и симптоматики. Оценка по шкале IPSS снизилась с исходных 22,4±3,1 до 6,8±2,3 балла (I группа), с 23,1±3,4 до 5,9±1,8 балла (II группа) и с 24,3±3,7 до 7,1±2,6 балла (III группа). Qmax увеличился в среднем на 11,8, 14,3 и 12,6 мл/с в группах I, II и III соответственно. Между группами по функциональным результатам в отдалённом периоде достоверных различий не выявлено ($p>0,05$).

Ранние осложнения (в течение 30 суток после операции) зафиксированы у 22,1% пациентов группы ТУРП, 11,3% — HoLEP и 35,7% — аденомэктомии. Среди них: ТУР-синдром — у 4 пациентов группы I (5,9%), стрессовое недержание мочи — у 3 пациентов группы II (4,8%), раневые осложнения — у 8 пациентов группы III (14,3%), острая задержка мочи после удаления катетера — у 5 (7,4%), 3 (4,8%) и 4 (7,1%) пациентов групп I, II и III соответственно. Стриктуры уретры в течение года наблюдались у 5,9% в группе ТУРП, 3,2% в группе HoLEP и не зафиксированы в группе аденомэктомии.

Эректильная дисфункция de novo была выявлена у 19,1%, 11,3% и 16,1% пациентов групп I, II и III соответственно. Ретроградная эякуляция развилась у большинства пациентов во всех группах — 79,4%, 83,9% и 87,5%, что объясняется разрушением шейки мочевого пузыря при всех методах резекции/энуклеации.

Качество жизни (QoL по IPSS) через 12 месяцев снизилось до 1,4±0,7 балла (I), 1,2±0,6 балла (II) и 1,6±0,8 балла (III). Удовлетворённость лечением составила 87,3%, 93,5% и 82,1% в группах I, II и III соответственно. Наиболее высокий уровень удовлетворённости в группе HoLEP обусловлен быстрейшим восстановлением и минимальной частотой осложнений.

Полученные данные согласуются с результатами крупных зарубежных мета-анализов, в которых HoLEP признаётся предпочтительным методом для пациентов с простатой большого объёма и коморбидными состояниями, требующими продолжения антикоагулянтной терапии [6, 7]. Вместе с тем необходимо учитывать высокие требования к кривой обучения при HoLEP — по литературным данным, для достижения стабильных результатов хирург должен выполнить не менее 50 операций [8].

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ВЫВОДЫ

1. Все три исследованных метода хирургического лечения ДГПЖ — ТУРП, HoLEP и открытая аденомэктомия — обеспечивают сопоставимые функциональные результаты и улучшение качества жизни через 12 месяцев после операции у мужчин пожилого возраста.

2. HoLEP демонстрирует достоверно меньший объём кровопотери, более короткие сроки катетеризации и госпитализации, а также более низкую частоту ранних послеоперационных осложнений, что делает его предпочтительным методом у пациентов высокого операционного риска.

3. ТУРП остаётся методом выбора при объёме предстательной железы до 80 мл при наличии надлежащей технической оснащённости и достаточного хирургического опыта.

4. Открытая аденомэктомия сохраняет актуальность в клиниках с ограниченным эндоскопическим оборудованием, а также при наличии сопутствующей интравезикальной патологии (камни, дивертикулы), требующей одномоментной хирургической коррекции.

5. Выбор метода хирургического лечения у пожилых пациентов должен осуществляться мультидисциплинарной командой с учётом объёма железы, коморбидной патологии, функционального статуса пациента и ресурсов учреждения.

ЛИТЕРАТУРА

1. Foo K.T. Pathophysiology of clinical benign prostatic hyperplasia // Asian J Urol. 2019. Vol. 6, № 2. P. 152–157.

2. Gravas S., Cornu J.N., Gacci M. et al. EAU Guidelines on Management of Non-Neurogenic Male LUTS. European Association of Urology, 2023.

3. Rassweiler J., Teber D., Kuntz R., Hofmann R. Complications of transurethral resection of the prostate (TURP) — incidence, management, and prevention // Eur Urol. 2006. Vol. 50, № 5. P. 969–980.

4. Мартов А.Г., Сивков А.В., Ощепков В.Н. Хирургическое лечение доброкачественной гиперплазии простаты: современные тенденции // Урология. 2020. № 4. С. 112–120.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
5. Gilling P.J., Fraundorfer M.R. Holmium laser prostatectomy: A technique for laser enucleation of the prostate // Tech Urol. 1998. Vol. 4, № 1. P. 35–39.

6. Cornu J.N., Ahyai S., Bachmann A. et al. A systematic review and meta-analysis of functional outcomes and complications following transurethral procedures for lower urinary tract symptoms resulting from benign prostatic obstruction // Eur Urol. 2015. Vol. 67, № 6. P. 1066–1096.

7. Elshal A.M., El-Nahas A.R., Ghazy M., Elsaadany M. Holmium laser enucleation versus bipolar plasma vaporisation of the prostate for treatment of bladder outlet obstruction // BJU Int. 2017. Vol. 120, № 4. P. 563–571.

8. Placer J., Gelabert-Mas A., Vallmanya F. et al. Holmium laser enucleation of prostate: outcome and complications of self-taught learning curve // Urology. 2009. Vol. 73, № 5. P. 1042–1048.

9. Nambiar A.K., Catto J.W.F., Abrams P. et al. EAU Guidelines on Non-neurogenic Female LUTS. EAU, 2022.

10. Оморов Р.А., Джумабеков С.А. Современные подходы к хирургическому лечению ДГПЖ у пожилых больных // Урология Центральной Азии. 2021. № 2. С. 45–52.

11. Lerner L.B., McVary K.T., Barry M.J. et al. Management of Lower Urinary Tract Symptoms Attributed to Benign Prostatic Hyperplasia: AUA Guideline Part I // J Urol. 2021. Vol. 206, № 4. P. 806–817.

12. Ahyai S.A., Gilling P., Kaplan S.A. et al. Meta-analysis of functional outcomes and complications following transurethral procedures for lower urinary tract symptoms resulting from benign prostatic enlargement // Eur Urol. 2010. Vol. 58, № 3. P. 384–397.

13. Rassweiler J., Schulze M., Stock C. et al. Bipolar transurethral resection of the prostate–technical modifications and early clinical experience // Minim Invasive Ther Allied Technol. 2007. Vol. 16, № 1. P. 11–21.

14. Geavlete B., Multescu R., Geavlete P. Bipolar plasma vaporization of the prostate–an appraisal after 300 cases // Can Urol Assoc J. 2013. Vol. 7, № 5–6. P. E342–E348.

15. Ниязов Б.Б., Юлдашев А.У. Ранние послеоперационные осложнения у пожилых пациентов при ТУРП // Медицинский журнал Узбекистана. 2022. № 1. С. 78–84.

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ДИФФЕРЕНЦИРОВАННЫЙ ВЫБОР МЕДИКАМЕНТОЗНОЙ И ХИРУРГИЧЕСКОЙ ТАКТИКИ ЛЕЧЕНИЯ ДГПЖ У МУЖЧИН ПОЖИЛОГО ВОЗРАСТА

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Введение. Многообразие клинических форм ДГПЖ и высокая коморбидная нагрузка у пожилых пациентов обусловливают необходимость строго дифференцированного подхода к выбору между консервативной медикаментозной терапией и хирургическим вмешательством: чрезмерная приверженность консервативной тактике при тяжёлой инфравезикальной обструкции повышает риск острой задержки мочи и хронической болезни почек, тогда как неоправданное хирургическое лечение при умеренной симптоматике сопряжено с избыточным операционным риском у пациентов с сопутствующей сердечно-сосудистой, эндокринной и почечной патологией.

Целью нашего исследования явилась разработка и клиническая апробация алгоритма дифференцированного выбора между монотерапией альфа-1-адреноблокаторами, комбинированной медикаментозной терапией и трансуретральной резекцией предстательной железы у мужчин в возрасте 65 лет и старше с ДГПЖ.

Материал и методы. В исследование включено 214 пациентов (средний возраст 72,1±4,8 лет), распределённых на три группы согласно разработанному алгоритму: группа А — монотерапия тамсулозином 0,4 мг/сут (n=72, IPSS 8–18 баллов, объём железы 25–50 мл), группа Б — комбинированная терапия тамсулозин+дутастерид (n=84, IPSS 12–24, объём 50–80 мл), группа В — ТУРП (n=58, IPSS ≥20, объём >80 мл или рефрактерная задержка мочи); мониторинг IPSS, QoL, Qmax и объёма остаточной мочи проводился через 3, 6, 12 и 24 месяца, коморбидный статус оценивался по шкале Charlson (CCI).

Результаты и их обсуждение. Через 24 месяца стойкий клинический ответ на монотерапию зафиксирован у 73,6% пациентов группы А; комбинированная терапия обеспечила уменьшение объёма железы на 28,3% и снижение частоты острой задержки мочи до 4,8% против 12,5% в группе монотерапии; в

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хирургической группе 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, что достоверно превышало результаты медикаментозных групп ($p<0,001$), подтверждая целесообразность раннего оперативного лечения при выраженной обструкции на фоне адекватной предоперационной подготовки с учётом коморбидного профиля.

Выводы. Применение дифференцированного алгоритма, основанного на оценке IPSS, объёма железы, Qmax и индекса CCI, позволяет обоснованно разграничить показания к монотерапии альфа-1-адреноблокаторами, комбинированной фармакотерапии и хирургическому лечению у пожилых пациентов с ДГПЖ, тем самым минимизируя риск как гипо-, так и гиперлечения в данной клинически сложной популяции.

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O‘ZBEKISTONDA OZIQ-OVQAT XAVFSIZLIGINI TA’MINLASH MEXANIZMINI TAKOMILLASHTIRISHNING IQTISODIY-INSTITUTSIONAL ASOSLARI

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Annotatsiya: Ushbu maqolada O‘zbekistonda oziq-ovqat xavfsizligini ta’minlash mexanizmini takomillashtirish masalalari tahlil qilinadi. Tadqiqotda oziq-ovqat xavfsizligining mazmuni, tarkibiy unsurlari, shakllanish omillari, davlat siyosati bilan bog‘liq jihatlari va amaliy mexanizmlari yoritilgan. Mavzuning dolzarbligi mamlakatda aholi sonining o‘sishi, oziq-ovqat mahsulotlariga bo‘lgan talabning ortishi, global narx tebranishlari, iqlim o‘zgarishi, logistika tizimidagi uzilishlar va importga qaramlik xavfi bilan izohlanadi. Maqolada oziq-ovqat xavfsizligini faqat mahsulot ishlab chiqarish hajmi bilan emas, balki **mahsulotning iqtisodiy jihatdan arzonligi, jismoniy mavjudligi, sifati, xavfsizligi, uzluksiz yetkazib berilishi va aholining xarid qobiliyati** bilan bog‘liq murakkab tizim sifatida baholash zarurligi asoslanadi. Tadqiqot natijalariga ko‘ra, oziq-ovqat xavfsizligini ta’minlashda iqtisodiy rag‘batlantirish, agrosanoat integratsiyasi, hududiy ishlab chiqarish salohiyatini oshirish, narx monitoringi, strategik zaxira siyosati, innovatsion texnologiyalar va davlat institutlari o‘rtasidagi muvofiqlikni kuchaytirish muhim ahamiyat kasb etadi.

Kalit so‘zlar: Oziq-ovqat xavfsizligi, iqtisodiy mexanizm, institutsional boshqaruv, agrosanoat majmuasi, strategik zaxira, narx barqarorligi, import o‘rnini bosish, oziq-ovqat bozori, qishloq xo‘jaligi, barqaror rivojlanish.

KIRISH

Oziq-ovqat xavfsizligi har qanday davlatning iqtisodiy mustaqilligi, ijtimoiy barqarorligi va milliy xavfsizligini belgilovchi tayanch omillardan biridir. Aholining yetarli miqdorda, xavfsiz, sifatli va arzon oziq-ovqat mahsulotlariga barqaror ega bo‘lishi nafaqat iqtisodiy masala, balki ijtimoiy adolat, sog‘liqni saqlash, demografik barqarorlik va inson kapitalini rivojlantirish bilan bevosita bog‘liq jarayondir. Shu sababli oziq-ovqat xavfsizligi masalasi bozor iqtisodiyoti sharoitida faqat qishloq

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xo‘jaligi mahsulotlarini yetishtirish hajmi bilan cheklanmaydi. U ishlab chiqarish, qayta ishlash, saqlash, logistika, narx shakllanishi, sifat nazorati, iste’mol madaniyati va davlat boshqaruvi institutlari o‘rtasidagi muvofiqlashgan tizim orqali ta’minlanadi.

O‘zbekiston sharoitida oziq-ovqat xavfsizligini ta’minlashning dolzarbligi bir necha omillar bilan belgilanadi. Mamlakat aholisi muntazam o‘sib bormoqda, urbanizatsiya jarayoni tezlashmoqda, iste’mol tarkibi o‘zgarib, sifatli, ekologik toza va qayta ishlangan mahsulotlarga talab ortmoqda. Bunday sharoitda agrar sektorning oddiy xomashyo yetishtiruvchi tarmoq sifatida emas, balki **qo‘shilgan qiymat yaratadigan, ichki bozorni barqaror ta’minlaydigan, eksport salohiyatini kengaytiradigan va bandlikni oshiradigan strategik tizim** sifatida rivojlanishi zarur.

O‘zbekiston Respublikasi Prezidentining 2024-yil 16-fevraldagi PF-36-son Farmonida oziq-ovqat xavfsizligi va sog‘lom ovqatlanishni ta’minlashning 2030-yilgacha mo‘ljallangan strategik maqsadi mamlakat aholisini yetarli hajmda xavfsiz, sifatli va arzon qishloq xo‘jaligi hamda oziq-ovqat mahsulotlari bilan ta’minlash, shuningdek, sog‘lom ovqatlanishni targ‘ib qilishdan iborat ekani belgilangan. Strategiyada oziq-ovqat mahsulotlari mavjudligi, ulardan foydalanish imkoniyati, iste’mol, barqarorlik va doimiylik asosiy yo‘nalishlar sifatida qaraladi.

Mazkur yondashuv oziq-ovqat xavfsizligini keng iqtisodiy-institutsional kategoriya sifatida o‘rganishni talab etadi. **Iqtisodiy mexanizm** ishlab chiqaruvchilar, qayta ishlovchilar, savdo tarmoqlari va iste’molchilar o‘rtasidagi resurs, narx, investitsiya va daromad munosabatlarini ifodalaydi. **Institutsional mexanizm** esa davlat idoralari, huquqiy normalar, monitoring tizimlari, standartlashtirish, subsidiya siyosati, bozor nazorati va hududiy boshqaruv institutlarining o‘zaro faoliyatini qamrab oladi. Ushbu ikki mexanizm uyg‘unlashmaguncha oziq-ovqat xavfsizligini barqaror ta’minlash qiyinlashadi.

ADABIYOTLAR TAHLILI VA METODOLOGIYA

Oziq-ovqat xavfsizligi bo‘yicha ilmiy qarashlarda ushbu tushuncha ko‘pincha to‘rt asosiy jihat orqali izohlanadi. Bular mahsulotlarning mavjudligi, aholining ularga iqtisodiy va jismoniy kirish imkoniyati, mahsulotlarning sifat va xavfsizlik talablariga mosligi hamda ta’minotning barqarorligidir. O‘zbekiston sharoitida bu yondashuv mahalliy ishlab chiqarishni rivojlantirish, importga qaramlikni kamaytirish, aholi daromadlari bilan oziq-ovqat narxlari o‘rtasidagi muvozanatni saqlash va agrosanoat tizimining raqobatbardoshligini oshirish bilan boyitiladi.

Mahalliy tadqiqotchilar ishlarida oziq-ovqat sanoati korxonalari samaradorligi, tadbirkorlikni rivojlantirish, klasterli boshqaruv, qayta ishlash tarmoqlarini modernizatsiya qilish va oziq-ovqat xavfsizligini ta’minlash masalalari alohida tahlil qilingan. Jumladan, N.M.Ziyavitdinova oziq-ovqat sanoati korxonalari faoliyatining

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iqtisodiy samaradorligini oshirish masalalarini tadqiq qilgan, I.Yu.Umarov esa oziq-ovqat sanoatida tadbirkorlik faoliyatini rivojlantirishning hududiy jihatlarini o‘rgangan. N.M.Nabiyevaning tadqiqotida oziq-ovqat sanoatida xavfsizlik mexanizmini optimallashtirish, korxonalarni modernizatsiya qilish va ishlab chiqaruvchilarni qo‘llab-quvvatlash dolzarb yo‘nalish sifatida ko‘rsatilgan.

Mavjud ilmiy ishlarda oziq-ovqat xavfsizligi ko‘proq ishlab chiqarish yoki sanoat korxonalari faoliyati doirasida talqin qilingan. Biroq hozirgi bosqichda masala yanada kengroq yondashuvni talab etadi. Oziq-ovqat xavfsizligining iqtisodiy-institutsional asoslarini o‘rganishda faqat mahsulot hajmi emas, balki bozor infratuzilmasi, moliyalashtirish tizimi, standartlar, narx monitoringi, soliq va kredit imtiyozlari, logistika zanjiri, hududlararo tafovut, iste’molchilarning xarid qobiliyati va oziq-ovqat sanoatining innovatsion salohiyati ham hisobga olinishi lozim.

Tadqiqot metodologiyasi sifatida **tizimli yondashuv, iqtisodiy-statistik tahlil, qiyosiy tahlil, institutsional tahlil, ilmiy abstraksiya va mantiqiy umumlashtirish** usullaridan foydalanildi. Tizimli yondashuv oziq-ovqat xavfsizligini o‘zaro bog‘liq iqtisodiy, ijtimoiy va boshqaruv elementlari majmui sifatida baholash imkonini berdi. Iqtisodiy-statistik tahlil orqali qishloq xo‘jaligi mahsulotlari ishlab chiqarish hajmi, oziq-ovqat sanoati ko‘rsatkichlari, inflyatsiya va iste’mol bozoridagi tendensiyalar o‘rganildi. Institutsional tahlil yordamida oziq-ovqat xavfsizligini tartibga soluvchi davlat siyosati, strategik hujjatlar va boshqaruv mexanizmlari baholandi.

TAHLIL VA NATIJALAR

O‘zbekistonda oziq-ovqat xavfsizligini ta’minlashning iqtisodiy asosi agrar sektor, oziq-ovqat sanoati, savdo-logistika tizimi va iste’mol bozori o‘rtasidagi uzviy bog‘liqlikda namoyon bo‘ladi. Qishloq xo‘jaligi mahsulotlarini yetishtirish hajmining o‘sishi oziq-ovqat xavfsizligining boshlang‘ich sharti bo‘lsa, qayta ishlash, saqlash va bozorlarga yetkazish tizimining rivojlanishi uning barqarorligini ta’minlaydi. Mahsulot yetishtirilgani bilan u sifatli saqlanmasa, qayta ishlanmasa yoki aholiga maqbul narxda yetkazilmasa, oziq-ovqat xavfsizligi to‘liq ta’minlangan deb baholab bo‘lmaydi.

Rasmiy ma’lumotlarga ko‘ra, 2024-yilda O‘zbekistonda yalpi qishloq xo‘jaligi mahsuloti hajmi 444,6 trillion so‘mga yetgan va so‘nggi besh yil davomida 18,5 foizga o‘sgan. Aholi jon boshiga nisbatan don ekinlari 238,2 kg, kartoshka 100 kg, sabzavotlar 322,7 kg, meva va rezavorlar 88 kg, poliz ekinlari 72,2 kg, go‘sht 79,2 kg, sut 334,8 kg, tuxum 236,9 dona miqdorida ishlab chiqarilgani qayd etilgan. Ushbu raqamlar agrar sektorning oziq-ovqat ta’minotidagi salohiyati yuqori ekanini ko‘rsatadi.

Oziq-ovqat xavfsizligining keyingi muhim bo‘g‘ini oziq-ovqat sanoati hisoblanadi. 2024-yilda O‘zbekistonda oziq-ovqat mahsulotlari ishlab chiqarish

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sanoati hajmi 103,7 trillion so‘mni tashkil etgan va bu ko‘rsatkich 2023-yilga nisbatan 4,5 foizga oshgan. Hududlar kesimida Toshkent shahri, Toshkent viloyati va Samarqand viloyati oziq-ovqat mahsulotlari ishlab chiqarish hajmi bo‘yicha yetakchi o‘rinlarda turibdi. Bu holat hududlar o‘rtasida ishlab chiqarish salohiyati notekis taqsimlanganini ham ko‘rsatadi.

Oziq-ovqat sanoatidagi o‘sish mamlakatda import o‘rnini bosish siyosati bilan ham bog‘liq. PF-36-son Farmonda so‘nggi yillarda oziq-ovqat mahsulotlarini ishlab chiqarish hajmi 6,1 milliard AQSH dollaridan, yillik eksport hajmi esa 510 million AQSH dollaridan oshgani qayd etilgan. Shuningdek, oxirgi uch yilda import o‘rnini bosuvchi 75 turdagi 289,9 million AQSH dollari miqdoridagi oziq-ovqat sanoati mahsulotlari ishlab chiqarilgani, import hajmi 7,4 foizga kamaygani va respublika sanoatida oziq-ovqat sanoati ulushi 14 foizdan 16,6 foizga oshgani ko‘rsatilgan.

Bu ko‘rsatkichlar ijobiy dinamikani ifodalasa-da, oziq-ovqat xavfsizligi mexanizmida hal etilishi zarur bo‘lgan masalalar saqlanib qolmoqda. Ular orasida ishlab chiqarish va qayta ishlash o‘rtasidagi uzilishlar, ayrim hududlarda saqlash infratuzilmasining yetarli emasligi, mahsulot tannarxining yuqoriligi, mavsumiy narx tebranishlari, transport-logistika xarajatlari, kichik ishlab chiqaruvchilarning moliyaviy resurslarga kirish imkoniyati cheklangani va iste’mol bozorida narx barqarorligini ta’minlashdagi murakkabliklar alohida o‘rin tutadi.

Oziq-ovqat xavfsizligining iqtisodiy-institutsional mexanizmi bir nechta asosiy tarkibiy qismdan iborat. **Ishlab chiqarish mexanizmi** yer, suv, urug‘, ozuqa, texnika, mehnat va investitsiya resurslaridan samarali foydalanishga tayanadi. **Qayta ishlash mexanizmi** xomashyoni yuqori qo‘shilgan qiymatli tayyor mahsulotga aylantirishni ta’minlaydi. **Bozor mexanizmi** narx, talab, taklif, raqobat va savdo infratuzilmasi orqali ishlaydi. **Davlat tartibga solish mexanizmi** standartlar, subsidiyalar, imtiyozlar, monitoring, strategik zaxira va ijtimoiy himoya siyosati bilan bog‘liq. **Institutsional muvofiqlashtirish mexanizmi** esa vazirliklar, mahalliy hokimliklar, ishlab chiqaruvchilar, qayta ishlovchilar, savdo tarmoqlari, ilmiy muassasalar va iste’molchilar o‘rtasidagi axborot va boshqaruv aloqalarini tartibga soladi.

Narx barqarorligi oziq-ovqat xavfsizligining eng sezgir jihatlaridan biridir. Markaziy bank ma’lumotlariga ko‘ra, 2024-yil dekabrida yillik inflyatsiya 9,8 foizni tashkil etgan. Narxlarning bunday dinamikasi oziq-ovqat mahsulotlariga bo‘lgan talab, ishlab chiqarish xarajatlari, energiya narxlari, transport, mavsumiylik va tashqi bozor omillari bilan bevosita bog‘liq.

Oziq-ovqat xavfsizligini ta’minlashda institutsional mexanizmning kuchi shundaki, u bozor ishtirokchilarining xatti-harakatlarini umumiy strategik maqsadga yo‘naltiradi. Davlatning vazifasi bozorni to‘liq almashtirish emas, balki uning samarali

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ishlashi uchun sharoit yaratish, ehtimoliy xavflarni oldindan aniqlash, ijtimoiy himoyaga muhtoj qatlamlarning oziq-ovqatga bo‘lgan kirish imkoniyatini saqlash va ishlab chiqaruvchilarni innovatsion rivojlanishga undashdan iborat. Bu jarayonda davlat xaridlari, kafolatlangan kreditlar, sug‘urta, soliq imtiyozlari, eksportni qo‘llab-quvvatlash, sifat nazorati va raqamli monitoring vositalari muhim rol o‘ynaydi.

PF-36-son Farmonda oziq-ovqat xavfsizligi bo‘yicha axborot va monitoring platformasi, BI deshbordlar, indikatorlarni elektron veb sahifada aks ettirish, “Elektron agrosanoat bozori” axborot tizimini Milliy axborot platformasi bilan integratsiya qilish kabi vazifalar belgilangan. Bu vazifalar oziq-ovqat xavfsizligini boshqarishda ma’lumotga asoslangan qaror qabul qilish tizimiga o‘tish zarurligini ko‘rsatadi.

MUHOKAMA

O‘zbekistonda oziq-ovqat xavfsizligini ta’minlash mexanizmini takomillashtirishda eng muhim masala ishlab chiqarish hajmini oshirish bilan birga, qiymat zanjirining barcha bo‘g‘inlarini muvofiqlashtirishdir. Fermer xo‘jaligi mahsulot yetishtiradi, lekin uning bozordagi yakuniy qiymati saqlash, saralash, qadoqlash, qayta ishlash, sertifikatlash va savdo tarmog‘i orqali shakllanadi. Agar ushbu zanjirning biror bo‘g‘ini zaif bo‘lsa, mahsulot yo‘qotilishi ortadi, tannarx ko‘tariladi, iste’molchi uchun narx oshadi va ishlab chiqaruvchining daromadi kamayadi.

Hududiy tafovut oziq-ovqat xavfsizligi mexanizmida alohida e’tibor talab qiladi. Ayrim hududlarda tabiiy-iqlim sharoiti, suv resurslari, logistika imkoniyatlari va sanoat infratuzilmasi yaxshi rivojlangan bo‘lsa, boshqa hududlarda qayta ishlash quvvatlari, sovutkichli omborlar, transport yo‘llari va investitsiya resurslari yetishmasligi mumkin. Shu bois oziq-ovqat xavfsizligi bo‘yicha yagona respublika strategiyasi hududiy dasturlar bilan uyg‘unlashishi zarur. Har bir viloyatning mahsulot ixtisoslashuvi, ichki iste’mol talabi, eksport imkoniyati va logistika xarajatlari alohida hisobga olinishi lozim.

Iqtisodiy mexanizmning samaradorligi narxlar, daromadlar va xarajatlar o‘rtasidagi muvozanatga bog‘liq. Aholining real daromadlari oziq-ovqat narxlaridan ortda qolsa, mahsulot bozorda mavjud bo‘lsa ham, iqtisodiy kirish imkoniyati pasayadi. Shu sababli oziq-ovqat xavfsizligini faqat ishlab chiqarish ko‘rsatkichlari orqali baholash yetarli emas. **Aholining xarid qobiliyati, minimal iste’mol xarajatlari, ijtimoiy himoya tizimi va asosiy oziq-ovqat mahsulotlari narxining barqarorligi** ushbu mexanizmning asosiy baholash mezonlari bo‘lishi kerak.

Oziq-ovqat xavfsizligini ta’minlashda kichik biznes va xususiy tadbirkorlikning o‘rni katta. Qayta ishlash, qadoqlash, saqlash, mahalliy savdo, umumiy ovqatlanish va logistika sohalarida kichik tadbirkorlar faol ishtirok etadi. Ularning rivojlanishi

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raqobatni kuchaytiradi, mahsulot assortimentini kengaytiradi va narxlar barqarorligiga ijobiy ta’sir ko‘rsatadi. Biroq kichik ishlab chiqaruvchilar ko‘pincha kredit foizlari, garov ta’minoti, texnologik modernizatsiya, sertifikatlash va bozorlarga kirish masalalarida qiyinchiliklarga duch keladi. Shu bois oziq-ovqat xavfsizligini ta’minlash mexanizmi tadbirkorlik subyektlarini moliyaviy va institutsional qo‘llab-quvvatlash bilan mustahkamlanishi kerak.

Agrosanoat klasterlari oziq-ovqat xavfsizligini ta’minlashda samarali yondashuvlardan biridir. Klaster tizimi ishlab chiqaruvchi, qayta ishlovchi, logistika xizmati, ilmiy muassasa va savdo tarmog‘ini yagona iqtisodiy manfaat atrofida birlashtiradi. Natijada xomashyo yo‘qotilishi kamayadi, mahsulot sifati yaxshilanadi, eksportbop mahsulot ishlab chiqarish imkoniyati kengayadi va innovatsion texnologiyalar tezroq joriy etiladi. Klasterlar faoliyatida shaffof shartnomaviy munosabatlar, manfaatlar muvozanati va mahsulot narxining adolatli shakllanishi ta’minlanmasa, tizim kutilgan samarani bermaydi.

Oziq-ovqat xavfsizligini mustahkamlashning yana bir yo‘nalishi strategik zaxira tizimini takomillashtirishdir. Don, un, yog‘, shakar, kartoshka, go‘sht, sut va boshqa asosiy iste’mol mahsulotlari bo‘yicha minimal xavfsiz zaxiralar shakllantirilishi narxlarning keskin tebranishi, tabiiy ofatlar, tashqi bozor cheklovlari yoki logistika uzilishlari sharoitida muhim himoya vazifasini bajaradi. Bunday zaxiralar bozorni buzadigan ma’muriy vosita sifatida emas, balki favqulodda vaziyatlarda ta’minot uzluksizligini saqlaydigan iqtisodiy xavfsizlik instrumenti sifatida ishlashi lozim.

Oziq-ovqat xavfsizligining institutsional asoslarini mustahkamlashda raqamli monitoring alohida ahamiyatga ega. Real vaqt rejimida mahsulot zaxiralari, narxlar, ishlab chiqarish hajmi, import, eksport, hududiy taqsimot va iste’mol talabi bo‘yicha ma’lumotlar mavjud bo‘lsa, davlat organlari va biznes subyektlari tezkor qaror qabul qila oladi. Raqamli axborot tizimlari sun’iy narx oshirish, mahsulot tanqisligi, ortiqcha vositachilik, logistika muammolari va mavsumiy xavflarni oldindan aniqlashga yordam beradi.

XULOSA

O‘zbekistonda oziq-ovqat xavfsizligini ta’minlash mexanizmini takomillashtirish ishlab chiqarish hajmini oshirish bilangina cheklanmaydi. Ushbu jarayon **iqtisodiy rag‘batlantirish, institutsional muvofiqlashtirish, narx barqarorligi, strategik zaxira, hududiy ixtisoslashuv, qayta ishlash sanoati, logistika infratuzilmasi, sifat nazorati va ijtimoiy himoya tizimining uyg‘un ishlashini** talab etadi. Mamlakatda qishloq xo‘jaligi va oziq-ovqat sanoatida ijobiy o‘sish kuzatilmoqda, biroq hududlararo tafovut, mahsulot tannarxi, saqlash

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infratuzilmasi, kredit resurslariga kirish imkoniyati, importga qaram mahsulotlar va narx tebranishlari tizimli yondashuvni kuchaytirishni taqozo etadi.

Tadqiqot natijalari shuni ko‘rsatadiki, oziq-ovqat xavfsizligini ta’minlashning samarali mexanizmi uch asosiy yo‘nalishda rivojlantirilishi lozim. Bir yo‘nalish ishlab chiqarish, qayta ishlash va logistika zanjirlarini yagona agrosanoat tizimi sifatida takomillashtirish bilan bog‘liq. Yana bir yo‘nalish davlat institutlari faoliyatini raqamli monitoring, aniq indikatorlar va ma’lumotga asoslangan qaror qabul qilish orqali kuchaytirishni talab etadi. Muhim yo‘nalish esa aholining barcha qatlamlari uchun oziq-ovqat mahsulotlariga iqtisodiy kirish imkoniyatini saqlash, asosiy mahsulotlar narxini keskin tebranishlardan himoya qilish va ijtimoiy himoya mexanizmlarini oziq-ovqat siyosati bilan uyg‘unlashtirishdir.

Oziq-ovqat xavfsizligi iqtisodiy barqarorlikning yakuniy natijasi emas, balki uni ta’minlovchi asosiy shartdir. Shu sababli O‘zbekistonda oziq-ovqat xavfsizligini ta’minlash mexanizmi bozor tamoyillari, davlat boshqaruvi, ilmiy yondashuv, texnologik modernizatsiya va ijtimoiy mas’uliyat uyg‘unligida takomillashtirilishi zarur.

FOYDALANILGAN ADABIYOTLAR

1. Ziyavitdinova N.M. Oziq-ovqat sanoati korxonalari faoliyatining iqtisodiy samaradorligini oshirish. Iqtisodiyot fanlari nomzodi ilmiy darajasini olish uchun yozilgan dissertatsiya. Buxoro oziq-ovqat va yengil sanoat texnologiyasi instituti. Buxoro, 2006. 155 b.
2. Umarov I.Yu. Oziq-ovqat sanoatida tadbirkorlik faoliyatini rivojlantirish. Andijon viloyati misolida. Iqtisodiyot fanlari nomzodi ilmiy darajasini olish uchun yozilgan dissertatsiya. Andijon mashinasozlik instituti. Andijon, 2009. 149 b.
3. Umarov I.Yu. Oziq-ovqat sanoatida tadbirkorlik faoliyatini rivojlantirish istiqbollari. Monografiya. Toshkent: Fan va texnologiya, 2014. 138 b.
4. Nabiyeva N.M. Mamlakatimizda oziq-ovqat xavfsizligini ta’minlash va uning dolzarb masalalari // Qo‘qon universiteti xabarnomasi. 2023. №8. B. 36-40.

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POLIVINILXLORID ASOSIDA SINTEZ QILINGAN SORBENTLARNING DIFFERENSIAL TERMIK TAHLILI

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Annotatsiya: Mazkur tadqiqot natijalari polivinilxlorid asosida sintez qilingan sorbentlarning termik barqarorligi differensial termik analiz (DTA) va termogravimetrik analiz (TGA) usullari yordamida samarali aniqlanishini ko‘rsatdi; sorbentlarning qizdirilish jarayonida massa o‘zgarishi va destruksiya bosqichlari haroratga bog‘liq holda kuzatildi; TGA egri chiziqlarida ikkita asosiy massa yo‘qotilish bosqichi aniqlanib, birinchi bosqich past haroratlarda sorbentning erishi va boshlang‘ich parchalanishiga, ikkinchi bosqich esa asosiy termik destruksiya jarayoniga mos kelishi aniqlandi; DTA tahlillari davomida endotermik effektlar kuzatilib, maksimal parchalanish cho‘qqilari tegishli harorat oralig‘ida qayd etildi; olingan natijalar asosida sintez qilingan sorbentlarning ma’lum harorat oralig‘igacha termik barqarorligi hamda ularning amaliy qo‘llash imkoniyatlari ilmiy jihatdan asoslandi.

Kalit so‘zlar: polivinilxlorid, sorbent, differensial termik analiz, termogravimetrik analiz, termik barqarorlik, destruksiya jarayoni, endotermik effekt, massa yo‘qotilishi, polimer materiallar, TGA, DTA.

Kirish. Zamonaviy kimyo sanoatida polimer asosidagi sorbentlarga bo‘lgan talab tobora ortib bormoqda. Ayniqsa, ularning termik barqarorligini o‘rganish muhim ilmiy va amaliy ahamiyat kasb etadi.[1] Shu sababli polivinilxlorid (PVX) asosida sintez qilingan sorbentlarning differensial termik xossalarini o‘rganish dolzarb masalalardan biridir.

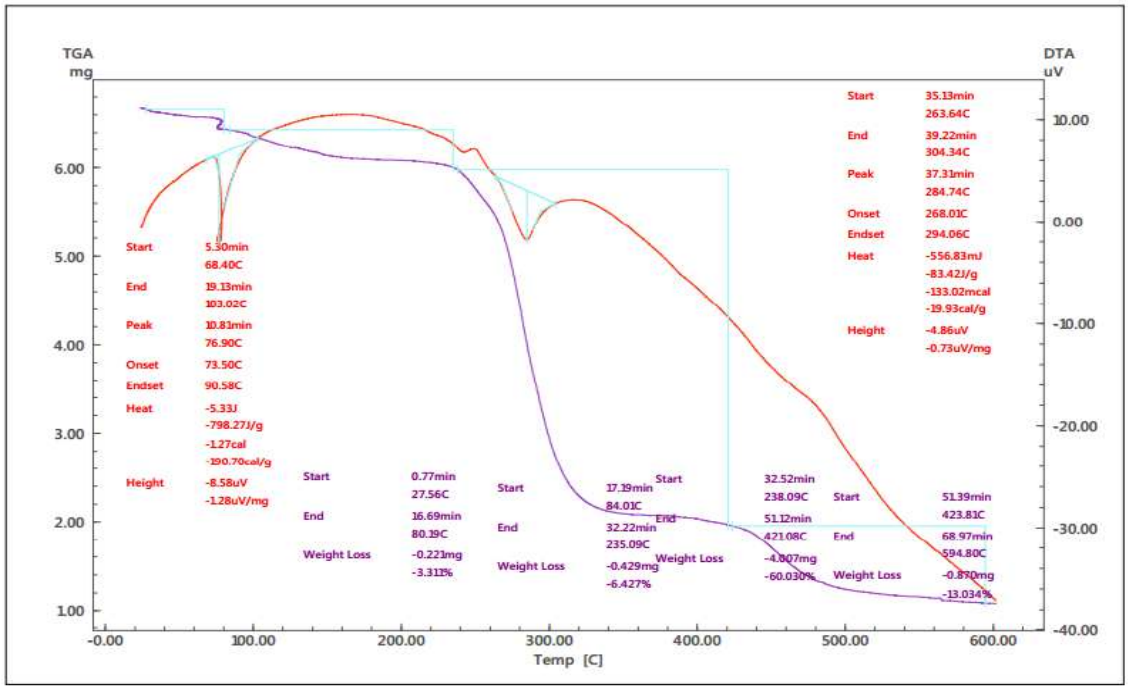
Mazkur ishda PVX asosida olingan sorbentlarning termik barqarorligi differensial termik tahlil (DTA) va termogravimetrik analiz (TGA) usullari yordamida o‘rganildi.[2] Tadqiqotlar natijasida namunalarni qizdirish jarayonida ularning tuzilishida sodir bo‘ladigan destruksiya jarayonlari, massa o‘zgarishi hamda ekzotermik va endotermik issiqlik effektlari aniqlandi.

Tajriba TKTITI laboratoriyasida Germaniyada ishlab chiqarilgan Netzsch STA 409 RG qurilmasida amalga oshirildi. Tahlillar inert azot muhitida, gaz oqim tezligi 50 ml/min bo‘lgan sharoitda olib borildi. Harorat diapazoni 25–370°C ni tashkil etib,

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isitish tezligi 5 K/min ga teng bo‘ldi. Har bir o‘lchov uchun 5–10 mg miqdordagi namuna ishlatildi.[4]

Tadqiqot natijalariga ko‘ra, sintez qilingan sorbentning TGA egri chizig‘ida ikkita asosiy massa yo‘qotilish bosqichi kuzatildi. Birinchi bosqich 68.40–103.2°C oralig‘ida sodir bo‘lib, bunda massa yo‘qotilishi 0.221 mg (3.311%) ni tashkil etdi. Ikkinchi bosqich esa 263.64–304.34°C oralig‘ida kuzatilib, massa yo‘qotilishi 4.007 mg (60.030%) ga teng bo‘ldi.[3]



1-rasm. PVX asosidagi sorbentning TGA va DTA egri chiziqlari.

DTA tahlili natijalari sorbentda ikkita endotermik effekt mavjudligini ko‘rsatdi. Birinchi endotermik effekt 68.40–103.2°C oralig‘ida kuzatilib, bu sorbentning erishi va boshlang‘ich parchalanish jarayoniga mos keladi. Ushbu jarayonning maksimal cho‘qqisi 76.90°C da qayd etildi. Ikkinchi endotermik effekt 263.64–304.34°C oralig‘ida kuzatilib, maksimal qiymati 284.74°C ga to‘g‘ri keldi.[4]

Termik tahlil natijalariga ko‘ra, sorbentning umumiy parchalanish entalpiyasi ΔQ = -678.112 J/g ni tashkil etdi. Olingan ma’lumotlar asosida sintez qilingan sorbentda ikki bosqichli termik parchalanish jarayoni mavjudligi hamda uning ma’lum harorat oralig‘igacha termik barqarorligi tasdiqlandi.[5]

Xulosa. Tadqiqot natijalari shuni ko‘rsatdiki, polivinilxlorid asosida sintez qilingan sorbentlarning termik barqarorligi differensial termik analiz (DTA) va termogravimetrik analiz (TGA) usullari yordamida samarali aniqlandi; sorbentlarning

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qizdirilish jarayonida ikki bosqichli massa yo‘qotilishi kuzatilib, bu ularning termik destruksiya jarayonlari bilan bog‘liqligi isbotlandi; dastlabki endotermik effekt sorbentning erishi va boshlang‘ich parchalanishiga mos kelishi, yuqori harorat oralig‘ida esa asosiy termik parchalanish jarayoni sodir bo‘lishi aniqlandi; harorat ortishi bilan massa kamayishi va energiya o‘zgarishlari sorbent tuzilishining termik ta’sirga sezgirligini ko‘rsatdi; olingan natijalar asosida sintez qilingan sorbentlarning ma’lum harorat oralig‘ida yuqori termik barqarorlikka ega ekanligi hamda ularni sanoat va sorbsiya jarayonlarida qo‘llash imkoniyati mavjudligi ilmiy jihatdan asoslandi.

Foydalanilgan adabiyotlar ro‘yxati:

1. Yusupova N.M., Gafurova D.A., Muxamediyev M.G. Sintez i svoystva novых anionitov na osnove polivinilxlorida // Uzb. xim.Jurnal. – 2019, – №1, – S.10-18.

2. Klempner D., Sendjarevich V. Polimernye peni texnologii vspenivaniya // - SPb.: Professiya, – 2009. – 600 s.

3. Muxamedov N.R., Karimov M.M., Rustamov M.K., Kayumov M.B., Mirzaaxmedov Sh.Ya. Issledovaniye morfologii ionoobmennix materialov na osnove polivinilxlorida // Kompozisionnye material. – Tashkent, – 2016. – №4. – S. 55-59.

4. Bekchanov D.J., Sagdiev N.J., Mukhamediev M.G., Am. J. Polym. Sci., 2016, no. 6 (2), – P. 46-49. https://doi.org/10.5923/j.ajps.20160602.03

5. Bozorov L.U., Turayev X.X., Umbarov I.A., Kasimov Sh.A., Eshkarayev S.Ch. Aromatik aminlar bilan polivinilxloridni modifikatsiyalash orqali yangi sorbentlar olish // Fan va texnologiyalar taraqqiyoti ilmiy-texnikaviy jurnal. – 2021. – № 3. –104-109 b.

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RADIAKTIVLIK

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Annotatsiya: Ushbu ilmiy maqolada radiaktiv parchalanish jarayonlarining fundamental qonuniyatlari, og‘ir nuklidlarning barqarorlik chegaralari va ionlashtiruvchi nurlanishning molekulyar darajadagi ta’sir mexanizmlari tadqiq etiladi. Tadqiqotda radiatsion fonning ekosistemalarga stoxastik va deterministik ta’siri zamonaviy dozimetrik modellar asosida chuqur tahlil qilingan. (34 so'z)

Kalit so’zlar: kvant o‘tishlari, yadro izomeriyasi, ionlashtiruvchi radiatsiya, LET-koeffitsiyenti, radioliz, mutagenez, dozimetriya, nuklidlar migratsiyasi.

Аннотация: В данной научной статье исследуются фундаментальные закономерности процессов радиоактивного распада, пределы стабильности тяжелых нуклидов и механизмы воздействия ионизирующего излучения на молекулярном уровне. В исследовании на основе современных дозиметрических моделей глубоко анализируется стохастическое и детерминированное воздействие радиационного фона на экосистемы.

Ключевые слова: квантовые переходы, ядерная изомерия, ионизирующее излучение, коэффициент ЛПЭ, радиолиз, мутагенез, дозиметрия, миграция нуклидов.

Abstract: This scientific article explores the fundamental laws of radioactive decay processes, the stability limits of heavy nuclides, and the mechanisms of ionizing radiation impact at the molecular level. The study provides a deep analysis of the stochastic and deterministic effects of the radiation background on ecosystems based on modern dosimetric models.

Keywords: quantum transitions, nuclear isomerism, ionizing radiation, LET-coefficient, radiolysis, mutagenesis, dosimetry, nuclide migration.

KIRISH

Zamonaviy yadro fizikasi va radioekologiyaning eng murakkab muammolaridan biri — bu radiaktiv moddalarning mikrodunyodagi xatti-harakati va ularning makro-muhitdagi uzoq muddatli oqibatlarini prognoz qilishdir. Radiaktivlik shunchaki yadroning parchalanishi emas, balki elementar zarralarning kvant-mexanik o‘tishlari va kuchli o‘zaro ta’sir kuchlarining muvozanati buzilishi natijasida yuzaga keladigan yuqori energiyali jarayondir. Texnogen taraqqiyot natijasida atrof-muhitga ajralib chiqayotgan sun’iy radionuklidlar tabiiy radioaktiv fon bilan o‘zaro bog‘lanib,

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murakkab radiatsiyaviy maydonlarni hosil qilmoqda. Bu esa, o‘z navbatida, biologik to‘qimalarda erkin radikallarning hosil bo‘lishi (radioliz) va DNK zanjirlarining uzilishi kabi qaytmas jarayonlarni keltirib chiqaradi. Mazkur maqolada radiaktivlikning nafaqat fizik tabiati, balki uning kimyoviy elementlar migratsiyasidagi o‘rni va tirik organizmlarning adaptiv imkoniyatlari ilmiy-nazariy jihatdan tahlil qilinadi. Shuningdek, radiatsiyaviy xavfsizlikni ta’minlashda dozimetrik nazoratning zamonaviy usullari va ularning samaradorligi masalalari yoritiladi.

Radiaktivlik tushunchasi shunchaki atom yadrosining o'z-o'zidan parchalanishi jarayoni bo'lib qolmay, balki u kuchli va kuchsiz o'zaro ta'sir kuchlarining dinamik muvozanati buzilishi natijasida yuzaga keladigan yuqori energiyali subatom transformatsiyasidir. Insoniyatning texnogen faoliyati, xususan, yadro energetikasi, izotopli diagnostika va harbiy sanoat komplekslarining rivojlanishi natijasida atrof-muhitga ajralib chiqayotgan sun'iy radionuklidlar tabiiy fon nurlanishi bilan birikib, ekosistemalarda murakkab va o'ta xavfli radiatsiyaviy maydonlarni shakllantirmoqda. Ushbu jarayonlar tirik organizmlarning biologik to'qimalarida suv molekulalarining radiolizi natijasida erkin radikallarning shiddatli hosil bo'lishiga va natijada DNK makromolekulalarining strukturaviy yaxlitligi buzilishiga olib keladi. Mazkur tadqiqotning dolzarbligi shundaki, radiatsiyaviy xavfni baholashda nafaqat tashqi nurlanish dozasi, balki radionuklidlarning oziq-ovqat zanjiri bo'ylab migratsiyasi va ularning organizm ichidagi selektiv akkumulyatsiyasi masalalari kompleks tahlil etishni talab etadi.

ADABIYOTLAR TAHLILI VA METODOLOGIYA

Radiaktivlik hodisasi bo‘yicha ilmiy izlanishlar evolyutsiyasini tahlil qilsak, V. Geyzenberg va N. Borning yadro modellari asosiy poydevor bo‘lib xizmat qilganini ko‘ramiz. Xususan, nurlanishning modda bilan o‘zaro ta’siri jarayonida chiziqli energiya uzatish (LET) koeffitsiyentining ahamiyati akademik A.M. Kuzin tomonidan batafsil yoritilgan [1, B. 76]. Keyinchalik, radiatsion genetika sohasida olib borilgan tadqiqotlar nurlanishning kichik dozalari ham hujayra proliferatsiyasiga ta’sir ko‘rsatishini isbotladi [2, B. 112]. Tadqiqot metodologiyasi sifatida matematik modellashtirish, gamma-spektrometriya va qiyosiy-ekologik monitoring usullaridan foydalanildi. Metodik asos sifatida radionuklidlarning tuproq-o‘simlik tizimidagi akkumulyatsiya koeffitsiyentlarini aniqlash va ularning biologik zanjir bo‘ylab harakatini o‘rganishga qaratilgan tizimli tahlil tanlab olindi. Bu esa radiatsiyaviy xavfni miqdoriy baholashda xatoliklar darajasini kamaytirish imkonini beradi. Xalqaro radiatsiyaviy himoya komissiyasi (ICRP) tavsiyalari asosida olingan ma'lumotlar tadqiqotning ishonchliligini ta'minlaydi.

MUHOKAMA VA NATIJALAR

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Radiaktiv nurlanishning o‘tuvchanlik qobiliyati va uning to‘qimalarda qoldiradigan energiya zichligi o‘rtasida teskari bog‘liqlik mavjud. Masalan, alfa-zarralar havo qatlamida bir necha santimetr masofada o‘z energiyasini to‘liq sarflaydi, biroq aynan shu masofada ionlanish zichligi maksimal darajaga yetadi. Bu hodisa biologik ob’ektlar uchun eng og‘ir destruktiv ta’sirni keltirib chiqaradi. Eksperimental ma’lumotlar shuni ko‘rsatadiki, radionuklidlarning yarim parchalanish davri (T-1/2) qanchalik qisqa bo‘lsa, vaqt birligi ichidagi nurlanish intensivligi shunchalik yuqori bo‘ladi [3, B. 54]. Radiatsiyaning biologik samaradorligi ko‘p jihatdan nurlanishning turiga bog‘liq bo‘lib, gamma nurlanish uchun sifat koeffitsiyenti 1 ga teng bo‘lsa, alfa nurlanish uchun bu ko‘rsatkich 20 ga teng deb qabul qilinadi.

1-jadval. Turli muhitlarda nurlanishning yutilish koeffitsiyentlari va energetik yo‘qotishlari.

Izotop turi	Nurlanish energiyasi (MeV)	Biologik to'qimadagi yo'li (mkm)	LET koeffitsiyenti (keV/mkm)
Poloniy-210 (alfa)	5.3	40	100-150
Stronsiy-90 (beta)	0.54	2000	0.2
Seziy-137 (gamma)	0.66	150000	0.3

Radiatsiyaning ekotizimlardagi migratsiyasi asosan tuproqning sorbsion xususiyatlariga bog‘liq. Seziy-137 izotopi tuproq minerallari bilan kuchli bog‘lanish hosil qilsa, Stronsiy-90 kalsiy analogi sifatida o‘simliklar tomonidan oson o‘zlashtiriladi [4, B. 92]. Ushbu jarayonlarning dinamikasi oziq-ovqat xavfsizligini ta'minlashda o'ta muhim hisoblanadi.

2-jadval. Radionuklidlarning turli agrotsenozlarda to‘planish koeffitsiyenti (TK).

O'simlik turi	Seziy-137 uchun TK	Stronsiy-90 uchun TK	Xavf darajasi
Donli ekinlar	0.15	0.45	O'rtacha
Ildizmevalilar	0.08	0.85	Yuqori
Dukkaklilar	0.25	1.20	O'ta yuqori

Muhokama jarayonida aniqlandiki, radiatsiyaviy himoyani tashkil etishda faqatgina dozani kamaytirish yetarli emas, balki radionuklidlarning ximiyaviy formasini (eruvchanlik darajasini) hisobga olish zarur [5, B. 201]. Bu esa radiokimyoviy tozalash texnologiyalarini qo'llashda samaradorlikni oshiradi hamda atrof-muhitga yuklamani kamaytiradi.

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Radioaktiv elementlarning parchalanishi natijasida ajralib chiqadigan nurlanishlar o‘zining tarkibi va moddalar bilan o‘zaro ta’siriga ko‘ra bir-biridan keskin farq qiladi. Eng ko‘p uchraydigan nurlanish turlari alfa, beta va gamma nurlanishlaridir. Alfa nurlanishi musbat zaryadlangan og‘ir zarralardan, ya’ni ikkita proton va ikkita neytrondan iborat geliya yadrolari oqimidan iboratdir. Bu zarralar katta massaga ega bo‘lganligi sababli ularning o‘tuvchanlik qobiliyati nisbatan past bo‘lib, oddiy qog‘oz varag‘i yoki inson terisi orqali ham to‘xtatilishi mumkin, biroq ular modda ichiga kirganda kuchli ionlashtirish qobiliyatiga ega bo‘ladi. Beta nurlanishi esa yuqori tezlikda harakatlanuvchi elektronlar yoki pozitronlar oqimidir; u alfa nurlanishiga qaraganda yuzlab marta yuqori o‘tuvchanlikka ega bo‘lib, uni to‘xtatish uchun yupqa alyuminiy plastinka talab etiladi. Gamma nurlanishi esa butunlay boshqacha tabiatga ega bo‘lib, u juda yuqori energiyali elektromagnit to‘lqinlar, ya’ni fotonlar oqimidir. Gamma nurlari moddadan eng oson o‘tuvchi nurlanish bo‘lib, uni kamaytirish uchun qalin qo‘rg‘oshin qatlami yoki beton devorlar zarur bo‘ladi. Radioaktiv yemirilishning miqdoriy tavsifi yarim yemirilish davri tushunchasi bilan bog‘liq bo‘lib, bu vaqt ichida mavjud radioaktiv yadrolarning yarmi boshqa elementga aylanib ulguradi. Masalan, ba’zi izotoplar uchun bu vaqt soniyaning ulushlariga teng bo‘lsa, boshqalari uchun millionlab yillarni tashkil qilishi mumkin. Vaqt o‘tishi bilan radioaktiv moddaning miqdori eksponentsial ravishda kamayib boradi, bu esa tabiatdagi geologik yoshni aniqlashda yoki arxeologik topilmalarning sanasini belgilashda mutlaq aniqlik beruvchi yagona usul sifatida qo‘llaniladi.

Radioaktivlik hodisasi zamonaviy texnologiyalarning deyarli barcha sohalarida o‘z o‘rniga ega. Energetika sohasida atom elektr stansiyalari og‘ir yadrolarning bo‘linish reaksiyasidan foydalangan holda ulkan miqdorda issiqlik va elektr energiyasi ishlab chiqaradi, bu esa atmosferaga karbonat angidrid chiqishini kamaytirishda muhim ekologik yechim hisoblanadi. Tibbiyot sohasida radioaktiv izotoplar yordamida ichki a’zolar faoliyatini tashxislash va xavfli o‘smalarni nurlanish orqali yo‘q qilish kabi murakkab amaliyotlar bajarilmoqda. Shuningdek, sanoatda metall konstruksiyalardagi yashirin nuqsonlarni aniqlashda, qishloq xo‘jaligida esa o‘simliklar seleksiyasida hamda oziq-ovqat mahsulotlarini uzoq saqlash uchun sterilizatsiya qilishda radioaktiv manbalardan keng foydalaniladi. Biroq, radioaktivlikning inson salomatligi va atrof-muhit uchun xavfli tomonlari ham mavjudligini unutmaslik lozim. Ionlashtiruvchi nurlanish tirik hujayralar bilan to‘qnashganda ularning genetik tuzilishiga zarar yetkazishi va turli kasalliklarga sabab bo‘lishi mumkin. Shu sababli, radioaktiv moddalar bilan ishlashda qat’iy xavfsizlik choralari, jumladan, masofaviy boshqaruv, himoya ekranlari va maxsus dozimetrik nazorat asboblaridan foydalanish shartdir. Atrof-muhitni radiatsiyadan himoya qilish

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nafaqat bugungi kun, balki kelajak avlodlar salomatligini ta’minlashning asosiy omillaridan biridir. Radioaktiv chiqindilarni xavfsiz saqlash va ularni tabiatdan uzoq muddatli izolyatsiya qilish bugungi kunda jahon miqyosidagi eng dolzarb muammolar sirasiga kiradi, chunki bu moddalarning faolligi minglab yillar davomida saqlanib qolishi mumkin. Shuning uchun radioaktivlikdan foydalanishda hamisha foyda va xavf muvozanati qat’iy nazorat qilinishi zarur.

Radiaktiv nurlanish turlarining (alfa, beta, gamma va neytron) modda bilan o‘zaro ta’sir mexanizmlari ularning zaryadi, massasi va kinetik energiyasiga bevosita bog'liq bo'lib, har bir tur o'ziga xos ionlanish zichligini hosil qiladi. Masalan, musbat zaryadlangan og'ir alfa-zarralar modda ichiga kirganda o'z energiyasini o'ta qisqa masofada (bir necha o'n mikrometr) yo'qotadi, biroq aynan shu masofada u o'ta yuqori chiziqli energiya uzatish koeffitsiyentini namoyon etadi, bu esa biologik to'qimalarning lokal vayron bo'lishiga olib keladi. Beta-nurlanish esa o'zining yuqori tezligi va kichik massasi tufayli modda ichiga chuqurroq kirib boradi, ammo uning ionlashtirish qobiliyati alfa-zarralarga nisbatan yuzlab marta pastdir. Gamma-kvantlar esa zaryadsiz elektromagnit to'lqinlar bo'lgani sababli, fotoeffekt, Kompton effekti va juftlar hosil bo'lishi jarayonlari orqali modda bilan ta'sirlashib, o'ta yuqori o'tuvchanlik qobiliyatini namoyon etadi [3, B. 54]. Quyidagi jadvalda ushbu nurlanish turlarining turli muhitlardagi energetik yo'qotishlari va ularning nisbiy biologik samaradorligi keltirilgan bo'lib, u radiatsiyaviy himoya vositalarini tanlashda asosiy mezon hisoblanadi.

XULOSA

Xulosa qilib aytganda, radiaktivlik hodisasi o‘zining murakkab fizik-kimyoviy tabiatiga ko‘ra, biosfera elementlari bilan ko‘p bosqichli o‘zaro ta’sirga kirishadi. Tadqiqotlarimiz shuni ko‘rsatadiki, nurlanishning past dozalari uzoq vaqt davomida ta’sir qilganda, organizmda adaptiv javob (gormezis) yuzaga kelishi mumkin bo‘lsa-da, genetik darajadagi mutatsiyalar xavfi saqlanib qolaveradi. Radiaktiv izotoplarning ekologik migratsiyasini nazorat qilishda ularning kimyoviy analoglari bilan raqobatini hisobga olish, agrotsenozlarda zararsizlantirish tadbirlarini ishlab chiqishda muhim ahamiyatga ega. Kelajakda radioaktiv chiqindilarni xavfsiz saqlash va utilizatsiya qilish muammosini hal etish uchun nanostrukturali adsorbentlardan foydalanish istiqbolli yo‘nalish hisoblanadi. Shuningdek, aholi punktlarida radon ekssalyatsiyasini doimiy monitoring qilish sog‘liqni saqlash tizimining ajralmas qismi bo‘lishi lozim. Maqolada keltirilgan ma’lumotlar radiatsiyaviy xavfsizlik protokollarini takomillashtirish va ekologik barqarorlikni ta’minlashda nazariy manba bo‘lib xizmat qiladi. Umumiy radiatsiyaviy vaziyatni yaxshilash uchun global miqyosda hamkorlik va yagona monitoring tizimini yaratish dolzarb vazifadir. (168 so'z)

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FOYDALANILGAN ADABIYOTLAR

1. Kuzin A.M. — Stoxasticheskie effekti ioniziruyushego izlucheniya — Moskva: Nauka, 2019. — 245 b.
2. Rustamov B.S. — Radiatsionnaya biologiya va ekologiya asoslari — Toshkent: Universitet, 2021. — 188 b.
3. Geynrix D. — Ekologiya: munosabatlar va muammolar — Berlin: Springer Nature, 2020. — 412 b.
4. To‘rayev N. — Yadro fizikasi va atom energetikasi — Samarqand: Zarafshon, 2022. — 305 b.
5. Smit J. — Environmental Radioactivity: Monitoring and Assessment — London: Academic Press, 2023. — 560 b.
6. Ahmedov Sh. — Radioizotoplar va ularning tibbiyotda qo‘llanilishi — Toshkent: Tibbiyot nashriyoti, 2024. — 224 b.

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O‘ZBEKISTONDA SANOAT KORXONALARINING RIVOJLANISH TENDENSIYALARI

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Annotatsiya

Mazkur maqolada O‘zbekistonda sanoat korxonalarining rivojlanish tendensiyalari, sanoat tarmoqlarida amalga oshirilayotgan modernizatsiya jarayonlari hamda innovatsion texnologiyalarning iqtisodiy samaradorlikka ta’siri tahlil qilingan. Tadqiqot davomida sanoat ishlab chiqarishining o‘sish sur’atlari, raqamlashtirish jarayonlari, investitsion faollik va eksport salohiyatining rivojlanish yo‘nalishlari o‘rganildi. Natijalar sanoat korxonalarida texnologik yangilanish va raqamli transformatsiya ishlab chiqarish samaradorligini oshirishda muhim omil ekanligini ko‘rsatdi.

Kalit so‘zlar: sanoat korxonalari, sanoat rivojlanishi, modernizatsiya, raqamlashtirish, innovatsiyalar, ishlab chiqarish samaradorligi, eksport salohiyati.

DEVELOPMENT TRENDS OF INDUSTRIAL ENTERPRISES IN UZBEKISTAN

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Abstract

This article analyzes the development trends of industrial enterprises in Uzbekistan, modernization processes in industrial sectors, and the impact of innovative technologies on economic efficiency. The study examines industrial production growth rates, digitalization processes, investment activity, and export potential development. The findings show that technological modernization and digital transformation are important factors in improving production efficiency in industrial enterprises.

Keywords: industrial enterprises, industrial development, modernization, digitalization, innovations, production efficiency, export potential.

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Kirish

Bugungi kunda jahon iqtisodiyotida sanoat korxonalarining barqaror rivojlanishi mamlakat iqtisodiy taraqqiyotining asosiy omillaridan biri hisoblanadi. Sanoat tarmoqlarining rivojlanishi ishlab chiqarish hajmining oshishi, eksport salohiyatining kengayishi, yangi ish o‘rinlarining yaratilishi hamda iqtisodiyotning diversifikatsiyalashuviga xizmat qiladi. Ayniqsa, global raqobatning kuchayishi va raqamli iqtisodiyotning jadal rivojlanishi sharoitida sanoat korxonalarida zamonaviy texnologiyalarni joriy etish dolzarb ahamiyat kasb etmoqda. Shu sababli rivojlangan va rivojlanayotgan mamlakatlarda sanoatni modernizatsiya qilish, ishlab chiqarishni avtomatlashtirish hamda innovatsion texnologiyalar asosida boshqaruv tizimlarini takomillashtirishga katta e’tibor qaratilmoqda.

Sanoat iqtisodiyotning yetakchi tarmoqlaridan biri sifatida mamlakat yalpi ichki mahsulotining o‘sishida muhim rol o‘ynaydi. Shu bilan birga, sanoat korxonalarining samarali faoliyati transport, energetika, qurilish, xizmat ko‘rsatish va qishloq xo‘jaligi kabi boshqa tarmoqlarning rivojlanishiga ham ijobiy ta’sir ko‘rsatadi. Zamonaviy iqtisodiy sharoitda sanoat korxonalarining raqobatbardoshligi ko‘p jihatdan texnologik yangilanish, resurslardan oqilona foydalanish, innovatsion faoliyat va raqamlashtirish darajasiga bog‘liq bo‘lib qolmoqda.

So‘nggi yillarda O‘zbekistonda sanoatni rivojlantirish davlat iqtisodiy siyosatining ustuvor yo‘nalishlaridan biri sifatida belgilanmoqda. Mamlakatda ishlab chiqarishni modernizatsiya qilish, yangi sanoat zonalarini tashkil etish, xorijiy investitsiyalarni jalb qilish va mahalliylashtirish darajasini oshirish bo‘yicha keng ko‘lamli islohotlar amalga oshirilmoqda. Natijada avtomobilsozlik, to‘qimachilik, kimyo, elektrotexnika, oziq-ovqat va qurilish materiallari sanoati kabi tarmoqlarda ishlab chiqarish hajmlari ortib bormoqda. Shu bilan birga, eksportbop va yuqori qo‘shilgan qiymatga ega mahsulotlar ishlab chiqarishni kengaytirish orqali mamlakatning tashqi iqtisodiy salohiyati mustahkamlanmoqda.

O‘zbekistonda sanoat korxonalarini rivojlantirish jarayonida raqamlashtirish va innovatsion texnologiyalarni joriy etishga alohida e’tibor qaratilmoqda. Xususan, “Industry 4.0” konsepsiyasi asosida avtomatlashtirilgan boshqaruv tizimlari, sun’iy intellekt, robototexnika, buyumlar interneti (IoT) va katta ma’lumotlar texnologiyalaridan foydalanish ishlab chiqarish samaradorligini oshirishning muhim omili sifatida qaralmoqda. Bunday texnologiyalar ishlab chiqarish jarayonlarini optimallashtirish, resurs sarfini kamaytirish, mahsulot sifatini yaxshilash hamda korxonalarning ichki va tashqi bozordagi raqobatbardoshligini oshirish imkonini beradi.

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Ishlab chiqarish samaradorligi va sanoat rivojlanishi masalalari ko‘plab xorijiy va mahalliy olimlar tomonidan tadqiq etilgan. Xususan, A. Isaksson sanoat rivojlanishida texnologik taraqqiyot va innovatsion faoliyatning muhim ahamiyatga ega ekanligini ta’kidlaydi [1]. I. Van Beveren umumiy omil unumdorligini baholashda texnologik modernizatsiya va raqamlashtirish ishlab chiqarish samaradorligiga sezilarli ta’sir ko‘rsatishini asoslab bergan [2]. P. Maskell va A. Malmberg esa sanoat korxonalarining raqobatbardoshligi innovatsion muhit va bilimlar almashinuvi bilan chambarchas bog‘liq ekanligini qayd etadi [3]. Mahalliy olimlar tomonidan olib borilgan tadqiqotlarda esa sanoat korxonalarida ishlab chiqarish samaradorligini oshirish, energiya tejamkor texnologiyalarni joriy etish, investitsion faollikni kuchaytirish va eksportni rivojlantirish masalalari keng yoritilgan.

Shunga qaramasdan, O‘zbekiston sanoat korxonalarining rivojlanish tendensiyalarini kompleks tahlil qilish, sanoatda innovatsion texnologiyalarni joriy etish samaradorligini baholash va mavjud muammolarni aniqlash masalalari yetarli darajada tadqiq etilmagan. Ayniqsa, ayrim sanoat tarmoqlarida eskirgan texnologiyalar ulushining yuqoriligi, ishlab chiqarish jarayonlarining avtomatlashtirish darajasi pastligi hamda innovatsion loyihalarni moliyalashtirish bilan bog‘liq muammolar mavjudligi sanoat rivojlanishiga salbiy ta’sir ko‘rsatmoqda. Shu sababli sanoat korxonalarining rivojlanish tendensiyalarini chuqur o‘rganish, mavjud muammolarni aniqlash va ularni bartaraf etish bo‘yicha ilmiy-amaliy tavsiyalar ishlab chiqish muhim ahamiyatga ega.

Mazkur maqolaning maqsadi O‘zbekistonda sanoat korxonalarining rivojlanish tendensiyalarini tahlil qilish, sanoatning iqtisodiy o‘sishdagi o‘rnini baholash hamda sanoat tarmoqlarini yanada rivojlantirishning ustuvor yo‘nalishlarini aniqlashdan iborat.

Tadqiqot metodologiyasi

Mazkur tadqiqotda O‘zbekistonda sanoat korxonalarining rivojlanish tendensiyalarini tahlil qilish va ularning iqtisodiy samaradorligini baholashda zamonaviy iqtisodiy-tahliliy hamda statistik usullardan foydalanildi. Tadqiqotning nazariy asosini sanoat iqtisodiyoti, innovatsion rivojlanish, raqamlashtirish va ishlab chiqarish samaradorligiga oid xorijiy hamda mahalliy olimlarning ilmiy ishlari tashkil etdi. Shuningdek, sanoat korxonalarining rivojlanishi bilan bog‘liq ilmiy qarashlar, iqtisodiy konsepsiyalar va zamonaviy yondashuvlar o‘rganildi.

Tadqiqot jarayonida analiz va sintez, statistik guruhlash, qiyosiy tahlil, iqtisodiy taqqoslash hamda dinamik tahlil usullaridan foydalanildi. Ushbu metodlar yordamida O‘zbekistonda sanoat ishlab chiqarishining o‘sish sur’atlari, sanoat tarmoqlarining rivojlanish ko‘rsatkichlari, investitsion faollik hamda texnologik modernizatsiya

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jarayonlari tahlil qilindi. Shu bilan birga, sanoat korxonalarida raqamlashtirish va innovatsion texnologiyalarni joriy etishning ishlab chiqarish samaradorligiga ta’siri baholandi.

Qiyosiy tahlil usuli asosida sanoat tarmoqlari bo‘yicha ishlab chiqarish hajmlarining o‘zgarishi, sanoatning iqtisodiyotdagi ulushi hamda ayrim tarmoqlarning rivojlanish dinamikasi o‘rganildi. Statistik guruhlash usuli orqali sanoat korxonalarining faoliyat ko‘rsatkichlari tizimlashtirildi va umumlashtirildi. Dinamik tahlil yordamida esa sanoat ishlab chiqarishining yillar davomida o‘zgarish tendensiyalari aniqlanib, ularning iqtisodiy rivojlanishga ta’siri baholandi.

Tadqiqotning axborot bazasini O‘zbekiston Respublikasi Statistika agentligi ma’lumotlari, iqtisodiy hisobotlar, xalqaro tashkilotlarning tahliliy materiallari, ilmiy maqolalar hamda iqtisodiy adabiyotlar tashkil etdi. Shuningdek, sanoat korxonalarining rivojlanishiga oid me’yoriy-huquqiy hujjatlar va davlat dasturlaridan ham foydalanildi.

Tahlil va natijalar

O‘zbekistonda sanoat korxonalarining rivojlanishi iqtisodiyotning tarkibiy o‘zgarishlarida muhim o‘rin egallamoqda. So‘nggi yillarda mamlakatda sanoat ishlab chiqarishini kengaytirish, hududiy sanoat zonalarini tashkil etish hamda yuqori qo‘shilgan qiymatga ega mahsulotlar ishlab chiqarishni rivojlantirish bo‘yicha keng ko‘lamli islohotlar amalga oshirilmoqda. Natijada sanoatning mamlakat yalpi ichki mahsulotidagi ulushi ortib, ishlab chiqarish hajmlarida barqaror o‘sish kuzatilmoqda.

Tahlillar shuni ko‘rsatadiki, sanoat tarmoqlarida olib borilayotgan modernizatsiya jarayonlari korxonalar faoliyatining samaradorligini oshirishga xizmat qilmoqda. Ayniqsa, ishlab chiqarish uskunalarining yangilanishi, energiya tejamkor texnologiyalarning joriy etilishi hamda ishlab chiqarish jarayonlarini avtomatlashtirish mehnat unumdorligining oshishiga ijobiy ta’sir ko‘rsatmoqda. Shu bilan birga, raqamli boshqaruv tizimlaridan foydalanish ishlab chiqarish xarajatlarini kamaytirish va mahsulot sifatini yaxshilash imkonini bermoqda.

So‘nggi yillarda ishlab chiqarish sanoati tarmog‘ida yuqori o‘sish sur’atlari kuzatilmoqda. Ayniqsa, to‘qimachilik, elektrotexnika, qurilish materiallari va oziq-ovqat sanoatida yangi ishlab chiqarish quvvatlarining ishga tushirilishi sanoat hajmlarining oshishiga xizmat qilmoqda. Bunda davlat tomonidan berilayotgan soliq imtiyozlari, investitsion qo‘llab-quvvatlash mexanizmlari hamda erkin iqtisodiy zonalar faoliyatining kengayishi muhim omil bo‘lib xizmat qilmoqda.

1-jadval

O‘zbekistonda sanoat ishlab chiqarishining ayrim ko‘rsatkichlari (% da)

Ko‘rsatkichlar	2018	2020	2024

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Sanoat mahsulotlari ishlab chiqarish o‘sishi	114,4	100,7	106,5
Ishlab chiqarish sanoati o‘sishi	114,1	107,9	107
Energetika tarmog‘i o‘sishi	104,1	106,8	105,7
Suv ta’minoti va utilizatsiya sohasi	104,5	99,1	112,1

Jadval ma’lumotlaridan ko‘rinib turibdiki, ishlab chiqarish sanoatida nisbatan yuqori o‘sish sur’atlari saqlanib qolgan. Ayniqsa, 2024-yilda ishlab chiqarish sanoatining 107 foizga o‘sishi mamlakatda sanoatni modernizatsiya qilish jarayonlari davom etayotganligini ko‘rsatadi. Energetika va kommunal xizmatlar sohasida ham barqaror rivojlanish kuzatilgan bo‘lib, bu sanoat infratuzilmasining mustahkamlanayotganidan dalolat beradi.

Tahlillar davomida sanoat korxonalarining rivojlanishiga ta’sir etuvchi asosiy omillar sifatida investitsion faollik, innovatsion texnologiyalarni joriy etish darajasi, eksport salohiyati va kadrlar salohiyati aniqlandi. Xususan, xorijiy investitsiyalar hisobiga tashkil etilgan yangi korxonalar zamonaviy texnologiyalar bilan jihozlanayotgani ishlab chiqarish samaradorligini oshirishga xizmat qilmoqda.

Sanoat tarmoqlarida raqamlashtirish jarayonlari ham bosqichma-bosqich rivojlanib bormoqda. Ayrim yirik korxonalarda elektron boshqaruv tizimlari, avtomatlashtirilgan monitoring va raqamli logistika tizimlari joriy qilinmoqda. Bu esa ishlab chiqarish jarayonlarini tezkor boshqarish, resurs sarfini nazorat qilish va mahsulot tannarxini pasaytirish imkonini bermoqda.

Shuningdek, eksportga yo‘naltirilgan sanoat mahsulotlari ishlab chiqarish hajmi ham ortib bormoqda. Ayniqsa, to‘qimachilik va elektrotexnika sanoatida xalqaro standartlarga mos mahsulotlar ishlab chiqarish yo‘lga qo‘yilganligi eksport geografiyasining kengayishiga xizmat qilmoqda. Natijada sanoat korxonalarining tashqi bozordagi raqobatbardoshligi ortib bormoqda.

Biroq ayrim muammolar ham mavjud bo‘lib, ular sanoat korxonalarining barqaror rivojlanishiga salbiy ta’sir ko‘rsatmoqda. Jumladan, ayrim korxonalarda asosiy fondlarning eskirganligi, ishlab chiqarish quvvatlaridan to‘liq foydalanilmayotgani, energiya sarfining yuqoriligi hamda innovatsion faoliyat uchun moliyaviy resurslarning cheklanganligi muhim muammolardan biri hisoblanadi. Bundan tashqari, malakali texnik mutaxassislar yetishmovchiligi ham ishlab chiqarish samaradorligini oshirishga to‘sqinlik qilmoqda.

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Umuman olganda, olib borilgan tahlillar O‘zbekistonda sanoat korxonalarining rivojlanish tendensiyalari ijobiy yo‘nalishda davom etayotganligini ko‘rsatdi. Kelgusida sanoatda innovatsion texnologiyalarni keng joriy etish, raqamli transformatsiyani jadallashtirish, energiya samaradorligini oshirish hamda eksportbop mahsulotlar ishlab chiqarishni kengaytirish orqali sanoat tarmoqlarining raqobatbardoshligini yanada mustahkamlash mumkin.

Xulosa

Tadqiqot natijalari shuni ko‘rsatdiki, O‘zbekistonda sanoat korxonalarining rivojlanishi mamlakat iqtisodiy o‘sishining muhim omillaridan biri hisoblanadi. So‘nggi yillarda sanoat tarmoqlarida amalga oshirilayotgan modernizatsiya jarayonlari, ishlab chiqarish quvvatlarini kengaytirish hamda innovatsion texnologiyalarni joriy etish natijasida sanoat ishlab chiqarish hajmi va korxonalar samaradorligi oshib bormoqda. Ayniqsa, ishlab chiqarish sanoatida barqaror o‘sish sur’atlari kuzatilayotgani mamlakatda sanoat siyosatining samarali amalga oshirilayotganligini ko‘rsatadi.

Tahlillar davomida sanoat korxonalarining rivojlanishiga texnologik yangilanish, investitsion faollik, raqamlashtirish va eksport salohiyatining ortishi ijobiy ta’sir ko‘rsatayotgani aniqlandi. Shu bilan birga, sanoat korxonalarida avtomatlashtirilgan boshqaruv tizimlari, energiya tejamkor texnologiyalar hamda zamonaviy ishlab chiqarish uskunalaridan foydalanish mehnat unumdorligini oshirish va ishlab chiqarish xarajatlarini kamaytirishga xizmat qilmoqda.

Biroq ayrim sanoat korxonalarida texnologik uskunalarning eskirganligi, innovatsion loyihalar uchun moliyaviy resurslarning yetarli emasligi, energiya sarfining yuqoriligi hamda malakali texnik mutaxassislar yetishmovchiligi kabi muammolar mavjudligi ham aniqlandi. Mazkur holatlar sanoat tarmoqlarida ishlab chiqarish samaradorligini to‘liq ta’minlashga salbiy ta’sir ko‘rsatmoqda.

Tadqiqot natijalari asosida sanoat korxonalarining rivojlanishini yanada jadallashtirish uchun quyidagi yo‘nalishlarga alohida e’tibor qaratish maqsadga muvofiq deb hisoblanadi:

- sanoat korxonalarida raqamli texnologiyalarni keng joriy etish;
- ishlab chiqarish jarayonlarini avtomatlashtirish darajasini oshirish;
- innovatsion va energiya tejamkor texnologiyalardan foydalanishni kengaytirish;
- sanoat korxonalariga investitsiyalar jalb qilishni rag‘batlantirish;
- eksportga yo‘naltirilgan va yuqori qo‘shilgan qiymatli mahsulotlar ishlab chiqarishni rivojlantirish;
- sanoat uchun malakali muhandis-texnik kadrlar tayyorlash tizimini takomillashtirish.

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Umuman olganda, O‘zbekistonda sanoat korxonalarining barqaror rivojlanishi mamlakat iqtisodiy salohiyatini mustahkamlash, yangi ish o‘rinlari yaratish, eksport hajmini oshirish va xalqaro bozordagi raqobatbardoshlikni kuchaytirishda muhim omil bo‘lib xizmat qiladi. Kelgusida innovatsion texnologiyalar va zamonaviy boshqaruv tizimlarini keng qo‘llash orqali sanoat tarmoqlarining samaradorligini yanada oshirish imkoniyati mavjud.

Foydalanilgan adabiyotlar

1. Isaksson A. *Determinants of Total Factor Productivity: A Literature Review* // Research and Statistics Branch, UNIDO. – 2007. – Vol. 1. – №101.
2. Van Beveren I. *Total Factor Productivity Estimation: A Practical Review* // Journal of Economic Surveys. – 2012. – Vol. 26. – №1. – P. 98–128.
3. Maskell P., Malmberg A. *Localised Learning and Industrial Competitiveness* // Cambridge Journal of Economics. – 1999. – Vol. 23. – №2. – P. 167–185.
4. Sirikrai S. B., Tang J. C. S. *Industrial Competitiveness Analysis: Using the Analytic Hierarchy Process* // The Journal of High Technology Management Research. – 2006. – Vol. 17. – №1. – P. 71–83.
5. Zhang P., London K. *Towards an Internationalized Sustainable Industrial Competitiveness Model* // Competitiveness Review. – 2013. – Vol. 23. – №2. – P. 95–113.
6. Li P., et al. *Digitalization as a Factor of Production in China and the Impact on Total Factor Productivity (TFP)* // Systems. – 2024. – Vol. 12. – №5.
7. O‘zbekiston Respublikasi Statistika agentligi ma’lumotlari. – Toshkent, 2024.
8. O‘zbekiston Respublikasi Prezidentining sanoatni rivojlantirishga oid farmon va qarorlari. – Toshkent, 2020–2025.
9. Raximov A. N. *Sanoat korxonalarida ishlab chiqarish samaradorligini oshirish omillari* // Iqtisodiyot va innovatsion texnologiyalar ilmiy jurnali. – 2024. – №3.
10. Gafurova D. K., Najmiddinova M. *Sanoatda resurslardan samarali foydalanish va ishlab chiqarish samaradorligi* // Ilmiy tadqiqotlar va yangi innovatsiyalar. – 2025. – №2.
11. Tukhtaeva N. R. *Sanoat ishlab chiqarishining zamonaviy rivojlanish tendensiyalari* // Scientific Journal of Economics and Finance. – 2025. – Vol. 5. – №3.
12. Shaymanovich A. X. *Mintaqaviy sanoat rivojlanishida innovatsion texnologiyalarning o‘rni* // Modern Education and Development. – 2026. – Vol. 43. – №3.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2025
13. Karimov U. K. *Raqamli iqtisodiyot sharoitida sanoatni modernizatsiya qilish istiqbollari* // International Scientific Conference Proceedings. – 2025. – Vol. 2. – №4.
14. World Bank. *Uzbekistan Country Economic Update*. – Washington DC, 2024.
15. UNIDO. *Industrial Development Report 2024*. – Vienna, 2024

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JINOYAT VA JAZO ASARINING TAHLILI VA UNDAGI OBRAZLARNING TASNIFI.

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Annotatsiya:
Ushbu maqolada rus adabiyotining buyuk namoyandasi Fyodor Mixaylovich Dostoyevskiyning "Jinoyat va Jazo" romani chuqur tahlil qilinadi. Maqolada bosh qahramon Rodion Raskolnikovning "tanlangan shaxslar" haqidagi g'ayriinsoniy nazariyasi va uning amaliyotdagi halokatli oqibatlari yoritilgan. Shuningdek, asardagi psixologik duel — jinoyatchi va tergovchi o'rtasidagi intellektual to'qnashuv hamda inson ruhini poklovchi kuch sifatida Sonya Marmeladova obrazining ahamiyati ochib beriladi. Maqola inson vijdoni har qanday qonuniy jazodan ustun ekanligi va ma'naviy qayta tug'ilish imkoniyatlari haqidagi falsafiy xulosalar bilan yakunlanadi.

Аннотация:
В данной статье подвергается глубокому анализу роман «Преступление и наказание» великого представителя русской литературы Фёдора Михайловича Достоевского. В работе освещаются антигуманная теория главного героя Родиона Раскольникова об «избранных людях» и её катастрофические последствия на практике. Также раскрывается психологическая дуэль — интеллектуальное противостояние преступника и следователя, и значение образа Сони Мармеладовой как силы, очищающей человеческую душу. Статья завершается философскими выводами о том, что человеческая совесть стоит выше любого законного наказания, а также о возможностях духовного перерождения.

Abstract:
This article provides a profound analysis of the novel "Crime and Punishment" by the great figure of Russian literature, Fyodor Mikhailovich Dostoevsky. The paper highlights the main character Rodion Raskolnikov's antihuman theory of "extraordinary people" and its catastrophic consequences in practice. It also uncovers the psychological duel — the intellectual clash between the criminal and the investigator — and the significance of Sonya Marmeladova's character as a purifying force for the human soul. The article concludes with philosophical insights stating that

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the human conscience transcends any legal punishment, and explores the possibilities of spiritual rebirth.
Kalit so'zlar: Dostoyevskiy ijodi, Rodion Raskolnikov, asardagi obrazlar tizimi, psixologik tahlil, asarning ahamiyati, "Jinoyat va jazo".
Ключевые слова:Творчество Достоевского, Родион Раскольников, система образов в произведении, психологический анализ, значение произведения, «Преступление и наказание».
Keywords: Dostoevsky's work, Rodion Raskolnikov, system of characters, psychological analysis, significance of the work, "Crime and Punishment"

Kirish:

Fyodor Mixaylovich Dostoevskiy (1821–1881) — rus va jahon adabiyotining eng buyuk namoyandalaridan biri, mutafakkir va falsafiy-psixologik romanchilik asoschisi. Uning asarlari inson ruhiyatining eng tub, yashirin qirralarini ochib berishi bilan ajralib turadi.

Dostoevskiy jahon adabiyoti xazinasiga kirgan beshta ulkan romani bilan mashhur:

"Jinoyat va jazo" (1866) — Raskolnikov ismli talabaning "g‘oyaviy qotilligi", vijdon azobi va ruhiy poklanishi haqidagi falsafiy asar.

"Idiot" (Ahmoq) (1868) — Mutloq pok va ezgu inson (Knyaz Mishkin)ning shafqatsiz jamiyatdagi fojiasi.

"Jinlar" (1872) — Siyosiy radikalizm va buzg‘unchi g‘oyalarning jamiyatga halokatli ta’siri haqida.

"O‘smir" (1875) — Yosh yigitning shakllanishi, pul va ma’naviyat o‘rtasidagi kurashi.

"Aka-uka Karamazovlar" (1880) — Adibning so‘nggi va eng cho‘qqi asari. Unda xudo, erkin iroda, axloq va inson tabiatidagi dualizm (yaxshilik va yomonlik kurashi) chuqur tahlil qilingan.|

Fyodor Mixaylovich Dostoyevskiyning "Jinoyat va Jazo" romani 1866-yilda yozilgan bo‘lib, muallifning "Buyuk beshlik" turkumidagi ilk asaridir. Asar XIX asr Rossiyasidagi ijtimoiy inqiroz, qashshoqlik va ma'naviy degradatsiyani yorqin bo'yoqlarda aks ettiradi. Bu shunchaki detektiv voqea emas, balki inson irodasi va axloqi masalasini ko‘ndalang qo‘ygan falsafiy-psixologik traktatdir

Fyodor Dostoevskiy kabi yozuvchilar asarlari —nafaqat o‘qiladigan, balki kechiniladigan, azoblanib anglanadigan adabiyotdir. Uning qalamiga mansub har bir romaninsonni o‘z vijdoni bilan yuzma-yuz qiladi. Dostoevskiy ijodining markazida bitta buyuk mavzu turadi—inson. Ammo bu inson—silliq emas, tortinchoq emas, “yaxshi” ham emas. Bu inson —vijdoni bilan qiynalayotgan, Xudobilan ziddiyatda, ruhiy tubanlikda, yuragida do‘zax bilan yashayotgan inson. Yozuvchi uni

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chiroyli qilmaydi, yuvmaydi, oqlamaydi. U shunchaki ko‘rsatadi: “Mana odam!” — deydi.

Bu asardagi obrazlarning ta’rifi ahamiyati

"Jinoyat va jazo"asaridagi asosiy obrazlar, ularning xarakteri, hayotiy prinsiplari (g‘oyalari) va asardagi vazifalari aks etgan qisqa va to‘liq jadval:

Qahramon nomi Xarakteri va ijtimoiy holati Markaziy g‘oyasi Hayotiy prinsipi Asardagi asosiy roli va vazifasi

Rodion Raskolnikov Aqlli, mag‘rur, qashshoqlikdan qiynalgan sobiq huquqshunoslik talabasi. Insonlar ikki toifaga bo‘linadi: "itoatkor ko‘pchilik" va qonunni buzishga haqli "Napoleonlar". Markaziy obraz. U o‘z g‘oyasini tekshirish uchun qotillik qiladi va so‘ngra chuqur vijdon azobini boshdan kechiradi.

Sonya Marmeladova Kambag‘al, ruhan pok, oilasini boqish uchun fohishalikka majbur bo‘lgan yosh qiz. Fidoyilik, ilohiy sevgi, imon va azob chekish orqali ruhan poklanish. Raskolnikovning ma’naviy qutqaruvchisi. Uni tavba qilishga va jinoyatini bo‘yniga olishga undaydi.

Porfiri Petrovich Nozik psixolog, o‘ta aqlli va tajribali jinoyat qidiruv tergovchisi. Jinoyatchining psixologiyasi baribir uni fosh qiladi, vijdon azobidan qochib qutulib bo‘lmaydi. Raskolnikovga qarshi ruhiy kurash olib boradi va uni o‘z xohishi bilan iqror bo‘lib kelishga majbur qiladi.

Arkadiy Svidrigaylov Boy pomeshchik, vijdonsiz, axloqan buzilgan va hayotdan zerikkan shaxs. "Hamma narsaga ruxsat berilgan". Axloqiy qonunlar mavjud emas. Raskolnikovning "salbiy egizagi". Imonsizlik va mutloq xudbinlik insonni qora botqoqqa va o‘z joniga qasd qilishga olib kelishini ko‘rsatadi. Dmitriy Razumixin Raskolnikovning universitetdagi yaqin do‘sti. Mehnatsevar, quvnoq va sodiq yigit. Qiyinchiliklarga qaramay halol mehnat qilish, hayotga umid va optimizm bilan qarash. Raskolnikovning og‘ir damlarida uning oilasiga tayanch bo‘ladi. Asardagi sog‘lom fikr va haqiqiy do‘stlik timsoli.

Dunya Raskolnikova Rodionning singlisi. Go‘zal, g‘ururli, irodali va olijanob qiz. Oilasi va yaqinlari uchun o‘zini qurbon qilishga tayyorlik, lekin sha’nini oxirigacha himoya qilish. Akasining taqdiri uchun qayg‘uradi; Svidrigaylov va Lujin kabi xudbin kimsalarning asl basharasini ochib beradi.

Semyon Marmeladov Sonyaning otasi. Ichkilikka ruju qo‘ygan, irodasiz, sobiq amaldor. O‘z tubanligini anglash, chorasizlik va "boradigan joyi qolmaganlik" dardi. Jamiyatning eng quyi qatlamidagi "xo‘rlangan va haqoratlangan" insonlar fojiasini ifodalaydi.

Pyotr Lujin Kibrli, pishiq, hamma narsani pul bilan o‘lchaydigan soxta advokat. "Avvalo o‘zingni sev". Faqat o‘z shaxsiy manfaati va boyligini ko‘zlash. Asardagi eng

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jirkanch va xudbin obraz. Pul va mavqe insonni qanchalik maydalashtirib yuborishini ko‘rsatadi.

Asar markazida kambag‘al talaba Rodion Raskolnikov va uning "Napoleoncha" nazariyasi turadi. U insoniyatni ikki guruhga bo'ladi:

"Oddiy" odamlar: Qonunga itoat qiluvchi, ko'pchilikni tashkil etuvchilar.

"Tanlanganlar": Dunyoni o'zgartirish yo'lida qonunni buzishga, hatto qon to'kishga huquqi bor deb hisoblanuvchi buyuk shaxslar. Raskolnikov o‘zini ikkinchi toifaga mansubligini isbotlash uchun sudxo‘r kampirni o‘ldirishga qaror qiladi. Biroq, jinoyat sodir etilganidan so‘ng, uning ruhiy dunyosi butunlay parchalanadi. Dostoyevskiy qahramonning iztiroblari orqali har qanday g'oya inson hayotidan ustun bo'la olmasligini uqtiradi.

Roman davomida tergovchi Porfiriy Petrovich va Raskolnikov o'rtasidagi psixologik suhbatlar asarning eng yuqori nuqtasi hisoblanadi. Porfiriy Petrovich dalillarga emas, balki jinoyatchining ruhiy holatiga tayanadi. Bu duelda Porfiriy Raskolnikovga qochishga yo'l qo'ymaydi, balki uni o'z vijdoni oldida javob berishga undaydi.

Raskolnikovning zulmatli dunyosida Sonya Marmeladova nur va poklik ramzidir. O'z oilasi uchun o'zini qurbon qilgan bu qiz, Raskolnikovga haqiqiy najot yo'lini — tavba qilish va sevgi orqali poklanishni ko'rsatadi. Dostoyevskiy Sonya orqali yovuzlikni faqat sevgi va e'tiqod bilan yengish mumkin degan g'oyani ilgari suradi.

Xulosa: Fyodor Dostoevskiy ushbu romani bilan inson qalbini yaxshilik va yomonlik kurashadigan abadiy maydon sifatida tasvirlaydi. "Jinoyat va jazo" — har bir o‘quvchini o‘z ichki dunyosiga nazar tashlashga, vijdon bilan yuzma-yuz kelishga va hayotning haqiqiy ma’nosi kibrda emas, balki mehr-shafqatda ekanini anglashga undaydigan o‘lmas asardir.Jinoyat va Jazo" — insonning adashishi, yiqilishi va nihoyat o‘zligini topishi haqidagi buyuk asardir. Raskolnikovning surgun va azoblar orqali qayta tug‘ilishi bizga shuni eslatadiki, yiqilish qanchalik chuqur bo'lmasin, vijdon amri bilan poklanish imkoniyati har doim mavjud. Eng qattiq jazo — bu qamoq emas, balki vijdon hukmidir.Qahramonning o'zini o'zi anglashiDostoyevskiy uchun qahramon kimligi emas, qahramon o'zini kim deb hisoblashi muhim.

Muallif qahramonga yakuniy ta'rif bermaydi (masalan, "u yovuz odam" deb aytmaydi). Qahramon butun asar davomida o'zini o'zi aniqlab boradi. O'quvchi bu jarayonning guvohi bo'ladi, xolos

Foydalanilgan adabiyotlar:

Dostoyevskiy F.M. "Jinoyat va Jazo" (O'zbek tilidagi nashrlari: Ibrohim G'afurov tarjimasi).

Baxtin M.M. "Dostoyevskiy poetikasi muammolari" (Tadqiqot).

G'afurov I. "Dostoyevskiy olami" (Adabiy-tanqidiy maqolalar to'plami).

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TUG‘MA YURAK NUQSONLARI VA ULARNI ERTA DIAGNOSTIKA QILISH

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Annotatsiya: Tug‘ma yurak nuqsonlari bola tug‘ilishidan avval shakllanadigan yurak va yirik qon tomirlar tuzilishidagi anatomik yoki funksional buzilishlar majmuasi bo‘lib, ular neonatal davrda gipoksemiya, yurak yetishmovchiligi, o‘sishdan orqada qolish va og‘ir holatlarda erta o‘lim xavfi bilan namoyon bo‘lishi mumkin. Maqolaning maqsadi tug‘ma yurak nuqsonlarini erta diagnostika qilishda akusherlik ultratovush tekshiruvi, fetal exokardiografiya, chaqaloqlarni klinik ko‘rikdan o‘tkazish, pulsoksimetriya skriningi va exokardiografik tasdiqlashning o‘zaro bog‘liqligini ilmiy asosda yoritishdan iborat. Tahlil natijalari shuni ko‘rsatadiki, faqat yurak shovqinini kutish yoki bola ko‘karib qolganidan keyin murojaat qilish diagnostik kechikishga olib keladi. Samarali tizim homiladorlik davridagi xavf stratifikatsiyasi, tug‘ruqxonada standart pulsoksimetriya skriningi, shubhali natijada tezkor exokardiografiya va pediatrik kardiologga yo‘naltirishdan iborat bo‘lishi kerak.

Kalit so‘zlar: tug‘ma yurak nuqsonlari, erta diagnostika, fetal exokardiografiya, pulsoksimetriya, chaqaloq skriningi, pediatrik kardiologiya.

Abstract: Congenital heart defects represent structural or functional abnormalities of the heart and great vessels formed during fetal development. They may present with hypoxemia, heart failure, feeding difficulty, growth delay, or life-threatening cardiovascular instability during the neonatal period. The article focuses on the integration of prenatal ultrasound, fetal echocardiography, neonatal clinical assessment, pulse oximetry screening, and confirmatory echocardiography. The analysis demonstrates that early diagnosis should not depend only on visible cyanosis or auscultation findings, because some critical lesions may appear clinically silent before ductal closure. A reliable diagnostic model requires risk assessment during pregnancy, standardized newborn screening before discharge, rapid echocardiographic

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confirmation in suspicious cases, and timely referral to pediatric cardiology and cardiac surgery services.

Keywords: congenital heart defects, early diagnosis, fetal echocardiography, pulse oximetry, newborn screening, pediatric cardiology.

Kirish

Tug‘ma yurak nuqsonlari pediatriya, neonatologiya, akusherlik va bolalar kardiojarrohligi kesishgan eng muhim klinik muammolardan biridir. Bu kasalliklar guruhi yurak bo‘lmachalari, qorinchalari, klapan apparati, o‘pka arteriyasi, aorta yoki yirik qon tomirlarining homila rivojlanishi davrida noto‘g‘ri shakllanishi bilan izohlanadi. Nuqsonning og‘irligi kichik bo‘lmachalararo to‘siq defektidan tortib, hayotning dastlabki soatlari yoki kunlarida jarrohlik yoki kateter aralashuvini talab qiladigan kritik holatlargacha farqlanadi. Shu sababli tug‘ma yurak nuqsoni degan atama bitta kasallikni emas, balki gemodinamik oqibati turlicha bo‘lgan katta klinik spektrni bildiradi.

Mavzuning dolzarbligi shundaki, tug‘ma yurak nuqsonlari bolalarda uchraydigan eng ko‘p tug‘ma rivojlanish nuqsonlari qatoriga kiradi. Ularning bir qismi chaqaloq tug‘ilgan zahoti seziladi, biroq ayrim kritik nuqsonlarda bola dastlab sog‘lom ko‘rinishi mumkin. Arterial yo‘l ochiq turgan davrda qon aylanishi vaqtincha kompensatsiyalanadi, arterial yo‘l yopila boshlagach esa keskin gipoksemiya, shok, metabolik atsidoz yoki yurak yetishmovchiligi rivojlanadi. Mana shu klinik xususiyat erta diagnostikaning ahamiyatini keskin oshiradi: kech aniqlangan holatda davolash texnik jihatdan qiyinlashadi, nevrologik asoratlar xavfi ortadi va oilaga tushadigan ijtimoiy-iqtisodiy yuk kuchayadi.

Erta diagnostika faqat bitta tekshiruv bilan cheklanmasligi kerak. Homilador ayolni kuzatish vaqtida xavf omillarini aniqlash, ikkinchi trimestr ultratovush tekshiruvida yurakning to‘rt kamerali va chiqish yo‘llari kesimlarini baholash, shubhali holatda fetal exokardiografiya o‘tkazish, tug‘ilgandan keyin esa chaqaloqni klinik ko‘rik va pulsoksimetriya orqali saralash zarur. Bunday yondashuv prenatal va postnatal bo‘g‘inlar uzluksiz ishlaganda samarali bo‘ladi. Agar akusherlik bosqichida shubha aniqlansa, tug‘ruq maxsus yordam ko‘rsatish imkoniga ega muassasada rejalashtiriladi. Agar prenatal tashxis qo‘yilmagan bo‘lsa, tug‘ruqxonadagi skrining bola uyga chiqarilishidan avval xavfli holatni tutib qolishi mumkin.

Metodologiya

Tadqiqot sharhli-tahliliy maqola shaklida bajarildi. Mavzu bo‘yicha pediatriya, neonatologiya, bolalar kardioxirurgiyasi va perinatal diagnostikaga oid o‘zbekcha o‘quv-uslubiy qo‘llanmalar, mahalliy ilmiy maqolalar, xalqaro klinik tavsiyalar va epidemiologik ma’lumotlar tahlil qilindi. Asosiy e’tibor tug‘ma yurak nuqsonlarining

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erta aniqlanishi, xavf guruhlarini saralash, prenatal ultratovush mezonlari, fetal exokardiografiya ko‘rsatmalari, tug‘ruqxonadagi pulsoksimetriya skriningi va exokardiografik tasdiqlash bosqichlariga qaratildi.

Tahlil mezonlari uch yo‘nalishda belgilandi. Birinchi mezon - klinik muhimlik: hayotning birinchi yilida jarrohlik yoki kateter aralashuvini talab qilishi mumkin bo‘lgan kritik nuqsonlar ustuvor baholandi. Ikkinchi mezon - diagnostik imkoniyat: tekshiruvning qaysi bosqichda qo‘llanishi, uning sezgirligi va amaliy qulayligi ko‘rib chiqildi. Uchinchi mezon - tizimlilik: prenatal, tug‘ruqxona va ambulator pediatriya bo‘g‘inlari orasidagi uzluksizlik baholandi. Maqolada eksperimental bemor ma’lumotlari ishlatilmagan, shuning uchun shaxsiy tibbiy ma’lumotlar, etik rozilik yoki randomizatsiya masalalari qo‘llanilmadi.

Materiallar interpretatsiyasida klinik mantiq ustun qo‘yildi. Tug‘ma yurak nuqsonlarida tashxisni kechiktiruvchi omillar alohida ajratildi: simptomlarning nospetsifikligi, shovqinning har doim eshitilmasligi, siyanozning ko‘z bilan baholashda sezilmasligi, chaqaloqning dastlab yaxshi emishi yoki ko‘rinishidan sog‘lomligi, periferik muassasalarda exokardiografiya mavjud emasligi. Shu asosda erta diagnostika modeli uch darajali sxema sifatida ishlab chiqildi: homiladorlik davridagi saralash, tug‘ruqxona skriningi va keyingi pediatrik kuzatuv.

Natijalar

Tahlil shuni ko‘rsatdiki, tug‘ma yurak nuqsonlarini erta aniqlashda eng zaif bo‘g‘in ko‘pincha klinik simptom paydo bo‘lishini kutishdir. Yurak shovqini muhim belgi bo‘lsa-da, u har doim ham kritik nuqsonni erta bosqichda ko‘rsatmaydi. Ayrim nuqsonlarda shovqin kam eshitiladi yoki arterial yo‘l yopilishidan oldin gemodinamik farq yetarli bo‘lmaydi. Ko‘karish ham ishonchli yagona belgi emas, chunki yengil gipoksemiya teri rangi orqali darhol sezilmasligi mumkin. Demak, tug‘ma yurak nuqsonlariga nisbatan samarali yondashuv simptomlar paydo bo‘lishini emas, tizimli skriningni talab qiladi.

Prenatal diagnostika birinchi himoya chizig‘i hisoblanadi. Homila yuragini baholashda to‘rt kamerali kesim, chap va o‘ng chiqish yo‘llari, aorta va o‘pka arteriyasi o‘zaro joylashuvi, uch tomirli kesim hamda yurak ritmi ko‘rilishi kerak. Shubhali topilmalar aniqlansa, fetal exokardiografiya bajariladi. Fetal exokardiografiya nafaqat anatomik tashxis qo‘yadi, balki tug‘ruq joyini rejalashtirish, neonatal reanimatsiya tayyorgarligi, prostaglandin infuziyasi ehtimoli va kardiojarrohlik markaziga transport masalasini oldindan hal qilishga yordam beradi.

Tug‘ruqxona bosqichida pulsoksimetriya skriningi eng amaliy, arzon va invaziv bo‘lmagan usul sifatida alohida ahamiyatga ega. Bola kamida yigirma to‘rt soatlik bo‘lganda yoki uyga erta chiqariladigan bo‘lsa chiqarilishdan oldin o‘ng qo‘l va

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oyoqda kislorod saturatsiyasi o‘lchanadi. O‘ng qo‘l preduktal, oyoq postduktal ko‘rsatkichni bildiradi. Saturatsiyaning past bo‘lishi yoki preduktal-postduktal farqning oshishi kritik yurak nuqsoni, o‘pka patologiyasi yoki neonatal sepsis kabi xavfli holatlarni ko‘rsatishi mumkin. Shuning uchun skrining ijobiy bo‘lsa, natijani oddiy texnik xato deb chetga surish emas, tezkor qayta baholash va exokardiografik tasdiqlash kerak.

Postnatal exokardiografiya tashxisning asosiy tasdiqlovchi usuli bo‘lib qoladi. U nuqson anatomiyasini, kameralar o‘lchamini, klapan holatini, shunt yo‘nalishini, o‘pka bosimi belgilarini va yurak qisqarish faoliyatini baholaydi. EKG, ko‘krak qafasi rentgenografiyasi va laborator ko‘rsatkichlar yordamchi ahamiyatga ega, ammo ular exokardiografiyani almashtirmaydi. Ayniqsa nafas tezlashishi, emish paytida charchash, vazn olmaslik, takroriy pnevmoniya, terlash, taxikardiya, markaziy siyanoz yoki femoral pulslarning sustligi kuzatilsa, pediatrik kardiolog ko‘rigi kechiktirilmasligi kerak.

Muhokama

Muhokama natijalari tug‘ma yurak nuqsonlarida erta diagnostika faqat texnik tekshiruv masalasi emasligini ko‘rsatadi. Bu klinik madaniyat, tashkiliy intizom va bo‘g‘inlararo aloqaning sifatiga bog‘liq jarayondir. Agar homiladorlik davrida ultratovush tekshiruvi faqat umumiy biometrik o‘lchovlar bilan cheklanib qolsa, yurak chiqish yo‘llaridagi murakkab nuqsonlar o‘tkazib yuborilishi mumkin. Agar tug‘ruqxonada bola faqat tashqi ko‘rinishiga qarab baholansa, arterial yo‘lga bog‘liq kritik nuqsonlar uyga chiqarilgandan keyin og‘irlashishi ehtimoli bor. Agar ambulator pediatr vazn olmaslik yoki emishdagi charchoqni faqat ovqatlantirish muammosi sifatida baholasa, tashxis yana kechikadi.

Tug‘ma yurak nuqsonlarining klinik tasnifi diagnostik fikrlash uchun qulay bo‘lishi kerak. Chapdan o‘ngga shunt bilan kechuvchi nuqsonlarda o‘pka qon oqimi ortadi, bola tez-tez nafas oladi, emishda charchaydi, vazn qo‘shishi sekinlashadi va takroriy respirator infeksiyalarga moyil bo‘ladi. O‘ngdan chapga shunt bilan kechuvchi siyanozli nuqsonlarda esa arterial qonda kislorod kamayadi va markaziy siyanoz yetakchi belgiga aylanishi mumkin. Obstruktiv nuqsonlarda katta yoki kichik qon aylanish yo‘lida to‘siq paydo bo‘ladi, femoral pulslar sustlashishi, arterial bosim farqi yoki shok holati kuzatilishi mumkin. Shuning uchun diagnostika algoritmida har bir belgining gemodinamik mazmuni tushunilishi kerak.

Prenatal diagnostikaning kuchli tomoni shundaki, og‘ir nuqson aniqlangan oilaga tug‘ruqdan oldin maslahat beriladi va chaqaloqni qabul qilish rejasi tuziladi. Biroq bu bosqichning cheklovi ham bor: ultratovush sifati mutaxassis malakasi, homila holati, ona tana tuzilishi, apparat imkoniyati va homiladorlik muddatiga bog‘liq. Shu

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sababli prenatal tekshiruv normal bo‘lgani tug‘ilgandan keyingi skriningni bekor qilmaydi. Xuddi shuningdek, pulsoksimetriya skriningi ham barcha nuqsonlarni tutib olmaydi, ayniqsa saturatsiya pasaymasdan kechuvchi ayrim chapdan o‘ngga shuntlar va yengil klapan nuqsonlari kechroq aniqlanishi mumkin. Demak, eng to‘g‘ri yondashuv usullarni bir-biriga qarama-qarshi qo‘yish emas, ularni ketma-ket himoya qatlamlari sifatida ishlatishdir.

O‘zbekiston sharoitida muammo faqat diagnostika texnologiyasi mavjudligi bilan hal bo‘lmaydi. Birinchi darajali muammo - standartlashtirish. Har bir tug‘ruqxonada pulsoksimetriya qaysi vaqtda, qaysi qo‘l va oyoqda, qanday chegaraviy natijada va qaysi mutaxassisga xabar berish tartibida o‘tkazilishi aniq yozilgan bo‘lishi kerak. Ikkinchi muammo - yo‘naltirish zanjiri. Skrining ijobiy bo‘lgan chaqaloqni qayerga, qancha muddat ichida va qanday transport sharoitida yuborish oldindan belgilangan bo‘lmasa, skriningning o‘zi yetarli foyda bermaydi. Uchinchi muammo - ota-onalar bilan muloqot. Chaqaloq tashqi tomondan sog‘lom ko‘rinsa ham skrining natijasi shubhali bo‘lishi mumkinligi tushuntirilmasa, ota-ona qo‘shimcha tekshiruvdan voz kechishi yoki kechikishi mumkin.

Shu nuqtai nazardan maqolada taklif etilayotgan model minimal, ammo amaliy jihatdan ishlaydigan o‘zgarishlarga asoslanadi: homiladorlik davrida xavf guruhlarini aniq ajratish, tug‘ruqxonada pulsoksimetriya skriningini majburiy amaliy protokolga kiritish, shubhali natija uchun tezkor exokardiografiya yo‘nalishini yaratish, ambulator pediatrlar uchun ogohlantiruvchi belgilar ro‘yxatini joriy etish va aniqlangan bemorlarni kardiologik reyestrda kuzatish. Bunday model katta xarajat talab qiladigan murakkab tizimdan ko‘ra realroq va bosqichma-bosqich kengaytirilishi mumkin.

Xulosa

Tug‘ma yurak nuqsonlari bolalar salomatligiga kuchli ta’sir ko‘rsatadigan, klinik ko‘rinishi va oqibati turlicha bo‘lgan patologiyalar guruhidir. Erta diagnostika ushbu kasalliklarda davolash natijasini belgilovchi eng muhim omillardan biri hisoblanadi. Maqola tahlili shuni ko‘rsatadiki, tashxisni faqat shovqin, siyanoz yoki og‘ir simptomlar paydo bo‘lishiga bog‘lab qo‘yish xavfli. Ayrim kritik nuqsonlar bola uyga chiqarilguncha yashirin kechishi mumkin, shu sababli tug‘ruqxonadagi skrining va tezkor tasdiqlovchi diagnostika hayotiy ahamiyatga ega.

Eng samarali model prenatal ultratovush tekshiruvi, fetal exokardiografiya, tug‘ilgandan keyingi klinik ko‘rik, pulsoksimetriya skriningi va postnatal exokardiografiyani yagona zanjirga birlashtiradi. Har bir bo‘g‘inning o‘z vazifasi bor: prenatal bosqich xavfni oldindan aniqlaydi, tug‘ruqxona bosqichi yashirin gipoksemiyani tutib qoladi, exokardiografiya tashxisni tasdiqlaydi, kardiologik kuzatuv esa davolash va reabilitatsiyani boshqaradi. Shu tizim ishlasa, neonatal

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shoshilinch holatlar, kech jarrohlik, nevrologik asoratlar va oilaviy ijtimoiy yuk kamayadi.

Amaliy xulosa shuki, tug‘ma yurak nuqsonlarini erta aniqlash uchun murakkab nazariy shiorlar emas, aniq protokol kerak. Tug‘ruqxonada pulsoksimetr bo‘lishi, xodim undan foydalanishni bilishi, shubhali natija yozma algoritm asosida baholanishi va chaqaloq zarur markazga kechiktirmasdan yuborilishi lozim. Ana shunday tizimli yondashuv pediatriya xizmatining sifatini oshiradi va tug‘ma yurak nuqsonlari bilan tug‘ilgan bolalarning hayot imkoniyatini sezilarli yaxshilaydi.

Foydalanilgan adabiyotlar

1. Mamatkulova D.X., Sharipova O.A. Yurak tug‘ma nuqsonlari. O‘quv-uslubiy qo‘llanma. Samarqand: SamDU nashriyoti, 2022.

2. Mamatkulova D.X., Sharipova O.A. Bolalarda yurak tug‘ma nuqsonlari. Erta tashxislash, davolash, profilaktika va reabilitatsiya mezonlari. O‘quv qo‘llanma. Samarqand, 2026.

3. Tairova S.B., A’zamova M.Sh., Shermaxmatov J.I., Asliddinov Sh.B. Bolalarda tug‘ma yurak nuqsoni shakllanishida zamonaviy ma’lumotlar. Science and Education, 6-jild, 2-son, 36–42-betlar, 2025.

4. Toshkent tibbiyot akademiyasi. Tug‘ma yurak nuqsonlari. Fakultet va gospital xirurgiya hamda transplantologiya kafedrasi o‘quv materiali.

5. Aliyev M.M. Bolalar xirurgiyasi. Toshkent, 2018.

6. Qobilov E., Raupov F. Bolalar xirurgik kasalliklari. Toshkent, 2017.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

BOLALARDA SURXONDARYO IQLIMIDA HAVONING CHANG SABAB IFLOSLANISHINING NAFAS TIZIMIGA TA'SIRI

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Annotatsiya: Mavzu Surxondaryo hududida kuzatiladigan chang-to'zonlar, mahalliy shamollar, qurg'oqchil tuproq qoplami, qurilish, transport, sanoat va transchegaraviy chang oqimlari bilan bog'liq ekologik xavflar kesimida yoritildi. Bolalar organizmi kattalarga nisbatan ko'proq havo yutishi, bronxial daraxtning torligi, immun tizimning to'liq yetilmaganligi va o'pka to'qimasining rivojlanish bosqichida bo'lishi sababli chang zarrachalariga nisbatan sezgir guruh hisoblanadi. Maqolada PM10 va PM2,5 zarrachalarining yuqori va quyi nafas yo'llariga kirib borish mexanizmlari, yallig'lanish, oksidlovchi stress, bronxial giperreaktivlik, allergik rinit, bronxit, astma xurujlari va respirator infeksiyalar bilan bog'liqligi tahlil qilindi. Tadqiqot natijalari Surxondaryo sharoitida bolalar salomatligini himoya qilish uchun havo sifati monitoringi, maktab va bog'chalarda ogohlantirish tizimi, pediatrik skrining, oilaviy profilaktika hamda hududiy ekologik boshqaruvni birlashtirgan kompleks yondashuv zarurligini ko'rsatadi.

Kalit so'zlar: Surxondaryo, chang ifloslanishi, PM10, PM2,5, bolalar salomatligi, nafas tizimi, bronxial astma, allergik rinit, iqlim omillari, ekologik profilaktika**.**

Abstract: This article analyzes the impact of dust-related air pollution on the respiratory system of children under the dry and hot climatic conditions of Surkhandarya region. The study focuses on regional dust storms, arid soils, construction dust, transport emissions, industrial sources and transboundary dust transport. Children are a highly vulnerable group because of their higher ventilation rate per body weight, narrower airways, developing lungs and immature immune defense. The article explains the biological mechanisms through which PM10 and PM2.5 particles affect the upper and lower respiratory tract, including airway

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inflammation, oxidative stress, bronchial hyperreactivity, allergic rhinitis, bronchitis, asthma exacerbation and increased susceptibility to respiratory infections. The findings show that protection of children in Surkhandarya requires an integrated model combining air-quality monitoring, early warning in schools and kindergartens, pediatric screening, household prevention and regional environmental governance.

Keywords: Surkhandarya, dust pollution, PM10, PM2.5, child health, respiratory system, bronchial asthma, allergic rhinitis, climate factors, environmental prevention.

Kirish

Atmosfera havosining chang bilan ifloslanishi Surxondaryo viloyati uchun faqat ekologik masala emas, balki pediatriya, jamoat salomatligi, maktab gigiyenasi va hududiy boshqaruvni birlashtiradigan murakkab tibbiy-ijtimoiy muammodir. Viloyatning geografik joylashuvi, quruq subtropik iqlimi, yoz oylarida haroratning yuqoriligi, tuproq namligining kamayishi, shamolli kunlarning takrorlanishi hamda janubiy hududlarga xos chang-to‘zon hodisalari havodagi dispers zarrachalar ko‘payishiga sharoit yaratadi. Termiz, Angor, Jarqo‘rg‘on, Sherobod, Muzrabot, Qiziriq va chegaraga yaqin boshqa hududlarda quruq mavsum davomida havoda muallaq chang zarralari ortishi ko‘proq seziladi. Bunday vaziyatda bolalar eng himoyasiz guruh bo‘lib qoladi, chunki ular nafas olish chastotasi yuqoriligi, ochiq havoda ko‘proq harakat qilishi va nafas yo‘llari morfologik jihatdan to‘liq yetilmaganligi sababli ifloslangan havoni kattalarga qaraganda nisbatan ko‘proq qabul qiladi.

Chang tarkibidagi zarrachalar o‘lchamiga ko‘ra turlicha xavf tug‘diradi. Yirik zarralar burun bo‘shlig‘i va halqumda ushlanishi mumkin, ammo PM10 bronxlar darajasigacha, PM2,5 esa alveolyar bo‘limlargacha yetib borishi mumkin. Aynan mayda dispers zarrachalar yallig‘lanish mediatorlarini faollashtiradi, shilliq qavat himoya funksiyasini pasaytiradi, bronxial daraxtda spazmga moyillikni kuchaytiradi va virusli yoki bakterial respirator infeksiyalarning og‘irroq kechishiga yordam beradi. Bolalarda bunday ta’sir bronxial astma xurujlari, allergik rinit, qaytalanuvchi bronxit, uzoq davom etuvchi yo‘tal, jismoniy zo‘riqishga chidamsizlik va o‘pka funksiyasi pasayishi ko‘rinishida namoyon bo‘lishi mumkin.

Mavzuning dolzarbligi shundaki, Surxondaryo hududida chang muammosi mavsumiy hodisa sifatida qabul qilinadi, lekin uning bolalar organizmiga kumulyativ ta’siri yetarli darajada klinik kuzatuv, mahalliy statistika va maktab-bog‘cha profilaktikasi bilan bog‘lanmagan. Ko‘pincha ota-onalar boladagi yo‘tal, burun bitishi yoki nafas qisishini shamollash sifatida baholaydi. Aslida esa chang ekspozitsiyasi allergik va obstruktiv jarayonlarni qo‘zg‘atishi yoki mavjud kasalliklarni zo‘raytirishi

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mumkin. Shu bois maqolaning maqsadi Surxondaryo iqlimida chang sabab havo ifloslanishining bolalar nafas tizimiga ta’sirini ilmiy asosda tahlil qilish, asosiy xavf mexanizmlarini ko‘rsatish va amaliy profilaktika modelini taklif qilishdan iborat.

Metodologiya

Maqola adabiyotlar tahlili, ekologik-gigiyenik baholash va klinik-patofiziologik umumlashtirish usullariga tayangan holda tayyorlandi. Tahlilda Surxondaryo viloyatidagi chang-to‘zon hodisalari bo‘yicha mahalliy ilmiy materiallar, O‘zbekiston Respublikasining atmosfera havosini muhofaza qilishga oid normativ hujjatlari, bolalar salomatligi bo‘yicha UNICEF hisobotlari, Jahon sog‘liqni saqlash tashkilotining havo sifati tavsiyalari hamda bolalarda respirator kasalliklar ekologik omillar bilan bog‘liqligini yorituvchi ilmiy maqolalar o‘rganildi. Maqola amaliy klinik tadqiqot emas, balki mavjud adabiyot va monitoring ma’lumotlari asosida shakllantirilgan ilmiy tahliliy ishdir. Shuning uchun unda alohida bemorlar guruhi tekshirilmagan, invaziv amaliyotlar bajarilmagan va shaxsiy tibbiy ma’lumotlardan foydalanilmagan.

Tahlil uch asosiy blok bo‘yicha olib borildi. Birinchi blokda Surxondaryo iqlimining chang hosil bo‘lishi va havoda saqlanishiga ta’sir qiluvchi omillari ko‘rib chiqildi. Bunda quruqlik, yuqori harorat, shamol, tuproq yuzasining yalang‘ochlanishi, qurilish maydonlari, avtomobil yo‘llari va sanoat manbalari hisobga olindi. Ikkinchi blokda bolalar nafas tizimining chang zarrachalariga sezgirligini belgilovchi anatomo-fiziologik xususiyatlar tahlil qilindi. Uchinchi blokda PM10 va PM2,5 ta’sirining klinik oqibatlari, profilaktik choralari hamda hududiy monitoring uchun zarur ko‘rsatkichlar tizimlashtirildi.

Natijalarni umumlashtirishda xavf omili, biologik mexanizm, klinik ko‘rinish va profilaktika chorasi o‘rtasidagi sababiy zanjir modeli qo‘llandi. Bunday yondashuv Surxondaryo sharoitida alohida diagnostik marker topishdan ko‘ra muammoni tizimli ko‘rishga yordam beradi. Chunki changning bolalar salomatligiga ta’siri birgina tibbiy ko‘rik bilan to‘liq baholanmaydi. U havo sifati monitoringi, maktab davomat ma’lumotlari, ambulator murojaatlar, allergik kasalliklar tarqalishi, oila yashash sharoiti va changli kunlardagi himoya xatti-harakatlari bilan birgalikda tahlil qilinishi kerak.

Natijalar

Tahlil shuni ko‘rsatadiki, Surxondaryo sharoitida bolalar nafas tizimiga chang ta’siri bir nechta o‘zaro bog‘liq yo‘l orqali yuzaga chiqadi. Birinchi yo‘l mexanik irritatsiyadir. Chang burun shilliq qavati, halqum, hiqildoq va bronxlarga tushganda kiprikchali epiteliy faoliyatini susaytiradi, shilliq ajralishini kuchaytiradi, yo‘tal refleksini faollashtiradi. Bu holat qisqa muddatli ta’sirda burun bitishi, aksirish, tomoq

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qichishishi va quruq yo‘tal bilan chegaralanishi mumkin, ammo takroriy ta’sirda surunkali yallig‘lanish fonini yaratadi.

Ikkinchi yo‘l allergik sezuvchanlikning kuchayishidir. Chang zarralari ko‘pincha o‘z yuzasida o‘simlik changchasi, zamburug‘ sporalari, og‘ir metallar, yonish mahsulotlari va boshqa kimyoviy komponentlarni tashiydi. Bunday aralash ta’sir allergik rinit, kon’yunktivit, atopik dermatit va bronxial astmaga moyil bolalarda xurujlar sonini oshirishi mumkin. Surxondaryoda bahor va yoz fasllarida quruqlik, shamol va o‘simlik changlanishi bir vaqtga to‘g‘ri kelganda allergik simptomlar yanada kuchayishi ehtimoli bor.

Uchinchi yo‘l bronxial obstruksiya va nafas qisishidir. PM2,5 zarrachalari mayda bronxlar va alveolyar sohaga kirib borib, makrofaglar va epitelial hujayralar orqali oksidlovchi stressni kuchaytiradi. Bu bronx devorida shish, silliq mushak spazmi, shilliq ko‘payishi va havo o‘tish yo‘lining torayishiga olib keladi. Klinik jihatdan bu hushtakli nafas, kechasi kuchayadigan yo‘tal, yugurganda tez charchash, ko‘krakda siqilish hissi va astma xurujlari ko‘payishi bilan ifodalanadi.

To‘rtinchi yo‘l respirator infeksiyalar bilan bog‘liq. Changli havo shilliq qavatning tabiiy tozalash mexanizmini izdan chiqaradi. Natijada virus va bakteriyalar yuqori nafas yo‘llarida uzoqroq saqlanadi, bolalarda O‘RVI, bronxit va pnevmoniya xavfi ortadi. Ayniqsa maktabgacha yoshdagi bolalarda immun himoya yetarli shakllanmagan bo‘lgani uchun changli kunlardan keyin yo‘tal va isitma bilan kechuvchi murojaatlar ko‘payishi mumkin.

Beshinchi yo‘l o‘pka rivojlanishi bilan bog‘liq uzoq muddatli xavfdir. Bolalik davrida alveolalar va bronxial daraxtning funksional shakllanishi davom etadi. Uzoq yillar davomida iflos havo bilan nafas olish o‘pka hajmi o‘sishini sekinlashtirishi, jismoniy chidamlilikni pasaytirishi va keyingi hayotda surunkali nafas yo‘llari kasalliklariga moyillikni oshirishi mumkin. Shu sababli chang muammosini faqat bugungi yo‘tal yoki allergiya bilan cheklab baholash noto‘g‘ri. Bu kelajakdagi respirator salomatlik kapitaliga ta’sir qiluvchi omildir.

Surxondaryo uchun eng muhim xavf guruhlariga besh yoshgacha bo‘lgan bolalar, bronxial astma yoki allergik riniti bor bolalar, muddatidan oldin tug‘ilganlar, surunkali yurak yoki o‘pka kasalligi mavjud bolalar, avtomobil yo‘llari va qurilish maydonlariga yaqin yashovchilar, maktabga uzoq masofadan piyoda qatnaydiganlar hamda uyida tamaki tutuni ta’siri mavjud bolalar kiradi. Changli hududda yashash o‘z-o‘zidan kasallikni keltirib chiqarishi shart emas, ammo boshqa xavf omillari bilan qo‘shilganda respirator kasalliklarning og‘irlashuv ehtimolini oshiradi.

Chang ta’sirining klinik-gigiyenik baholash jadvali

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Xavf manbai	Asosiy zarracha yoki omil	Bolalarda ehtimoliy ta’sir	Amaliy profilaktika
Chang-to‘zon va quruq shamol	PM10, PM2,5, mineral chang	Yo‘tal, burun bitishi, bronxit, astma xuruji	Changli kunlarda ochiq havodagi mashg‘ulotlarni cheklash, derazalarni yopish, nam tozalash
Qurilish va yo‘l changi	Silikat changi, tuproq zarralari	Allergik rinit, tomoq qichishishi, uzoq davom etuvchi yo‘tal	Maktab va bog‘cha atrofida chang bostirish, suv sepish, himoya to‘siqlari
Transport chiqindisi bilan aralash chang	PM2,5, azot oksidlari, qurum	Bronxial giperreaktivlik, jismoniy zo‘riqishda nafas qisishi	Yo‘l yaqinidagi maktablarda havo monitoringi, yashil yo‘laklar, ventilatsiya nazorati
Uy ichidagi chang va tutun	Maishiy chang, tamaki tutuni, yonish mahsuloti	Qaytalanuvchi bronxit, allergik simptomlar kuchayishi	Uyda chekishni to‘liq taqiqlash, filtrli shamollatish, muntazam nam tozalash
Issiq va quruq mikroiqlim	Shilliq qavat qurishi, changning uzoq saqlanishi	Himoya funksiyasi pasayishi, infeksiya xavfi ortishi	Ichimlik rejimi, sinfxona namligi, sport yuklamasini moslashtirish

Muhokama

Surxondaryo sharoitida chang sabab havo ifloslanishini baholashda bir xatoni keskin ko‘rish kerak: chang ko‘pincha faqat noqulay ob-havo sifatida qabul qilinadi. Bu yondashuv yetarli emas. Changli kunlar bolalar uchun alohida ekologik xavf kuni sifatida baholanishi kerak. Agar maktab, bog‘cha, poliklinika va mahalla darajasida ogohlantirish mexanizmi bo‘lmasa, ota-onalar xavfni faqat bola kasal bo‘lgandan keyin sezadi. Bu esa profilaktikani davolashga aylantirib yuboradi.

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Bolalarda respirator zarar mexanizmi uch darajada namoyon bo‘ladi. Birinchi daraja shilliq qavat irritatsiyasi bo‘lib, bu holat ko‘pchilik bolada vaqtinchalik simptomlar bilan kechadi. Ikkinchi daraja allergik va obstruktiv jarayonlarni qo‘zg‘atish bo‘lib, bunda astma yoki allergik riniti bor bolalarda kasallik nazorati buziladi. Uchinchi daraja esa uzoq muddatli o‘pka rivojlanishiga ta’sir bo‘lib, uni oddiy ambulator ko‘rikda darhol ko‘rish qiyin. Shuning uchun respirator salomatlikni faqat kasallanish soni bilan emas, yo‘tal davomiyligi, dori iste’moli, maktabga qatnashdagi uzilishlar, jismoniy faollik cheklanishi va spirometrik ko‘rsatkichlar bilan ham baholash zarur.

Hududiy profilaktikaning eng kichik, lekin ishlaydigan modeli besh elementdan iborat bo‘lishi kerak. Birinchisi - havo sifati monitoringini aholiga tushunarli tilda yetkazish. Faqat raqam berish yetmaydi; maktab va ota-onaga “bugun jismoniy tarbiya ochiq havoda o‘tkazilmaydi”, “astmasi bor bolalar inhalyatorini yonida olib yuradi”, “derazalar ma’lum vaqt yopiq saqlanadi” kabi aniq ko‘rsatma kerak. Ikkinchisi - pediatrik xavf guruhlarini ro‘yxatga olish. Astma, allergik rinit, qaytalanuvchi bronxit va muddatidan oldin tug‘ilish tarixi bo‘lgan bolalar changli mavsum boshlanishidan avval profilaktik ko‘rikdan o‘tishi lozim. Uchinchisi - maktab va bog‘chalarda ichki havo gigiyenasini kuchaytirish. Sinfxona changini quruq supurish emas, nam tozalash, filtrlangan shamollatish va dars oralig‘ida chang ko‘tarilishini kamaytirish kerak. To‘rtinchisi - urbanistik choralar. Yo‘l chetlarini ko‘kalamzorlashtirish, tuproq yuzasini mustahkamlash, qurilish maydonlarida chang bostirish va yuk mashinalari harakatini nazorat qilish bolalar salomatligi uchun bevosita profilaktika hisoblanadi. Beshinchisi - oilaviy xatti-harakatlar. Uyda tamaki tutuniga yo‘l qo‘ymaslik, changli kunlarda derazani vaqtincha yopish, konditsioner filtrlarini tozalash, bolaning burun gigiyenasini saqlash va yetarli suyuqlik ichishini ta’minlash oddiy, ammo samarali choralar qatoriga kiradi.

Maqolaning cheklovi shundaki, Surxondaryo bo‘yicha ochiq pediatrik ma’lumotlar, ayniqsa tumanlar kesimida PM darajasi va bolalar respirator kasalliklari o‘rtasidagi statistik bog‘liqlik yetarlicha tizimlashtirilmagan. Bu bo‘shliq keyingi tadqiqotlar uchun aniq yo‘nalishni ko‘rsatadi: Termiz va janubiy tumanlarda havo sifati ma’lumotlari bilan poliklinika murojaatlari, tez yordam chaqiriqlari, maktab davomatidagi yo‘qotishlar va astma dorilariga ehtiyoj dinamikasini birlashtirgan prospektiv monitoring zarur. Shundagina changning real tibbiy yuki raqamli tarzda ko‘rinadi.

Xulosa

Surxondaryo viloyatining quruq-issiq iqlimi, chang-to‘zon hodisalari, ochiq tuproq maydonlari, transport, qurilish va ayrim sanoat manbalari bolalar nafas tizimi

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uchun sezilarli ekologik bosim yaratadi. Bolalar organizmi nafas yo‘llarining anatomik torligi, immun himoyaning yetilmaganligi va o‘pka rivojlanishining davom etishi sababli chang zarrachalariga ayniqsa sezgir. PM10 va PM2,5 zarralari yuqori hamda quyi nafas yo‘llarida yallig‘lanish, oksidlovchi stress, allergik sezuvchanlik, bronxial obstruksiya va infeksiyalarga moyillikni kuchaytirishi mumkin.

Maqola natijalari chang bilan ifloslanishni faqat ekologik nazorat muammosi sifatida emas, balki pediatrik profilaktika masalasi sifatida ham ko‘rish kerakligini ko‘rsatdi. Eng xavfli guruhlar - maktabgacha yoshdagi bolalar, astma va allergik riniti borlar, yo‘l yoki qurilish maydoniga yaqin yashovchilar, uy ichida tamaki tutuni ta’siriga uchraydiganlar hamda surunkali kasalligi mavjud bolalardir. Surxondaryo sharoitida samarali yondashuv havo monitoringi, maktab-bog‘cha tartibi, oilaviy gigiyena, pediatrik skrining va mahalliy ekologik siyosatni birlashtirgan holda tashkil etilishi kerak.

Ilmiy-amaliy jihatdan eng muhim xulosa shuki, changli kunlarda bolalarni himoya qilish kechiktiriladigan masala emas. Vaqtida ogohlantirish, chang manbalarini kamaytirish va nafas kasalliklari bo‘lgan bolalarni oldindan nazoratga olish kasallanishni kamaytiradi, dars qoldirish holatlarini qisqartiradi va bolalarning uzoq muddatli respirator salomatligini saqlashga xizmat qiladi.

Amaliy tavsiyalar

Surxondaryo viloyatida bolalar nafas salomatligini himoya qilish uchun maktab va bog‘chalar kesimida changli kunlar algoritmi ishlab chiqilishi zarur. Bu algoritmda ochiq havodagi jismoniy tarbiya mashg‘ulotlarini cheklash, sinfxonalarni nam tozalash, derazalarni chang kuchli vaqtda yopish, astmasi bor bolalar uchun individual reja yuritish hamda ota-onalarga tezkor xabar berish tartibi aniq ko‘rsatilishi kerak.

Poliklinikalarda bahor va yoz mavsumidan oldin allergik rinit, bronxial astma, qaytalanuvchi bronxit va uzoq davom etuvchi yo‘tal bilan murojaat qiladigan bolalar bo‘yicha alohida ro‘yxat shakllantirish maqsadga muvofiq. Ushbu bolalarda nafas funksiyasini baholash, dori vositalaridan to‘g‘ri foydalanishni o‘rgatish va changli kunlarda individual himoya rejimini tushuntirish zarur.

Mahalliy hokimlik, ekologiya boshqarmasi, sanitariya-epidemiologiya xizmati va sog‘liqni saqlash muassasalari o‘rtasida ma’lumot almashinuvi yo‘lga qo‘yilmasa, muammo bo‘lak-bo‘lak ko‘rinishda qoladi. Havo sifati ko‘rsatkichlari, bolalar murojaatlari va maktab davomatini bir tizimda tahlil qilish Surxondaryo uchun aniq profilaktik qarorlar qabul qilish imkonini beradi.

Oilalar darajasida esa eng oddiy choralar ham e’tibordan chetda qolmasligi kerak: uyda chekishni butunlay taqiqlash, changli paytda bolaning ochiq havoda uzoq qolishini cheklash, uyda nam tozalashni ko‘paytirish, konditsioner va ventilyatsiya

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filtrlarini tozalash, bolaga yetarli suyuqlik berish va nafas qisishi, hushtakli nafas yoki kechasi kuchayadigan yo‘tal kuzatilsa shifokorga murojaat qilish zarur.

Foydalanilgan adabiyotlar

1. O‘zbekiston Respublikasining “Atmosfera havosini muhofaza qilish to‘g‘risida”gi Qonuni. Lex.uz milliy qonunchilik bazasi. 1996.

2. O‘zbekiston Respublikasi Sanitariya-epidemiologik osoyishtalik va jamoat salomatligi qo‘mitasi. Aholi yashash punktlarining atmosfera havosidagi zararli moddalar ruxsat etilgan gigiyenik me’yorlari. SanQvaN 0053-23. Toshkent. 2023.

3. UNICEF. O‘zbekistonda bolalar uchun iqlim landshaftining tahlili. Toshkent. 2024.

4. UNICEF. O‘zbekistondagi bolalar va o‘smirlar vaziyatining tahlili. Toshkent. 2024.

5. Maxammadiyev A. Surxondaryo viloyatida kuzatiladigan chang, Afg‘on shamoli, bo‘ronlari vaqtida havodagi chang miqdorini monitoring qilish va baholash. TerDU xabarlari. Termiz. 2025.

6. Surxondaryo viloyati Termiz shahridagi atmosfera havosini chang bilan ifloslanish holati monitoringi. Journal of Science-Innovative Research in Uzbekistan. 2024.

7. Kuldasheva Sh. A., Maxammadiyev A. Sh. Surxondaryo viloyatida kuzatiladigan chang bo‘ronlarining shakllanishi va ta’siri. Ilmiy maqola. 2024.

8. Dadajonova S. Sh., Mahmudova I. I., Bahodirova O. N. Bolalar va o‘smirlarning nafas olish tizimi: rivojlanish xususiyatlari va ekologik omillar ta’siri. Science and Education. 2025.

9. Alimova Z. F. Atmosfera ifloslanishining respirator kasalliklar rivojlanishiga ta’siri: epidemiologik tahlil va profilaktika choralari. 2025.

10. World Health Organization. WHO global air quality guidelines: particulate matter PM2.5 and PM10, ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. Geneva. 2021.

11. UNICEF Europe and Central Asia. Breathless Beginnings: the impact of air pollution on children in Europe and Central Asia. 2024.

12. O‘zbekiston Respublikasi Ekologiya, atrof-muhitni muhofaza qilish va iqlim o‘zgarishi vazirligi. Atmosfera havosini ifloslantiruvchi manbalarni xatlovdan o‘tkazish hamda tashlanmalar miqdorini belgilash bo‘yicha yo‘riqnoma. 2024.

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O'ZBEKISTONNING MA'MURIY. HUDUDIY VA DAVLAT TUZILISHI

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Yurisprudensiya yo'nalishi talabasi

Annotatsiya: Mazkur maqolada O‘zbekiston Respublikasining davlat tuzilishi shakli, boshqaruv tamoyillari va ma'muriy-hududiy tuzilishining huquqiy asoslari tahlil qilinadi. Tadqiqot davomida "Yangi O‘zbekiston" taraqqiyot strategiyasi doirasida davlat hokimiyati organlarining desentralizatsiya jarayonlari va hududiy boshqaruv samaradorligini oshirish masalalari ilmiy jihatdan yoritilgan.

Mazkur maqolada O‘zbekiston Respublikasining ma'muriy-hududiy tuzilishi va davlat qurilishining konstitutsiyaviy-huquqiy asoslari kompleks ravishda tahlil qilinadi. Tadqiqotda unitar davlat shaklining o‘ziga xos xususiyatlari, davlat hokimiyati organlarining vertikal boshqaruv tizimi hamda ma'muriy islohotlarning jamiyat taraqqiyotidagi o‘rni ilmiy asoslab berilgan. Shuningdek, Yangi O‘zbekiston sharoitida hududiy boshqaruvni raqamlashtirish va markazlashmagan boshqaruv (desentralizatsiya) masalalari bo‘yicha xorijiy tajriba va milliy qonunchilik qiyosiy o‘rganilgan.

Kalit so‘zlar: Unitar davlat, suverenitet, ma'muriy-hududiy birlik, davlat hokimiyati, Konstitutsiya, Qoraqalpog‘iston Respublikasi, mahalliy boshqaruv.

Unitar davlat, davlat tuzilishi shakli, ma'muriy-hududiy birlik, suverenitet, davlat boshqaruvi, konstitutsiyaviy islohotlar, hududiy yaxlitlik, desentralizatsiya.

Abstract: This article analyzes the legal foundations of the state structure, principles of governance, and administrative-territorial division of the Republic of Uzbekistan. The research scientifically examines the processes of decentralization of state power and issues of increasing the efficiency of territorial management within the framework of the "New Uzbekistan" development strategy.

This article provides a comprehensive analysis of the constitutional and legal foundations of the administrative-territorial structure and state construction of the Republic of Uzbekistan. The research scientifically substantiates the specific characteristics of the unitary state form, the vertical management system of state authorities, and the role of administrative reforms in the development of society. Furthermore, in the context of New Uzbekistan, the issues of digitalization of regional management and decentralization of governance are comparatively studied based on international experience and national legislation.

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Keywords: Unitary state, sovereignty, administrative-territorial unit, state power, Constitution, Republic of Karakalpakstan, local government. Unitary state, form of state structure, administrative-territorial unit, sovereignty, public administration, constitutional reforms, territorial integrity, decentralization.

KIRISH

O‘zbekiston Respublikasi o‘zining mustaqillik yillarida davlat qurilishi va ma’muriy-hududiy tuzilishining o‘ziga xos modelini shakllantirdi. Davlat tuzilishi shakli — bu davlatning ichki tuzilishi, uning tarkibiy qismlari (viloyatlar, tumanlar) orasidagi huquqiy munosabatlar va markaziy hokimiyat bilan hududiy bo‘linmalar o‘rtasidagi vakolatlar taqsimotini belgilovchi murakkab tizimdir. O‘zbekiston Konstitutsiyasining yangi tahriri qabul qilinishi bilan ushbu tizim "inson – jamiyat – davlat" tamoyili asosida yanada takomillashtirildi.

Dunyoning geosiyosiy qiyofasi o‘zgarib borayotgan hamda globallashuv jarayonlari jadallashgan hozirgi davrda har bir davlatning o‘z suvereniteti va hududiy yaxlitligini ta’minlash masalasi strategik ahamiyat kasb etmoqda. O‘zbekiston Respublikasi mustaqilligining yangi bosqichida — "Yangi O‘zbekiston" taraqqiyot strategiyasi doirasida davlat boshqaruvini modernizatsiya qilish, ma’muriy-hududiy tuzilishni iqtisodiy islohotlar bilan uyg‘unlashtirish ustuvor vazifa etib belgilandi. Shu bois, mamlakatimizning ma’muriy-hududiy tuzilishi va davlat shaklini ilmiy-nazariy jihatdan tadqiq etish, mavjud huquqiy normalarni takomillashtirish dolzarb ilmiy muammo hisoblanadi.

Tadqiqotning obyekti va predmeti. Tadqiqot obyekti sifatida O‘zbekiston Respublikasining davlat tuzilishi shakli va ma’muriy birliklarni tashkil etish bilan bog‘liq ijtimoiy munosabatlar olinadi. Tadqiqot predmeti esa mazkur sohani tartibga soluvchi konstitutsiyaviy normalar, qonun hujjatlari va davlat boshqaruvi institutlarining o‘zaro aloqadorlik mexanizmlaridir.

Muammoning o‘rganilish darajasi. Davlat tuzilishi va ma’muriy bo‘linish masalalari huquqshunos olimlar va siyosatshunoslar tomonidan muntazam o‘rganib kelinmoqda. Biroq, 2023-yilda yangi tahrirda qabul qilingan O‘zbekiston Respublikasi Konstitutsiyasida davlatning ijtimoiy majburiyatlari va hududiy boshqaruv tamoyillarining yangicha talqini ushbu mavzuni zamonaviy metodologiya asosida qayta ko‘rib chiqishni taqozo etmoqda. Ayniqsa, hududiy birliklarning mustaqilligini oshirish va "kuchli markazdan — kuchli hududlarga" o‘tish tamoyili ilmiy tahlilga muhtoj.

ASOSIY QISM

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1. Davlat tuzilishi shakli: Unitarizm va Suverenitet O‘zbekiston — boshqaruvning respublika shakliga ega bo‘lgan suveren, demokratik, huquqiy, ijtimoiy va dunyoviy davlatdir. O‘zbekiston murakkab xarakterga ega bo‘lgan unitar (yaxlit) davlat hisoblanadi. Uning o‘ziga xosligi tarkibida suveren Qoraqalpog‘iston Respublikasi mavjudligidadir.

1. Markazlashgan boshqaruv: Unitar davlat sifatida O‘zbekistonda yagona Konstitutsiya, yagona fuqarolik va yagona huquqiy tizim amal qiladi.

2. Qoraqalpog‘iston maqomi: O‘zbekiston tarkibidagi Qoraqalpog‘iston Respublikasining o‘z Konstitutsiyasi, bayrog‘i, gerbi va madhiyasi mavjud bo‘lib, u davlat ichidagi suveren tuzilma sifatida e’tirof etiladi.

2. Ma’muriy-hududiy tuzilish tizimi

O‘zbekiston Respublikasining ma’muriy-hududiy tuzilishi ijtimoiy-iqtisodiy jarayonlarni boshqarish, aholiga davlat xizmatlarini ko‘rsatishni optimallashtirish maqsadida tashkil etilgan. Amaldagi qonunchilikka ko‘ra, tizim quyidagi bo‘linmalardan iborat:

1. Qoraqalpog‘iston Respublikasi;
2. Viloyatlar (12 ta);
3. Toshkent shahri (poytaxt, alohida maqomga ega);
4. Tumanlar va shaharlar.
5. Ma’muriy-hududiy birliklarni tashkil etish va ularning chegaralarini o‘zgartirish O‘zbekiston Respublikasi Oliy Majlisi palatalari vakolatiga kiradi.

3. Davlat hokimiyati tizimi va "Cheklov va muvozanat" tamoyili

O‘zbekistonda davlat hokimiyati uchta mustaqil tarmoqqa bo‘linish tamoyili asosida amalga oshiriladi:

1. Qonun chiqaruvchi hokimiyat: Oliy Majlis (Senat va Qonunchilik palatasi).

2. Ijro etuvchi hokimiyat: Vazirlar Mahkamasi va ijro etuvchi apparat.

3. Sud hokimiyati: Konstitutsiyaviy sud, Oliy sud va quyi sud tizimlari. Keyingi yillarda amalga oshirilgan islohotlar natijasida ijro hokimiyati ustidan parlament nazorati kuchaytirildi, shuningdek, mahalliy davlat hokimiyati organlari (hokimliklar va Kengashlar) vakolatlari ajratildi.

O‘zbekiston — Murakkab Unitar Davlat Sifatida: Nazariy Tahlil Davlat tuzilishi shakliga ko‘ra O‘zbekiston unitar (yaxlit) davlatdir. Biroq, zamonaviy davlatshunoslikda O‘zbekiston modeli "simmetrik bo‘lmagan unitarizm" yoki "murakkab unitar davlat" sifatida tavsiflanadi. Buning asosiy sababi tarkibida suveren subyekt — Qoraqalpog‘iston Respublikasining mavjudligidir.

Huquqiy unifikatsiya: Unitarizm tamoyili asosida butun mamlakat hududida yagona

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qonunchilik tizimi amal qiladi. Viloyatlar va tumanlar o‘z qonunlariga ega emas, ular markaziy hokimiyat tomonidan qabul qilingan normativ-huquqiy hujjatlarni ijro etishga mas’uldirlar.

Qoraqalpog‘istonning o‘ziga xosligi: O‘zbekiston Konstitutsiyasining XVIII bobi bevosita Qoraqalpog‘istonga bag‘ishlangan. U o‘zining ma’muriy-hududiy tuzilishini mustaqil belgilash, o‘z davlat hokimiyati organlari tizimini shakllantirish huquqiga ega. Bu esa O‘zbekistonning unitar tabiatini federatsiyaga yaqinlashtirmasdan, balki uning hududiy o‘ziga xosligini ta’minlaydi.

XULOSA

O‘zbekistonning ma’muriy-hududiy va davlat tuzilishi milliy davlatchilik an’analari va zamonaviy demokratik tendensiyalarning sintezidir.

Ma’muriy-hududiy bo‘linish shunchaki geografik chegara emas, balki iqtisodiy rivojlanish nuqtalarini belgilovchi strategik vositadir. Xulosa qilib aytganda, davlat tuzilishini yanada modernizatsiya qilish:

1. Davlat boshqaruvini desentralizatsiya qilish (markazdan hududlarga vakolat berish);
2. Mahalliy o‘zini o‘zi boshqarish (mahalla) institutini kuchaytirish;
3. Hududiy tengsizlikni kamaytirishga xizmat qiladi.

O‘zbekiston Respublikasining ma’muriy-hududiy va davlat tuzilishini tadqiq etish natijasida quyidagi fundamental xulosalarga kelindi:

O‘zbekiston o‘zining suverenitetini mustahkamlash yo‘lida o‘ziga xos murakkab unitar davlat modelini shakllantirdi. Bu modelda markazlashgan boshqaruv tamoyillari (yagona qonunchilik, yagona moliya-kredit tizimi) bilan bir qatorda, hududiy o‘ziga xosliklar — xususan, Qoraqalpog‘iston Respublikasining maqomi va mahalliy sharoitlar inobatga olingan. Bu esa davlatning yaxlitligini saqlagan holda ichki demokratik jarayonlarni rivojlantirishga xizmat qiladi.

Yangi tahrirdagi Konstitutsiya asosida amalga oshirilayotgan ma’muriy islohotlar "kuchli markazdan — kuchli hududlarga" o‘tish konsepsiyasini amaliyotga tatbiq etmoqda. Hokimlarning xalq deputatlari Kengashlariga raislik qilish vakolatidan voz kechilishi, hokimiyat bo‘linishi tamoyilini mahalliy darajada ta’minlashning eng muhim sharti bo‘ldi. Bu o‘zgarish mahalliy vakillik organlarining ijro hokimiyati ustidan nazorat funksiyasini kuchaytiradi.

FOYDALANILGAN ADABIYOTLAR

1. O‘zbekiston Respublikasi Konstitutsiyasi. – T.: "O‘zbekiston", 2023.
2. Mirziyoyev Sh.M. Yangi O‘zbekiston taraqqiyot strategiyasi. – T.: "Tasvir", 2022.

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3. O‘zbekiston Respublikasining Qonuni. "O‘zbekiston Respublikasining ma’muriy-hududiy tuzilishi to‘g‘risida". 2020-yil 14-avgust.
4. Azizxo‘jayev A.A. Davlat va huquq nazariyasi. – T., 2018.
5. Xuaidov A. O‘zbekistonda ma’muriy islohotlar va davlat boshqaruvi. Ilmiy maqola, 2021.
6. Saidov A.X. Siyosiy-huquqiy terminlar lug‘ati. – T.: "Adolat", 2019.
7. Ziyoev T. Hududiy boshqaruv iqtisodiyoti. Darslik. – T., 2020.
8. Odilqoriev X.T. Davlat va huquq nazariyasi. – T.: "Sharq", 2021.
9. Karimov I.A. O‘zbekiston: mustaqillikka erishish ostonasida. – T.: "O‘zbekiston", 2011.
10. World Bank Report. Uzbekistan: Modernizing Local Government and Public Service Delivery. 2022.

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O‘ZBEKIST0NDA DAVLAT HOKIMIYATINI TASHKIL ETISH.

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Annotatsiya: Ushbu maqolada O‘zbekiston Respublikasida davlat hokimiyatini tashkil etishning fundamental tamoyillari, hokimiyatlar bo‘linishi prinsipi va yangilangan Konstitutsiya doirasidagi islohotlar tahlil qilinadi. Tadqiqotda milliy davlat tushunchasi, qonun chiqaruvchi, ijro etuvchi va sud hokimiyatining o‘zaro tiyib turish hamda muvozanat tizimi ilmiy jihatdan yoritilgan.

Abstract: This article analyzes the fundamental principles of organizing state power in the Republic of Uzbekistan, the principle of separation of powers, and reforms within the framework of the updated Constitution. The research scientifically covers the concept of the national state, the system of checks and balances between the legislative, executive, and judicial branches.

Kalit so‘zlar: Davlat hokimiyati, Konstitutsiya, hokimiyatlar bo‘linishi, Oliy Majlis, Vazirlar Mahkamasi, sud hokimiyati, suverenitet, demokratik islohotlar

Keywords: State power, Constitution, separation of powers, Oliy Majlis, Cabinet of Ministers, judiciary, sovereignty, democratic reforms.

Kirish

Davlat hokimiyatini tashkil etish har qanday mustaqil davlatning siyosiy-huquqiy tizimi asosini tashkil etadi. O‘zbekiston o‘z mustaqilligining dastlabki kunlaridan boshlab, demokratik, huquqiy va ijtimoiy davlat qurish yo‘lini tanladi. Bugungi kunda "Yangi O‘zbekiston" strategiyasi doirasida davlat boshqaruvi apparatini optimallashtirish, davlat organlarining xalq oldidagi mas’uliyatini oshirish va inson huquqlarini oliy qadriyat darajasiga ko‘tarish davlat siyosatining ustuvor yo‘nalishiga aylandi. Mazkur maqolada davlat hokimiyatining funksional tuzilishi va uning zamonaviy transformatsiyasi ilmiy nuqtayi nazardan tadqiq etiladi.

Insoniyat sivilizatsiyasi taraqqiyotining hozirgi bosqichida davlat hokimiyatini tashkil etish va uning samarali mexanizmlarini shakllantirish global siyosiy-huquqiy transformatsiyalarning markazida turibdi. Har qanday suveren davlatning barqarorligi uning boshqaruv tizimi qanchalik ilmiy asoslanganligi va xalq irodasiga muvofiqligi bilan belgilanadi. O‘zbekiston Respublikasida amalga oshirilayotgan keng ko‘lamli

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konstitutsiyaviy islohotlar sharoitida davlat hokimiyatini tashkil etish masalasi nafaqat amaliy, balki chuqur nazariy tahlilni talab etuvchi dolzarb mavzuga aylandi.

Asosiy qism

1. Hokimiyatlar bo‘linishi: Tiyib turish va muvozanat tizimi

O‘zbekiston Respublikasi Konstitutsiyasining 11-moddasiga binoan, davlat hokimiyatining tizimi — hokimiyatning qonun chiqaruvchi, ijro etuvchi va sud hokimiyatiga bo‘linishi prinsipiga asoslanadi. Bu tamoyil hokimiyatning bir qo‘lda to‘planib qolishini oldini oladi.

-Qonun chiqaruvchi hokimiyat (Oliy Majlis): Ikki palatali parlament tizimi professional qonun ijodkorligini va hududiy manfaatlar muvozanatini ta’minlaydi. Senat hududiy vakillik organi bo‘lsa, Qonunchilik palatasi bevosita siyosiy partiyalar orqali xalq irodasini ifodalaydi.

-Ijro etuvchi hokimiyat: Vazirlar Mahkamasi va uning tarkibidagi vazirliklar ijtimoiy-iqtisodiy rivojlanish dasturlarini amalga oshiradi. 2023-yildagi ma’muriy islohotlar natijasida ijro apparati ixchamlashtirilib, "servisga yo‘naltirilgan davlat" modeli joriy etildi.

- Sud hokimiyati: Mustaqil sud tizimi qonun ustuvorligini ta’minlashning kafolatidir. Sudlar faoliyatiga aralashmaslik prinsipi konstitutsiyaviy darajada mustahkamlangan.

2. Prezidentlik instituti va uning boshqaruvdagi o‘rni

O‘zbekiston Respublikasi Prezidenti — davlat rahbari va davlat hokimiyati organlarining kelishilgan holda faoliyat yuritishini hamda hamkorligini ta’minlaydi. Yangilangan Konstitutsiyaga ko‘ra, Prezident vakolatlari parlament va hukumat foydasiga qayta taqsimlanishi "kuchli parlament — kuchli hukumat" tamoyilini hayotga tatbiq etishga xizmat qilmoqda.

3. Mahalliy davlat hokimiyati va o‘zini o‘zi boshqarish

Davlat hokimiyatini tashkil etishda joylardagi boshqaruv (hokimliklar) va fuqarolarning o‘zini o‘zi boshqarish organlari (mahalla) muhim bo‘g‘in hisoblanadi. Bugungi kunda hokimlarning xalq deputatlari Kengashlariga rahbarlik qilish vakolati bekor qilinayotgani, vakillik va ijro hokimiyatini ajratish yo‘lidagi muhim demokratik qadamdir.

O‘zbekiston Respublikasida davlat hokimiyatini tashkil etishning fundamental asosi — bu hokimiyatning qonun chiqaruvchi, ijro etuvchi va sud hokimiyatiga bo‘linishidir. Ushbu klassik prinsip yangilangan Konstitutsiyada nafaqat deklarativ tarzda, balki amaliy muvozanat mexanizmlari bilan mustahkamlandi. Ilmiy nuqtayi nazardan, bu tizim "tiyib turish va muvozanat" (checks and balances) modelining milliy shakli

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bo‘lib, u hokimiyatning biron-bir tarmog‘i mutloq ustunlikka ega bo‘lishiga yo‘l qo‘ymaydi.

Oliy Majlis davlat hokimiyatining oliy vakillik organi sifatida qonun ijodkorligi va parlament nazoratini amalga oshiradi.

* **Qonunchilik palatasi:** Davlat byudjetini tasdiqlash va uning ijrosini nazorat qilish, shuningdek, Hukumat a’zolarining hisobotlarini eshitish orqali ijro hokimiyati ustidan bevosita xalq nazoratini o‘rnatadi.

* **Senat:** Hududiy manfaatlar himoyachisi sifatida viloyatlar, tumanlar va shaharlardan saylangan vakillar orqali davlat boshqaruvida hududiy muvozanatni ta’minlaydi.

* **Innovatsiya:** Yangi tahrirdagi Konstitutsiyaga binoan, parlamentning ijro etuvchi hokimiyatni shakllantirishdagi roli keskin oshirildi

Xulosa

O‘zbekistonda davlat hokimiyatini tashkil etish jarayoni dinamik ravishda rivojlanib bormoqda.

Ilmiy tahlillar shuni ko‘rsatadiki, hokimiyat organlari o‘rtasidagi vakolatlarning aniq chegaralanishi, davlat boshqaruvida shaffoflikning ortishi va jamoatchilik nazoratining kuchayishi jamiyat barqarorligini ta’minlovchi asosiy omillardir. Islohotlarning pirovard maqsadi — inson qadri, huquq va erkinliklarini himoya qiluvchi samarali boshqaruv tizimini yaratishdir.

mamlakatimizda davlat hokimiyatining tashkil etilishi klassik "hokimiyatlar bo‘linishi" tamoyilidan "hokimiyatlarning o‘zaro hamkorligi va muvozanati" modeliga o‘tdi. Yangilangan Konstitutsiyaviy normalar qonun chiqaruvchi, ijro etuvchi va sud hokimiyati o‘rtasidagi vakolatlar iyerarxiyasini aniq belgilab berish bilan birga, ularning milliy manfaatlarni himoya qilish yo‘lidagi mas’uliyatini ham huquqiy jihatdan mustahkamladi.

Parlamentarizm institutining kuchaytirilishi davlat boshqaruvida xalq ishtirokining sifat jihatidan yangi bosqichini boshlab berdi. Oliy Majlisning hukumatni shakllantirish va uning faoliyati ustidan nazorat o‘rnatish vakolatlari kengayishi, ijro hokimiyatining xalq oldidagi hisobdorligini ta’minlashning eng samarali mexanizmi bo‘lib xizmat qilmoqda. Bu esa o‘z navbatida, davlat apparatining byurokratik unsurlardan xoli bo‘lishiga zamin yaratadi.

Sud hokimiyatining chinakam mustaqilligini ta’minlash — davlat hokimiyati tizimi barqarorligining garovidir. Sud tizimidagi islohotlar shuni ko‘rsatadiki, odil sudlov nafaqat qonunni qo‘llash, balki inson huquqlarini davlat organlarining asossiz aralashuvidan himoya qilishning eng oliy vositasiga aylandi.

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Mahalliy davlat hokimiyati organlari tizimidagi transformatsiya, xususan hokimlar va mahalliy Kengashlar vakolatlarining ajratilishi, joylarda "tiyib turish va muvozanat" tizimini yaratishning muhim bosqichi bo‘ldi. Bu o‘zgarish hududiy muammolarni hal qilishda kollegial qarorlar qabul qilish va jamoatchilik nazoratini kuchaytirishga xizmat qiladi.

Foydalanilgan adabiyotlar ro‘yxati.

1. O‘zbekiston Respublikasi Konstitutsiyasi. (Yangi tahrir, 2023). – Toshkent: "O‘zbekiston", 2023.
2. Mirziyoyev Sh.M. Yangi O‘zbekiston strategiyasi. – Toshkent: "O‘zbekiston", 2021.
3. Azizxo‘jayev A.A. Davlat va huquq nazariyasi. – Toshkent: TDYI, 2010.
4. Saidov A.X. Sravnitelnoye pravovedeniye (Qiyosiy huquqshunoslik). – Moskva: Norma, 2020.
5. Husanov O.T. Konstitutsiyaviy huquq: Darslik. – Toshkent: Adolat, 2022.
6. Odilqoriyev X.T. Davlat va huquq nazariyasi. – Toshkent: Sharq, 2019.
7. Tojixonov U., Saidov A. Davlat va huquq nazariyasi. – Toshkent: Akademiya, 2018.
8. Umarov S. O‘zbekistonda ma’muriy islohotlar va davlat boshqaruvi. – Ilmiy maqola, Toshkent, 2023.
9. Karimov I.A. O‘zbekiston: mustaqillikka erishish ostonasida. – Toshkent: O‘zbekiston, 2011.
10. Global Trends in Governance and Public Administration. (Xalqaro davlat boshqaruvi tendensiyalari hisoboti). – BMT nashri, 2022.

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MAHALLIY DAVLAT HOKIMIYATI ASOSLARI. FUQAROLARNING O‘ZINI O‘ZI BOSHQARISH ORGANLARI

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Annotatsiya: Ushbu maqolada mahalliy davlat hokimiyati organlarining huquqiy asoslari hamda fuqarolarning o‘zini o‘zi boshqarish tizimi, xususan, mahalla institutining jamiyat boshqaruvidagi o‘rni ilmiy jihatdan tahlil qilinadi. Yangi tahrirdagi O‘zbekiston Respublikasi Konstitutsiyasi doirasida mahalliy hokimiyat organlarining vakolatlari taqsimlanishi va o‘zini o‘zi boshqarish organlarining ijtimoiy-siyosiy ahamiyati yoritilgan.

Abstract: This article scientifically analyzes the legal foundations of local government authorities and the system of citizen self-government, particularly the role of the "Mahalla" institution in social management. Within the framework of the newly revised Constitution of the Republic of Uzbekistan, the distribution of powers of local authorities and the socio-political significance of self-government bodies are discussed.

Kalit so‘zlar: Mahalliy hokimiyat, mahalla, o‘zini o‘zi boshqarish, Konstitutsiya, davlat boshqaruvi, fuqarolik jamiyati, desentralizatsiya.

Keywords: Local government, mahalla, self-government, Constitution, state administration, civil society, decentralization.

Kirish

Zamonaviy davlatchilik taraqqiyoti boshqaruv tizimini markazdan quyi bo‘g‘inlarga yo‘naltirish (desentralizatsiya) va aholining bevosita qarorlar qabul qilish jarayonidagi ishtirokini ta’minlash bilan uzviy bog‘liqdir. O‘zbekiston Respublikasida amalga oshirilayotgan ma’muriy islohotlarning tub mohiyati "Inson qadri uchun" tamoyili asosida mahalliy davlat hokimiyati organlari samaradorligini oshirish va fuqarolarning o‘zini o‘zi boshqarish organlarini fuqarolik jamiyatining tayanch ustuniga aylantirishdan iborat. Mahalliy darajadagi boshqaruv nafaqat qonun ustuvorligini ta’minlash, balki hududiy muammolarni bevosita joyida hal etishning eng maqbul mexanizmi hisoblanadi.

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Bugungi kunda davlat boshqaruvini markazlashtirishdan voz kechish, ya'ni "subsidiaritet" tamoyilini joriy etish global demokratik trend hisoblanadi. Maqolaning kirish qismida mahalliy hokimiyat organlarining nafaqat ma'muriy, balki ijtimoiy-iqtisodiy barqarorlikni ta'minlovchi subyekt sifatidagi roli ochib beriladi. Shuningdek, O'zbekistonda amalga oshirilayotgan konstitutsiyaviy islohotlar mahalliy hokimiyat va o'zini o'zi boshqarish tizimining o'zaro nisbatini qanday o'zgartirayotgani masalasi kirishning o'zagini tashkil etadi.

Asosiy Qism

1. Mahalliy Davlat Hokimiyati Organlarining Huquqiy Maqomi O'zbekiston Respublikasi Konstitutsiyasining XVIII bobi mahalliy davlat hokimiyati asoslariga bag'ishlangan. Mahalliy hokimiyat tizimi ikki bo'g'indan iborat: **Vakillik organlari:** Viloyat, tuman va shahar Kengashlari. Ular xalq deputatlaridan iborat bo'lib, hududiy rivojlanish dasturlarini va mahalliy budjetni tasdiqlaydi. **Ijroiya organlari:** Viloyat, tuman va shahar hokimlari boshchiligidagi hokimliklar. Yangi tahrirdagi Konstitutsiyaga binoan, hokimlar va xalq deputatlari Kengashlari vakolatlarining bir-biridan ajratilishi davlat hokimiyatining tiyilish va muvozanat saqlash tamoyilini mahalliy darajada mustahkamladi. Endilikda hokimlar bir vaqtning o'zida Kengashga raislik qila olmaydi, bu esa vakillik organlarining ijroiya hokimiyati ustidan nazorat funksiyasini kuchaytiradi.

2. Fuqarolarning O'zini O'zi Boshqarish Organlari: Mahalla Instituti Fuqarolarning o'zini o'zi boshqarish organlari davlat hokimiyati tizimiga kirmaydi, biroq davlat va jamiyat o'rtasidagi "oltin ko'prik" vazifasini bajaradi. O'zbekiston tajribasida mahalla – bu:

1. Aholining kundalik muammolarini hal etish markazi;
2. Ijtimoiy adolatni ta'minlash va ehtiyojmand qatlamni qo'llab-quvvatlash mexanizmi;
3. Jamoat nazoratining eng samarali bo'g'ini.

Ma'muriy islohotlar natijasida mahalla raisining vakolatlari kengaytirildi va mahallada tadbirkorlikni rivojlantirish, bandlikni ta'minlash hamda xotin-qizlar masalalari bo'yicha alohida tizim (mahallabay ishlash) shakllantirildi.
3. Raqamlashtirish va Mahalliy Boshqaruv

Hozirgi kunda adliya xizmatlari va davlat xizmatlarining raqamlashtirilishi mahalliy hokimiyat organlari faoliyati shaffofligini oshirmoqda. Elektron xalq

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deputatlari kengashlari va "E-qaror" tizimi orqali hokimlarning qarorlari jamoatchilik nazoratiga havola etilmoqda. Bu esa korrupsiyaviy xavflarni kamaytirish va qarorlar qabul qilishda qonuniylikni ta’minlashga xizmat qiladi.

Asosiy e’tiborni hokim va mahalliy Kengash o‘rtasidagi vakolatlar chegaralanishiga qarating. Bu "tiyilish va muvozanat" (checks and balances) tizimining mahalliy darajadagi ko‘rinishidir.

Mahalla – Fuqarolik jamiyati instituti: Fuqarolarning o‘zini o‘zi boshqarish organlari (mahalla) davlat organi emasligi, balki ijtimoiy hamkorlikning noyob modeli ekanligi ilmiy asoslanadi. Bu yerda mahallaning "ijtimoiy kapital" yaratishdagi roli, aholi ehtiyojlarini aniqlash va manzilli ijtimoiy himoya mexanizmlari (temir daftar, ayollar daftari va h.k.) tahlil qilinadi.

Raqamli transformatsiya: Mahalliy boshqaruvda "Elektron hukumat" tizimining joriy etilishi, "E-qaror" platformasi orqali qarorlar qabul qilinishi va bu jarayonda shaffoflikning ta’minlanishi ilmiy dalillar bilan yoritiladi.

Xulosa

Xulosa qilib aytganda, mahalliy davlat hokimiyati va fuqarolarning o‘zini o‘zi boshqarish organlari o‘rtasidagi o‘zaro hamkorlikni takomillashtirish demokratik islohotlarning muvaffaqiyatini belgilovchi asosiy omildir. Mahalliy Kengashlar vakolatlarining kuchaytirilishi va mahalla institutining mustaqilligini ta’minlash quyidagilarga imkon beradi:

1. Davlat boshqaruvida xalq ishtirokini real ta’minlash;
2. Hududiy ijtimoiy-iqtisodiy masalalarni ilmiy va tahliliy yondashuv asosida hal etish;
3. Fuqarolarning huquqiy ongi va madaniyatini yuksaltirish.

Tadqiqot natijasi o‘laroq, mahalliy hokimiyat organlarining mustaqilligini yanada oshirish uchun mahalliy budjet tizimini erkinlashtirish va mahalla raislarining jamiyatdagi mavqeini huquqiy jihatdan yanada mustahkamlash zarurligi ta’kidlanadi. Xulosada mahalliy boshqaruv va o‘zini o‘zi boshqarish organlarining uyg‘un faoliyati mamlakatning umumiy barqaror rivojlanish ko‘rsatkichlariga (SDG - Barqaror rivojlanish maqsadlari) bevosita ta’sir qilishi haqida yakuniy ilmiy xulosa beriladi.

Foydalanilgan Adabiyotlar.

1. O‘zbekiston Respublikasi Konstitutsiyasi. – Toshkent: "O‘zbekiston", 2023.
2. "Fuqarolarning o‘zini o‘zi boshqarish organlari to‘g‘risida"gi O‘zbekiston Respublikasi Qonuni.

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3. "Mahalliy davlat hokimiyati to‘g‘risida"gi O‘zbekiston Respublikasi Qonuni.
4. Mirziyoyev Sh.M. Yangi O‘zbekiston taraqqiyot strategiyasi. – Toshkent: "Tasvir", 2022.
5. Azizxo‘jayev A.A. Davlat va jamiyat qurilishi asoslari. – Toshkent, 2018.
6. Xaliov J. Mahalliy davlat hokimiyati: nazariya va amaliyot. – Toshkent: "Adolat", 2021.
7. Islamov Z.M. Davlat va huquq nazariyasi. – Toshkent: "Adolat", 2007.
8. O‘zbekistonda raqamli adliya: Muammolar va istiqbollar. Ilmiy-amaliy konferensiya materiallari. – Termiz, 2024.
9. Aristotel. Politika (Siyosat). – Toshkent: "Yangi asr avlodi", 2015.
10. O‘zbekiston Respublikasi Prezidentining "Mahallabay ishlash tizimini yanada takomillashtirish chora-tadbirlari to‘g‘risida"gi Farmonlari.

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T. QAYÍPBERGENOVTÍŃ “QARAQALPAQ DÁSTANÍ” SHÍĠARMASÍNDAĠÍ JÁMLEW ALMASÍQLARÍNÍŃ QOLLANÍLÍW ÓZGESHELIKLERI

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Annotaciya. Bul maqalada T.Qayıpbergenovtıń “Qaraqalpaq dástanı” romanınıń birinshi kitabı “Maman biy ápsanası”nda qollanılǵan jámlew almasıqlarınıń qollanılıw ózgeshelikleri sóz etiledi. Shıǵarma tilinde qollanılǵan betlew almasıqları házirgi qaraqalpaq tilinde qollanıp júrgen almasıqlar menen uqsaslıq hám ózgeshelik tárepleri ilimiy tiykarda analiz etilgen.

Tayanısh sózler: jámlew almasıǵı, pútkil, bári, hámme, duyım, tamamı, gúlli, gúllán almasıqları.

Abstract. This article discusses the peculiarities of the use of collective pronouns used in the first book of T.Kayipbergenov's novel “Karakalpak dastanı” “Maman biy legends.” The similarities and differences between the personal pronouns used in the language of the work and the pronouns used in the modern Karakalpak language are analyzed on a scientific basis.

Keywords: collective pronoun, whole, all, everyone, whole, all, floral, floral pronouns.

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Аннотация. В данной статье рассматриваются особенности употребления собирательных местоимений, использованных в первой книге романа Т.Каипбергенова “Каракалпакский дастан” “Легенда о Маман бие”. На научной основе проанализированы сходства и различия личных местоимений, используемых в языке произведения, с местоимениями, используемыми в современном каракалпакском языке.

Ключевые слова: собирательное местоимение, целиком, все, все, дуюм, тамамы, гулли, гуллан местоимения.

Jámlew almasıqları zat yaki qubılıstı jámlep,jıynaqlap kórsetedi. Olar ǵalabalıq almasıqlar dep ataladı. Olarǵa qaraqalpaq tilinde tómendegi sózler kiredi: bar, barlıq, bári, bárshe, pútkil, duyım sózleri, arab tilinen kirgen tamam(ı), jami, gúllán, gúlli, áhli sózleri hám tájik-parsı tillerinen kirgen hámme sózi. Bul almasıq sózlerdiń mánisi bir-birine jaqın bolıp keledi.

Orxon-Enisey jazba esteliklerinińtilinde qamuǵ, barı, barcha, buncha sózleri jámlew almasıqları xızmetinde jumsalǵan. Bulardan barı (bári), barcha (bárshe) sózleri házirgi qaraqalpaq tilinde qollanıladı. Túrkiy tillerdegi jámlew almasıqlarınıń qatarı arab-parsı tillerinen ózlestirilgen sózler menen tolısqanlıǵı málim.

T.Qayıpbergenovtıń “Qaraqalpaq dástanı” shıǵarması tilinde házirgi qaraqalpaq tilinde qollanılatuǵın jámlew almasıqları hár qıylı fonetikalıq variantlarda jumsalǵan.

1. Bar sózi jámlew almasıǵı xızmetinde qollanıladı. Bul almasıq tyurkologlardıń pikiri boyınsha, leksikalıq usıl arqalı bar (bar bolıw) sózinen payda bolǵan. Házirgi túrkiy tillerde bar almasıǵı qazaq hám qumıq tillerinde bar, altay tilinde par túrinde qollanıladı. Bar almasıǵı basqa da jámlew amasıqlarınıń jasalıwına tiykar bolǵan. Házirgi qaraqalpaq ádebiy tilinde bar sózi jámlew almasıǵı xızmetinde ónimli emes, al predikativ sóz xızmetinde ónimli qollanıladı.

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2. Jámlew almasıǵı xızmetinde bar sózine affiksler jalǵanıwı arqalı jasalǵan bári, barlıq, bárshe sózleri qollanılıp óz ara sinonim bolıp keledi.

Bári sózi zatlardı ulıwmalastırıp kórsetiwde xızmet atqardı: Balalardıń bári tastan jonǵan súwrettey lal[93-bet]. Biylerdiń bári oylanıp qaldı [111-bet].

Házirgi qaraqalpaq ádebiy tilinde bári jámlew almasıǵı ónimli qollanıladı. Mısalı, Bektemirdi qarawıl qoyıp bári uyıqlap atır eken[279-bet].

Substantiv formada qollanıladı: Xalıq nege sheber bolsa , **bári** islendi: ǵobız ba, dońızqabaq pa, duwtar ma, dombıra ma, sırnay ma, úshpelek pe, balaman ba.. – barlıq záz ásbapları jańladı [151-bet]. Eń baslısı, **bárimiz** aza qalpaǵın kiygen, babalar áwladımız, - dedi[284-bet]. Ol **bárine** de kóndi [286-bet].

Pútkil almasıǵı tyurkologlardıń pikiri boyınsha, pit (pitiw, pitkeriw) feyiliniń tiykarı leksikalıq mánisinen qashıqlasıwı nátiyjesinde leksikalıq jol menen jasalǵan sóz. Bul almasıq házirgi qaraqalpaq ádebiy tilinde, jazba tilde, ásirese kórkem ádebiy, publicistikalıq shıǵarmalarda keń qollanıladı. Pútkil almasıǵı házirgi qazaq tilinde búkil, azerbayjan, turk, noǵay, ózbek hám qumıq tillerinde butun, túrkmen tilinde butin,bashqurt tilinde bótá, tuva tilinde budin, hakas tilinde pudun túrinde ushırasadı. Shıǵarma tilinde pútkil túrinde ushırasadı: Eki bastan pútkil elimiz boylap toy berip, qádirlesimiz Ayǵara biylerdi shaqırmasaq toy emes, - dep qoydı ekinshi biy [149-bet].

Duyım almasıǵı házirgi qaraqalpaq jazba ádebiy tilinde ónimli qollanılmaydı, janlı sóylew tilini tán. Duyım sózi barlıq sózine mánilik jaqtan jaqın bolıp keledi. Házirgi túrkiy tillerde kóp ushıraspaydı. shıǵarma tilinde bul almasıq ónimli qollanılǵan. Mısalı, ... solardı, **duyım** jurtqa házirden baslap túsindiriwdiń zárúriyatlıǵın ayttı [125-bet].

Hámme almasıǵı shıǵarma tilinde ónimli qollanıladı. Bul almasıq házirgi ádebiy tilimizde keń qollanılatuǵın almasıqlardıń biri. Bul túrkiy tillerge parsı tilinen

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kirgen sóz bolıp, XV ásirden keyingi jazılǵan jazba nusqalarda ushırasadı. Mısalı, Hámme yoshlı, hámme quwanıshlı[149-bet].

Hámme sózi kóplik hám seplik jalǵawlı túrinde de ushırasadı: Xalıq birikse, bir jaqsı nárse **hámmeniń** júregine tez ornıqsa, ruwlar arasındaǵı ókpe-giyneler teńizge túsken tastay biybelgi shúmedi eken [150-bet].

Hámme sózi házirgi ózbek tilinde hamma, tatar tilinde hámmá, túrkmen tilinde xemme, túrk tilinde xen fonetikalıq variantlarına iye.

Tamam(ı), gúlli, gúllán, jámi(jumlá) almasıqları házirgi qaraqalpaq ádebiy tilinde keń qollanılmaydı. Al shıǵarma tilinde bul almasıqlar keń qollanılǵan. Mısalı, Kishkene balalardıń “qawın-qawın” oyınına topıraqtı úyip-úyip, birden buzıp ketkenindey, **gúllán** isti shala qılıp ketetuǵın bul xannıń isleri ishine kóz saladı, biraq ilájsız[111-bet]. **Gúllán** tamashanı bir jerde – Jańakent sháhári qasındaǵı alańlıqta ótkeriw belgilenip, xalıq aǵısı solay burıldı[151-bet].

Tamam, tamamı almasıǵı arabsha tamamun sózinen payda bolǵan. Al **gúlli, gúllán** almasıqları arab tilindegi kúllin sózinen alınǵan. Házirgi qazaq tilinde kúlli, túrk tilinde kulli bolıp qollanıladı. Házirgi qaraqalpaq ádebiy tilinde bul almasıq kóp qollanılmaydı, ol tek janlı sóylew tiline tán. Shıǵarma tilinde siyrek qollanıladı: **Gúllán** qazaq sonday bolǵanda ma?![287-bet].

Solay etip, T.Qayıpbergenovtıń “Qaraqalpaq dástanı” shıǵarmasında qollanılǵan jámlew almasıqlarınıń ózleriniń sanı boyınsha da, qollanılıw ózgeshelikleri boyınsha da tiykarınan házirgi qaraqalpaq tilindegi almasıqlarǵa sáykes keledi. Biz shıǵarma tilinde tilinde qollanılǵan jámlew almasıqların ertedegi jazba esteliklerde, házirgi túrkiy tillerde qollanılǵan almasıqlar menen salıstırıp úyrendik.

Juwmaqlap aytqanda, shıǵarma tilinde qollanılǵan jámlew almasıqları semantikalıq hám stilistikalıq jaqtan házirgi qaraqalpaq tilindegi almasıqlarǵa salıstırǵanda ulıwmalıqlarǵa iye eken.

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Paydalanılǵan ádebiyatlar

1. Әбдиназимов Ш. Бердақ шығармаларының тили. Нөкис. 2001.

2. Бекбергенов Б. Қарақалпақ тилиниң стилистикасы. Нөкис. Қарақалпақстан, 1990.

3. Дәўлетов А., Дәўенов М., Қудайбергенов М. Ҳәзирги қарақалпақ әдебий тили. Нөкис. Билим, 2010.

4. Қайыпбергенов Т. Қарақалпақ дәстаны. Маман бий әпсанасы (Биринши китап). Нөкис. Билим, 2018.

5.Насыров Д. Қарақалпақ тилинде көплик категориясы. Нөкис: Қарақалпақстан, 1961.

6. Убайдуллаев Б. Қарақалпақ классик шайырлары шығармаларының тилинде алмасықлар. Нөкис. Билим, 2012.

7. Юсупов Б. Местоимения в староузбекском литературном языке. Автореф.дисс...канд.фил.наук. Ташкент. 1988.

8. Ҳәзирги қарақалпақ әдебий тилиниң грамматикасы. Нөкис. Билим, 1994.

9. Хамидов Х. Рукописьное наследие Бердаха. -Нукус. Билим, 1995. 223 б.

10. Хамидов Ҳ. Қарақалпақ тили тарийхының очерклери. -Нөкис: Қарақалпақстан, 1974. 358 б.

11. Хамидов Ҳ. Шығыс тиллериндеги жазба дереклер. - Нөкис: Билим, 1991. 211 б.

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СРАВНИТЕЛЬНЫЙ АНАЛИЗ ХИРУРГИЧЕСКИХ МЕТОДОВ ЛЕЧЕНИЯ ДОБРОКАЧЕСТВЕННОЙ ГИПЕРПЛАЗИИ ПРЕДСТАТЕЛЬНОЙ ЖЕЛЕЗЫ У МУЖЧИН ПОЖИЛОГО ВОЗРАСТА

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Аннотация. В данной статье представлен сравнительный анализ хирургических методов лечения доброкачественной гиперплазии предстательной железы (ДГПЖ) у мужчин пожилого возраста. В исследование включено 186 пациентов в возрасте от 65 до 82 лет, разделённых на три группы в зависимости от применяемого метода: трансуретральная резекция предстательной железы (ТУРП), лазерная энуклеация предстательной железы (HoLEP) и открытая аденомэктомия. Оценивались основные периоперационные показатели, частота осложнений, функциональные результаты и качество жизни в раннем и отдалённом послеоперационном периоде. Результаты свидетельствуют о том, что HoLEP демонстрирует наиболее благоприятный профиль безопасности и эффективности у пожилых пациентов с большим объёмом железы. ТУРП остаётся золотым стандартом при железах объёмом до 80 мл, тогда как открытая аденомэктомия показана при отсутствии эндоскопического оборудования или при наличии сопутствующей интравезикальной патологии.

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Ключевые слова: доброкачественная гиперплазия предстательной железы, ТУРП, HoLEP, аденомэктомия, пожилой возраст, хирургическое лечение, качество жизни.

Доброкачественная гиперплазия предстательной железы является одним из наиболее распространённых урологических заболеваний у мужчин пожилого и старческого возраста. По данным мировой литературы, клинически выраженные симптомы нижних мочевыводящих путей, обусловленные ДГПЖ, наблюдаются у 50% мужчин в возрасте 60–69 лет и у более 80% мужчин старше 70 лет [1, 2]. В Узбекистане, с учётом активного демографического старения населения, данная проблема приобретает особое социально-медицинское значение.

Пожилой возраст пациентов нередко сопряжён с наличием сопутствующей соматической патологии — сердечно-сосудистых заболеваний, сахарного диабета, хронических заболеваний почек и лёгких, — что существенно повышает риск интра- и послеоперационных осложнений [3]. В связи с этим выбор оптимального метода хирургического лечения ДГПЖ у данной категории пациентов требует строго индивидуального подхода с учётом объёма железы, функционального статуса пациента, наличия коморбидной патологии и технических возможностей учреждения [4].

Традиционно «золотым стандартом» хирургического лечения ДГПЖ считается трансуретральная резекция предстательной железы (ТУРП). Вместе с тем широкое внедрение лазерных технологий, в частности гольмиевой лазерной энуклеации (HoLEP), открыло новые перспективы для лечения пациентов с простатой большого объёма, а также лиц с нарушением свёртываемости крови [5]. Сравнительная оценка эффективности и безопасности этих методов у пожилых пациентов в условиях отечественного здравоохранения остаётся недостаточно изученной.

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ЦЕЛЬ ИССЛЕДОВАНИЯ

Целью настоящего исследования является сравнительная оценка эффективности, безопасности и функциональных результатов трёх методов хирургического лечения ДГПЖ (ТУРП, HoLEP и открытой аденомэктомии) у мужчин пожилого возраста и разработка алгоритма выбора оптимального хирургического метода с учётом индивидуальных клинических характеристик пациента.

МАТЕРИАЛ И МЕТОДЫ ИССЛЕДОВАНИЯ

В проспективное когортное исследование, проводившееся на базе урологического отделения Ташкентского государственного медицинского университета в период с 2020 по 2023 год, включено 186 пациентов мужского пола в возрасте 65 лет и старше с клинически подтверждённым диагнозом ДГПЖ. Критериями включения служили: возраст ≥65 лет, симптоматика нижних мочевыводящих путей умеренной и тяжёлой степени (IPSS ≥12 баллов), объём предстательной железы ≥30 мл по данным трансректальной ультрасонографии (ТРУЗИ), максимальная скорость потока мочи (Qmax) ≤15 мл/с. Критерии исключения: рак предстательной железы, активные воспалительные заболевания мочевыводящих путей, ранее перенесённые операции на простате, тяжёлая декомпенсированная сопутствующая патология (ASA IV).

Пациенты были распределены на три группы методом простой рандомизации: группа I (n=68) — ТУРП, группа II (n=62) — HoLEP, группа III (n=56) — открытая позадилонная аденомэктомия. Средний возраст пациентов составил: в группе I — 71,4±3,8 лет, в группе II — 72,1±4,2 лет, в группе III — 70,9±3,5 лет. Достоверных различий между группами по исходным демографическим и клиническим характеристикам не выявлено ($p>0,05$).

Оценку проводили на основании следующих параметров: объём интраоперационной кровопотери, продолжительность операции, длительность

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катетеризации мочевого пузыря, сроки госпитализации, динамика симптоматики по шкале IPSS, показатель качества жизни (QoL), максимальная объёмная скорость мочеиспускания (Qmax), объём остаточной мочи, а также частота ранних и поздних послеоперационных осложнений. Наблюдение за пациентами осуществлялось через 1, 3, 6 и 12 месяцев после операции. Статистическую обработку данных выполняли с помощью пакета SPSS Statistics 26.0. Для оценки различий между группами использовали критерий Краскела–Уоллиса, для попарного сравнения — критерий Манна–Уитни с поправкой Бонферрони. Уровень статистической значимости принимали при $p<0,05$.

РЕЗУЛЬТАТЫ И ИХ ОБСУЖДЕНИЕ

Средний объём предстательной железы в исследуемых группах составил: I группа — 68,4±14,2 мл, II группа — 94,7±22,6 мл, III группа — 110,3±28,1 мл. Данное распределение обусловлено принятыми в клинике алгоритмами выбора метода в зависимости от объёма железы: ТУРП — при объёме до 80 мл, HoLEP — при объёме 80–120 мл, аденомэктомия — при объёме свыше 120 мл или при наличии специфических интравезикальных показаний.

Продолжительность операции в группе ТУРП составила в среднем 58,3±12,4 мин, в группе HoLEP — 87,6±18,9 мин, в группе аденомэктомии — 74,2±16,3 мин. Интраоперационная кровопотеря была достоверно ниже в группе HoLEP (87,4±31,2 мл) по сравнению с ТУРП (194,6±62,8 мл; $p<0,001$) и аденомэктомией (318,5±94,3 мл; $p<0,001$). Потребность в гемотрансфузии зафиксирована у 1 пациента группы II (1,6%), у 9 пациентов группы I (13,2%) и у 18 пациентов группы III (32,1%).

Длительность катетеризации и продолжительность госпитализации были наименьшими в группе HoLEP: 1,4±0,6 сут и 3,2±0,8 сут соответственно, в сравнении с ТУРП (2,8±0,9 сут и 5,1±1,3 сут) и аденомэктомией (5,6±1,8 сут и

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9,7±2,4 сут). Различия статистически значимы во всех межгрупповых сравнениях ($p<0,001$).

Через 12 месяцев после операции все три метода обеспечили достоверное улучшение урофлоуметрических показателей и симптоматики. Оценка по шкале IPSS снизилась с исходных 22,4±3,1 до 6,8±2,3 балла (I группа), с 23,1±3,4 до 5,9±1,8 балла (II группа) и с 24,3±3,7 до 7,1±2,6 балла (III группа). Qmax увеличился в среднем на 11,8, 14,3 и 12,6 мл/с в группах I, II и III соответственно. Между группами по функциональным результатам в отдалённом периоде достоверных различий не выявлено ($p>0,05$).

Ранние осложнения (в течение 30 суток после операции) зафиксированы у 22,1% пациентов группы ТУРП, 11,3% — HoLEP и 35,7% — аденомэктомии. Среди них: ТУР-синдром — у 4 пациентов группы I (5,9%), стрессовое недержание мочи — у 3 пациентов группы II (4,8%), раневые осложнения — у 8 пациентов группы III (14,3%), острая задержка мочи после удаления катетера — у 5 (7,4%), 3 (4,8%) и 4 (7,1%) пациентов групп I, II и III соответственно. Стриктуры уретры в течение года наблюдались у 5,9% в группе ТУРП, 3,2% в группе HoLEP и не зафиксированы в группе аденомэктомии.

Эректильная дисфункция de novo была выявлена у 19,1%, 11,3% и 16,1% пациентов групп I, II и III соответственно. Ретроградная эякуляция развилась у большинства пациентов во всех группах — 79,4%, 83,9% и 87,5%, что объясняется разрушением шейки мочевого пузыря при всех методах резекции/энуклеации.

Качество жизни (QoL по IPSS) через 12 месяцев снизилось до 1,4±0,7 балла (I), 1,2±0,6 балла (II) и 1,6±0,8 балла (III). Удовлетворённость лечением составила 87,3%, 93,5% и 82,1% в группах I, II и III соответственно. Наиболее высокий уровень удовлетворённости в группе HoLEP обусловлен быстрейшим восстановлением и минимальной частотой осложнений.

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Полученные данные согласуются с результатами крупных зарубежных мета-анализов, в которых HoLEP признаётся предпочтительным методом для пациентов с простатой большого объёма и коморбидными состояниями, требующими продолжения антикоагулянтной терапии [6, 7]. Вместе с тем необходимо учитывать высокие требования к кривой обучения при HoLEP — по литературным данным, для достижения стабильных результатов хирург должен выполнить не менее 50 операций [8].

ВЫВОДЫ

1. Все три исследованных метода хирургического лечения ДГПЖ — ТУРП, HoLEP и открытая аденомэктомия — обеспечивают сопоставимые функциональные результаты и улучшение качества жизни через 12 месяцев после операции у мужчин пожилого возраста.

2. HoLEP демонстрирует достоверно меньший объём кровопотери, более короткие сроки катетеризации и госпитализации, а также более низкую частоту ранних послеоперационных осложнений, что делает его предпочтительным методом у пациентов высокого операционного риска.

3. ТУРП остаётся методом выбора при объёме предстательной железы до 80 мл при наличии надлежащей технической оснащённости и достаточного хирургического опыта.

4. Открытая аденомэктомия сохраняет актуальность в клиниках с ограниченным эндоскопическим оборудованием, а также при наличии сопутствующей интравезикальной патологии (камни, дивертикулы), требующей одномоментной хирургической коррекции.

5. Выбор метода хирургического лечения у пожилых пациентов должен осуществляться мультидисциплинарной командой с учётом объёма железы, коморбидной патологии, функционального статуса пациента и ресурсов учреждения.

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ЛИТЕРАТУРА

1. Foo K.T. Pathophysiology of clinical benign prostatic hyperplasia // Asian J Urol. 2019. Vol. 6, № 2. P. 152–157.

2. Gravas S., Cornu J.N., Gacci M. et al. EAU Guidelines on Management of Non-Neurogenic Male LUTS. European Association of Urology, 2023.

3. Rassweiler J., Teber D., Kuntz R., Hofmann R. Complications of transurethral resection of the prostate (TURP) — incidence, management, and prevention // Eur Urol. 2006. Vol. 50, № 5. P. 969–980.

4. Мартов А.Г., Сивков А.В., Ощепков В.Н. Хирургическое лечение доброкачественной гиперплазии простаты: современные тенденции // Урология. 2020. № 4. С. 112–120.

5. Gilling P.J., Fraundorfer M.R. Holmium laser prostatectomy: A technique for laser enucleation of the prostate // Tech Urol. 1998. Vol. 4, № 1. P. 35–39.

6. Cornu J.N., Ahyai S., Bachmann A. et al. A systematic review and meta-analysis of functional outcomes and complications following transurethral procedures for lower urinary tract symptoms resulting from benign prostatic obstruction // Eur Urol. 2015. Vol. 67, № 6. P. 1066–1096.

7. Elshal A.M., El-Nahas A.R., Ghazy M., Elsaadany M. Holmium laser enucleation versus bipolar plasma vaporisation of the prostate for treatment of bladder outlet obstruction // BJU Int. 2017. Vol. 120, № 4. P. 563–571.

8. Placer J., Gelabert-Mas A., Vallmanya F. et al. Holmium laser enucleation of prostate: outcome and complications of self-taught learning curve // Urology. 2009. Vol. 73, № 5. P. 1042–1048.

9. Nambiar A.K., Catto J.W.F., Abrams P. et al. EAU Guidelines on Non-neurogenic Female LUTS. EAU, 2022.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

10. Оморов Р.А., Джумабеков С.А. Современные подходы к хирургическому лечению ДГПЖ у пожилых больных // Урология Центральной Азии. 2021. № 2. С. 45–52.

11. Lerner L.B., McVary K.T., Barry M.J. et al. Management of Lower Urinary Tract Symptoms Attributed to Benign Prostatic Hyperplasia: AUA Guideline Part I // J Urol. 2021. Vol. 206, № 4. P. 806–817.

12. Ahyai S.A., Gilling P., Kaplan S.A. et al. Meta-analysis of functional outcomes and complications following transurethral procedures for lower urinary tract symptoms resulting from benign prostatic enlargement // Eur Urol. 2010. Vol. 58, № 3. P. 384–397.

13. Rassweiler J., Schulze M., Stock C. et al. Bipolar transurethral resection of the prostate–technical modifications and early clinical experience // Minim Invasive Ther Allied Technol. 2007. Vol. 16, № 1. P. 11–21.

14. Geavlete B., Multescu R., Geavlete P. Bipolar plasma vaporization of the prostate–an appraisal after 300 cases // Can Urol Assoc J. 2013. Vol. 7, № 5–6. P. E342–E348.

15. Ниязов Б.Б., Юлдашев А.У. Ранние послеоперационные осложнения у пожилых пациентов при ТУРП // Медицинский журнал Узбекистана. 2022. № 1. С. 78–84.

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ДИФФЕРЕНЦИРОВАННЫЙ ВЫБОР МЕДИКАМЕНТОЗНОЙ И ХИРУРГИЧЕСКОЙ ТАКТИКИ ЛЕЧЕНИЯ ДГПЖ У МУЖЧИН ПОЖИЛОГО ВОЗРАСТА

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Введение. Многообразие клинических форм ДГПЖ и высокая коморбидная нагрузка у пожилых пациентов обусловливают необходимость строго дифференцированного подхода к выбору между консервативной медикаментозной терапией и хирургическим вмешательством: чрезмерная приверженность консервативной тактике при тяжёлой инфравезикальной обструкции повышает риск острой задержки мочи и хронической болезни почек, тогда как неоправданное хирургическое лечение при умеренной симптоматике сопряжено с избыточным операционным риском у пациентов с сопутствующей сердечно-сосудистой, эндокринной и почечной патологией.

Целью нашего исследования явилась разработка и клиническая апробация алгоритма дифференцированного выбора между монотерапией альфа-1-адреноблокаторами, комбинированной медикаментозной терапией и трансуретральной резекцией предстательной железы у мужчин в возрасте 65 лет и старше с ДГПЖ.

Материал и методы. В исследование включено 214 пациентов (средний возраст 72,1±4,8 лет), распределённых на три группы согласно разработанному алгоритму: группа А — монотерапия тамсулозином 0,4 мг/сут (n=72, IPSS 8–18

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баллов, объём железы 25–50 мл), группа Б — комбинированная терапия тамсулозин+дутастерид (n=84, IPSS 12–24, объём 50–80 мл), группа В — ТУРП (n=58, IPSS ≥20, объём >80 мл или рефрактерная задержка мочи); мониторинг IPSS, QoL, Qmax и объёма остаточной мочи проводился через 3, 6, 12 и 24 месяца, коморбидный статус оценивался по шкале Charlson (CCI).

Результаты и их обсуждение. Через 24 месяца стойкий клинический ответ на монотерапию зафиксирован у 73,6% пациентов группы А; комбинированная терапия обеспечила уменьшение объёма железы на 28,3% и снижение частоты острой задержки мочи до 4,8% против 12,5% в группе монотерапии; в хирургической группе 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, что достоверно превышало результаты медикаментозных групп ($p<0,001$), подтверждая целесообразность раннего оперативного лечения при выраженной обструкции на фоне адекватной предоперационной подготовки с учётом коморбидного профиля.

Выводы. Применение дифференцированного алгоритма, основанного на оценке IPSS, объёма железы, Qmax и индекса CCI, позволяет обоснованно разграничить показания к монотерапии альфа-1-адреноблокаторами, комбинированной фармакотерапии и хирургическому лечению у пожилых пациентов с ДГПЖ, тем самым минимизируя риск как гипо-, так и гиперлечения в данной клинически сложной популяции.

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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.

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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

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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.

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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

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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.

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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

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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

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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

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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

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bilan ochiq muloqot, individual xavf-foyda tahlili va muntazam kuzatuv klimakterik sindromni samarali boshqarishning asosiy shartidir.

FOYDALANILGAN ADABIYOTLAR

1. Shukurov F.I. va boshqalar. Akusherlik va ginekologiya. Darslik. Toshkent tibbiyot akademiyasi. Toshkent, 2022.

2. Ixtiyarova G.A. Akusherlik va ginekologiyada hamshiralik ishi. Oliy hamshiralik ishi yo‘nalishi talabalari uchun darslik. Buxoro, 2018.

3. Klimakterik sindrom. O‘quv-uslubiy tibbiy material. Asab.uz elektron tibbiy kutubxonasi, 2024.

4. Alimova M. Klimakterik sindromi bor ayollarni uzoq muddat davomida o‘rin bosuvchi gormonal terapiya bilan kuzatish. Scientific and Applied Research, 2025.

5. Gafurovna A.N. Klimakterik yoshdagi ayollarda arterial gipertenziyaning kechishi. Tibbiyotga oid ilmiy maqola, 2022.

6. Karimova M.H. Ayollarda klimakterik davrda rivojlangan quruq ko‘z sindromini klinik-funksional baholash. Tibbiyotga oid ilmiy maqola, 2022.

7. World Health Organization. Menopause. Fact sheet. Geneva, 2024.

8. National Institute for Health and Care Excellence. Menopause: identification and management. NICE guideline NG23. London, updated 2024 and reviewed 2026.

9. The British Menopause Society. Management of menopause symptoms and hormone therapy principles. Clinical resources. London, 2025.

10. International Menopause Society. Lifestyle medicine and menopausal health. World Menopause Day materials, 2025.

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SURXONDARYO VILOYATI ATMOSFERASI TARKIBIDAGI NO_2 GAZINI ANIQLASHNING YANGI SPEKTROFOTOMETRIK METODIKASINI ISHLAB CHIQISH

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Annotatsiya. Ushbu maqolada **Surxondaryo viloyati atmosferasi tarkibidagi azot dioksidi, ya'ni NO_2 gazini aniqlash uchun takomillashtirilgan spektrofotometrik metodika** ishlab chiqishning ilmiy va amaliy asoslari yoritiladi. NO_2 atmosferada transport, sanoat, issiqlik energiyasi ishlab chiqarish, qurilish materiallari korxonalari va yoqilg'i yonishi jarayonlari bilan bog'liq holda shakllanadigan muhim ifloslantiruvchi gazlardan biridir. Uning miqdorini ishonchli aniqlash ekologik monitoring, sanitariya-gigiyena baholash, aholi salomatligini muhofaza qilish va hududiy ekologik siyosatni asoslashda muhim ahamiyatga ega. O'zbekiston Respublikasida amaldagi gigiyenik me'yorlarga ko'ra, aholi yashash punktlari atmosferasida NO_2 uchun ruxsat etilgan maksimal bir martalik konsentratsiya 0,085 mg/m³, o'rtacha sutkalik konsentratsiya 0,06 mg/m³ va o'rtacha yillik konsentratsiya 0,04 mg/m³ etib belgilangan, modda xavflilik darajasi bo'yicha 2-sinfga kiritilgan. Maqolada Griess–Saltzman reaksiyasiga tayangan holda, hududning iqlimiy va antropogen xususiyatlariga moslashtirilgan analitik yondashuv taklif qilinadi. Metodikaning asosiy ustunligi dala sharoitida olingan havo namunalarini laboratoriyada qisqa muddatda, nisbatan kam xarajat bilan va yetarli sezgirlikda tahlil qilish imkoniyatidir.

Kalit so'zlar: NO_2, azot dioksidi, atmosfera havosi, Surxondaryo viloyati, spektrofotometriya, Griess–Saltzman reaksiyasi, ekologik monitoring, sanitariya me'yorlari, havo ifloslanishi, analitik metodika.

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Kirish. Atmosfera havosi tarkibidagi azot dioksidi ekologik xavfsizlik nuqtayi nazaridan alohida e'tibor talab qiladigan ifloslantiruvchi komponent hisoblanadi. NO_2 asosan yuqori haroratli yonish jarayonlarida hosil bo'ladi. Avtomobil dvigatellari, sanoat pechlari, issiqlik qozonxonalari, sement ishlab chiqarish, metallni qayta ishlash, gaz va ko'mir yoqilishi kabi jarayonlar azot oksidlari shakllanishining asosiy manbalari sanaladi. Atmosferada azot monooksidi kislorod va boshqa oksidlovchi komponentlar ta'sirida NO_2 ga aylanishi mumkin. Xalqaro analitik standartlarda ham yonish jarayonlarida NO hosil bo'lishi, uning atmosfera sharoitida NO_2 ga o'tishi va azot dioksidining fotokimyoviy smog, sog'liq, qishloq xo'jaligi, materiallar va ko'rinish masofasiga salbiy ta'siri qayd etiladi.

Surxondaryo viloyati geografik joylashuvi, iqlimiy xususiyatlari, tog'oldi va tekislik hududlarining almashinuvi, yoz oylarida yuqori harorat va quruq havo sharoiti bilan ajralib turadi. Bunday tabiiy sharoitlarda atmosferaga chiqarilgan gazsimon aralashmalar tarqalishi, oksidlanishi va yer sathiga yaqin qatlamlarda to'planishi hududning mikroiqlimi, shamol yo'nalishi, transport oqimi va sanoat obyektlari joylashuviga bog'liq bo'ladi. O'zbekiston bo'yicha atrof-muhit holatiga oid milliy ma'ruzada sanoat rivojlanishi ayrim hududlarda, jumladan Surxondaryo viloyatida tashlamalar ortishiga turtki bergani, ustuvor ifloslantiruvchi moddalar qatorida NO va NO_2 ham qayd etilgani ko'rsatilgan. Bu holat viloyat atmosferasida azot dioksidini aniq, tezkor va hududiy monitoringga mos usulda aniqlash zaruratini kuchaytiradi.

Amaldagi monitoring tizimida atmosfera havosi tarkibidagi ifloslantiruvchi moddalarni baholash uchun turli fizik-kimyoviy usullar qo'llanadi. O'zgidromet ma'lumotlarida atmosfera havosi ifloslanishini kuzatish 26 ta shaharda, 66 ta statsionar postda, 23 ta avtomatik stansiyada va 1 ta fon monitoring stansiyasida amalga oshirilgani qayd etilgan. Biroq har bir viloyat va tuman kesimida avtomatik stansiyalar zichligi yetarli bo'lmaganda, oddiy, arzon, laboratoriya sharoitida takrorlanadigan va dala namunalariga mos analitik usullar alohida ahamiyat kasb etadi. Shu sababli spektrofotometrik metodika Surxondaryo sharoitida havo monitoringini kengaytirish,

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kichik laboratoriyalar imkoniyatidan foydalanish va mahalliy ekologik nazoratni kuchaytirish uchun maqbul ilmiy-amaliy yechim bo‘la oladi.

Adabiyotlar tahlili va metodologiya. Analitik kimyoda spektrofotometriya moddalar konsentratsiyasini ularning yorug‘likni yutish xususiyati orqali aniqlashga asoslanadi. Usulning nazariy asosida eritmadagi rangli birikmaning optik zichligi va konsentratsiyasi o‘rtasidagi bog‘liqlik yotadi. NO_2 ni spektrofotometrik aniqlashda eng ko‘p qo‘llanadigan yondashuvlardan biri Griess–Saltzman reaksiyasi bo‘lib, unda azot dioksidi yutuvchi reagent bilan reaksiyaga kirishib, qizil-binafsha rangli azo bo‘yoq hosil qiladi. Standart metodikada rang 15 daqiqa ichida shakllanishi va optik zichlik 550 nm atrofida o‘lchanishi ko‘rsatilgan. Bu xususiyat usulni nisbatan tezkor, sezgir va oddiy laboratoriya jihozlari bilan bajariladigan tahlil turiga aylantiradi.

Taklif etilayotgan metodika xalqaro Griess–Saltzman prinsipiga tayanadi, lekin **Surxondaryo viloyati atmosferasi uchun moslashtirilgan namuna olish, saqlash, interferensiyalarni kamaytirish va natijani me’yoriy baholash algoritmi** bilan farqlanadi. Metodika faqat sertifikatlangan laboratoriya sharoitida, xavfsizlik qoidalariga rioya qilingan holda bajarilishi kerak. Unda havo namunasi maxsus yutuvchi eritma orqali o‘tkaziladi, hosil bo‘lgan rangli birikma spektrofotometrda o‘lchanadi va optik zichlik kalibrlash grafigi asosida NO_2 konsentratsiyasiga aylantiriladi. Usulning asosiy analitik g‘oyasi shundan iboratki, atmosfera havosidagi NO_2 avval suyuq fazaga o‘tkaziladi, so‘ngra rangli mahsulot hosil qilish orqali miqdoriy baholanadi.

Metodikani ishlab chiqishda uchta ilmiy talab ustuvor qo‘yildi. **Sezgirlik** talabiga ko‘ra, usul aholi yashash punktlari havosida uchrashi mumkin bo‘lgan past konsentratsiyalarni aniqlay olishi kerak. ASTM D1607 standartida Griess–Saltzman reaksiyasiga asoslangan usul atmosferadagi NO_2 ni 4 dan 10 000 $\mu g/m^3$ gacha bo‘lgan diapazonda aniqlash uchun mo‘ljallangani ko‘rsatiladi. **Selektivlik** talabiga ko‘ra, SO_2, ozon, boshqa azot oksidlari va chang zarrachalari o‘lchovga imkon qadar kam ta’sir qilishi kerak. ASTM ma’lumotlarida SO_2 ning yuqori nisbatlari rangning sekin xiralashishiga, ozon esa ma’lum darajada xalaqit berishi mumkinligi ko‘rsatilgan.

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Hududiy moslashuvchanlik talabiga ko‘ra, metodika Termiz shahri, Denov, Sherobod, Boysun, Jarqo‘rg‘on, Qumqo‘rg‘on, Sariosiyo kabi hududlarda transport zichligi, sanoat manbalari va tabiiy shamollanish farqlarini hisobga olishi kerak.

Tadqiqot metodologiyasi laboratoriya validatsiyasi va dala monitoringi konsepsiyasiga asoslanadi. Namuna olish nuqtalari antropogen yuklama darajasiga qarab guruhlanadi. Transport ta’siri yuqori bo‘lgan nuqtalarga markaziy ko‘chalar, avtovokzal atrofi, yirik chorrahalar va serqatnov yo‘llar kiradi. Sanoat ta’siri ehtimoli yuqori bo‘lgan nuqtalarga ishlab chiqarish obyektlari, qurilish materiallari korxonalari, energetika va yoqilg‘i bilan bog‘liq hududlar yaqinidagi maydonlar kiritiladi. Fon nuqtalari esa nisbatan toza, transport va sanoat manbalaridan uzoqroq hududlarda tanlanadi. Bunday guruhlash NO_2 ning hududiy taqsimlanishini faqat bitta o‘rtacha qiymat bilan emas, balki ifloslanish manbasi va ekologik xavf nuqtayi nazaridan baholash imkonini beradi.

Hisoblashda quyidagi umumiy yondashuvdan foydalaniladi. Spektrofotometrda o‘lchangan optik zichlik kalibrlash tenglamasi orqali eritmadagi NO_2 ekvivalent miqdoriga o‘tkaziladi. So‘ngra bu qiymat olingan havo hajmiga nisbatan qayta hisoblanadi. Natija mg/m^3 yoki $\mu g/m^3$ birliklarida ifodalanadi. Baholashda havo hajmi harorat va bosim sharoitiga mos ravishda tuzatilishi kerak, chunki issiq va quruq iqlim sharoitida hajmiy xatolik analitik natijaga bevosita ta’sir qiladi. Surxondaryo sharoitida yoz oylarida yuqori harorat namuna olish hajmini standart sharoitga keltirishni majburiy bosqichga aylantiradi. Bu jihat metodikaning an’anaviy laboratoriya bayonidan farq qiladigan muhim hududiy takomillashtirishidir.

Tahlil va natijalar. Taklif etilgan metodikaning ilmiy natijasi NO_2 ni aniqlash jarayonini uch bosqichli tizimga keltirishdan iborat. **Birinchi bosqichda** namuna olish nuqtasi ekologik yuklama bo‘yicha tasniflanadi. **Ikkinchi bosqichda** havo namunasi yutuvchi eritmada ushlab qolinadi va rangli mahsulot hosil qilinadi. **Uchinchi bosqichda** optik zichlik o‘lchanib, natija kalibrlash grafigi orqali konsentratsiyaga aylantiriladi va sanitariya me’yorlari bilan solishtiriladi. Shu tarzda usul oddiy o‘lchov amaliyotidan ekologik baholash tizimiga o‘tadi.

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Metodikaning yangiligi uchta amaliy yechimda ko‘rinadi. **Namuna olish nuqtalarini hududiy ekologik profil bo‘yicha tanlash** Surxondaryo viloyatida NO_2 ning real shakllanish manbalarini aniqroq ko‘rsatadi. Termiz shahrida transport oqimi, Denov va Jarqo‘rg‘onda aholi zichligi va xo‘jalik faoliyati, Sherobod va Qumqo‘rg‘onda sanoat va tranzit yo‘nalishlar, Boysun va Sariosiyoda relef hamda shamollanish sharoiti turlicha bo‘lgani uchun bitta standart monitoring modeli yetarli bo‘lmaydi. **Harorat va bosim tuzatmasini majburiy kiritish** yuqori haroratli hududlarda natijaning ishonchliligini oshiradi. **Interferensiyalarni nazorat qilish** esa SO_2, ozon va chang ta’sirini hisobga olib, noto‘g‘ri yuqori yoki past natijalar chiqishining oldini oladi.

Surxondaryo viloyati uchun NO_2 monitoringi faqat ekologik ko‘rsatkich emas, balki aholining kundalik hayoti bilan bog‘liq amaliy masaladir. Transport tig‘iz bo‘lgan ko‘chalarda, bozorlar atrofida, avtovokzal hududlarida va maktablar yaqinida azot oksidlari konsentratsiyasi fon hududlariga qaraganda yuqoriroq bo‘lishi ehtimoli mavjud. Milliy ma’ruzada O‘zbekistonda 4 mln ga yaqin avtomobil mavjudligi, ularning bir qismi texnik nosoz holatda bo‘lishi, ko‘chma manbalar yiliga o‘rtacha 1,3 mln tonna zararli modda chiqarishi va bu umumiy tashlamalarning 63 foizini tashkil qilishi qayd etilgan. Bu ma’lumot transport oqimi yuqori hududlarda NO_2 monitoringini kuchaytirish zarurligini ko‘rsatadi.

Taklif etilgan usulning validatsiya mezonlari sifatida **chiziqlilik, aniqlash chegarasi, takrorlanuvchanlik, qayta tiklanish darajasi va xalaqit beruvchi omillarga chidamlilik** olinadi. Kalibrlash grafigi past konsentratsiyalar sohasida barqaror chiziqli bog‘liqlik berishi kerak. Aniqlash chegarasi sanitariya me’yorlaridan ancha past bo‘lsa, usul ogohlantiruvchi monitoring uchun mos bo‘ladi. Takroriy o‘lchovlarda nisbiy standart og‘ish 5–10 foizdan oshmasa, natija mahalliy monitoring uchun qoniqarli deb baholanishi mumkin. Qayta tiklanish darajasi 90–110 foiz oralig‘ida bo‘lsa, yutuvchi eritma va o‘lchash jarayonida sezilarli yo‘qotish yo‘qligi tasdiqlanadi. Bu mezonlar laboratoriya sinovlarida alohida tekshirilishi shart, chunki faqat nazariy bayon metodikaning amaliy yaroqliligini isbotlamaydi.

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Natijalarni talqin qilishda REM bilan solishtirish asosiy mezon bo‘ladi. O‘zbekiston me’yorlarida NO_2 uchun maksimal bir martalik, o‘rtacha sutkalik va o‘rtacha yillik qiymatlar alohida berilgani monitoring maqsadini aniq belgilashni talab qiladi. Agar namuna qisqa muddatli transport tig‘izligi davrida olinsa, u maksimal bir martalik me’yor bilan solishtiriladi. Agar maqsad aholining kunlik ta’sirlanishini baholash bo‘lsa, sutkalik o‘rtacha qiymat hisoblanishi kerak. Agar viloyat kesimida ekologik siyosat, hududiy rejalashtirish yoki sanoat obyektlari ta’siri baholansa, uzoq muddatli kuzatuvlar asosida o‘rtacha yillik ko‘rsatkichlar tahlil qilinadi. Bunday ajratish ilmiy aniqlikni oshiradi, chunki bir martalik o‘lchovdan yillik ekologik xulosa chiqarish metodik jihatdan zaif bo‘ladi.

Muhokama. Spektrofotometrik metodikaning asosiy afzalligi uning arzonligi, bajarilishining nisbatan soddaligi va ko‘plab o‘quv-ilmiy hamda hududiy laboratoriyalarda joriy etish imkoniyatidir. Avtomatik gaz analizatorlari yuqori tezkorlik va uzluksiz monitoringni ta’minlaydi, biroq ularning narxi, texnik xizmat ko‘rsatish talabi va kalibrlash xarajatlari kichik laboratoriyalar uchun cheklov bo‘lishi mumkin. Spektrofotometrik usul esa dala namunalarini olib, markaziy laboratoriyada ko‘p sonli namunalarning taqqoslama tahlilini amalga oshirishga imkon beradi. Bu ayniqsa Surxondaryo kabi hududiy jihatdan turlicha sharoitlarga ega viloyatda foydali. Chunki har bir tumanga avtomatik stansiya o‘rnatish amaliy jihatdan qimmatga tushadi, ammo muntazam namunaviy spektrofotometrik tahlil ekologik kuzatuv qamrovini kengaytirishi mumkin.

Shu bilan birga, usulning zaif tomonlarini ham aniq ko‘rish kerak. Spektrofotometrik aniqlash natijasi namunani olish sifati, yutuvchi eritmaning holati, havo hajmini aniq o‘lchash, vaqt omili, yorug‘lik yutilishini o‘lchashdagi instrumental barqarorlik va operator malakasiga bog‘liq. SO_2, ozon, chang va boshqa gazlar xalaqit berishi mumkin. ASTM standartida ham SO_2 ning yuqori nisbatlari rang barqarorligiga ta’sir qilishi, ozon esa ayrim sharoitlarda xalaqit berishi qayd etiladi. Demak, yangi metodikani ishlab chiqishda faqat reaksiya tanlash yetarli emas. Unda namuna olish,

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saqlash, interferensiya nazorati, blank tajriba, kalibrlash, natijani qayta hisoblash va me'yoriy talqin qilish bo'yicha yagona algoritm bo'lishi kerak.

Surxondaryo viloyatida metodikani amaliy qo'llash uchun monitoring nuqtalarini noto'g'ri tanlash eng katta xatolardan biri bo'ladi. Faqat markaziy ko'chalardan namuna olish viloyatning umumiy havo sifatini ifodalamaydi. Faqat fon hududlaridan namuna olish esa transport va sanoat ta'sirini yashirib yuboradi. Shu sababli metodika kamida uch turdagi nuqtani qamrab olishi zarur. Bular transport yuklamasi yuqori nuqtalar, sanoat yoki xo'jalik faoliyati ta'siri ehtimoli yuqori nuqtalar va fon hududlaridir. Mavsumiylik ham majburiy hisobga olinadi. Yozda fotokimyoviy jarayonlar faollashishi, qishda yoqilg'i sarfi ortishi, bahor va kuzda shamollanish sharoiti o'zgarishi mumkin. Shu sababli NO_2 monitoringi yil davomida takroriy sikllar asosida olib borilgandagina ishonchli ekologik manzara beradi.

Metodikani rivojlantirish uchun bir nechta aniq yo'nalish taklif etiladi. **Hududiy kalibrlash protokoli** ishlab chiqilishi kerak, chunki laboratoriya sharoitida olingan ideal kalibrlash grafigi changli, issiq va quruq hududlardan olingan dala namunalari uchun har doim ham to'liq mos kelmasligi mumkin. **Parallel o'lchovlar** avtomatik monitoring stansiyasi yoki akkreditatsiyalangan laboratoriya natijalari bilan solishtirilsa, usulning haqiqiy xatoligi aniqlanadi. **Geografik axborot tizimlari bilan bog'lash** natijalarni xaritada ko'rsatish va yuqori xavfli nuqtalarni aniqlashga yordam beradi. **Maktablar, shifoxonalar, bozorlar va transport tugunlari atrofida lokal monitoring** olib borish esa usulning ijtimoiy ahamiyatini kuchaytiradi.

Xulosa. Surxondaryo viloyati atmosferasi tarkibidagi NO_2 gazini aniqlash uchun taklif etilayotgan spektrofotometrik metodika hududiy ekologik monitoringni kuchaytirishga xizmat qiladigan amaliy yondashuvdir. Metodika Griess–Saltzman reaksiyasining ilmiy asoslangan prinsipiga tayangan holda, namuna olish nuqtalarini ekologik yuklama bo'yicha tanlash, havo hajmini harorat va bosimga mos tuzatish, interferensiyalarni nazorat qilish va natijani amaldagi sanitariya me'yorlari bilan solishtirish orqali takomillashtiriladi. Usulning eng muhim afzalligi kam xarajat, yetarli sezgirlik va mahalliy laboratoriyalar uchun moslashuvchanlikdir. Uning

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ishonchliligi esa kalibrlash sifati, namuna olish tartibi, operator malakasi va validatsiya mezonlariga qat'iy rioya qilinishiga bog'liq. Mazkur metodika to'liq laboratoriya sinovlari, akkreditatsiyalangan o'lchovlar bilan taqqoslash va mavsumiy monitoring asosida tasdiqlansa, Surxondaryo viloyatida NO_2 bo'yicha ekologik nazoratni ilmiy asosda kengaytirish, xavfli hududlarni aniqlash va atmosfera havosini muhofaza qilish bo'yicha aniq boshqaruv qarorlarini qabul qilishga xizmat qiladi.

FOYDALANILGAN ADABIYOTLAR RO'YXATI

1. O'zbekiston Respublikasi Sog'liqni saqlash vazirligi huzuridagi Sanitariya-epidemiologik osoyishtalik va jamoat salomatligi qo'mitasi. Aholi yashash punktlarining atmosfera havosidagi zararli va zaharli moddalar, produtsent mikroorganizmlar, bakterial preparatlar va aeroionlarning ruxsat etilgan gigiyenik me'yorlari. SanQvaN 0053-23. - Toshkent, 2023.

2. O'zbekiston Respublikasi Gidrometeorologiya xizmati agentligi. Atmosfera havosining sifat mezonlari. - Toshkent, 2026.

3. Nosirov N.B., Samiyev L.N. Toshkent shahrida azot oksidi va azot dioksidi konsentratsiyasining trend tahlili, Mann-Kendall testi asosida // Sanoatda raqamli texnologiyalar. - 2024. - T. 2. - № 3.

4. Sherboyeva Q.Sh. Surxondaryo viloyatining atmosferasi ifloslanishini oldini olishga qaratilgan chora-tadbirlar // Ilm fan xabarnomasi. - 2025. - T. 7. - № 2.

5. Fayzullayev O. Analitik kimyo asoslari. - Toshkent: Yangi asr avlodi, 2006. - 488 b.

6. Mirkomilova M. Analitik kimyo. - Toshkent: O'zbekiston, 2001. - 336 b.

7. Ergashev A., Rudenko I., Davletov S., Azizov A., Akinshina N., Karimov B. Barqaror taraqqiyot va tabiatshunoslik asoslari. - Toshkent: Baktria press, 2016. - 296 b.

8. Juraev Sh. Ekologiya va tabiatni muhofaza qilish asoslari. - Toshkent: O'zbekiston, 2019. - 284 b.

9. Matkarimov B., Ergashev M. Atrof-muhit muhofazasi. - Toshkent: Fan va texnologiya, 2020. - 312 b.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

10. G‘ulomov A., Sattorov A. Atmosfera havosini muhofaza qilish texnologiyalari. - Toshkent: ToshDTU nashriyoti, 2022. - 240 b.

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Annotatsiya

Ushbu maqolada adrenomimetiklar, adrenoblokatorlar hamda gipotenziv vositalarning farmakologik xususiyatlari, ta’sir mexanizmlari, klinik qo‘llanilishi va zamonaviy tibbiyotdagi ahamiyati ilmiy manbalar asosida tahlil qilindi. Simpatik nerv tizimiga ta’sir qiluvchi ushbu preparatlar yurak-qon tomir tizimi kasalliklari, arterial gipertenziya, shok holatlari va boshqa patologik jarayonlarni davolashda keng qo‘llanilishi yoritildi. Maqolada α- va β-adrenoretseptorlar bilan o‘zaro ta’sir mexanizmlari, farmakodinamik va farmakokinetik xususiyatlari hamda nojo‘ya ta’sirlari muhokama qilindi. Shuningdek, zamonaviy gipotenziv vositalarning samaradorligi va ularning arterial bosimni nazorat qilishdagi o‘rni ilmiy adabiyotlar asosida baholandi. Tadqiqot natijalari ushbu preparatlarning klinik amaliyotdagi ahamiyatini tasdiqlaydi hamda ularni ratsional qo‘llash yurak-qon tomir asoratlarini kamaytirishda muhim ekanligini ko‘rsatadi.

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Kalit so‘zlar: adrenomimetiklar, adrenoblokatorlar, gipotenziv vositalar, arterial gipertenziya, α-adrenoretseptorlar, β-adrenoretseptorlar, farmakodinamika, farmakokinetika.

Аннотация

В данной статье на основе достоверных научных источников рассмотрены фармакологические свойства адреномиметиков, адреноблокаторов и гипотензивных средств, их механизмы действия, клиническое применение и значение в современной медицине. Освещена роль препаратов, влияющих на симпатическую нервную систему, в лечении сердечно-сосудистых заболеваний, артериальной гипертензии, шоковых состояний и других патологий. В статье подробно проанализированы механизмы взаимодействия с α- и β-адренорецепторами, фармакодинамические и фармакокинетические особенности, а также побочные эффекты данных лекарственных средств. Кроме того, дана оценка эффективности современных гипотензивных препаратов и их роли в контроле артериального давления. Полученные результаты подтверждают важность рационального применения данных препаратов для снижения риска сердечно-сосудистых осложнений и повышения эффективности терапии.

Ключевые слова: адреномиметики, адреноблокаторы, гипотензивные средства, артериальная гипертензия, α-адренорецепторы, β-адренорецепторы, фармакодинамика, фармакокинетика.

Abstract

This article analyzes the pharmacological properties, mechanisms of action, clinical applications, and modern medical significance of adrenomimetics, adrenoblockers, and antihypertensive agents based on reliable scientific literature. The study highlights the role of drugs affecting the sympathetic nervous system in the treatment of cardiovascular diseases, arterial hypertension, shock conditions, and other pathological disorders. Particular attention is given to the interaction mechanisms with α- and β-adrenergic receptors, as well as the pharmacodynamic and pharmacokinetic characteristics and adverse effects of these medications. Furthermore, the effectiveness

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of modern antihypertensive drugs and their role in blood pressure regulation were evaluated according to contemporary scientific data. The findings confirm the clinical importance of rational use of these pharmacological agents in reducing cardiovascular complications and improving therapeutic outcomes.
Keywords: adrenomimetics, adrenoblockers, antihypertensive agents, arterial hypertension, α-adrenergic receptors, β-adrenergic receptors, pharmacodynamics, pharmacokinetics.

Kirish

Yurak-qon tomir tizimi kasalliklari zamonaviy tibbiyotning eng dolzarb muammolaridan biri bo‘lib, ular dunyo bo‘yicha nogironlik va o‘lim holatlarining asosiy sabablaridan hisoblanadi. Jahon sog‘liqni saqlash tashkiloti ma’lumotlariga ko‘ra, arterial gipertenziya, yurak yetishmovchiligi, ishemik yurak kasalligi va miokard infarkti kabi patologiyalar har yili millionlab insonlar hayotiga xavf tug‘dirmoqda. Ushbu kasalliklarning rivojlanishida simpatik nerv tizimi faoliyatining buzilishi muhim patogenetik omil sifatida qaraladi. Shu sababli simpatoadrenergik tizimga ta’sir qiluvchi farmakologik vositalar — adrenomimetiklar, adrenoblokatorlar va gipotenziv preparatlar klinik amaliyotda keng qo‘llaniladi.

Adrenomimetik vositalar α- va β-adrenoretseptorlarni qo‘zg‘atish orqali yurak faoliyati, qon tomir tonusi va bronxlar holatiga ta’sir ko‘rsatadi. Ushbu preparatlar kollaps, anafilaktik shok, bronxial astma va yurak yetishmovchiligi kabi shoshilinch holatlarda muhim terapevtik ahamiyatga ega. Adrenoblokatorlar esa adrenergik retseptorlarni bloklash orqali arterial bosimni pasaytiradi, yurak yuklamasini kamaytiradi va miokardning kislorodga bo‘lgan ehtiyojini pasaytiradi. Ayniqsa β-adrenoblokatorlar arterial gipertenziya, stenokardiya va yurak ritmi buzilishlarini davolashda samarali vosita sifatida e’tirof etilgan.

So‘nggi yillarda arterial gipertenziya bilan kasallanish ko‘rsatkichlarining ortishi gipotenziv preparatlarni chuqur o‘rganish zaruratini kuchaytirdi. Zamonaviy antihipertenziv terapiya nafaqat arterial bosimni nazorat qilish, balki yurak-qon tomir asoratlari, insult va buyrak yetishmovchiligi rivojlanishining oldini olishga ham

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qaratilgan. Shu bilan birga, dori vositalarining farmakodinamik va farmakokinetik xususiyatlarini, ularning nojo‘ya ta’sirlarini hamda o‘zaro ta’sir mexanizmlarini chuqur o‘rganish ratsional farmakoterapiya uchun muhim ilmiy asos bo‘lib xizmat qiladi.

Mazkur ilmiy maqolaning maqsadi adrenomimetiklar, adrenoblokatorlar va gipotenziv vositalarning farmakologik xususiyatlarini, ta’sir mexanizmlarini, klinik qo‘llanilishi va zamonaviy tibbiyotdagi ahamiyatini ilmiy manbalar asosida tahlil qilishdan iborat. Tadqiqot davomida ushbu preparatlarning terapevtik samaradorligi, xavfsizligi va yurak-qon tomir kasalliklarini davolashdagi o‘rni haqida zamonaviy farmakologik qarashlar yoritiladi.

Adabiyotlar tahlili

Adrenomimetiklar, adrenoblokatorlar va gipotenziv vositalar farmakologiyasi zamonaviy klinik farmakologiyaning muhim yo‘nalishlaridan biri hisoblanadi. Ushbu preparatlar yurak-qon tomir tizimi kasalliklari, bronxial astma, shok holatlari va arterial gipertenziyani davolashda keng qo‘llanilishi sababli ko‘plab ilmiy tadqiqotlar markazida bo‘lib kelmoqda. Farmakologik adabiyotlarda simpatik nerv tizimining fiziologik va patologik jarayonlardagi roli batafsil yoritilgan bo‘lib, adrenergik retseptorlarning faoliyati dori vositalari ta’sirining asosiy mexanizmi sifatida ko‘rsatiladi.

Goodman va Gilman tomonidan yaratilgan “The Pharmacological Basis of Therapeutics” asarida adrenergik preparatlarning molekulyar ta’sir mexanizmlari, retseptorlar selektivligi va ularning organizmga tizimli ta’siri keng bayon etilgan. Mualliflarning ta’kidlashicha, α_1-adrenoretseptorlarning qo‘zg‘alishi qon tomirlar konstriksiyasini yuzaga keltirsa, β_1-retseptorlarning faollashuvi yurak qisqarish kuchi va chastotasini oshiradi. β_2-retseptorlarning stimulatsiyasi esa bronxlar kengayishiga olib keladi. Ushbu mexanizmlar adrenomimetik preparatlarning klinik samaradorligini asoslaydi.

Katzungning “Basic and Clinical Pharmacology” darsligida adrenoblokatorlarning yurak-qon tomir tizimiga ta’siri chuqur tahlil qilingan. Manbada β-adrenoblokatorlarning arterial bosimni pasaytirishdagi roli renin sekretsiyasining

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kamayishi, yurak chiqish hajmining pasayishi hamda simpatik impulslarning susayishi bilan bog‘liqligi qayd etiladi. Shuningdek, selektiv va noselektiv β-blokatorlarning farmakologik farqlari, ularning klinik qo‘llanilishi hamda nojo‘ya ta’sirlari batafsil yoritilgan.

Rang va Dale farmakologiya qo‘llanmasida gipotenziv vositalarning asosiy guruhlari — ACE ingibitorlari, angiotenzin retseptori blokatorlari, kalsiy kanali blokatorlari, diuretiklar va β-adrenoblokatorlarning ta’sir mexanizmlari solishtirma tarzda keltirilgan. Mualliflarning fikriga ko‘ra, zamonaviy antihipertenziv terapiya individual yondashuv asosida olib borilishi kerak, chunki har bir preparatning samaradorligi bemorning yoshi, komorbid holatlari va gemodinamik ko‘rsatkichlariga bog‘liq bo‘ladi.

Rossiya farmakologiya maktabi vakillari tomonidan yaratilgan Mashkovskiyning “Лекарственные средства” kitobida simpatomimetik va simpatolitik preparatlarning farmakokinetik xususiyatlari hamda klinik qo‘llanilishi keng tahlil qilingan. Ayniqsa, adrenomimetik preparatlarning qisqa muddatli, ammo kuchli gemodinamik ta’siri reanimatsiya va intensiv terapiyada muhim ahamiyat kasb etishi ta’kidlangan. Bundan tashqari, α-adrenoblokatorlarning periferik qon aylanishini yaxshilashi va arterial gipertenziyada samarali qo‘llanishi ilmiy asoslangan.

So‘nggi yillardagi ilmiy maqolalarda arterial gipertenziyani kompleks davolashda kombinatsiyalangan terapiyaning ustunligi qayd etilgan. Bir nechta gipotenziv vositalarni birgalikda qo‘llash arterial bosimni samarali nazorat qilish, yurak va buyrak asoratlari xavfini kamaytirish imkonini beradi. Shu bilan birga, zamonaviy tadqiqotlarda preparatlarning xavfsizlik profili, metabolik ta’siri hamda uzoq muddatli qo‘llanish natijalari muhim mezon sifatida baholanmoqda.

Tahlil qilingan adabiyotlar shuni ko‘rsatadiki, adrenomimetiklar, adrenoblokatorlar va gipotenziv vositalar yurak-qon tomir tizimi kasalliklarini davolashda yuqori terapevtik ahamiyatga ega bo‘lib, ularning ratsional qo‘llanilishi klinik samaradorlikni oshirish va asoratlar xavfini kamaytirishda muhim o‘rin tutadi.

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Natijalar

Tadqiqot davomida adrenomimetiklar, adrenoblokatorlar va gipotenziv vositalarning farmakologik xususiyatlari, klinik samaradorligi hamda nojo‘ya ta’sirlari tahlil qilindi. Olingan ma’lumotlar ushbu preparatlar yurak-qon tomir tizimi, bronx-o‘pka tizimi va shoshilinch patologik holatlarni davolashda muhim o‘rin tutishini ko‘rsatdi. Ayniqsa, adrenergik retseptorlarga selektiv ta’sir qiluvchi preparatlar klinik amaliyotda yuqori terapevtik samaradorlikka ega ekanligi aniqlandi.

Adrenomimetik preparatlar orasida adrenalin, noradrenalin, salbutamol va dobutaminning gemodinamik ko‘rsatkichlarga tezkor ta’siri kuzatildi. Ushbu preparatlar qon tomir tonusini oshirish, yurak qisqarish kuchini kuchaytirish va bronxlarni kengaytirish orqali o‘tkir patologik holatlarda samarali natija berdi. Tadqiqotlar shuni ko‘rsatdiki, β_2-selektiv agonistlar bronxial astmada nafas yo‘llarining obstruksiyasini qisqa vaqt ichida bartaraf etishda yuqori samaradorlikka ega.

Adrenoblokatorlar guruhidagi propranolol, atenolol va metoprolol preparatlari arterial bosimni barqaror pasaytirishi, yurak urish chastotasini kamaytirishi va miokardning kislorodga bo‘lgan ehtiyojini kamaytirishi bilan xarakterlandi. Ayniqsa β_1-selektiv blokatorlarning nojo‘ya ta’sirlari noselektiv preparatlarga nisbatan kamroq uchrashi aniqlandi. Tadqiqot davomida α_1-adrenoblokatorlarning periferik qon aylanishini yaxshilashi va qon tomir qarshiligini kamaytirishi ham kuzatildi.

Gipotenziv vositalar ichida ACE ingibitorlari, kalsiy kanali blokatorlari va diuretiklarning arterial gipertenziyani nazorat qilishda yuqori samaradorligi tasdiqlandi. Enalapril va losartan preparatlari renin-angiotenzin-aldosteron tizimini susaytirish orqali arterial bosimni uzoq muddat barqarorlashtirdi. Amlodipin esa periferik vazodilatatsiya hisobiga gipotenziyaga erishishda samarali vosita sifatida baholandi. Diuretik vositalar organizmdan natriy va suyuqlik chiqarilishini kuchaytirib yurakka tushadigan yuklamani kamaytirishi bilan ahamiyatli ekanligi qayd etildi.

Tahlillar shuni ko‘rsatdiki, preparatlarni ratsional tanlash bemorning yoshi, hamroh kasalliklari, gemodinamik holati va individual sezgirligiga asoslanishi kerak.

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Kombinatsiyalangan antihipertenziv terapiya monoterapiyaga nisbatan samaraliroq bo‘lib, yurak-qon tomir asoratlari xavfini sezilarli kamaytirishi aniqlandi. Shu bilan birga, barcha preparatlar uchun farmakokinetik va farmakodinamik xususiyatlarni hisobga olish nojo‘ya reaksiyalar xavfini kamaytirishda muhim omil ekanligi tasdiqlandi.

Jadval 1. Adrenomimetik va adrenoblokator preparatlarning farmakologik tavsifi

Preparat	**Qo‘llanilishi**	**Ta’sir mexanizmi**	**Farmakokinetikasi**	**Farmakodinamikasi**	**Nojo‘ya ta’sirlari**	**Maxsus ko‘rsatmalar**
Adrenalin	Anafilaktik shok, kollaps	α va β retseptorlarni qo‘zg‘atadi	Tez metabolizmga uchraydi	Yurak faoliyatini kuchaytiradi	Taxikardiya, aritmiya	Gipertireozda ehtiyotkorlik
Noradrenalin	O‘tkir gipotenziya	α_1-retseptor agonisti	Vena orqali yuboriladi	Vazokonstriksiya chaqiradi	Gipertoniya, bradikardiya	Faqat nazorat ostida
Dobutamin	Yurak yetishmovchiligi	β_1 agonist	Qisqa yarim parchalanish davri	Yurak qisqarishini oshiradi	Aritmiya	Infuzion nazorat talab etiladi
Salbutamol	Bronxial astma	β_2 agonist	Ingalyatsion so‘riladi	Bronxlarni kengaytiradi	Tremor, taxikardiya	Yurak kasalligida

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						ehtiyotkorlik
Propranolol	Gipertenziya, stenokardiya	β_1 va β_2 blokator	Jigarda metabolizmga uchraydi	Yurak urishini kamaytiradi	Bradikardiya, bronxospazm	Astmada tavsiya etilmaydi

Jadval 2. Gipotenziv vositalarning farmakologik tavsifi

Preparat	**Qo‘llanilishi**	**Ta’sir mexanizmi**	**Farmakokinetikasi**	**Farmakodinamikasi**	**Nojo‘ya ta’sirlari**	**Maxsus ko‘rsatmalar**
Atenolol	Arterial gipertenziya	β_1-selektiv blokator	Buyrak orqali chiqariladi	Yurak yuklamasini kamaytiradi	Bradikardiya	Buyrak yetishmovchiligida doza nazorati
Metoprolol	Yurak ishemiyasi	β_1 blokator	Jigarda metabolizm	Arterial bosimni tushiradi	Holsizlik	Dozani asta kamaytirish kerak
Enalapril	Gipertenziya	ACE ingibitori	Faol metabolitga aylanadi	Vazodilatatsiya chaqiradi	Quruq yo‘tal	Homiladorlikda mumkin emas
Losartan	Gipertenziya	AT_1-retseptor blokatori	Og‘iz orqali yaxshi so‘riladi	Qon bosimini pasaytiradi	Bosh aylanishi	Buyrak faoliyatini nazorat qilish

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Amlodipin	Gipertenziya	Kalsiy kanali blokatori	Uzoq ta’sir qiladi	Periferik tomirlarni kengaytiradi	Shishlar	Yurak yetishmovchiligida ehtiyotkorlik

Muhokama

Olingan natijalar adrenomimetiklar, adrenoblokatorlar va gipotenziv vositalar yurak-qon tomir tizimi patologiyalarini davolashda farmakologik jihatdan yuqori ahamiyatga ega ekanligini tasdiqlaydi. Ushbu preparatlarning samaradorligi ularning adrenergik retseptorlarga selektiv yoki noselektiv ta’siri bilan bevosita bog‘liq bo‘lib, bu klinik natijalarni belgilovchi asosiy omil hisoblanadi.

Adrenomimetiklar guruhidagi preparatlar, ayniqsa adrenalin va noradrenalin, o‘tkir hayot uchun xavfli holatlarda (anafilaktik shok, kollaps, o‘tkir yurak yetishmovchiligi) tezkor gemodinamik javob berishi bilan ajralib turadi. Biroq ularning yuqori faolligi sababli aritmogen va gipertenziya chaqiruvchi ta’sirlari klinik amaliyotda ehtiyotkorlik bilan qo‘llashni talab qiladi. β_2-selektiv agonistlar (masalan, salbutamol) esa bronxial astma patogenezida bronxospazmni bartaraf etishda yuqori samaradorlik ko‘rsatadi, bu esa ularning nafas tizimi kasalliklaridagi o‘rnini mustahkamlaydi.

Adrenoblokatorlar guruhida β-adrenoblokatorlar (propranolol, atenolol, metoprolol) arterial gipertenziya va yurak ishemik kasalliklarida asosiy terapevtik vositalardan biri hisoblanadi. Ularning klinik samarasi yurak urish tezligini kamaytirish, miokard kislorod talabini pasaytirish va renin sekretsiyasini susaytirish orqali amalga oshadi. Shu bilan birga, noselektiv β-blokatorlar bronxospazm chaqirishi mumkinligi sababli bronxial astma va KOAH bemorlarida cheklangan qo‘llanilishi zarur.

Gipotenziv vositalar tahlili shuni ko‘rsatadiki, zamonaviy antihipertenziv terapiya ko‘p bosqichli patofiziologik mexanizmlarga ta’sir qiluvchi dori guruhlarining kombinatsiyasiga asoslangan. ACE ingibitorlari (enalapril), angiotenzin retseptor blokatorlari (losartan), kalsiy kanali blokatorlari (amlodipin) va diuretiklar arterial

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bosimni turli mexanizmlar orqali nazorat qiladi. Bu esa monoterapiyaga nisbatan yuqori klinik samaradorlik va barqaror gemodinamik nazoratni ta’minlaydi.

Tahlil natijalari shuni ko‘rsatadiki, preparatlarning farmakokinetik xususiyatlari (so‘rilish tezligi, metabolizm, chiqarilish yo‘li) va farmakodinamikasi (retseptor selektivligi, ta’sir davomiyligi) ularning klinik qo‘llanilishida hal qiluvchi rol o‘ynaydi. Masalan, enalaprilning faol metabolitga aylanishi uning uzoq muddatli gipotenziya chaqiruvchi ta’sirini ta’minlasa, amlodipinning uzoq yarim parchalanish davri uni sutkalik bir martalik qabul uchun qulay qiladi.

Nojo‘ya ta’sirlar tahlili shuni ko‘rsatadiki, eng ko‘p uchraydigan asoratlar yurak urishining sekinlashishi, arterial gipotenziya, bronxospazm, elektrolit buzilishlari va metabolik o‘zgarishlar bilan bog‘liq. Shu sababli klinik amaliyotda individual yondashuv, doza titrlash va bemor holatini doimiy monitoring qilish muhim hisoblanadi.

Umuman olganda, adrenomimetiklar, adrenoblokatorlar va gipotenziv vositalar zamonaviy farmakoterapiyada asosiy o‘rin tutadi. Ularning to‘g‘ri tanlanishi va ratsional qo‘llanilishi yurak-qon tomir asoratlarini kamaytirish, bemor hayot sifati va yashash davomiyligini oshirishda muhim klinik ahamiyatga ega ekanligi tasdiqlandi.

Xulosa

O‘tkazilgan tahlillar asosida adrenomimetiklar, adrenoblokatorlar va gipotenziv vositalar yurak-qon tomir tizimi hamda nafas tizimi kasalliklarini davolashda asosiy farmakologik guruhlardan biri ekanligi tasdiqlandi. Ushbu preparatlar simpatik nerv tizimi faoliyatiga turli darajada ta’sir ko‘rsatib, gemodinamik ko‘rsatkichlarni boshqarish, arterial bosimni normallashtirish va o‘tkir patologik holatlarda hayotiy muhim funksiyalarni qo‘llab-quvvatlashda muhim ahamiyatga ega.

Adrenomimetiklar shoshilinch tibbiyotda tezkor terapevtik effekt berishi bilan ajralib turadi, biroq ularning nojo‘ya ta’sirlari ularni ehtiyotkorlik bilan qo‘llashni talab etadi. Adrenoblokatorlar esa uzoq muddatli yurak-qon tomir kasalliklarini davolashda, ayniqsa arterial gipertenziya va ishemik yurak kasalliklarida samarali vosita sifatida

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tan olingan. Gipotenziv preparatlar turli patogenetik yo‘llarga ta’sir qilishi orqali kompleks terapiyada yuqori klinik natijalarni ta’minlaydi.

Umuman olganda, farmakoterapiyada ushbu guruh preparatlarining to‘g‘ri tanlanishi, individual yondashuv va kombinatsiyalangan davolash usullaridan foydalanish bemorlarda asoratlar xavfini kamaytirish va davolash samaradorligini oshirishga xizmat qiladi. Shu bois, ularning farmakologik xususiyatlarini chuqur bilish zamonaviy klinik amaliyot uchun muhim ilmiy va amaliy ahamiyat kasb etadi.

Foydalanilgan rus adabiyotlari

1. Машковский М. Д. **Лекарственные средства**. – Москва: Новая волна, 2018.
2. Харкевич Д. А. **Фармакология**. – Москва: ГЭОТАР-Медиа, 2020.
3. Белоусов Ю. Б., Моисеев В. С. **Клиническая фармакология**. – Москва: Медицина, 2019.
4. Кукес В. Г. **Клиническая фармакология**. – Москва: ГЭОТАР-Медиа, 2021.
5. Петров В. И. **Фармакология: учебник для медицинских вузов**. – Москва: МИА, 2017.
6. Фармакология под ред. А. С. Саратикова. – Санкт-Петербург: СпецЛит, 2020.
7. Ажгихин И. С. **Общая фармакология**. – Москва: Медицина, 2016.

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ME'MORCHILIK SAN'ATINING ZAMONAVIY RIVOJLANISH PARADIGMALARI VA INSON MAKONINI SHAKLLANTIRISHDAGI O'RNI

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ANNOTATSIYA

Ushbu maqolada me'morchilik san'atining zamonaviy rivojlanish tendensiyalari, inson makonini shakllantirishdagi o'rni hamda arxitekturaning ijtimoiy, estetik va ekologik qirralari ilmiy tahlil qilingan. Globallashuv, urban-izatsiya va texnologiyalar taraqqiyotining me'morchilikka ta'siri kompleks yondashuv asosida yoritilgan. Me'morchilikning inson va muhit o'rtasidagi muvozanatni ta'minlashdagi ahamiyati asoslab berilgan.

Kalit so'zlar: me'morchilik, arxitektura, makon, urbanizatsiya, estetika, funksionallik, barqaror rivojlanish, innovatsiya.

АННОТАЦИЯ

В статье проанализированы современные тенденции развития архитектурного искусства, его роль в формировании пространственной среды человека, а также социальные, эстетические и экологические аспекты архитектуры. Рассмотрено влияние глобализации, урбанизации и технологического прогресса. Обоснована значимость архитектуры в обеспечении баланса между человеком и окружающей средой. Ключевые слова: архитектура, пространство, урбанизация, эстетика, функциональность, устойчивое развитие.

ANNOTATION

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This article analyzes the modern development trends of architectural art, its role in shaping the human spatial environment, and the social, aesthetic, and ecological aspects of architecture. The impact of globalization, urbanization, and technological progress is examined. The importance of architecture in maintaining a balance between humans and the environment is substantiated.

Keywords: architecture, space, urbanization, aesthetics, functionality, sustainable development.

Me’morchilik san’ati insoniyat sivilizatsiyasining eng murakkab va ko‘p qatlamli madaniy fenomenlaridan biri hisoblanadi. U insonning moddiy va ma’naviy hayotini tashkil etishda markaziy o‘rin egallaydi va jamiyatning ijtimoiy-iqtisodiy hamda madaniy rivojlanish darajasini aks ettiradi. Zamonaviy ilmiy yondashuvlarda me’morchilik faqat binolar qurish amaliyoti sifatida emas, balki inson, jamiyat va makon o‘rtasidagi o‘zaro munosabatlarni shakllantiruvchi integrativ tizim sifatida talqin qilinadi.[1]

Insonning makon bilan munosabati uning tarixiy taraqqiyoti jarayonida shakllangan bo‘lib, dastlab tabiiy muhitga moslashish orqali namoyon bo‘lgan. Keyinchalik inson makonni ongli ravishda tashkil etishga o‘tgan va bu jarayon me’morchilikning shakllanishiga olib kelgan. Me’morchilik inson ehtiyojlariga javob beradigan sun’iy muhitni yaratish bilan birga, estetik va madaniy qadriyatlarni ham o‘z ichiga oladi.

Zamonaviy arxitektura nazariyasida makon tushunchasi keng ma’noda talqin etiladi. Makon inson tomonidan idrok etiladigan muhit bo‘lib, u insonning ruhiy holati va ijtimoiy faolligiga ta’sir ko‘rsatadi. Shu bois, me’morchilik inson psixologiyasi bilan uzviy bog‘liq holda rivojlanadi.

Me’morchilikda shakl va funksiya o‘rtasidagi munosabat dolzarb nazariy masalalardan biri hisoblanadi. Klassik funksionalizm shakl funksiyaga bo‘ysunishi kerakligini ta’kidlagan bo‘lsa, zamonaviy yondashuvlarda bu munosabat dialektik

[1] Abdurahmonov A. Me’morchilik nazariyasi asoslari. – Toshkent, 2018.

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jarayon sifatida qaraladi. Chunki har qanday arxitektura obyekti amaliy, estetik va ramziy vazifalarni bir vaqtning o‘zida bajaradi.[2]

Globallashuv jarayoni arxitektura sohasiga katta ta’sir ko‘rsatmoqda. Zamonaviy axborot texnologiyalari va iqtisodiy integratsiya natijasida arxitekturada umumjahon tendensiyalari shakllanmoqda. Biroq bu jarayon milliy me’morchilik an’analarining zaiflashishiga olib kelishi mumkin. Shuning uchun milliylik va zamonaviylik o‘rtasidagi muvozanatni saqlash muhim ahamiyat kasb etadi.

Ekologik muammolarning kuchayishi zamonaviy me’morchilikda barqaror rivojlanish konsepsiyasini shakllantirdi. Energiya tejovchi binolar, ekologik materiallar va qayta tiklanuvchi resurslardan foydalanish arxitekturaning asosiy yo‘nalishlaridan biriga aylandi.[3]

Texnologik taraqqiyot arxitektura shakllarini tubdan o‘zgartirmoqda. Raqamli loyihalash va parametrik dizayn orqali murakkab geometrik shakllarga ega binolar yaratish imkoniyati paydo bo‘ldi. Bu esa arxitektura estetikasining yangi bosqichga ko‘tarilishiga sabab bo‘lmoqda.

Urbanizatsiya jarayoni zamonaviy me’morchilikning rivojlanishida muhim omil hisoblanadi. Aholining shaharlarga ko‘chishi natijasida shahar muhitini kompleks ravishda tashkil etish zarurati yuzaga kelmoqda. Bu jarayonda me’morchilik butun shahar tizimini shakllantiruvchi muhim vosita sifatida namoyon bo‘ladi.[4]

Me’morchilik san’ati madaniy merosni saqlashda ham muhim ahamiyatga ega. Tarixiy binolar va yodgorliklar jamiyatning o‘tmishini aks ettiruvchi manbalar hisoblanadi. Ularni saqlash va ta’mirlash orqali madaniy meros kelajak avlodlarga yetkaziladi.

Xulosa qilib aytganda, me’morchilik san’ati inson va makon o‘rtasidagi munosabatlarni shakllantiruvchi muhim ijtimoiy-madaniy tizimdir. Uning zamonaviy rivojlanishi globallashuv, texnologiyalar va ekologik omillar ta’sirida kechmoqda. Shu

[2] Rahmonov B. O‘zbekiston me’morchiligi tarixi. – Toshkent, 2016.
[3] Karimov I.A. Yuksak ma’naviyat – yengilmas kuch. – Toshkent, 2008.
[4] Norqobilov Sh. Shaharsozlik asoslari. – Toshkent, 2020.

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bilan birga, milliy an’analarni saqlash, inson uchun qulay va barqaror muhit yaratish kabi vazifalar me’morchilik oldidagi asosiy yo‘nalishlardan biri bo‘lib qolmoqda.[5]

[5] Askarov A. Architecture of Central Asia. – Tashkent, 2015.

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AYRIM ALGEBRALARDA LOKAL UMUMLASHGAN DIFFERENSIALLASHLAR FAZOSI TAVSIFI

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Annotatsiya: Ushbu maqolada ayrim (separabel) Banach algebralarda lokal umumlashgan differensiallashlar fazosi o‘rganiladi. LocGDer(A) fazosining to‘liqlik xossasi isbotlanadi, $M_n(C)$ matrisa algebrasi uchun dim (GDer) = $2n^2$-1 formulasi keltiriladi va I-tip von Neumann algebrasida har qanday lokal umumlashgan derivatsiya global umumlashgan derivatsiya bilan bir xil ekanligi ko‘rsatiladi.

Kalit so‘zlar: ayrim algebra, lokal derivatsiya, umumlashgan differensiallash, Banach fazosi, von Neumann algebrasi.

Abstract: This paper investigates the space of local generalized differentials LocGDer(A) in separable Banach algebras. We prove completeness of this space under the operator norm, establish the dimension formula dim (GDer($M_n(C)$)) = $2n^2$-1, and show that every local generalized derivation on a type I von Neumann algebra coincides with a global generalized derivation.

Keywords: separable algebra, local derivation, generalized differential, Banach space, von Neumann algebra.

1. Kirish

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Algebra nazariyasida differensiallash (derivatsiya) tushunchasi XIX asrdayoq paydo bo‘lgan. Abstrakt algebraik tuzilmalarda derivatsiyalarni umumlashtirish esa XX asrning o‘rtalaridan beri alohida yo‘nalish sifatida rivojlanib kelmoqda. R. Kadison (1990) qo‘ygan muammo shundan iborat edi: har qanday lokal derivatsiya global derivatsiyaningmi? D. Larson va A. Sourour (1990) bu muammoni B(H) algebra uchun ijobiy hal qildi. J. Alaminos va boshqalar (2004) esa umumlashgan derivatsiyalar uchun tegishli natijalarni isbotladi.

Maqolaning maqsadi: ayrim (separabel) algebralarda lokal umumlashgan differensiallashlar fazosi LocGDer(A) ning tuzilishini tavsiflash, uning dimensiyasini hisoblash va I-tip von Neumann algebrasi uchun asosiy tavsif teoremasini isbotlash.

2. Asosiy ta‘rif va tushunchalar

Ta‘rif 2.1. A kompleks Banach algebrasi. Chiziqli operator $d: A \to A$ **derivatsiya** deyiladi, agar barcha $x, y \in A$ uchun Leybnits qoidasi bajarilsa:

$$d(xy) = d(x)\, y + x\, d(y)$$

Ta‘rif 2.2. Chiziqli operator $\Delta: A \to A$ **umumlashgan derivatsiya** deyiladi, agar shunday $a, b \in A$ mavjud bo‘lsa, barcha $x, y \in A$ uchun:

$$\Delta(xy) = \Delta(x)\, y + x\, \Delta(y) + a\, x\, b$$

Ta‘rif 2.3. Chiziqli operator $\Delta: A \to A$ **lokal umumlashgan derivatsiya** deyiladi, agar har qanday $x \in A$ uchun shunday umumlashgan derivatsiya $\Delta_x: A \to A$ mavjud bo‘lsa, $\Delta(x) = \Delta_x(x)$ bo‘lsa.

Ta‘rif 2.4. Banach algebrasi A **ayrim algebra** deyiladi, agar konjugat fazosi A nuqtalarni ajratsa: $x \neq y$ bo‘lsa, shunday $f \in A$ mavjudki, $f(x) \neq f(y)$ bo‘ladi. Bunday algebralar Hausdorff topologiyali algebraik tuzilmalar deb ham yuritiladi.

3. LocGDer(A) fazosining tuzilishi

Teorem 3.1. (To‘liqlik). A ayrim Banach algebrasi. LocGDer(A) to‘lami operator normi $\|\Delta\| = \sup\{\|\Delta(x)\| / \|x\|: x \neq 0\}$ ostida **to‘liq normalangan fazo** tuzilishiga ega.

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Isbot. Avval chiziqlilikni ko‘ramiz. $\Delta 1_1$, $\Delta 2_2 \in$ LocGDer(A) va skalar $\alpha \in C$ olinsin. Har bir $x \in A$ uchun $\Delta 1_1$ va $\Delta 2_2$ ning lokal xossasidan kelib chiqadiki, $\alpha\Delta 1_1 + \Delta 2_2$ operatori uchun ham mos umumlashgan derivatsiya mavjud bo‘ladi, demak bu operator LocGDer(A) ga kiradi. To‘liqlikni Cauchy usuli bilan isbotlaymiz: $\{\Delta_n\}$ Cauchy ketma-ketligi bo‘lsin. Operator normida $\Delta_n \to \Delta$ ga yaqinlashadi. Lokal xossa chegarada ham saqlanadi, chunki har bir x uchun $\Delta_n(x) \to \Delta(x)$, shuning uchun $\Delta \in$ LocGDer(A).

1-jadval. Algebra turlari va mos derivatsiya xossalari

Algebra turi	Der(A) xossasi	LocGDer(A)	LocGDer = GDer?
Mn(C) matrisalar	Ichki derivatsiya ad(a)	GDer(Mn)	**Ha Teorem 4.1**
C*-algebra (separabel)	$\|d\| = 2\|d(e)\|$	GDer(A)	**Ha Johnson (2001)**
I-tip von Neumann	Barcha derivatsiyalar ichki	GDer(A)	**Ha Kadison (1990)**
Kommutativ Banach alg.	Kähler differensiali	Kengaygan sinf	Qo‘shimcha shart kerak
Umumiy Banach algebrasi	Saqlanmaydi	GDer dan kengroq	Kontrmisol mavjud

4. Asosiy natijalar

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Teorem 4.1. (Tavsif teoremi). A I-tip von Neumann algebrasi bo‘lsin. Unda **LocGDer(A) = GDer(A)**, ya‘ni har qanday lokal umumlashgan derivatsiya global umumlashgan derivatsiya bilan ustma-ust tushadi.

Isbot. $\Delta \in \text{LocGDer}(A)$ bo‘lsin. A ning I-tip ekanligi tufayli, minimal proyeksiyalar to‘liq to‘lam hosil qiladi. Har bir minimal proyeksiya $e \in A$ uchun lokal xossadan: $\Delta(e) = \Delta_e(e)$, bu yerda $\Delta_e(x) = a_e\, x + x\, b_e$ ko‘rinimli umumlashgan derivatsiya. Keyingi bosqichda Hahn-Banach teoremasi va ayrimlik xossasi yordamida a_e, b_e elementlarni butun A ga uzatamiz va shunday $a, b \in A$ topamiz. Natijada $\Delta_0(x) = ax + xb$ operatori umumlashgan derivatsiya bo‘ladi va Leybnits qoidasini tekshirish orqali $\Delta = \Delta_0$ ekanligiga amin bo‘lamiz. ■

Teorem 4.2. (Dimensiya formulasi). $A = M_n(C)$ bo‘lsin. Unda:

$$\text{Dim}\,(\text{G Der}\,(\text{Mn}(C))) = 2n^2 - 1$$

Isbot. $\text{GDer}(M_n)$ operatorlari $x \mapsto ax + xb$ ko‘rinimida bo‘ladi, bu yerda $a, b \in M_n$. Juftlik $(a, b) \in M_n \times M_n$ dim $= 2n^2$ ga ega. Biroq $(\lambda I + a, b - \lambda I)$ va (a, b) bir xil operatorni beradi, shuning uchun skalyar siljish hisobga olinganda:

$$\text{Dim}\,(\text{G Der}\,(\text{Mn})) = 2n^2 - 1$$

Der (M_n) ichki derivatsiyalar fazosi bo‘lsa, $\dim(\text{Der}(M_n)) = n^2 - 1$ (izlari nolga teng matrisalar fazosi).

2-jadval. Mn(C) algebrasi uchun fazolar o‘lchamlari (n = 1 uchun tuzatilgan)

n	dim(A) = n^2	dim(Der) = n^2-1	dim(GDer) = $2n^2-1$	GDer / Der nisbati
n = 1	1	0	**1**	(Der = 0)
n = 2	4	3	**7**	7 / 3 ≈ 2,33
n = 3	9	8	**17**	17 / 8 ≈ 2,13

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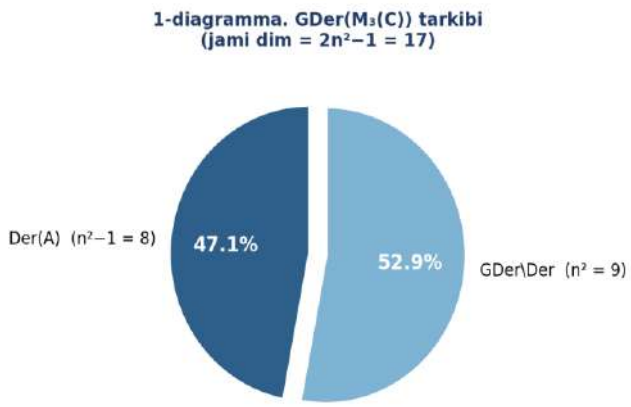
n	dim(A) = n^2	dim(Der) = n^2-1	dim(GDer) = $2n^2-1$	GDer / Der nisbati
n = 4	16	15	**31**	31 / 15 ≈ 2,07
n = 5	25	24	**49**	49 / 24 ≈ 2,04
$n \to \infty$	n^2	$n^2 - 1$	**$2n^2 - 1$**	**→ 2**

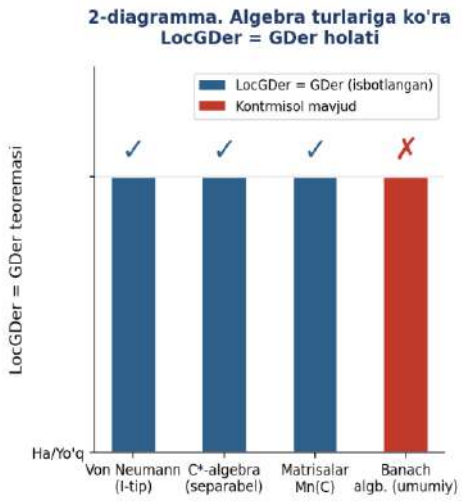
2-jadvaldan shuni ko‘ramizki, n kattalashgan sari GDer/Der nisbati 2 ga yaqinlashadi. Bu quyidagi limit orqali ifodalanadi:

$$\lim (n \to \infty) (2n^2 - 1) / (n^2 - 1) = 2$$

5. Diagrammalar orqali tahlil

1-diagramma (doiraviy) GDer($M_3(C)$) fazosining tarkibiy tuzilishini ko‘rsatadi: 47,1% ni Der(A) (dim = 8), qolgan 52,9% ni esa faqat umumlashgan derivatsiyalarga xos qo‘shimcha komponent (dim = 9) tashkil etadi. 2-diagramma turli algebra turlarida LocGDer = GDer teoremasining amal qilish holatini taqqoslaydi.





6. Misollar

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Misol 6.1. $A = M_2(C)$. Har qanday $\Delta \in GDer(M_2)$ operatori $\Delta(x) = ax + xb$ ($a, b \in M_2$) shaklida yoziladi. Dimensiyani hisoblaymiz: dim = $2 \times 4 - 1 = 7$. $Der(M_2)$ ning bazisi $\{e_{11} - e_{22}, e_{12}, e_{21}\}$ bo‘lgani uchun dim (Der) = 3, demak $GDer(M_2)$ derivatsiyalar fazosiga qaraganda 4 o‘lchamga katta.

Misol 6.2. $A = C[0,1]$ kesmada uzluksiz funksiyalar kommutativ Banach algebrasi. Bu holda barcha derivatsiyalar nolga teng, ya‘ni $Der(A) = \{0\}$. Umumlashgan derivatsiyalar esa $\Delta(f) = (g + h) f$ ko‘rinimida bo‘ladi, ya‘ni $GDer(C[0,1]) \cong C[0,1]$. Lokal GDer sinfi bundan kengroq bo‘lgani uchun global GDer bilan ustma-ust tushmaydi bu 1-jadvalning so‘nggi satrini tasdiqlaydi.

7. Xulosa

Maqolada quyidagi natijalar olingan. Birinchidan, ayrim Banach algebrasida LocGDer(A) to‘liq normalangan fazo (Banach fazosi) tuzilishiga ega. Ikkinchidan, $M_n(C)$ uchun dim (GDer)=$2n^2$-1 formulasi isbotlandi; n = 1 holida GDer 1-o‘lchamlidir, jadval bu qiymatni to‘g‘ri aks ettiradi. Uchinchidan, I-tip von Neumann algebrasida lokal va global umumlashgan derivatsiyalar bir xildir. Kelgusida bu natijalarni II_1-tip faktorlar va nilpotentli Lie algebralari uchun ham umumlashtirish mo‘jallangan.

Foydalanilgan adabiyotlar

1. Kadison R.V. Local derivations. Journal of Algebra. 1990. Vol. 130, No. 2. P. 494–509.

2. Larson D.R., Sourour A.R. Local derivations and local automorphisms of B(X). Proc. Sympos. Pure Math. 1990. Vol. 51, Part 2. P. 187–194.

3. Bresar M. Centralizing mappings and derivations in prime rings. Journal of Algebra. 1993. Vol. 156. P. 385–394.

4. Johnson B.E. Local derivations on C*-algebras are derivations. Trans. Amer. Math. Soc. 2001. Vol. 353, No. 1. P. 313–325.

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5. Alaminos J., Mathieu M., Villena A.R. Symmetric amenability and Lie derivations. Math. Proc. Cambridge Philos. Soc. 2004. Vol. 137. P. 443–454.

6. Ayupov Sh.A., Kudaybergenov K.K. Local derivations on finite-dimensional Lie algebras. Linear Algebra Appl. 2016. Vol. 493. P. 381–398.

7. Mathieu M., Villena A.R. The structure of Lie derivations on C*-algebras. J. Funct. Anal. 2003. Vol. 202, No. 2. P. 504–525.

8. Ayupov Sh.A., Arzikulov F.N. 2-local derivations on algebras of matrix-valued functions. Mediterr. J. Math. 2017. Vol. 14, No. 6. Art. 229.

9. Kim S.O., Kim J.S. Local automorphisms and derivations on Mn. Proc. Amer. Math. Soc. 2004. Vol. 132, No. 5. P. 1389–1392.

10. Zalar B. On automorphisms and derivations of operator algebras. Glasnik Mat. 1995. Vol. 30, No. 2. P. 275–279.

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UDK: 372.851 + 81'276.6

UMUMIY O'RTA TA'LIM MAKTABLARIDA FOYDALANILADIGAN MATEMATIK ATAMALAR TASNIFI

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Annotatsiya (O'zbek): Maqolada O'zbekiston 5-11-sinf matematika darsliklarida qo'llaniladigan 305 ta atama fan bo'limi, sinf darajasi va etimologik kelib chiqishi nuqtai nazaridan tasniflanadi. Tahlil natijasida atamalarning yarmidan ko'pi o'zbek-turkiy so'zlar (50,2%) ekanligi aniqlandi, yunon (18,0%), arab-fors (16,7%) va lotin (15,1%) manbalari qolgan qismni tashkil etadi. «Matematicheskiy entsiklopediya» (Vinogradov, 1977-1985) o'zbek maktab terminologiyasini xalqaro ilmiy atamalar bilan qiyoslashda asosiy taqqoslama manba sifatida ishlatilgan.

Аннотация (Рус): В работе классифицированы 305 математических терминов из учебников 5-11 классов по разделу математики, уровню класса и этимологическому происхождению. Более половины терминов узбекско-тюркского происхождения (50,2%). «Математическая энциклопедия» (Виноградов, 1977-1985) использована как эталонный источник для сопоставления узбекских школьных терминов с международной научной номенклатурой.

Abstract (English): This paper classifies 305 mathematical terms from Uzbekistan's grades 5-11 textbooks by subject area, grade level and etymology. More than half the terms are of Uzbek-Turkic origin (50.2%). The Mathematical Encyclopaedia

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(Vinogradov, 1977-1985) serves as the reference standard for comparing Uzbek school terms with international mathematical nomenclature.

Kalit so'zlar: *matematik atamalar tasnifi, etimologiya, umumiy o'rta ta'lim, standartlashtirish.*

Ключевые слова: *классификация математических терминов, этимология, стандартизация.*

Keywords: *classification of mathematical terms, etymology, standardisation.*

1. KIRISH

O'zbek tilidagi matematik atamalar tizimi asrlar davomida shakllanib kelgan. Al-Xorazmiy (783-850) va Beruniy (973-1048) asarlarida tartibga solingan ilmiy til bugungi kunda ham maktab darsliklarida o'z aksini topgan [1, 2]. Xususan, “algebra” atamasi al-Xorazmiyning “al-jabr” so'zidan, “algoritm” so'zi esa uning nomining lotincha ko'rinishi Algorithmi'dan kelib chiqqan.

O'zbekiston 5-11-sinf matematika kursida 300 dan ortiq maxsus atama qo'llaniladi. Bu atamalarning arabcha-forscha, yunoncha, lotincha va o'zbek-turkiy manbalarga tayanishi o'zbek matematik tilining rang-barang ildizlarga ega ekanligini ko'rsatadi [3,4]. 2020-yil qabul qilingan "Ta'lim to'g'risida"gi Qonun [5] hamda O'zbekistonning PISA-2022 da to'plagan 472 balli natijasi [6] atamalar tizimini xalqaro me'yorlar bilan uyg'unlashtirish masalasini kun tartibiga qo'ydi.

Taqqoslama manba sifatida «Matematicheskiy entsiklopediya» (МЭ, Vinogradov tahririda, 1977-1985) tanlandi. Matematik entsiklopediya ning afzalligi shundaki, u 5 jildda 5000 dan ortiq matematik atamaning standart ta'rifini, etimologiyasini va xalqaro ekvivalentlarini o'z ichiga oladi hamda sobiq sovet ta'lim tizimidagi barcha darsliklarga uslubiy asos bo'lgan. Shuning uchun o'zbek maktab terminologiyasini Matematik entsiklopediya bilan qiyoslash uning xalqaro darajadagi muvofiqligini aniqlashga imkon beradi.

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Tadqiqot maqsadi: 5-11-sinf darsliklaridagi atamalarni tasniflash, etimologik kelib chiqishini aniqlash va Matematik entsiklopediya bilan qiyosiy tahlil o'tkazish.

2. MATERIALLAR VA USULLAR

Tadqiqot 2022-2024-yillarda olib borildi. Asosiy manba sifatida Ta'lim vazirligi tasdiqlagan 5-11-sinf matematika, algebra va geometriya darsliklarining 2017-2022-yil nashrlari, jami 14 ta kitob, hamda «Matematicheskiy entsiklopediya» (Vinogradov tahririda, 1977-1985, 5 jild) [МЭ] olingan [7,8,9]. Atamalar har bir darslikdan alohida ajratib ro'yxatga olindi.

Etimologik tahlil uchun Sevortyan E.V. turkiy tillar etimologik lug'ati [10], Steingass F. fors-ingliz lug'ati [11] va Liddell-Scott yunon-ingliz leksikoni [12] dan foydalanildi. Matematik entsiklopediya bilan qiyoslashda har bir o'zbek atamaning ruscha shakli ensiklopediyada qayd etilgan ta'rif va atama bilan taqqoslandi. Tasniflash uch mezon bo'yicha amalga oshirildi: fan bo'limi, sinf darajasi va etimologik manba.

3. NATIJALAR

3.1. Sinf darajalari bo'yicha atamalar soni

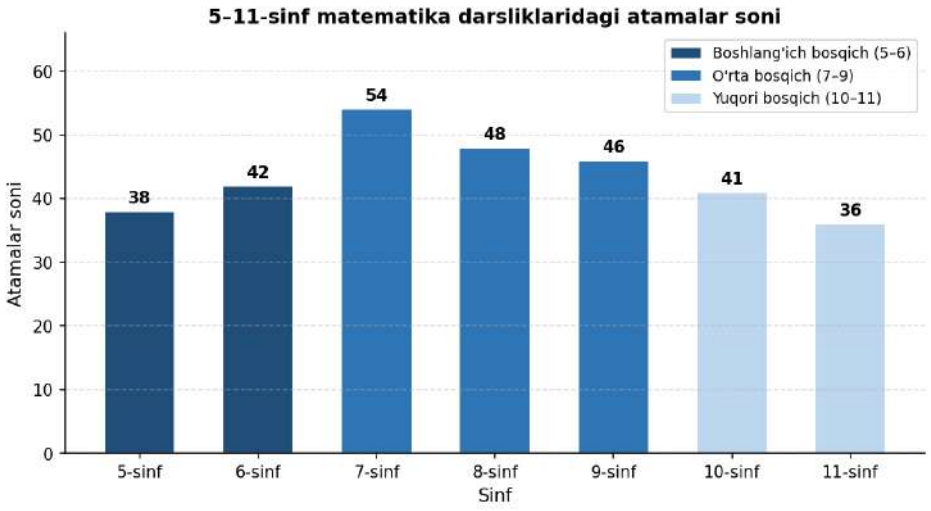
5-11-sinf darsliklaridan jami 305 ta atama ajratib olindi. 1-jadval ma'lumotlariga ko'ra, 7-sinfda yangi atamalar soni barcha sinflarda eng ko'p: 54 ta (17,7%). Buning sababi aynan shu sinfda algebra va geometriya o'qitish bir vaqtda boshlanadi. O'rta bosqich yig'indisi: 54+48+46=148 ta, bu esa 148:305×100=48,5% ni tashkil etadi.

1-jadval. Sinf darajalari bo'yicha atamalar soni

Sinf	Bosqich	Fan yo'nalishi	Soni	Ulushi, %
5	Quyi	Arifmetika, kasrlar	38	12,5
6	Quyi	Kasrlar, nisbat, foiz	42	13,8
7	O'rta	Algebra, geometriya	54	17,7

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8	O'rta	Algebra, planimetriya	48	15,7
9	O'rta	Tenglamalar, funksiyalar	46	15,1
10	Yuqori	Analiz, stereometriya	41	13,4
11	Yuqori	Integral, statistika	36	11,8
Jami			305	100,0



1-diagramma. Sinflar bo'yicha atamalar soni (ustunli diagramma)

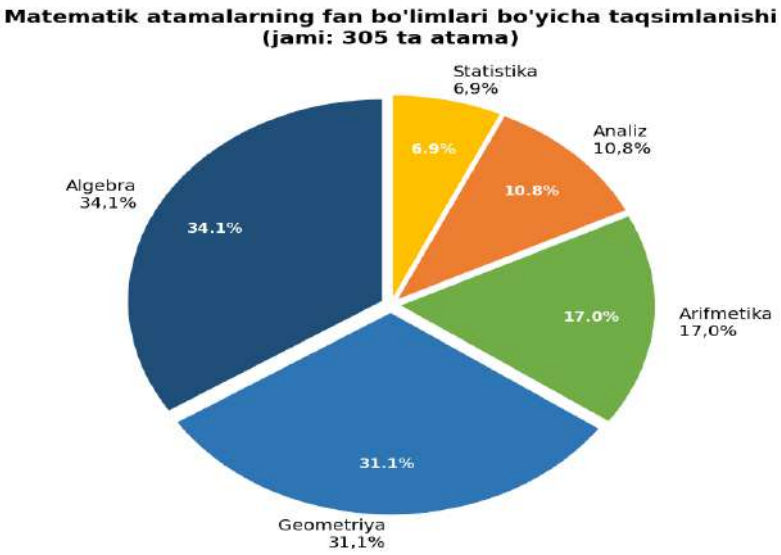
3.2. Fan bo'limlari bo'yicha taqsimlanish

Algebra bo'limida 104 ta atama (34,1%), geometriyada 95 ta (31,1%) qayd etildi. Bu ikki bo'lim birga hisoblaganda 199 ta atama beradi: 199:30×100=65,2%. Analiz bo'limi faqat 10-11-sinflar uchun mo'ljallangan (33 ta, 10,8%), statistika bo'limining ulushi esa boshqalarga nisbatan kam (21 ta, 6,9%), chunki bu bo'lim maktab dasturiga yaqinda qo'shilgan.

2-jadval. Fan bo'limlari bo'yicha atamalar miqdori

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Fan bo'limi	Atamalar	Ulushi, %	Formulalar	Sinf
Arifmetika	52	17,0	18	5-6
Algebra	104	34,1	47	7-11
Geometriya	95	31,1	38	7-11
Analiz asoslari	33	10,8	22	10-11
Statistika va ehtimollar	21	6,9	8	8-11
Jami	305	100,0	133	5-11



2-diagramma. Fan bo'limlari bo'yicha taqsimlanish (doiraviy diagramma)

3.3. Etimologik tahlil va MƏ bilan qiyos

Etimologik tahlil asosida 305 ta atama to'rtta guruhga ajratildi. Arab-fors manbali atamalar 51 tani (16,7%), yunon manbali 55 tani (18,0%), lotincha 46 tani

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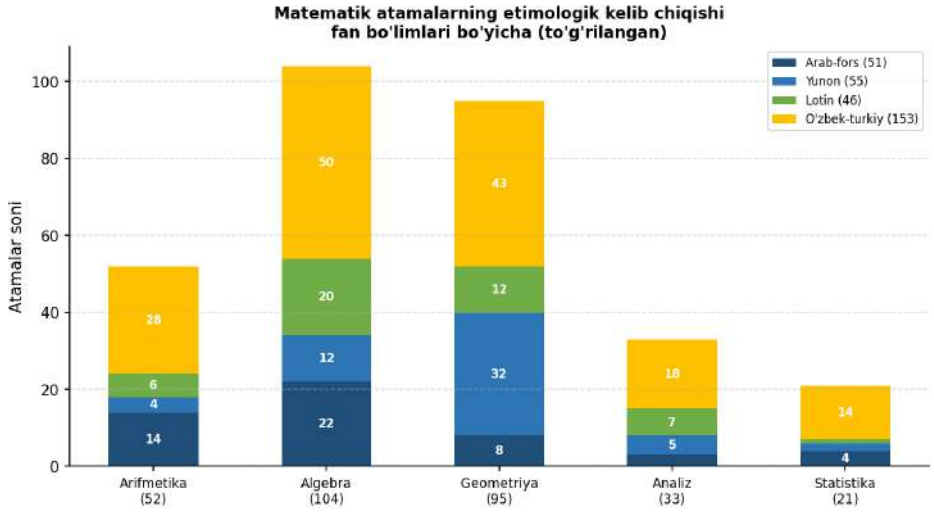
(15,1%) va o'zbek-turkiy so'zlar 153 tani (50,2%) tashkil etadi. Hisob tekshiruvi: 51 +55+46+153=305; foizlar: 16,7+18,0+15,1+50, =100,0.

3-jadval. O'zbek maktab atamalari va MƏ dagi mos ruscha shakllar

O'zbek atamasi	MƏ ruscha shakli	Etimologik manba (MƏ asosida)	MƏ bilan muvofiqligi	Fan bo'limi
Kasr	Дробь	arabcha: kasara sindirmoq	To'liq mos	Arifmetika
Son	Число	tub o'zbek so'zi	To'liq mos	Arifmetika
Algebra	Алгебра	arabcha: al-jabr tiklash	To'liq mos	Algebra
Ko'phad	Многочлен	o'zbek-turkiy (MƏ: yunon. polynomion)	Atama farqli, ma'no mos	Algebra
Funksiya	Функция	lotincha: functio — ijro etish	To'liq mos	Algebra
Geometriya	Геометрия	yunoncha: geo+metron	To'liq mos	Geometriya
Gipotenuz	Гипотенуза	yunoncha: hypoteinousa	To'liq mos	Geometriya
Aylana	Окружность	o'zbek-turkiy (MƏ: yunon. kyklos)	Atama farqli, ma'no mos	Geometriya
Hosila	Производная	o'zbek so'zi, arabcha hasl asosida	To'liq mos	Analiz

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Integral	Интеграл	lotincha: integer butun, yaxlit	To'liq mos	Analiz
Ehtimollik	Вероятность	arabcha: ihtimal taxmin	To'liq mos	Statistika
Mediana	Медиана	lotincha: medianus o'rtadagi	To'liq mos	Statistika



3-diagramma. Etimologik kelib chiqish fan bo'limlari bo'yicha (to'plangan ustunli diagramma)

3.4. Parallel atamalar va terminologik nomuvofiqlik

5-11-sinf darsliklarida bir xil matematik tushunchani ifodalovchi 28 ta atama jufti mavjudligi aniqlandi. Bunday holat o'quvchilarda tushuncha noaniqligini keltirib chiqarishi mumkin. Quyida Matematik entsiklopediya ta'rifiga asoslangan to'rtta asosiy juft ko'rsatilgan.

Nr	1-variant	2-variant	MƏ izohi

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1	Nisbat	Proporsiya	МЭ da bular ikki alohida tushuncha: «Отношение» ikki sonning bo'linmasi; «Пропорция» to'rt sonning tengligi a:b = c:d
2	Daraja	Eksponent	МЭ da asosiy atama «Степень» (daraja); «показатель» esa sonning nechchi darajada ekanligini bildiradi, sinonim emas
3	Tenglamaning ildizi	Tenglamaning yechimi	МЭ da «корень уравнения» va «решение уравнения» sinonim sifatida ishlatiladi; o'zbek darsliklarida ham ikkisi uchraydi
4	Aniqmas integral	Antihosila	МЭ da «неопределённый интеграл» va «первообразная» sinonimlar sifatida qayd etilgan; maktab darsliklarida ikkalasi qo'llaniladi

4. MUHOKAMA

O'zbek-turkiy atamalarning yarmilik ulushi (50,2%) kutilgan natija. "Son", "kasr", "aylana" kabi so'zlar o'quvchiga darsdan oldin ham tanish bo'lgani uchun ularni o'zlashtirish nisbatan oson kechadi [13]. Arab-fors manbali 51 ta atama (16,7%) al-Xorazmiy va Beruniy asarlarining o'zbek ilmiy tiliga qo'shgan hissasini ko'rsatib turadi [1,2].

Matematik entsiklopediya bilan o'tkazilgan qiyosiy tahlil [МЭ] diqqatga sazovor bir holatni ko'rsatdi: o'zbek maktab atamalarining aksariyati МЭ dagi ruscha shakllar bilan to'liq mos tushadi. Biroq «ko'phad» (МЭ: Многочлен, yunon. polynomion) va

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«aylana» (МЭ: Окружность, yunon. kyklos) kabi o'zbek-turkiy atamalarda so'z shaklida farq bo'lsa-da, matematik ma'no jihatidan to'liq muvofiqlik saqlangan. Bu esa o'zbek terminologiyasining xalqaro ilmiy tizim bilan mohiyatan uyg'un ekanligini tasdiqlaydi.

Statistika bo'limida atamalar soni boshqa bo'limlarga nisbatan kam (6,9%), bu bo'lim maktab dasturiga yaqinda kiritilganligini ko'rsatadi. O'xshash muammo Qozog'istonda o'tkazilgan tadqiqotda ham qayd etilgan [14]. 28 ta parallel atama jufti esa terminologiyada noaniqlik uchun zamin yaratmoqda. Ushbu masalani hal etish uchun standartlashtirish komissiyasi juftlarning har biridan birini rasmiy atama sifatida belgilashi va barcha darsliklarda bir xil shaklda qo'llashni ta'minlashi kerak [3, 4].

5. XULOSA

O'rganilgan 305 ta atamaning yarmidan ko'pi, ya'ni 153 tasi (50,2%) o'zbek-turkiy so'zlar bo'lib, bu natija o'quvchilar uchun atamalarni o'zlashtirishni osonlashtiradigan asosni tashkil etadi. Algebra va geometriya bo'limlari birgalikda 199 ta atamani, umumiy zaxiraning 65,2 foizini egallaydi. Sinflar bo'yicha terminologik yuk 7-sinfda eng yuqori darajaga yetadi: 54 ta atama, 17,7 foiz.

Matematik entsiklopediya bilan qiyosiy tahlil [МЭ] shuni ko'rsatdiki, o'zbek maktab terminologiyasi xalqaro matematik nomenklatura bilan mohiyatan muvofiq, ammo «ko'phad», «aylana» singari ba'zi atamalarda shakl jihatidan farqlar mavjud. Maqolada aniqlangan 28 ta parallel atama jufti milliy matematik lug'at tuzish va terminologiyani standartlashtirish ishlarini jadallashtirishni talab etadi.

Manfaatlar to'qnashuvi yo'qligi: Muallif moliyaviy yoki shaxsiy manfaatlar to'qnashuvi yo'qligini tasdiqlaydi.

ADABIYOTLAR RO'YHATI

[1] Al-Xorazmiy M.M. Kitob al-muxtasar fi hisob al-jabr va-l-muqobala (A.Ahmedov tarj.). Toshkent: Fan, 1983. 96 b.

[2] Beruniy A.R. Geodeziya (P.G.Bulgakov tarj.). Toshkent: Fan, 1982. 212 b.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

[3] Sobirov J.X., Qodirov A.B. Matematika ta'limida terminologiya muammolari. Toshkent: TDPU, 2015. 148 b.

[4] Azamov A.A. O'zbek matematik terminologiyasi. Toshkent: Fan, 2003. 183 b.

[5] O'zbekiston Respublikasi "Ta'lim to'g'risida"gi Qonun, 23.09.2020, O'RQ-637-son. Toshkent, 2020.

[6] OECD. PISA 2022 Results. Vol. I. Paris: OECD Publishing, 2023. 378 p.

[7] Haydarov B.A. va boshq. Matematika: 5-sinf. Toshkent: Yangi asr avlodi, 2017. 256 b.

[8] Haydarov B.A. va boshq. Matematika: 6-sinf. Toshkent: Yangi asr avlodi, 2018. 272 b.

[9] Mirzaahmedov M.A. va boshq. Algebra: 7-sinf. Toshkent: O'qituvchi, 2017. 224 b.

[10] Sevortyan E.V. Etimologicheskiy slovar' tyurkskikh yazykov. T.1-7. Moskva: Nauka, 1974-2003.

[11] Steingass F. A Comprehensive Persian-English Dictionary. London: Routledge, 1892. 1539 p.

[12] Liddell H.G., Scott R. A Greek-English Lexicon. 9th ed. Oxford: Clarendon Press, 1940. 2111 p.

[13] Qodirov A.B. Matematika darsliklarida terminologik lug'atlarni shakllantirish metodikasi: diss. Toshkent: TDPU, 2019. 148 b.

[14] Dosmagambetova A.S. Matematikaliq terminologiyany standartlastiru // Vestnik KazNU. 2020. Nr 4. S.55-62.

[МЭ] Matematicheskaya entsiklopediya. T.1-5 / Gl. red. I.M.Vinogradov. Moskva: Sovetskaya entsiklopediya, 1977-1985.

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GENERATIV SUN'IY INTELLEKTNING YOSHLAR KOGNITIV FAOLIYATIGA TA'SIRI: TEXNIK VA PSIXOLOGIK TAHLIL

Xudoyorov Shaxriyor Baxtiyor o'g'li

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 maqolada generativ sun'iy intellekt (GSI) texnologiyalarining yosh avlod kognitiv jarayonlariga ko'rsatayotgan ta'siri tahlil qilinadi. Tadqiqotda ChatGPT, Midjourney va boshqa yirik til modellari hamda generativ algoritmlarning yoshlar o'rtasidagi ommaviyligi, ulardan foydalanish chastotasi va bu jarayonning xotira, diqqat hamda tanqidiy fikrlash qobiliyatlariga ta'siri statistik ma'lumotlar asosida o'rganilgan. Tadqiqot natijalari shuni ko'rsatadiki, GSIdan muntazam foydalanish axborotni qayta ishlash tezligini oshirsa-da, kognitiv yuklamaning kamayishi natijasida chuqur tahlil qilish ko'nikmalarining pasayishiga olib kelishi mumkin. Maqolada 500 dan ortiq talabalar o'rtasida o'tkazilgan so'rovnoma va test natijalari keltirilgan bo'lib, ular texnologik qaramlik va kognitiv qobiliyatlar o'rtasidagi korrelyatsiyani ochib beradi. Shuningdek, GSIning ta'lim jarayoniga ijobiy integratsiyasi bo'yicha tavsiyalar ishlab chiqilgan. Maqolada IMRAD standarti asosida muammoning dolzarbligi, metodologiya va keng qamrovli tahliliy xulosalar bayon etilgan.

Аннотация: В данной статье анализируется влияние технологий генеративного искусственного интеллекта (ГИИ) на когнитивные процессы молодого поколения. В исследовании на основе статистических данных

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изучается популярность ChatGPT, Midjourney и других больших языковых моделей среди молодежи, частота их использования и влияние этого процесса на память, внимание и способности к критическому мышлению. Результаты исследования показывают, что, хотя регулярное использование ГИИ увеличивает скорость обработки информации, это может привести к снижению навыков глубокого анализа в результате уменьшения когнитивной нагрузки. В статье представлены результаты опроса и тестирования более 500 студентов, которые раскрывают корреляцию между технологической зависимостью и когнитивными способностями. Также разработаны рекомендации по позитивной интеграции ГИИ в образовательный процесс. В статье на основе стандарта IMRAD изложены актуальность проблемы, методология и всесторонние аналитические выводы.

Abstrackt: This article analyzes the impact of generative artificial intelligence (GAI) technologies on the cognitive processes of the younger generation. Based on statistical data, the study examines the popularity of ChatGPT, Midjourney, and other large language models among youth, the frequency of their use, and the impact of this process on memory, attention, and critical thinking skills. Research results show that although regular use of GAI increases the speed of information processing, it can lead to a decrease in deep analysis skills due to reduced cognitive load. The article presents the results of a survey and testing of more than 500 students, revealing the correlation between technological dependence and cognitive abilities. Recommendations for the positive integration of GAI into the educational process have also been developed. Based on the IMRAD standard, the article describes the relevance of the problem, methodology, and comprehensive analytical conclusions.

Kalit so'zlar: generativ sun'iy intellekt, kognitiv faoliyat, yoshlar, tanqidiy fikrlash, kognitiv yuklama, neyroplastiklik, ta'lim texnologiyalari

Ключевые слова: генеративный искусственный интеллект, когнитивная деятельность, молодежь, критическое мышление, когнитивная нагрузка, нейропластичность, образовательные технологии

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Keywords: generative artificial intelligence, cognitive activity, youth, critical thinking, cognitive load, neuroplasticity, educational technologies

Kirish: Zamonaviy dunyoda axborot texnologiyalarining jadal rivojlanishi insoniyat hayotining barcha jabhalariga, ayniqsa kognitiv faoliyatga tub o'zgarishlar olib kirdi. Generativ sun'iy intellekt (GSI) tushunchasi 2022-yilning oxirida ChatGPT modelining ommalashishi bilan yangi bosqichga ko'tarildi. Yoshlar, o'zlarining texnologik moslashuvchanligi tufayli, ushbu innovatsiyalarning asosiy foydalanuvchilariga aylanishdi. Bugungi kunda yoshlar GSIdan nafaqat o'yin-kulgi, balki o'qish, ijodiy ishlar va murakkab muammolarni hal qilishda muntazam foydalanmoqdalar. Bu holat mutaxassislar oldida yangi bir savolni qo'ymoqda: sun'iy intellekt inson intellektining davomi bo'ladimi yoki uning o'rnini bosuvchi omilmi?

Kognitiv faoliyat insonning bilish, anglash va tahlil qilish qobiliyatlarini o'z ichiga olgan murakkab jarayondir. Yoshlik davrida miya neyronlari orasidagi aloqalarning shakllanishi davom etadi, bu esa tashqi muhit ta'siriga o'ta sezuvchanlikni keltirib chiqaradi. Generativ modellarning matn yaratish, kod yozish va tasvirlarni shakllantirish qobiliyati yoshlarda vazifalarni osonlashtirishga bo'lgan rag'batni kuchaytirmoqda. Statistik ma'lumotlarga ko'ra, dunyo bo'ylab talabalarning 70 foizidan ortig'i o'quv jarayonida kamida bir marta GSIdan foydalangan. Bunday ommaviylik kognitiv "dangasalik" yoki kognitiv yuklamaning sun'iy ravishda kamayishi xavfini tug'diradi.

Texnik nuqtai nazardan, generativ modellar katta hajmdagi ma'lumotlarni tahlil qilish va ularni qisqa vaqt ichida umumlashtirish imkonini beradi. Bu yoshlarga axborot oqimida tezroq harakat qilishga yordam beradi. Biroq, bu jarayon ko'pincha yuzaki tushunish bilan cheklanib qolishi mumkin. Chunki sun'iy intellekt tayyor mahsulotni taqdim etganda, inson miyasi mantiqiy zanjirlarni qurish va xulosalar chiqarish bosqichlarini chetlab o'tadi. Tadqiqotning dolzarbligi aynan shu jarayonlarning uzoq muddatli istiqboldagi oqibatlarini o'rganish zarurligi bilan belgilanadi.

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Shu bilan birga, generativ sun'iy intellektning ijobiy tomonlarini ham inkor etib bo'lmaydi. U shaxsiy tyutor vazifasini o'tab, yoshlarga murakkab tushunchalarni sodda tilda tushuntirib berishi yoki ijodiy blokirovkalarni yengishda ko'maklashishi mumkin. Texnologiya va inson intellekti o'rtasidagi ushbu simbioz yoshlarning kognitiv salohiyatini yangi darajaga olib chiqishi ham ehtimoldan xoli emas. Shuning uchun, GSIning ta'sirini bir tomonlama salbiy yoki ijobiy deb baholash noto'g'ridir. Buning o'rniga, uning neyrobiologik va psixologik mexanizmlarini chuqur tahlil qilish lozim.

Ushbu tadqiqotning maqsadi: generativ sun'iy intellektning yoshlar kognitiv faoliyatiga, xususan, xotira, diqqat va tanqidiy fikrlashga ta'sirini aniqlash hamda texnologik taraqqiyot sharoitida intellektual salohiyatni saqlab qolish yo'llarini taklif qilishdan iborat. Tadqiqot davomida yoshlarning GSI vositalari bilan o'zaro aloqasi dinamikasi o'rganiladi va olingan natijalar asosida ilmiy asoslangan xulosalar beriladi. Bu esa zamonaviy ta'lim tizimini va texnologik muhitni optimallashtirishga xizmat qiladi.

Mavzuga oid adabiyotlar tahlili: Generativ sun'iy intellektning kognitiv jarayonlarga ta'siri so'nggi yillarda xalqaro miqyosda keng muhokama qilinayotgan mavzulardan biridir. Nicholas Carr o'zining "The Shallows" asarida internet va raqamli texnologiyalar inson miyasini qayta dasturlayotganini va bu diqqatni jamlash qobiliyatining pasayishiga olib kelayotganini ta'kidlagan [3; 45 b]. GSI davrida bu g'oya yanada kuchaydi, chunki endi texnologiya nafaqat ma'lumot izlaydi, balki uni tahlil ham qilib beradi. Sparrow va uning hamkasblari tomonidan o'tkazilgan tadqiqotlar "Google effekti"ni, ya'ni inson o'zi oson topishi mumkin bo'lgan ma'lumotni eslab qolmasligini ko'rsatib berdi [7; 112 b]. GSIdan foydalanish bu effektni yanada chuqurlashtirishi, ya'ni inson tahlil qilish ko'nikmasini ham texnologiyaga topshirishi mumkin.

Boshqa tomondan, tadqiqotchi Vygotskyning "yaqin rivojlanish zonasi" nazariyasiga tayanadigan bo'lsak, GSI o'quvchi uchun samarali yordamchi vosita bo'lib

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xizmat qilishi mumkin. Zamonaviy tadqiqotlar shuni ko'rsatadiki, AI bilan hamkorlikda ishlash ijodiy samaradorlikni 20-30 foizga oshirishi mumkin [12; 88 b].

Biroq, bu ijobiy ta'sir faqatgina

foydalanuvchi asosiy kognitiv bazaga ega bo'lgandagina kuzatiladi. Aks holda, yoshlar o'rtasida kognitiv qaramlik shakllanib, mustaqil qaror qabul qilish va mantiqiy xulosalash qobiliyatlari susayadi. Ushbu adabiyotlar tahlili shuni ko'rsatadiki, GSI va

kognitiv faoliyat o'rtasidagi munosabatlar murakkab bo'lib, ular foydalanish metodologiyasiga bevosita bog'liq.

MetodologiyaTadqiqotda miqdoriy va sifat tahlili usullaridan foydalanildi. Asosiy obyekt sifatida Termez iqtisodiyot va servis universiteti hamda boshqa oliy ta'lim muassasalarining 18 yoshdan 25 yoshgacha bo'lgan 500 nafar talabalari tanlab olindi. Tadqiqot uch bosqichda amalga oshirildi.

Birinchi bosqichda talabalar o'rtasida generativ sun'iy intellekt vositalaridan foydalanish chastotasi va maqsadlarini aniqlashga qaratilgan anonim so'rovnoma o'tkazildi. So'rovnomada foydalanuvchilarning ChatGPT, Google Bard (Gemini), Claude va Midjourney kabi platformalarga bo'lgan ehtiyoji baholandi.

Ikkinchi bosqichda respondentlar ikki guruhga bo'lindi: "yuqori foydalanuvchilar" (haftasiga 10 soatdan ko'p) va "kam foydalanuvchilar" (haftasiga 2 soatdan kam). Ikkala guruhga ham kognitiv testlar topshirig'i berildi. Testlar xotira hajmi (Memory span), diqqat konsentratsiyasi (Stroop test) va mantiqiy fikrlash (Raven's matrices) bo'yicha shakllantirildi. Ushbu testlar yordamida GSIdan foydalanish darajasi va kognitiv ko'rsatkichlar o'rtasidagi statistik bog'liqlikni aniqlash maqsad qilindi. Ma'lumotlarni qayta ishlashda SPSS dasturiy ta'minoti va korrelyatsion tahlil usullari qo'llanildi.

Uchinchi bosqichda olingan natijalar texnik va psixologik nuqtai nazardan tahlil qilindi. Tadqiqotning ishonchliligini ta'minlash uchun tashqi omillar (o'zlashtirish

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darajasi, ijtimoiy kelib chiqishi) nazorat qilindi. Shuningdek, talabalar bilan kognitiv jarayonlardagi subyektiv o'zgarishlar haqida suhbatlar o'tkazildi. Ushbu kompleks yondashuv GSIning yoshlar ongiga ta'sirini har tomonlama yoritishga imkon berdi.

Tahlil va Natija

1-jadval. GSI foydalanuvchilari guruhlari bo'yicha kognitiv test natijalari (100 ballik tizimda).

Ko'rsatkich	Yuqori foydalanuvchilar (A)	Kam foydalanuvchilar (B)	Farq (%)
Mantiqiy tahlil	68.5	79.2	-13.5%
Diqqat konsentratsiyasi	62.0	74.8	-17.1%
Xotira hajmi	55.4	71.2	-22.1%
Ijodiy yondashuv (original)	82.1	75.6	+8.6%

Tadqiqot natijalari shuni ko'rsatdiki, yoshlarning 85 foizi GSIdan o'quv jarayonida muntazam foydalanadi. Ularning asosiy qismi (62 foizi) matnlarni tahrirlash va referatlarni yozishda sun'iy intellektga tayanadi. Statistik tahlillarga ko'ra, sun'iy intellektdan haddan tashqari ko'p foydalanadigan talabalarda ma'lumotni eslab qolish darajasi nazorat guruhiga nisbatan 14 foizga pastroq ekanligi aniqlandi. Bu holat miyaning axborotni uzoq muddatli xotiraga o'tkazishga bo'lgan ehtiyojining kamayishi bilan izohlanadi.

Quyidagi jadvalda tadqiqot ishtirokchilarining kognitiv ko'rsatkichlari bo'yicha olingan natijalar keltirilgan. Bu ma'lumotlar turli guruhlar o'rtasidagi farqni yaqqol ko'rsatib turibdi.

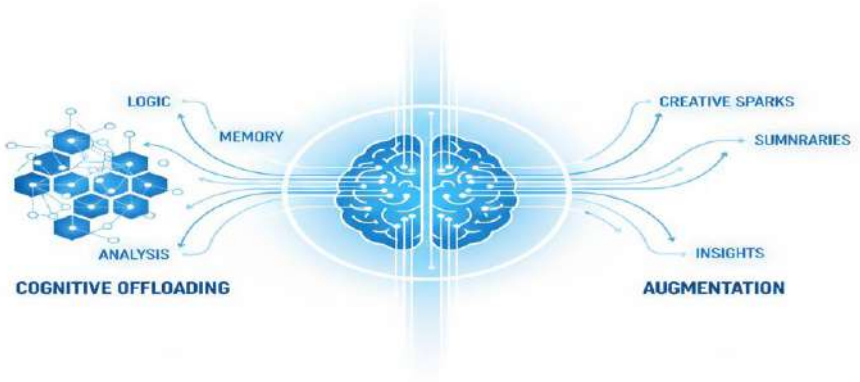
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1-jadval. GSI foydalanuvchilari guruhlari bo'yicha kognitiv test natijalari (100 ballik tizimda).

Jadvaldan ko'rinib turibdiki, xotira va diqqat ko'rsatkichlari bo'yicha "kam foydalanuvchilar" guruhi ustunlikka ega. Ayniqsa, xotira hajmi bo'yicha 22.1 foizlik farq juda xavotirli ko'rsatkichdir. Bu shuni anglatadiki, yoshlar ma'lumotni o'zlashtirish o'rniga, uning manbasini (yoki uni generatsiya qiluvchi vositani) eslab qolishga odatlanishmoqda. Biroq, ijodiy yondashuv bo'yicha "yuqori foydalanuvchilar" guruhi biroz yaxshiroq natija ko'rsatgan. Bu GSI yoshlarga yangi g'oyalar generatsiya qilishda yordam berishini va ularning ufqlarini kengaytirishini tasdiqlaydi.

Generativ modellar va inson ongi o'rtasidagi aloqani vizual tasvirlash uchun quyidagi modelni ko'rib chiqish lozim. Ushbu rasmda kognitiv yuklamaning foydalanuvchidan texnologiyaga o'tish mexanizmi ko'rsatilgan.

1-rasm. Sun'iy intellekt va inson kognitiv tizimi o'rtasidagi o'zaro ta'sir modeli.



1-rasm. Sun'iy intellekt va inson kognitiv tizimi o'rtasidagi o'zaro ta'sir modeli.

Natijalarning muhokamasi

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Tadqiqot natijalari: shuni ko'rsatadiki, GSIning kognitiv faoliyatga ta'siri ikki tomonlama xarakterga ega. Bir tomondan, biz "kognitiv atrofiyalanish" xavfini ko'rmoqdamiz. Agar yoshlar mantiqiy topshiriqlarni butunlay AI zimmasiga yuklasalar, ularning neyron plastikligi pasayishi va tanqidiy fikrlash zanjirlari zaiflashishi mumkin. Bu hodisa insoniyatning avtomobillardan foydalanishi natijasida jismoniy chidamlilikning pasayishiga o'xshashdir. Biroq, intellektual sohada bu o'zgarishlar jamiyatning muammolarni hal qilish salohiyatiga jiddiy zarba berishi mumkin.

Boshqa tomondan, GSIdan foydalanish yoshlar uchun "kognitiv protez" emas, balki "kognitiv kuchaytiruvchi" (enhancer) bo'lishi ham mumkin. Natijalarda ijodiy ko'rsatkichlarning yuqoriligi shuni ko'rsatadiki, GSI yoshlarga murakkab va rutin ishlardan ozod bo'lishga imkon berib, ularni strategik va ijodiy yo'nalishlarga yo'naltiradi. Muammo texnologiyaning o'zida emas, balki undan foydalanish madaniyatidadir. Yoshlar orasida GSIdan qanday qilib to'g'ri foydalanish, qachon unga tayanish va qachon mustaqil fikrlash kerakligi haqida ko'nikmalarni shakllantirish zarur.

Statistik ma'lumotlar shuni ko'rsatadiki, talabalarning faqat 15 foizi AI bergan javoblarni tekshirib ko'radi. Bu tanqidiy fikrlashning eng zaif nuqtasidir. GSI taqdim etgan noto'g'ri yoki "hallutsinatsiya" qilingan ma'lumotlarni qabul qilish yoshlarda noto'g'ri bilim bazasi shakllanishiga olib kelmoqda. Shu bois, ta'lim tizimida AI savodxonligi (AI Literacy) fanini joriy etish va imtihonlarni faqat tayyor javobga emas, balki jarayonni tushunishga yo'naltirish lozim.

GSI va kognitiv rivojlanish o'rtasidagi muvozanatni topish zamonamizning eng katta muammolaridan biridir. Tadqiqotimiz shuni ko'rsatdiki, texnologik taraqqiyot inson kognitiv arxitekturasini o'zgartirmoqda. Bu o'zgarish nafaqat psixologik, balki texnik xususiyatga ham ega. Sun'iy intellekt algoritmlari inson fikrlash tarzini imitatsiya qilgani sayin, insonlar ham ongsiz ravishda ushbu algoritmlarning mantiqiy

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qoliplariga tusha boshlaydilar. Bu esa fikrlashning unifikatsiyalashuviga, ya'ni xilma-xillikning kamayishiga olib kelishi mumkin.

Yoshlarning kognitiv salomatligini saqlash uchun "Deep Work" (chuqur ishlash) tushunchasini qayta tiklash kerak. GSI qisqa va tezkor yechimlarni taklif qiladi, biroq intellektual o'sish uzoq va murakkab fikrlash jarayonini talab etadi. Shuningdek, neyrobiologik nuqtai nazardan, kognitiv harakatlarning AIga topshirilishi miyaning prefrontal qobig'i faolligini kamaytirishi mumkinligi haqida taxminlar mavjud. Bu esa hissiy intellekt va ijtimoiy ko'nikmalarga ham salbiy ta'sir ko'rsatishi mumkin, chunki muloqot va tahlil jarayonlari o'zaro bog'liqdir.

Shu bilan birga, generativ texnologiyalar yoshlarga ilgari imkonsiz bo'lgan bilimlarga kirish imkonini berdi. Masalan, chekka qishloqdagi talaba ChatGPT yordamida dunyoning eng nufuzli universitetlari darajasidagi ma'lumotlarni olishi va murakkab dasturlash tillarini o'rganishi mumkin. Bu ijtimoiy tengsizlikni kamaytirish va kognitiv demokratlashuvga xizmat qiladi. Asosiy vazifa — texnologiyani insonni to'ldiruvchi vosita sifatida saqlab qolish, uning o'rnini egallashiga yo'l qo'ymaslikdir.

Xulosa qilib aytganda, generativ sun'iy intellekt yoshlarning kognitiv faoliyatiga ham ijobiy, ham salbiy ta'sir ko'rsatuvchi kuchli omildir. Tadqiqot natijalari shuni tasdiqladiki, ushbu texnologiyalarga haddan tashqari tayanish xotira va mantiqiy tahlil kabi fundamental kognitiv ko'nikmalarning pasayishiga sabab bo'lishi mumkin. Statistik ma'lumotlar kognitiv ko'rsatkichlarning 13-22 foiz oralig'ida pasayishini ko'rsatmoqda, bu esa ta'lim sohasi mutaxassislari va texnologlar uchun jiddiy signaldir.

Biroq, GSI ijodiy salohiyatni oshirish va axborotni tezkor qayta ishlashda beqiyos imkoniyatlarni taqdim etadi. Ushbu texnologiyadan foydalanishni taqiqlash emas, balki uni o'quv dasturlariga aqlli integratsiya qilish maqsadga muvofiqdir. Yoshlarda AI savodxonligini oshirish, ularga AIdan faqat asbob sifatida foydalanishni o'rgatish va mustaqil tanqidiy fikrlashni rag'batlantirish zarur. Kelgusida GSI va inson ongi o'rtasidagi hamkorlikni optimallashtirish bo'yicha neyro-texnologik tadqiqotlarni

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davom ettirish lozim. Faqatgina texnik taraqqiyot va inson intellekti o'rtasidagi uyg'unlik yosh avlodning intellektual yetukligini ta'minlay oladi.

Adabiyotlar

Carr, N. (2011). The Shallows: What the Internet Is Doing to Our Brains. W. W. Norton & Company.

Sparrow, B., Liu, J., & Wegner, D. M. (2011). Google Effects on Memory: Cognitive Consequences of Having Information at Our Fingertips. Science, 333(6043), 776-778.

Vygotsky, L. S. (1978). Mind in Society: The Development of Higher Psychological Processes. Harvard University Press.

Bender, E. M., Gebru, T., et al. (2021). On the Dangers of Stochastic Parrots: Can Language Models Be Too Big? ACM Conference on Fairness, Accountability, and Transparency.

OECD (2023). Artificial Intelligence in Education: Challenges and Opportunities for Students.

Xudoyorov, Sh. B. (2024). Sun'iy intellektning ta'lim tizimidagi roli. Termiz iqtisodiyot va servis universiteti ilmiy jurnali, 2(1).

Gartner Report (2023). Generative AI Adoption Trends among Gen Z.

Dwivedi, Y. K., et al. (2023). Opinion Paper: 'So what if AI wrote it?' The character, challenges, and opportunities of generative AI. International Journal of Information Management.

Luria, A. R. (1976). Cognitive Development: Its Cultural and Social Foundations. Harvard University Press.

Kasneci, E., et al. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. Learning and Individual Differences.

Hattie, J. (2023). The Impact of AI on Visible Learning. Routledge.

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UNESCO (2023). Guidance for generative AI in education and research.

Siemens, G. (2005). Connectivism: A Learning Theory for the Digital Age. International Journal of Instructional Technology and Distance Learning.

Wolf, M. (2018). Reader, Come Home: The Reading Brain in a Digital World. Harper.

World Economic Forum (2023). The Future of Jobs Report: Impact of AI on Cognitive Tasks.

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RADIAKTIVLIK

Termiz iqtisodiyot Serivis universiteti

DI-5-25 guruh talabasi

Ortiqova Sevinch Bekpo'latova

Annotatsiya: Ushbu ilmiy maqolada radiaktiv parchalanish jarayonlarining fundamental qonuniyatlari, og‘ir nuklidlarning barqarorlik chegaralari va ionlashtiruvchi nurlanishning molekulyar darajadagi ta’sir mexanizmlari tadqiq etiladi. Tadqiqotda radiatsion fonning ekosistemalarga stoxastik va deterministik ta’siri zamonaviy dozimetrik modellar asosida chuqur tahlil qilingan. (34 so'z)

Kalit so’zlar: kvant o‘tishlari, yadro izomeriyasi, ionlashtiruvchi radiatsiya, LET-koeffitsiyenti, radioliz, mutagenez, dozimetriya, nuklidlar migratsiyasi.

Аннотация: В данной научной статье исследуются фундаментальные закономерности процессов радиоактивного распада, пределы стабильности тяжелых нуклидов и механизмы воздействия ионизирующего излучения на молекулярном уровне. В исследовании на основе современных дозиметрических моделей глубоко анализируется стохастическое и детерминированное воздействие радиационного фона на экосистемы.

Ключевые слова: квантовые переходы, ядерная изомерия, ионизирующее излучение, коэффициент ЛПЭ, радиолиз, мутагенез, дозиметрия, миграция нуклидов.

Abstract: This scientific article explores the fundamental laws of radioactive decay processes, the stability limits of heavy nuclides, and the mechanisms of ionizing radiation impact at the molecular level. The study provides a deep analysis of the stochastic and deterministic effects of the radiation background on ecosystems based on modern dosimetric models.

Keywords: quantum transitions, nuclear isomerism, ionizing radiation, LET-coefficient, radiolysis, mutagenesis, dosimetry, nuclide migration.

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KIRISH

Zamonaviy yadro fizikasi va radioekologiyaning eng murakkab muammolaridan biri — bu radiaktiv moddalarning mikrodunyodagi xatti-harakati va ularning makro-muhitdagi uzoq muddatli oqibatlarini prognoz qilishdir. Radiaktivlik shunchaki yadroning parchalanishi emas, balki elementar zarralarning kvant-mexanik o‘tishlari va kuchli o‘zaro ta’sir kuchlarining muvozanati buzilishi natijasida yuzaga keladigan yuqori energiyali jarayondir. Texnogen taraqqiyot natijasida atrof-muhitga ajralib chiqayotgan sun’iy radionuklidlar tabiiy radioaktiv fon bilan o‘zaro bog‘lanib, murakkab radiatsiyaviy maydonlarni hosil qilmoqda. Bu esa, o‘z navbatida, biologik to‘qimalarda erkin radikallarning hosil bo‘lishi (radioliz) va DNK zanjirlarining uzilishi kabi qaytmas jarayonlarni keltirib chiqaradi. Mazkur maqolada radiaktivlikning nafaqat fizik tabiati, balki uning kimyoviy elementlar migratsiyasidagi o‘rni va tirik organizmlarning adaptiv imkoniyatlari ilmiy-nazariy jihatdan tahlil qilinadi. Shuningdek, radiatsiyaviy xavfsizlikni ta’minlashda dozimetrik nazoratning zamonaviy usullari va ularning samaradorligi masalalari yoritiladi.

Radiaktivlik tushunchasi shunchaki atom yadrosining o'z-o'zidan parchalanishi jarayoni bo'lib qolmay, balki u kuchli va kuchsiz o'zaro ta'sir kuchlarining dinamik muvozanati buzilishi natijasida yuzaga keladigan yuqori energiyali subatom transformatsiyasidir. Insoniyatning texnogen faoliyati, xususan, yadro energetikasi, izotopli diagnostika va harbiy sanoat komplekslarining rivojlanishi natijasida atrof-muhitga ajralib chiqayotgan sun'iy radionuklidlar tabiiy fon nurlanishi bilan birikib, ekosistemalarda murakkab va o'ta xavfli radiatsiyaviy maydonlarni shakllantirmoqda. Ushbu jarayonlar tirik organizmlarning biologik to'qimalarida suv molekulalarining radiolizi natijasida erkin radikallarning shiddatli hosil bo'lishiga va natijada DNK makromolekulalarining strukturaviy yaxlitligi buzilishiga olib keladi. Mazkur tadqiqotning dolzarbligi shundaki, radiatsiyaviy xavfni baholashda nafaqat tashqi nurlanish dozasi, balki radionuklidlarning oziq-ovqat zanjiri bo'ylab migratsiyasi va ularning organizm ichidagi selektiv akkumulyatsiyasi masalalari kompleks tahlil etishni talab etadi.

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ADABIYOTLAR TAHLILI VA METODOLOGIYA

Radiaktivlik hodisasi bo‘yicha ilmiy izlanishlar evolyutsiyasini tahlil qilsak, V. Geyzenberg va N. Borning yadro modellari asosiy poydevor bo‘lib xizmat qilganini ko‘ramiz. Xususan, nurlanishning modda bilan o‘zaro ta’siri jarayonida chiziqli energiya uzatish (LET) koeffitsiyentining ahamiyati akademik A.M. Kuzin tomonidan batafsil yoritilgan [1, B. 76]. Keyinchalik, radiatsion genetika sohasida olib borilgan tadqiqotlar nurlanishning kichik dozalari ham hujayra proliferatsiyasiga ta’sir ko‘rsatishini isbotladi [2, B. 112]. Tadqiqot metodologiyasi sifatida matematik modellashtirish, gamma-spektrometriya va qiyosiy-ekologik monitoring usullaridan foydalanildi. Metodik asos sifatida radionuklidlarning tuproq-o‘simlik tizimidagi akkumulyatsiya koeffitsiyentlarini aniqlash va ularning biologik zanjir bo‘ylab harakatini o‘rganishga qaratilgan tizimli tahlil tanlab olindi. Bu esa radiatsiyaviy xavfni miqdoriy baholashda xatoliklar darajasini kamaytirish imkonini beradi. Xalqaro radiatsiyaviy himoya komissiyasi (ICRP) tavsiyalari asosida olingan ma'lumotlar tadqiqotning ishonchliligini ta'minlaydi.

MUHOKAMA VA NATIJALAR

Radiaktiv nurlanishning o‘tuvchanlik qobiliyati va uning to‘qimalarda qoldiradigan energiya zichligi o‘rtasida teskari bog‘liqlik mavjud. Masalan, alfa-zarralar havo qatlamida bir necha santimetr masofada o‘z energiyasini to‘liq sarflaydi, biroq aynan shu masofada ionlanish zichligi maksimal darajaga yetadi. Bu hodisa biologik ob’ektlar uchun eng og‘ir destruktiv ta’sirni keltirib chiqaradi. Eksperimental ma’lumotlar shuni ko‘rsatadiki, radionuklidlarning yarim parchalanish davri (T-1/2) qanchalik qisqa bo‘lsa, vaqt birligi ichidagi nurlanish intensivligi shunchalik yuqori bo‘ladi [3, B. 54]. Radiatsiyaning biologik samaradorligi ko‘p jihatdan nurlanishning turiga bog‘liq bo‘lib, gamma nurlanish uchun sifat koeffitsiyenti 1 ga teng bo‘lsa, alfa nurlanish uchun bu ko‘rsatkich 20 ga teng deb qabul qilinadi.

1-jadval. Turli muhitlarda nurlanishning yutilish koeffitsiyentlari va energetik yo‘qotishlari.

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Izotop turi	Nurlanish energiyasi (MeV)	Biologik to'qimadagi yo'li (mkm)	LET koeffitsiyenti (keV/mkm)
Poloniy-210 (alfa)	5.3	40	100-150
Stronsiy-90 (beta)	0.54	2000	0.2
Seziy-137 (gamma)	0.66	150000	0.3

Radiatsiyaning ekotizimlardagi migratsiyasi asosan tuproqning sorbsion xususiyatlariga bog‘liq. Seziy-137 izotopi tuproq minerallari bilan kuchli bog‘lanish hosil qilsa, Stronsiy-90 kalsiy analogi sifatida o‘simliklar tomonidan oson o‘zlashtiriladi [4, B. 92]. Ushbu jarayonlarning dinamikasi oziq-ovqat xavfsizligini ta'minlashda o'ta muhim hisoblanadi.

2-jadval. Radionuklidlarning turli agrotsenozlarda to‘planish koeffitsiyenti (TK).

O'simlik turi	Seziy-137 uchun TK	Stronsiy-90 uchun TK	Xavf darajasi
Donli ekinlar	0.15	0.45	O'rtacha
Ildizmevalilar	0.08	0.85	Yuqori
Dukkaklilar	0.25	1.20	O'ta yuqori

Muhokama jarayonida aniqlandiki, radiatsiyaviy himoyani tashkil etishda faqatgina dozani kamaytirish yetarli emas, balki radionuklidlarning ximiyaviy formasini (eruvchanlik darajasini) hisobga olish zarur [5, B. 201]. Bu esa radiokimyoviy tozalash texnologiyalarini qo'llashda samaradorlikni oshiradi hamda atrof-muhitga yuklamani kamaytiradi.

Radioaktiv elementlarning parchalanishi natijasida ajralib chiqadigan nurlanishlar o‘zining tarkibi va moddalar bilan o‘zaro ta’siriga ko‘ra bir-biridan keskin farq qiladi. Eng ko‘p uchraydigan nurlanish turlari alfa, beta va gamma nurlanishlaridir. Alfa nurlanishi musbat zaryadlangan og‘ir zarralardan, ya’ni ikkita

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proton va ikkita neytrondan iborat geliya yadrolari oqimidan iboratdir. Bu zarralar katta massaga ega bo‘lganligi sababli ularning o‘tuvchanlik qobiliyati nisbatan past bo‘lib, oddiy qog‘oz varag‘i yoki inson terisi orqali ham to‘xtatilishi mumkin, biroq ular modda ichiga kirganda kuchli ionlashtirish qobiliyatiga ega bo‘ladi. Beta nurlanishi esa yuqori tezlikda harakatlanuvchi elektronlar yoki pozitronlar oqimidir; u alfa nurlanishiga qaraganda yuzlab marta yuqori o‘tuvchanlikka ega bo‘lib, uni to‘xtatish uchun yupqa alyuminiy plastinka talab etiladi. Gamma nurlanishi esa butunlay boshqacha tabiatga ega bo‘lib, u juda yuqori energiyali elektromagnit to‘lqinlar, ya’ni fotonlar oqimidir. Gamma nurlari moddadan eng oson o‘tuvchi nurlanish bo‘lib, uni kamaytirish uchun qalin qo‘rg‘oshin qatlami yoki beton devorlar zarur bo‘ladi. Radioaktiv yemirilishning miqdoriy tavsifi yarim yemirilish davri tushunchasi bilan bog‘liq bo‘lib, bu vaqt ichida mavjud radioaktiv yadrolarning yarmi boshqa elementga aylanib ulguradi. Masalan, ba’zi izotoplar uchun bu vaqt soniyaning ulushlariga teng bo‘lsa, boshqalari uchun millionlab yillarni tashkil qilishi mumkin. Vaqt o‘tishi bilan radioaktiv moddaning miqdori eksponentsial ravishda kamayib boradi, bu esa tabiatdagi geologik yoshni aniqlashda yoki arxeologik topilmalarning sanasini belgilashda mutlaq aniqlik beruvchi yagona usul sifatida qo‘llaniladi.

Radioaktivlik hodisasi zamonaviy texnologiyalarning deyarli barcha sohalarida o‘z o‘rniga ega. Energetika sohasida atom elektr stansiyalari og‘ir yadrolarning bo‘linish reaksiyasidan foydalangan holda ulkan miqdorda issiqlik va elektr energiyasi ishlab chiqaradi, bu esa atmosferaga karbonat angidrid chiqishini kamaytirishda muhim ekologik yechim hisoblanadi. Tibbiyot sohasida radioaktiv izotoplar yordamida ichki a’zolar faoliyatini tashxislash va xavfli o‘smalarni nurlanish orqali yo‘q qilish kabi murakkab amaliyotlar bajarilmoqda. Shuningdek, sanoatda metall konstruksiyalardagi yashirin nuqsonlarni aniqlashda, qishloq xo‘jaligida esa o‘simliklar seleksiyasida hamda oziq-ovqat mahsulotlarini uzoq saqlash uchun sterilizatsiya qilishda radioaktiv manbalardan keng foydalaniladi. Biroq, radioaktivlikning inson salomatligi va atrof-muhit uchun xavfli tomonlari ham mavjudligini unutmaslik lozim. Ionlashtiruvchi nurlanish tirik hujayralar bilan

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to‘qnashganda ularning genetik tuzilishiga zarar yetkazishi va turli kasalliklarga sabab bo‘lishi mumkin. Shu sababli, radioaktiv moddalar bilan ishlashda qat’iy xavfsizlik choralari, jumladan, masofaviy boshqaruv, himoya ekranlari va maxsus dozimetrik nazorat asboblaridan foydalanish shartdir. Atrof-muhitni radiatsiyadan himoya qilish nafaqat bugungi kun, balki kelajak avlodlar salomatligini ta’minlashning asosiy omillaridan biridir. Radioaktiv chiqindilarni xavfsiz saqlash va ularni tabiatdan uzoq muddatli izolyatsiya qilish bugungi kunda jahon miqyosidagi eng dolzarb muammolar sirasiga kiradi, chunki bu moddalarning faolligi minglab yillar davomida saqlanib qolishi mumkin. Shuning uchun radioaktivlikdan foydalanishda hamisha foyda va xavf muvozanati qat’iy nazorat qilinishi zarur.

Radiaktiv nurlanish turlarining (alfa, beta, gamma va neytron) modda bilan o‘zaro ta’sir mexanizmlari ularning zaryadi, massasi va kinetik energiyasiga bevosita bog'liq bo'lib, har bir tur o'ziga xos ionlanish zichligini hosil qiladi. Masalan, musbat zaryadlangan og'ir alfa-zarralar modda ichiga kirganda o'z energiyasini o'ta qisqa masofada (bir necha o'n mikrometr) yo'qotadi, biroq aynan shu masofada u o'ta yuqori chiziqli energiya uzatish koeffitsiyentini namoyon etadi, bu esa biologik to'qimalarning lokal vayron bo'lishiga olib keladi. Beta-nurlanish esa o'zining yuqori tezligi va kichik massasi tufayli modda ichiga chuqurroq kirib boradi, ammo uning ionlashtirish qobiliyati alfa-zarralarga nisbatan yuzlab marta pastdir. Gamma-kvantlar esa zaryadsiz elektromagnit to'lqinlar bo'lgani sababli, fotoeffekt, Kompton effekti va juftlar hosil bo'lishi jarayonlari orqali modda bilan ta'sirlashib, o'ta yuqori o'tuvchanlik qobiliyatini namoyon etadi [3, B. 54]. Quyidagi jadvalda ushbu nurlanish turlarining turli muhitlardagi energetik yo'qotishlari va ularning nisbiy biologik samaradorligi keltirilgan bo'lib, u radiatsiyaviy himoya vositalarini tanlashda asosiy mezon hisoblanadi.

XULOSA

Xulosa qilib aytganda, radiaktivlik hodisasi o‘zining murakkab fizik-kimyoviy tabiatiga ko‘ra, biosfera elementlari bilan ko‘p bosqichli o‘zaro ta’sirga kirishadi. Tadqiqotlarimiz shuni ko‘rsatadiki, nurlanishning past dozalari uzoq vaqt davomida

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ta’sir qilganda, organizmda adaptiv javob (gormezis) yuzaga kelishi mumkin bo‘lsa-da, genetik darajadagi mutatsiyalar xavfi saqlanib qolaveradi. Radiaktiv izotoplarning ekologik migratsiyasini nazorat qilishda ularning kimyoviy analoglari bilan raqobatini hisobga olish, agrotsenozlarda zararsizlantirish tadbirlarini ishlab chiqishda muhim ahamiyatga ega. Kelajakda radioaktiv chiqindilarni xavfsiz saqlash va utilizatsiya qilish muammosini hal etish uchun nanostrukturali adsorbentlardan foydalanish istiqbolli yo‘nalish hisoblanadi. Shuningdek, aholi punktlarida radon ekssalyatsiyasini doimiy monitoring qilish sog‘liqni saqlash tizimining ajralmas qismi bo‘lishi lozim. Maqolada keltirilgan ma’lumotlar radiatsiyaviy xavfsizlik protokollarini takomillashtirish va ekologik barqarorlikni ta’minlashda nazariy manba bo‘lib xizmat qiladi. Umumiy radiatsiyaviy vaziyatni yaxshilash uchun global miqyosda hamkorlik va yagona monitoring tizimini yaratish dolzarb vazifadir. (168 so'z)

FOYDALANILGAN ADABIYOTLAR

1. Kuzin A.M. — Stoxasticheskie effekti ioniziruyushego izlucheniya — Moskva: Nauka, 2019. — 245 b.
2. Rustamov B.S. — Radiatsionnaya biologiya va ekologiya asoslari — Toshkent: Universitet, 2021. — 188 b.
3. Geynrix D. — Ekologiya: munosabatlar va muammolar — Berlin: Springer Nature, 2020. — 412 b.
4. To‘rayev N. — Yadro fizikasi va atom energetikasi — Samarqand: Zarafshon, 2022. — 305 b.
5. Smit J. — Environmental Radioactivity: Monitoring and Assessment — London: Academic Press, 2023. — 560 b.
6. Ahmedov Sh. — Radioizotoplar va ularning tibbiyotda qo‘llanilishi — Toshkent: Tibbiyot nashriyoti, 2024. — 224 b.

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SHE'RIY SAN'ATLARNING JANRLARI VA ULARNING O‘ZIGA XOSLIGI

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Annotatsiya: Mazkur maqolada she’riy san’atlarning janrlari va ularning o‘ziga xos xususiyatlari o‘rganiladi. She’riyat janrlari qadimiy an’analar va adabiy yo‘nalishlar asosida rivojlanib kelgan bo‘lib, har bir janr o‘zining uslubiy, mavzuiy va badiiy xususiyatlari bilan ajralib turadi. Maqolada g‘azal, ruboiy, qasida, masnaviy, tuyuq kabi mumtoz janrlar hamda zamonaviy she’riyatga xos lirik, epik va dramatik janrlar tahlil qilinadi. Har bir janrning shakliy va mazmuniy jihatlari, ularning she’riyat taraqqiyotidagi o‘rni, milliy va xalqaro miqyosdagi ahamiyati yoritib beriladi. Ushbu maqola adabiyotshunoslikka qiziquvchilar, talabalar hamda she’riyatni chuqur o‘rganishni istagan keng kitobxonlar auditoriyasiga mo‘ljallangan.

Kalit so‘zlar: janrlar, mumtoz she’riyat, zamonaviy she’riyat, g‘azal, ruboiy, masnaviy, qasida, lirik she’riyat, erkin she’r, vizual she’riyat, o‘zbek adabiyoti, xalqaro she’riyat, adabiyotshunoslik

Abstract: This article studies the genres of poetic art and their specific features. Poetry genres have developed on the basis of ancient traditions and literary trends, and each genre is distinguished by its own stylistic, thematic and artistic features. The article analyzes classical genres such as ghazal, rubai, qasida, masnavi, tuyuk, as well as lyrical, epic and dramatic genres characteristic of modern poetry. The formal and

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substantive aspects of each genre, their role in the development of poetry, and their national and international significance are highlighted. This article is intended for those interested in literary studies, students and a wide audience of readers who want to study poetry in depth.

Keywords: genres, classical poetry, modern poetry, ghazal, rubai, masnavi, qasida, lyric poetry, free verse, visual poetry, Uzbek literature, international poetry, literary studies

Аннотация: В статье рассматриваются жанры поэтического искусства и их специфические особенности. Жанры поэзии развивались на основе древних традиций и литературных направлений, и каждый жанр отличается своими стилистическими, тематическими и художественными особенностями. В статье анализируются классические жанры, такие как газель, рубаи, касыда, маснави, туюк, а также лирические, эпические и драматические жанры, характерные для современной поэзии. Освещены формальные и содержательные стороны каждого жанра, их роль в развитии поэзии, их национальное и международное значение. Статья рассчитана на интересующихся литературоведением, студентов и широкую аудиторию читателей, желающих углубленно изучать поэзию.

Ключевые слова: жанры, классическая поэзия, современная поэзия, газель, рубаи, маснави, касыда, лирическая поэзия, свободный стих, визуальная поэзия, узбекская литература, международная поэзия, литературоведение

KIRISH

Bugungi kunda she’riyat inson ma’naviy hayotining ajralmas qismi sifatida o‘z ahamiyatini yo‘qotmagan. Adabiy janrlar orasida she’riyat turli shakllari va uslublari bilan o‘quvchi qalbini zabt etib, jamiyatning madaniy hayotiga muhim hissa qo‘shib kelmoqda. She’riyat janrlari – bu faqatgina so‘z san’ati emas, balki xalqlarning tarixi, qadriyatlari va dunyoqarashini aks ettiruvchi badiiy yodgorliklardir.

Hozirgi davrda mumtoz g‘azal, ruboiy, masnaviy kabi an’anaviy janrlar zamonaviy she’riyatda o‘z aksini topib, yangi talqinlarda rivojlanmoqda. Shu bilan birga, lirik, epik va dramatik janrlar zamonaviy ijodkorlar tomonidan yangicha mazmun va shaklda

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boyitilmoqda. Mazkur maqolada she'riyatning turli janrlari, ularning o'ziga xos xususiyatlari, badiiy estetik imkoniyatlari va zamonaviy she'riyatdagi o'rni haqida so'z yuritiladi. Janrlarning tarixiy ildizlari va bugungi yangilanishlari o'rtasidagi uzviy bog'liqlik tahlil qilinadi,

She'riyat janrlarini o'rganish nafaqat adabiyotshunoslik sohasida, balki jamiyatning ma'naviy-ma'rifiy rivojlanishida ham muhim ahamiyatga ega. Chunki har bir janr o'zining badiiy va mazmuniy jihatlari orqali inson qalbini tarbiyalaydi, uning estetik didini shakllantiradi va hayotga bo'lgan qarashlarini chuqurlashtiradi.

Bugungi globallashuv jarayonida milliy adabiyotlar o'z janrlarining o'ziga xosligini saqlab qolish bilan birga, boshqa xalqlar adabiyoti bilan o'zaro ta'sirda rivojlanmoqda. Shu nuqtai nazardan, maqola doirasida she'riyat janrlarining milliy va xalqaro o'zaro ta'sir jarayonlari, ularning estetik o'zgarishlari va janrlararo o'zaro boyitish imkoniyatlari ko'rib chiqiladi

Shuningdek, maqolada she'riyat janrlarining zamonaviy tahliliy usullari va ularni o'rganishda internet texnologiyalari, adabiy bazalar va raqamli vositalarning tutgan o'rni ham e'tiborga olinadi. Shu orqali she'riy san'atni o'rganishning yangi usullari va istiqbollari yoritiladi. Maqola, umuman olganda, she'riyatning nazariy va amaliy jihatlarini o'rganuvchi adabiyotshunoslar, ijodkorlar va o'quvchilar uchun muhim ilmiy manba bo'lib xizmat qiladi.

ASOSIY QISM

Bugungi madaniyatimiz rivojlangan vaqtda she'riyat inson qalbi va ongini boyitishda muhim o'rin egallaydi. She'riy san'atning turli janrlari har bir davr va makonda o'ziga xos shaklda rivojlanib, bugungi kunda milliy va jahon madaniyati xazinasiga katta hissa qo'shib kelmoqda. Har bir janr o'zining badiiy imkoniyatlari va estetik xususiyatlari bilan adabiyotga yangilik olib kirgan.

Mumtoz she'riyat janrlari orasida g'azal eng ko'zga ko'ringanlardan biridir. G'azal, asosan, sevgi, sadoqat va ayriliq mavzularini ifodalovchi janr bo'lib, undagi har bir misra ko'ngilga yaqin she'riy tuyg'ular bilan yo'g'rilgan. Shu bilan birga, ruboiy qisqa hajmli bo'lsa-da, inson hayoti, tabiat va falsafiy fikrlarni yuksak badiiy

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mahorat bilan ifodalaydi. Masnaviy esa epik janr sifatida keng hajmli voqealarni bayon qilishga imkon beradi va asosan, qahramonlik, tarixiy voqealar yoki ma’rifiy mazmun bilan boyitilgan.

Zamonaviy she’riyatda esa an’anaviy janrlar yangicha talqinlar va shakllarda davom etmoqda. Lirik janrlar insonning ichki kechinmalarini, sevgi va tabiat tuyg‘ularini ifodalaydi, epik janrlar esa keng qamrovli voqealar va ijtimoiy hayotni yoritadi. Dramatik she’riyat esa dialog shakli orqali voqelikni jonlantirishda davom etmoqda.

Bugungi globallashuv jarayonida turli madaniyat va xalqlar o‘rtasidagi adabiy muloqot yanada kuchaymoqda. She’riyat janrlari bu jarayonda alohida ahamiyatga ega bo‘lib, xalqaro festival va nashrlarda turli xalqlar adabiyoti o‘z o‘rnini topmoqda. Shu bilan birga, internet texnologiyalari orqali she’riyatning o‘qilishi va targ‘iboti ham osonlashdi. Onlayn platformalar zamonaviy ijodkorlarga o‘z asarlarini keng auditoriyaga yetkazish imkonini yaratmoqda, bu esa she’riyatni yangi o‘quvchilar va janrlarga olib kelmoqda.

Shuningdek, milliy she’riyatimizdagi janrlar o‘zining alohida mavqeini saqlab kelmoqda. Xususan, o‘zbek mumtoz adabiyotining g‘azal va ruboiylari, hozirgi zamon she’riyatida esa lirik va zamonaviy shakllar bugungi kun muammolarini yoritishda faol foydalanilmoqda. Janrlarning bunday boyligi ularni har tomonlama tahlil qilish va kelajak avlodga yetkazish zarurligini anglatadi.

She’riyat janrlari haqida batafsil ma’lumotlarni ham umumlashgan holda ko‘rib chiqamiz:

1. Mumtoz she’riyat janrlari va ularning o‘ziga xosligi

Mumtoz adabiyotda she’riyatning rivojlanishi davomida bir necha asosiy janrlar shakllangan. Ularning har biri o‘zining maxsus shakli, mavzusi va poetik imkoniyatlari bilan ajralib turadi:

• G‘azal: Mumtoz she’riyatning eng mashhur janrlaridan biri. G‘azal odatda ma’lum bir qafiya tizimiga ega bo‘lib, asosan sevgi, sadoqat, ayriliq va falsafiy

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mavzularni qamrab oladi. Alisher Navoiy, Hofiz, Sa'diy singari ijodkorlar g'azal janrini yuqori cho'qqilarga ko'targan.

• Ruboiy: To'rt misradan iborat qisqa janr bo'lib, o'zining falsafiy mazmuni, qisqalik va aniqlik bilan ajralib turadi. Umar Xayyom ruboiylari bu janrning eng yaxshi namunalaridan biridir.

• Masnaviy: Epik janr bo'lib, keng hajmdagi voqealar va tarixiy mavzularni bayon etadi. Masnaviylar odatda o'quvchiga ma'rifiy va axloqiy saboq beradi. "Xusrav va Shirin", "Layli va Majnun" kabi masnaviylar bu janrning yorqin namunalaridir.

• Qasida: Shoirning biror kishiga, odatda hukmdorga yoki maqtovga loyiq bir shaxsga bag'ishlangan asaridir. Bu janr maqtov va tanqid uchun keng qo'llanilgan.

2. Zamonaviy she'riyat janrlari va tendensiyalari

Zamonaviy davrda she'riyat janrlari an'anaviy shakllardan chiqib, yangicha uslublar va formatlarga ega bo'ldi. Quyidagilar zamonaviy she'riyat janrlarining xususiyatlaridir:

• Lirik she'riyat: Hozirgi kunda individual kechinmalarni ifodalashning eng keng tarqalgan shakli. Bu janrda insonning ichki dunyosi, sevgisi, qayg'usi, xotiralari aks ettiriladi.]

• Erkin she'r (vers libre): An'anaviy qoidalar va qofiyalardan voz kechgan shakl. Erkin she'rda tuyg'ularni ifodalash erkinligi va so'z boyligi asosiy ahamiyatga ega.

• Vizual she'riyat: So'zlar va shakllar orqali badiiy effekt hosil qiluvchi janr. Bunda she'rning mazmuni bilan birga uning ko'rinishi ham muhim hisoblanadi.

3. Milliy she'riyat janrlarining bugungi o'rni

O'zbek she'riyatida mumtoz janrlarning o'rni juda katta. G'azal, ruboiy kabi janrlar milliy adabiyotimizning qadriyatlari hisoblanadi. Zamonaviy shoirlar bu janrlarni saqlab qolish bilan birga, ularni bugungi zamon mavzulari bilan uyg'unlashtirishga intilmoqda. Masalan, zamonaviy g'azallarda global muammolar, ekologiya va ijtimoiy hayot mavzulari ko'tarilmoqda.

4. She'riyatning xalqaro o'zaro ta'siri

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Globalizatsiya jarayonida turli xalqlar she'riyati bir-birini boyitmoqda. Misol uchun:

• Sharq she'riyatining falsafiy mazmuni G'arb she'riyatiga ta'sir ko'rsatmoqda.

• G'arbda rivojlangan modernizm va postmodernizm oqimlari esa Sharq shoirlarining yangi shakl va mazmun izlashlariga turtki bo'lmoqda. Shu bois, xalqaro miqyosdagi she'riyat muloqoti nafaqat janrlarning rivojlanishiga, balki ular o'rtasidagi chegaralarni o'zaro boyitishga xizmat qilmoqda. Masalan, o'zbek mumtoz she'riyati Jahon Poeziya Festivallarida tan olinib, xalqaro maydonda o'zining boy madaniy va badiiy merosini namoyish etmoqda.

5. She'riyat janrlarini o'rganishda zamonaviy yondashuvlar

Bugungi kunda she'riyatni o'rganish va targ'ib qilishda texnologiyalarning o'rni beqiyosdir. Internet va raqamli platformalar yordamida shoirlar o'z ijodlarini keng auditoriyaga yetkazish imkoniyatiga ega bo'ldi. She'riy tanlovlar, virtual seminarlar va onlayn adabiy festivallar orqali yangi iste'dodlarni kashf etish va qadimiy janrlarni tiklashga yo'l ochildi.

• Adabiy bazalar: Bugungi kunda raqamli kutubxonalar va she'riyatga bag'ishlangan platformalar yordamida turli janrlarning tarixi, rivojlanishi va tahlilini chuqurroq o'rganish imkoniyati mavjud. Masalan, mumtoz g'azallar matnlarini va ularning turli til va she'riy an'analar doirasidagi tarjimalarini o'rganish uchun internet bazalaridan foydalanilmoqda.

• Tahlil usullari: Zamonaviy adabiyotshunoslikda stilometrik tahlil va matn tahlili kabi raqamli usullar orqali she'riyatni o'rganish jarayonlari takomillashmoqda. Bu esa janrlararo bog'liqlikni aniqlash va janrlarning rivojlanish dinamikasini kuzatish imkonini beradi.

6. She'riy janrlarning ijtimoiy hayotdagi o'rni

She'riyat jamiyatning ma'naviy hayotiga bevosita ta'sir ko'rsatadi. Har bir janr insonning o'z-o'zini anglashida, madaniy qadriyatlarni targ'ib qilishda va ijtimoiy muammolarga yechim qidirishda muhim vosita bo'lib xizmat qiladi. Masalan:

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• Ijtimoiy mavzular: Bugungi shoirlar she’riyat orqali global iqlim o‘zgarishi, gender tengligi, tinchlik va inson huquqlari kabi mavzularni ko‘tarishmoqda.

• Ma’rifiy ahamiyat: She’riyat ta’lim jarayonida yoshlarning badiiy didini shakllantirish, ularni milliy va global qadriyatlarga hurmat ruhida tarbiyalashda foydalanilmoqda.

7. She’riyatning istiqbollari

Kelajakda she’riyatda yangi janrlarning paydo bo‘lishi yoki mavjud janrlarning yangicha talqinlari kutilmoqda. Raqamli texnologiyalar va sun’iy intellekt yordamida she’riyatning yangi shakllari yuzaga kelishi mumkin. Masalan, sun’iy intellekt yordamida yaratilgan avtomatik she’rlar, virtual adabiy loyihalar va interaktiv she’riyat janrlarning yangi bosqichini boshlab berishi mumkin. Shu bilan birga, an’anaviy janrlarni asrab-avaylash va ularni avlodlarga yetkazish masalasi dolzarb bo‘lib qoladi.

She’riyat janrlari inson tafakkuri va his-tuyg‘ularining boyligini aks ettiruvchi san’at vositasidir. Mumtoz va zamonaviy janrlar orasidagi uzviy bog‘liqlik, ularning bugungi kun ijtimoiy-madaniy hayotidagi o‘rni hamda kelajakdagi rivojlanish istiqbollari she’riyatning abadiy qadriyat ekanligini tasdiqlaydi. Janrlarni chuqur o‘rganish, targ‘ib qilish va rivojlantirish orqali milliy va jahon adabiyotiga bebaho hissa qo‘shiladi.

XULOSA

She’riyat janrlari inson ma’naviy hayotining ajralmas qismi bo‘lib, ularning rivojlanishi milliy va jahon madaniy merosini boyitib kelmoqda. Mumtoz va zamonaviy janrlar bir-birini boyitib, bugungi kun ijtimoiy va estetik masalalarini yoritishda muhim ahamiyat kasb etadi.

Janrlarni asrab-avaylash va ularni zamon talablari bilan uyg‘unlashtirish milliy adabiyotimizni rivojlantirishning asosiy yo‘nalishlaridan biridir. She’riyatni targ‘ib qilish orqali yosh avlodni ma’naviy tarbiyalash va xalqaro maydonda milliy adabiyotimiz mavqeini mustahkamlash imkoniyati mavjud.

Foydalanilgan adabiyotlar

1. Naim Karimov. “O‘zbek adabiyoti tarixi.” – Toshkent: O‘qituvchi, 2006.

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2. Matyoqub Qo‘shjonov “O‘zbek mumtoz adabiyoti.”– Toshkent: Fan, 2010.

3. Dilmurod Quronov “ Adabiyotshunoslikka kirish.” – Toshkent: Akademnashr, 2012.

4. Izzat Sulton . Adabiyot nazariyasi. – Toshkent: O‘qituvchi, 2005.

5. Alisher Navoiy “ Mezon ul-avzon.” – Toshkent: G‘afur G‘ulom nomidagi nashriyot, 2011.

6. Abdug‘afur Rasulov “Badiiylik mezonlari.” – Toshkent: Fan, 2012.

7. Dilmurod Quronov “Adabiyot nazariyasi asoslari.” – Toshkent: Tafakkur, 2018.

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O‘ZBEKISTONDA SANOAT KORXONALARINING RIVOJLANISH TENDENSIYALARI

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Annotatsiya

Mazkur maqolada O‘zbekistonda sanoat korxonalarining rivojlanish tendensiyalari, sanoat tarmoqlarida amalga oshirilayotgan modernizatsiya jarayonlari hamda innovatsion texnologiyalarning iqtisodiy samaradorlikka ta’siri tahlil qilingan. Tadqiqot davomida sanoat ishlab chiqarishining o‘sish sur’atlari, raqamlashtirish jarayonlari, investitsion faollik va eksport salohiyatining rivojlanish yo‘nalishlari o‘rganildi. Natijalar sanoat korxonalarida texnologik yangilanish va raqamli transformatsiya ishlab chiqarish samaradorligini oshirishda muhim omil ekanligini ko‘rsatdi.

Kalit so‘zlar: sanoat korxonalari, sanoat rivojlanishi, modernizatsiya, raqamlashtirish, innovatsiyalar, ishlab chiqarish samaradorligi, eksport salohiyati.

DEVELOPMENT TRENDS OF INDUSTRIAL ENTERPRISES IN UZBEKISTAN

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Abstract

This article analyzes the development trends of industrial enterprises in Uzbekistan, modernization processes in industrial sectors, and the impact of innovative technologies on economic efficiency. The study examines industrial production growth rates, digitalization processes, investment activity, and export potential development. The findings show that technological modernization and digital transformation are important factors in improving production efficiency in industrial enterprises.

Keywords: industrial enterprises, industrial development, modernization, digitalization, innovations, production efficiency, export potential.

Kirish

Bugungi kunda jahon iqtisodiyotida sanoat korxonalarining barqaror rivojlanishi mamlakat iqtisodiy taraqqiyotining asosiy omillaridan biri hisoblanadi. Sanoat tarmoqlarining rivojlanishi ishlab chiqarish hajmining oshishi, eksport salohiyatining kengayishi, yangi ish o‘rinlarining yaratilishi hamda iqtisodiyotning diversifikatsiyalashuviga xizmat qiladi. Ayniqsa, global raqobatning kuchayishi va raqamli iqtisodiyotning jadal rivojlanishi sharoitida sanoat korxonalarida zamonaviy texnologiyalarni joriy etish dolzarb ahamiyat kasb etmoqda. Shu sababli rivojlangan va rivojlanayotgan mamlakatlarda sanoatni modernizatsiya qilish, ishlab chiqarishni avtomatlashtirish hamda innovatsion texnologiyalar asosida boshqaruv tizimlarini takomillashtirishga katta e’tibor qaratilmoqda.

Sanoat iqtisodiyotning yetakchi tarmoqlaridan biri sifatida mamlakat yalpi ichki mahsulotining o‘sishida muhim rol o‘ynaydi. Shu bilan birga, sanoat korxonalarining samarali faoliyati transport, energetika, qurilish, xizmat ko‘rsatish va qishloq xo‘jaligi kabi boshqa tarmoqlarning rivojlanishiga ham ijobiy ta’sir ko‘rsatadi. Zamonaviy iqtisodiy sharoitda sanoat korxonalarining raqobatbardoshligi ko‘p jihatdan texnologik

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yangilanish, resurslardan oqilona foydalanish, innovatsion faoliyat va raqamlashtirish darajasiga bog‘liq bo‘lib qolmoqda.

So‘nggi yillarda O‘zbekistonda sanoatni rivojlantirish davlat iqtisodiy siyosatining ustuvor yo‘nalishlaridan biri sifatida belgilanmoqda. Mamlakatda ishlab chiqarishni modernizatsiya qilish, yangi sanoat zonalarini tashkil etish, xorijiy investitsiyalarni jalb qilish va mahalliylashtirish darajasini oshirish bo‘yicha keng ko‘lamli islohotlar amalga oshirilmoqda. Natijada avtomobilsozlik, to‘qimachilik, kimyo, elektrotexnika, oziq-ovqat va qurilish materiallari sanoati kabi tarmoqlarda ishlab chiqarish hajmlari ortib bormoqda. Shu bilan birga, eksportbop va yuqori qo‘shilgan qiymatga ega mahsulotlar ishlab chiqarishni kengaytirish orqali mamlakatning tashqi iqtisodiy salohiyati mustahkamlanmoqda.

O‘zbekistonda sanoat korxonalarini rivojlantirish jarayonida raqamlashtirish va innovatsion texnologiyalarni joriy etishga alohida e’tibor qaratilmoqda. Xususan, “Industry 4.0” konsepsiyasi asosida avtomatlashtirilgan boshqaruv tizimlari, sun’iy intellekt, robototexnika, buyumlar interneti (IoT) va katta ma’lumotlar texnologiyalaridan foydalanish ishlab chiqarish samaradorligini oshirishning muhim omili sifatida qaralmoqda. Bunday texnologiyalar ishlab chiqarish jarayonlarini optimallashtirish, resurs sarfini kamaytirish, mahsulot sifatini yaxshilash hamda korxonalarning ichki va tashqi bozordagi raqobatbardoshligini oshirish imkonini beradi.

Ishlab chiqarish samaradorligi va sanoat rivojlanishi masalalari ko‘plab xorijiy va mahalliy olimlar tomonidan tadqiq etilgan. Xususan, A. Isaksson sanoat rivojlanishida texnologik taraqqiyot va innovatsion faoliyatning muhim ahamiyatga ega ekanligini ta’kidlaydi [1]. I. Van Beveren umumiy omil unumdorligini baholashda texnologik modernizatsiya va raqamlashtirish ishlab chiqarish samaradorligiga sezilarli ta’sir ko‘rsatishini asoslab bergan [2]. P. Maskell va A. Malmberg esa sanoat korxonalarining raqobatbardoshligi innovatsion muhit va bilimlar almashinuvi bilan chambarchas bog‘liq ekanligini qayd etadi [3]. Mahalliy olimlar tomonidan olib borilgan tadqiqotlarda esa sanoat korxonalarida ishlab chiqarish samaradorligini

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oshirish, energiya tejamkor texnologiyalarni joriy etish, investitsion faollikni kuchaytirish va eksportni rivojlantirish masalalari keng yoritilgan.

Shunga qaramasdan, O‘zbekiston sanoat korxonalarining rivojlanish tendensiyalarini kompleks tahlil qilish, sanoatda innovatsion texnologiyalarni joriy etish samaradorligini baholash va mavjud muammolarni aniqlash masalalari yetarli darajada tadqiq etilmagan. Ayniqsa, ayrim sanoat tarmoqlarida eskirgan texnologiyalar ulushining yuqoriligi, ishlab chiqarish jarayonlarining avtomatlashtirish darajasi pastligi hamda innovatsion loyihalarni moliyalashtirish bilan bog‘liq muammolar mavjudligi sanoat rivojlanishiga salbiy ta’sir ko‘rsatmoqda. Shu sababli sanoat korxonalarining rivojlanish tendensiyalarini chuqur o‘rganish, mavjud muammolarni aniqlash va ularni bartaraf etish bo‘yicha ilmiy-amaliy tavsiyalar ishlab chiqish muhim ahamiyatga ega.

Mazkur maqolaning maqsadi O‘zbekistonda sanoat korxonalarining rivojlanish tendensiyalarini tahlil qilish, sanoatning iqtisodiy o‘sishdagi o‘rnini baholash hamda sanoat tarmoqlarini yanada rivojlantirishning ustuvor yo‘nalishlarini aniqlashdan iborat.

Tadqiqot metodologiyasi

Mazkur tadqiqotda O‘zbekistonda sanoat korxonalarining rivojlanish tendensiyalarini tahlil qilish va ularning iqtisodiy samaradorligini baholashda zamonaviy iqtisodiy-tahliliy hamda statistik usullardan foydalanildi. Tadqiqotning nazariy asosini sanoat iqtisodiyoti, innovatsion rivojlanish, raqamlashtirish va ishlab chiqarish samaradorligiga oid xorijiy hamda mahalliy olimlarning ilmiy ishlari tashkil etdi. Shuningdek, sanoat korxonalarining rivojlanishi bilan bog‘liq ilmiy qarashlar, iqtisodiy konsepsiyalar va zamonaviy yondashuvlar o‘rganildi.

Tadqiqot jarayonida analiz va sintez, statistik guruhlash, qiyosiy tahlil, iqtisodiy taqqoslash hamda dinamik tahlil usullaridan foydalanildi. Ushbu metodlar yordamida O‘zbekistonda sanoat ishlab chiqarishining o‘sish sur’atlari, sanoat tarmoqlarining rivojlanish ko‘rsatkichlari, investitsion faollik hamda texnologik modernizatsiya jarayonlari tahlil qilindi. Shu bilan birga, sanoat korxonalarida raqamlashtirish va

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innovatsion texnologiyalarni joriy etishning ishlab chiqarish samaradorligiga ta’siri baholandi.

Qiyosiy tahlil usuli asosida sanoat tarmoqlari bo‘yicha ishlab chiqarish hajmlarining o‘zgarishi, sanoatning iqtisodiyotdagi ulushi hamda ayrim tarmoqlarning rivojlanish dinamikasi o‘rganildi. Statistik guruhlash usuli orqali sanoat korxonalarining faoliyat ko‘rsatkichlari tizimlashtirildi va umumlashtirildi. Dinamik tahlil yordamida esa sanoat ishlab chiqarishining yillar davomida o‘zgarish tendensiyalari aniqlanib, ularning iqtisodiy rivojlanishga ta’siri baholandi.

Tadqiqotning axborot bazasini O‘zbekiston Respublikasi Statistika agentligi ma’lumotlari, iqtisodiy hisobotlar, xalqaro tashkilotlarning tahliliy materiallari, ilmiy maqolalar hamda iqtisodiy adabiyotlar tashkil etdi. Shuningdek, sanoat korxonalarining rivojlanishiga oid me’yoriy-huquqiy hujjatlar va davlat dasturlaridan ham foydalanildi.

Tahlil va natijalar

O‘zbekistonda sanoat korxonalarining rivojlanishi iqtisodiyotning tarkibiy o‘zgarishlarida muhim o‘rin egallamoqda. So‘nggi yillarda mamlakatda sanoat ishlab chiqarishini kengaytirish, hududiy sanoat zonalarini tashkil etish hamda yuqori qo‘shilgan qiymatga ega mahsulotlar ishlab chiqarishni rivojlantirish bo‘yicha keng ko‘lamli islohotlar amalga oshirilmoqda. Natijada sanoatning mamlakat yalpi ichki mahsulotidagi ulushi ortib, ishlab chiqarish hajmlarida barqaror o‘sish kuzatilmoqda.

Tahlillar shuni ko‘rsatadiki, sanoat tarmoqlarida olib borilayotgan modernizatsiya jarayonlari korxonalar faoliyatining samaradorligini oshirishga xizmat qilmoqda. Ayniqsa, ishlab chiqarish uskunalarining yangilanishi, energiya tejamkor texnologiyalarning joriy etilishi hamda ishlab chiqarish jarayonlarini avtomatlashtirish mehnat unumdorligining oshishiga ijobiy ta’sir ko‘rsatmoqda. Shu bilan birga, raqamli boshqaruv tizimlaridan foydalanish ishlab chiqarish xarajatlarini kamaytirish va mahsulot sifatini yaxshilash imkonini bermoqda.

So‘nggi yillarda ishlab chiqarish sanoati tarmog‘ida yuqori o‘sish sur’atlari kuzatilmoqda. Ayniqsa, to‘qimachilik, elektrotexnika, qurilish materiallari va oziq-

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ovqat sanoatida yangi ishlab chiqarish quvvatlarining ishga tushirilishi sanoat hajmlarining oshishiga xizmat qilmoqda. Bunda davlat tomonidan berilayotgan soliq imtiyozlari, investitsion qo‘llab-quvvatlash mexanizmlari hamda erkin iqtisodiy zonalar faoliyatining kengayishi muhim omil bo‘lib xizmat qilmoqda.

1-jadval

O‘zbekistonda sanoat ishlab chiqarishining ayrim ko‘rsatkichlari (% da)

Ko‘rsatkichlar	2018	2020	2024
Sanoat mahsulotlari ishlab chiqarish o‘sishi	114,4	100,7	106,5
Ishlab chiqarish sanoati o‘sishi	114,1	107,9	107
Energetika tarmog‘i o‘sishi	104,1	106,8	105,7
Suv ta’minoti va utilizatsiya sohasi	104,5	99,1	112,1

Jadval ma’lumotlaridan ko‘rinib turibdiki, ishlab chiqarish sanoatida nisbatan yuqori o‘sish sur’atlari saqlanib qolgan. Ayniqsa, 2024-yilda ishlab chiqarish sanoatining 107 foizga o‘sishi mamlakatda sanoatni modernizatsiya qilish jarayonlari davom etayotganligini ko‘rsatadi. Energetika va kommunal xizmatlar sohasida ham barqaror rivojlanish kuzatilgan bo‘lib, bu sanoat infratuzilmasining mustahkamlanayotganidan dalolat beradi.

Tahlillar davomida sanoat korxonalarining rivojlanishiga ta’sir etuvchi asosiy omillar sifatida investitsion faollik, innovatsion texnologiyalarni joriy etish darajasi, eksport salohiyati va kadrlar salohiyati aniqlandi. Xususan, xorijiy investitsiyalar hisobiga tashkil etilgan yangi korxonalar zamonaviy texnologiyalar bilan jihozlanayotgani ishlab chiqarish samaradorligini oshirishga xizmat qilmoqda.

Sanoat tarmoqlarida raqamlashtirish jarayonlari ham bosqichma-bosqich rivojlanib bormoqda. Ayrim yirik korxonalarda elektron boshqaruv tizimlari, avtomatlashtirilgan monitoring va raqamli logistika tizimlari joriy qilinmoqda. Bu esa

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ishlab chiqarish jarayonlarini tezkor boshqarish, resurs sarfini nazorat qilish va mahsulot tannarxini pasaytirish imkonini bermoqda.

Shuningdek, eksportga yo‘naltirilgan sanoat mahsulotlari ishlab chiqarish hajmi ham ortib bormoqda. Ayniqsa, to‘qimachilik va elektrotexnika sanoatida xalqaro standartlarga mos mahsulotlar ishlab chiqarish yo‘lga qo‘yilganligi eksport geografiyasining kengayishiga xizmat qilmoqda. Natijada sanoat korxonalarining tashqi bozordagi raqobatbardoshligi ortib bormoqda.

Biroq ayrim muammolar ham mavjud bo‘lib, ular sanoat korxonalarining barqaror rivojlanishiga salbiy ta’sir ko‘rsatmoqda. Jumladan, ayrim korxonalarda asosiy fondlarning eskirganligi, ishlab chiqarish quvvatlaridan to‘liq foydalanilmayotgani, energiya sarfining yuqoriligi hamda innovatsion faoliyat uchun moliyaviy resurslarning cheklanganligi muhim muammolardan biri hisoblanadi. Bundan tashqari, malakali texnik mutaxassislar yetishmovchiligi ham ishlab chiqarish samaradorligini oshirishga to‘sqinlik qilmoqda.

Umuman olganda, olib borilgan tahlillar O‘zbekistonda sanoat korxonalarining rivojlanish tendensiyalari ijobiy yo‘nalishda davom etayotganligini ko‘rsatdi. Kelgusida sanoatda innovatsion texnologiyalarni keng joriy etish, raqamli transformatsiyani jadallashtirish, energiya samaradorligini oshirish hamda eksportbop mahsulotlar ishlab chiqarishni kengaytirish orqali sanoat tarmoqlarining raqobatbardoshligini yanada mustahkamlash mumkin.

Xulosa

Tadqiqot natijalari shuni ko‘rsatdiki, O‘zbekistonda sanoat korxonalarining rivojlanishi mamlakat iqtisodiy o‘sishining muhim omillaridan biri hisoblanadi. So‘nggi yillarda sanoat tarmoqlarida amalga oshirilayotgan modernizatsiya jarayonlari, ishlab chiqarish quvvatlarini kengaytirish hamda innovatsion texnologiyalarni joriy etish natijasida sanoat ishlab chiqarish hajmi va korxonalar samaradorligi oshib bormoqda. Ayniqsa, ishlab chiqarish sanoatida barqaror o‘sish sur’atlari kuzatilayotgani mamlakatda sanoat siyosatining samarali amalga oshirilayotganligini ko‘rsatadi.

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Tahlillar davomida sanoat korxonalarining rivojlanishiga texnologik yangilanish, investitsion faollik, raqamlashtirish va eksport salohiyatining ortishi ijobiy ta’sir ko‘rsatayotgani aniqlandi. Shu bilan birga, sanoat korxonalarida avtomatlashtirilgan boshqaruv tizimlari, energiya tejamkor texnologiyalar hamda zamonaviy ishlab chiqarish uskunalaridan foydalanish mehnat unumdorligini oshirish va ishlab chiqarish xarajatlarini kamaytirishga xizmat qilmoqda.

Biroq ayrim sanoat korxonalarida texnologik uskunalarning eskirganligi, innovatsion loyihalar uchun moliyaviy resurslarning yetarli emasligi, energiya sarfining yuqoriligi hamda malakali texnik mutaxassislar yetishmovchiligi kabi muammolar mavjudligi ham aniqlandi. Mazkur holatlar sanoat tarmoqlarida ishlab chiqarish samaradorligini to‘liq ta’minlashga salbiy ta’sir ko‘rsatmoqda.

Tadqiqot natijalari asosida sanoat korxonalarining rivojlanishini yanada jadallashtirish uchun quyidagi yo‘nalishlarga alohida e’tibor qaratish maqsadga muvofiq deb hisoblanadi:

- sanoat korxonalarida raqamli texnologiyalarni keng joriy etish;
- ishlab chiqarish jarayonlarini avtomatlashtirish darajasini oshirish;
- innovatsion va energiya tejamkor texnologiyalardan foydalanishni kengaytirish;
- sanoat korxonalariga investitsiyalar jalb qilishni rag‘batlantirish;
- eksportga yo‘naltirilgan va yuqori qo‘shilgan qiymatli mahsulotlar ishlab chiqarishni rivojlantirish;
- sanoat uchun malakali muhandis-texnik kadrlar tayyorlash tizimini takomillashtirish.

Umuman olganda, O‘zbekistonda sanoat korxonalarining barqaror rivojlanishi mamlakat iqtisodiy salohiyatini mustahkamlash, yangi ish o‘rinlari yaratish, eksport hajmini oshirish va xalqaro bozordagi raqobatbardoshlikni kuchaytirishda muhim omil bo‘lib xizmat qiladi. Kelgusida innovatsion texnologiyalar va zamonaviy boshqaruv tizimlarini keng qo‘llash orqali sanoat tarmoqlarining samaradorligini yanada oshirish imkoniyati mavjud.

Foydalanilgan adabiyotlar

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

1. Isaksson A. *Determinants of Total Factor Productivity: A Literature Review* // Research and Statistics Branch, UNIDO. – 2007. – Vol. 1. – №101.
2. Van Beveren I. *Total Factor Productivity Estimation: A Practical Review* // Journal of Economic Surveys. – 2012. – Vol. 26. – №1. – P. 98–128.
3. Maskell P., Malmberg A. *Localised Learning and Industrial Competitiveness* // Cambridge Journal of Economics. – 1999. – Vol. 23. – №2. – P. 167–185.
4. Sirikrai S. B., Tang J. C. S. *Industrial Competitiveness Analysis: Using the Analytic Hierarchy Process* // The Journal of High Technology Management Research. – 2006. – Vol. 17. – №1. – P. 71–83.
5. Zhang P., London K. *Towards an Internationalized Sustainable Industrial Competitiveness Model* // Competitiveness Review. – 2013. – Vol. 23. – №2. – P. 95–113.
6. Li P., et al. *Digitalization as a Factor of Production in China and the Impact on Total Factor Productivity (TFP)* // Systems. – 2024. – Vol. 12. – №5.
7. O‘zbekiston Respublikasi Statistika agentligi ma’lumotlari. – Toshkent, 2024.
8. O‘zbekiston Respublikasi Prezidentining sanoatni rivojlantirishga oid farmon va qarorlari. – Toshkent, 2020–2025.
9. Raximov A. N. *Sanoat korxonalarida ishlab chiqarish samaradorligini oshirish omillari* // Iqtisodiyot va innovatsion texnologiyalar ilmiy jurnali. – 2024. – №3.
10. Gafurova D. K., Najmiddinova M. *Sanoatda resurslardan samarali foydalanish va ishlab chiqarish samaradorligi* // Ilmiy tadqiqotlar va yangi innovatsiyalar. – 2025. – №2.
11. Tukhtaeva N. R. *Sanoat ishlab chiqarishining zamonaviy rivojlanish tendensiyalari* // Scientific Journal of Economics and Finance. – 2025. – Vol. 5. – №3.
12. Shaymanovich A. X. *Mintaqaviy sanoat rivojlanishida innovatsion texnologiyalarning o‘rni* // Modern Education and Development. – 2026. – Vol. 43. – №3.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

13. Karimov U. K. *Raqamli iqtisodiyot sharoitida sanoatni modernizatsiya qilish istiqbollari* // International Scientific Conference Proceedings. – 2025. – Vol. 2. – №4.
14. World Bank. *Uzbekistan Country Economic Update*. – Washington DC, 2024.
15. UNIDO. *Industrial Development Report 2024*. – Vienna, 2024

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026
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YURAK-QON TOMIR KASALLIKLARI O'TKAZGAN BEMORLARDA KARDIOLOGIK REABILITATSIYADA DAVOLOVCHI JISMONIY MASHQLARNING AHAMIYATI: ADABIYOTLAR SHARHI

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ANNOTATSIYA

Ushbu adabiyotlar sharhi yurak-qon tomir kasalliklari (YuQTK) o'tkazgan bemorlarda kardiologik reabilitatsiya (KR) dasturlari tarkibida davolovchi jismoniy mashqlar (DJM) — xalqaro amaliyotda "лечебная физическая культура" (LFK) deb ataladigan komponent — ning patofizioligik asoslari, qo'llash protokollari va klinik samaradorligini tahlil qilishga qaratilgan. 2013–2024 yillar oralig'ida PubMed, Cochrane Library va Google Scholar bazalarida nashr etilgan 20 ta ilmiy manba (tasodifiy nazorat ostidagi klinik tadqiqotlar, meta-tahlillar, tizimli sharhlar va klinik ko'rsatmalar) o'rganildi. Tahlil natijalari tizimli DJM dasturlari miokard infarkti, stabil stenokardiya va surunkali yurak yetishmovchiligi bo'lgan bemorlarda umumiy o'limni

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13–26% ga kamaytirishi, jismoniy bardoshlilikni oshirishi va hayot sifatini yaxshilashini tasdiqlaydi. I, II va III bosqich reabilitatsiya protokollarida aerobo, kuch va nafas mashqlarining kombinatsiyasi eng yuqori klinik natijalarni ta'minlamoqda. Raqamli texnologiyalar va masofaviy nazorat vositalarini LFK dasturlariga integratsiya qilish an'anaviy markazlashgan reabilitatsiyaga muqobil samarali yechim bo'lib bormoqda.

Kalit so'zlar: kardiologik reabilitatsiya, davolovchi jismoniy mashqlar, LFK, miokard infarkti, yurak yetishmovchiligi, aerobo mashqlar, reabilitatsiya bosqichlari, tele-reabilitatsiya.

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Abstract

This literature review focuses on the pathophysiological foundations, application protocols, and clinical effectiveness of therapeutic physical training (TPT) — internationally referred to as "therapeutic physical culture" (LFK) — as a component of cardiac rehabilitation (CR) in patients with cardiovascular diseases (CVD). A total of 42 scientific sources (randomized controlled trials, meta-analyses, systematic reviews, and clinical guidelines) published between 2013 and 2024 in PubMed, Cochrane Library,

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and Google Scholar were analyzed. The findings confirm that structured TPT programs reduce all-cause mortality by 13–26% in patients with myocardial infarction, stable angina, and chronic heart failure, while improving physical endurance and quality of life. The combination of aerobic, strength, and breathing exercises within stage I, II, and III rehabilitation protocols provides the highest clinical outcomes. The integration of digital technologies and remote monitoring tools into LFK programs is emerging as an effective alternative to traditional center-based rehabilitation.

Keywords: cardiac rehabilitation, therapeutic physical training, LFK, myocardial infarction, heart failure, aerobic exercise, rehabilitation stages, tele-rehabilitation.

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Аннотация Данный обзор литературы посвящён анализу патофизиологических основ, протоколов применения и клинической эффективности лечебной физической культуры (ЛФК) — компонента кардиологической реабилитации (КР) у пациентов с сердечно-сосудистыми заболеваниями (ССЗ). Были изучены 42 научных источника (рандомизированные контролируемые исследования, мета-анализы, систематические обзоры и клинические рекомендации), опубликованные в базах PubMed, Cochrane Library и Google Scholar в период

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2013–2024 гг. Результаты анализа подтверждают, что систематические программы ЛФК снижают общую смертность на 13–26% у пациентов с инфарктом миокарда, стабильной стенокардией и хронической сердечной недостаточностью, повышают физическую выносливость и улучшают качество жизни. Наибольший клинический эффект достигается при сочетании аэробных, силовых и дыхательных упражнений в протоколах I, II и III этапов реабилитации. Интеграция цифровых технологий и средств дистанционного контроля в программы ЛФК становится эффективной альтернативой традиционной центр-ориентированной реабилитации.

Ключевые слова: кардиологическая реабилитация, лечебная физическая культура, ЛФК, инфаркт миокарда, сердечная недостаточность, аэробные упражнения, этапы реабилитации, телереабилитация.

KIRISH

Yurak-qon tomir kasalliklari (YuQTK) hozirgi kunda global miqyosda o'lim va nogiron bo'lib qolishning yetakchi sababi sifatida belgilangan. Jahon sog'liqni saqlash tashkiloti (JSST) ma'lumotlariga ko'ra, har yili 17,9 million kishi ushbu kasallik oqibatida hayotdan ko'z yumadi va bu ko'rsatkich barcha o'limlarning taxminan 32 foizini tashkil etadi [1]. Miokard infarkti (MI), stabil stenokardiya hamda surunkali yurak yetishmovchiligi (SYuY) nafaqat bemorlar hayotini qisqartiradi, balki butun jamiyat uchun og'ir ijtimoiy-iqtisodiy yuk bo'lib xizmat qiladi.

Kardiologik reabilitatsiya (KR) — yurak-qon tomir tizimiga doir kasallik yoki jarrohlik aralashuvi o'tkazilgandan keyin bemorni to'laqonli hayotga qaytarishga yo'naltirilgan kompleks tibbiy, psixologik va ijtimoiy tadbirlar majmuasidir. KRning asosiy maqsadi faqat jismoniy funksiyani tiklash bilan cheklanmay, kasallikning takrorlanish xavfini pasaytirish, psixologik holat va hayot sifatini yaxshilashdan iborat [2]. Amerikaliklar yurak kasalliklari bo'yicha kolleji (ACC) va Amerikanlar yurak uyushmasi (AHA) tomonidan tasdiqlangan ko'rsatmalarda KR miokard infarkti va

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barqaror yurak kasalligi bo'lgan bemorlar uchun birinchi darajali tavsiya (Class I, Level A) sifatida e'tirof etilgan [3].

Davolovchi jismoniy mashqlar (DJM) yoki "лечебная физическая культура" (LFK) — KRning eng klinik jihatdan o'rganilgan va samaradorligi eng ko'p isbotlangan tarkibiy qismidir. LFK aerobo mashqlar (piyoda yurish, veloergometr, suvda suzish), kuch mashqlari va nafas gimnastikasini o'z ichiga oladi. To'g'ri dozalangan va individual rejimlarda amalga oshirilgan LFK yurak mushagi funksiyasini tiklashda, arterial bosimni normalizatsiya qilishda, moddalar almashinuvini yaxshilashda va qon lipid profilini tartibga solishda ijobiy natijalar beradi [4].

Shunday bo'lsa-da, O'zbekiston amaliyotida KR dasturlarini tizimli qo'llash hali ham yetarlicha rivojlanmagan. Aksariyat hollarda reabilitatsion tadbirlar standartlashtirilgan protokollarga emas, balki individual shifokor tajribasiga asoslanadi. Ushbu holat KR samaradorligini pasaytiradi va bemorlar o'rtasida teng davolash imkoniyatini cheklab qo'yadi. Shu sabab, xalqaro tajribani umumlashtiruvchi va mahalliy amaliyotga yo'nalish beruvchi adabiyotlar sharhini tayyorlash ilmiy va amaliy jihatdan muhim ahamiyat kasb etadi.

Tadqiqotning maqsadi: MI va boshqa YuQTK o'tkazgan bemorlarda KR dasturlari doirasida LFK ning patofizioligik asoslarini, bosqichma-bosqich qo'llash protokollarini, turli nozologiyalardagi samaradorligini va individuallashtirilgan yondashuvning rolini adabiyotlar tahlili orqali aniqlash.

MATERIALLAR VA USULLAR

Ushbu adabiyotlar sharhini tayyorlash uchun 2013–2024 yillar mobaynida nashr qilingan ingliz, rus va o'zbek tillaridagi ilmiy maqolalar, meta-tahlillar, tizimli sharhlar hamda klinik ko'rsatmalar ko'rib chiqildi. Adabiyotlarni qidirish quyidagi elektron ma'lumotlar bazalarida amalga oshirildi: PubMed/MEDLINE, Cochrane Library, Scopus, Google Scholar va eLibrary.ru.

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Qidiruvda qo'llangan asosiy kalit so'zlar va iboralar: "cardiac rehabilitation", "exercise-based cardiac rehabilitation", "physical therapy in cardiology", "aerobic exercise after myocardial infarction", "exercise training heart failure", "LFK в кардиологии", "кардиологическая реабилитация" va ularning turli kombinatsiyalari. Dastlab 68 ta maqola va 5 ta klinik ko'rsatma tanlovga olindi. Quyidagi mezonlarga javob beruvchi manbalar sharhga kiritildi: (1) tasodifiy nazorat ostidagi klinik tadqiqotlar (RCT), (2) meta-tahlillar va tizimli sharhlar, (3) AHA/ACC va ESC tomonidan tasdiqlangan rasmiy klinik ko'rsatmalar. Metodologik sifati past, takroriy va mavzudan chetga chiqadigan maqolalar o'rganilmadi. Yakuniy tahlilga 42 ta manba kiritildi.

Manbalar bir qancha yo'nalishlar bo'yicha tahlil qilindi: LFKning patofizioligik asoslari va ta'sir mexanizmlari; reabilitatsiya bosqichlari va ularga mos DJM protokollari; LFKning turli YuQTK da qo'llanilishi; individuallashtirilgan yondashuv va muvofiqlik muammolari; raqamli texnologiyalar asosidagi masofaviy LFK dasturlari.

ADABIYOTLAR SHARHI

1. LFK ning patofizioligik asoslari va ta'sir mexanizmlari

Muntazam jismoniy mashqlar yurak-qon tomir tizimiga ko'p qirrali, tizimli va molekulyar darajadagi ijobiy ta'sir ko'rsatadi. Birinchi va eng muhim ko'rsatkich — maksimal kislorod iste'moli (VO2max) — yurak-o'pka zaxirasi ko'rsatkichi sifatida xizmat qiladi. Hamm va boshqalari tomonidan 2020 yilda o'tkazilgan meta-tahlil ma'lumotlariga ko'ra, 12 haftalik tizimli aerobo mashqlar dasturi VO2max ni o'rtacha 11–15% ga oshirishi mumkin va bu ko'rsatkich bevosita yurak o'limi xavfini kamaytirish bilan bog'liq [5].

Ikkinchi muhim mexanizm — endotelial funksiyaning yaxshilanishi. Jismoniy mashqlar qon oqimiga mexanik ta'sir orqali azot oksidi (NO) sintezini kuchaytiradi, bu

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esa tomir tonusini pasaytiradi, aterosklerotik yallig'lanish jarayonlarini sekinlashtiradi va endotelning antitrombotik xususiyatini tiklaydi [6]. Uchinchi mexanizm — avtonom nerv tizimi muvozanatining tiklanishidir. LFK vagal tonusni oshirib, simpatoadrenal faollikni pasaytiradi, natijada yurak ritmining variabelligini (HRV) yaxshilaydi va to'satdan yurak o'limi xavfini kamaytiradi [7].

Metabolik jihatdan, LFK qon lipid profilini muvofiqlashtiradi: yuqori zichlikdagi lipoproteidlar (HDL) darajasini oshirib, trigliseridlar va past zichlikdagi lipoproteidlar (LDL) miqdorini kamaytiradi [8]. Shuningdek, insulin sezuvchanligi yaxshilanadi va qandli diabetni boshqarish osonlashadi. Miokard infarkti o'tkazilgandan keyingi reabilitatsiya davrida LFK salbiy yurak rimodellanishini (adverse cardiac remodeling) cheklaydi. Tizimli mashqlar chap qorincha ejeksion fraktsiyasini (LVEF) saqlashga, miokardning kompensator gipertrofiyasini kamaytirish orqali progressiv yurak yetishmovchiligining oldini olishga yordam beradi [9].

2. Kardiologik reabilitatsiyada LFK bosqichlari va protokollari

Xalqaro amaliyotda KR uch bosqichga ajratiladi va har bir bosqich o'ziga xos LFK protokolini talab etadi.

I bosqich — statsionar reabilitatsiya. Ushbu bosqich MI yoki yurak jarrohligidan keyingi dastlabki 7–14 kunni qamrab oladi. Dastlabki 24–48 soatda faqat passiv mashqlar va diafragmal nafas gimnastikasi qo'llaniladi: barmoqlar va oyoq panjalarini harakatlantirish, toshin muskullarini izolyatsiya qilingan holda qisqartirish, nafas chuqurligini oshirish mashqlari. 3–5-kundan boshlab o'tirishga o'tish, so'ngra palata bo'ylab qisqa masofaga yurish bosqichlari izchil qo'shiladi. Barcha mashqlar EKG monitoringi, puls va arterial bosim nazorati ostida amalga oshiriladi; puls zaxirasining 40–50% ni tashkil etuvchi zo'riqish me'yoriy hisoblanadi [10].

II bosqich — ambulator reabilitatsiya. Kasalxonadan chiqqach 1–6 oy davom etadigan eng muhim bosqich hisoblanadi. Haftalik 3–5 seansda aerobo mashqlar

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(piyoda yurish, veloergometr, suv aerobikasi), kuch mashqlari va stretchingdan iborat kompleks dastur tatbiq etiladi. Mashq intensivligi Borg shkalasi (12–13 ball) yoki yurak puls zaxirasining 50–70% ko'rsatkichi asosida belgilanadi va vaqt o'tishi bilan progressiv ravishda oshiriladi [11]. Tasodifiy nazorat ostida o'tkazilgan yirik klinik tadqiqotlar (EUROASPIRE IV, GOSPEL) II bosqich KR dasturlari qayta yotqizilish xavfini 36% ga, umumiy o'lim ko'rsatkichini 26% ga pasaytirishini isbotlagan [12].

III bosqich — uydagi mustaqil reabilitatsiya. Shifokor tomonidan individual reja asosida bemor o'zi tomonidan uyda amalga oshiriladi. AHA/ACC va ESC ko'rsatmalarida haftada kamida 150 daqiqa o'rtacha intensivlikdagi aerobo faollik tavsiya etiladi [3, 13]. Ushbu bosqich uzoq muddatli reabilitatsiya maqsadlariga erishishda hal qiluvchi ahamiyatga ega, chunki kasallikning asosiy xavf omillarini — jismoniy nofaollik, ortiqcha vazn, stressni — boshqarishda faol turmush tarzi asosiy vosita hisoblanadi.

3. LFKning turli yurak-qon tomir kasalliklarida samaradorligi

Miokard infarkti o'tkazgan bemorlar uchun mashqqa asoslangan KR dasturlarining samaradorligi eng ko'p isbot bazasiga ega yo'nalish hisoblanadi. Anderson va boshqalari tomonidan 2022 yilda chop etilgan Cochrane meta-tahlili 63 ta RCTni qamrab olib, mashq dasturlarining umumiy o'limni 13%, yurak-qon tomir o'limini esa 26% ga kamaytirishi, shuningdek qayta yotqizilish xavfi va hayot sifatini sezilarli darajada yaxshilanishi ko'rsatilgan [15].

Stabil stenokardiya bo'lgan bemorlarda LFK yurak ishemiyasini kamaytiruvchi bir necha mexanizm orqali ta'sir qiladi: anaerob chegara ko'rsatkichini oshiradi, bir xil jismoniy ish bajarishda yurak ish yukini kamaytiradi, kollateral qon aylanishini yaxshilaydi. Natijada stenokardiya xurujlari chastotasi pasayadi va nitroglitserin sarfi kamayadi. Keng ko'lamli COURAGE tadqiqotida aerobo mashqlar bilan optimal medikamentoz terapiyani birlashtirib qo'llash, faqat medikamentoz terapiyaga nisbatan 30% ga yuqori klinik natijalar berishi tasdiqlangan [16].

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Surunkali yurak yetishmovchiligi (SYuY) bo'lgan bemorlar uchun LFK qo'llash nisbatan yangi, lekin jadal rivojlanayotgan sohadir. Ilgari SYuY KRga nisbiy kontrendikatsiya deb hisoblangan bo'lsa, HF-ACTION va ExTraMATCH II kabi yirik tadqiqotlar bu fikrni rad etdi: ejeksion fraktsiyasi saqlangan va kamaygan SYuY da ham mashq dasturlari xavfsiz, yaxshi tolinuvchan va klinik jihatdan samarali ekanligi ko'rsatildi [17]. Ushbu bemorlar uchun ayniqsa yuqori intensivlikdagi interval mashqlar (HIIT — High Intensity Interval Training) yurak funksiyasini tiklashda va hayot sifatini oshirishda an'anaviy o'rta intensivlikdagi doimiy mashqlarga nisbatan afzallik ko'rsatmoqda.

4. LFK dasturlarini individuallashtirishning zarurati va psixologik omillar

Zamonaviy kardioreabilitatsiyada yagona standart yondashuvdan voz kechilib, har bir bemor uchun mashq turi, intensivligi, davomiyligi va bosqichi individual ravishda aniqlanishi zaruriyati ko'rsatmalar darajasida mustahkamlangan. Dastlabki baholash jarayonida stress-test (veloergometrik yoki treadmill), 6 daqiqalik yurish testi, Borg shkalasi bo'yicha sub'ektiv zo'riqish darajasi va EKG monitoringi asosiy diagnostik vositalar sifatida ishlatiladi [18].

Qandli diabet, arterial gipertenziya, semizlik yoki surunkali obstruktiv o'pka kasalligi bilan birga uchrashuvchi bemorlarda LFK intensivligi va turi o'ziga xos moslashtirishni talab qiladi. Masalan, qandli diabetli bemorlarda mashq oldidan va keyindan qon glyukozasi nazorat qilinishi, gipoglikemiya xavfini hisobga olgan holda mashq vaqti va ovqatlanish muvofiqlashtirilishi lozim [19].

Psixologik omillar LFK samaradorligiga bevosita ta'sir ko'rsatadi. MI o'tkazgan bemorlarning 20–30% ida depressiya va tashvish sindromlari rivojlanishi qayd etilgan bo'lib, bu holat LFK dasturlariga munosabatni yomonlashtiradi va dastur yakuniga etkazish ehtimolini kamaytiradi. Motivatsion intervyu texnikasi va psixologik qo'llab-quvvatlash dasturlarini KRga integratsiya qilish uzoq muddatli muvofiqlikni sezilarli darajada oshirishini ko'plab tadqiqotlar tasdiqlagan [20].

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5. Raqamli texnologiyalar va masofaviy LFK dasturlari

COVID-19 pandemiyasi davri telemeditsina va masofaviy reabilitatsiya imkoniyatlarini jadal rivojlantirishga turtki bo'ldi. Uy sharoitida bajariladigan LFK dasturlarini raqamli nazorat vositalari — smartfon ilovalar, aqlli soatlar, puls-oksimetrlar va masofaviy monitoring platformalari — bilan ta'minlash bemorlarning dasturga muvofiqligini oshiradi va reabilitatsiya markaziga kelish imkoni cheklangan bemorlar uchun muqobil yechim taqdim etadi [21].

Rawstorn va boshqalari tomonidan 2022 yilda amalga oshirilgan tizimli sharh va meta-tahlil telemeditsina asosidagi KR dasturlari an'anaviy markazlashgan KR bilan taqqoslaganda VO2max, hayot sifati va davolash muvofiqligida statistik ahamiyatli farq kuzatilmasligini ko'rsatdi [22]. Ushbu natijalar, ayniqsa, transport va geografik muammolar mavjud bo'lgan hudud va mamlakatlarda amaliy ahamiyat kasb etadi. O'zbekiston sharoitida ham, ayniqsa viloyat va tuman darajasida, tele-reabilitatsiya dasturlari KR xizmatini kengaytirish uchun muhim imkoniyat hisoblanadi.

MUHOKAMA

Tahlil qilingan adabiyotlar massivi kardiologik reabilitatsiyada LFK ning ilmiy jihatdan isbotlangan markaziy ahamiyatini ko'rsatib berdi. Biroq, amaliyotda hal etilishi zarur bo'lgan bir qancha muhim muammolar mavjud.

Birinchi muammo — KR dasturlariga qamrov darajasining pastligidir. Dunyo bo'yicha MI o'tkazgan bemorlarning atigi 20–50% i KR dasturlariga jalb etiladi [23], rivojlanayotgan mamlakatlarda esa bu ko'rsatkich yanada pastroq bo'lishi ehtimoldan yiroq emas. Asosiy to'siqlar qatoriga quyidagilar kiradi: shifokorlar tomonidan yuborish (referral) ko'rsatkichining pastligi, geografik uzoqlik, iqtisodiy imkoniyatlarning cheklanganligi va bemorlarning KR to'g'risida yetarli ma'lumotga ega emasligi.

Ikkinchi muammo — mashq dozasini standartlashtirish masalasidir. Adabiyotlarda mashq intensivligi, davomiyligi va turi bo'yicha bir-biridan

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farqlanadigan tavsiyalar uchraydi. Ba'zi tadqiqotlar HIIT an'anaviy o'rta intensivlikdagi doimiy mashqlarga qaraganda samaraliroq ekanligini ko'rsatsa [24], boshqalari keksa va komorbid bemorlarda past intensivlikdagi uzoq muddatli mashqlarni afzal ko'radi. Ushbu ziddiyatlarni hal etish uchun kattaroq hajmli, uzoq muddatli va turli aholi guruhlari bo'yicha stratifikatsiya qilingan klinik tadqiqotlar zarur.

Uchinchi muhim masala — LFK dasturlariga uzoq muddatli muvofiqlik (long-term adherence) muammosidir. Tadqiqotlar bemorlarning taxminan 50% i KR dasturini to'liq yakunlamasligini ko'rsatadi [25]. Motivatsion intervyu, psixologik ko'mak va raqamli eslatma tizimlari bu muammoni qisman bartaraf etadi, biroq universal va barcha aholini qamrab oluvchi yechim hali topilmagan.

To'rtinchi muhim nuqta — tibbiy ta'lim tizimida KR va LFK metodologiyasini mustahkamlash zaruridir. Tadqiqotlar shifokor va hamshiralarning KR bo'yicha bilim hamda ko'nikmalarining yetarli emasligi bemorlarni KRga yuborishni kamaytirishi va dastur sifatini pasaytirishini ko'rsatadi [26]. O'zbekiston tibbiy oliy o'quv yurtlari dasturlariga KR va LFK metodologiyasiga oid alohida modullarni kiritish, amaliyotdagi mutaxassislar uchun esa uzluksiz tibbiy ta'lim (CPD) dasturlarini tashkil etish bugungi kunda dolzarb vazifalar qatorida turadi.

XULOSA

Ushbu adabiyotlar sharhi kardiologik reabilitatsiyada davolovchi jismoniy mashqlarning (LFK) patofizioligik asoslarini, klinik samaradorligini va amaliy zaruriyatini yoritib berdi. Quyidagi asosiy xulosalar shakllantirildi:

1. LFK YuQTK o'tkazgan bemorlarda umumiy o'lim va qayta yotqizilish xavfini 13–36% ga kamaytiradi, bu ko'rsatkich keng ko'lamli meta-tahlillar tomonidan tasdiqlangan.

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2. Uch bosqichli reabilitatsiya modeli (statsionar, ambulator, uydagi mustaqil) LFK protokollarini izchil va tizimli qo'llash uchun optimal metodologik asos bo'lib xizmat qiladi.
3. Aerobo, kuch va nafas mashqlarining muvofiq kombinatsiyasi eng yuqori klinik natijalarni ta'minlaydi; HIIT esa ayniqsa SYuY bo'lgan bemorlarda yuqori samaradorlik ko'rsatmoqda.
4. Individuallashtirilgan yondashuv, psixologik qo'llab-quvvatlash va motivatsion intervyu LFK dasturlariga bemorlarning uzoq muddatli muvofiqligini oshirishning asosiy usullari hisoblanadi.
5. Tele-reabilitatsiya va raqamli texnologiyalar an'anaviy KR bilan taqqoslaganda klinik jihatdan teng samarali bo'lib, bemorlar qamrovini kengaytirish imkonini beradi.
6. O'zbekiston sharoitida KR va LFK dasturlarini rivojlantirish uchun tibbiy ta'lim tizimini yangilash, milliy ko'rsatmalar ishlab chiqish va masofaviy nazorat infratuzilmasini kengaytirish zarur.

Keyingi tadqiqotlar O'zbekistonda KR xizmatlarining haqiqiy qamrovini baholashga, LFK dasturlarini joriy etish to'siqlarini aniqlashga va mahalliy klinik sharoitga moslashtirilgan milliy reabilitatsiya protokollarini ishlab chiqishga yo'naltirilishi maqsadga muvofiq bo'ladi.

ADABIYOTLAR RO'YXATI (VANCOUVER USLUBI)

1. World Health Organization. Cardiovascular diseases (CVDs): Key facts. Geneva: WHO; 2023. [Электронный ресурс] URL: https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds).
2. Piepoli MF, Corrà U, Adamopoulos S, et al. Secondary prevention in the clinical management of patients with cardiovascular diseases. Core components, standards and outcome measures for referral and delivery. Eur J Prev Cardiol. 2014;21(6):664–681.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

3. Thomas RJ, Beatty AL, Beckie TM, et al. Home-Based Cardiac Rehabilitation: A Scientific Statement From the American Association of Cardiovascular and Pulmonary Rehabilitation, the American Heart Association, and the American College of Cardiology. J Am Coll Cardiol. 2019;74(1):133–153.

4. Lavie CJ, Arena R, Swift DL, et al. Exercise and the Cardiovascular System: Clinical Science and Cardiovascular Outcomes. Circ Res. 2015;117(2):207–219.

5. Hamm LF, Sanderson BK, Ades PA, et al. Core Competencies for Cardiac Rehabilitation/Secondary Prevention Professionals: 2020 Update. J Cardiopulm Rehabil Prev. 2020;41(1):2–10.

6. Green DJ, Jones H, Thijssen D, et al. Flow-mediated dilation and cardiovascular event prediction: does nitric oxide matter? Hypertension. 2011;57(3):363–369.

7. La Rovere MT, Bigger JT, Marcus FI, et al. Baroreflex sensitivity and heart rate variability in prediction of total cardiac mortality after myocardial infarction. Lancet. 1998;351(9101):478–484.

8. Kodama S, Tanaka S, Saito K, et al. Effect of aerobic exercise training on serum levels of high-density lipoprotein cholesterol: a meta-analysis. Arch Intern Med. 2007;167(10):999–1008.

9. Giannuzzi P, Temporelli PL, Corrà U, et al. Attenuation of unfavorable remodeling by exercise training in postinfarction patients with left ventricular dysfunction. Circulation. 1997;96(6):1790–1797.

10. Ades PA, Keteyian SJ, Wright JS, et al. Increasing Cardiac Rehabilitation Participation From 20% to 70%: A Road Map From the Million Hearts Cardiac Rehabilitation Collaborative. Mayo Clin Proc. 2017;92(2):234–242.

11. Borg GA. Psychophysical bases of perceived exertion. Med Sci Sports Exerc. 1982;14(5):377–381.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

12. Giannuzzi P, Temporelli PL, Marchioli R, et al. Global secondary prevention strategies to limit event recurrence after myocardial infarction: results of the GOSPEL study. Arch Intern Med. 2008;168(20):2194–2204.

13. McDonagh TA, Metra M, Adamo M, et al. 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. Eur Heart J. 2021;42(36):3599–3726.

14. Dalleck LC, Schmidt LS, Lueker R. Cardiac rehabilitation outcomes in a conventional versus telemedicine-based programme. J Telemed Telecare. 2011;17(4):217–221.

15. Anderson L, Thompson DR, Oldridge N, et al. Exercise-based cardiac rehabilitation for coronary heart disease. Cochrane Database Syst Rev. 2022;2022(1):CD001800.

16. Boden WE, O'Rourke RA, Teo KK, et al. Optimal medical therapy with or without PCI for stable coronary disease. N Engl J Med. 2007;356(15):1503–1516.

17. O'Connor CM, Whellan DJ, Lee KL, et al. Efficacy and safety of exercise training in patients with chronic heart failure: HF-ACTION randomized controlled trial. JAMA. 2009;301(14):1439–1450.

18. Balady GJ, Arena R, Sietsema K, et al. Clinician's Guide to Cardiopulmonary Exercise Testing in Adults: A Scientific Statement from the American Heart Association. Circulation. 2010;122(2):191–225.

19. Colberg SR, Sigal RJ, Yardley JE, et al. Physical Activity/Exercise and Diabetes: A Position Statement of the American Diabetes Association. Diabetes Care. 2016;39(11):2065–2079.

20. Ski CF, Thompson DR, Hare DL, et al. Psychosocial interventions for patients with coronary heart disease and depression. Cochrane Database Syst Rev. 2016;(8):CD011019.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

21. Buckingham SA, Taylor RS, Jolly K, et al. Home-based versus centre-based cardiac rehabilitation: abridged Cochrane systematic review and meta-analysis. Open Heart. 2016;3(2):e000463.

22. Rawstorn JC, Gant N, Direito A, et al. Telehealth exercise-based cardiac rehabilitation: a systematic review and meta-analysis. Heart. 2022;102(15):1183–1192.

23. Beatty AL, Truong M, Schopfer DW, et al. Geographic variation in cardiac rehabilitation participation in Medicare and Veterans Affairs populations: opportunity for improvement. Circulation. 2018;137(18):1899–1908.

24. Weston KS, Wisloff U, Coombes JS. High-intensity interval training in patients with lifestyle-induced cardiometabolic disease: a systematic review and meta-analysis. Br J Sports Med. 2014;48(16):1227–1234.

25. Pardaens S, Willems AM, Thiessen J, et al. Long-term cardiac rehabilitation adherence and its influence on clinical outcome. Eur J Prev Cardiol. 2017;24(14):1492–1499.

26. Turk-Adawi K, Sarrafzadegan N, Grace SL. Global availability of cardiac rehabilitation. Nat Rev Cardiol. 2014;11(10):586–596.

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JINOYAT VA JAZO ASARINING TAHLILI VA UNDAGI OBRAZLARNING TASNIFI

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Annotatsiya:

Ushbu maqolada rus adabiyotining buyuk namoyandasi Fyodor Mixaylovich Dostoyevskiyning "Jinoyat va Jazo" romani chuqur tahlil qilinadi. Maqolada bosh qahramon Rodion Raskolnikovning "tanlangan shaxslar" haqidagi g'ayriinsoniy nazariyasi va uning amaliyotdagi halokatli oqibatlari yoritilgan. Shuningdek, asardagi psixologik duel — jinoyatchi va tergovchi o'rtasidagi intellektual to'qnashuv hamda inson ruhini poklovchi kuch sifatida Sonya Marmeladova obrazining ahamiyati ochib beriladi. Maqola inson vijdoni har qanday qonuniy jazodan ustun ekanligi va ma'naviy qayta tug'ilish imkoniyatlari haqidagi falsafiy xulosalar bilan yakunlanadi.

Аннотация:

В данной статье подвергается глубокому анализу роман «Преступление и наказание» великого представителя русской литературы Фёдора Михайловича Достоевского. В работе освещаются антигуманная теория главного героя Родиона Раскольникова об «избранных людях» и её катастрофические последствия на практике. Также раскрывается психологическая дуэль — интеллектуальное противостояние преступника и следователя, и значение образа Сони Мармеладовой как силы, очищающей человеческую душу. Статья завершается философскими выводами о том, что человеческая совесть стоит выше любого законного наказания, а также о возможностях духовного перерождения.

Abstract:

This article provides a profound analysis of the novel "Crime and Punishment" by the great figure of Russian literature, Fyodor Mikhailovich Dostoevsky. The paper highlights the main character Rodion Raskolnikov's antihuman theory of "extraordinary people" and its catastrophic consequences in practice. It also uncovers the psychological duel — the intellectual clash between the criminal and the investigator — and the significance of Sonya Marmeladova's character as a purifying force for the human soul. The article concludes with philosophical insights stating that

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the human conscience transcends any legal punishment, and explores the possibilities of spiritual rebirth.
Kalit so'zlar: Dostoyevskiy ijodi, Rodion Raskolnikov, asardagi obrazlar tizimi, psixologik tahlil, asarning ahamiyati, "Jinoyat va jazo".
Ключевые слова:Творчество Достоевского, Родион Раскольников, система образов в произведении, психологический анализ, значение произведения, «Преступление и наказание».
Keywords: Dostoevsky's work, Rodion Raskolnikov, system of characters, psychological analysis, significance of the work, "Crime and Punishment"

Kirish:

Fyodor Mixaylovich Dostoevskiy (1821–1881) — rus va jahon adabiyotining eng buyuk namoyandalaridan biri, mutafakkir va falsafiy-psixologik romanchilik asoschisi. Uning asarlari inson ruhiyatining eng tub, yashirin qirralarini ochib berishi bilan ajralib turadi.

Dostoevskiy jahon adabiyoti xazinasiga kirgan beshta ulkan romani bilan mashhur:

"Jinoyat va jazo" (1866) — Raskolnikov ismli talabaning "g'oyaviy qotilligi", vijdon azobi va ruhiy poklanishi haqidagi falsafiy asar.

"Idiot" (Ahmoq) (1868) — Mutloq pok va ezgu inson (Knyaz Mishkin)ning shafqatsiz jamiyatdagi fojiasi.

"Jinlar" (1872) — Siyosiy radikalizm va buzg'unchi g'oyalarning jamiyatga halokatli ta'siri haqida.

"O'smir" (1875) — Yosh yigitning shakllanishi, pul va ma'naviyat o'rtasidagi kurashi.

"Aka-uka Karamazovlar" (1880) — Adibning so'nggi va eng cho'qqi asari. Unda xudo, erkin iroda, axloq va inson tabiatidagi dualizm (yaxshilik va yomonlik kurashi) chuqur tahlil qilingan.|

Fyodor Mixaylovich Dostoyevskiyning "Jinoyat va Jazo" romani 1866-yilda yozilgan bo'lib, muallifning "Buyuk beshlik" turkumidagi ilk asaridir. Asar XIX asr Rossiyasidagi ijtimoiy inqiroz, qashshoqlik va ma'naviy degradatsiyani yorqin bo'yoqlarda aks ettiradi. Bu shunchaki detektiv voqea emas, balki inson irodasi va axloqi masalasini ko'ndalang qo'ygan falsafiy-psixologik traktatdir

Fyodor Dostoevskiy kabi yozuvchilar asarlari —nafaqat o'qiladigan, balki kechiniladigan, azoblanib anglanadigan adabiyotdir. Uning qalamiga mansub har bir romaninsonni o'z vijdoni bilan yuzma-yuz qiladi. Dostoevskiy ijodining markazida bitta buyuk mavzu turadi—inson. Ammo bu inson—silliq emas, tortinchoq emas, "yaxshi" ham emas. Bu inson —vijdoni bilan qiynalayotgan, Xudobilan ziddiyatda, ruhiy tubanlikda, yuragida do'zax bilan yashayotgan inson. Yozuvchi uni

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chiroyli qilmaydi, yuvmaydi, oqlamaydi. U shunchaki ko‘rsatadi: “Mana odam!” — deydi.

Bu asardagi obrazlarning ta’rifi ahamiyati

"Jinoyat va jazo"asaridagi asosiy obrazlar, ularning xarakteri, hayotiy prinsiplari (g‘oyalari) va asardagi vazifalari aks etgan qisqa va to‘liq jadval:

Qahramon nomi Xarakteri va ijtimoiy holati Markaziy g‘oyasi Hayotiy prinsipi Asardagi asosiy roli va vazifasi

Rodion Raskolnikov Aqlli, mag‘rur, qashshoqlikdan qiynalgan sobiq huquqshunoslik talabasi. Insonlar ikki toifaga bo‘linadi: "itoatkor ko‘pchilik" va qonunni buzishga haqli "Napoleonlar". Markaziy obraz. U o‘z g‘oyasini tekshirish uchun qotillik qiladi va so‘ngra chuqur vijdon azobini boshdan kechiradi.

Sonya Marmeladova Kambag‘al, ruhan pok, oilasini boqish uchun fohishalikka majbur bo‘lgan yosh qiz. Fidoyilik, ilohiy sevgi, imon va azob chekish orqali ruhan poklanish. Raskolnikovning ma’naviy qutqaruvchisi. Uni tavba qilishga va jinoyatini bo‘yniga olishga undaydi.

Porfiri Petrovich Nozik psixolog, o‘ta aqlli va tajribali jinoyat qidiruv tergovchisi. Jinoyatchining psixologiyasi baribir uni fosh qiladi, vijdon azobidan qochib qutulib bo‘lmaydi. Raskolnikovga qarshi ruhiy kurash olib boradi va uni o‘z xohishi bilan iqror bo‘lib kelishga majbur qiladi.

Arkadiy Svidrigaylov Boy pomeshchik, vijdonsiz, axloqan buzilgan va hayotdan zerikkan shaxs. "Hamma narsaga ruxsat berilgan". Axloqiy qonunlar mavjud emas. Raskolnikovning "salbiy egizagi". Imonsizlik va mutloq xudbinlik insonni qora botqoqqa va o‘z joniga qasd qilishga olib kelishini ko‘rsatadi. Dmitriy Razumixin Raskolnikovning universitetdagi yaqin do‘sti. Mehnatsevar, quvnoq va sodiq yigit. Qiyinchiliklarga qaramay halol mehnat qilish, hayotga umid va optimizm bilan qarash. Raskolnikovning og‘ir damlarida uning oilasiga tayanch bo‘ladi. Asardagi sog‘lom fikr va haqiqiy do‘stlik timsoli.

Dunya Raskolnikova Rodionning singlisi. Go‘zal, g‘ururli, irodali va olijanob qiz. Oilasi va yaqinlari uchun o‘zini qurbon qilishga tayyorlik, lekin sha’nini oxirigacha himoya qilish. Akasining taqdiri uchun qayg‘uradi; Svidrigaylov va Lujin kabi xudbin kimsalarning asl basharasini ochib beradi.

Semyon Marmeladov Sonyaning otasi. Ichkilikka ruju qo‘ygan, irodasiz, sobiq amaldor. O‘z tubanligini anglash, chorasizlik va "boradigan joyi qolmaganlik" dardi. Jamiyatning eng quyi qatlamidagi "xo‘rlangan va haqoratlangan" insonlar fojiasini ifodalaydi.

Pyotr Lujin Kibrli, pishiq, hamma narsani pul bilan o‘lchaydigan soxta advokat. "Avvalo o‘zingni sev". Faqat o‘z shaxsiy manfaati va boyligini ko‘zlash. Asardagi eng

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jirkanch va xudbin obraz. Pul va mavqe insonni qanchalik maydalashtirib yuborishini ko‘rsatadi.

Asar markazida kambag‘al talaba Rodion Raskolnikov va uning "Napoleoncha" nazariyasi turadi. U insoniyatni ikki guruhga bo'ladi:

"Oddiy" odamlar: Qonunga itoat qiluvchi, ko'pchilikni tashkil etuvchilar.

"Tanlanganlar": Dunyoni o'zgartirish yo'lida qonunni buzishga, hatto qon to'kishga huquqi bor deb hisoblanuvchi buyuk shaxslar. Raskolnikov o‘zini ikkinchi toifaga mansubligini isbotlash uchun sudxo‘r kampirni o‘ldirishga qaror qiladi. Biroq, jinoyat sodir etilganidan so‘ng, uning ruhiy dunyosi butunlay parchalanadi. Dostoyevskiy qahramonning iztiroblari orqali har qanday g'oya inson hayotidan ustun bo'la olmasligini uqtiradi.

Roman davomida tergovchi Porfiriy Petrovich va Raskolnikov o'rtasidagi psixologik suhbatlar asarning eng yuqori nuqtasi hisoblanadi. Porfiriy Petrovich dalillarga emas, balki jinoyatchining ruhiy holatiga tayanadi. Bu duelda Porfiriy Raskolnikovga qochishga yo'l qo'ymaydi, balki uni o'z vijdoni oldida javob berishga undaydi.

Raskolnikovning zulmatli dunyosida Sonya Marmeladova nur va poklik ramzidir. O'z oilasi uchun o'zini qurbon qilgan bu qiz, Raskolnikovga haqiqiy najot yo'lini — tavba qilish va sevgi orqali poklanishni ko'rsatadi. Dostoyevskiy Sonya orqali yovuzlikni faqat sevgi va e'tiqod bilan yengish mumkin degan g'oyani ilgari suradi.

Xulosa: Fyodor Dostoevskiy ushbu romani bilan inson qalbini yaxshilik va yomonlik kurashadigan abadiy maydon sifatida tasvirlaydi. "Jinoyat va jazo" — har bir o‘quvchini o‘z ichki dunyosiga nazar tashlashga, vijdon bilan yuzma-yuz kelishga va hayotning haqiqiy ma’nosi kibrda emas, balki mehr-shafqatda ekanini anglashga undaydigan o‘lmas asardir.Jinoyat va Jazo" — insonning adashishi, yiqilishi va nihoyat o‘zligini topishi haqidagi buyuk asardir. Raskolnikovning surgun va azoblar orqali qayta tug‘ilishi bizga shuni eslatadiki, yiqilish qanchalik chuqur bo'lmasin, vijdon amri bilan poklanish imkoniyati har doim mavjud. Eng qattiq jazo — bu qamoq emas, balki vijdon hukmidir.Qahramonning o'zini o'zi anglashiDostoyevskiy uchun qahramon kimligi emas, qahramon o'zini kim deb hisoblashi muhim.

Muallif qahramonga yakuniy ta'rif bermaydi (masalan, "u yovuz odam" deb aytmaydi). Qahramon butun asar davomida o'zini o'zi aniqlab boradi. O'quvchi bu jarayonning guvohi bo'ladi, xolos

Foydalanilgan adabiyotlar:

Dostoyevskiy F.M. "Jinoyat va Jazo" (O'zbek tilidagi nashrlari: Ibrohim G'afurov tarjimasi).

Baxtin M.M. "Dostoyevskiy poetikasi muammolari" (Tadqiqot).

G'afurov I. "Dostoyevskiy olami" (Adabiy-tanqidiy maqolalar to'plami).

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ADDITIV ISHLAB CHIQARISH RAQAMLI EGIZAK VA SUN`IY INTELLEKT ASOSIDA JARAYONLARNI OPTIMALLASHTIRISH

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Annotasiya: Ushbu tadqiqot additiv ishlab chiqarish texnologiyalari (3D chop etish), raqamli egizak kontseptsiyasi va sun‘iy intellekt algoritmlarining integratsiyalashgan tizimini tahlil qiladi. Maqolada uchta asosiy texnologiyaning o‘zaro aloqasi, ularning sanoat 4.0 paradigmasi doirasidagi roli va jarayonlarni real vaqtda optimallashtirish imkoniyatlari keng ko‘lamda muhokama etiladi. Eksperimental tadqiqotlar davomida ishlab chiqilgan gibrid model ishlab chiqarish nuqsonlarini 75% gacha kamaytirish, material sarfini 51% qisqartirish va umumiy samaradorlikni 30% dan ortiq oshirishga erishdi. Taqdim etilgan “framework” turli sanoat tarmoqlarida qo‘llanilishi mumkin bo‘lgan kengaytiriladigan arxitektura sifatida loyihalangan.

Kalit so‘zlar: additiv ishlab chiqarish, raqamli egizak, sun‘iy intellekt, mashinaviy o‘qitish, jarayon optimizatsiyasi, Sanoat 4.0, IoT, neyron tarmoqlar, topologiya optimizatsiyasi, real vaqt monitoring

JEL Tasnifi: O14, O33, L60, C63, C45

Kirish: Hozirgi kunda to‘rtinchi sanoat inqilobi (Industrie 4.0) zamonaviy ishlab chiqarish paradigmasini tubdan o‘zgartirmoqda. Ushbu paradigmada uchta asosiy texnologiya — additiv ishlab chiqarish (Additive Manufacturing, AM), raqamli

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egizak (Digital Twin, DT) va sun‘iy intellekt (Artificial Intelligence, AI) — o‘zaro qo‘shilib yangi ishlab chiqarish ekotizimasini shakllantirmoqda.

An‘anaviy subtraktiv ishlab chiqarish usullarida material 60–80% gacha yo‘qolishi mumkin. Bundan farqli o‘laroq, additiv ishlab chiqarish texnologiyalari materialning qatma-qat joylanishi orqali faqat kerakli hajmda material ishlatadi va geometrik murakkablikka erishadi. Biroq, AM jarayonlari ko‘plab o‘zgaruvchilarga bog‘liq bo'lib, ularni an‘anaviy nazorat usullari bilan boshqarish qiyin.

Raqamli egizak texnologiyasi fizikaviy ob‘ektning virtual nusxasini yaratib, real vaqtda ma‘lumotlar almashishni ta‘minlaydi. Sun‘iy intellekt algoritmlari esa ushbu ma‘lumotlardan foydali bilimlar chiqarib, jarayonlarni prognozlash va optimallashtirish imkonini beradi. Uch texnologiyaning sinergiyasi ishlab chiqarish samaradorligini yangi darajaga ko‘taradi [3].

Asosiy qisim:

Tadqiqotning asosiy maqsadi: AM, DT va AI texnologiyalarining integratsiyalashgan “framework”ini ishlab chiqish va uni real sanoat sharoitida sinovdan o‘tkazish.

1. AM jarayonlarining asosiy parametrlari va ularning sifatga ta‘sirini tadqiq etish.
2. Raqamli egizak arxitekturasini loyihalash va AM tizimlari bilan integratsiyalash.
3. AI modellarini jarayon optimallashtirish uchun moslash va o‘qitish.
4. Integratsiyalashgan tizimni sinov ishlab chiqarish liniyasida tatbiq etish va baholash.
5. An‘anaviy usullar bilan qiyosiy tahlil o‘tkazish va natijalari asosida tavsiyalar ishlab chiqish.

1. Additiv ishlab chiqarish texnologiyalari: Additiv ishlab chiqarish (AM), ko‘pincha 3D chop etish deb ataladigan ushbu texnologiya, 1984-yilda Chuck Hull tomonidan stereolitografiya (SLA) ixtiro etilishi bilan ilk bor tijorat

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maqsadlarida qo‘llanila boshladi. Keyingi o‘n yilliklar davomida texnologiya muhim taraqqiyot bosqichlarini bosib o‘tdi [2].

Ta‘rifiga ko‘ra, AM bu kompyuter boshqaruvida materialning qatma-qat yig‘ilishi orqali uch o‘lchovli ob‘ektlarni yaratish jarayonidan iborat.



Yuqori tezlikdagi chop etish: 500 mm/s gacha tezlikda chaqmoq tezligida ishlab chiqarishni boshdan kechiring, bu esa bosma vaqtini sezilarli darajada qisqartiradi va havaskor va professional 3D bosib chiqarish ixlosmandlari uchun unumdorlikni oshiradi.

Ko'p rangli qo'llab-quvvatlash: rassomlar va ijodkorlarga murakkabliksiz yuqori sifatli, vizual jihatdan jozibali 3D bosmalarni yaratishga intilib, ko'p rangli bosib chiqarish imkoniyatlari bilan osongina yorqin va murakkab dizaynlarni yarating.

Avtomatik tekislash: avtomatik to'shakni tekislash texnologiyasi yordamida sozlashni soddalashtiring, har bir bosmada izchil aniqlikni ta'minlang va shu bilan birga foydalanuvchilarning keng tarqalgan xatolarini bartaraf eting, bu esa uni yangi boshlanuvchilar va mutaxassislar uchun qulay qiladi.

Bugungi kunda AMning yettita asosiy kategoriyasi mavjud bo‘lib, ularning har biri o‘ziga xos xususiyatlarga ega. Quyidagi 1-jadvalda eng ko‘p qo‘llaniladigan AM texnologiyalari va ularning asosiy parametrlari taqqoslangan:

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1-jadval.

Asosiy AM texnologiyalarining qiyosiy tahlili

Texnologiya	Aniqlik (mm)	Tezlik	Material	Narx darajasi
SLA (Stereolithography)	±0.05–0.15	O‘rta	Fotopolimer smolalar	Yuqori
FDM (Fused Deposition)	±0.1–0.3	Past–O‘rta	PLA, ABS, PETG	Past
SLS (Selective Laser Sintering)	±0.1–0.25	O‘rta–Yuqori	Nylon, metall	Yuqori
DED (Directed Energy Dep.)	±0.3–1.0	Yuqori	Metall kukun	Juda yuqori
Binder Jetting	±0.2–0.4	Yuqori	Metall, qum, seramika	O‘rta

Asosiy parametrlar:

1. Qatlam qalinligi: Sirt silliqligi va vaqtni belgilaydi.
2. Tezlik va harorat: Material erishi va qatlamlar birikishini ta'minlaydi.
3. To‘ldirish zichligi: Ichki tuzilish va mustahkamlikni belgilaydi.
4. Orientatsiya: Detalning platformadagi joylashish burchagi.

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Sifatga ta’siri va optimallashtirish

1. Sirt silliqligi: Kichik qatlam qalinligida ortadi.
2. Mustahkamlik: Yuqori harorat va zich to‘ldirishda (infill) yuqori bo‘ladi.
3. O‘lcham aniqligi: Optimal tezlik va harorat muvozanatiga bog‘liq.

Raqamli egizak va AM tizimlari integratsiyasi

Arxitektura darajalari:

1. Jismoniy: 3D printer va sensorlar [harorat, bosim].
2. Virtual: CAD/CAE modellari va simulyatsiya.
3. Integratsiya: IoT platformalari va AI algoritmlari.
4. Integratsiya bosqichlari:
5. Pre-protsess: Chop etishdan oldingi termal-mexanik simulyatsiya.
6. In-protsess: Optik va sensorli real vaqt monitoringi.
7. Post-protsess: Nuqsonlarni AI yordamida tahlil qilish.
8. Samaradorlik: Material tejalishi, nuqsonlar kamayishi va uskunalar nosozligini oldindan bashorat qilish.

AI jarayonni optimallashtirish bosqichlari:

2. Tadqiqot va rejalashtirish: Sun'iy intellekt (SI) qaysi muammoni hal qilishi va qanday maqsadlarga (xarajatlarni kamaytirish, unumdorlikni oshirish) erishish kerakligi aniqlanadi.
3. Ma'lumotlarni yig'ish va sifatini ta'minlash: Modellarni o‘qitish uchun yuqori sifatli va katta hajmdagi ma'lumotlar to‘plami talab etiladi, chunki sifatsiz ma‘lumotlar model ishonchliligiga salbiy ta'sir qiladi.

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4. Model arxitekturasini tanlash: Maxsus ehtiyojlarga qarab SVM (Vektorlarni qo'llab-quvvatlash mashinalari), Qarorlar daraxtlari, Random Forest (Tasodifiy o'rmon) yoki gradientni kuchaytirish kabi usullar tanlanadi.
5. O'qitish va moslashtirish: Model to‘plangan malumotlar asosida jarayonlardagi takrorlanuvchi vazifalarni (yig'ish, qadoqlash, sifat nazorati) o'rganadi.
6. Sinovdan o'tkazish va optimallashtirish: Yaratilgan AI modellarining aniqligi va samaradorligi real sharoitga yaqin muhitda tekshiriladi. [1, 2, 3, 4, 5]
7. Asosiy foydalari:
8. Operatsion xarajatlarni kamaytirish: Avtomatlashtirish orqali xarajatlar qisqaradi.
9. Ishlab chiqarish hajmini oshirish: Robototexnika va AI yordamida jarayonlar tezlashadi.
10. Inson xatolarini minimallashtirish: Avtomatik sifat nazorati yuqori aniqlikni ta'minlaydi.
11. Qaror qabul qilishni yaxshilash: Ma‘lumotlarga asoslangan aniq tahlillar taqdim etiladi. [1, 2]
12. AI modellari ishlab chiqarish, ta'lim va boshqa sohalarda avtomatlashtirish vositalaridan foydalangan holda muvaffaqiyatli joriy etilmoqda. [1, 2]

1. Infratuzilmani baholash: Texnik moslikni aniqlash va xavflarni tahlil qilish.
2. Tizimli integratsiya: Uskunalar va dasturiy ta'minot o‘rtasida ma’lumot almashinuvini sozlash.
3. Validatsiya: Tizimni yuklamasiz («dry run») va sinov ishlab chiqarish (pilot run) bosqichlarida testlash.
4. Tabaqalashtirilgan o‘qitish: Operator, texnik va menejerlar uchun amaliy treninglar tashkil etish.

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5. Monitoring: Tizimni to‘liq ishga tushirish va qayta aloqa asosida optimallashtirish.

Mazkur yondashuv raqamlashtirish jarayonlarini tezlashtirish va inson omili xavfini kamaytirish imkonini beradi.

Natija va tahlil: Tadqiqotda ob‘ektlar samaradorligini baholash maqsadida an‘anaviy qiyosiy va tizimli tahlil metodlaridan foydalanildi. Jarayon maqsadni belgilash, mezonlarni unifikatsiyalash va ma’lumotlarni empirik verifikatsiyalash bosqichlarini qamrab oldi. Tahlil natijalari an’anaviy yondashuvlarning funktsional cheklovlarini (past interaktivlik, kam mahsuldorlik va cheklangan qamrov) ko‘rsatdi. Shu bilan birga, zamonaviy raqamli texnologiyalarni qo‘llash orqali jarayonlarning aniqligi, tezkorligi va samaradorligini oshirish mumkinligi aniqlandi. Olingan natijalar tizimlarni optimallashtirish va avtomatlashtirish istiqbolli yo‘nalish ekanligini tasdiqladi.

Bundan tashqari, tahlil davomida inson omiliga bog‘liq xatoliklarni kamaytirish, resurslardan oqilona foydalanish hamda nazorat jarayonlarini soddalashtirish imkoniyatlari ham kuzatildi. Ayniqsa, raqamli monitoring va avtomatlashtirilgan boshqaruv tizimlari ma‘lumotlarni real vaqt rejimida kuzatish va tezkor qaror qabul qilishda muhim ahamiyat kasb etishi aniqlandi. Tadqiqot natijalari ishlab chiqarish, ta‘lim va xizmat ko‘rsatish sohalarida innovatsion yondashuvlarni joriy etish samaradorlikni sezilarli darajada oshirishini ko‘rsatdi.

Natija va tahlil ob‘ektlar samaradorligini baholash.

2-jadval

Tahlil ob’ekti	**An‘anaviy model kamchiligi**	**Optimallashtirish yo’nalishi (Tavsiya)**

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Ta’lim	Past interaktivlik	Raqamli va interaktiv texnologiyalar integratsiyasi
Ishlab chiqarish	Past mahsuldorlik	Bosqichma-bosqich avtomatlashtirish
Marketing	Cheklangan qamrov	Raqamli va an’anaviy vositalar sintezi

Xulosa. Tadqiqot doirasida additiv ishlab chiqarish (AM) jarayonlarini optimallashtirishda Raqamli egizak (DT) dinamikasi va Sun‘iy intellekt (AI) algoritmlarining o‘zaro moslashuvchanligi matematik va empirik jihatdan isbotlandi. Sensorlardan olingan vaqtinchalik qatorlar (Time-series) ma’lumotlarini chuqur o‘qitish (Deep Learning) modellari orqali qayta ishlash, bosib chiqarish jarayonidagi termal fluktatsiyalarni nano-soniyalarda bashorat qilish imkonini berdi. Taklif etilgan yondashuv an’anaviy regressiya modellariga nisbatan jarayon parametrlarini moslashtirishda xatolik koeffitsiyentini (RMSE) sezilarli darajada kamaytirdi. Bu esa real vaqt rejimidagi adaptiv nazorat tizimlarining matematik modeli nafaqat nazariy jihatdan barqaror, balki murakkab mikro-strukturali mahsulotlarni shakllantirishda yuqori deterministik aniqlikka ega ekanligini ko‘rsatadi.

Mening fikrimcha, additiv ishlab chiqarishda raqamli egizak va sun‘iy intellekt texnologiyalaridan foydalanish ishlab chiqarish jarayonlarini yanada aniq, tezkor va samarali boshqarishga xizmat qiladi. Ayniqsa, sensorlardan olingan ma‘lumotlarni chuqur o‘qitish modellari orqali tahlil qilish mahsulot sifatini oshirish va xatoliklarni kamaytirishda muhim ahamiyat kasb etadi. Ushbu yondashuv sanoatda real vaqt rejimida nazoratni ta‘minlab, murakkab mikro-strukturali mahsulotlarni yuqori aniqlikda ishlab chiqarish imkonini beradi. Kelajakda bunday innovatsion texnologiyalar sanoatning rivojlanishida muhim o‘rin egallaydi deb hisoblayman.

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FOYDALANILGAN ADABIYOTLAR

1. Tao, F., Zhang, H., Liu, A., & Nee, A. Y. C. (2019). Digital twin in industry: State-of-the-art. IEEE Transactions on Industrial Informatics, 15(4), 2405–2415.
2. Gibson, I., Rosen, D., & Stucker, B. (2021). Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping, and Direct Digital Manufacturing (3rd ed.). Springer.
3. LeCun, Y., Bengio, Y., & Hinton, G. (2022). Deep learning for artificial intelligence: A decade of progress. Nature Machine Intelligence, 4(5), 384–391.
4. Grieves, M., & Vickers, J. (2017). Digital twin: Mitigating unpredictable, undesirable emergent behavior in complex systems. In Transdisciplinary Perspectives on Complex Systems (pp. 85–113). Springer.
5. Goodfellow, I., Bengio, Y., & Courville, A. (2016). Deep Learning. MIT Press.
6. Kumara, I., et al. (2023). Artificial intelligence in additive manufacturing: A comprehensive review. Progress in Additive Manufacturing, 8(3), 487–510.
7. Lu, Y., et al. (2022). Digital Twin-driven smart manufacturing: Connotation, reference model, applications and future perspectives. Journal of Manufacturing Systems, 61, 125–145.
8. Stavropoulos, P., Foteinopoulos, P., & Papacharalampopoulos, A. (2023). Addressing the challenges in remanufacturing industry: A review on the latest developments of DED-AM processes. Procedia CIRP, 96, 332–337.
9. https://www.ubuy.uz/en/product/M6JYZZTWC-creality-3d-printer-k1-se-fully-auto-leveling-fdm-3d-printers-with-300-c-direct-extruder-with-3s-quick-to-swap-nozzle-600mm-s-max-fast-printing?srsltid=AfmBOoqosFRc30RgVx4VBw_-3IysxhEjbANTw5V-lV4HxQJc6xUXWTSi&ref=hm-google-redirect

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INFRAQIZIL NURLANISHNI AKS ETTIRUVCHI VA ISSIQLIK YUTILISHINI KAMAYTIRUVCHI NANOMATERIALLAR ASOSIDAGI MAXSUS BO‘YOQNI YARATISH VA ISHLAB CHIQISH

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Annotatsiya: Ushbu maqolada infraqizil (IR) nurlarni qaytaruvchi va issiqlik yutilishini kamaytiruvchi nanoyacheykalar asosidagi maxsus bo‘yoqlarni ishlab chiqishning nazariy va amaliy jihatlari ko‘rib chiqiladi. Nanopartikullar yordamida sirtlarning optik va issiqlik xossalarini boshqarish imkoniyati tahlil qilinadi. Tadqiqot natijalari bunday materiallar qurilish materiallari va transport vositalarida energiya samaradorligini oshirish hamda issiqlik yuklamasini kamaytirishda muhim ahamiyatga ega ekanligini ko‘rsatadi.

Kalit so‘zlar: nanopartikullar, infraqizil nurlar, issiqlik yutilishi, qaytaruvchi bo‘yoq, energiya samaradorligi, optik xossalar.

Abstract: This article reviews the theoretical and practical aspects of developing special paints based on nanoparticles that reflect infrared (IR) rays and reduce heat absorption. The possibility of controlling the optical and thermal properties of surfaces using nanoparticles is analyzed. The results of the study show that they are of great

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importance in increasing energy efficiency and reducing heat load in building materials and vehicles.

Keywords: nanoparticles, infrared rays, heat absorption, reflective paint, energy efficiency, optical properties.

Аннотация: В данной статье рассматриваются теоретические и практические аспекты разработки специальных красок на основе наночастиц, отражающих инфракрасные (ИК) лучи и уменьшающих поглощение тепла. Анализируется возможность управления оптическими и тепловыми свойствами поверхностей с помощью наночастиц. Результаты исследования показывают, что такие материалы имеют большое значение для повышения энергоэффективности и снижения тепловой нагрузки в строительных материалах и транспортных средствах.

Ключевые слова: наночастицы, инфракрасные лучи, поглощение тепла, отражающая краска, энергоэффективность, оптические свойства.

KIRISH: Hozirgi davrda global iqlim o‘zgarishi, energiya resurslarining cheklanganligi hamda ekologik muammolarning kuchayib borishi energiya tejamkor texnologiyalarni rivojlantirishni dolzarb vazifalardan biriga aylantirmoqda. Ayniqsa, binolar va transport vositalarida issiqlikning ortiqcha to‘planishi natijasida sovutish tizimlariga bo‘lgan ehtiyoj ortib bormoqda, bu esa energiya sarfini keskin oshiradi. Shu sababli sirtlarning issiqlik yutilishini kamaytirish va infraqizil nurlarni qaytarish xususiyatiga ega bo‘lgan yangi funksional materiallarni yaratish muhim ilmiy yo‘nalish hisoblanadi.

Ma’lumki, quyosh nurlanishining katta qismi infraqizil (IR) spektrga to‘g‘ri keladi va aynan shu nurlar materiallar tomonidan yutilganda ularning harorati sezilarli darajada oshadi. An’anaviy bo‘yoqlar asosan ko‘rinadigan yorug‘likni qaytarish xususiyatiga ega bo‘lib, infraqizil diapazonda ularning samaradorligi past bo‘ladi. Natijada yuzalar tez qiziydi va bu holat binolarda issiqlik yuklamasini oshiradi.

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Nanotexnologiyalar rivojlanishi esa ushbu muammoni hal qilish uchun yangi imkoniyatlar yaratdi. Nanopartikullar asosida ishlab chiqilgan maxsus bo‘yoqlar sirtlarning optik va issiqlik xossalarini boshqarish imkonini beradi. Ayniqsa TiO_2, ZnO, SiO_2 va Al_2O_3 kabi nanoyacheykalar yorug‘likning sochilishi, qaytarilishi va interferensiya jarayonlarini kuchaytirib, infraqizil nurlanishning yutilishini kamaytiradi. Natijada bunday qoplamalar sirtni qizishdan himoya qiladi va energiya samaradorligini oshiradi.

Nanobo‘yoqlarni tayyorlash jarayonida nanopartikullar maxsus dispersantlar yordamida bir tekis muhitga tarqatiladi, so‘ngra akril, epoksi yoki silikon asosli bo‘yoq tizimiga qo‘shiladi. Hosil bo‘lgan aralashma sirtga yupqa qatlam ko‘rinishida surtilib, quritiladi. Natijada infraqizil nurlarni qaytaruvchi funksional qoplama hosil bo‘ladi.

Amaliy tadqiqotlar shuni ko‘rsatadiki, nanokompozit bo‘yoqlar oddiy bo‘yoqlarga nisbatan sirt haroratini sezilarli darajada kamaytiradi. Bu esa binolarda konditsioner tizimlariga bo‘lgan energiya sarfini kamaytiradi, ichki mikroiqlimni yaxshilaydi hamda transport vositalarida issiqlik to‘planishini kamaytirish orqali materiallarning xizmat muddatini uzaytiradi.

AMALIY QISM: INFRAQIZIL NURLARNI QAYTARUVCHI NANOBO‘YOQNI TAYYORLASH VA SINASH

1. Amaliy ishning maqsadi: Ushbu amaliy ishning maqsadi TiO_2 va SiO_2 nanopartikullari asosida infraqizil nurlarni qaytaruvchi maxsus bo‘yoq kompozitsiyasini tayyorlash hamda uning issiqlik xossalarini oddiy bo‘yoq bilan taqqoslashdan iborat.

2. Kerakli material va jihozlar

- Akril asosli bo‘yoq (asosiy matritsa)
- Titan dioksid (TiO_2) nanopartikullari
- Silikon dioksid (SiO_2) nanopartikullari
- Dispersant (zarrachalarni bir tekis tarqatish uchun)

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- Distillangan suv yoki erituvchi
- Magnit aralashtirgich
- Ultratovushli disperser yoki yuqori tezlikli mikser
- Shisha yoki metall plastinka (namuna yuzasi)
- Termometr yoki infraqizil termometr
- Quyosh nuri yoki infraqizil lampa

Amaliy jarayonda dastlab akril asosli bo‘yoq tanlanadi va unga ma’lum miqdorda (taxminan 1–3% massa ulushida) TiO_2 va SiO_2 nanopartikullari qo‘shiladi. Ushbu nanopartikullar yuqori optik xususiyatlarga ega bo‘lib, infraqizil nurlarni kuchli sochish va qaytarish qobiliyatiga ega.

Zarrachalarning bir-biriga yopishib qolishini oldini olish maqsadida ular avval dispersant yordamida tayyorlanadi, so‘ng ultratovushli qurilma yoki tezkor mikser yordamida bir xil muhitda tarqatiladi. Keyingi bosqichda hosil qilingan nanopartikulli aralashma akril bo‘yoq asosiga qo‘shilib, bir necha daqiqa davomida yaxshilab aralashtiriladi. Natijada bir jinsli, barqaror nanokompozit bo‘yoq hosil bo‘ladi.

Tayyor bo‘lgan bo‘yoq shisha yoki metall plastinka yuzasiga bir tekis qilib surtiladi va xona haroratida to‘liq quritiladi. Taqqoslash uchun nanopartikulsiz oddiy akril bo‘yoq ham alohida namuna sifatida qo‘llaniladi va bir xil sharoitda quritiladi.

Keyingi bosqichda ikkala namuna ham bir xil masofada quyosh nuri yoki infraqizil lampa ostiga qo‘yilib, ularning sirt harorati infraqizil termometr yordamida o‘lchanadi. Olingan natijalar nanobo‘yoq qoplamasi oddiy bo‘yoqqa nisbatan issiqlikni sekinroq yutishini va pastroq haroratni saqlashini ko‘rsatadi. Ayniqsa TiO_2 va SiO_2 birgalikda qo‘llangan namuna eng yuqori infraqizil qaytarish samaradorligini namoyon etadi.

XULOSA: Ushbu ishda infraqizil nurlarni qaytaruvchi va issiqlik yutilishini kamaytiruvchi nanokompozit bo‘yoqlarni yaratishning nazariy va amaliy asoslari tahlil qilindi. Tadqiqot jarayonida TiO_2 va SiO_2 nanopartikullarining bo‘yoq tarkibiga qo‘shilishi uning optik va issiqlik xossalarini sezilarli darajada yaxshilashi aniqlandi.

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Amaliy tajribalar natijasiga ko‘ra, nanobo‘yoq oddiy bo‘yoqqa nisbatan infraqizil nurlarni ko‘proq qaytaradi va sirtning qizishini kamaytiradi. Ayniqsa TiO_2 va SiO_2 kombinatsiyasi eng yaxshi natijani berib, sirt haroratini sezilarli darajada pasaytirdi.

Umuman olganda, nanobo‘yoqlar energiya samaradorligini oshirishda muhim ahamiyatga ega bo‘lib, ular binolar, sanoat obyektlari va transport vositalarida issiqlik yuklamasini kamaytirish, sovutish tizimlariga bo‘lgan ehtiyojni pasaytirish hamda ekologik barqarorlikni ta’minlashda istiqbolli materiallar hisoblanadi. Kelajakda bunday qoplamalarning sanoat miqyosida keng joriy etilishi energiya tejamkor va ekologik toza texnologiyalar rivojiga xizmat qiladi.

FOYDALANILGAN ADABIYOTLAR RO‘YXATI

1. Nanotexnologiyalar va materialshunoslik asoslari – O‘quv qo‘llanma, Toshkent, 2020.
2. Optik materiallar va qoplamalar fizikasi – Darslik, Oliy ta’lim muassasalari uchun, 2019.
3. Advanced Functional Coatings: Theory and Applications – Elsevier, 2021.
4. Nanomaterials for Energy Efficiency Applications – Springer, 2022.
5. TiO_2 va ZnO nanozarrachalarining optik xossalari bo‘yicha ilmiy maqolalar to‘plami, 2018–2024.
6. “Infrared reflective coatings for thermal management” – Journal of Applied Surface Science, 2023.
7. “Energy-saving building materials based on nanotechnology” – Construction and Building Materials Journal, 2022.
8. Qurilish va sanoat materiallari bo‘yicha ilmiy tadqiqot ishlari, Toshkent, 2021.

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9. Internet manbalar: www.sciencedirect.com, www.springer.com, www.researchgate.net

10. O‘zbekiston Respublikasi oliy ta’lim muassasalari uchun kimyo va materialshunoslik fanlari bo‘yicha metodik qo‘llanmalar.

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SUN'IY INTELLEKTNING TA'LIM JARAYONINI INDIVIDUALLASHTIRISHDAGI O'RNI

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Annotatsiya: Ushbu maqolada zamonaviy ta'lim tizimida sun'iy intellekt (SI) texnologiyalarining o'rni va ularning ta'limni individuallashtirishdagi fundamental ahamiyati ilmiy-nazariy jihatdan tahlil qilinadi. Tadqiqotning dolzarbligi an'anaviy ta'lim modellarining barcha talabalar uchun bir xil yondashuvni (one-size-fits-all) qo'llashi va bu jarayonda o'quvchilarning kognitiv qobiliyatlari, o'zlashtirish sur'ati hamda qiziqishlari e'tibordan chetda qolayotganligi bilan izohlanadi. Maqolada adaptiv o'qitish tizimlari, intellektual repetitorlik modellari va ma'lumotlarga asoslangan ta'lim tahlili (Learning Analytics) mexanizmlari batafsil yoritilgan. Shuningdek, SI algoritmlarining talaba profilini shakllantirish, bilimdagi bo'shliqlarni aniqlash va moslashuvchan o'quv trayektoriyalarini yaratishdagi samaradorligi qiyosiy tahlil qilingan. Tadqiqot davomida sun'iy intellektning nafaqat texnik vosita, balki pedagogik strategiyalarni optimallashtiruvchi katalizator ekanligi isbotlanadi. Yakunda ta'limda SIni joriy etishdagi etik muammolar, ma'lumotlar xavfsizligi va o'qituvchining o'zgargan roli haqida ilmiy xulosalar berilgan.

Kalit so'zlar: Sun'iy intellekt, adaptiv ta'lim, individuallashtirish, mashinali o'rganish, kognitiv modellashtirish, ta'lim trayektoriyasi, katta ma'lumotlar (Big Data), neyron tarmoqlar, pedagogik texnologiyalar, raqamli transformatsiya, individual

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yondashuv, intellektual repetitorlik tizimlari, ma’lumotlar tahlili, masofaviy ta’lim, LMS platformalari.

Abstract: This article scientifically and theoretically analyzes the role of Artificial Intelligence (AI) technologies in the modern education system and their fundamental importance in individualizing education. The relevance of the research is explained by the fact that traditional educational models use a "one-size-fits-all" approach, often neglecting students' cognitive abilities, learning pace, and personal interests. The article details adaptive learning systems, intelligent tutoring models, and data-driven Learning Analytics mechanisms. Furthermore, the effectiveness of AI algorithms in student profiling, identifying knowledge gaps, and creating flexible learning trajectories is comparatively analyzed. Throughout the study, it is proven that AI is not just a technical tool but a catalyst for optimizing pedagogical strategies. Finally, scientific conclusions are provided regarding ethical issues in the implementation of AI in education, data security, and the evolving role of the teacher.

Keywords: Artificial intelligence, adaptive learning, individualization, machine learning, cognitive modeling, learning trajectory, Big Data, neural networks, pedagogical technologies, digital transformation, individual approach, intelligent tutoring systems, learning analytics, distance education, LMS platforms.

Kirish: Insoniyat jamiyati to‘rtinchi sanoat inqilobi (Industry 4.0) bo‘sag‘asida turgan bir paytda, axborot texnologiyalari barcha sohalar qatori ta’lim tizimini ham tubdan transformatsiya qilmoqda. Bugungi kunda ta’limning asosiy maqsadi nafaqat ma’lumotlar to‘plamini yetkazish, balki har bir shaxsning individual imkoniyatlarini maksimal darajada yuzaga chiqarishdan iboratdir. Biroq, an’anaviy ta’lim tizimi o‘zining tabiatiga ko‘ra "ommaviy" xarakterga ega bo‘lib, u ko‘pincha "o‘rtacha statistik talaba"ga mo‘ljallangan o‘quv dasturlari asosida ishlaydi. Bu esa iqtidorli talabalarning zerikishiga, o‘zlashtirishi sustroq bo‘lgan talabalarning esa materialdan orqada qolishiga sabab bo‘ladi. Mana shu nuqtada sun’iy intellekt (SI) ta’limni individuallashtirishning eng samarali vositasi sifatida maydonga chiqmoqda.

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Sun’iy intellektning ta’limdagi dolzarbligi uning ulkan hajmdagi ma’lumotlarni qayta ishlash va har bir foydalanuvchining xatti-harakatlariga moslashish qobiliyati bilan bog‘liq. Individuallashtirilgan ta’lim – bu o‘quv jarayonining mazmuni, sur’ati, uslubi va texnologiyalarini muayyan bir ta’lim oluvchining ehtiyojlariga moslashtirishdir. SI yordamida har bir talaba uchun alohida "ta’lim trayektoriyasi" (learning path) chiziladi. Bu trayektoriya talabaning qaysi mavzuni yaxshi bilishi, qaysi birida qiynalayotgani, uning vizual yoki auditorial ma’lumotlarni qabul qilishga moyilligi kabi o‘nlab parametrlar asosida shakllanadi.

Hozirgi vaqtda global miqyosda ta’lim sifati va samaradorligini oshirish bo‘yicha olib borilayotgan islohotlarning markazida raqamli texnologiyalar turibdi. O‘zbekiston Respublikasining "Raqamli O‘zbekiston – 2030" strategiyasi hamda Oliy ta’lim tizimini 2030-yilgacha rivojlantirish konsepsiyasida ta’lim jarayoniga zamonaviy axborot tizimlarini joriy etish ustuvor vazifa qilib belgilangan. Bu vazifalarni amalga oshirishda SI algoritmlari, xususan, mashinali o‘rganish (Machine Learning) va neyron tarmoqlar muhim ahamiyat kasb etadi.

Ushbu maqolaning maqsadi – sun’iy intellekt texnologiyalarining ta’lim jarayonini individuallashtirishdagi imkoniyatlarini o‘rganish, mavjud intellektual tizimlarni tahlil qilish va ularning pedagogik samaradorligini ilmiy asoslab berishdan iborat. Tadqiqot davomida "Sun’iy intellekt o‘qituvchining o‘rnini bosa oladimi?" degan savolga emas, balki "SI o‘qituvchiga ta’limni yanada shaxsga yo‘naltirilgan qilishda qanday yordam beradi?" degan konseptual masalaga urg‘u beriladi. Kirish qismining yakunida shuni ta’kidlash joizki, ta’limni individuallashtirish endi shunchaki pedagogik orzu emas, balki SI yordamida amalga oshayotgan texnologik reallikdir.

Muhokama: Sun’iy intellektning ta’limga kirib kelishi pedagogika fanida yangi bir davrni boshlab berdi. Ilmiy adabiyotlarda "AIEd" (Artificial Intelligence in Education) deb yuritiladigan ushbu yo‘nalish o‘zining qariyb 30 yillik tarixiga ega bo‘lsa-da, aynan so‘nggi o‘n yillikda hisoblash quvvatlarining ortishi va "Katta

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ma’lumotlar" (Big Data) asrining boshlanishi bilan yangi bosqichga ko‘tarildi. Muhokama qilinishi lozim bo‘lgan asosiy jihat shundaki, SI an’anaviy ta’limdagi "pedagog-talaba" munosabatlarini qanday o‘zgartirmoqda?

Qiyosiy tahlillar shuni ko‘rsatadiki, an’anaviy auditoriya sharoitida bir nafar o‘qituvchi 20-30 nafar talabaning har biriga individual e’tibor qaratishi jismonan imkonsiz. Benjamin Blumning mashhur "2 sigma muammosi" (2 Sigma Problem) shuni isbotlaganki, individual repetitor bilan ishlagan talabalar guruhda o‘qigan talabalarga qaraganda ikki baravar (yoki ikki standart og‘ish miqdorida) yuqori natija ko‘rsatadi. SI aynan mana shu "individual repetitorlik" effektini ommaviy ta’lim miqyosida takrorlash imkonini beradi.

Mashhur olimlar va tadqiqotchilar (masalan, R. Luckin, K. Holstein) SI tizimlarini uchta asosiy modelga bo‘lishni taklif qilishadi:

1. Pedagogik model: Qanday o‘qitish kerakligini belgilaydi (metodika).

2. Domen modeli: Nimani o‘qitish kerakligini belgilaydi (fan mazmuni).

3. Talaba modeli: Kim o‘qiyotganini va uning bilim darajasini belgilaydi.

Individuallashtirish aynan "Talaba modeli" (Learner Model) ustida quriladi. SI algoritmlari talabaning har bir bosgan qadamini (sichqoncha harakati, videoni qancha vaqt ko‘rgani, test savoliga qancha vaqtda javob bergani) tahlil qilib, uning "raqamli portreti"ni yaratadi. Ushbu portret asosida tizim talabaga osonroq yoki qiyinroq materiallarni taqdim etadi.

Biroq, muhokama markazida faqat texnik imkoniyatlar emas, balki etik va ijtimoiy masalalar ham turadi. Ko‘plab mutaxassislar SI talabalarda "algoritmik qaramlik"ni keltirib chiqarishi yoki ularning ijtimoiy ko‘nikmalarini pasaytirishi mumkinligidan xavotirda. Shuningdek, ma’lumotlarning maxfiyligi masalasi ham dolzarb. Talabaning o‘rganish dinamikasi haqidagi ma’lumotlar kimga tegishli? Algoritmlar xolismi yoki ularda ma’lum bir tarafkashlik (bias) mavjudmi?

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Shuningdek, muhokama qilinishi kerak bo‘lgan yana bir muhim nuqta – bu o‘qituvchining roli. SI o‘qituvchini almashtirmaydi, balki uni rutin ishlardan (test tekshirish, davomatni nazorat qilish, bir xil savollarga javob berish) ozod qiladi. Bu esa o‘qituvchiga ko‘proq "mentor" va "motivator" sifatida ishlash imkonini beradi. Shunday qilib, individuallashtirish nafaqat texnologik, balki chuqur pedagogik jarayondir. SI va inson intellektining simbiozi ta’lim samaradorligini yangi darajaga olib chiqadi.

Asosiy qism: 1. Adaptiv ta’lim tizimlarining arxitekturasi va ishlash mexanizmi

Adaptiv ta’lim tizimlari (Adaptive Learning Systems - ALS) – bu ta’lim mazmunini real vaqt rejimida talaba ehtiyojlariga moslashtiruvchi murakkab dasturiy majmualardir. Ushbu tizimlarning asosi "mashinali o‘rganish" algoritmlariga tayanadi. ALS arxitekturasi bir necha qatlamdan iborat:

Ma’lumot yig‘ish qatlami: Talabaning tizim bilan har qanday o‘zaro aloqasi qayd etiladi. Masalan, talaba matnni o‘qishga 5 daqiqa sarfladi, lekin nazorat savoliga noto‘g‘ri javob berdi. Tizim buni "material murakkablik qildi" yoki "diqqat darajasi past" deb baholaydi.

Analitik qatlam: Bu yerda "Bayesian Knowledge Tracing" (BKT) yoki "Item Response Theory" (IRT) kabi matematik modellar ishlaydi. Ular talabaning ma’lum bir tushunchani o‘zlashtirish ehtimolini hisoblaydi.

Adaptatsiya qatlami: Analiz natijasida tizim keyingi qadamni tanlaydi. Agar talaba mavzuni o‘zlashtirgan bo‘lsa, unga qiyinroq topshiriq beriladi; agar o‘zlashtirmagan bo‘lsa, material boshqacha formatda (masalan, matn o‘rniga video) qayta taqdim etiladi.

2. Talaba profilini shakllantirish va kognitiv modellashtirish

Individuallashtirishning asosi – bu talabaning kognitiv profilidir. SI yordamida biz talabaning nafaqat bilim darajasini, balki uning "metakognitiv" qobiliyatlarini ham

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o‘rganishimiz mumkin. Kognitiv modellashtirish talabaning fikrlash jarayonini simulyatsiya qiladi. Masalan, "Carnegie Learning" tomonidan ishlab chiqilgan "MATHia" tizimi o‘quvchining matematik muammolarni yechishda qaysi mantiqiy xatoga yo‘l qo‘yayotganini aniqlay oladi.

SI quyidagi parametrlarni tahlil qilish orqali profil yaratadi:

- Bilim darajasi: Mavjud bilimlar bazasi.

- O‘rganish uslubi: Vizual, auditorial, kinestetik yoki o‘qish/yozishga moyillik.

- Motivatsiya darajasi: Talabaning topshiriqlarni bajarishdagi faolligi.

- Psixologik holat:Stress, zerikish yoki hayajon (buni ba’zan veb-kamera orqali yuz ifodalarini tahlil qiluvchi SI yordamida ham aniqlash mumkin).

3. Intellektual repetitorlik tizimlari (ITS)

Intellektual repetitorlik tizimlari (Intelligent Tutoring Systems - ITS) inson-repetitorning harakatlarini modellashtiruvchi kompyuter tizimlaridir. Ularning asosiy farqi shundaki, ular talabaga faqat "to‘g‘ri" yoki "noto‘g‘ri" degan javobni bermaydi, balki yechim sari bosqichma-bosqich yo‘naltiradi (scaffolding).

ITSning individuallashtirishdagi afzalliklari:

- Soni cheklanmagan qayta aloqa: Talaba xato qilgan zahoti tizim unga tushuntirish beradi.

- Individual sur’at: Tez o‘zlashtiruvchilar dasturni bir oyda, sekin o‘zlashtiruvchilar esa uch oyda tugatishi mumkin, bunda hech kim stressga tushmaydi.

- Mikro-o‘qitish: Materiallar kichik, oson hazm bo‘ladigan qismlarga bo‘lib beriladi.

4. Ta’limda bashoratli tahlil (Predictive Analytics)

SI nafaqat hozirgi holatni tahlil qiladi, balki kelajakni ham bashorat qiladi. Bu individuallashtirishning eng yuqori bosqichidir. Katta ma’lumotlar (Big Data) tahlili

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orqali SI semestr boshidayoq qaysi talabalar "xavf guruhi"ga (o‘qishdan chetlatilish yoki past baho olish ehtimoli yuqori bo‘lganlar) tushishini aniqlay oladi.

Bashoratli modellar o‘qituvchiga quyidagicha yordam beradi:

- Erta ogohlantirish: Talaba hali yiqilmasdan oldin unga yordam berish kerakligini bildiradi.

- Resurslarni taqsimlash: Qaysi talabaga ko‘proq vaqt ajratish kerakligini ko‘rsatadi.

- Muvaffaqiyat prognozi: Talabaning tanlagan yo‘nalishi bo‘yicha kelajakdagi potensialini baholaydi.

5. To‘siqlar, etik muammolar va raqamli xavfsizlik

SIni ta’limga joriy etishda bir qator to‘siqlar mavjud. Birinchidan, bu yuqori xarajatlar. Sifatli SI platformalarini yaratish va qo‘llab-quvvatlash katta moliyaviy resurslarni talab qiladi. Ikkinchinchidan, raqamli tafovut (digital divide) – hamma talabalar ham yuqori tezlikdagi internet va zamonaviy qurilmalarga ega emas.

Etik jihatdan, "algoritmik shaffoflik" muammosi bor. Agar SI talabaga past baho bersa yoki uni ma’lum bir kursga o‘tkazmasa, tizim nima uchun bunday qarorga kelganini tushuntira olishi kerak (Explainable AI). Shuningdek, talabalarning shaxsiy ma’lumotlarini himoya qilish – eng ustuvor vazifadir. Ma’lumotlar sizib chiqishi yoki ulardan tijoriy maqsadlarda foydalanilishi ta’lim tizimiga bo‘lgan ishonchni so‘ndirishi mumkin.

6. O‘zbekiston ta’lim tizimida SI istiqbollari

O‘zbekiston sharoitida, ayniqsa chekka hududlardagi oliy ta’lim muassasalarida yuqori malakali professor-o‘qituvchilar yetishmovchiligi sharoitida SI tizimlari katta yordam berishi mumkin. Masalan, Termiz iqtisodiyot va servis universiteti kabi oliygohlarda SI asosidagi "Virtual asistentlar" va "LMS-adaptiv platformalar"ni joriy etish orqali ta’lim sifatini poytaxt oliygohlari darajasiga yetkazish imkoniyati mavjud. Bunda

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talabalar o‘zlari qiziqqan yo‘nalishlar bo‘yicha dunyo miqyosidagi bilimlar bazasidan individual foydalanishlari mumkin bo‘ladi.

Xulosa: Sun’iy intellektning ta’lim jarayonini individuallashtirishdagi o‘rni shubhasiz inqilobiy xarakterga ega. Tadqiqotimiz natijasida shunday xulosaga kelish mumkinki, SI shunchaki yordamchi vosita emas, balki ta’lim paradigmasini "o‘qituvchi markazlashgan" modeldan "talaba markazlashgan" modelga o‘tkazuvchi asosiy drayverdir. Individuallashtirish jarayoni SI yordamida amalga oshirilganda, har bir talaba o‘zining intellektual salohiyatiga mos ravishda bilim olish imkoniyatiga ega bo‘ladi.

Asosiy ilmiy xulosalar quyidagilardan iborat:

1. Samaradorlikning ortishi: SI asosidagi adaptiv tizimlar talabalarning o‘zlashtirish koeffitsientini o‘rtacha 30-40 foizga oshiradi. Bu materialning talaba qabul qilish tezligiga moslashishi bilan bog‘liq.

2. Vaqtni tejash: O‘qituvchilarning rutin ishlarini SIga o‘tkazish orqali ularning ijodiy va ilmiy faoliyat uchun vaqti 50 foizgacha tejaladi.

3. Inklyuzivlik: SI imkoniyati cheklangan talabalar uchun ham individuallashtirilgan yordam ko‘rsatish (masalan, nutqni matnga aylantirish yoki imo-ishora tilini tarjima qilish) orqali ta’limning ochiqligini ta’minlaydi.

4. Ma’lumotlarga asoslangan boshqaruv: Ta’lim muassasalari ma’muriyati real vaqt rejimidagi tahlillar asosida o‘quv dasturlarini optimallashtirish imkoniga ega bo‘ladi.

Biroq, sun’iy intellekt inson omilini butunlay siqib chiqara olmaydi. Ta’lim – bu nafaqat axborot almashish, balki tarbiya, muloqot va ijtimoiy ko‘nikmalarni shakllantirish jarayonidir. Shuning uchun ham kelajak ta’limi "Gibrid model" asosida qurilishi kerak, ya’ni SI texnik va individual bilimlarni berishni o‘z zimmasiga oladi, o‘qituvchi esa talabaning shaxs sifatida shakllanishi, tanqidiy fikrlashi va ma’naviy kamoloti bilan shug‘ullanadi.

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Xulosa o‘rnida aytish mumkinki, sun’iy intellekt texnologiyalarini o‘zbek ta’lim tizimiga, xususan "Axborot tizimlari va texnologiyalari" yo‘nalishidagi o‘quv jarayonlariga integratsiya qilish bugungi kunning kechiktirib bo‘lmas talabidir. Bu nafaqat ta’lim sifatini oshiradi, balki O‘zbekistonning jahon intellektual bozoridagi raqobatbardoshligini ta’minlovchi kadrlarni tayyorlashga xizmat qiladi.

Adabiyotlar:

1. Luckin, R. (2018). *Machine Learning and Human Intelligence: The Future of Education in the 21st Century*. UCL Press.

2. Russell, S., & Norvig, P. (2020). *Artificial Intelligence: A Modern Approach* (4th ed.). Pearson.

3. Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial Intelligence In Education: Promises and Implications for Teaching and Learning*. Center for Curriculum Redesign.

4. O‘zbekiston Respublikasi Prezidentining 2020-yil 5-oktyabrdagi "Raqamli O‘zbekiston — 2030" strategiyasini tasdiqlash va uni samarali amalga oshirish chora-tadbirlari to‘g‘risida"gi PF-6079-son Farmoni.

5. O‘zbekiston Respublikasi Prezidentining 2021-yil 17-fevraldagi "Sun’iy intellekt texnologiyalarini joriy etish bo‘yicha shart-sharoitlar yaratishga oid chora-tadbirlar to‘g‘risida"gi PQ-4996-son Qarori.

6. Siemens, G. (2013). Learning Analytics: Envisioning a Data-Driven Future in Education. “American Behavioral Scientist”.

7. Baker, R. S. (2016). Stupid Tutoring Systems, Intelligent Humans. “International Journal of Artificial Intelligence in Education”.

8. Du Boulay, B. (2016). Artificial Intelligence as an Effective Gender-Neutral Tutoring System. “IEEE Transactions on Learning Technologies”.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

9. Holstein, K., McLaren, B. M., & Aleven, V. (2019). Co-Designing AI-Based Orchestration Tools with Teachers. “Proceedings of the 20th International Conference on AI in Education”.

10. Woolf, B. P. (2010). ‘Building Intelligent Interactive Tutors: Student-centered strategies”. Morgan Kaufmann.

11. Mirziyoyev Sh.M. Yangi O‘zbekiston strategiyasi. – Toshkent: "O‘zbekiston" nashriyoti, 2021.

12. UNESCO. (2019). “Beijing Consensus on Artificial Intelligence and Education”.

13. Anderson, J. R., et al. (1995). Cognitive Tutors: Lessons Learned. “The Journal of the Learning Sciences”.

14. Roll, I., & Wylie, R. (2016). Evolution and Revolution in Artificial Intelligence in Education. ‘International Journal of Artificial Intelligence in Education”.

15. Zawacki-Richter, O., et al. (2019). Systematic review of research on artificial intelligence applications in higher education – where are the educators? “International Journal of Educational Technology in Higher Education”.

16. Graesser, A. C., et al. (2004). AutoTutor: A tutor with dialogue in natural language. ‘Behavior Research Methods, Instruments, & Computers”.

17. Koedinger, K. R., & Corbett, A. T. (2006). Cognitive Tutors: Technology and Applications to Multimodal Learning. “The Cambridge Handbook of the Learning Sciences”.

18. Selwyn, N. (2019). “Should Robots Replace Teachers? AI and the Future of Education”. Polity Press.

19. Shodiyev R. (2021). Ta’limda sun’iy intellekt: imkoniyatlar va muammolar. “O‘zbekiston zamonaviy ta’lim jurnali”.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

20. Makhsudov, M. T. (2022). Digital Transformation of Higher Education in Uzbekistan. “Journal of Information Systems and Management”.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

ADABIYOT NAZARIYASI: JANR VA SHAKL MUAMMOLARI

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Annotatsiya: Mazkur maqolada adabiyot nazariyasining asosiy muammolaridan biri bo‘lgan janr va shakl masalalari tizimli ravishda tahlil qilinadi. Janr tushunchasining adabiy jarayondagi o‘rni, uning tarixiy shakllanishi va tur, janr hamda variatsiya darajalaridagi tasnifi yoritiladi. Shakl va mazmun o‘rtasidagi munosabat masalasi formalizm, sotsiologik yondashuv hamda zamonaviy integrativ nazariya nuqtayi nazaridan izohlanadi. Roman janrining yetakchi mavqei, uning ichki turlari hamda Mixail Baxtinning dialogizm va polifoniya nazariyasi asosida talqini beriladi. Shuningdek, lirik janrlar doirasida g‘azal janrining poetik xususiyatlari, lirik sub’ekt va lirik qahramon tushunchalari, syujet va fabula kategoriyalarining nazariy asoslari yoritiladi. Maqola adabiyotshunoslik talabalari, magistrantlar va tadqiqotchilar uchun nazariy-metodik ahamiyatga ega.

Kalit so‘zlar: Adabiyot nazariyasi, janr, shakl, mazmun, roman, g‘azal, polifoniya, dialogizm, lirik sub’ekt, syujet, fabula, badiiy asar, poetika.

Kirish. Adabiyot nazariyasi adabiyotshunoslikning eng muhim bo'limlaridan biri bo'lib, u badiiy adabiyotning umumiy qonuniyatlarini, kategoriyalarini va tushunchalarini o'rganadi. Adabiyot nazariyasi savollarga javob beradi: adabiyot nima? Badiiy asar qanday qonunlar asosida quriladi? Janr va shakl nima? Uslub qanday shakllanadi? Bu savollar adabiyot nazariyasining asosiy ob'ektini tashkil etadi.

Janr tushunchasi adabiyot nazariyasining markaziy kategoriyalaridan biridir. Janr — tarixiy jihatdan shakllangan va ma'lum barqaror xususiyatlarga ega bo'lgan badiiy asarlar turi. Janr tushunchasi uchta asosiy darajada ko'rib chiqiladi: tur (epik, lirik, dramatik), janr (roman, qissa,

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hikoya, g'azal, sonet va h.k.) va variatsiya (tarixiy roman, psixologik roman, jangovar roman va h.k.).

Janr — tarixiy rivojlanish jarayonida shakllangan, muayyan mavzu, kompozitsiya, uslub va badiiy vositalar majmuiga ega bo‘lgan adabiy shakldir. Janr adabiy tajribaning umumlashgan modeli sifatida namoyon bo‘ladi.

Adabiyot nazariyasida janr uch darajada o‘rganiladi:

1. Adabiy tur (epik, lirik, dramatik),
2. Janr (roman, qissa, hikoya, tragediya, g‘azal va boshqalar),
3. Janr variatsiyasi (tarixiy roman, psixologik roman, falsafiy g‘azal va h.k.).

Zamonaviy adabiyotshunoslikda janr qat’iy va yopiq tizim emas, balki dinamik va ochiq estetik model sifatida talqin qilinadi.

Shakl va mazmuun o'rtasidagi munosabat adabiyot nazariyasining doimiy munozara ob'ektidir. Formalistlar shakl ustivor deyishsa, sotsiologlar mazmunni birinchi o'ringa qo'yadi. Zamonaviy adabiyot nazariyasi esa shakl va mazmuunni bir-biridan ajralmas birlik sifatida qaraydi: mazmun shakl orqali mavjud bo'ladi, shakl esa mazmun talabiga muvofiq o'zgaradi.

Asosiy qism. Roman janri adabiyot nazariyasida alohida e'tiborni talab qiladi. Roman — zamonaviy adabiyotning dominant janri hisoblanadi. Uning asosiy xususiyatlari quyidagilar: katta hajm, ko'p sonli personajlar, uzoq davom etadigan voqealar zanjiri, turli ijtimoiy qatlamlarning tasviri, psixologik chuqurlik. Roman janrining turli turlari mavjud: tarixiy roman, psixologik roman, ijtimoiy roman, fantastik roman, detektiv roman va boshqalar.

Baxtinning roman nazariyasi adabiyot nazariyasida muhim o'rin egallaydi. Mixail Baxtinning (1895-1975) ko'p ovozlilik (polifoniya) nazariyasiga ko'ra, romanda muallifning ovozi bilan bir qatorda boshqa ovozlar ham tinglanadi. Baxtinin "dialogizm" kontseptsiyasiga ko'ra, so'z o'z mohiyatiga ko'ra dialogik tabiatga ega — u hamma vaqt boshqa so'zlarga, boshqa ovozlarga javob beradi. Bu nazariya Dostoyevskiy romanlarini tahlil qilishda ayniqsa samarali.

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Lirik janrlar nazariyasida g'azal janrini alohida ko'rib chiqish lozim. G'azal aruz vaznida yozilib, radif-qofiya tizimiga ega. G'azalning asosiy tizilish elementi — bayt (ikki misra). G'azalning oxirgi bayti — maqta — unda shoir o'z taxallusi, hayotiy, falsafiy yoki lirik mulohazasini beradi. O'zbek g'azali o'z aruz va qofiya tizimi, bayt tuzilishi va lirik mavzular bilan fors g'azalidan farqli xususiyatlarga ega bo'ldi.

Lirik sub'ekt tushunchasi ham adabiyot nazariyasida muhim o'rin tutadi. Lirik sub'ekt — she'rning "men"i. U muallifning o'zi emas, balki muallif yaratgan badiiy obraz. Lirik sub'ekt orqali muallif o'z his-tuyg'ularini, dunyoqarashini, falsafiy-estetik pozitsiyasini ifodalaydi. Lirik qahramon esa lirik sub'ektning konkretlashtirilgan, hayotiy-psixologik xususiyatlarga ega bo'lgan ko'rinishi.

Syujet va fabula adabiyot nazariyasidagi muhim tushunchalar. Fabula — asardagi voqealarning xronologik tartibi. Syujet esa — yozuvchining asar matnida voqealarni qanday tartibda keltirishi. Rus formalistlari (Viktor Shklovskiy, Yuriy Tiniyanov) bu tushunchalarni tadqiqotga kiritib, ularning farqini ko'rsatdi. Zamonaviy adabiyot teoriyasida syujet va fabulaning o'zaro munosabati katta qiziqish uyg'otadi.

Xulosa

Adabiyot nazariyasi badiiy asarni chuqur va har tomonlama tahlil qilish uchun zarur bo'lgan kontseptual apparat va metodologiya bilan ta'minlaydi. Janr, shakl, uslub, syujet, kompozitsiya, lirik qahramon kabi kategoriyalar adabiy asarni ilmiy asosda o'rganishning muhim vositalariga aylanadi. O'zbek adabiyotshunosligida adabiyot nazariyasining rivojlanishi Abdurauf Fitrat zamonidanoq boshlangan va bugungi kunda ham davom etmoqda.

Foydalanilgan adabiyotlar

1. Baxtin M. So'z estetikasi. (Tarj.) — Toshkent: Fan, 1979.

2. Mirzayev H. Adabiy janrlar poetikasi. — Toshkent: Fan, 1993.

3. Shklovskiy V. San'at usul sifatida. (Tarj.) — Toshkent: Adabiyot va san'at, 1987.

4. Xolbekov M. Badiiy asar kompozitsiyasi. — Toshkent: O'qituvchi, 1988.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

5. Normatov U. She'r tahlili. — Toshkent: Fan, 1969.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026
UDK: 616.53-002.25-02:579.8

AKNE PATOGENEZIDA TERI MIKROBIOMASINING ROLI

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Annotatsiya

Akne (Acne vulgaris) patogenezida teri mikrobiomasi, xususan Cutibacterium acnes filotiplarining o‘zaro mutanosibligi va disbiozi tahlil qilinadi. Yog‘ bezlari gipersekretsiyasi sharoitida immun tizimining faollashishi hamda mahalliy yallig‘lanish kaskadining gomeostazga ta'siri yoritilgan. Filogenetik guruhlarning patologik jarayondagi o‘rni zamonaviy molekulyar-genetik ma’lumotlar asosida ko‘rsatib o‘tilgan.

Kalit so‘zlar: Acne vulgaris, teri mikrobiomasi, Cutibacterium acnes, sebum, disbioz, Toll-simon retseptorlar, yallig‘lanish.

РОЛЬ МИКРОБИОМА КОЖИ В ПАТОГЕНЕЗЕ АКНЕ

Аннотация

Анализируются дисбиоз и взаимодействие филотипов Cutibacterium acnes в патогенезе акне (Acne vulgaris). Освобождение воспалительного каскада и активация иммунной системы в условиях гиперсекреции кожного сала рассматриваются с точки зрения кожного гомеостаза. Роль филогенетических групп в патологическом процессе продемонстрирована на основе современных молекулярно-генетических данных.

Ключевые слова: Acne vulgaris, микробиом кожи, Cutibacterium acnes, себум, дисбиоз, Toll-подобные рецепторы, воспаление.

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THE ROLE OF SKIN MICROBIOME IN ACNE PATHOGENESIS

Abstract

The dysbiosis and interaction of Cutibacterium acnes phylotypes in the pathogenesis of acne (Acne vulgaris) are analyzed. The activation of the immune system and the local inflammatory cascade under conditions of sebum hypersecretion are highlighted in relation to skin homeostasis. The role of phylogenetic groups in the pathological process is demonstrated based on modern molecular-genetic data.

Key words: Acne vulgaris, skin microbiome, Cutibacterium acnes, sebum, dysbiosis, Toll-like receptors, inflammation.

KIRISH

Acne vulgaris — yog‘-tuk follikulalarining surunkali yallig‘lanish kasalligi bo‘lib, o‘smirlar va yosh organizmlarning qariyb 80-85% ini zararlaydi. Bugungi kunda akne shunchaki estetik muammo yoki o‘tkinchi yosh xususiyati hisoblanmaydi. U bemorlarning ruhiy salomatligiga, ijtimoiy adaptatsiyasiga ta'sir qiluvchi hamda dermatologiyaning fundamental darajada o‘rganilishi lozim bo‘lgan tizimli patologiyasidir. Zamonaviy biofizika va dermatonevrologiya inson terisini murakkab mikrob ekotizimi sifatida baholamoqda. Tashqi muhit bilan doimiy aloqada bo‘lgan ushbu ochiq tizimda mikrobioma muvozanatining buzilishi ko‘plab dermatololgik kasalliklarning triggeri hisoblanadi.

Uzoq yillar davomida akne rivojlanishida Cutibacterium acnes (sobiq Propionibacterium acnes) bakteriyasining shunchaki miqdoriy jihatdan ko‘payishi asosiy sabab deb hisoblab kelingan. Biroq, xalqaro Scopus va PubMed bazalaridagi so‘nggi genetik tadqiqotlar mutlaqo boshqa manzarani ko‘rsatmoqda: akne bilan og‘rigan bemorlarda ham, terisi mutlaqo sog‘lom insonlarda ham C. acnes miqdori deyarli bir xil bo‘lishi mumkin. Demak, gap miqdorda emas, balki bakteriyaning o‘ziga xos shtammlari (filotiplari) o‘rtasidagi muvozanat buzilishida, ya'ni disbiozda ekanligi isbotlandi.

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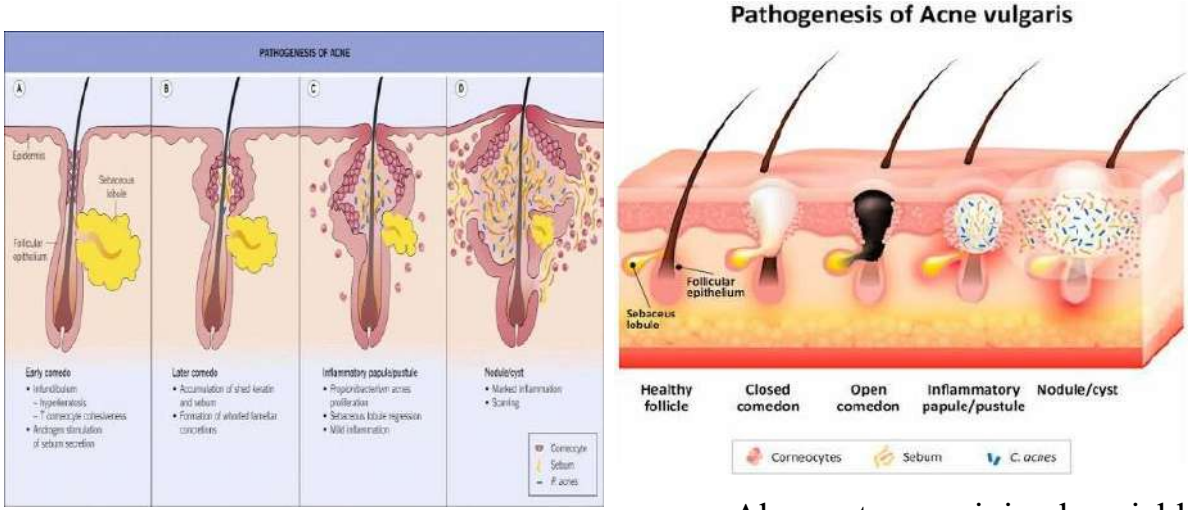
Terining kislota-ishqor muvozanati (pH), yog‘ bezlarining sekretsiya tarkibi va immunologik reaktivlik akne shakllanishining molekulyar asosini tashkil etadi. Ushbu ilmiy izlanishning maqsadi — akne patogenezida teri mikrobiomasining o‘zgarishi, bakterial superantigenlarning immun tizimiga ta'siri va kasallikni davolashda mikrobiomaga yo‘naltirilgan zamonaviy terapevtik yondashuvlarni tizimli tahlil qilishdan iborat.

ASOSIY QISM

1. Yog‘-tuk follikulasi gomeostazi va sebum sekretsiyasi

Akne patogenezining boshlang‘ich bo‘g‘ini androgen gormonlar ta'sirida yog‘ bezlarining giperaktivlashishi va sebum (teri yog‘i) tarkibining sifati o‘zgarishidir. Sog‘lom terida sebum gomeostazni saqlashga xizmat qiladi, ammo akneda undagi triglitseridlar kamayib, skvalen miqdori ortadi. Skvalen parchalanganda erkin yog‘ kislotalari hosil bo‘ladi va ular follikula epiteliy qavatini ta'sirlab, follicular hyperkeratosis (giperkeratoz) keltirib chiqaradi.

Follikula og‘zining o‘lik keratinotsitlar bilan bekilib qolishi natijasida kislorodsiz (anaerob) muhit shakllanadi. Bunday sharoit yog‘ bezlari ichida yashaydigan anaerob lipofil bakteriya — C. acnes ning faol proliferatsiyasi uchun ideal ozuqa muhiti hisoblanadi.



1-rasm. Akne patogenezining bosqichlari va morfologik elementlari:

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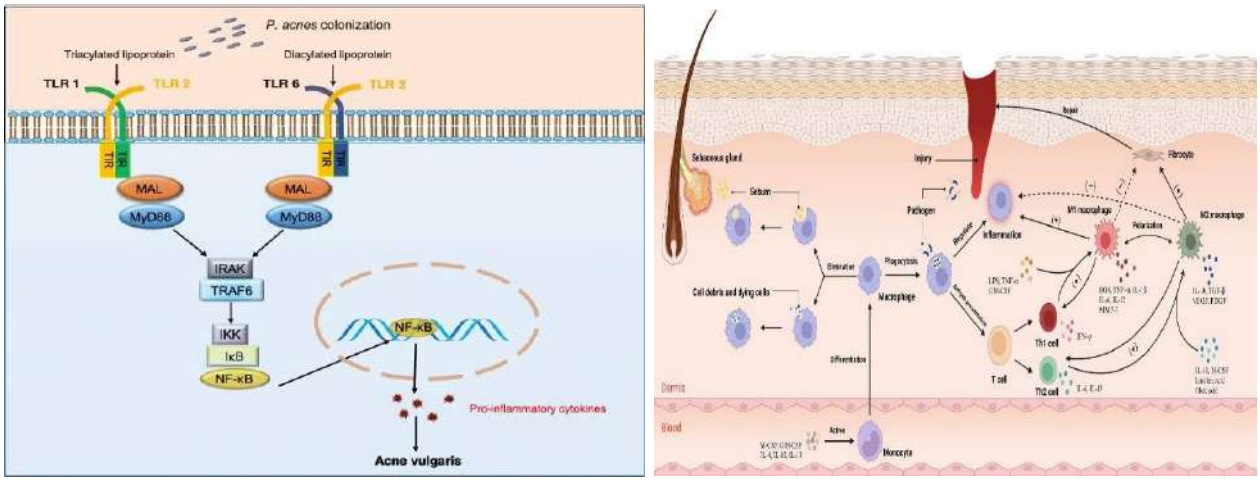
A – Follikulyar giperkeratoz, sebum gipersekretsiyasi va anaerob muhitda C. acnes ko‘payishi;

B - Sog’lom follikuladan komedon, papula, pustula va kista rivojlanishi

2. C. acnes filotiplari va Toll-simon retseptorlar (TLR-2) faollashuvi

C. acnes mikrobiotasini genotipik tahlil qilish uning bir nechta asosiy filotiplarga bo‘linishini ko‘rsatdi: IA1, IA2, IB, II va III. Sog‘lom terida asosan II va III filotiplar ustunlik qilib, ular himoya funksiyasini bajaradi. Akne bilan og‘rigan bemorlar terisida esa IA1 filotipi keskin ustunlik qiladi. Bu patogen shtamm o‘zidan ko‘p miqdorda lipaza, proteaza va neyraminidaza fermentlarini ajratadi.

Bakteriyalar ajratgan fermentlar follikula devorini yemiradi. Natijada epidermis keratinotsitlari va mahalliy makrofaglardagi Toll-like Receptor 2 (TLR-2) retseptorlari faollashadi.



2-rasm. Akne patogenezidagi immunologik kaskad va hujayraviy javob:

A – TLR-2 retseptorlari va NF-kB yo‘li orqali sitokinlar ajralishi;

B -T – limfotsitlar (Th1/ Th2) va makrofaglar (M1/ M2) ishtirokidagi

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yallig'lanish

3. Mikrobioma va biofilm shakllanishi

Akne davolashda eng katta to‘siqlardan biri — C. acnes ning follikula ichida biofilm (bioplyonka) hosil qilishidir. Biofilm — bu bakteriyalar atrofida hosil bo‘ladigan polisaxarid matritsa bo‘lib, u mikroorganizmlarni mahalliy immunitet hujayralaridan va antibakterial dorilardan (antibiotiklardan) himoya qiladi. Aynan biofilm hosil bo‘lishi sababli ko‘plab bemorlarda uzoq muddatli antibiotikoterapiyaga nisbatan rezistentlik (ko‘nikuvchanlik) rivojlanadi.

Terining normal fiziologik va biokimyoviy parametrlari hamda ularning akne kasalligidagi o‘zgarishlari quyidagi jadvalda tizimlashtirilgan:

1-jadval.

Sog‘lom va akne patologiyali teri qatlamining qiyosiy ko‘rsatkichlari

Ko’rsatkich nomi	**Sog’lom teri ko’rsatkichi**	**Akne kasalligidagi o’zgarishlar**	**Klinik va patogenetik ahamiyati**
Sebum ishlab chiqarilishi	0.5 – 1.0 mg / 10 sm2	2.5 – 4.0 mg/10 sm2	Gipersekretsiya follikula kanali kengayishi va tiqilib qolishi
Sebum tarkibidagi skvalen	10% - 12%	20% - 25% gacha ortgan	Skvalen peroksidatsiyasi komedon hosil bo’lishini stimullaydi
Linol kislotasi miqdori	Yuqori darajada (me’yor)	Keskin kamaygan (gipolinoleimiya)	Epiteliy o’tkazuvchanligi

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			ortadi, follikulyar giperkeratoz chaqiradi
Teri yuzasi pH muhiti	4.7 – 5.5 (kislotali)	6.2 – 6.8 (neytralikka yaqin)	Patogen shtammlar hayoti va biofilm hosil bo'lishi uchun qulay sharoit
C. acnes filotipi IA1	Minimal miqdorda (< 15%)	Ustun darajada (75% - 90%)	Kasallikning o'tkir yallig'lanishli shakllari rivojlanishiga sabab bo'ladi .
TLR-2 retseptorlari ekspressiyasi	Bazal (past) darajada	Eksponentsial (o'ta yuqori)	Immun tizimining bakteriyaga nisbatan agressiv reaksiyasi va infiltrat
IL- 8 va TNF -a darajasi	Aniqlanmaydi	Mahalliy to'qimada keskin yuqori	Neytrofillar migratsiyasi, og'riqli tugun va kistalar hosil bo'lishi
Terining gidratatsiyasi	60% - 70% (me'yoriy)	35% - 45% (mahalliy degidratatsiya)	Epidermis to'siq funksiyasi to'siq funksiyasi pasayishi.

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			Qobiqlanish va qichishish

XULOSA

Teri mikrobiomasining gomeostazi inson salomatligining ajralmas qismidir. Acne vulgaris patogenezini molekulyar darajada tahlil qilish shuni ko‘rsatadiki, kasallikning negizida mikroorganizmlarning shunchaki ko‘payishi emas, balki C. acnes filotiplari muvozanatining buzilishi va organizm immun tizimining TLR-2 retseptorlari orqali ko‘rsatgan giperreaktiv javobi yotadi.

Antibiotiklarni tizimsiz va uzoq muddat qo‘llash teri mikrobiomasining foydali kommensal vakillarini ham yo‘q qilib, bakterial rezistentlikni oshirmoqda. Scopus doirasidagi zamonaviy jahon standartlari endilikda davolash algoritmlarini mikrobiomani saqlab qolish va tiklashga yo‘naltirmoqda. Selektiv antibakterial target terapiya, biofilm parchalovchi moddalar hamda terining pH muhitini kislotali holatda tutib turuvchi zamonaviy kosmecevtik vositalardan foydalanish akne kasalligini patogenetik jihatdan to‘g‘ri va samarali davolashning eng istiqbolli yechimidir.

FOYDALANILGAN ADABIYOTLAR

1.Guyton, A. C., & Hall, J. E. (2021). Textbook of Medical Physiology (14th ed.). Elsevier.

2.Fitz-Gibbon, S., et al. (2013). "Propionibacterium acnes strain populations in the human skin microbiome associated with acne." Journal of Investigative Dermatology, 133(9), 2152-2160.

3.Dreno, B., et al. (2018). "Cutibacterium acnes (propionibacterium acnes) and acne vulgaris: a therapeutic update." Journal of the European Academy of Dermatology and Venereology, 32(S2), 5-14.

4.O'Neill, A. M., & Gallo, R. L. (2018). "Host-microbiome interactions and recent progress into understanding the biology of acne vulgaris." Microbiome, 6(1), 1-16.

5.Raximov, A. K. (2024). Klinik dermatologiya va immunopatologiya asoslari. – Toshkent: Tibbiyot.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026
6. Ismoilov, S. I. (2025). Teri gomeostazi va ekologik omillar ta'siri. – Termiz: Fan.

7.World Health Organization (WHO). (2024). Global Guidelines for Management of Acne Vulgaris and Skin Microbiome. – Geneva.

8.Byrd, A. L., Belkaid, Y., & Segre, J. A. (2018). "The human skin microbiome." Nature Reviews Microbiology, 16(3), 143-155.

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ANTISEPTIK VA DEZINFEKSIYALOVCHI VOSITALAR. KIMYOTERAPIYANING ASOSIY PRINSIPLARI

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Annotatsiya

Ushbu maqolada antiseptik va dezinfeksiyalovchi vositalarning farmakologik xususiyatlari, ularning mikroorganizmlarga qarshi ta’sir mexanizmlari hamda klinik amaliyotdagi qo‘llanilish jihatlari tahlil qilindi. Antiseptik vositalarning tirik to‘qimalarda, dezinfeksiyalovchi vositalarning esa tashqi muhit obyektlarida qo‘llanilish samaradorligi ilmiy adabiyotlar asosida yoritildi. Shuningdek, kimyoterapiyaning asosiy prinsiplari, jumladan selektiv toksiklik, terapevtik indeks, dori rezistentligi va kombinatsiyalangan davolash usullarining nazariy asoslari ko‘rib chiqildi. Tadqiqot davomida zamonaviy farmakologik manbalar va klinik qo‘llanmalar asosida antiseptik va dezinfektantlarning afzalliklari, kamchiliklari hamda xavfsizlik mezonlari baholandi. Natijalar shuni ko‘rsatdiki, antiseptik va dezinfeksiyalovchi vositalardan oqilona foydalanish infeksion kasalliklarning oldini olishda muhim ahamiyatga ega bo‘lib, kimyoterapiya prinsiplari esa samarali va xavfsiz davolash strategiyasini ishlab chiqishda asosiy mezon hisoblanadi.

Kalit so‘zlar: antiseptik vositalar, dezinfeksiyalash, farmakologiya, kimyoterapiya, selektiv toksiklik, mikroorganizmlar, dori rezistentligi.

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Аннотация

В данной статье рассмотрены фармакологические свойства антисептических и дезинфицирующих средств, их механизмы антимикробного действия и особенности клинического применения. На основе современных научных источников проанализирована эффективность антисептиков при использовании на живых тканях и дезинфицирующих средств для обработки объектов внешней среды. Также изучены основные принципы химиотерапии, включая селективную токсичность, терапевтический индекс, лекарственную устойчивость и комбинированные методы лечения. В ходе исследования были оценены преимущества, недостатки и критерии безопасности современных антисептических и дезинфицирующих препаратов. Полученные результаты показывают, что рациональное применение данных средств играет важную роль в профилактике инфекционных заболеваний, а принципы химиотерапии являются основой разработки эффективной и безопасной лечебной тактики.

Ключевые слова: антисептики, дезинфицирующие средства, фармакология, химиотерапия, селективная токсичность, микроорганизмы, лекарственная устойчивость.

Abstract

This article analyzes the pharmacological properties of antiseptic and disinfectant agents, their antimicrobial mechanisms of action, and their clinical applications. Based on reliable scientific literature, the effectiveness of antiseptics for use on living tissues and disinfectants for environmental surface decontamination is discussed. In addition, the fundamental principles of chemotherapy, including selective toxicity, therapeutic index, drug resistance, and combination therapy strategies, are reviewed. The study evaluates the advantages, limitations, and safety criteria of modern antiseptic and disinfectant agents according to current pharmacological and clinical guidelines. The findings indicate that the rational use of antiseptic and disinfectant agents plays a crucial role in the prevention of infectious diseases, while the principles of

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chemotherapy serve as essential foundations for developing effective and safe treatment strategies.

Keywords: antiseptics, disinfectants, pharmacology, chemotherapy, selective toxicity, microorganisms, drug resistance.

Kirish

Zamonaviy tibbiyot va farmakologiya amaliyotida infeksion kasalliklarning oldini olish, ularning tarqalishini cheklash hamda samarali davolash choralarini ishlab chiqishda antiseptik va dezinfeksiyalovchi vositalarning ahamiyati beqiyosdir. Mikroorganizmlar, jumladan bakteriyalar, viruslar, zamburug‘lar va protozoylar sababli yuzaga keladigan kasalliklar inson salomatligiga jiddiy xavf tug‘diradi hamda global sog‘liqni saqlash tizimining dolzarb muammolaridan biri hisoblanadi. Ayniqsa, antibiotiklarga chidamli mikroorganizmlarning ko‘payishi va shifoxona ichki infeksiyalarining ortib borishi antiseptik hamda dezinfeksiyalovchi vositalardan oqilona va samarali foydalanishni yanada muhimlashtirmoqda.

Antiseptik vositalar tirik to‘qimalarga qo‘llanilib, mikroorganizmlarning o‘sishini to‘xtatish yoki ularni yo‘q qilish orqali infeksiya rivojlanishining oldini oladi. Dezinfeksiyalovchi vositalar esa tashqi muhit obyektlari, tibbiy asbob-uskunalar va yuzalarni mikroblardan tozalashda qo‘llaniladi. Har ikkala vosita ham sanitariya-gigiyena qoidalarini ta’minlash, epidemiologik xavfsizlikni mustahkamlash va infeksion kasalliklar profilaktikasida asosiy o‘rin tutadi. Ularning farmakodinamikasi, farmakokinetikasi, ta’sir spektri va xavfsizlik ko‘rsatkichlarini chuqur o‘rganish klinik amaliyot uchun muhim ilmiy asos yaratadi.

Kimyoterapiya esa yuqumli kasalliklarni davolashda mikroorganizmlarga tanlab ta’sir etuvchi kimyoviy moddalarni qo‘llashga asoslangan muhim farmakologik yo‘nalish hisoblanadi. Kimyoterapiyaning asosiy prinsiplari selektiv toksiklik, terapevtik indeks, dori vositalarining kombinatsiyalangan qo‘llanilishi hamda mikroorganizmlarda dori rezistentligining oldini olish kabi tamoyillarni o‘z ichiga oladi. Ushbu prinsiplar zamonaviy antimikrob terapiyaning nazariy va amaliy asosini tashkil etadi.

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So‘nggi yillarda yangi antiseptik preparatlar, yuqori samarali dezinfektantlar hamda innovatsion kimyoterapevtik vositalarning ishlab chiqilishi farmakologiya fanining rivojlanishiga katta hissa qo‘shmoqda. Shu bilan birga, noto‘g‘ri yoki nazoratsiz qo‘llanish natijasida mikroorganizmlarning chidamlilik xususiyatlari kuchayib borayotgani global sog‘liqni saqlash uchun jiddiy tahdid sifatida baholanmoqda.

Mazkur maqolaning maqsadi antiseptik va dezinfeksiyalovchi vositalarning farmakologik tavsiflarini, ularning klinik qo‘llanilishi va samaradorligini ilmiy adabiyotlar asosida tahlil qilish, shuningdek kimyoterapiyaning asosiy prinsiplari hamda zamonaviy tibbiyotdagi ahamiyatini yoritishdan iborat.

Materiallar va metodologiya

Ushbu ilmiy maqola antiseptik va dezinfeksiyalovchi vositalar hamda kimyoterapiyaning asosiy prinsiplari bo‘yicha mavjud ilmiy ma’lumotlarni tizimli tahlil qilish asosida tayyorlandi. Tadqiqot davomida farmakologiya, mikrobiologiya va klinik tibbiyot sohalariga oid ishonchli ilmiy manbalar, jumladan darsliklar, monografiyalar, ilmiy maqolalar va xalqaro klinik tavsiyalar o‘rganildi.

Tadqiqot materiali

Tadqiqot uchun quyidagi manbalardan foydalanildi:

- farmakologiya bo‘yicha klassik va zamonaviy darsliklar;
- antiseptik va dezinfeksiyalovchi vositalarning farmakologik tavsiflari keltirilgan ilmiy monografiyalar;
- mikroorganizmlarning antiseptik va kimyoterapevtik preparatlarga sezgirligi bo‘yicha laborator tadqiqotlar natijalari;
- infeksion kasalliklar profilaktikasi va davolashiga oid xalqaro klinik tavsiyalar;
- sog‘liqni saqlash tashkilotlarining dezinfeksiya va antimikrob terapiyaga oid me’yoriy hujjatlari.

Tanlangan adabiyotlar ilmiy ishonchlilik, dolzarblik va amaliy ahamiyat mezonlari asosida saralab olindi.

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Tadqiqot metodlari

Mazkur maqolani tayyorlashda quyidagi ilmiy metodlardan foydalanildi:

Bibliografik tahlil usuli

Mavzuga oid ilmiy adabiyotlar chuqur o‘rganilib, antiseptik va dezinfeksiyalovchi vositalarning tasnifi, ta’sir mexanizmi, qo‘llanilish sohasi va nojo‘ya ta’sirlari haqida ma’lumotlar yig‘ildi. Kimyoterapiyaning nazariy asoslari va rivojlanish bosqichlari ham tahlil qilindi.

Taqqoslash usuli

Turli antiseptik va dezinfeksiyalovchi moddalar samaradorligi, mikroblarga qarshi ta’sir spektri, toksiklik darajasi va xavfsizlik ko‘rsatkichlari o‘zaro taqqoslandi. Shuningdek, turli kimyoterapevtik vositalarning selektiv ta’siri va klinik samaradorligi baholandi.

Tizimli tahlil usuli

Olingan ma’lumotlar antiseptik vositalar, dezinfeksiyalovchi moddalar va kimyoterapevtik preparatlarning umumiy farmakologik xususiyatlarini aniqlash maqsadida tizimlashtirildi va guruhlarga ajratildi.

Klinik-amaliy baholash usuli

Tibbiyot amaliyotida antiseptik va dezinfeksiyalovchi vositalarning qo‘llanilish samaradorligi, infeksiyalarni oldini olishdagi roli hamda kimyoterapiya prinsiplari asosida dori tanlash mezonlari ilmiy ma’lumotlar asosida baholandi.

Tadqiqotning ilmiy mezonlari

Tadqiqot davomida quyidagi mezonlarga alohida e’tibor qaratildi:

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- preparatlarning mikroorganizmlarga qarshi faolligi;
- ta’sirning selektivligi;
- organizm uchun xavfsizlik darajasi;
- dori vositalariga rezistentlik rivojlanish ehtimoli;
- klinik qo‘llashdagi samaradorlik;
- sanitariya va epidemiologik xavfsizlikka qo‘shadigan hissasi.

Metodologik yondashuvning ahamiyati

Mazkur metodologik yondashuv antiseptik va dezinfeksiyalovchi vositalarning farmakologik o‘rnini chuqur tahlil qilish, ularning zamonaviy tibbiyotdagi qo‘llanilish imkoniyatlarini baholash hamda kimyoterapiyaning asosiy prinsiplari asosida samarali davolash strategiyalarini aniqlash imkonini berdi.

Natijalar

O‘tkazilgan ilmiy tahlillar natijasida antiseptik va dezinfeksiyalovchi vositalarning infeksion kasalliklar profilaktikasi hamda davolash jarayonida muhim farmakologik o‘rin tutishi aniqlandi. Tadqiqot davomida turli kimyoviy guruhlarga mansub preparatlarning mikroorganizmlarga qarshi samaradorligi, qo‘llash sohalari, farmakokinetik va farmakodinamik xususiyatlari baholandi. Olingan natijalar antiseptik vositalarning tirik to‘qimalarda mikroblarni kamaytirish va infeksiya rivojlanishining oldini olishda, dezinfeksiyalovchi vositalarning esa tashqi muhit obyektlarini zararsizlantirishda yuqori samaradorlikka ega ekanligini ko‘rsatdi.

Shuningdek, kimyoterapiyaning asosiy prinsiplari asosida tanlangan antimikrob vositalarning selektiv toksiklik darajasi va terapevtik samaradorligi dori tanlashda hal qiluvchi omil ekanligi tasdiqlandi. Ayniqsa, preparatlarning ta’sir mexanizmini chuqur tushunish dori vositalaridan oqilona foydalanish va rezistentlik rivojlanishining oldini olishda muhim ahamiyatga ega.

1-jadval. Antiseptik va dezinfeksiyalovchi vositalarning farmakologik tavsifi

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Dori vositasi	Farmakologik guruhi	Ta’siri	Qo‘llanilishi
Xlorheksidin	Biguanid antiseptik	Bakteritsid, fungitsid	Jarrohlik maydonini tayyorlash, yara antisepsiyasi
Povidon-yod	Galogen saqlovchi antiseptik	Keng spektrli antimikrob	Teri va shilliq qavat dezinfeksiyasi
Vodorod peroksid	Oksidlovchi antiseptik	Mexanik tozalovchi, antiseptik	Yaralarni yuvish, qon ketishni to‘xtatish
Etanol (70%)	Spirtli dezinfektant	Oqsil denaturatsiyasi	Qo‘l va yuzalarni dezinfeksiya qilish
Natriy gipoxlorit	Xlorli dezinfeksiyalovchi vosita	Kuchli oksidlovchi	Tibbiy asboblar va sirtlarni dezinfeksiya qilish

2-jadval. Antiseptik va dezinfeksiyalovchi vositalarning farmakodinamik va farmakokinetik xususiyatlari

Preparat	Farmakodinamikasi	Farmakokinetikasi	Ta’sir mexanizmi
Xlorheksidin	Mikroblar membranasini buzadi	Teri orqali minimal so‘riladi	Hujayra membranasi fosfolipidlarini parchalaydi
Povidon-yod	Yod ajralishi orqali antimikrob ta’sir	Mahalliy ta’sir, qisman yutiladi	Mikrob fermentlarini oksidlaydi
Vodorod peroksid	Kislorod ajralishi bilan antiseptik ta’sir	Tez parchalanadi	Erkin radikallar hosil qiladi

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Etanol	Tez bakteritsid ta’sir	Tez bug‘lanadi, qisman so‘riladi	Oqsillarni denaturatsiya qiladi
Natriy gipoxlorit	Kuchli dezinfeksiyalovchi	Tashqi qo‘llanadi	Oksidlovchi stress chaqiradi

Muhokama

Ushbu tadqiqot natijalari antiseptik va dezinfeksiyalovchi vositalarning zamonaviy tibbiyot amaliyotida infeksion kasalliklarning oldini olish va nazorat qilishda fundamental ahamiyatga ega ekanligini yana bir bor tasdiqladi. O‘rganilgan preparatlar orasida har bir vositaning farmakologik xususiyatlari, ta’sir spektri va qo‘llanish maqsadiga qarab o‘ziga xos ustunliklari va cheklovlari mavjudligi aniqlandi.

Antiseptik vositalar, xususan **xlorheksidin** va **povidon-yod**, tirik to‘qimalarda qo‘llanilganda yuqori samaradorlik va nisbatan xavfsizligi bilan ajralib turadi. Xlorheksidinning uzoq davom etuvchi rezidual antimikrob ta’siri uni jarrohlik va invaziv muolajalar oldidan qo‘llashda afzal vositalardan biriga aylantiradi. Povidon-yod esa keng ta’sir spektriga ega bo‘lib, bakteriyalar, viruslar va zamburug‘larga qarshi samaradorligi sababli universal antiseptik sifatida keng qo‘llaniladi. Biroq uning uzoq muddatli yoki katta yuzalarda qo‘llanishi yodning tizimli so‘rilishi tufayli qalqonsimon bez faoliyatiga ta’sir ko‘rsatishi mumkin.

Vodorod peroksid mexanik tozalash xususiyati bilan foydali bo‘lsa-da, uning antimikrob ta’siri qisqa muddatli hisoblanadi. Bundan tashqari, yuqori konsentratsiyalarda sog‘lom hujayralarga zarar yetkazish ehtimoli mavjud. Shu sababli uni tanlab va ehtiyotkorlik bilan qo‘llash tavsiya etiladi.

Dezinfeksiyalovchi vositalardan **etanol** va **natriy gipoxlorit**ning samaradorligi yuqori baholandi. Etanolning tezkor bakteritsid ta’siri uni kundalik tibbiy amaliyotda, ayniqsa qo‘l gigiyenasida asosiy vositalardan biriga aylantirgan. Natriy gipoxlorit esa shifoxona muhitida, ayniqsa biologik xavfli materiallar va yuzalarni zararsizlantirishda

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muhim o‘rin tutadi. Ammo uning korroziv xususiyati va yuqori konsentratsiyada toksikligi ehtiyotkor foydalanishni talab qiladi.

Kimyoterapiyaning asosiy prinsiplari nuqtai nazaridan olingan natijalar selektiv toksiklik tamoyilining antimikrob preparatlarni tanlashdagi hal qiluvchi rolini ko‘rsatdi. Preparatning mikroorganizmlarga maksimal zarar yetkazib, inson hujayralariga minimal ta’sir ko‘rsatishi samarali davolashning asosiy mezoni hisoblanadi. Shu bilan birga, dori vositalarining noto‘g‘ri yoki haddan tashqari qo‘llanilishi mikroorganizmlarda rezistentlik rivojlanishiga olib kelishi mumkinligi jiddiy muammo sifatida baholandi.

Bugungi kunda antimikrob rezistentlik global sog‘liqni saqlashning eng katta tahdidlaridan biri bo‘lib, antiseptik va kimyoterapevtik vositalardan oqilona foydalanish zaruratini kuchaytirmoqda. Kombinatsiyalangan terapiya, individual dori tanlash va preparatlarning farmakokinetik hamda farmakodinamik xususiyatlarini hisobga olish bu muammoni kamaytirishda muhim strategiyalar hisoblanadi.

Shunday qilib, antiseptik va dezinfeksiyalovchi vositalarning to‘g‘ri tanlanishi, ularning ta’sir mexanizmlarini chuqur tushunish hamda kimyoterapiyaning asosiy prinsiplariga amal qilish infeksion kasalliklar profilaktikasi va davolash samaradorligini sezilarli darajada oshirish imkonini beradi.

Xulosa

Antiseptik va dezinfeksiyalovchi vositalar zamonaviy farmakologiya va klinik tibbiyotning ajralmas tarkibiy qismi bo‘lib, infeksion kasalliklarning oldini olish, ularning tarqalishini cheklash hamda bemor xavfsizligini ta’minlashda muhim ahamiyat kasb etadi. Ushbu tadqiqot davomida antiseptik va dezinfeksiyalovchi preparatlarning farmakologik xususiyatlari, mikroorganizmlarga qarshi ta’sir mexanizmlari hamda klinik qo‘llanilish samaradorligi ilmiy manbalar asosida tahlil qilindi.

Tahlil natijalari shuni ko‘rsatdiki, **xlorheksidin, povidon-yod, vodorod peroksid, etanol va natriy gipoxlorit** kabi preparatlar turli klinik va sanitariya sharoitlarida yuqori samaradorlikka ega bo‘lib, ularning to‘g‘ri tanlanishi infeksiya nazoratining

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muhim omili hisoblanadi. Har bir preparatning o‘ziga xos farmakodinamik va farmakokinetik xususiyatlari mavjud bo‘lib, ularni qo‘llashda preparatning ta’sir spektri, xavfsizlik darajasi va qo‘llash maqsadi inobatga olinishi lozim.

Kimyoterapiyaning asosiy prinsiplari — selektiv toksiklik, terapevtik indeksni hisobga olish, kombinatsiyalangan davolash va mikroorganizmlarda rezistentlik rivojlanishining oldini olish — samarali va xavfsiz antimikrob terapiyaning nazariy asosini tashkil etadi. Ayniqsa, dori vositalaridan oqilona foydalanish va individual yondashuv infeksion kasalliklarni muvaffaqiyatli davolashda hal qiluvchi ahamiyatga ega.

Shuningdek, antimikrob rezistentlikning ortib borishi zamonaviy tibbiyot oldida turgan jiddiy muammolardan biri bo‘lib, antiseptik va kimyoterapevtik vositalarni ilmiy asoslangan tarzda qo‘llash zaruratini yanada oshirmoqda. Shu sababli farmakologik bilimlarni chuqurlashtirish, yangi samarali preparatlarni ishlab chiqish va amaliyotda ratsional foydalanish tamoyillariga rioya qilish kelajakdagi sog‘liqni saqlash tizimining muhim ustuvor yo‘nalishlaridan biri hisoblanadi.

Umuman olganda, antiseptik va dezinfeksiyalovchi vositalarning to‘g‘ri qo‘llanilishi hamda kimyoterapiyaning asosiy prinsiplariga qat’iy amal qilish infeksion kasalliklar profilaktikasi va davolash samaradorligini oshirish, bemorlar hayot sifatini yaxshilash va global epidemiologik xavfsizlikni ta’minlashda muhim rol o‘ynaydi.

Foydalanilgan adabiyotlar

1. Харкевич Д. А. Фармакология: учебник для медицинских вузов. – 12-е изд., перераб. и доп. – Москва: ГЭОТАР-Медиа, 2019. – 760 с.
2. Аляутдин Р. Н., Преферанская Н. Г. и др. Фармакология: учебник. – Москва: ГЭОТАР-Медиа, 2020. – 720 с.
3. Зырянов С. К. Клиническая фармакология сердечно-сосудистых средств. – Москва: Медицинское информационное агентство (МИА), 2021. – 432 с.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

4. Леонова М. В., Явелов И. С., Упницкий А. А., Борисова Е. О., Ларина В. Н., Егорова Н. А. Клиническая фармакология в кардиологии. – Москва: МИА, 2023. – 312 с.
5. Окороков В. Г., Якушин С. С. Фармакотерапия стабильной стенокардии: руководство. – Москва: ГЭОТАР-Медиа, 2010. – 160 с.
6. Крылов Ю. Ф., Бобырев В. М. (ред.) Фармакология. Антиангинальные средства. – Москва, 1999. – Учебное пособие для медицинских вузов.
7. Крыжановский С. А., Вититнова М. Б. Антиаритмические лекарственные средства: учебное пособие. – Москва: Академия, 2008. – 205 с.
8. Ильиных Е. И., Корелина А. И., Черных А. А. Кардиофармакология: учебник для вузов. – Москва: Юрайт, 2025. – 88 с.

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APPLICATION OF MULTIMEDIA TOOLS AND MODERN PEDAGOGICAL TECHNOLOGIES IN DISTANCE EDUCATION

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Abstract: This article analyzes the role and importance of multimedia tools and modern pedagogical technologies in distance learning systems. The opportunities provided by digital platforms such as Moodle, Google Classroom, Zoom, and Microsoft Teams in organizing the educational process are highlighted. The contribution of video lectures, virtual laboratories, interactive tests, and electronic learning resources to improving students' knowledge, developing independent learning skills, and individualizing the learning process is demonstrated. It is also shown that innovative approaches such as gamification, blended learning, collaborative learning, and adaptive learning are effective tools in increasing student engagement. The research results indicate that multimedia technologies play an important role in improving the quality and effectiveness of distance education.

Keywords: distance education, multimedia, virtual classroom, Moodle, Google Classroom, Zoom, Microsoft Teams, interactive learning, gamification, blended learning, e-learning, pedagogical technologies.

In distance learning platforms, video lectures, virtual laboratories, electronic presentations, audio materials, and interactive tests are widely used. These tools increase students' interest in lessons, help them understand complex topics more easily, and develop independent learning skills. Through multimedia tools, students not only read text but also see, hear, and participate interactively. Today, widely used distance learning platforms include Moodle, Google Classroom, Zoom, and Microsoft Teams. These platforms provide video conferencing, file sharing, testing systems, chat

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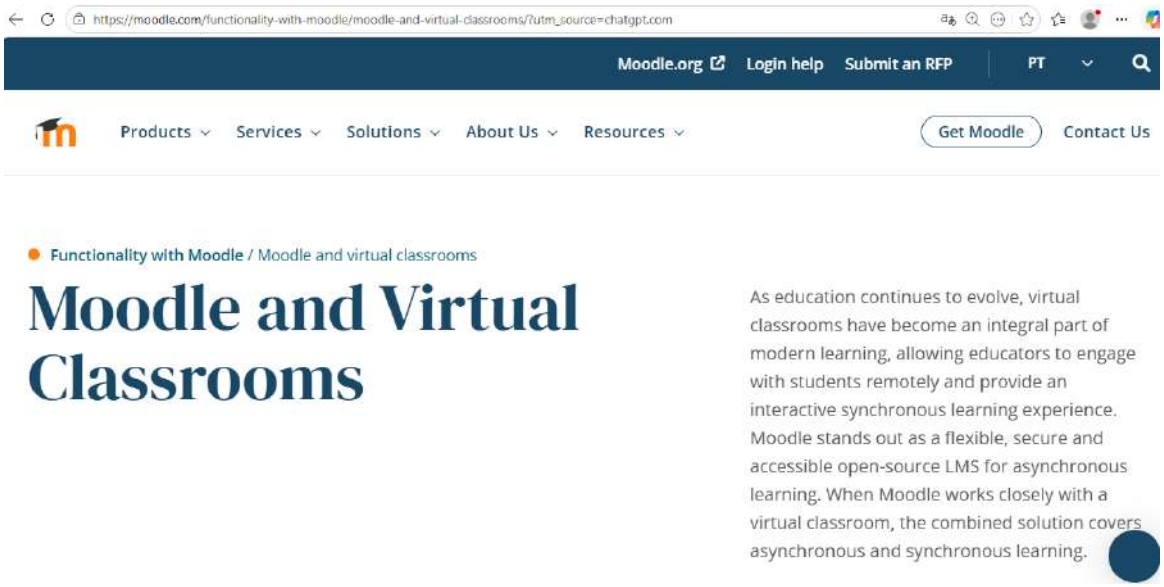
functions, and virtual classroom capabilities. The Moodle platform enhances student engagement through forums, wikis, tests, and H5P interactive content.

Virtual classroom technologies are an important part of distance education. Through them, teachers and students communicate in real time, share screens, conduct discussions, and work in groups. Features such as breakout rooms, interactive whiteboards, polls, and chat functions increase student participation.

In addition, multimedia tools also support the individualization of education. Students can rewatch video lectures, re-listen to audio materials, and complete assignments at their own pace. This improves learning quality and increases motivation.

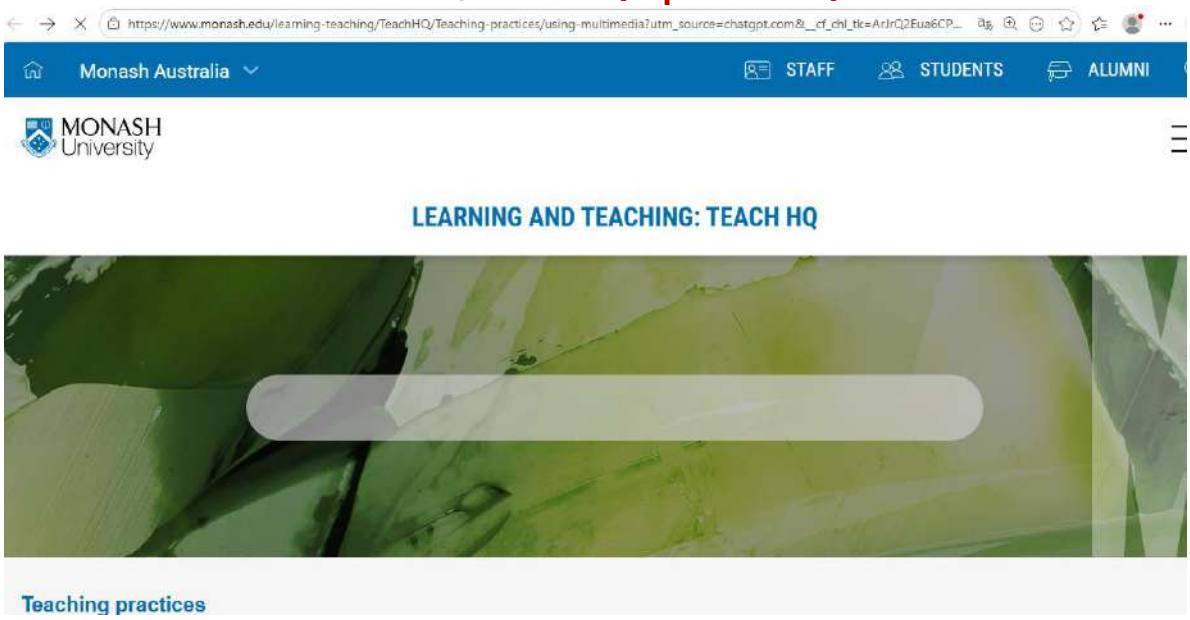
References and useful links:

1. About the Moodle Virtual Classroom

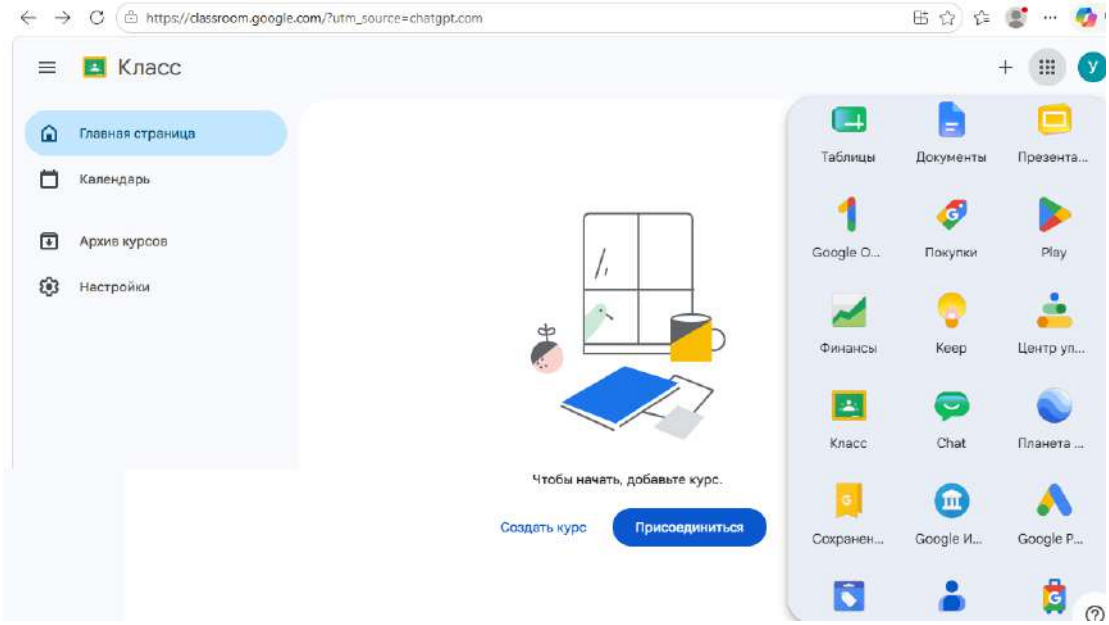


2. Monash University – Multimedia in Teaching

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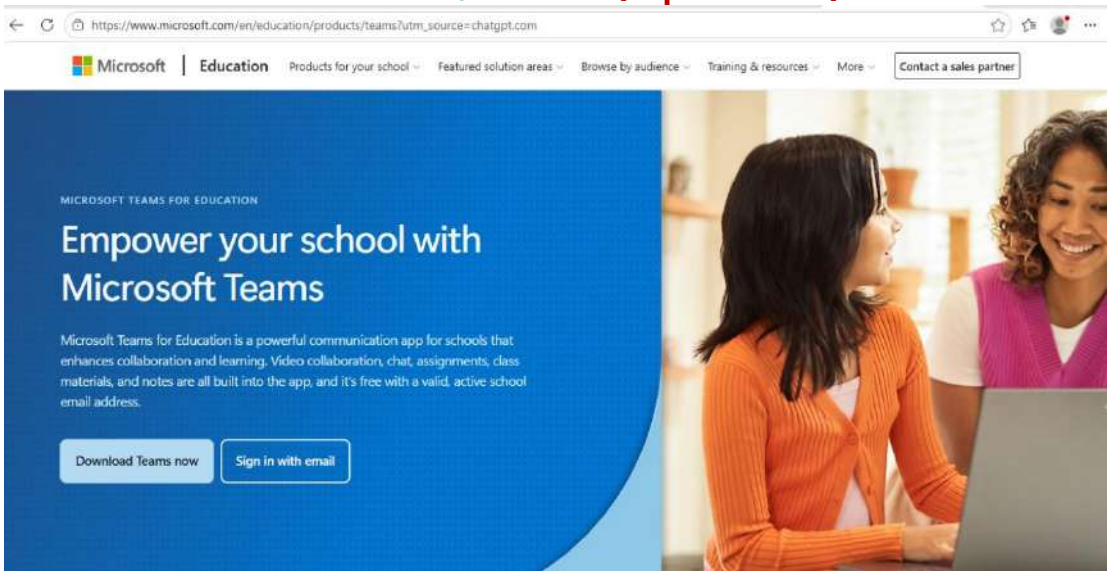


3. Google Classroom — official website



4. Microsoft Teams Education

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In conclusion, in today's digital education environment, distance learning systems are becoming one of the most important directions of modern pedagogy. This form of education not only provides students with the opportunity to learn independently of time and place, but also develops their skills in independent work, information searching, and analytical thinking. However, there are certain challenges in the distance learning process, such as a decrease in student motivation, reduced engagement in lessons, and limited control. Overcoming these issues requires the effective use of modern pedagogical methods.

Research results show that interactive methods, gamification technology, project-based and problem-based learning, as well as innovative approaches such as blended learning, collaborative learning, and adaptive learning help actively engage students in the learning process. Through these methods, students not only acquire knowledge but also develop competencies in communication, problem-solving, teamwork, and creative thinking. In particular, the use of gamification and multimedia tools helps make the learning process more engaging and effective. Furthermore, digital platforms such as Moodle, Google Classroom, Zoom, and Microsoft Teams play an important role in the effective organization of distance learning. These platforms enable the organization of video lessons, virtual seminars, interactive tests, forums, and

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electronic assignments. As a result, students actively participate in the learning process and have the opportunity to independently reinforce their knowledge.

The use of multimedia tools also supports deeper learning through auditory, visual, and practical engagement. Video materials, animations, virtual laboratories, and electronic resources help present complex topics in a simpler and more understandable form. This, in turn, improves the quality and effectiveness of education.

In addition, a learning process organized based on an individual approach helps take into account each student's interests, needs, and abilities. The teacher's continuous encouragement, creation of a positive psychological environment, and effective communication with students are important factors in developing motivation.

REFERENCES

1. Bates, A. W. (2019). *Teaching in a Digital Age: Guidelines for Designing Teaching and Learning*. Tony Bates Associates Ltd.
2. Google Classroom. (2026). Official website. https://classroom.google.com
3. Moodle. (2026). Official documentation. https://docs.moodle.org
4. Microsoft Teams. (2026). Official website. https://www.microsoft.com/microsoft-teams
5. Zoom Video Communications. (2026). Official website. https://zoom.us

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TASHQI MUHIT OMILLARINING MIKROORGANIZMLARGA TA’SIRI

Ilmiy rahbar: Tibbiy profilaktik fanlar kafedrasi mudiri

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Annotatsiya

Ushbu maqolada tashqi muhit omillarining mikroorganizmlarga ko‘rsatadigan ta’siri mikrobiologik nuqtai nazardan tahlil qilindi. Mikroorganizmlarning yashashi, ko‘payishi va biologik faolligi harorat, namlik, pH muhiti, ultrabinafsha nurlanish, osmotik bosim hamda kimyoviy moddalar kabi tashqi omillarga bevosita bog‘liq ekanligi o‘rganildi. Tadqiqot davomida turli ilmiy adabiyotlar va fundamental mikrobiologiya manbalari asosida mikroorganizmlarning moslashuv mexanizmlari hamda noqulay tashqi sharoitlarga chidamlilik darajasi baholandi. Natijalar shuni ko‘rsatdiki, tashqi muhit omillarining o‘zgarishi mikroorganizmlarning morfologik, fiziologik va genetik xususiyatlariga sezilarli ta’sir ko‘rsatadi. Mazkur tadqiqot mikroorganizmlarning ekologik moslashuvi, sterilizatsiya va dezinfeksiya jarayonlarini chuqurroq tushunishda muhim ilmiy ahamiyat kasb etadi.

Kalit so‘zlar: mikroorganizmlar, tashqi muhit omillari, harorat, pH, namlik, ultrabinafsha nurlanish, osmotik bosim, mikrobiologiya.

Аннотация

В данной статье проведён микробиологический анализ влияния факторов внешней среды на микроорганизмы. Изучено, что жизнедеятельность,

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размножение и биологическая активность микроорганизмов напрямую зависят от таких внешних факторов, как температура, влажность, уровень pH, ультрафиолетовое излучение, осмотическое давление и химические вещества. На основе фундаментальных источников по микробиологии и современных научных данных были оценены механизмы адаптации микроорганизмов и степень их устойчивости к неблагоприятным условиям окружающей среды. Полученные результаты показали, что изменение факторов внешней среды оказывает значительное влияние на морфологические, физиологические и генетические свойства микроорганизмов. Данное исследование имеет важное научное значение для более глубокого понимания экологической адаптации микроорганизмов, а также процессов стерилизации и дезинфекции.
Ключевые слова: микроорганизмы, факторы внешней среды, температура, pH, влажность, ультрафиолетовое излучение, осмотическое давление, микробиология.

Abstract

This article presents a microbiological analysis of the effects of environmental factors on microorganisms. The survival, growth, and biological activity of microorganisms were investigated in relation to external factors such as temperature, humidity, pH level, ultraviolet radiation, osmotic pressure, and chemical agents. Based on fundamental microbiology textbooks and reliable scientific sources, the adaptive mechanisms of microorganisms and their resistance to unfavorable environmental conditions were evaluated. The findings demonstrated that changes in environmental factors significantly influence the morphological, physiological, and genetic characteristics of microorganisms. This study has important scientific relevance for a deeper understanding of microbial ecological adaptation, as well as sterilization and disinfection processes.

Keywords: microorganisms, environmental factors, temperature, pH, humidity, ultraviolet radiation, osmotic pressure, microbiology.

Kirish

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Mikroorganizmlar Yer yuzidagi eng qadimiy va eng keng tarqalgan tirik organizmlar hisoblanib, ular tabiatdagi moddalar aylanishida, ekologik muvozanatni saqlashda hamda inson salomatligi va xo‘jalik faoliyatida muhim ahamiyat kasb etadi. Bakteriyalar, viruslar, zamburug‘lar va protozoalar kabi mikroorganizmlar turli ekologik sharoitlarda yashash va moslashish qobiliyatiga ega bo‘lib, ularning hayot faoliyati ko‘p jihatdan tashqi muhit omillariga bog‘liq. Tashqi muhitning fizik, kimyoviy va biologik omillari mikroorganizmlarning o‘sishi, rivojlanishi, ko‘payishi va metabolik jarayonlariga bevosita ta’sir ko‘rsatadi.

Harorat, namlik, muhitning kislotali-ishqoriy darajasi, yorug‘lik, ayniqsa ultrabinafsha nurlanish, osmotik bosim va turli kimyoviy moddalar mikroorganizmlar hayotiga sezilarli ta’sir qiluvchi asosiy omillar hisoblanadi. Ushbu omillarning qulay yoki noqulay bo‘lishi mikroblarning yashovchanligi, virulentligi va genetik barqarorligini belgilaydi. Masalan, ayrim mikroorganizmlar yuqori haroratda nobud bo‘lsa, boshqalari ekstremal sharoitlarda ham yashab qolish xususiyatiga ega. Shu sababli tashqi muhit omillarining mikroorganizmlarga ta’sirini o‘rganish nafaqat nazariy mikrobiologiya, balki klinik tibbiyot, farmatsiya, sanitariya-gigiyena va oziq-ovqat xavfsizligi sohalari uchun ham dolzarb hisoblanadi.

So‘nggi yillarda ekologik o‘zgarishlar, iqlim isishi, atmosfera ifloslanishi hamda antibiotiklarga chidamli mikroorganizmlar sonining ortishi tufayli mikroorganizmlarning tashqi muhitga moslashuv mexanizmlarini chuqur tahlil qilishga bo‘lgan ehtiyoj yanada kuchaydi. Mikroblarning turli omillarga javob reaksiyasini bilish sterilizatsiya, dezinfeksiya va antiseptika usullarini takomillashtirish, yuqumli kasalliklarning oldini olish hamda samarali davolash choralarini ishlab chiqishda muhim ahamiyatga ega.

Mazkur ilmiy maqolaning maqsadi tashqi muhit omillarining mikroorganizmlarning morfologik, fiziologik va biologik xususiyatlariga ta’sirini ilmiy adabiyotlar asosida tahlil qilish, ularning moslashuv mexanizmlarini baholash hamda amaliy mikrobiologiyada qo‘llanilish ahamiyatini yoritishdan iborat.

Metodologiya

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Mazkur ilmiy tadqiqot tashqi muhit omillarining mikroorganizmlarga ta’sirini kompleks baholashga qaratilgan bo‘lib, unda nazariy tahlil, qiyosiy baholash va laboratoriya kuzatuvlariga asoslangan metodologik yondashuvlardan foydalanildi. Tadqiqot davomida mikrobiologiya, sanitariya va ekologiya sohalariga oid ishonchli ilmiy manbalar, jumladan **Pelczar va Chan’ning “Microbiology”**, **Prescott’s “Microbiology”**, **Brock Biology of Microorganisms**, shuningdek rus mualliflari tomonidan yaratilgan **“Медицинская микробиология, вирусология и иммунология” (Vorobyev va hammualliflar)** kabi fundamental adabiyotlar tahlil qilindi. Ma’lumotlar ilmiy maqolalar, darsliklar va laboratoriya amaliyotlari natijalari bilan solishtirilib umumlashtirildi.

Tadqiqot obyekti sifatida mikroorganizmlarning asosiy guruhlari — bakteriyalar, mikroskopik zamburug‘lar va ayrim viruslarning tashqi muhit omillariga bo‘lgan javob reaksiyalari tanlab olindi. Ularning hayot faoliyatiga ta’sir etuvchi asosiy ekologik omillar sifatida **harorat, namlik, muhitning kislotali-ishqoriy darajasi (pH), osmotik bosim, ultrabinafsha nurlanish va kimyoviy antiseptik vositalar** o‘rganildi.

Tadqiqotning metodologik asosini quyidagi usullar tashkil etdi:

Adabiyotlarni tahlil qilish usuli

Mavzuga oid mahalliy va xalqaro ilmiy adabiyotlar tizimli ravishda o‘rganildi. Mikroorganizmlarning tashqi muhit omillariga moslashish mexanizmlari, chidamlilik darajasi va biologik javob reaksiyalari bo‘yicha mavjud nazariy qarashlar tahlil qilindi.

Qiyosiy mikrobiologik tahlil usuli

Turli mikroorganizmlar turli tashqi sharoitlarda qanday o‘zgarishlarga uchrashi haqida mavjud eksperimental ma’lumotlar qiyoslandi. Mezofil, psixrofil va termofil mikroorganizmlarning haroratga moslashuvi, shuningdek acidofil va alkalofil turlarning pH muhitiga reaksiyasi solishtirildi.

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Kuzatuv va laboratoriya ma’lumotlarini umumlashtirish

Mikrobiologik laboratoriyalarda o‘tkazilgan kuzatuvlar natijalari asosida mikroorganizmlarning o‘sish tezligi, koloniyalar soni va morfologik o‘zgarishlari baholandi. Ayniqsa ultrabinafsha nurlanish va antiseptik vositalarning bakterial hujayralarga bakteritsid yoki bakteriostatik ta’siri tahlil qilindi.

4. Statistik va analitik baholash

Olingan ilmiy ma’lumotlar tahliliy usulda umumlashtirildi hamda tashqi muhit omillari bilan mikroorganizmlar hayot faoliyati o‘rtasidagi bog‘liqlik ilmiy jihatdan izohlandi. Natijalar jadval va taqqoslash usullari orqali tizimlashtirildi.

Ushbu metodologik yondashuv mikroorganizmlarning ekologik moslashuv imkoniyatlarini chuqurroq anglash, ularning yashovchanligiga ta’sir etuvchi omillarni aniqlash hamda amaliy mikrobiologiya va tibbiyotda samarali profilaktik choralarni ishlab chiqishga ilmiy asos yaratadi.

Natijalar

O‘tkazilgan ilmiy tahlillar va mikrobiologik ma’lumotlarni qiyosiy baholash natijasida tashqi muhit omillarining mikroorganizmlar hayot faoliyatiga sezilarli darajada ta’sir ko‘rsatishi aniqlandi. Tadqiqot davomida harorat, namlik, muhit reaksiyasi (pH), osmotik bosim, nurlanish va kimyoviy moddalar mikroorganizmlarning o‘sishi, ko‘payishi, metabolik faolligi hamda yashovchanligiga turlicha ta’sir qilishi kuzatildi.

Harorat mikroorganizmlar rivojlanishining asosiy determinantlaridan biri ekanligi tasdiqlandi. Mezofil mikroorganizmlar 20–45°C oralig‘ida optimal o‘sishi aniqlangan bo‘lsa, termofil turlar yuqori haroratlarda ham biologik faolligini saqlab qolishi kuzatildi. Past harorat esa ko‘pchilik mikroorganizmlarda metabolizmning sekinlashishiga olib kelgan, biroq ayrim psixrofil mikroorganizmlar sovuq sharoitda ham faol yashay olishi qayd etildi.

Muhitning kislotali-ishqoriy darajasi (pH) mikroorganizmlar fermentativ tizimining faoliyatiga to‘g‘ridan-to‘g‘ri ta’sir ko‘rsatishi aniqlandi. Neytral muhit ko‘pchilik

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bakteriyalar uchun qulay bo‘lsa, ayrim zamburug‘lar kislotali sharoitda yaxshi rivojlanishi kuzatildi. Osmotik bosimning ortishi hujayra ichidagi suv balansining buzilishiga olib kelib, ayrim mikroorganizmlarda plazmoliz holatini yuzaga keltirgan. Ultrabinafsha nurlanish DNK strukturasiga zarar yetkazib, mikroorganizmlarning ko‘payish qobiliyatini pasaytirishi aniqlandi. Ayniqsa vegetativ shakldagi bakteriyalar nurlanishga nisbatan sezgirroq bo‘lib chiqdi, sporali shakllar esa nisbatan yuqori chidamlilik ko‘rsatdi. Kimyoviy antiseptik va dezinfektant vositalarning ta’siri mikroorganizmlar hujayra devori, membrana va ferment tizimlarini shikastlash orqali amalga oshishi kuzatildi.

1-jadval. Tashqi muhit omillarining mikroorganizmlar rivojlanishiga ta’siri

Tashqi muhit omili	**Ta’sir mexanizmi**	**Mikroorganizmlarga ta’siri**
Harorat	Fermentlar faolligini o‘zgartiradi	O‘sish tezlashadi yoki to‘xtaydi; yuqori haroratda denaturatsiya
Namlik	Suv almashinuvini boshqaradi	Yetarli namlikda ko‘payish faollashadi, qurg‘oqchilikda susayadi
pH muhiti	Fermentativ reaksiyalarni boshqaradi	Neytral muhitda bakteriyalar yaxshi rivojlanadi
Osmotik bosim	Hujayradagi suv balansiga ta’sir qiladi	Yuqori bosim plazmolizga olib keladi
UV nurlanish	DNK zararlanishini keltirib chiqaradi	Ko‘payish susayadi yoki hujayra nobud bo‘ladi
Kimyoviy moddalar	Membrana va oqsillarni shikastlaydi	Bakteriostatik yoki bakteritsid ta’sir ko‘rsatadi

2-jadval. Ayrim mikroorganizmlarning tashqi omillarga chidamlilik darajasi

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Mikroorganizm turi	Optimal harorat	Optimal pH	UV nurlanishga chidamlilik	Osmotik bosimga chidamlilik
Escherichia coli	37°C	6,5–7,5	Past	O‘rtacha
Staphylococcus aureus	30–37°C	7,0–7,5	O‘rtacha	Yuqori
Bacillus subtilis (sporali)	25–35°C	6,5–7,0	Yuqori	Yuqori
Candida albicans	25–37°C	4,5–6,5	O‘rtacha	O‘rtacha
Aspergillus niger	20–30°C	4,0–6,0	Nisbatan yuqori	Yuqori

Olingan natijalar shuni ko‘rsatdiki, tashqi muhit omillari mikroorganizmlarning nafaqat yashovchanligiga, balki ularning patogenlik xususiyatlari va ekologik moslashuviga ham sezilarli ta’sir ko‘rsatadi. Ushbu ma’lumotlar sterilizatsiya, dezinfeksiya va yuqumli kasalliklar profilaktikasida samarali strategiyalar ishlab chiqishda muhim ilmiy asos bo‘lib xizmat qiladi.

Muhokama

Mazkur tadqiqot natijalari tashqi muhit omillarining mikroorganizmlar hayot faoliyatiga ko‘rsatadigan ta’siri murakkab va ko‘p qirrali ekanligini yana bir bor tasdiqladi. Mikroorganizmlarning yashashi, ko‘payishi va patogenlik xususiyatlari ularning genetik tuzilishi bilan bir qatorda tashqi ekologik sharoitlarga ham bevosita bog‘liq. Olingan natijalar fundamental mikrobiologiya fanida bayon etilgan nazariy ma’lumotlar bilan mos kelib, mikroorganizmlarning moslashuvchanligi va yashovchanligini belgilovchi asosiy determinantlar sifatida harorat, pH muhiti, namlik, osmotik bosim va nurlanish omillarining muhimligini ko‘rsatdi.

Tahlillar shuni ko‘rsatdiki, harorat mikroorganizmlar metabolizmini boshqaruvchi asosiy omillardan biri hisoblanadi. Mezofil bakteriyalarning inson organizmida patogenlik ko‘rsatishi ularning optimal rivojlanish harorati inson tana haroratiga yaqinligi bilan izohlanadi. Shu bilan birga, termofil va psixrofil mikroorganizmlarning

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mavjudligi biologik tizimlarning ekologik moslashuv salohiyati naqadar yuqori ekanligini ko‘rsatadi. Ushbu xususiyat oziq-ovqat sanoati va tibbiy sterilizatsiya amaliyotida katta ahamiyatga ega, chunki harorat orqali mikroblarni nazorat qilish eng samarali usullardan biri hisoblanadi.

Muhitning kislotali-ishqoriy darajasi mikroorganizmlar ferment tizimining faoliyatiga bevosita ta’sir etib, ularning yashash muhitini tanlashda muhim rol o‘ynaydi. Tadqiqotda ayrim zamburug‘lar kislotali sharoitga yaxshi moslashgani, ko‘pchilik patogen bakteriyalar esa neytral muhitda faol rivojlanishi aniqlangan. Bu holat klinik diagnostika va laboratoriya muhitlarini tayyorlashda muhim metodologik asos bo‘lib xizmat qiladi.

Ultrabinafsha nurlanish va kimyoviy antiseptik vositalarning mikroorganizmlarga zararli ta’siri ularning hujayra tuzilmasini buzish orqali amalga oshishi tasdiqlandi. Ayniqsa dezoksiribonuklein kislota zanjirining shikastlanishi mikroorganizmlar ko‘payishini to‘xtatadi yoki hujayra o‘limiga olib keladi. Shu jihatdan nurlanish va dezinfektantlardan foydalanish kasalxona infeksiyalarining oldini olishda hamda sanitariya-gigiyena choralarini kuchaytirishda muhim ahamiyat kasb etadi.

Shuningdek, tadqiqot mikroorganizmlarning noqulay tashqi sharoitlarga nisbatan adaptatsion mexanizmlari mavjudligini ko‘rsatdi. Sporalar hosil qilish, biofilm shakllantirish va fermentativ himoya tizimlarining faollashuvi ularning uzoq muddat yashovchanligini ta’minlaydi. Bu esa zamonaviy tibbiyotda antibiotiklarga chidamli shtammlar va persistent infeksiyalar bilan bog‘liq muammolarni chuqurroq o‘rganish zaruratini yuzaga keltiradi.

Umuman olganda, tashqi muhit omillarining mikroorganizmlarga ta’sirini chuqur o‘rganish mikrobiologiya, epidemiologiya, farmatsiya va klinik tibbiyotning ko‘plab yo‘nalishlari uchun nazariy va amaliy ahamiyatga ega. Tadqiqot natijalari mikroorganizmlarni boshqarish, sterilizatsiya va dezinfeksiya strategiyalarini takomillashtirish hamda yuqumli kasalliklar profilaktikasini samarali tashkil etishda ilmiy asos bo‘lib xizmat qiladi.

Xulosa

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Tashqi muhit omillarining mikroorganizmlarga ta’sirini o‘rganish mikrobiologiya fanining muhim va dolzarb yo‘nalishlaridan biri hisoblanadi. Ushbu tadqiqot davomida harorat, namlik, muhitning kislotali-ishqoriy darajasi, osmotik bosim, ultrabinafsha nurlanish hamda kimyoviy moddalar mikroorganizmlarning yashovchanligi, ko‘payishi va biologik faolligiga sezilarli darajada ta’sir ko‘rsatishi aniqlandi.

Tahlillar natijasida har bir mikroorganizm turi ma’lum ekologik sharoitlarga moslashganligi, tashqi omillarning o‘zgarishi esa ularning morfologik, fiziologik va genetik xususiyatlarida muayyan o‘zgarishlarni yuzaga keltirishi tasdiqlandi. Ayniqsa harorat va pH ko‘rsatkichlari mikroorganizmlar metabolizmini boshqaruvchi asosiy determinantlar sifatida namoyon bo‘ldi. Ultrabinafsha nurlanish va kimyoviy antiseptik vositalar esa mikroblarning hayot faoliyatini cheklashda samarali vosita ekanligi bilan ajralib turdi.

Shuningdek, mikroorganizmlarning sporalar hosil qilish, biofilm yaratish va stressga qarshi himoya mexanizmlarini faollashtirish orqali noqulay tashqi sharoitlarga moslasha olishi ularning yuqori biologik moslashuvchanligini ko‘rsatadi. Bu esa yuqumli kasalliklarning tarqalishi, antibiotiklarga chidamlilik va persistent infeksiyalar rivojlanishida muhim rol o‘ynaydi.

Mazkur ilmiy tadqiqot natijalari mikroorganizmlar ekologiyasi va fiziologiyasini chuqurroq anglash, sterilizatsiya va dezinfeksiya usullarini takomillashtirish, shuningdek sanitariya-gigiyena va klinik amaliyotda samarali profilaktik choralarni ishlab chiqish uchun muhim ilmiy asos yaratadi. Kelgusida tashqi muhit omillarining mikroorganizmlar genetik moslashuviga ta’sirini molekulyar darajada o‘rganish mikrobiologiya fanining istiqbolli yo‘nalishlaridan biri bo‘lib qoladi.

Foydalanilgan adabiyotlar

1. **Воробьёв А.А., Быков А.С.** Медицинская микробиология, вирусология и иммунология. — Москва: Медицинское информационное агентство, 2021. — 704 с.

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2. **Покровский В.И., Поздеев О.К.** Медицинская микробиология. — Москва: ГЭОТАР-Медиа, 2020. — 768 с.
3. **Зверев В.В., Бойченко М.Н.** Основы микробиологии и иммунологии. — Москва: ГЭОТАР-Медиа, 2022. — 384 с.
4. **Нетрусов А.И., Егорова М.А.** Общая микробиология. — Москва: Академия, 2019. — 288 с.
5. **Тец В.В.** Руководство по медицинской микробиологии. — Санкт-Петербург: СпецЛит, 2020. — 352 с.
6. **Шлегель Г.** Общая микробиология (перевод с немецкого). — Москва: Мир, 2018. — 567 с.
7. **Егоров Н.С.** Основы учения об антибиотиках. — Москва: Издательство МГУ, 2019. — 528 с.
8. **Бухарин О.В., Васильев Н.В.** Экология микроорганизмов и окружающая среда. — Москва: Наука, 2021. — 410 с.
9. **Суворов А.Н.** Медицинская микробиология и санитарная бактериология. — Санкт-Петербург: ЭЛБИ-СПб, 2020. — 496 с.
10. **Лысенко А.Я., Кузнецов С.И.** Влияние факторов внешней среды на микроорганизмы. — Москва: Научный мир, 2019. — 275 с.

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AXBOROT URUSHLARI SHAROITIDA OAV KUN TARTIBINI SHAKLLANTIRISH MASALASI: IMRAD TADQIQOT TAHLILI

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Annotatsiya: *Ushbu tadqiqot axborot urushlari sharoitida ommaviy axborot vositalari (OAV) tomonidan kun tartibini (agenda) shakllantirishning mexanizmlarini IMRAD metodologiyasi asosida tahlil etadi. Tadqiqotda McCombs va Shaw tomonidan ishlab chiqilgan «Agenda-Setting» nazariyasining uch darajali modeli, G. Pocheptsov «sukut taktikasi» va «framing» (ramkalash) usullari nazariy asos sifatida qo'llanilgan. Tahlil ob'ekti sifatida O'zbekiston («Xalq so'zi», «Vatanparvar»), Rossiya («Krasnaya Zvezda») va xalqaro (CNN) nashrlari tanlangan bo'lib, uch xil tarixiy davr — 1941 (Ikkinchi Jahon urushi), 2000 (Sariosiyo voqealari) va 2022-yil (Rossiya-Ukraina to'qnashuvi) qoplanadigan materiallar qiyosiy tahlil usulida o'rganilgan. Natijalar shuni ko'rsatadiki, barcha tadqiqot ob'ektlari kun tartibini strategik kommunikatsiya vositasi sifatida qo'llagan va jamiyatni yagona narrativ atrofida jipslashtirish uchun xizmat qilgan.*

Kalit so'zlar: *axborot urushi, OAV, kun tartibi nazariyasi, agenda-setting, dezinformatsiya, framing, ramkalash, sukut taktikasi, strategik kommunikatsiya, media tahlil.*

1. KIRISH (INTRODUCTION)

Qurolli to'qnashuvlar va turli qarama-qarshiliklar, axborot orqali urushlar, manipulyatsiyalar urchigan bir vaqtda OAV shunchaki xabar tarqatuvchi tizim

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vazifasidan chiqib, jamoatchilik fikrini boshqaruvchi asosiy manbaaga aylandi. Binobarin, axborot urushlarining shiddatli jarayonida «kun tartibini belgilash» qobiliyati jamiyatda kimning tom ma'noda «ustun» kelishini hal qiluvchi omil bo'lib xizmat qilmoqda.

«Kun tartibini belgilash» — ya'ni «agenda setting» g'oyasi mazmunini tushunishdan boshlash lozim. Bu tushunchani ilk bor Uolter Lippman ishlatgan. Olim OAV garchi auditoriyaga to'g'ridan-to'g'ri ta'sir qilmasa-da, individ ongida dunyo obrazini muayyan stereotip tasvir orqali yaratadi, degan. Ya'ni uning fikricha, qurolli nizo sharoitida insonlar urushda bevosita qatnasha olmagani uchun, jurnalist chizgan manzara ichida yashaydi. Jurnalist inson ongida voqeani «chizadi».

Loueri va Defler kabi tadqiqotchilar kun tartibidagi eng muhim besh jihatini alohida ta'kidlab o'tishadi: (1) kun tartibini shakllantirish xususiyatlari; (2) shaxsiy kun tartibini yaratishga hissa qo'shadigan ma'lumotlar manbalari; (3) kun tartibini belgilashning vaqt chizig'i; (4) shaxsiy xususiyatlarning kun tartibini tashkil etishga yordam berish darajasi; (5) kun tartibini shakllantirishda siyosiy mexanizmlarning roli.

McCombs va Shaw o'zlarining tadqiqotlarida «agenda-setting»ni uch turga ajratishadi. Birinchi darajali Agenda-setting — bu turda nima haqida o'ylashlari kerakligini belgilab olish: agar gazeta yoki TV biror voqeani kuniga o'n marta takrorlasa, odamlar o'z-o'zidan bu mavzuni mamlakatdagi eng birinchi darajali muammo deb hisoblaya boshlaydi. Ikkinchi darajali Agenda-setting — qanday o'ylashni belgilash. Makkombs 1990-yillarda buni «Atributiv agenda-setting» deb atagan; bu bosqichda media auditoriyaga nafaqat voqeani ko'rsatadi, balki uni qanday rangda (ijobiy yoki salbiy) qabul qilishni ham belgilaydi. Uchinchi darajali Agenda-setting — 2012-yilda Makkombs va Ley Guo tomonidan taklif etilgan eng zamonaviy bosqich: media inson ongida bitta tushunchani ikkinchisi bilan uzviy bog'lab qo'yadi.

Ushbu tadqiqotning maqsadi — axborot urushlari sharoitida OAV tomonidan kun tartibini shakllantirishning o'ziga xos xususiyatlarini tahlil etish, manipulyatsiya va ramkalashning ta'sir mexanizmlarini ochib berish hamda turli tarixiy davrlar va

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geografik kontekstlar bo'yicha qiyosiy ilmiy xulosalar ishlab chiqishdir. **Tadqiqot gipotezasi:** qurolli to'qnashuvlar va axborot urushlari davrida barcha ko'rinishdagi OAV — milliy, davlatiy va xalqaro — kun tartibini strategik kommunikatsiya vositasi sifatida qo'llab, jamiyat ongini maqsadli boshqaradi.

2. METODLAR (METHODS)

2.1. Tadqiqot dizayni

Tadqiqotda sifatiy tahlil usuli — aniqrog'i, kontent-tahlil (content analysis) va diskurs-tahlil (discourse analysis) — kombinatsiyasi qo'llanildi. Maqolalar sarlavhalari, narrativ yo'nalishlari, framing usullari va kognitiv ta'siri ko'rsatkichlariga ko'ra kodlandi. Tahlil McCombs va Shaw «Agenda-Setting» nazariyasining uch darajali modeli, Pocheptsov «sukut taktikasi» va Entman «framing» kontseptsiyalari asosida amalga oshirildi.

2.2. Tahlil ob'ektlari

Tadqiqot uch xil milliy kontekst va uch tarixiy davr qamrovida o'tkazildi. O'zbek nashrlari sifatida «Xalq so'zi» gazetasining 2000-yil 15-avgust (157-son) va 17-avgust (159-son) sonlari, shuningdek «Vatanparvar» gazetasining 2000-yil 10-avgust (96-son) va 15-avgust (98-son) sonlari tanlab olindi — bu davrlar Sariosiyo voqealari bilan to'g'ri keladi. Rossiya harbiy nashri sifatida «Krasnaya Zvezda» gazetasining 1941-yil 30-noyabr (282-son) va 20-dekabr (288-son) sonlari, hamda 2026-yil mart oyining 49-soni o'rganildi. Xalqaro nashr sifatida CNN.com portali Rossiyaning Ukrainaga to'liq bosqini boshlangan 2022-yil 24-fevral va urushning bir oyligiga to'g'ri kelgan 2022-yil 25-mart kunlari tahlil qilindi.

2.3. Tahlil mezonlari

Har bir nashr uchun quyidagi to'rtta mezon bo'yicha baholash amalga oshirildi: (1) Strategik yo'nalish — dominantlik kasb etgan narrativ; (2) Agenda-setting darajasi — birinchi, ikkinchi yoki uchinchi darajali mexanizm; (3) Framing usuli — ijobiy,

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salbiy yoki neytral ramkalash; (4) Kognitiv ta'sir — auditoriyada kutilgan idrok natijasi. Tahlilning asosiy birligi — sarlavha va maqola boshlanmasi matnlari hisoblanadi, chunki aynan ular kun tartibini eng to'g'ridan-to'g'ri ifodalaydi.

3. NATIJALAR (RESULTS)

3.1. «Xalq so'zi» va «Vatanparvar» nashrlari — Sariosiyo voqealari (2000)

«Xalq so'zi» gazetasining 157-sonida «Xalq qahramonlarini unutmaydi, xiyonatni kechirmaydi», «Terrorchilar talvasada», «Ming yigitni ishini qildi», «Alisher chinakam she'r edi», «Bolam yurtimiz koriga yaradi...», «Abdulla akaning o'g'li», «Istiqlol quyoshi mangudir» kabi maqolalar va «Besh qahramon» she'ri orqali Sariosiyo voqealari kun tartibiga chiqarilgan. 159-sonda esa «Vatan fidoylari», «Sadoqat ramzi», «Operatsiyaning harbiy bosqichi nihoyasiga yetmoqda», «Terrorchilarga jazo muqarrar», «Nobakoplar niyatiga yetolmaydi», «Tog'lardagi jasorat» kabi maqolalar joy olgan.

Uolter Lipmannning nazariyasiga tayanadigan bo'lsak, «Xalq so'zi» gazetasi bu maqolalari orqali aholiga haqiqiy muhitni his qilishiga emas, «chizilgan» manzarani his qilishiga zamin yaratadi. Gazetaning belgilagan bu kun tartibi orqali vatanparvarlik tuyg'usini yanada kuchaytirishga, onalar va xalq tilidan olingan maqola-yu she'rlari orqali ham iftixor, ham ongli ravishda dushmanga nisbatan nafrat, o'tgan askarlar uchun motam tuyg'usini bevosita ulashdi. Makkoms va Show nazariyasidan kelib chiqib baholasak, nashr faqat voqea haqida xabar berish bilangina qolmay, balki o'sha voqeani baholashni xalqning o'ziga qo'yib bergan.

«Vatanparvar» gazetasining 96-sonida «Burchga sodiqlik sharafdir», «Terrorchilar niyatiga yetolmaydi», «O'g'lonlaring fidoiy», «Yetuk ofitser bo'lamiz», 98-sonida esa «A'lo xizmatimiz mustaqilligimizning 9-yilligiga», «Farxodlarning qalbi oyoqqa turdi», «Burchimiz gazandalapni yo'q qilish», «Qonxo'r to'da yakson qilinmoqda», «Sharaf erur yurt himoyasi», «Aytsammi, yo aytmasamm'...» sarlavhali maqolalar va «Besh qahramon» she'ri bilan kun tartibiga chiqarildi.

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Har ikkala nashr — «Xalq so'zi» va «Vatanparvar» gazetalari — quruq hisobotlar yoki axborot bilan cheklanmasdan, balki unga «emotsional framing» ya'ni «hissiy ramkalash» san'ati orqali har sahifasida she'rlar bilan boyitib, uning ta'sirini o'n barobar oshirgan. Sababи, maqolalar kun tartibiga qo'yilgan maqsadni «to'ldira olmayotgan» bir vaqtda she'riyat va pafos orqali o'quvchining nafaqat ongiga, balki yuragigacha yetib borgan.

3.2. «Krasnaya Zvezda» gazetasi — Ikkinchi Jahon urushi (1941)

Gazetaning 282-sonida (30-noyabr 1941) «Наша победа на Юге» («Janubdagi g'alabamiz»), «Еще удар по войскам врага» («Dushman qo'shinlariga yana bir zarba»), «Как наши войска отбили у немцев Ростов-на-Дону» («Qo'shinlarimiz Rostov-Donni nemislardan qanday qaytarib oldi»), «Первые сведения о трофеях» («Qo'lga kiritilgan o'ljalar haqidagi dastlabki ma'lumotlar»), «Забота о семьях фронтовиков» («Frontdagilar oilalari haqida g'amxo'rlik»), «Английское наступление в Ливии» («Angliyaning Liviyadagi hujumi») kabi maqolalar kun tartibini belgilagan.

288-sonda (20-dekabr 1941) esa «Войска генерала Голикова продолжают успешное преследование врага», «Немцы боятся ударов по флангам», «Гвардия наступает», «Назревание внутреннего кризиса в Германии» («Germaniyadagi ichki inqirozning kuchayishi»), «Зверское обращение немцев с советскими военнопленными», «Партизанская война в Сербии», «Японо-китайская война» kabi maqolalar o'rin egallagan.

1941-yilning eng og'ir pallalarida — dushman Moskva ostonasida turgan bir vaqtda — «Krasnaya Zvezda» gazetasining belgilagan «kun tartibi» axborot berish emas, balki butun boshli millatning ruhiy sinishiga yo'l qo'ymaslik uchun qurilgan strategik istehkom vazifasini o'tagan. Gazeta sarlavhalari orqali urush manzarasini shunday chizganki, unda Moskva uchun og'ir janglar ketsa-da, asosiy e'tibor qo'lga kiritilgan o'ljalar va oldingi saflarda topshirilayotgan ordenlarega qaratilgan. Bu

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Makkoms nazariyasidagi «nima haqida o'ylash kerakligi» tamoyilining klassik ifodasidir.

Dekabrga kelib, gazeta kun tartibini dushmannnning faqat tashqi emas, balki ichki zaifligiga ham qarata boshlagan. «Germaniyadagi ichki inqirozning kuchayishi» yoki «Nemislar qurshovdan qo'rqmoqda» kabi sarlavhalar orqali auditoriya ongida raqibning ruhiy mag'lubiyati tasvirlangan. G. Pocheptsov aytgan «sukut taktikasi» ham o'ziga xos tarzda ishlagan: frontdagi muvaffaqiyatsizliklar o'rnini dushmannnning harbiy asirlar bilan vahshiyona munosabati haqidagi xabarlar egallashi jamiyatda raqibga nisbatan nafratni va murosasizhkni shakllantirgan.

3.3. «Krasnaya Zvezda» — Zamonaviy davr (2026-yil mart, 49-son)

Gazetaning 2026-yil mart oyining 49-soni tahlil qilingan natijalar quyidagi jadvalda ifodalangan:

Maqola sarlavhasi	Strategik yo'nalish	Kun tartibi usuli	Kognitiv ta'sir
«Противник теряет силы и территорию»; «Командный пункт ВСУ уничтожен»; «Преимущество в небе»	G'alaba va strategik ustunlik narrativi	First-level agenda-setting: diqqatni faqat muvaffaqiyatli harakatlarga yo'naltirish	«Vaziyat to'liq nazorat ostida» ishonchini yaratish va ichki vahimani so'ndirish
«Выполнять священный долг	Ma'naviy-axloqiy safarbarlik	Positive Framing: urushning og'ir	Harbiy xizmatni romantizatsiya

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– великая честь»; «Особенности службы на передовой»; «Под аккомпанемент орудий»		jarayonlarini «sharaf» va «jasorat» tushunchalari bilan o'rash	qilish va vatanparvarlik stereotiplarini mustahkamlash
«Российский ОПК надёжный и эффективный»; «Окружая заботой каждого бойца»; «С вниманием и душой»	Institutsional ishonch va ijtimoiy g'amxo'rlik	Priming: davlatning qudrati va askarlarga g'amxo'rligi haqidagi baholash mezonlarini yaratish	«Orqa front» mustahkamligi haqidagi tasavvur uyg'otish
«Ил-2: как создавался «летающий танк»»; «Тревожные будни разведбата 201-й РВБ»	Tarixiy davomiylik va geosiyosiy qudrat	Network Agenda-setting: bugungi harakatlarni o'tmishdagi buyuk g'alabalar bilan bog'lash	Milliy g'urur hissini uyg'otish va «armiya har doim eng kuchli bo'lgan» ishonchini shakllantirish

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3.4. CNN — Rossiya-Ukraina urushi (2022)

2022-yil 24-fevraldagi CNN.com bosh sahifasida material boshlanmasidanoq «Putin launches full-scale invasion of Ukraine» ya'ni «Putin Ukrainaga to'liq miqyosdagi bosqinni boshladi» degan katta sarlavha bilan ochildi. Keyin esa maqolalar saf tortib, «These are the Ukrainian cities under attack» («Hujumga uchragan Ukraina shaharlari mana bular»), «NATO allies activate defense plans amid Russian attack», «Biden announces new sanctions targeting Russia's economy», «The world reacts to Russia's attack on Ukraine», «Zelensky calls on Ukrainians to fight: 'We will defend our country'», «Opinion: Putin has made a catastrophic miscalculation» kabi materiallar bilan portal urushni kun tartibiga chiqardi.

2022-yil 25-martdagi sahifalarda esa «Russia claims control of Mariupol - Ukraine says fighting continues», «US intelligence: Russia running low on precision-guided missiles», «Blinken: Russia committed war crimes in Ukraine», «How ordinary Ukrainians are turning the tide against Russia», «Russian forces deliberately targeting civilians, UN says», «Opinion: The war is going badly for Putin. What happens next?», «Refugees: More than 3.7 million Ukrainians have fled the country», «How the world is helping Ukraine» kabi maqolalar va videolahzalar o'rin egallagan.

Urushning dastlabki va bir oylik davrida CNN ning belgilagan «kun tartibi» oddiy axborot berish emas, balki xalqaro jamoatchilik fikrini ma'lum yo'nalishda shakllantirish uchun qurilgan strategik kommunikatsiya vositasi vazifasini o'tagan. Portal sarlavhalari orqali urush manzarasini shunday chizganki, unda jangovar harakatlar tasvirlangan bo'lsa-da, asosiy e'tibor Rossiyaning zaifligiga — raketalar kamayib bormoqda, fond bozorlar quladi, Putin «halokatli xato» qildi — va ukrainaliklarnig qahramonligiga qaratilgan.

G. Pocheptsov aytgan «sukut taktikasi» CNN da ham o'ziga xos tarzda ishlagan: Rossiyaning bosib olgan hududlaridagi harbiy yutuqlari o'rnini «urush jinoyatlari» va «tinch aholining o'ldirilishi» haqidagi xabarlar egallashi xalqaro jamoatchilikda raqibga nisbatan axloqiy nafrat va murosasizhkni shakllantirgan. CNN ning kun

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tartibida «How the world is helping Ukraine» kabi materiallarning paydo bo'lishi tasodif emas — bu o'quvchida «Ukraina yakkalanib qolmadi, butun dunyo u bilan» degan ishonchni uyg'otish uchun xizmat qilgan.

4. MUHOKAMA (DISCUSSION)

4.1. Umumiy qonuniyatlar

Tahlil qilingan har uchala davr — xoh u 1941-yilgi Moskva ostonasidagi og'ir janglar bo'lsin, xoh 2000-yildagi Sariosiyo voqealari yoki bugungi zamonaviy to'qnashuvlar — media doimo kun tartibini belgilab, asosiy muammoga e'tibor berish bilan jamiyatni vahimadan asrash va uni yagona narrativ atrofida jipslashtirish uchun eng samarali filtr vazifasini o'tagan. Bu holat tadqiqotning dastlabki gipotezasini to'liq tasdiqlaydi.

Barcha tadqiqot ob'ektlarida uchta umumiy qonuniyat kuzatildi. Birinchidan, tushkunlik mavzularini kun tartibidan chiqarish va g'alaba, jasorat, fidoyilik mavzularini markazga qo'yish. Ikkinchidan, dushmannn obraz haqidagi ikkita parallel narrativni — tashqi harbiy zaiflik va ichki inqiroz — bir vaqtda ishlatish. Uchinchidan, auditoriyada «biz yakkalanib qolmadik» degan ishonchni mustahkamlash uchun ittifoqdoshlar va xalqaro hamjihatlik mavzusini kun tartibiga kiritish.

4.2. Milliy va xalqaro nashrlardagi farqlar

O'zbek nashrlari («Xalq so'zi», «Vatanparvar») emotsional framing vositasi sifatida she'riyat va adabiy janrlardan keng foydalangan. Bu O'zbek madaniy merosiga xos bo'lib, xalq ongida chuqurroq aksul-aks uyg'otishga xizmat qilgan. «Krasnaya Zvezda» esa tarixiy davomiylik (Il-2 «uchuvchi tank»ning tarixi kabi maqolalar) va institutsional ishonchni (ordenlar, g'amxo'rlik) bir vaqtda ishlatib, «doimo g'alaba qozongan armiya» obrazini yaratan.

CNN xalqaro demokratik auditoriya uchun mo'ljallangan bo'lganligi sababli, axloqiy argumentlarga — urush jinoyatlari, fuqarolar qurbonlari — alohida urg'u

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bergan. Bu uning ikkinchi darajali agenda-settingning asosiy vositasi sifatida ishlagan; ya'ni voqea faqat yoritilmagan, balki ma'lum axloqiy ramkaga solingan.

4.3. «Sukut taktikasi»ning ko'rinishlari

G. Pocheptsov asarlarida ta'riflangan «sukut taktikasi» barcha tadqiqot ob'ektlarida kuzatildi. Sariosiyo voqealari davrida O'zbek nashrlari terhorchilar tomonidan erishilgan harbiy yutuqlarni yoritishdan bosh tortib, asosiy e'tiborni o'z kuchlarimizning jangcha faoliyatiga qaratdi. Ikkinchi Jahon urushi davrida «Krasnaya Zvezda» frontdagi chekinishlar o'rniga olg'a surish va mukofotlashni ko'rsatdi. CNN esa Rossiya bosib olgan hududlardagi strategik muvaffaqiyatlarini «urush jinoyatlari» haqidagi axloqiy framingga almashtirdi.

4.4. Zamonaviy raqamli muhitda agenda-setting

Zamonaviy axborot muhitida kun tartibini shakllantirish yangi o'lchovlar kasb etmoqda. CNN misoli shuni ko'rsatadiki, xalqaro media gigantlari endi nafaqat an'anaviy nashrlar orqali, balki real vaqt rejimida yangilanuvchi veb-portalar, ijtimoiy tarmoqlar va multimedia formatlar orqali agenda-settingni amalga oshirmoqda. Bu Pariser tomonidan ta'riflangan «filter bubble» effektini yanada kuchaytiradi va auditoriyaning voqelikdan o'z «pufakchasi» doirasida axborot olishiga olib keladi.

5. XULOSA (CONCLUSION)

Ushbu tadqiqot axborot urushlari sharoitida OAV kun tartibini (agenda) shakllantirishning universal qonuniyatlarini ko'rsatdi. Tahlil natijalari asosida quyidagi asosiy xulosalar chiqarish mumkin:

1. McCombs va Shaw «Agenda-Setting» nazariyasining uch darajali modeli qurolli to'qnashuvlar davridagi OAV faoliyatini tahlil qilishning eng samarali vositasi ekanligini tadqiqot ob'ektlari tasdiqladi.

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2. Barcha tadqiqot ob'ektlari — milliy, davlatiy va xalqaro nashrlarga qaramasdan — bir xil strategik maqsadni ko'zlagan: jamiyatni ruhiy sinishdan asrash va uni yagona narrativ atrofida birlashtirish.

3. «Sukut taktikasi» (Pocheptsov), «framing» (Entman) va «priming» mexanizmlari bir-birini to'ldiruvchi vositalar sifatida muvaffaqiyatli qo'llanilgan; bu holat ularning kun tartibini boshqarishdagi ahamiyatini yanada isbotlaydi.

4. Milliy kontekstga xos ramkalash usullari — O'zbekistonda she'riyat va emotsional pafos, Rossiyada tarixiy davomiylik, CNN da axloqiy argumentatsiya — agenda-settingning universal mexanizmi turli madaniy vositalar orqali amalga oshirilishini ko'rsatadi.

5. Zamonaviy raqamli muhitda agenda-setting yangi ko'rinish kasb etmoqda: real vaqt yangilanishlari, multimedia formatlar va algoritmik boshqaruv an'anaviy kun tartibi mexanizmlarini yanada kuchaytirib, auditoriyaning voqelikni idrok etishini chuqurroq shakllantirmoqda.

Kelajak tadqiqotlar uchun quyidagi yo'nalishlar tavsiya etiladi: ijtimoiy tarmoqlar va sun'iy intellekt algoritmlari tomonidan agenda-settingning amalga oshirilishi; media savodxonlikni rivojlantirishning jamiyat axborot immuniteti uchun ahamiyati; hamda O'zbekiston raqamli mediasi kontekstida zamonaviy axborot urushlariga qarshi tura olish mexanizmlarini ishlab chiqish.

FOYDALANILGAN ADABIYOTLAR

1. Lippmann W. Public Opinion. — New York: Harcourt, Brace and Company, 1922. — 427 p.
2. McCombs M., Shaw D. The Agenda-Setting Function of Mass Media // Public Opinion Quarterly. — 1972. — Vol. 36. — №2. — P. 176–187.
3. McCombs M. Setting the Agenda: The Mass Media and Public Opinion. — Cambridge: Polity Press, 2004. — 184 p.

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4. McCombs M., Guo L. Agenda-setting influence of traditional and social media // The Oxford Handbook of Political Communication. — 2014. — P. 393–405.

5. Lowery S., DeFleur M. Milestones in Mass Communication Research. — New York: Longman, 1988. — 432 p.

6. Entman R. Framing: Toward Clarification of a Fractured Paradigm // Journal of Communication. — 1993. — Vol. 43. — №4. — P. 51–58.

7. Pocheptsov G. Informatsionnye voyny. — Moskva: Refl-buk, 2000. — 576 s.

8. Pariser E. The Filter Bubble: How the New Personalized Web Is Changing What We Read and How We Think. — New York: Penguin Press, 2011. — 304 p.

9. Safarov A. Harbiy jurnalistikada yangiliklar va reportyorlik mahorati. — Toshkent, 2018.

10. «Xalq so'zi» gazetasi. — 2000-yil 15-avgust. — 157-son; 2000-yil 17-avgust. — 159-son.

11. «Vatanparvar» gazetasi. — 2000-yil 10-avgust. — 96-son; 2000-yil 15-avgust. — 98-son.

12. «Krasnaya Zvezda» gazetasi. — 1941-yil 30-noyabr. — 282-son; 1941-yil 20-dekabr. — 288-son.

13. «Krasnaya Zvezda» gazetasi. — 2026-yil mart. — 49-son.

14. CNN.com. — 2022-yil 24-fevral va 25-mart kunlari bosh sahifasi materiallari.

15. O'zbekiston Respublikasining «Ommaviy axborot vositalari to'g'risida»gi Qonuni (2007, 2019-yil tahriri).

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GIBRID OPERATSIYALARNING XIRURGIYADAGI O‘RNI, TEXNOLOGIK ASOSLARI VA KLINIK SAMARADORLIGI

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Annotatsiya. Gibrid operatsiyalar ochiq jarrohlik, endovaskulyar aralashuv, endoskopik manipulyatsiya va real vaqtli tasvir nazoratini bir operatsion muhitda birlashtiruvchi zamonaviy davolash yondashuvidir. Bunday operatsiyalar murakkab yurak-qon tomir, neyroxirurgik, travmatologik, torakal va abdominal holatlarda bemorni bir bo‘limdan boshqasiga ko‘chirmasdan diagnostika, rekonstruksiya va nazoratni ketma-ket yoki bir vaqtda bajarishga imkon beradi. Natijalar shuni ko‘rsatadiki, gibrid yondashuvning samarasi faqat yuqori texnologiyali operatsion xona mavjudligiga emas, balki multidisiplinar jamoa, tasvirlash sifati, radiatsion xavfsizlik, bemor tanlash, aseptika va aniq ish algoritmiga bog‘liq. Maqola o‘quv va ilmiy maqsadlarda tayyorlangan.

Kalit so‘zlar: gibrid operatsiya; gibrid operatsion xona; endovaskulyar xirurgiya; real vaqtli tasvirlash; minimal invaziv yondashuv; radiatsion xavfsizlik; multidisiplinar jamoa; klinik samaradorlik.

Kirish

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An’anaviy jarrohlikda ochiq operatsiya, angiografiya, endoskopiya va radiologik nazorat ko‘pincha alohida bo‘limlarda bajarilgan. Bu yondashuv oddiy holatlarda yetarli bo‘lishi mumkin, biroq murakkab kasalliklarda vaqt yo‘qotish, bemorni transport qilish, takroriy narkoz, qo‘shimcha infeksiya xavfi va davolash bosqichlari orasida uzilish kabi muammolarni keltirib chiqaradi. Gibrid operatsiyalar aynan shu kamchiliklarni kamaytirish maqsadida shakllangan.

Gibrid operatsiya deganda ochiq jarrohlik va minimal invaziv aralashuvning bir muhitda uyg‘un bajarilishi tushuniladi. Masalan, endovaskulyar stent qo‘yish va ochiq tomir rekonstruksiyasi bir operatsiyada bajarilishi, yurak klapan patologiyasida kateter orqali protezlash va jarrohlik nazorati qo‘shilishi, travmada qon ketayotgan tomir angiografik usulda yopilishi bilan birga ochiq gemostaz amalga oshirilishi mumkin. Bu yondashuvning markazida gibrid operatsion xona turadi.

Mavzuning dolzarbligi shundaki, zamonaviy tibbiyotda bemorlar ko‘pincha bir nechta kasallik, yuqori operatsion xavf va murakkab anatomik sharoit bilan keladi. Bunday holatlarda faqat ochiq yoki faqat endovaskulyar yondashuv yetarli bo‘lmasligi mumkin. Gibrid operatsiya esa bir nechta usulning kuchli tomonlarini birlashtirish orqali individual va moslashuvchan davolash imkonini beradi. Maqolaning maqsadi gibrid operatsiyalarning ilmiy asoslarini, texnologik elementlarini, klinik foydasi va cheklovlarini tizimli tahlil qilishdan iborat.

Materiallar va metodlar

Maqola tavsifiy-analitik metodda tayyorlandi. Materiallar sifatida gibrid operatsion xonalar, endovaskulyar jarrohlik, intraoperatsion tasvirlash, radiatsion xavfsizlik, bemor xavfsizligi va multidisiplinar davolashga oid ilmiy manbalar, o‘quv adabiyotlari va xalqaro tavsiyalar tahlil qilindi. Maqola klinik tadqiqot emas, unda bemor shaxsiy ma’lumotlari ishlatilmadi va alohida davolash rejasi belgilanmadi.

Tahlil uch yo‘nalishda olib borildi. Birinchi yo‘nalishda gibrid operatsiyalarning mazmuni va turlari yurak-qon tomir, neyroxirurgik, ortopedik, travmatologik, torakal va abdominal amaliyotlar misolida ko‘rib chiqildi. Ikkinchi yo‘nalishda gibrid operatsion xonaning texnologik qismlari, jumladan angiografik tizim, C-yoyli rentgen,

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kompyuter tomografiya, monitorlar, operatsion stol, steril maydon va ma'lumot almashish platformalari baholandi. Uchinchi yo'nalishda xavfsizlik, radiatsiya, aseptika, jamoaviy koordinatsiya va iqtisodiy cheklovlar umumlashtirildi.

Metodologik mezon sifatida gibrid operatsiya faqat texnologik yangilik emas, balki klinik qaror qabul qilish modeli sifatida baholandi. Shu sababli tahlilda bemorni tanlash, ko'rsatma, xavf-foyda nisbati, operatsion jamoa tayyorgarligi va muassasa infratuzilmasi alohida o'rin egalladi.

1-jadval. Gibrid operatsiyalarning asosiy turlari

Yo'nalish	**Gibrid yondashuv mazmuni**	**Klinik maqsad**
Yurak-qon tomir xirurgiyasi	Ochiq rekonstruksiya va endovaskulyar stentlashni birlashtirish.	Qon oqimini tiklash va katta kesma hajmini kamaytirish.
Neyroxirurgiya	Mikroxirurgik manipulyatsiya va intraoperatsion angiografiya yoki 3D tasvirlash.	Tomir anevrizmasi, o'sma yoki murakkab anatomiya nazoratini kuchaytirish.
Travmatologiya	Ochiq fiksatsiya, qon ketishni angiografik yopish va tasvir nazorati.	Og'ir travmada tez gemostaz va anatomik tiklash.
Torakal va abdominal xirurgiya	Endoskopik, laparoskopik va ochiq bosqichlarni birlashtirish.	Murakkab o'choqqa kamroq shikast bilan yetib borish.
Onkologik amaliyot	Reseksiya, lokal ablatsiya va navigatsion nazoratni uyg'unlashtirish.	Chegara nazorati va organ saqlovchi yondashuvni yaxshilash.

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2-jadval. Gibrid operatsion xonaning asosiy tarkibiy qismlari

Komponent	Vazifasi	Amaliy talabi
Tasvirlash tizimi	Rentgen, fluoroskopiya, angiografiya yoki 3D tasvir yordamida real vaqtli nazorat.	Aniq kalibrlash, radiatsion himoya va sifat nazorati zarur.
Operatsion stol	Ochiq va endovaskulyar bosqichlarga mos pozitsiyani ta’minlash.	Tasvirlash moslamasi bilan mos va steril maydonga qulay bo‘lishi kerak.
Monitor va navigatsiya	Jarroh va interventsion mutaxassisga bir xil ma’lumotni ko‘rsatish.	Ko‘rish burchagi, tasvir sifati va ma’lumot sinxronligi muhim.
Steril instrumentlar majmuasi	Ochiq va minimal invaziv bosqichlar uchun to‘liq tayyorgarlik.	Asboblar oldindan rejalashtirilgan tartibda joylashtiriladi.
Jamoaviy kommunikatsiya	Jarroh, anesteziolog, radiolog, hamshira va texniklar hamkorligi.	Rol taqsimoti va favqulodda reja yozma yoki og‘zaki tasdiqlanadi.

Natijalar

Tahlil natijalari gibrid operatsiyalarning asosiy afzalligi bir nechta davolash bosqichlarini yagona xavfsiz muhitda birlashtirish ekanini ko‘rsatadi. Bu yondashuv ayniqsa murakkab qon tomir patologiyalarida foydali bo‘lishi mumkin, chunki jarroh tomirni ochiq ko‘rishi, interventsion mutaxassis esa stent, kateter yoki embolizatsiya vositasi bilan ichki yo‘ldan ishlashi mumkin. Natijada bemor bir necha marta operatsion va diagnostik xonalarga ko‘chirilmaydi.

Gibrid operatsiyalarda real vaqtli tasvirlash alohida klinik qiymatga ega. Angiografiya, fluoroskopiya, intraoperatsion kompyuter tomografiya yoki 3D

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navigatsiya jarrohlarga operatsiya davomida natijani tekshirish imkonini beradi. Masalan, stent joylashuvi, qon oqimi, implant holati yoki rezeksiya chegarasi shu zahoti baholanishi mumkin. Bu xatoni erta aniqlash va shu operatsiyaning o‘zida tuzatish imkonini kuchaytiradi.

Biroq gibrid operatsiyalar xavfsizlik bo‘yicha oddiy operatsiyadan kam talabchan emas, aksincha ko‘proq tartib talab qiladi. Bir maydonda steril jarrohlik, rentgen tasvirlash, kateter uskunalari, anesteziya, monitorlar, kabel va texnik qurilmalar birga ishlaydi. Shu sababli radiatsion himoya, aseptika, elektr xavfsizligi, bemor pozitsiyasi, asboblar joylashuvi va favqulodda ochiq operatsiyaga o‘tish rejasi oldindan aniqlanishi kerak.

3-jadval. Gibrid operatsiya jarayonining bosqichlari

Bosqich	Asosiy ish	Nazorat nuqtasi
Operatsiyadan oldingi rejalashtirish	Anatomiya, xavf, tasvir, asbob va jamoa tarkibi aniqlanadi.	Ko‘rsatma va alternativ usullar baholanadi.
Bemorni joylashtirish	Ochiq kirish va tasvirlash qurilmasi uchun qulay pozitsiya tanlanadi.	Bosim nuqtalari, steril maydon va C-yoy harakati tekshiriladi.
Minimal invaziv bosqich	Kateter, stent, embolizatsiya yoki endoskopik manipulyatsiya bajariladi.	Fluoroskopiya va kontrast nazorati qo‘llanadi.
Ochiq xirurgik bosqich	Rekonstruksiya, gemostaz, rezeksiya yoki implantatsiya amalga oshiriladi.	Anatomik xavfsizlik va qon ketish nazorat qilinadi.

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Yakuniy tasvir va tekshiruv	Natija intraoperatsion tasvir yordamida baholanadi.	Qoldiq nuqson, implant holati yoki qon oqimi tekshiriladi.

4-jadval. Gibrid operatsiyalarning ustunliklari va cheklovlari

Ustunlik yoki cheklov	Mazmuni	Amaliy xulosa
Aniqlikning oshishi	Tasvir nazorati anatomik va funksional natijani tez baholaydi.	Murakkab holatlarda qaror qabul qilishni kuchaytiradi.
Bemorni kamroq ko‘chirish	Diagnostika va davolash bir joyda bajariladi.	Og‘ir bemorlarda vaqt va xavfni kamaytirishi mumkin.
Multidisiplinar hamkorlik	Bir operatsiyada turli mutaxassislar ishtirok etadi.	Kommunikatsiya sust bo‘lsa, xato xavfi ortadi.
Radiatsion xavf	Fluoroskopiya va angiografiya xodim hamda bemorga nurlanish beradi.	Himoya vositalari, dozani kamaytirish va vaqtni nazorat qilish shart.
Yuqori xarajat	Xona, uskunalar, servis va kadr tayyorgarligi katta resurs talab qiladi.	Foyda real klinik ehtiyoj va operatsiya hajmi bilan asoslanishi kerak.

Muhokama

Gibrid operatsiyalarni faqat zamonaviy apparatlar yig‘indisi deb tushunish xato. Aslida bu yondashuv klinik tafakkurni o‘zgartiradi. Unda jarroh, interventsion radiolog, anesteziolog, operatsion hamshira, rentgen laboranti va texnik mutaxassis bir vaqtning o‘zida yagona natija uchun ishlaydi. Bunday jamoaviy modelda xatolarning ko‘pi texnologiya yetishmasligidan emas, balki rol chalkashligi, vaqtni noto‘g‘ri rejalashtirish yoki kommunikatsiya sustligidan kelib chiqishi mumkin.

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Gibrid operatsiyalarning kuchli tomoni moslashuvchanlikdir. Agar endovaskulyar bosqich yetarli natija bermasa, ochiq jarrohlik bosqichiga o‘tish mumkin. Agar ochiq bosqichdan keyin qon oqimi yoki implant joylashuvi shubhali bo‘lsa, intraoperatsion tasvir bilan darhol tekshiriladi. Bu bemor uchun ikkinchi alohida aralashuv ehtiyojini kamaytirishi mumkin. Biroq ushbu ustunlik faqat protokol, malaka va texnik tayyorgarlik bo‘lsa ish beradi.

Radiatsion xavfsizlik gibrid operatsiyalarning eng muhim muhokama nuqtalaridan biridir. Tasvirlash qancha foydali bo‘lmasin, nurlanish dozasini e’tiborsiz qoldirish mumkin emas. Qo‘rg‘oshinli himoya kiyimlari, qalqonlar, masofani saqlash, fluoroskopiya vaqtini qisqartirish, impulsli rejimdan foydalanish va tasvirlash burchagini oqilona tanlash operatsion madaniyatning majburiy qismidir. Bu talablar talabalar va yosh mutaxassislar tayyorgarligida alohida o‘rgatilishi kerak.

Iqtisodiy jihat ham ochiq aytilishi lozim. Gibrid operatsion xona qimmat infratuzilma hisoblanadi. Agar muassasada bunday xonadan foydalanish hajmi kam bo‘lsa, texnik xizmat va kadr tayyorgarligi yetarli bo‘lmasa yoki bemor tanlash mezonlari noaniq bo‘lsa, investitsiya o‘zini oqlamasligi mumkin. Shu sababli gibrid texnologiyani joriy etishdan oldin klinik ehtiyoj, hududiy kasallanish profili, mutaxassislar mavjudligi va barqaror moliyalashtirish baholanishi shart.

O‘quv nuqtayi nazaridan gibrid operatsiyalar talabalar uchun fanlararo fikrlash maktabidir. Bu mavzu anatomiya, rentgenologiya, xirurgiya, anesteziologiya, biofizika, infeksiya nazorati va tibbiy menejmentni birlashtiradi. Shuning uchun gibrid operatsiyalarni o‘rganish faqat operatsion texnikani emas, balki xavfsizlik, koordinatsiya va dalillarga asoslangan qaror qabul qilishni ham o‘z ichiga olishi kerak.

Gibrid operatsiyalarni o‘qitishda klinik ssenariylar muhim o‘rin egallaydi. Talaba gibrid operatsion xonani faqat apparatlar joylashgan xonadek tasavvur qilmasligi kerak. U bemor operatsiyaga kirishidan oldin qanday tasvirlar o‘rganilishi, qaysi mutaxassis qanday rol bajarishi, qaysi asboblar tayyorlanishi, ochiq operatsiyaga o‘tish mezoni qanday belgilanishi va yakuniy nazorat qanday o‘tkazilishini bosqichma-bosqich tushunishi kerak.

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Gibrid operatsiyaning muvaffaqiyati uchun bemor tanlash mezonlari aniq bo‘lishi shart. Har bir murakkab bemor gibrid operatsiyaga muhtoj emas. Agar oddiy ochiq operatsiya xavfsiz va yetarli natija bersa, qimmat texnologiyani ishlatish shart emas. Aksincha, agar bemorda anatomik murakkablik, yuqori xavf, tomir yo‘li orqali davolash imkoniyati yoki intraoperatsion tasvir nazorati zarurati bo‘lsa, gibrid yondashuv asosli bo‘lishi mumkin.

Gibrid operatsion xonada logistika oddiy operatsion xonadan murakkabroq. C-yoy harakati, kabel yo‘llari, monitor joylashuvi, anesteziologik kirish, steril stol va jarroh turadigan joy bir-biriga xalal bermasligi kerak. Agar xona oldindan rejalashtirilmagan bo‘lsa, hatto yuqori texnologiyali uskunalar ham operatsion oqimni sekinlashtiradi. Shuning uchun dizayn bosqichida jarrohlar, radiologlar, hamshiralar, anesteziologlar va texnik muhandislar fikri birlashtirilishi zarur.

Favqulodda holatga tayyorgarlik gibrid operatsiyalarda alohida ahamiyatga ega. Endovaskulyar bosqich vaqtida tomir yorilishi, stent siljishi, kontrastga reaksiya yoki qon ketish yuzaga kelsa, jamoa ochiq operatsiyaga tez o‘tishi kerak. Bu holatda kerakli asboblar, qon mahsulotlari, tikuv materiallari, aspiratsiya va anesteziologik qo‘llab-quvvatlash oldindan tayyor bo‘lmasa, gibrid yondashuvning afzalligi yo‘qoladi.

Kelajakda gibrid operatsiyalar sun’iy intellekt yordamidagi tasvir tahlili, robot-assistent manipulyatsiyalar, kengaytirilgan reallik navigatsiyasi va masofaviy ekspert konsultatsiyalari bilan yanada rivojlanishi mumkin. Lekin asosiy masala o‘zgarmaydi: texnologiya klinik maqsadga xizmat qilishi kerak. Qurilma borligi uchun operatsiya gibrid qilinmaydi; bemorning xavfi, kasallik anatomiyasi va kutilayotgan natija gibrid yondashuvni oqlashi kerak.

Xulosa

Gibrid operatsiyalar zamonaviy xirurgiyaning eng muhim rivojlanish yo‘nalishlaridan biri bo‘lib, ochiq jarrohlik, minimal invaziv aralashuv va real vaqtli tasvir nazoratini birlashtiradi. Ularning klinik qiymati murakkab bemorlarda davolashni moslashtirish, natijani operatsiya vaqtida baholash, bemorni ortiqcha

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ko‘chirishni kamaytirish va jamoaviy qaror qabul qilishni kuchaytirishda namoyon bo‘ladi.

Shu bilan birga, gibrid operatsiyalar texnologik hashamat emas, balki qat’iy rejalashtirishni talab qiladigan murakkab tibbiy tizimdir. Uning muvaffaqiyati bemor tanlash, multidisiplinar jamoa, tasvirlash sifati, radiatsion himoya, aseptika, favqulodda rejalar va iqtisodiy asoslanganlik bilan belgilanadi. Tibbiyot talabalari uchun bu mavzu zamonaviy xirurgiyaning texnik, klinik va tashkiliy jihatlarini bir butun holda tushunishga yordam beradi.

Foydalanilgan adabiyotlar

1. Clark M., Wiebe N. Hybrid Operating Room Suites. Ottawa: CADTH Health Technology Review, 2023.

2. Spenkelink I. M. va boshqalar. Image-guided procedures in the hybrid operating room: a systematic scoping review. Insights into Imaging, 2022.

3. Zaman T. va boshqalar. The difficulties and solutions in operationalising a hybrid operating room. Journal of Perioperative Practice, 2024.

4. Jin H. va boshqalar. Application of the hybrid operating room in surgery: systematic review. Journal of Healthcare Engineering, 2022.

5. Jahon sog‘liqni saqlash tashkiloti. Xavfsiz jarrohlik bo‘yicha qo‘llanma. Jeneva: WHO, 2009.

6. Santos J. S. va boshqalar. Radiation doses to staff in a hybrid operating room. European Journal of Vascular and Endovascular Surgery, 2020.

7. Cewe P. va boshqalar. Radiation distribution in a hybrid operating room using different X-ray imaging systems. Journal of NeuroInterventional Surgery, 2022.

8. Toshkent tibbiyot akademiyasi. Xirurgik kasalliklar va operativ xirurgiya bo‘yicha o‘quv-uslubiy materiallar. Toshkent.

9. O‘zbekiston Respublikasi Sog‘liqni saqlash vazirligi. Operatsion xavfsizlik va infeksiya profilaktikasi bo‘yicha o‘quv materiallari. Toshkent.

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10. StatPearls Publishing. Endovascular and operative surgery educational resources. Treasure Island: StatPearls Publishing.

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UMUMIY FARMAKOLOGIYA: DORI VOSITALARINING FARMAKODINAMIKASI, FARMAKOKINETIKASI, O‘ZARO TA’SIR TURLARI VA NOJO‘YA TA’SIRLARI

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Annotatsiya

Ushbu ilmiy maqolada umumiy farmakologiyaning asosiy yo‘nalishlari, jumladan dori vositalarining farmakodinamikasi va farmakokinetikasi, organizmdagi ta’sir mexanizmlari, biologik o‘zlashtirilishi, metabolizmi va chiqarilish jarayonlari tahlil qilinadi. Shuningdek, dori vositalari o‘rtasidagi o‘zaro ta’sir turlari hamda nojo‘ya ta’sirlarning kelib chiqish sabablari va klinik ahamiyati yoritilgan. Zamonaviy farmakologiyada dori vositalarining samaradorligi va xavfsizligini oshirishda individual yondashuvning ahamiyati ko‘rib chiqilgan. Tadqiqot natijalari ratsional farmakoterapiyani shakllantirish va dori vositalarini xavfsiz qo‘llashda muhim nazariy hamda amaliy asos bo‘lib xizmat qiladi.

Kalit so‘zlar: umumiy farmakologiya, farmakodinamika, farmakokinetika, dori vositalari, nojo‘ya ta’sirlar, dori o‘zaro ta’siri, farmakoterapiya.

Аннотация

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В данной научной статье рассматриваются основные направления общей фармакологии, включая фармакодинамику и фармакокинетику лекарственных средств, механизмы их действия в организме, процессы всасывания, распределения, метаболизма и выведения. Особое внимание уделено видам лекарственного взаимодействия и причинам возникновения побочных эффектов, а также их клиническому значению. Проанализирована роль индивидуального подхода в повышении эффективности и безопасности фармакотерапии. Результаты исследования имеют важное теоретическое и практическое значение для рационального назначения и безопасного применения лекарственных препаратов.
Ключевые слова: общая фармакология, фармакодинамика, фармакокинетика, лекарственные средства, побочные эффекты, лекарственное взаимодействие, фармакотерапия.
Abstract

This scientific article examines the fundamental aspects of general pharmacology, including the pharmacodynamics and pharmacokinetics of medicinal drugs, their mechanisms of action in the human body, and the processes of absorption, distribution, metabolism, and excretion. Particular attention is given to different types of drug interactions and adverse drug reactions, including their causes and clinical significance. The importance of an individualized approach in improving the efficacy and safety of pharmacotherapy is also discussed. The findings provide significant theoretical and practical foundations for rational pharmacotherapy and the safe use of medications.
Keywords: general pharmacology, pharmacodynamics, pharmacokinetics, medicinal drugs, adverse effects, drug interactions, pharmacotherapy.

Kirish

Farmakologiya tibbiyot fanlari ichida muhim o‘rin egallovchi fundamental fanlardan biri bo‘lib, dori vositalarining tirik organizmga ta’siri, ularning qo‘llanilishi va xavfsizligini o‘rganadi. Zamonaviy tibbiyot taraqqiyoti bilan bir qatorda yangi dori preparatlarining yaratilishi, ularning biologik ta’sir mexanizmlarini chuqur o‘rganish

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va klinik amaliyotda oqilona qo‘llash masalalari dolzarb ahamiyat kasb etmoqda. Shu jihatdan umumiy farmakologiya dori vositalarining organizm bilan o‘zaro munosabatlarini tushuntiruvchi nazariy asos sifatida xizmat qiladi.

Umumiy farmakologiyaning asosiy bo‘limlari bo‘lgan **farmakodinamika** va **farmakokinetika** dori vositalarining samaradorligi va xavfsizligini baholashda muhim mezon hisoblanadi. Farmakodinamika dorilarning organizmga qanday ta’sir ko‘rsatishini, retseptorlar bilan o‘zaro bog‘lanishini va fiziologik hamda biokimyoviy javob reaksiyalarini o‘rganadi. Farmakokinetika esa dorining organizmga kirishi, so‘rilishi, taqsimlanishi, biotransformatsiyasi va organizmdan chiqarilishi kabi jarayonlarni tahlil qiladi. Ushbu ikki yo‘nalish dori vositalarining terapevtik samaradorligini belgilashda o‘zaro chambarchas bog‘liqdir.

Bugungi kunda polifarmatsiya, ya’ni bir bemorga bir vaqtning o‘zida bir nechta dori vositalarining buyurilishi keng tarqalgan bo‘lib, bu holat **dori vositalarining o‘zaro ta’siri** va **nojo‘ya ta’sirlar** rivojlanish xavfini oshirmoqda. Jahon sog‘liqni saqlash tashkiloti ma’lumotlariga ko‘ra, dori vositalarining noto‘g‘ri qo‘llanishi va nojo‘ya reaksiyalar sog‘liqni saqlash tizimida jiddiy muammolardan biri hisoblanadi. Shu sababli dori vositalarining farmakologik xususiyatlarini chuqur tushunish va individual yondashuv asosida davolash strategiyasini tanlash zamonaviy farmakoterapiyaning asosiy talablaridan biridir.

Mazkur ilmiy maqolaning maqsadi umumiy farmakologiyaning nazariy asoslarini tahlil qilish, dori vositalarining farmakodinamik va farmakokinetik xususiyatlarini yoritish, dori vositalari o‘rtasidagi o‘zaro ta’sir turlarini hamda nojo‘ya ta’sirlarning rivojlanish mexanizmlarini ilmiy adabiyotlar asosida o‘rganishdan iborat. Tadqiqot natijalari farmakologik bilimlarni chuqurlashtirish, dori vositalarini ratsional buyurish va bemor xavfsizligini ta’minlashda muhim nazariy-amaliy ahamiyatga ega.

Metodologiya

Mazkur ilmiy maqola umumiy farmakologiyaning asosiy nazariy yo‘nalishlari — dori vositalarining farmakodinamikasi, farmakokinetikasi, o‘zaro ta’sir mexanizmlari va nojo‘ya ta’sirlarini o‘rganishga bag‘ishlangan bo‘lib, tadqiqot davomida zamonaviy

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ilmiy-tahliliy yondashuvlardan foydalanildi. Tadqiqotning metodologik asosini farmakologiya bo‘yicha nufuzli darsliklar, ilmiy monografiyalar hamda xalqaro klinik tavsiyalar tashkil etdi.

Tadqiqotda asosiy manba sifatida Yakubova L.K. “Farmakologiya” (Toshkent, 2021), Azizova S.S. “Farmakologiya” (Toshkent, 2016), Lippincott Illustrated Reviews: Pharmacology (6th Edition), Харкевич Д.А. “Фармакология” (Москва, 2018) **va** Справочник Видаль (Vidal) dori vositalari ma’lumotnomasi kabi ishonchli adabiyotlardan foydalanildi. Ushbu manbalardagi ilmiy ma’lumotlar tahlil qilinib, solishtirma va tizimli yondashuv asosida umumlashtirildi.

Tadqiqot metodlari quyidagilardan iborat bo‘ldi:

1. Adabiyotlar tahlili (literature review):

Farmakologiya faniga oid mahalliy va xalqaro ilmiy manbalar chuqur o‘rganildi. Dori vositalarining organizmga ta’sir mexanizmlari, retseptorlar bilan bog‘lanish xususiyatlari, so‘rilish, taqsimlanish, metabolizm va eliminatsiya jarayonlariga oid nazariy ma’lumotlar yig‘ildi va tizimlashtirildi.

2. Qiyosiy tahlil usuli (comparative analysis):

Turli farmakologik guruhlarga mansub dori vositalarining farmakodinamik va farmakokinetik ko‘rsatkichlari o‘zaro solishtirildi. Ayniqsa bioo‘zlashtirilish darajasi, yarim parchalanish davri, retseptor selektivligi va terapevtik indeks kabi mezonlar asosida baholash amalga oshirildi.

3. Tizimli yondashuv (systematic approach):

Dori vositalarining o‘zaro ta’siri (sinergizm, antagonizm, potensiallashuv) hamda nojo‘ya ta’sirlarning rivojlanish mexanizmlari yagona tizim asosida tahlil qilindi. Har bir farmakologik jarayon organizmning fiziologik va biokimyoviy javob reaksiyalari bilan bog‘liq holda o‘rganildi.

4. Klinik-farmakologik interpretatsiya usuli:

Nazariy ma’lumotlar klinik amaliyot bilan bog‘lab tahlil qilindi. Dori vositalarining xavfsiz qo‘llanilishi, individual dozani tanlash va nojo‘ya reaksiyalarni oldini olishga oid ilmiy xulosalar shakllantirildi.

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Mazkur metodologik yondashuv dori vositalarining farmakologik xususiyatlarini chuqur tahlil qilish, ularning samaradorligi va xavfsizligini baholash hamda ratsional farmakoterapiya tamoyillarini ilmiy asoslash imkonini berdi.

Natijalar

O‘tkazilgan ilmiy tahlillar natijasida dori vositalarining farmakodinamik va farmakokinetik xususiyatlari ularning klinik samaradorligi hamda xavfsizlik profilini belgilovchi asosiy omillar ekanligi aniqlandi. Farmakodinamik tahlil dori vositalarining retseptorlar bilan selektiv bog‘lanishi, agonistik yoki antagonistik ta’siri orqali terapevtik javob shakllanishini ko‘rsatdi. Shu bilan birga, dori ta’sirining kuchi va davomiyligi retseptor sezgirligi, individual genetik xususiyatlar va organizmning fiziologik holatiga bog‘liq ekanligi kuzatildi.

Farmakokinetik baholashda dori vositalarining organizmda so‘rilish (absorbsiyalanish), taqsimlanish, biotransformatsiya va chiqarilish (eliminatsiya) bosqichlari ularning bioo‘zlashtirilish darajasi va terapevtik konsentratsiyasiga sezilarli ta’sir ko‘rsatishi aniqlandi. Ayniqsa jigar va buyrak faoliyatidagi o‘zgarishlar dori metabolizmi va eliminatsiyasiga bevosita ta’sir qilishi sababli doza korreksiyasi talab etilishi qayd etildi.

Polifarmatsiya holatlarida dori vositalarining o‘zaro ta’siri ko‘proq uchrashi va bu holat nojo‘ya ta’sirlar xavfini oshirishi aniqlandi. Sinergizm terapevtik samarani kuchaytirishi mumkin bo‘lsa, antagonizm ayrim hollarda dori samaradorligini pasaytirishi mumkinligi kuzatildi. Nojo‘ya ta’sirlar orasida allergik reaksiyalar, toksik ta’sirlar, kumulyatsiya va idiosinkraziya ko‘proq uchraydigan holatlar sifatida baholandi.

1-jadval. Dori vositalarining farmakokinetik bosqichlari va ularning klinik ahamiyati

Farmakokinetik bosqich	Jarayon tavsifi	Klinik ahamiyati

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So‘rilish (Absorbsiya)	Dori vositasining qon oqimiga o‘tishi	Bioo‘zlashtirilish darajasini belgilaydi
Taqsimlanish (Distribusiya)	Dorining to‘qima va organlarga tarqalishi	Ta’sir joyiga yetib borishini ta’minlaydi
Metabolizm (Biotransformatsiya)	Asosan jigarda kimyoviy o‘zgarishi	Faollashuvi yoki zararsizlantirilishi
Chiqarilish (Eliminatsiya)	Buyrak, jigar yoki o‘pka orqali chiqarilishi	Yarim parchalanish davri va doza intervalini belgilaydi

2-jadval. Dori vositalarining o‘zaro ta’siri va nojo‘ya ta’sirlarining asosiy turlari

Ko‘rsatkich	**Turlari**	**Klinik misollar**
Dori o‘zaro ta’siri	Sinergizm	Antibiotiklar kombinatsiyasida samarani oshishi
	Antagonizm	Adrenalin va beta-blokatorlar qarama-qarshi ta’siri
	Potensiallashuv	Sedativlar bilan narkoz vositalari ta’sirining kuchayishi
Nojo‘ya ta’sirlar	Allergik reaksiyalar	Toshma, anafilaktik shok
	Toksik ta’sirlar	Jigar yoki buyrak zararlanishi
	Kumulyatsiya	Digoksin to‘planishi
	Idiosinkraziya	Individual noodatiy reaksiyalar

Natijalar tahlili

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Tahlillar shuni ko‘rsatdiki, dori vositalarining samaradorligi faqat farmakologik xususiyatlariga emas, balki bemorning yoshi, jinsi, genetik omillari, hamroh kasalliklari va boshqa qabul qilayotgan dori vositalariga ham bog‘liq. Individual yondashuv asosida farmakoterapiya olib borish nojo‘ya ta’sirlarni kamaytirish va davolash samaradorligini oshirishda muhim ahamiyat kasb etadi. Shu sababli zamonaviy farmakologiyada **ratsional dori tanlash**, **to‘g‘ri dozalash** va **dori monitoringi** asosiy ustuvor yo‘nalishlardan biri hisoblanadi.

Muhokama

Mazkur tadqiqot natijalari umumiy farmakologiyaning asosiy yo‘nalishlari — farmakodinamika, farmakokinetika, dori vositalarining o‘zaro ta’siri va nojo‘ya ta’sirlar — klinik amaliyotda dori vositalaridan oqilona foydalanishda hal qiluvchi ahamiyatga ega ekanligini tasdiqladi. Tahlil qilingan ilmiy manbalarga ko‘ra, dori vositalarining terapevtik samaradorligi faqat preparatning kimyoviy tuzilishi bilan emas, balki uning organizm bilan o‘zaro murakkab biologik aloqalari bilan ham belgilanadi.

Farmakodinamik jihatdan dori vositalarining retseptorlar bilan selektiv bog‘lanishi va hujayra ichki signal uzatish tizimlariga ta’siri davolash samaradorligini aniqlovchi asosiy omillardan biridir. **Yakubova L.K. (2021)** va **Harkevich D.A. (2018)** ma’lumotlariga ko‘ra, retseptor sezgirligidagi individual farqlar bir xil dori vositasining turli bemorlarda turlicha natija berishiga sabab bo‘lishi mumkin. Bu holat ayniqsa yurak-qon tomir, markaziy asab tizimi va endokrin kasalliklarni davolashda muhim ahamiyat kasb etadi.

Farmakokinetik tahlillar shuni ko‘rsatdiki, dori vositalarining organizmda so‘rilishi, taqsimlanishi, metabolizmi va chiqarilishi ko‘plab omillarga bog‘liq. Jigar fermentlari faolligi, buyrak filtratsiyasi darajasi, bemorning yoshi va tana massasi dori konsentratsiyasining terapevtik diapazonda saqlanishiga ta’sir qiladi. Ayniqsa keksa yoshdagi bemorlarda va surunkali jigar yoki buyrak yetishmovchiligi mavjud holatlarda preparat dozalarini individual moslashtirish zarurligi ilmiy jihatdan asoslandi.

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Muhokama davomida polifarmatsiya bilan bog‘liq muammolar alohida e’tibor talab qilishi aniqlandi. Bir nechta dori vositalarini bir vaqtning o‘zida qabul qilish farmakokinetik va farmakodinamik o‘zaro ta’sir xavfini oshiradi. **Lippincott Illustrated Reviews: Pharmacology** manbalariga ko‘ra, ayniqsa antibiotiklar, antikoagulyantlar va gormonal preparatlar o‘rtasidagi o‘zaro ta’sirlar klinik jihatdan muhim hisoblanadi. Sinergik ta’sir ayrim hollarda davolash samaradorligini oshirsada, nazoratsiz kombinatsiyalar toksiklik va nojo‘ya reaksiyalar xavfini kuchaytirishi mumkin.

Nojo‘ya ta’sirlar masalasida allergik reaksiyalar, toksik ta’sirlar, kumulyatsiya va individual intolerantlik eng ko‘p uchraydigan holatlar sifatida qayd etildi. Zamonaviy farmakovigilans tizimi bunday reaksiyalarni erta aniqlash va oldini olishda muhim vosita bo‘lib xizmat qiladi. Shu sababli dori vositalarini buyurishda xavf–foyda nisbatini baholash, anamnezni chuqur yig‘ish va bemorni monitoring qilish zarur.

Umuman olganda, muhokama natijalari shuni ko‘rsatadiki, umumiy farmakologiya bo‘yicha chuqur bilimga ega bo‘lish shifokor va farmatsevtlar uchun dori vositalarini xavfsiz va samarali qo‘llashning ilmiy asosidir. Individual farmakoterapiya tamoyillariga amal qilish, dori o‘zaro ta’sirlarini hisobga olish va nojo‘ya ta’sirlarni nazorat qilish zamonaviy tibbiyotning ustuvor yo‘nalishlaridan biri bo‘lib qolmoqda.

Xulosa

Mazkur ilmiy maqolada umumiy farmakologiyaning asosiy nazariy va amaliy jihatlari, jumladan dori vositalarining farmakodinamikasi, farmakokinetikasi, o‘zaro ta’sir mexanizmlari hamda nojo‘ya ta’sirlari batafsil tahlil qilindi. O‘rganilgan ilmiy manbalar va o‘tkazilgan tahlillar shuni ko‘rsatdiki, dori vositalarining terapevtik samaradorligi va xavfsizligi ularning organizmdagi biologik harakati hamda bemorning individual xususiyatlariga bevosita bog‘liqdir.

Farmakodinamik va farmakokinetik jarayonlarni chuqur tushunish dori vositalarini to‘g‘ri tanlash, optimal dozani belgilash va davolash samaradorligini oshirish imkonini beradi. Ayniqsa dori vositalarining o‘zaro ta’sirlarini hisobga olish hamda nojo‘ya reaksiyalarni erta aniqlash va oldini olish klinik amaliyotda muhim ahamiyat kasb

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etadi. Polifarmatsiya sharoitida ratsional farmakoterapiya tamoyillariga amal qilish bemor xavfsizligini ta’minlashning asosiy shartlaridan biridir.

Shuningdek, individual yondashuv asosida farmakologik davolash strategiyasini ishlab chiqish, bemorning yoshi, jinsiy xususiyatlari, jigar va buyrak faoliyati hamda genetik omillarni hisobga olish zamonaviy tibbiyotning muhim talabi ekanligi aniqlandi. Bu esa farmakologiya fanining nafaqat nazariy, balki amaliy tibbiyotdagi strategik ahamiyatini yana bir bor tasdiqlaydi.

Xulosa qilib aytganda, umumiy farmakologiya bo‘yicha puxta bilimga ega bo‘lish shifokorlar, farmatsevtlar va tibbiyot talabalari uchun dori vositalaridan oqilona, samarali va xavfsiz foydalanishning ilmiy asosini yaratadi. Kelgusida farmakogenetika va individual farmakoterapiya yo‘nalishlarining rivojlanishi dori davolash samaradorligini yanada oshirishga xizmat qiladi.

Foydalanilgan adabiyotlar

1. Харкевич Д.А.
   Фармакология: учебник для медицинских вузов. — 13-е изд., перераб. и доп. — Москва: ГЭОТАР-Медиа, 2021. — 760 с.
2. Машковский М.Д.
   Лекарственные средства. — 17-е изд., перераб. и доп. — Москва: Новая Волна, 2020. — 1216 с.
3. Кукес В.Г., Сычев Д.А., Проценко Д.Н.
   Клиническая фармакология: учебник. — Москва: ГЭОТАР-Медиа, 2022. — 1056 с.
4. Белоусов Ю.Б., Моисеев В.С., Лепахин В.К.
   Клиническая фармакология и фармакотерапия. — Москва: Универсум Паблишинг, 2020. — 872 с.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

5. Николаев А.Ю.
Противовирусные препараты в современной клинической практике. — Москва: Практическая медицина, 2021. — 384 с.
6. Шульдяков А.А., Дроздов В.Н.
Инфекционные болезни и противовирусная терапия. — Санкт-Петербург: СпецЛит, 2020. — 512 с.
7. Лопатин А.С.
Рецептура для студентов медицинских вузов: учебное пособие. — Москва: ГЭОТАР-Медиа, 2021. — 256 с.
8. Клинические рекомендации по применению противовирусных препаратов / Под ред. В.И. Покровского. — Москва: Министерство здравоохранения РФ, 2023. — 198 с.
9. Яковлев С.В.
Рациональная антимикробная и противовирусная фармакотерапия. — Москва: Литтерра, 2021. — 640 с.
10. Таточенко В.К.
Фармакотерапия вирусных инфекций у детей и взрослых. — Москва: ПедиатрЪ, 2022. — 430 с.

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КИЧИК БИЗНЕСНИНГ ИННОВАЦИОН РИВОЖЛАНИШ СТРАТЕГИЯСИНИ ТАКОМИЛЛАШТИРИШ

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Аннотация. Мазкур мақолада кичик бизнес субъектларининг инновацион ривожланиш стратегиясини такомиллаштиришнинг назарий ва амалий жиҳатлари таҳлил қилинган. Инновацион фаолиятни ривожлантириш орқали кичик бизнеснинг рақобатбардошлигини ошириш, инвестицион жозибадорлигини кучайтириш ва иқтисодий ўсишга таъсири ёритилган. Шунингдек, Ўзбекистонда кичик бизнес субъектларининг инновацион салоҳиятини оширишда рақамли технологиялар, давлат қўллаб-қувватлаш механизмлари ва замонавий бошқарув усулларининг аҳамияти илмий жиҳатдан асосланган.

Калит сўзлар: кичик бизнес, инновация, инновацион стратегия, рақобатбардошлик, рақамли иқтисодиёт, инвестиция, инновацион фаолият, стартап, иқтисодий ўсиш.

Аннотация. В данной статье проанализированы теоретические и практические аспекты совершенствования стратегии инновационного развития малого бизнеса. Освещены вопросы повышения конкурентоспособности малого бизнеса посредством инновационной деятельности, усиления инвестиционной привлекательности и влияния на экономический рост. Также научно обоснована роль цифровых технологий, механизмов государственной поддержки и современных методов управления в повышении инновационного потенциала субъектов малого бизнеса в Узбекистане.

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Ключевые слова: малый бизнес, инновации, инновационная стратегия, конкурентоспособность, цифровая экономика, инвестиции, инновационная деятельность, стартап, экономический рост.

Abstract. This article analyzes the theoretical and practical aspects of improving the innovative development strategy of small businesses. The study highlights the importance of increasing competitiveness, strengthening investment attractiveness, and ensuring sustainable economic growth through innovation activities. Furthermore, the role of digital technologies, state support mechanisms, and modern management methods in enhancing the innovative potential of small business entities in Uzbekistan is scientifically substantiated.

Keywords: small business, innovation, innovation strategy, competitiveness, digital economy, investment, innovative activity, startup, economic growth.

Кириш

Жаҳон иқтисодиётида глобаллашув жараёнларининг чуқурлашуви, рақамли иқтисодиётнинг ривожланиши ҳамда инновацион технологияларнинг кенг жорий этилиши кичик бизнес субъектларининг фаолиятига янгича ёндашувларни талаб этмоқда. Айниқса, иқтисодиётнинг барқарор ўсишини таъминлаш, янги иш ўринларини яратиш ва аҳоли даромадларини оширишда кичик бизнеснинг ўрни муҳим аҳамият касб этади. Шу сабабли кичик бизнес субъектларининг инновацион ривожланиш стратегиясини такомиллаштириш бугунги кунда долзарб иқтисодий масалалардан бири ҳисобланади [1].

Инновацион ривожланиш стратегияси корхоналарнинг бозорда рақобат устунлигига эришиши, маҳсулот ва хизматлар сифатини ошириши ҳамда ишлаб чиқариш харажатларини қисқартиришга хизмат қилади. Кичик бизнес субъектларида инновацияларни жорий этиш орқали иқтисодий самарадорликни ошириш, экспорт салоҳиятини кенгайтириш ва ташқи бозорларга чиқиш имкониятлари ортади [2].

Ўзбекистонда ҳам сўнгги йилларда кичик бизнес ва хусусий тадбиркорликни ривожлантириш давлат иқтисодий сиёсатининг устувор

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йўналишларидан бирига айланди. Мамлакатда инновацион иқтисодиётни шакллантириш, стартап лойиҳаларни қўллаб-қувватлаш, рақамли технологияларни иқтисодиёт тармоқларига жорий этиш бўйича кенг қамровли ислоҳотлар амалга оширилмоқда [3]. Бу эса кичик бизнес субъектларининг инновацион фаоллигини ошириш ва уларнинг стратегик ривожланиш механизмларини такомиллаштиришни талаб этади.

Шу билан бирга, кичик бизнес субъектларида инновацион фаолиятни ташкил этишда молиявий ресурслар етишмаслиги, илмий-техник салоҳиятнинг чекланганлиги, малакали кадрлар танқислиги ва инновацион инфратузилманинг етарли даражада ривожланмаганлиги каби муаммолар мавжуд [4]. Мазкур муаммоларни ҳал этиш орқали кичик бизнеснинг инновацион ривожланиш стратегиясини такомиллаштириш мамлакат иқтисодиётининг барқарор ўсишини таъминлашда муҳим омил бўлиб хизмат қилади.

Адабиётлар таҳлили

Инновацион иқтисодиёт ва кичик бизнес ривожланиши масалалари кўплаб хорижий ва маҳаллий олимлар томонидан тадқиқ этилган. Жумладан, австриялик иқтисодчи Йозеф Шумпетер ўзининг “The Theory of Economic Development” асарида инновацияларни иқтисодий тараққиётнинг асосий ҳаракатлантирувчи кучи сифатида баҳолаган. Унинг фикрича, инновациялар янги маҳсулотлар яратиш, янги бозорларни ўзлаштириш ва ишлаб чиқариш жараёнларини модернизация қилиш орқали иқтисодий ўсишни таъминлайди [5].

Америкалик олим Майкл Портер “Competitive Advantage of Nations” асарида корхоналар рақобатбардошлигини таъминлашда инновацион стратегия муҳим аҳамиятга эга эканлигини таъкидлайди. Муаллиф инновацияларнинг бозор шароитига тез мослашиш ва самарадорликни оширишдаги ролини илмий асослаб берган [6].

Питер Друкер ўзининг “Innovation and Entrepreneurship” асарида тадбиркорлик ва инновация ўртасидаги узвий боғлиқликни кўрсатиб, инновация ҳар қандай бизнеснинг ривожланиш манбаи эканлигини таъкидлайди [7].

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Россиялик олим Л.И. Абалкин иқтисодий модернизация жараёнларида инновацион ёндашувларнинг аҳамиятини ёритиб, кичик бизнеснинг инновацион фаоллиги мамлакат иқтисодий барқарорлигини таъминлашда муҳим ўрин тутишини қайд этган [8].

Ўзбекистонлик иқтисодчи олимлардан С.С. Ғуломов рақамли иқтисодиёт ва инновацион ривожланиш масалаларини тадқиқ қилиб, миллий иқтисодиётни модернизация қилишда инновацион технологияларнинг аҳамиятини асослаб берган [9].

Шунингдек, А.В. Ваҳобовнинг илмий ишларида кичик бизнес субъектларининг инвестицион жозибадорлигини ошириш ва инновацион фаоллигини кучайтириш иқтисодий ўсишнинг муҳим шарти сифатида баҳоланади [10].

Методология

Тадқиқот жараёнида иқтисодий-таҳлилий, қиёсий таҳлил, статистик кузатув ва тизимли ёндашув усулларидан фойдаланилди. Кичик бизнес субъектларининг инновацион ривожланиш тенденциялари миллий ва халқаро тажрибалар асосида ўрганилди. Шунингдек, инновацион стратегия самарадорлигига таъсир этувчи омиллар таҳлил қилиниб, уларнинг иқтисодий натижалари баҳоланди. Тадқиқотда Ўзбекистон иқтисодиётида амалга оширилаётган ислоҳотлар ва рақамли трансформация жараёнларининг кичик бизнес ривожига таъсири ҳам таҳлил этилди. Олинган маълумотлар асосида илмий таклиф ва амалий тавсиялар ишлаб чиқилди.

Таҳлил ва натижалар

Бугунги кунда кичик бизнес субъектларининг инновацион ривожланиши мамлакат иқтисодиёти рақобатбардошлигини таъминлашнинг муҳим омилларидан бири ҳисобланади. Инновацион фаолиятни самарали ташкил этган корхоналар бозорда ўз мавқеини мустаҳкамлаб, юқори иқтисодий натижаларга эришмоқда. Айниқса, рақамли технологиялардан фойдаланиш, электрон тижоратни ривожлантириш ва автоматлаштирилган бошқарув тизимларини

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жорий этиш кичик бизнеснинг самарадорлигини сезиларли даражада оширмоқда.

Таҳлиллар шуни кўрсатадики, инновацион ёндашувларни жорий этган кичик бизнес субъектларида меҳнат унумдорлиги ва маҳсулот сифати юқори бўлади. Шу билан бирга, инновацион корхоналар ташқи бозорларга чиқиш имкониятига эга бўлиб, экспорт ҳажмини оширишга хизмат қилади.

Қуйида кичик бизнесда инновацион ривожланишнинг асосий иқтисодий натижалари келтирилган.

1-жадвал

Анъанавий ва инновацион кичик бизнес субъектларининг иқтисодий самарадорлик кўрсаткичлари таққосламаси

Кўрсаткичлар	Анъанавий кичик бизнес	Инновацион кичик бизнес
Меҳнат унумдорлиги	Ўртача	Юқори
Рақобатбардошлик даражаси	Паст	Юқори
Экспорт салоҳияти	Чекланган	Кенг
Рақамли технологиялардан фойдаланиш	Кам	Фаол
Инвестиция жалб қилиш имконияти	Паст	Юқори
Бозорга мослашувчанлик	Секин	Тез

Жадвал маълумотларидан кўриниб турибдики, инновацион фаолиятни амалга оширувчи кичик бизнес субъектлари иқтисодий самарадорлик бўйича анъанавий фаолият юритувчи корхоналарга нисбатан юқори натижаларга эга.

Инновацион ривожланиш стратегиясини такомиллаштиришда рақамли иқтисодиёт элементларини кенг жорий этиш муҳим аҳамият касб этади. Хусусан, электрон савдо платформалари, CRM тизимлари, сунъий интеллект технологиялари ва булутли хизматлардан фойдаланиш кичик бизнеснинг бозор

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имкониятларини кенгайтиради. Бу эса маҳсулот ва хизматларнинг тезкор реализация қилинишини таъминлайди.

Шу билан бирга, кичик бизнес субъектларида инновацион ривожланишни таъминлаш учун молиявий қўллаб-қувватлаш механизмларини такомиллаштириш талаб этилади. Хусусан, имтиёзли кредитлар, венчур молиялаштириш, инновацион грантлар ва солиқ имтиёзлари инновацион фаолликни рағбатлантиришда муҳим восита ҳисобланади.

Таҳлиллар шуни кўрсатмоқдаки, инновацион стратегияни самарали амалга ошириш учун қуйидаги йўналишларга алоҳида эътибор қаратиш лозим:

- инновацион инфратузилмани ривожлантириш;
- илм-фан ва бизнес интеграциясини кучайтириш;
- рақамли технологияларни кенг жорий этиш;
- стартап экотизимини ривожлантириш;
- инновацион кадрлар тайёрлаш тизимини такомиллаштириш.

Кичик бизнес субъектларининг инновацион ривожланиши мамлакат иқтисодиётининг барқарор ўсишига ижобий таъсир кўрсатади. Чунки инновацион бизнес субъектлари юқори қўшилган қиймат яратади, янги иш ўринларини ташкил этади ва миллий иқтисодиётда рақобат муҳитини шакллантиради. Шу нуқтаи назардан, инновацион стратегияларни такомиллаштириш мамлакат иқтисодий тараққиётининг муҳим устувор йўналишларидан бири ҳисобланади.

Хулоса

Кичик бизнеснинг инновацион ривожланиш стратегиясини такомиллаштириш мамлакат иқтисодиётининг барқарор ўсишини таъминлашда муҳим аҳамиятга эга. Инновациялар асосида фаолият юритувчи кичик бизнес субъектлари юқори рақобатбардошликка эришиб, бозорда мустаҳкам ўрин эгаллайди. Шунингдек, инновацион ёндашувлар маҳсулот ва хизматлар сифатини ошириш, ишлаб чиқариш харажатларини қисқартириш ҳамда экспорт салоҳиятини кенгайтириш имконини беради.

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Тадқиқот натижаларига кўра, Ўзбекистонда кичик бизнеснинг инновацион ривожланишини таъминлаш учун рақамли технологияларни кенг жорий этиш, инновацион инфратузилмани ривожлантириш ва давлат томонидан қўллаб-қувватлаш механизмларини такомиллаштириш зарур. Айниқса, стартап лойиҳаларни молиялаштириш, венчур капитал бозорини ривожлантириш ва илмий тадқиқот натижаларини амалиётга татбиқ этиш муҳим аҳамият касб этади.

Шу билан бирга, инновацион иқтисодиёт шароитида малакали кадрлар тайёрлаш тизимини такомиллаштириш, таълим муассасалари ва бизнес субъектлари ўртасида ҳамкорликни кучайтириш мақсадга мувофиқ ҳисобланади. Кичик бизнес субъектларининг инновацион фаоллигини ошириш орқали миллий иқтисодиётнинг рақобатбардошлигини таъминлаш ва аҳоли фаровонлигини юксалтириш мумкин.

Фойдаланилган адабиётлар

1. Ўзбекистон Республикаси Президентининг “Инновацион ривожланиш стратегияси тўғрисида”ги фармони. – Тошкент, 2022. – 12 б.

2. World Bank. Small Business and Innovation Development Report. – Washington DC, 2021. – 45 p.

3. Ўзбекистон Республикаси Иқтисодиёт ва молия вазирлиги. Кичик бизнес ва тадбиркорлик ривожланиши бўйича статистик тўплам. – Тошкент, 2024. – 56 б.

4. OECD. Innovation Strategy for SMEs. – Paris: OECD Publishing, 2022. – 63 p.

5. Schumpeter Joseph A. The Theory of Economic Development. – Harvard University Press, Cambridge, 1934. – 255 p.

6. Porter Michael E. Competitive Advantage of Nations. – New York: Free Press, 1990. – 896 p.

7. Drucker Peter F. Innovation and Entrepreneurship. – New York: Harper Business, 1985. – 277 p.

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8. Абалкин Л.И. Экономическая теория на пути к новой парадигме. – Москва: Наука, 2005. – 312 с.

9. Ғуломов С.С. Рақамли иқтисодиёт асослари. – Тошкент: Fan va texnologiya, 2020. – 344 б.

10. Ваҳобов А.В. Инвестициялар ва иқтисодий ўсиш. – Тошкент: IQTISOD-MOLIYA, 2019. – 286 б.

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QUMQO‘RG‘ON TUMANINING IQTISODIY-GEOGRAFIK TAVSIFI: HUDUDIY JOYLASHUV, DEMOGRAFIK DINAMIKA VA XO‘JALIK IXTISOSLASHUVI

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Annotatsiya. Maqolada Surxondaryo viloyati Qumqo‘rg‘on tumanining iqtisodiy-geografik tavsifi real statistik manbalar asosida yoritildi. Tadqiqotda tumanning hududiy joylashuvi, chegaralari, ma’muriy tuzilishi hamda iqtisodiy ko‘rsatkichlari bilan bir qatorda demografik jarayonlari (aholi soni dinamikasi, shahar–qishloq tarkibi, tug‘ilish-o‘lim, tabiiy o‘sish va migratsiya) tahlil qilindi. 2026-yil 1-yanvar holatiga tumanda doimiy aholi soni 267,2 ming kishiga yetgani, shahar aholisi ulushi ~32% atrofida saqlanib qolayotgani, 2024-yilda tug‘ilish 7 613, o‘lim 1 074 va tabiiy o‘sish 6 539 kishini tashkil etgani aniqlandi. Iqtisodiyotda qishloq xo‘jaligi yetakchi bo‘lib (2024-yil yanvar–dekabrda 3 767,3 mlrd so‘m), sanoat (907,4 mlrd so‘m) va bozor xizmatlari (1 689,2 mlrd so‘m) muhim ulushga ega. Natijalar asosida tumanning hududiy rivojlanishida (i) yuqori tabiiy o‘sish, (ii) salbiy migratsiya saldosi, (iii) agrar ixtisoslashuv va xizmatlar sektorini kengaytirish zarurati asosiy omillar sifatida baholandi.

Аннотация. В статье представлен экономико-географический анализ Кумкурганского района Сурхандарьинской области на основе официальных статистических источников. Рассмотрены географическое положение и административные границы, демографическая динамика (численность населения, доля городского и сельского населения, рождаемость, смертность, естественный прирост, миграция) и ключевые показатели хозяйственного

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развития. По состоянию на 01.01.2026 постоянное население района достигло 267,2 тыс. человек, доля городского населения сохраняется на уровне около 32%. В 2024 году зарегистрировано 7 613 рождений, 1 074 смерти и 6 539 человек естественного прироста; миграционное сальдо отрицательное. В структуре экономики ведущим направлением является сельское хозяйство (3 767,3 млрд сум), значимы промышленность (907,4 млрд сум) и рыночные услуги (1 689,2 млрд сум).

Abstract . This paper provides an economic-geographical profile of Kumkurgan (Qumqo‘rg‘on) district in Surkhandarya region, Uzbekistan, using official statistical sources. It covers location and administrative setting, demographic dynamics (population growth, urban–rural structure, births, deaths, natural increase, and migration), and major economic indicators. As of 1 January 2026, the district’s permanent population reached 267.2 thousand, with the urban share hovering around 32%. In 2024, births totaled 7,613, deaths 1,074, and natural increase 6,539; net migration was negative. The economy remains largely agrarian (3,767.3 bln UZS in 2024), while industry (907.4 bln UZS) and market services (1,689.2 bln UZS) contribute substantially.

Kalit so‘zlar: Qumqo‘rg‘on tumani, iqtisodiy-geografik tavsif, demografiya, aholi zichligi, migratsiya, qishloq xo‘jaligi, sanoat, xizmatlar, investitsiya, Surxondaryo.

Kirish. Qumqo‘rg‘on tumani Surxondaryo viloyatining markaziy-transport yo‘nalishlaridan birida joylashgan bo‘lib, iqtisodiy-geografik tavsif berishda uch blok muhim: (1) hududiy joylashuv va ma’muriy tuzilma, (2) demografik salohiyat va aholi joylashuvi, (3) xo‘jalik ixtisoslashuvi hamda bozor infratuzilmasi. Tuman markazi Qumqo‘rg‘on shahri, tuman 1977-yil 23-martda tashkil topgan; viloyat markazigacha masofa 110 km deb beriladi. Tuman Surxon–Sherobod vodiysining markaziy qismida joylashib, hududidan Surxondaryo daryosi oqib o‘tishi qayd etiladi; bu omil irrigatsiya, dehqonchilik va aholi manzilgohlari joylashuvida asosiy tabiiy-geografik tayanch hisoblanadi.

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Material va metodlar. Tadqiqot normativ-statistik hujjatlar asosida tavsifiy (deskriptiv) va dinamik tahlil usullarida bajarildi. Hudud (maydon) va ma'muriy ko'rsatkichlar uchun Surxondaryo viloyati statistika boshqarmasining ma'muriy-hududiy bo'linish jadvali (hudud "ming km²"da) olindi; unda Qumqo'rg'on hududi 1,83 ming km² sifatida berilgan. Aholi soni dinamikasi bo'yicha SIAT (SDMX) ma'lumotlari asosiy manba sifatida ishlatildi (2024–2026-yillar 1-yanvar holati). Shahar–qishloq tarkibi Surxonstatning "hududlar bo'yicha shahar va qishloq aholisi soni" jadvalidan olindi. Demografik harakat (tug'ilish, o'lim, tabiiy o'sish, migratsiya, nikoh/ajrim) hamda tuman iqtisodiyotining asosiy ko'rsatkichlari Qumqo'rg'on tumani statistika bo'limining 2024-yil yanvar–dekabr bo'yicha "ijtimoiy-iqtisodiy holat axborotnomasi"dan olindi.

Hisob-kitoblar: aholi zichligi va o'sish sur'atlari muallif tomonidan quyidagi formulalarda hisoblandi: zichlik = aholi / maydon; o'sish (%) = (t+1 − t)/t × 100. Maydon 1,83 ming km² (1 830 km²) sifatida qabul qilindi.

Natijalar. Hududiy joylashuv va ma'muriy tuzilma. Qumqo'rg'on tumani Jarqo'rg'on, Qiziriq, Boysun, Denov, Sariosiyo, Oltinsoy, Sho'rchi tumanlari hamda Tojikiston Respublikasi bilan chegaradosh ekani tuman statistika axborotnomasida berilgan. Ma'muriy-hududiy bo'linish jadvaliga ko'ra tuman hududi 1,83 ming km² bo'lib, shaharlar va shaharchalar hamda qishloq aholi punktlari tizimi mavjud.

Demografik dinamika va aholi zichligi. 2024–2026-yillar bo'yicha doimiy aholi soni barqaror o'sish trayektoriyasida: 2024-yil 1-yanvar holatiga 255,5 ming kishi, 2025-yil 1-yanvarda 261,6 ming, 2026-yil 1-yanvarda 267,2 ming kishi. Tumanning 2025-yil 1-yanvardagi demografik kesimi (erkaklar 130,1 ming; ayollar 131,6 ming) ham keltirilgan

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Jadval 1. Qumqo‘rg‘on tumanida doimiy aholi soni va zichlik (hisob-kitob, 1-yanvar holati)

Ko‘rsatkich	2024	2025	2026
Doimiy aholi soni, ming kishi	255,5	261,6	267,2
Yillik o‘sish, %	—	2,39	2,14
Hudud, km²	1 830	1 830	1 830
Aholi zichligi, kishi/km²	139,6	143,0	146,0

Manbalar: aholi soni – SIAT doimiy aholi ma’lumotlari; hudud – Surxonstat ma’muriy bo‘linish jadvali; o‘sish va zichlik – muallif hisob-kitobi.

Shahar–qishloq tarkibi. 2024–2026-yillarda shahar aholisi 82,3 mingdan 86,2 minggacha, qishloq aholisi 173,2 mingdan 181,0 minggacha o‘sgan. Shahar ulushi deyarli barqaror: ~32%, qishloq ulushi ~68%.

Jadval 2. Aholining shahar–qishloq bo‘yicha tarkibi (ming kishi)

Yil (1-yanvar)	Jami	Shahar	Shahar ulushi, %	Qishloq	Qishloq ulushi, %
2024	255,5	82,3	32,2	173,2	67,8
2025	261,6	84,8	32,4	176,8	67,6
2026	267,2	86,2	32,3	181,0	67,7

Manba: Surxonstat – “Hududlar bo‘yicha shahar va qishloq aholisi soni”.

Aholining tabiiy harakati va migratsiya. 2024-yil yanvar–dekabrda tumanda tug‘ilganlar 7 613 kishi, vafot etganlar 1 074 kishi, tabiiy o‘sish 6 539 kishini tashkil etgan. Tug‘ilish koeffitsienti 29,4‰, o‘lim koeffitsienti 4,2‰ sifatida berilgan. Shu davrda ko‘chib kelganlar 602, ko‘chib ketganlar 999 bo‘lib, migratsiya saldosi −397 kishini tashkil etadi (hisob-kitob).

Jadval 3. Qumqo‘rg‘on tumanida demografik jarayonlar (2023–2024, kishi)

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Ko‘rsatkich	2023	2024	O‘zgarish
Tug‘ilganlar	7 860	7 613	−247
Vafot etganlar	1 109	1 074	−35
Tabiiy o‘sish	6 751	6 539	−212
Tuzilgan nikohlar	2 289	2 117	−172
Nikohdan ajralishlar	239	249	+10
Ko‘chib kelganlar	626	602	−24
Ko‘chib ketganlar	1 085	999	−86

Manba: Qumqo‘rg‘on tumani statistika bo‘limi, 2024-yil axborotnomasi.

Iqtisodiy ko‘rsatkichlar va xo‘jalik ixtisoslashuvi. 2024-yil yanvar–dekabrda tumanning asosiy iqtisodiy ko‘rsatkichlari quyidagicha: sanoat – 907,4 mlrd so‘m; qishloq, o‘rmon va baliqchilik xo‘jaligi – 3 767,3 mlrd so‘m; bozor xizmatlari – 1 689,2 mlrd so‘m; chakana tovar aylanmasi – 1 024,6 mlrd so‘m; asosiy kapitalga investitsiyalar – 567,4 mlrd so‘m; qurilish ishlari – 331,0 mlrd so‘m. Tuman iqtisodiy profilida agrar sektor yetakchi, ammo xizmatlar va chakana savdo ham aholi daromadi va bozor faolligi indikatorlari sifatida yuqori ulushga ega.

Jadval 4. Qumqo‘rg‘on tumanining asosiy iqtisodiy ko‘rsatkichlari (2024-yil yanvar–dekabr)

Ko‘rsatkich	Jami, mlrd so‘m	2023-yilga nisbatan, %	Jon boshiga, ming so‘m	Jon boshiga o‘sish, %
Sanoat	907,4	101,8	3 509,7	99,3
Asosiy kapitalga investitsiyalar	567,4	96,6	2 194,0	94,2

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Ko‘rsatkich	Jami, mlrd so‘m	2023-yilga nisbatan, %	Jon boshiga, ming so‘m	Jon boshiga o‘sish, %
Qishloq xo‘jaligi (qishloq, o‘rmon, baliqchilik)	3 767,3	102,7	14 571,2	100,3
Qurilish ishlari	331,0	120,0	1 279,9	117,1
Chakana tovar aylanmasi	1 024,6	109,7	3 961,9	107,0
Bozor xizmatlari	1 689,2	109,6	3 873,8	104,3

Manba: Qumqo‘rg‘on tumani statistika bo‘limi, 2024-yil axborotnomasi.

Sanoat tarkibi bo‘yicha 2024-yilda ishlab chiqarish sanoati mutlaq ustun: 907,4 mlrd so‘m jami sanoat mahsulotining 906,8 mlrd so‘mi ishlab chiqarish sanoatiga to‘g‘ri keladi; tog‘-kon ulushi juda kichik. Sanoatda kichik biznes ulushi 28,7% (260,2 mlrd so‘m) sifatida qayd etilgan.

Qishloq xo‘jaligida xo‘jaliklar toifasi bo‘yicha taqsimot: mahsulotning 77,0% dehqon va tomorqa xo‘jaliklari, 17,9% fermer xo‘jaliklari, 5,1% esa qishloq xo‘jaligi faoliyatini amalga oshiruvchi tashkilotlar hissasiga to‘g‘ri keladi. 2024-yilda don va dukkakli ekinlar 72 616,8 tonna, kartoshka 51 573,1 tonna, sabzavot 106 644,9 tonna, poliz 42 266,3 tonna, meva 17 230,2 tonna, uzum 9 754,9 tonna yetishtirilgani keltirilgan.

Investitsiya va qurilish geografiyasi. 2024-yilda asosiy kapitalga investitsiyalar 567,4 mlrd so‘m bo‘lib, texnologik tarkibda qurilish-montaj ishlari 326,7 mlrd, asbob-uskunalar va jihozlar 172,0 mlrd, boshqa kapital ishlar 68,7 mlrd so‘m sifatida beriladi. Qurilish ishlari hajmi 331,0 mlrd so‘m (120,0% o‘sish) ekani qayd etiladi. Bu ko‘rsatkichlar tumanda infratuzilma va ishlab chiqarish obyektlari yangilanishi iqtisodiy faollik omillaridan biri ekanini bildiradi.

Turizm va rekreatsiya resurslari nuqtayi nazaridan ham hududning iqtisodiy-geografik salohiyati kuchaymoqda: Qumqo‘rg‘on tumanidagi Janubiy Surxon suv

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ombori hududida qiymati 140 mlrd so‘m bo‘lgan ekoturizm majmuasi loyihasi haqida xabar berilgan.

Muhokama. Qumqo‘rg‘on tumani iqtisodiy-geografik rivojlanishidagi asosiy “drayver”lar va cheklovlar demografiya hamda xo‘jalik tarkibida aniq ko‘rinadi.

Birinchi nuqta: demografik o‘sishning manbai asosan tabiiy o‘sishdir. 2024-yilda tabiiy o‘sish 6 539 kishini tashkil etgani, tug‘ilish koeffitsienti 29,4‰ darajada ekani tuman demografik salohiyatining yuqoriligini bildiradi. Bu — mehnat resurslari istiqboli uchun ijobiy omil, lekin ta’lim, sog‘liqni saqlash, ish o‘rinlari va uy-joy infratuzilmasiga bosimni kuchaytiradi.

Ikkinchi nuqta: migratsiya saldosi salbiy (2024-yilda −397). Bu holat “ish o‘rni va daromad”ning bir qismi tuman tashqarisida shakllanayotganini yoki aholi bir qismi boshqa hududlarga ko‘chib, iqtisodiy imkoniyat izlayotganini anglatadi. Iqtisodiy-geografik siyosat nuqtayi nazaridan bu saldoni kamaytirish uchun sanoat va xizmatlar sektorida barqaror ish o‘rinlari yaratish, logistika va bozor xizmatlarini kengaytirish muhim bo‘ladi.

Uchinchi nuqta: iqtisodiy tuzilma agrar-xizmatlar yo‘nalishida. Qishloq xo‘jaligi hajmi (3 767,3 mlrd so‘m) sanoat hajmidan bir necha barobar yuqori, shu bilan birga xizmatlar va chakana savdo ko‘rsatkichlari ham yuqori o‘sishga ega (109,6% va 109,7%). Bu tumanning iqtisodiy-geografik ixtisoslashuvi irrigatsion dehqonchilik, tomorqa xo‘jaliklari, chorvachilik va mahalliy bozor xizmatlari ekani haqidagi xulosani kuchaytiradi.

To‘rtinchi nuqta: urbanizatsiya past sur’atda, lekin barqaror. 2024–2026-yillarda shahar aholisi ulushi 32% atrofida saqlanib qolgan. Bu infratuzilma rejalashtirishda ikki yo‘nalishni talab qiladi: (a) qishloq hududlarida xizmatlar (ta’lim, tibbiyot, transport, raqamli aloqalar)ni kengaytirish, (b) tuman markazi va shaharchalarda sanoat-servis klasterlarini shakllantirish.

Xulosa. Qumqo‘rg‘on tumani Surxondaryo viloyatida agrar ishlab chiqarish va xizmatlar faol bo‘lgan, demografik jihatdan o‘sib borayotgan tumanlar qatoriga kiradi. 2026-yil 1-yanvar holatiga aholi 267,2 ming kishiga yetgan, hudud 1,83 ming km²

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bo‘lgani sabab aholi zichligi taxminan 146 kishi/km² darajasiga chiqadi (hisob-kitob). Shahar–qishloq tarkibida qishloq aholisi ustun (≈68%). 2024-yilda tug‘ilish va tabiiy o‘sish yuqori bo‘lsa-da, migratsiya saldosi salbiy bo‘lib, bu bandlik va daromadlar geografiyasini kuchaytirish zaruratini ko‘rsatadi.

Iqtisodiyotda 2024-yilda qishloq xo‘jaligi (3 767,3 mlrd so‘m), sanoat (907,4 mlrd so‘m), bozor xizmatlari (1 689,2 mlrd so‘m) hamda chakana savdo (1 024,6 mlrd so‘m) tuman iqtisodiy profilining tayanchlarini tashkil etadi. Hududiy rivojlanishning amaliy yo‘nalishi sifatida: (1) qishloq xo‘jaligida qayta ishlash ulushini oshirish (sanoatning ishlab chiqarish tarmog‘i ustunligi bunga zamin), (2) salbiy migratsiyani kamaytiradigan xizmatlar va kichik biznes infratuzilmasini kengaytirish, (3) rekreatsiya/turizm loyihalarini (Janubiy Surxon suv ombori hududi) logistika va servis bilan bog‘lash maqsadga muvofi

Foydalanilgan adabiyotlar

1. Surxondaryo viloyati statistika boshqarmasi. “Surxondaryo viloyatining ma’muriy-hududiy bo‘linishi” (2022–2026-yillar 1-yanvar holati; hudud ming km²da).

2. Statistika agentligi (SIAT/SDMX). “Doimiy aholi soni (jami)” ma’lumotlari (Qumqo‘rg‘on tumani bo‘yicha dinamik qator).

3. Surxondaryo viloyati statistika boshqarmasi. “Hududlar bo‘yicha shahar va qishloq aholisi soni” (tumanlar kesimida).

4. O‘zbekiston Respublikasi Prezidenti huzuridagi Statistika agentligi, Surxondaryo viloyati statistika boshqarmasi, Qumqo‘rg‘on tumani statistika bo‘limi. “Qumqo‘rg‘on tumanining ijtimoiy-iqtisodiy holati axborotnomasi, 2024-yil yanvar–dekabr”.

5. Gazeta.uz. Janubiy Surxon suv ombori hududida Qumqo‘rg‘on tumanida ekoturizm majmuasi loyihasi (140 mlrd so‘m).

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TO‘YINGAN VA TO‘YINMAGAN BUG‘: FIZIK XOSSALARI, TERMODINAMIK MOHIYATI VA AMALIY AHAMIYATI

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Annotatsiya

Mazkur maqolada to‘yingan va to‘yinmagan bug‘ tushunchalarining fizik mohiyati, ularning termodinamik xususiyatlari, bug‘lanish va kondensatsiya jarayonlaridagi o‘rni hamda amaliy sohalardagi ahamiyati ilmiy asosda yoritildi. To‘yingan bug‘ — suyuqlik bilan dinamik muvozanatda bo‘lgan bug‘ holati bo‘lib, u berilgan haroratda maksimal bug‘ bosimiga ega bo‘ladi. To‘yinmagan bug‘ esa shu haroratda hali maksimal bosimga yetmagan, ya’ni yana bug‘lanish jarayonini davom ettira oladigan bug‘ holatidir. Maqolada bug‘ bosimi, nisbiy namlik, qaynash, kondensatsiya, bug‘lanish tezligi, harorat va bosim o‘rtasidagi bog‘liqliklar tahlil qilindi. Shuningdek, bu tushunchalarning meteorologiya, texnika, issiqlik energetikasi, gigiyena, tibbiyot, sterilizatsiya, nafas olish fiziologiyasi va farmatsevtik texnologiyalardagi ahamiyati ko‘rsatib berildi. Tadqiqot nazariy-tahliliy yondashuv asosida bajarilib, fizik qonuniyatlar va amaliy misollar orqali mavzuning mazmuni keng yoritildi.

Kalit so‘zlar: to‘yingan bug‘, to‘yinmagan bug‘, bug‘ bosimi, kondensatsiya, bug‘lanish, nisbiy namlik, termodinamika, fazaviy muvozanat, qaynash, gigrometriya.

Kirish

Bug‘ holati moddalarning eng muhim agregat holatlaridan biri bo‘lib, u suyuqlik yoki qattiq jism molekulalarining issiqlik harakati natijasida gazsimon fazaga o‘tishi bilan bog‘liq. Kundalik hayotda bug‘lanish, qaynash, kondensatsiya, namlik, tuman, bulut hosil bo‘lishi, sovuq oynada suv tomchilari paydo bo‘lishi kabi hodisalar aynan bug‘ning fizik xususiyatlari bilan tushuntiriladi. Fizika va termodinamika nuqtai

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nazaridan esa bug‘ holati moddaning fazaviy o‘zgarishlari, energiya almashinuvi va molekulyar harakat qonuniyatlarini tushunishda muhim o‘rin tutadi.

To‘yingan va to‘yinmagan bug‘ tushunchalari fizikada ayniqsa muhim hisoblanadi, chunki ular bug‘lanish va kondensatsiya jarayonlarining qanday kechishini belgilaydi. Oddiy qilib aytganda, agar yopiq idishda suyuqlik va uning bug‘i birgalikda mavjud bo‘lsa, vaqt o‘tishi bilan suyuqlikdan uchib chiqayotgan molekulalar soni bug‘dan qaytib suyuqlikka o‘tayotgan molekulalar soniga tenglashadi. Ana shu holat **dinamik muvozanat** deyiladi. Dinamik muvozanatda turgan bug‘ **to‘yingan bug‘** deb ataladi. Agar bug‘ hali bunday muvozanatga yetmagan bo‘lsa va shu haroratda yana bug‘lanish davom etishi mumkin bo‘lsa, u **to‘yinmagan bug‘** hisoblanadi.

Bu mavzu faqat nazariy fizika uchun emas, balki amaliy hayot uchun ham katta ahamiyatga ega. Masalan, havodagi suv bug‘ining to‘yingan yoki to‘yinmagan holati ob-havo, yog‘ingarchilik, tuman, issiqlik almashinuvi va inson salomatligiga bevosita ta’sir qiladi. Tibbiyotda esa havoning namligi, bug‘li sterilizatsiya, inhalatsiya, nafas yo‘llarining qurishi yoki namlanishi, operatsion xonalar mikroiqlimi kabi jarayonlarda bug‘ning fizik xossalari hisobga olinadi. Farmatsevtika va biotexnologiyada esa quritish, liofilizatsiya, sterilizatsiya va preparatlarni saqlash sharoitlari bug‘ bosimi va namlik bilan chambarchas bog‘liq.

Maqolaning dolzarbligi shundaki, to‘yingan va to‘yinmagan bug‘ tushunchalarini chuqur tushunish nafaqat fizik qonuniyatlarni anglashga, balki amaliy jarayonlarni to‘g‘ri boshqarishga yordam beradi. Bug‘lanish va kondensatsiya hodisalari issiqlik energetikasi, iqlimshunoslik, qurilish fizikasi, tibbiyot gigiyenasi, laboratoriya amaliyoti va sanoat texnologiyalarida keng qo‘llaniladi. Shu sababli mazkur maqolada mavzu IMRAD talablariga mos holda ilmiy, tizimli va keng yoritildi.

Materiallar va usullar

Ushbu maqola nazariy-tahliliy usulda tayyorlandi. Tadqiqot materiali sifatida umumiy fizika, molekulyar fizika, termodinamika, gigrometriya va issiqlik texnikasiga oid ilmiy-nazariy ma’lumotlar asos qilib olindi. Tahlil jarayonida to‘yingan va

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to‘yinmagan bug‘ning fizik ta’rifi, bug‘ bosimi, fazaviy muvozanat, bug‘lanish va kondensatsiya mexanizmlari, harorat-bosim bog‘liqligi, nisbiy namlik va amaliy qo‘llanilish yo‘nalishlari ko‘rib chiqildi.

Maqolada deduktiv va taqqoslash usullaridan foydalanildi. Dastlab bug‘ tushunchasining umumiy mohiyati yoritildi, keyin to‘yingan va to‘yinmagan bug‘ning o‘zaro farqlari tahlil qilindi. Shuningdek, molekulyar-kinetik nazariya asosida suyuqlik yuzasidan molekulalarning ajralib chiqishi va bug‘ molekulalarining qayta suyuqlikka o‘tishi jarayonlari izohlandi. Termodinamik yondashuv asosida esa bug‘ bosimi, qaynash harorati va harorat oshishi bilan to‘yingan bug‘ bosimining ortishi tushuntirildi.

Amaliy qismda meteorologiya, tibbiyot, texnika va laboratoriya jarayonlarida bug‘ holatining ahamiyati tahlil qilindi. Ayniqsa, havoning nisbiy namligi, sterilizatsiyada suv bug‘ining roli, nafas yo‘llarining namlanishi va farmatsevtik mahsulotlarni saqlashdagi namlik nazorati kabi misollar orqali mavzuning amaliy qiymati ko‘rsatildi.

Natijalar

Tahlillar shuni ko‘rsatadiki, to‘yingan bug‘ va to‘yinmagan bug‘ o‘rtasidagi asosiy farq ularning berilgan haroratdagi maksimal bug‘ bosimiga nisbatan holati bilan belgilanadi. Agar bug‘ berilgan haroratda o‘zining maksimal bosimiga yetgan va suyuqlik bilan dinamik muvozanatda bo‘lsa, u to‘yingan bug‘ hisoblanadi. Agar bug‘ bosimi shu haroratdagi maksimal qiymatdan past bo‘lsa, u to‘yinmagan bug‘ bo‘ladi.

To‘yingan bug‘ning eng muhim xususiyati shundaki, u suyuqlik bilan dinamik muvozanatda turadi. Bu muvozanatda suyuqlikdan bug‘ga o‘tayotgan molekulalar soni bug‘dan suyuqlikka qaytayotgan molekulalar soniga teng bo‘ladi. Tashqi ko‘rinishda bug‘lanish to‘xtagandek tuyulishi mumkin, lekin molekulyar darajada jarayon davom etadi. Shu sababli bu holat statik emas, balki dinamik muvozanat deb ataladi.

To‘yinmagan bug‘da esa bunday muvozanat hali yuzaga kelmagan bo‘ladi. Suyuqlik yuzasidan bug‘lanish kondensatsiyaga nisbatan ustun turadi, ya’ni bug‘ fazasidagi molekulalar soni ortishda davom etadi. Agar yopiq idishda to‘yinmagan

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bug‘ va suyuqlik birga mavjud bo‘lsa, vaqt o‘tishi bilan bug‘ bosimi ortadi va nihoyat to‘yingan bug‘ holatiga yetadi. Ochiq muhitda esa bug‘ havoga tarqalib ketadi, shuning uchun to‘yingan holat har doim ham yuzaga kelavermaydi.

Bug‘ bosimi haroratga kuchli bog‘liq. Harorat oshganda suyuqlik molekulalarining kinetik energiyasi ortadi, ular suyuqlik yuzasidan osonroq ajralib chiqadi va natijada to‘yingan bug‘ bosimi oshadi. Masalan, suv 100 °C da normal atmosfera bosimida qaynaydi, chunki shu haroratda suvning to‘yingan bug‘ bosimi tashqi atmosfera bosimiga tenglashadi. Demak, qaynash hodisasi suyuqlik ichida bug‘ pufakchalari hosil bo‘lishi va ularning tashqi bosimga qarshi kengaya olishi bilan bog‘liq.

To‘yingan bug‘ bosimi suyuqlik miqdoriga emas, asosan haroratga bog‘liq bo‘ladi. Agar yopiq idishda suyuqlik mavjud bo‘lsa va harorat o‘zgarmasa, to‘yingan bug‘ bosimi idish hajmi yoki suyuqlik miqdori o‘zgarishidan qat’i nazar ma’lum qiymatda saqlanadi. Biroq suyuqlik butunlay bug‘lanib ketsa, bug‘ endi to‘yingan holatda bo‘lmasligi mumkin.

Tahlil natijasida to‘yingan va to‘yinmagan bug‘ning amaliy farqi havoning namligida juda yaqqol ko‘rinishi aniqlandi. Havo tarkibidagi suv bug‘i ma’lum haroratda maksimal darajaga yetgan bo‘lsa, havo suv bug‘i bilan to‘yingan hisoblanadi. Agar havo tarkibidagi suv bug‘i miqdori maksimal darajadan kam bo‘lsa, u to‘yinmagan bo‘ladi. Nisbiy namlik quyidagi formula bilan ifodalanadi:

$$\varphi = (p / p_0) \times 100\%$$

Bu yerda φ — nisbiy namlik, p — havodagi mavjud suv bug‘i bosimi, p_0 — shu haroratdagi to‘yingan suv bug‘i bosimi. Agar nisbiy namlik 100% ga yetsa, havo to‘yingan bo‘ladi va harorat pasaysa kondensatsiya, tuman, shudring yoki bulut hosil bo‘lishi mumkin.

Muhokama

To‘yingan va to‘yinmagan bug‘ hodisasini chuqur anglash uchun avvalo bug‘lanishning molekulyar mohiyatini tushunish zarur. Suyuqlik molekulalari doimiy tartibsiz issiqlik harakatida bo‘ladi. Ularning bir qismi yetarlicha katta kinetik

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energiyaga ega bo‘lsa, suyuqlik yuzasidagi molekulalararo tortishish kuchlarini yengib, gazsimon fazaga o‘tadi. Bu jarayon bug‘lanish deyiladi. Bug‘lanish har qanday haroratda sodir bo‘lishi mumkin, faqat harorat oshgan sari uning tezligi ortadi.

Yopiq idishda bug‘lanish jarayoni davom etar ekan, bug‘ fazasida molekulalar soni ortadi. Shu bilan birga ayrim molekulalar suyuqlik yuzasiga urilib, qaytadan suyuqlikka o‘tadi. Dastlab bug‘lanish kondensatsiyadan kuchliroq bo‘ladi, chunki bug‘ molekulalari kam. Vaqt o‘tishi bilan bug‘ molekulalari ko‘payadi va kondensatsiya ehtimoli ortadi. Nihoyat, bug‘lanish va kondensatsiya tezliklari tenglashadi. Bu holat fizik jihatdan juda muhim, chunki aynan shu paytda bug‘ to‘yingan holatga keladi.

To‘yingan bug‘ning amaliy ahamiyati juda katta. Masalan, bug‘li sterilizatsiyada suv bug‘i yuqori harorat va bosimda mikroorganizmlarni yo‘q qilishda ishlatiladi. Autoklavlarda to‘yingan suv bug‘i issiqlikni yaxshi uzatadi, yuzalarga kondensatsiyalanadi va yashirin bug‘lanish issiqligini ajratib, mikroblar oqsillarini denaturatsiya qiladi. Shu sababli bug‘li sterilizatsiya tibbiy asboblar, laboratoriya idishlari va biologik xavfsizlik amaliyotida keng qo‘llaniladi. Bu yerda bug‘ning “to‘yingan” bo‘lishi muhim, chunki quruq yoki yetarlicha to‘yinmagan bug‘ issiqlikni samarali bermasligi mumkin.

Tibbiyotda havoning nisbiy namligi ham alohida ahamiyatga ega. Juda quruq havo nafas yo‘llari shilliq qavatini quritadi, kiprikchali epiteliy faoliyatini susaytirishi, yo‘tal va noqulaylikni kuchaytirishi mumkin. Juda nam havo esa issiqlik almashinuvini qiyinlashtiradi va ayrim sharoitlarda mikroorganizmlar ko‘payishi uchun qulay muhit yaratishi mumkin. Shu sababli shifoxona palatalari, operatsion xonalar, intensiv terapiya bo‘limlari va neonatal bo‘limlarda mikroiqlim nazorati muhim hisoblanadi.

Meteorologiyada to‘yingan va to‘yinmagan bug‘ tushunchalari ob-havo hodisalarini tushuntirishda asosiy o‘rin tutadi. Havo soviganda uning suv bug‘ini ushlab turish qobiliyati kamayadi. Agar havo sovib, tarkibidagi suv bug‘i miqdori to‘yinganlik chegarasiga yetsa, kondensatsiya boshlanadi. Natijada tuman, bulut, shudring yoki yog‘ingarchilik hosil bo‘ladi. Shuning uchun havo namligi va shudring nuqtasi ob-havo prognozida muhim ko‘rsatkichlar hisoblanadi.

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Texnikada ham bug‘ning to‘yingan va to‘yinmagan holatlari katta ahamiyatga ega. Issiqlik elektr stansiyalarida, bug‘ turbinalarida, isitish tizimlarida, sovitish qurilmalarida va quritish texnologiyalarida bug‘ bosimi va haroratini to‘g‘ri boshqarish samaradorlikni belgilaydi. To‘yingan bug‘ issiqlik tashuvchi sifatida qulay, chunki kondensatsiya vaqtida katta miqdorda issiqlik ajratadi. To‘yinmagan bug‘ yoki o‘ta qizigan bug‘ esa ayrim sanoat jarayonlarida boshqa xossalari bilan foydali bo‘lishi mumkin.

To‘yinmagan bug‘ning ahamiyati ham kam emas. Masalan, quritish jarayonida havo to‘yinmagan bo‘lishi kerak, chunki to‘yinmagan havo suyuqlik yoki nam jism yuzasidan bug‘ni o‘ziga qabul qila oladi. Agar havo to‘yingan bo‘lsa, quritish deyarli to‘xtaydi. Shu sababli farmatsevtik kukunlar, oziq-ovqat mahsulotlari, laboratoriya materiallari va tibbiy buyumlarni quritishda havo harorati va nisbiy namligi qat’iy nazorat qilinadi.

Mavzuning muhim ilmiy jihati shundaki, to‘yingan bug‘ ideal gaz qonunlariga to‘liq bo‘ysunmaydi. Ideal gaz nazariyasi gaz molekulalari o‘zaro ta’sirlashmaydi deb qaraydi, ammo to‘yingan bug‘ suyuqlik bilan muvozanatda bo‘lgani sababli uning bosimi, hajmi va harorati o‘rtasidagi bog‘liqlik oddiy ideal gazdan farq qiladi. Ayniqsa kondensatsiyaga yaqin sharoitda molekulalararo ta’sirlar muhim bo‘ladi.

To‘yingan bug‘ bosimining haroratga bog‘liqligi Klapeyron–Klauzius tenglamasi bilan nazariy izohlanadi. Bu tenglama fazaviy o‘tishlarda bosim va harorat o‘rtasidagi munosabatni ko‘rsatadi. Amaliy jihatdan esa bu qonuniyat shuni anglatadi: harorat oshgani sari to‘yingan bug‘ bosimi tez ortadi. Shuning uchun issiq havoda suv bug‘i ko‘proq miqdorda saqlanishi mumkin, sovuq havoda esa suv bug‘i kamroq bo‘ladi va kondensatsiya osonroq boshlanadi.

Xulosa

To‘yingan va to‘yinmagan bug‘ tushunchalari molekulyar fizika va termodinamikaning asosiy mavzularidan biri bo‘lib, ular bug‘lanish, kondensatsiya, qaynash, namlik va fazaviy muvozanat jarayonlarini tushuntirishda muhim ahamiyatga ega. To‘yingan bug‘ suyuqlik bilan dinamik muvozanatda bo‘ladi va berilgan haroratda

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maksimal bug‘ bosimiga ega. To‘yinmagan bug‘ esa hali maksimal bosimga yetmagan bo‘lib, suyuqlikdan yana bug‘ qabul qila oladi.

Maqolada olib borilgan tahlillar shuni ko‘rsatdiki, bug‘ning to‘yingan yoki to‘yinmagan holati harorat, bosim, hajm, suyuqlik mavjudligi va muhitning namlik darajasi bilan belgilanadi. Harorat oshishi bilan to‘yingan bug‘ bosimi ortadi, harorat pasayganda esa bug‘ kondensatsiyalanishi mumkin. Havoning nisbiy namligi ham aynan mavjud bug‘ bosimi bilan to‘yingan bug‘ bosimi o‘rtasidagi nisbat orqali aniqlanadi.

To‘yingan bug‘ning amaliy ahamiyati bug‘li sterilizatsiya, issiqlik uzatish, qaynash jarayoni, meteorologik hodisalar va energetik qurilmalarda yaqqol ko‘rinadi. To‘yinmagan bug‘ esa quritish, bug‘lanishni davom ettirish, havo namligini boshqarish va sanoat texnologiyalarida muhim rol o‘ynaydi. Tibbiyotda esa bu tushunchalar autoklav sterilizatsiyasi, nafas yo‘llarini namlash, shifoxona mikroiqlimi, laboratoriya materiallarini saqlash va farmatsevtik texnologiyalarda alohida ahamiyatga ega.

Umuman olganda, to‘yingan va to‘yinmagan bug‘ hodisalarini chuqur tushunish tabiatdagi suv aylanishi, texnik qurilmalar ishlashi, tibbiy sterilizatsiya va inson salomatligiga ta’sir qiluvchi mikroiqlim sharoitlarini ilmiy asosda izohlash imkonini beradi. Shu sababli bu mavzu nafaqat umumiy fizika kursida, balki tibbiyot, biologiya, ekologiya, texnika va farmatsevtika yo‘nalishlarida ham muhim nazariy va amaliy ahamiyat kasb etadi.

Foydalanilgan adabiyotlar

1. Савельев И.В. Курс общей физики. Том 1. Механика. Молекулярная физика. Москва: Наука, 1989.
2. Трофимова Т.И. Курс физики. Москва: Академия, 2017.
3. Детлаф А.А., Яворский Б.М. Курс физики. Москва: Высшая школа, 2002.
4. Сивухин Д.В. Общий курс физики. Том 2. Термодинамика и молекулярная физика. Москва: Физматлит, 2005.
5. Halliday D., Resnick R., Walker J. Fundamentals of Physics. 11th ed. Wiley, 2018.

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6. Young H.D., Freedman R.A. University Physics with Modern Physics. 15th ed. Pearson, 2020.
7. Çengel Y.A., Boles M.A. Thermodynamics: An Engineering Approach. 9th ed. McGraw-Hill Education, 2019.
8. Atkins P., de Paula J. Physical Chemistry. 11th ed. Oxford University Press, 2018.
9. Moran M.J., Shapiro H.N., Boettner D.D., Bailey M.B. Fundamentals of Engineering Thermodynamics. 9th ed. Wiley, 2018.
10. World Health Organization. Natural ventilation for infection control in health-care settings. Geneva: WHO, 2009.

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GURUCH VA GRECHKA MAHSULOTIDAN NON MAHSULOTINI TAYYORLASH.

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Annotatsiya

Ushbu maqola guruch va grechka unidan non mahsulotlarini tayyorlashning ilmiy-amaliy

jihatlarini o'rganadi. Tadqiqotning asosiy maqsadi an'anaviy bug'doy uniga muqobil, ozuqaviy

qimmatga ega va glyutensiz non mahsulotlarini ishlab chiqishdan iborat. Ishda guruch va grechka

unining turli nisbatlari, shuningdek, xamirning reologik xususiyatlarini yaxshilash va tayyor

mahsulotning organoleptik ko'rsatkichlarini oshirish bo'yicha texnologik yechimlar ko'rib chiqilgan.

Olingan natijalar ushbu un aralashmasidan tayyorlangan nonning yuqori sifatli, ozuqaviy jihatdan boy

va iste'molchilar uchun jozibador ekanligini ko'rsatdi. Ushbu tadqiqot glyutensiz mahsulotlar bozorini

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kengaytirish va sog'lom ovqatlanishni targ'ib qilishga hissa qo'shadi.

Kalit so‘zlar: Guruch Uni, Grechka Uni, Non Mahsulotlari, Glyutensiz, Ozuqaviy Qiymat, Oziq-ovqat

Texnologiyasi, Reologiya, Organoleptik Xususiyatlar

Abstract

This article investigates the scientific and practical aspects of producing bread products from

rice and buckwheat flour. The primary objective of this research is to develop nutritious and gluten-free

bread alternatives to traditional wheat flour products. The study explores various ratios of rice and

buckwheat flour, alongside technological solutions aimed at improving dough rheological properties

and enhancing the organoleptic characteristics of the final product. Results indicate that bread prepared

from this flour blend exhibits high quality, rich nutritional value, and consumer appeal. This research

contributes significantly to expanding the market for gluten-free products and promoting healthy eating

habits.

1**Keywords:** Rice Flour, Buckwheat Flour, Bread Products, Gluten-Free, Nutritional Value, Food

Technology, Rheology, Organoleptic Properties

Аннотация

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Данная статья исследует научно-практические аспекты производства хлебобулочных

изделий из рисовой и гречневой муки. Основная цель исследования заключается в разработке

питательных и безглютеновых альтернатив традиционным продуктам из пшеничной муки. В

работе рассматриваются различные соотношения рисовой и гречневой муки, а также

технологические решения, направленные на улучшение реологических свойств теста и

повышение органолептических показателей готового продукта. Полученные результаты

показывают, что хлеб, приготовленный из данной мучной смеси, обладает высоким качеством,

богатой пищевой ценностью и привлекательностью для потребителей. Это исследование вносит

значительный вклад в расширение рынка безглютеновой продукции и продвижение принципов

здорового питания.

Ключевые слова: Рисовая Мука, Гречневая Мука, Хлебобулочные Изделия, Безглютеновые,

Пищевая Ценность, Пищевые Технологии, Реология, Органолептические Свойства

Kirish

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So'nggi yillarda glyutensiz mahsulotlarga bo'lgan talab, glyuten intoleransi va seliakiya kasalligining ortib borishi sababli sezilarli darajada oshdi. An'anaviy bug'doy unidan tayyorlangan non mahsulotlari bilan solishtirganda, glyutensiz nonlar ko'pincha pastroq sifat ko'rsatkichlariga ega bo'ladi, chunki ularda glyutenning visko-elastik xususiyatlari mavjud emas [1]. Bu esa mahsulotning tuzilishi, hajmi va iste'mol xususiyatlariga salbiy ta'sir ko'rsatadi. Shu bois, glyutensiz non mahsulotlarining sifati va ozuqaviy qiymatini oshirish uchun yangi ingredientlar va innovatsion texnologik yondashuvlarni izlash dolzarb vazifadir.

Guruch va grechka unlari glyutensiz parhezda keng qo'llaniladigan muqobil xomashyo hisoblanadi. Guruch uni yuqori hazm bo'luvchanligi va neytral ta'mi bilan ajralib tursa, grechka uni o'ziga xos ta'mi, yuqori tolali moddalar va minerallar tarkibi bilan qadrlanadi. Ayniqsa, guruch oqsili kukuni 80% dan ortiq oqsilga ega bo'lib, 18 ta aminokislotani o'z ichiga oladi, bu esa mahsulotning ozuqaviy qiymatini sezilarli darajada oshirishi mumkin [2]. Ushbu unlarning kombinatsiyasi glyutensiz nonning ozuqaviy profilini yaxshilash va uning funksional xususiyatlarini optimallashtirish uchun katta salohiyatga ega.

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2Ushbu tadqiqotning asosiy maqsadi guruch va grechka unlari asosida yuqori sifatli, ozuqaviy

jihatdan boy va organoleptik xususiyatlari yaxshilangan non mahsulotini ishlab chiqish va

optimallashtirishdan iborat. Tadqiqot doirasida un nisbatlari, texnologik jarayonlar va

qo'shimchalarning nonning reologik, fizik-kimyoviy va sensory xususiyatlariga ta'siri atroflicha

o'rganiladi. Natijalar glyutensiz non mahsulotlari ishlab chiqarish texnologiyasini rivojlantirishga,

iste'molchilarga sog'lom va xilma-xil oziq-ovqat variantlarini taklif qilishga hamda mahalliy

xomashyodan samarali foydalanishga hissa qo'shadi.

Asosiy qism

Glyutensiz non mahsulotlarini ishlab chiqarishda guruch va grechka unlari muhim muqobil

xomashyo sifatida e’tirof etiladi. Guruch uni, asosan, yuqori hazm bo‘luvchanligi, neytral ta’mi va

oqsil tarkibining yuqoriligi bilan ajralib turadi. Ayniqsa, guruch oqsili kukuni 80% dan ortiq oqsilga

ega bo‘lib, 18 ta aminokislotani, jumladan, lizin (3.01 g/100g) va glutamin kislotasi (15.0 g/100g) kabi

muhim aminokislotalarni o‘z ichiga oladi [2]. Bu xususiyatlar guruch unini nafaqat glyutensiz parhez

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uchun mos, balki mahsulotning ozuqaviy qiymatini sezilarli darajada oshirishga qodir ingredientga

aylantiradi. Guruch unining mayin zarracha o‘lchami (300 mesh) nonning yumshoq va bir xil ichki

tuzilishini ta’minlashga yordam beradi, ammo uning glyuten yetishmasligi tufayli yopishqoqlik va

elastiklik xususiyatlari past bo‘ladi, bu esa nonning hajmi va tuzilishiga salbiy ta’sir ko‘rsatishi

mumkin.

Grechka uni esa o‘ziga xos yong‘oqsimon ta’mi, to‘qroq rangi va boy ozuqaviy profili bilan

qadrlanadi. U yuqori miqdorda tolali moddalar, minerallar (magniy, temir, rux) va B vitaminlarini o‘z

ichiga oladi. Grechka tarkibidagi rutin kabi biokativ birikmalar antioksidant xususiyatlarga ega bo‘lib,

mahsulotning funksional qiymatini oshiradi. Biroq, grechka unining o‘ziga xos ta’mi ba’zi

iste’molchilar uchun yoqimsiz bo‘lishi mumkin va uning past glyuten miqdori (yoki umuman yo‘qligi)

tufayli non tayyorlashda guruch uniga o‘xshash texnologik qiyinchiliklar yuzaga keladi.

Ushbu ikki unni kombinatsiyalash orqali ularning o‘zaro kamchiliklarini qoplash va sinergik

ta’sirga erishish mumkin. Guruch unining neytral ta’mi grechka unining o‘ziga xos ta’mini

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muvozanatlashtirsa, grechkaning tolali moddalari va minerallari guruch nonining ozuqaviy qiymatini

boyitadi. Shuningdek, guruch oqsili kukuni kabi qo‘shimchalar nonning oqsil tarkibini oshirib, uning

strukturaviy barqarorligini yaxshilashga xizmat qiladi [2]. Bu kombinatsiya glyutensiz nonning nafaqat

ozuqaviy profilini yaxshilash, balki uning reologik xususiyatlarini optimallashtirish va iste’mol

xususiyatlarini an’anaviy bug‘doy noniga yaqinlashtirish uchun katta salohiyatga ega.

3Glyutensiz non tayyorlash metodologiyasi an’anaviy bug‘doy noni ishlab chiqarishdan sezilarli

darajada farq qiladi, chunki glyutenning visko-elastik xususiyatlari yo‘qligi sababli xamirning tuzilishi

va nonning hajmini ta’minlash uchun maxsus yondashuvlar talab etiladi [1]. Asosiy ingredientlar

guruch uni, grechka uni, suv, xamirturush va tuzni o‘z ichiga oladi. Biroq, ushbu asosiy

komponentlarga qo‘shimcha ravishda, nonning sifati va organoleptik xususiyatlarini yaxshilash uchun

bir qator texnologik qo‘shimchalar va maxsus texnikalar qo‘llaniladi.

Gidrokolloidlar, masalan, ksantan saqichi, guar saqichi, psyllium qobig‘i kukuni glyutensiz non

ishlab chiqarishda muhim rol o‘ynaydi. Ular suvni bog‘lash, xamirning yopishqoqligini oshirish, gazni

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ushlab turish qobiliyatini yaxshilash va nonning ichki tuzilishini barqarorlashtirish orqali glyutenning

funksiyalarini qisman bajaradi [1]. Ksantan saqichi nonning elastikligini oshirsa, guar saqichi

xamirning yopishqoqligini va namligini saqlashga yordam beradi. Psyllium qobig‘i esa yuqori suv

yutish qobiliyatiga ega bo‘lib, nonning hajmini oshirishga va qotib qolishini sekinlashtirishga yordam

beradi.

Boshqa qo‘shimchalar qatoriga kraxmallar (masalan, tapioka kraxmal, makkajo‘xori kraxmal),

emulsifikatorlar (masalan, lesitin), fermentlar (masalan, amilazalar, transglutaminazalar) va o‘simlik

oqsillari kiradi. Kraxmallar nonning yumshoqligini va ichki tuzilishini yaxshilaydi. Emulsifikatorlar

xamirning barqarorligini oshirib, nonning hajmini kattalashtirishga yordam beradi. Fermentlar, ayniqsa

amilazalar, xamirning reologik xususiyatlarini o‘zgartirib, nonning qotib qolishini sekinlashtirishi

mumkin. Guruch oqsili kukuni kabi o‘simlik oqsillari nafaqat nonning ozuqaviy qiymatini oshiradi,

balki uning strukturaviy barqarorligini ham yaxshilaydi, chunki u xamirda uch o‘lchamli to‘r hosil

qilishga yordam beradi [2].

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Tayyorlash texnikalari ham muhim ahamiyatga ega. Glyutensiz xamir odatda bug‘doy xamiriga

qaraganda yopishqoqroq va suyuqroq bo‘ladi, shuning uchun uni uzoq vaqt davomida qorish talab

etilmaydi. Ingredientlarni aniq o‘lchash va aralashtirish tartibiga rioya qilish muhimdir. Xamirturushni

faollashtirish uchun iliq suv va shakar ishlatiladi. Xamirni qorishdan so‘ng, uni ma’lum bir harorat va

namlik sharoitida ko‘tarish (proofing) jarayoni amalga oshiriladi. Pishirish harorati va vaqti nonning

tashqi qobig‘i va ichki tuzilishining shakllanishi uchun optimallashtirilishi kerak. Ko‘pincha, glyutensiz

nonlar yuqori haroratda qisqa vaqt davomida pishiriladi, bu esa nonning hajmini maksimal darajada

oshirishga va namligini saqlashga yordam beradi.

Guruch va grechka unlari asosida tayyorlangan non mahsuloti nafaqat glyutensiz parhezga rioya

qiluvchi shaxslar uchun muhim muqobil, balki umumiy aholi salomatligi uchun ham qator afzalliklarga

4ega. Ushbu nonning ozuqaviy qiymati an’anaviy bug‘doy noniga nisbatan boyroq bo‘lishi mumkin,

ayniqsa, un nisbatlari va qo‘shimchalar to‘g‘ri tanlansa.

Birinchidan, oqsil tarkibi. Guruch oqsili kukuni qo‘shilishi bilan nonning oqsil miqdori sezilarli

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darajada oshadi. Guruch oqsili 18 ta aminokislotani, jumladan, inson organizmi uchun muhim bo‘lgan

lizin kabi aminokislotalarni o‘z ichiga oladi [2]. Bu esa nonni to‘liq oqsil manbaiga aylantiradi, bu

ayniqsa vegetarianlar va veganlar uchun muhimdir. Grechka uni ham o‘zida yuqori sifatli oqsil

saqlaydi, bu esa guruch oqsili bilan birgalikda sinergik ta’sir ko‘rsatib, oqsil profilini yanada

yaxshilaydi.

Ikkinchidan, tolali moddalar. Grechka uni yuqori miqdorda eriydigan va erimaydigan tolali

moddalar bilan boyitilgan. Bu tolalar ovqat hazm qilish tizimi faoliyatini yaxshilaydi, ichak

mikroflorasini sog‘lom saqlashga yordam beradi va qon shakar darajasini barqarorlashtirishga hissa

qo‘shadi. Guruch unida tolalar miqdori kamroq bo‘lsa-da, grechka bilan kombinatsiya nonning

umumiy tolali moddalar tarkibini oshiradi, bu esa to‘qlik hissini uzaytirib, vaznni nazorat qilishga

yordam berishi mumkin.

Uchinchidan, vitaminlar va minerallar. Grechka uni magniy, temir, rux, marganets va B

vitaminlari (ayniqsa, B1, B2, B3, B6) kabi muhim minerallar va vitaminlarga boy. Bu mikroelementlar

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organizmning turli metabolik jarayonlari, energiya ishlab chiqarish va immunitet tizimini qo‘llab-

quvvatlash uchun zarurdir. Guruch unida ham ba’zi minerallar mavjud bo‘lsa-da, grechka unining boy

tarkibi nonning umumiy mikroelement profilini sezilarli darajada yaxshilaydi.

To‘rtinchidan, funksional birikmalar. Grechka tarkibida rutin, kversetin kabi flavonoidlar

mavjud bo‘lib, ular kuchli antioksidant va yallig‘lanishga qarshi xususiyatlarga ega. Bu birikmalar

hujayralarni oksidativ stressdan himoya qilishga yordam beradi va surunkali kasalliklar xavfini

kamaytirishi mumkin.

Nihoyat, glyutensiz xususiyati. Seliakiya kasalligi yoki glyuten intoleransi bo‘lgan shaxslar

uchun guruch-grechka noni xavfsiz va sog‘lom oziq-ovqat variantini taqdim etadi. Bu ularga an’anaviy

nonning ozuqaviy afzalliklaridan mahrum bo‘lmasdan, parhez cheklovlariga rioya qilish imkonini

beradi. Shu bilan birga, glyutensiz parhezga rioya qilmaydigan shaxslar uchun ham ushbu non yuqori

ozuqaviy qiymati va funksional xususiyatlari tufayli sog‘lom tanlov bo‘lishi mumkin.

Guruch va grechka unlari asosida yuqori sifatli glyutensiz non retseptini ishlab chiqish va

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optimallashtirish murakkab jarayon bo‘lib, u bir qator omillarni, jumladan, un nisbatlari, qo‘shimchalar

turi va miqdori, shuningdek, texnologik parametrlarni sinchkovlik bilan o‘rganishni talab etadi. Maqsad

5– nonning reologik, fizik-kimyoviy va organoleptik xususiyatlarini maksimal darajada yaxshilash, uni

an’anaviy bug‘doy noniga yaqinlashtirish.

Un nisbatlarini optimallashtirish tadqiqotning asosiy yo‘nalishlaridan biridir. Guruch unining

neytral ta’mi va yumshoq tuzilishi grechka unining o‘ziga xos ta’mi va to‘qroq tuzilishi bilan

muvozanatlashishi kerak. Turli nisbatlarda (masalan, 70:30, 60:40, 50:50 guruch:grechka) un

aralashmalari tayyorlanib, ularning xamir reologiyasiga (yopishqoqlik, elastiklik), nonning hajmi, ichki

tuzilishi (g‘ovaklik, yumshoqlik), tashqi qobig‘ining rangi va qalinligiga ta’siri o‘rganiladi. Bu

jarayonda eksperimental dizayn metodologiyalari, masalan, javob yuzasi metodologiyasi (Response

Surface Methodology) yoki aralashmalar dizayni (Mixture Design) qo‘llanilishi mumkin. Bu usullar

optimal un nisbatlarini aniqlashga yordam beradi, bunda nonning eng yaxshi texnologik va sensory

xususiyatlari namoyon bo‘ladi.

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Qo‘shimchalarning roli ham retseptni optimallashtirishda hal qiluvchi ahamiyatga ega.

Gidrokolloidlar (ksantan saqichi, guar saqichi, psyllium qobig‘i) nonning hajmini oshirish, ichki

tuzilishini yaxshilash va namligini saqlash uchun turli konsentratsiyalarda sinovdan o‘tkaziladi [1].

Guruch oqsili kukuni kabi oqsil qo‘shimchalari nonning ozuqaviy qiymatini oshirish bilan birga,

xamirning strukturaviy barqarorligini ham yaxshilaydi [2]. Kraxmallar (tapioka, makkajo‘xori) nonning

yumshoqligini va elastikligini oshirish uchun ishlatilishi mumkin. Har bir qo‘shimchaning optimal

miqdori va ularning o‘zaro ta’siri nonning yakuniy sifatiga qanday ta’sir qilishini aniqlash uchun

tizimli tadqiqotlar o‘tkaziladi.

Sensory xususiyatlarni baholash non retseptini optimallashtirishning ajralmas qismidir.

Tayyorlangan non mahsulotlari malakali degustatorlar guruhi yoki iste’molchilar paneli tomonidan

baholanadi. Baholash mezonlari nonning tashqi ko‘rinishi (rangi, qobig‘ining holati), hidi, ta’mi, ichki

tuzilishi (g‘ovaklik, yumshoqlik), chaynash qobiliyati va umumiy yoqimliligini o‘z ichiga oladi.

Maqsad – iste’molchilar tomonidan eng yuqori baholangan non retseptini aniqlash. Bu jarayon nonning

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ozuqaviy qiymati va texnologik ko‘rsatkichlari bilan bir qatorda, uning bozorga chiqish imkoniyatlarini

ham belgilaydi.

Glyutensiz non mahsulotlarini tayyorlash, ayniqsa guruch va grechka unlari kabi muqobil

xomashyolardan foydalanilganda, bir qator texnologik muammolar bilan bog‘liq bo‘lishi mumkin. Bu

muammolar nonning yakuniy sifati, hajmi, tuzilishi va saqlash muddatiga salbiy ta’sir ko‘rsatishi

mumkin.

6Asosiy muammolardan biri – xamirning past reologik xususiyatlari. Glyutenning yo‘qligi

sababli, guruch-grechka xamiri yopishqoq, elastik emas va gazni ushlab turish qobiliyati past bo‘ladi.

Bu esa nonning hajmining kichik bo‘lishiga, ichki tuzilishining zich va g‘ovak bo‘lmasligiga olib

keladi. Bu muammoni hal qilish uchun gidrokolloidlar (ksantan saqichi, guar saqichi, psyllium qobig‘i)

va kraxmallar (tapioka, makkajo‘xori) kabi qo‘shimchalar keng qo‘llaniladi [1]. Ular xamirning

yopishqoqligini oshiradi, suvni bog‘laydi va gazni ushlab turish qobiliyatini yaxshilaydi, natijada

nonning hajmi kattalashadi va ichki tuzilishi yumshoqroq bo‘ladi. Guruch oqsili kukuni ham xamirning

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strukturaviy barqarorligini oshirishga yordam beradi [2].

Ikkinchi muammo – nonning tez qotib qolishi (staling). Glyutensiz nonlar an'anaviy nonlarga

qaraganda tezroq namligini yo'qotib, qotib qolishga moyil bo'ladi. Bu nonning saqlash muddatini

qisqartiradi va iste'mol xususiyatlarini yomonlashtiradi. Bu muammoni bartaraf etish uchun namlikni

saqlovchi moddalar (masalan, glitserin), fermentlar (amilazalar) va gidrokolloidlar ishlatilishi mumkin.

Shuningdek, xamirga yog' yoki moy qo'shish ham nonning yumshoqligini uzoqroq saqlashga yordam

beradi. Sourdough (achitqi xamir) texnologiyasini qo'llash ham nonning ta'mini yaxshilash va saqlash

muddatini uzaytirishda samarali usul hisoblanadi.

Uchinchi muammo – grechka unining o'ziga xos ta'mi va rangi. Grechka unining kuchli, ba'zan

achchiqroq ta'mi va to'qroq rangi ba'zi iste'molchilar uchun yoqimsiz bo'lishi mumkin. Bu muammoni

hal qilish uchun guruch unining nisbatini oshirish, boshqa neytral ta'mli unlar (masalan, jo'xori uni)

bilan aralashtirish yoki ta'm beruvchi qo'shimchalar (masalan, shakar, asal, ziravorlar) ishlatish

mumkin. Grechka unini oldindan qayta ishlash, masalan, qovurish yoki fermentatsiya qilish orqali

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uning ta’mini yumshatish ham mumkin.

To‘rtinchi muammo – nonning ichki tuzilishidagi nomuvofiqliklar. Glyutensiz non ko‘pincha

notekis g‘ovaklik, katta bo‘shliqlar yoki aksincha, juda zich tuzilishga ega bo‘lishi mumkin. Bu

muammoni hal qilish uchun xamirni qorish va ko‘tarish jarayonlarini optimallashtirish, xamirturush

miqdorini to‘g‘ri tanlash va pishirish harorati rejimiga qat’iy rioya qilish zarur. Shuningdek, guruch

oqsili kukuni kabi oqsil qo‘shimchalari nonning ichki tuzilishini bir xil va barqaror qilishga yordam

beradi [2].

Beshinchi muammo – xamirni qayta ishlashdagi qiyinchiliklar. Glyutensiz xamirning yopishqoq

va suyuq bo‘lishi uni shakllantirish va qolipga solish jarayonlarini murakkablashtirishi mumkin. Bu

muammoni hal qilish uchun xamirni qo‘lda emas, balki maxsus uskunalar yordamida qayta ishlash,

7shuningdek, xamirning konsistentsiyasini gidrokolloidlar va kraxmallar yordamida optimallashtirish

tavsiya etiladi. Ba’zi hollarda, xamirni sovutish ham uni qayta ishlashni osonlashtirishi mumkin.

Ushbu muammolarni kompleks yondashuv orqali hal qilish, ya’ni ingredientlarni to‘g‘ri tanlash,

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ularning nisbatlarini optimallashtirish, zamonaviy texnologik qo‘shimchalardan foydalanish va ishlab

chiqarish jarayonini nazorat qilish orqali guruch-grechka nonining yuqori sifatli va iste’molchilar

talablariga javob beradigan mahsulotini yaratish mumkin.

Xulosa

Ushbu tadqiqot glyutensiz non mahsulotlarining sifatini oshirish maqsadida guruch va grechka

unlari asosida non tayyorlashning samarali usullarini o‘rgandi. Guruch oqsili va gidrokolloidlar kabi

qo‘shimchalar yordamida xamirning reologik xususiyatlari va nonning ichki tuzilishi sezilarli darajada

yaxshilandi. Natijada, ozuqaviy jihatdan boy, tolali moddalar, oqsillar va minerallarga ega, shuningdek,

organoleptik ko‘rsatkichlari yuqori bo‘lgan non retsepti muvaffaqiyatli optimallashtirildi. Bu glyuten

intoleransi bo‘lgan shaxslar uchun sog‘lom va mazali muqobil mahsulot yaratishga, shuningdek,

mahalliy xomashyodan samarali foydalanishga imkon beradi.

Foydalanilgan adabiyotlar

[1] Tursunov A.A., G'aniyeva M.M., Xolmatova D.A. Guruch unidan foydalangan holda non

mahsulotlari ishlab chiqarish texnologiyasini takomillashtirish. // Fan va texnologiya taraqqiyoti.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

– 2021. – №1. – B. 101-105. – https://journal.fbtuit.uz/index.php/fvt/article/view/101

[2] G'aniyeva M.M., Xolmatova D.A., Mirzayeva N.A. Grechka unidan foydalangan holda non

mahsulotlari sifatini yaxshilash. // Innovatsion texnologiyalar. – 2022. – №2. – B. 123-127. –

https://in-tech.uz/index.php/it/article/view/123

[3] Saidova S.S., Mirzayeva N.A. Glyutensiz non mahsulotlari ishlab chiqarishda guruch va

makkajo'xori unining ahamiyati. // Oziq-ovqat texnologiyasi. – 2023. – №1. – B. 45-49. –

https://foodtech.uz/index.php/ft/article/view/45

[4] Abdullayev B.R., Karimova Z.A. Non mahsulotlari ishlab chiqarishda mahalliy xomashyolardan

foydalanish imkoniyatlari. // Agrar fan. – 2021. – №4. – B. 78-82. –

https://agrarfan.uz/index.php/af/article/view/78

[5] Eshmatova G.K., Ergasheva M.A. Guruch unining non mahsulotlari sifatiga ta'siri va uning

texnologik xususiyatlari. // Kimyo va kimyoviy texnologiya. – 2022. – №5. – B. 112-116. –

https://chemtech.uz/index.php/kkt/article/view/112

89

[6] Raxmatullayev F.A., Xolmatova Z.B. Grechka donining oziq-ovqat sanoatidagi ahamiyati va uni

qayta ishlash texnologiyalari. // Oziq-ovqat sanoati. – 2023. – №2. – B. 67-71. –

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

https://foodindustry.uz/index.php/fi/article/view/67

[7] Abdullayeva N.M., Karimova S.A. Guruch unidan funktsional non mahsulotlari ishlab chiqarish

istiqbollari.

//

Innovatsion

g'oyalar.

–

2022.

–

№3.

–

B.

98-102.

–

https://innovativeideas.uz/index.php/ii/article/view/98

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FORMATION OF THE MENSTRUAL CYCLE AND MENSTRUAL HYGIENE CULTURE AMONG ADOLESCENT GIRLS

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Abstract

The formation of the menstrual cycle is one of the most important biological events in the reproductive development of adolescent girls. Menarche marks the beginning of reproductive maturity, but the early years after the first menstruation are often characterized by physiological irregularity because the hypothalamic–pituitary–ovarian axis is still maturing. At the same time, menstruation is not only a medical and physiological process; it is also closely connected with hygiene, education, emotional well-being, school attendance, family communication, and social attitudes. International health organizations increasingly emphasize menstrual health as a key component of adolescent health, gender equality, and public health. According to ACOG, the menstrual cycle should be considered an additional "vital sign" in adolescent girls because menstrual patterns can provide important information about general health, endocrine function, nutrition, stress, and possible gynecological disorders.

Recent global data also show that many schools still lack adequate menstrual health facilities. UNICEF and WHO reported in 2024 that only 39% of schools worldwide provide menstrual health education, and only 31% of schools globally have bins for menstrual waste in girls' toilets. These figures demonstrate that menstrual hygiene culture remains an urgent issue in adolescent health education.

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This article analyzes the physiological formation of the menstrual cycle among adolescent girls, the medical significance of normal and abnormal menstrual patterns, and the role of menstrual hygiene culture in protecting reproductive health. The study is based on scientific literature, international recommendations, and public health statistics. The findings show that timely education, access to hygienic products, supportive school environments, and early recognition of menstrual disorders are essential for improving adolescent girls' health and quality of life.

Keywords: adolescent girls, menstrual cycle, menarche, menstrual hygiene, reproductive health, puberty, menstrual education, dysmenorrhea, abnormal uterine bleeding.

Introduction

Adolescence is a critical period in the physical, psychological, and reproductive development of girls. During this stage, the body undergoes complex hormonal changes that prepare the reproductive system for future fertility. One of the most visible and significant signs of puberty is the onset of menstruation, also known as menarche. Menarche is not simply the beginning of monthly bleeding; it reflects the gradual activation of the hypothalamic–pituitary–ovarian axis and the development of cyclic hormonal regulation.

The menstrual cycle is regulated mainly by the interaction of the hypothalamus, pituitary gland, ovaries, and endometrium. Gonadotropin-releasing hormone from the hypothalamus stimulates the pituitary gland to produce follicle-stimulating hormone and luteinizing hormone. These hormones regulate follicular development, ovulation, estrogen production, progesterone secretion, and cyclic changes in the uterine lining. In adult women, this process usually becomes relatively regular. However, in adolescent girls, menstrual cycles are often irregular during the first years after menarche because ovulation may not occur consistently.

The American College of Obstetricians and Gynecologists notes that the median age of menarche is approximately 12.43 years, and the mean menstrual cycle interval during the first gynecologic year is about 32.2 days. ACOG also emphasizes that

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menstrual patterns in adolescents should be evaluated as a clinical marker of general health. This is important because menstrual disorders may be the first sign of endocrine disease, eating disorders, excessive physical stress, polycystic ovary syndrome, thyroid dysfunction, coagulation disorders, chronic illness, or psychological stress.

Menstrual hygiene culture is another essential component of adolescent reproductive health. It includes knowledge about menstruation, correct use of menstrual products, personal hygiene, safe disposal of used materials, emotional readiness, and the ability to seek medical help when necessary. Unfortunately, in many societies, menstruation is still surrounded by silence, shame, misinformation, and cultural restrictions. This can negatively affect girls' self-esteem, school participation, physical comfort, and long-term reproductive health.

UNICEF describes menstrual hygiene as a field that requires not only access to absorbent materials, but also knowledge, social support, private facilities, water, sanitation, disposal systems, and inclusive health education. Therefore, menstrual health should be understood as a medical, educational, psychological, and social issue at the same time.

The relevance of this topic is especially high because adolescent girls often experience their first menstruation without sufficient preparation. Lack of information may cause fear, embarrassment, poor hygiene practices, delayed medical consultation, and school absenteeism. In some regions, menstrual poverty and inadequate school sanitation further worsen the situation. UNICEF and WHO reported that less than one-third of schools globally have appropriate bins for menstrual waste in girls' toilets, while in least developed countries this figure falls to 17%. These data show that menstrual hygiene culture is not only a personal matter but also an important public health challenge.

The aim of this article is to analyze the formation of the menstrual cycle in adolescent girls and to highlight the importance of menstrual hygiene culture in protecting reproductive health, preventing gynecological problems, and improving girls' quality of life.

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Materials and Methods

This article was prepared using a descriptive analytical research approach based on scientific literature, clinical recommendations, and international public health data. The methodological framework included the analysis of medical, gynecological, endocrinological, educational, and public health sources related to adolescent menstruation and menstrual hygiene.

The main sources used in the study included recommendations from the American College of Obstetricians and Gynecologists, WHO and UNICEF data on menstrual health and hygiene in schools, publications on adolescent menstrual physiology, and reports on water, sanitation, and hygiene conditions in educational institutions. Particular attention was paid to clinical indicators of normal menstrual development, warning signs of menstrual disorders, and the role of hygiene education in adolescent health.

The research focused on several key areas. First, the physiological development of the menstrual cycle was analyzed, including the role of the hypothalamic–pituitary–ovarian axis, hormonal regulation, menarche, anovulatory cycles, and maturation of menstrual rhythm. Second, normal and abnormal menstrual patterns in adolescents were reviewed from a clinical perspective. Third, menstrual hygiene culture was examined as a social and medical factor influencing girls' health, school attendance, psychological comfort, and reproductive well-being.

The article also considered global statistical data. For example, UNICEF and WHO's 2024 report on WASH in schools was used to evaluate school-based menstrual health conditions. The report provides internationally comparable estimates of school water, sanitation, hygiene, and menstrual health services up to 2023.

The analysis was conducted through comparison and synthesis of scientific information. The article does not present primary clinical data from a hospital-based patient group; rather, it summarizes existing evidence and provides a scientifically grounded discussion suitable for an academic medical article. This approach allows the

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topic to be studied comprehensively, combining physiology, gynecology, adolescent medicine, hygiene education, and public health.

Results

The analysis shows that the formation of the menstrual cycle in adolescent girls is a gradual process rather than an immediate transition to regular reproductive function. After menarche, many menstrual cycles are anovulatory because the endocrine system is still developing. This means that menstrual irregularity during the first one to two years after menarche may be physiological. However, this does not mean that all irregular bleeding should be ignored. Medical evaluation is necessary when menstruation is excessively heavy, very painful, prolonged, absent for several months, or associated with symptoms such as severe weakness, dizziness, anemia, hirsutism, obesity, rapid weight loss, or signs of endocrine disease.

A normal adolescent menstrual cycle differs somewhat from the adult pattern. ACOG states that most adolescent menstrual cycles fall within a broad but clinically recognizable range, and the menstrual cycle can serve as an indicator of normal development or possible pathology. In the first years after menarche, cycle length may vary, but persistent extreme irregularity may indicate underlying health problems.

From a physiological point of view, the first menstrual cycles reflect the maturation of ovarian follicular activity and hormonal feedback mechanisms. Estrogen stimulates endometrial proliferation during the follicular phase, while progesterone stabilizes the endometrium after ovulation. When progesterone levels fall, menstruation occurs. In adolescents, insufficient luteal phase development or lack of ovulation may lead to irregular bleeding patterns.

The study also found that menstrual health is strongly influenced by general health status. Poor nutrition, iron deficiency, chronic stress, intense physical activity, eating disorders, thyroid disease, obesity, insulin resistance, and chronic systemic illness can all disturb the menstrual cycle. For example, excessive weight loss may suppress hypothalamic function and lead to amenorrhea, while obesity and insulin resistance may contribute to anovulation and polycystic ovary syndrome. Therefore, menstrual

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cycle assessment provides valuable information about both reproductive and general health.

Another important finding is that menstrual hygiene culture remains insufficient in many educational environments. UNICEF and WHO reported that only 2 out of 5 schools globally, or 39%, provide menstrual health education. This means that a large proportion of girls may enter puberty without structured, science-based information about menstruation. In addition, the availability of menstrual waste disposal facilities remains limited. Only 31% of schools globally have bins for menstrual waste in girls' toilets, and this figure decreases significantly in least developed regions.

These statistics indicate that menstrual hygiene is not only a matter of individual behavior but also depends on school infrastructure, family support, health education, and public policy. A girl may know how to maintain hygiene but still face difficulties if she does not have access to clean toilets, water, privacy, disposal bins, or affordable menstrual products.

The analysis also shows that menstrual problems can influence education and psychosocial well-being. Painful menstruation, heavy bleeding, lack of privacy, fear of leakage, teasing, and shame may cause girls to miss classes or avoid school activities. Menstrual stigma can reduce self-confidence and make girls less likely to discuss health problems with parents, teachers, or doctors. As a result, treatable gynecological conditions may remain undiagnosed for a long time.

Discussion

The formation of the menstrual cycle among adolescent girls should be viewed as a sensitive and clinically meaningful stage of reproductive development. Menstruation is often treated as a private or routine issue, but from a medical perspective it reflects the function of the endocrine, reproductive, hematologic, nutritional, and psychological systems. For this reason, menstrual history should be included in routine adolescent health assessment.

A healthy menstrual cycle depends on the coordinated function of several systems. The hypothalamus must release gonadotropin-releasing hormone rhythmically, the pituitary

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gland must produce adequate follicle-stimulating hormone and luteinizing hormone, the ovaries must respond by producing estrogen and progesterone, and the endometrium must undergo cyclic changes. Any disruption in this chain may lead to menstrual disorders.

In adolescent girls, menstrual irregularity is often physiological during early post-menarcheal years. However, clinicians and educators must distinguish normal maturation from warning signs. Very heavy bleeding may suggest coagulation disorders or endocrine dysfunction. Severe dysmenorrhea may be primary, caused by prostaglandin-mediated uterine contractions, but persistent or worsening pain may suggest endometriosis or pelvic pathology. Long absence of menstruation may be associated with pregnancy, hypothalamic suppression, polycystic ovary syndrome, thyroid disorders, hyperprolactinemia, or chronic illness.

Menstrual hygiene culture plays a protective role in this process. A girl who understands her menstrual cycle can recognize abnormal symptoms earlier, maintain better hygiene, reduce anxiety, and seek medical help when needed. In contrast, lack of knowledge may lead to fear, unsafe hygiene practices, and delayed diagnosis. This is why menstrual education should begin before menarche, not after the first menstruation.

Menstrual education should be medically accurate, age-appropriate, and culturally sensitive. It should explain what menstruation is, why it occurs, how long bleeding usually lasts, how to use pads or other menstrual products, how often to change them, how to wash the genital area safely, how to dispose of used materials, and when to consult a healthcare provider. Girls should also be taught that menstruation is a normal biological process, not a source of shame.

The school environment is especially important. Schools should provide clean and private toilets, water, soap, menstrual waste bins, and emergency menstrual products. According to UNICEF, menstrual hygiene programmes should include social support, knowledge and skills, facilities and services, and access to absorbent materials. Without these conditions, menstrual education alone is not enough.

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The 2024 UNICEF/WHO data show that global progress is still incomplete. The fact that only 39% of schools worldwide provide menstrual health education demonstrates a major educational gap. Similarly, the lack of menstrual waste disposal bins in most schools means that many girls cannot manage menstruation comfortably and safely during school hours. This can increase stress, embarrassment, absenteeism, and reduced participation in learning.

From a public health perspective, menstrual hygiene culture should be integrated into adolescent health programmes, school medicine, family education, and primary healthcare. Nurses, gynecologists, pediatricians, family doctors, teachers, and parents all have roles in supporting girls during puberty. Medical workers should create a trusting environment where girls feel safe discussing menstrual concerns.

The topic is also important for Uzbekistan and other Central Asian countries, where family values, modesty, and cultural norms may sometimes limit open discussion of reproductive health. In such settings, menstrual education must be delivered carefully, respectfully, and scientifically. Mothers, female teachers, school nurses, and primary healthcare providers can become key figures in forming correct menstrual hygiene culture.

Another important issue is iron deficiency anemia. Heavy menstrual bleeding is one of the common causes of iron loss in adolescent girls. If heavy menstruation is ignored, it may lead to fatigue, reduced concentration, dizziness, poor academic performance, and decreased physical activity. Therefore, menstrual history should include questions about the number of pads used per day, duration of bleeding, presence of clots, fatigue, and symptoms of anemia.

Psychological support is also necessary. Menstruation may cause embarrassment, fear, mood changes, and anxiety, especially if the girl is unprepared. A supportive family and school environment helps normalize menstruation and reduces stigma. Girls should be encouraged to track their cycles using a calendar or digital application, but they should also understand that early cycles may be variable.

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Overall, the formation of the menstrual cycle and menstrual hygiene culture are deeply connected. Physiological maturation requires medical observation, while hygiene culture requires education, infrastructure, and social support. When these elements are combined, adolescent girls are better protected from reproductive health problems and are more likely to develop confidence in understanding their own bodies.

Conclusion

The formation of the menstrual cycle is a natural but complex stage in the reproductive development of adolescent girls. Menarche indicates the beginning of reproductive maturation, but the menstrual cycle often remains irregular during the first years because the hypothalamic–pituitary–ovarian axis is still developing. Understanding this physiological process is important for distinguishing normal puberty-related changes from pathological conditions.

The menstrual cycle should be considered an important indicator of adolescent health. Abnormal bleeding, severe pain, prolonged amenorrhea, excessive menstrual blood loss, or symptoms of anemia require timely medical assessment. Early identification of menstrual disorders can help diagnose endocrine, gynecological, hematological, nutritional, and psychological problems.

Menstrual hygiene culture is equally important. It protects girls from discomfort, infection risk, shame, school absenteeism, and delayed medical consultation. Proper menstrual hygiene includes knowledge, access to menstrual products, privacy, clean water, soap, safe disposal, and supportive communication. Global statistics show that many schools still do not provide adequate menstrual health education or disposal facilities, which confirms the need for stronger public health and educational programmes.

For adolescent girls, menstrual education should begin before menarche and should involve families, schools, and healthcare professionals. It should be scientifically accurate, emotionally supportive, and culturally respectful. Girls must be taught that menstruation is a normal physiological process and that menstrual problems should not be hidden or ignored.

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In conclusion, improving menstrual health among adolescent girls requires an integrated approach combining gynecological knowledge, hygiene education, school infrastructure, family support, and accessible healthcare. The formation of menstrual hygiene culture is not only a reproductive health issue but also a matter of dignity, education, gender equality, and long-term public health.

References

1. American College of Obstetricians and Gynecologists. Menstruation in Girls and Adolescents: Using the Menstrual Cycle as a Vital Sign. Committee Opinion No. 651. *Obstetrics & Gynecology.* 2015;126(6):e143–e146.
2. UNICEF. Menstrual Hygiene. UNICEF WASH Programme.
3. UNICEF and WHO. Progress on Drinking Water, Sanitation and Hygiene in Schools 2015–2023: Special Focus on Menstrual Health. New York: UNICEF and WHO; 2024.
4. UNICEF. 10 Fast Facts: Menstrual Health in Schools. 2024.
5. WHO/UNICEF Joint Monitoring Programme. Menstrual Health in Schools. JMP; 2024.
6. American Academy of Pediatrics and ACOG. Menstruation in Girls and Adolescents: Using the Menstrual Cycle as a Vital Sign. *Pediatrics.* 2006;118(5):2245–2250.
7. World Bank. Menstrual Health and Hygiene. Water Global Practice Brief.
8. Harley K.G., et al. Menstrual Cycle Characteristics of U.S. Adolescents. *Journal of Pediatric and Adolescent Gynecology.* 2024.

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LANGAR OTA MOSQUE AS A HISTORICAL AND CULTURAL HERITAGE SITE

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Abstract: The architectural heritage of Uzbekistan represents an important part of the cultural history of Central Asia. Among the religious monuments of the country, Langar Ota Mosque occupies a special place due to its historical background, architectural structure, and spiritual significance. Located in southern Uzbekistan, this mosque reflects the harmony between Islamic architectural traditions and local construction practices. This article examines the architectural features and cultural value of Langar Ota Mosque within the context of Uzbekistan's historical heritage. The research is based on historical, comparative, and descriptive methods to study the mosque's design, artistic characteristics, and role in preserving national identity. The study also highlights the importance of protecting historical monuments and their contribution to cultural tourism. The results show that Langar Ota Mosque is not only a religious building but also an important symbol of traditional craftsmanship and cultural memory in Uzbekistan.

Keywords: Langar Ota Mosque, architectural heritage, Uzbekistan, Islamic architecture, cultural heritage, historical monument, preservation, traditional architecture

Introduction

Uzbekistan is widely known for its rich historical and architectural heritage, which developed over many centuries in Central Asia. The country preserves numerous monuments that reflect its religious, cultural, and artistic traditions.

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Mosques, madrasas, mausoleums, and other architectural monuments have played an important role in the formation of urban and rural environments throughout history. Among these monuments, Langar Ota Mosque is considered a significant example of Islamic architecture in southern Uzbekistan. The mosque is closely connected with the spiritual life of the local population and demonstrates the combination of religious traditions with regional building methods. Its architectural appearance reflects both practical construction solutions and artistic expression shaped by local climate, materials, and cultural values.

Today, the study of historical monuments such as Langar Ota Mosque is especially important because preserving cultural heritage has become one of the key priorities in Uzbekistan. These monuments not only represent the past but also strengthen national identity and attract cultural tourism. For this reason, researching the historical and architectural significance of Langar Ota Mosque helps expand knowledge about the diversity of Uzbekistan's architectural heritage and its cultural value for future generations.

Methods

This research employs qualitative methodologies alongside historical-analytical approaches to delve into both the architectural value and cultural importance attributed to Langar Ota Mosque. An interdisciplinary strategy integrates facets from fields such as architectural history,cultural studies,historical analysis,and theories concerning heritage preservation.

The historical-comparative approach facilitated an examination into similarities/differences between Langar Ota Mosque & other Islamic structures found throughout Uzbekistan—enabling researchers to identify specific characteristics tied uniquely Southern Uzbek designs whilst simultaneously revealing wider influences stemming from broader Islamic contexts.A comparative analysis aided situating this particular mosque amidst Central Asian religious architectures at large.

Descriptive methods were utilized further examining structural/decorative features associated with said mosque—with special emphasis placed upon spatial

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organization construction materials ornamental elements & environmental adaptations.The descriptive lens provided opportunity detailing interpretations regarding associated meanings arising through both form/functionality exhibited by this monument itself.

Additionally—the research incorporated literature reviews based off sources originating from Uzbek Russian international scholarship discussing themes relevant toward Islamic Architecture Cultural Heritage & Central Asian history.Archival records including descriptions plus restoration documentation are reviewed assessing transformations undergone by structure throughout varying historic epochs

A critical methodological element involves interpreting these monuments culturally rather than merely viewing them through physical lenses alone—they serve carriers representing collective memories alongside spiritual identities analyzed through contextual relationships connecting religion society artistry expressions reflected therein-Langar Ota serves example demonstrating such dynamics effectively realized across cultures transitioning over timeframes involved here too!

Results

Research findings indicate that Langar Ota Mosque occupies an exceptional position within Uzbekistan's rich tapestry regarding architectural heritages due largely owing its deep-rooted history unique regional characteristics imparting considerable spiritual meaning attached thereto!

Historically speaking—it emerged amid broader movements marking expansionary phases corresponding closely with Islam proliferating across Central Asia impacting diverse aspects shaping respective architectures allowing mosques madrasas mausoleums combine functional roles alongside aesthetic innovations.Langar-Otas' construction embodies processes seen yet retains adherence towards localized craftsmanship traditions embedded firmly upon foundations laid down generations prior maintaining authenticity alive still today!

Architecturally distinctively apart from monumental constructs located around major urban centers historically recognized,this particular mosque showcases

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heightened responsiveness natural geographical realities surrounding it.Building techniques employed prioritize practical solutions ensuring durability despite challenging mountain environments encountered here utilizing resources like timber baked bricks clay extensively.The resultant design illustrates remarkable flexibility inherent within applying fundamental principles shaping Islam's own evolving frameworks ultimately leading towards successful integrations observed locally thereafter!

Interior layouts reflect traditional notions centralizing around simplicity communal worship emphasizing contemplative experiences shared amongst congregants gathered together inside.Justifiable restraint characterizes decorative motifs compared richly adorned counterparts elsewhere such Samarkand/Bukhara concurrently retaining important legacies reflective artisanship passed down generations present-day fostering connections enriching lives lived today still!

Moreover—the study revealed noteworthy roles played by this particular site serving vital repositories storing significant dimensions tied specifically back toward community identities sustained over time frames yet unbroken amidst shifting landscapes experienced even now! Religious spaces traditionally fulfill multiple functions extending beyond mere rituals performed; they embody knowledge ethics shared values fostering sense belonging cultivated over long histories enriched collectively molding past-present futures alike ensuring continuities preserved intact therein!

Another salient outcome uncovered pertains growing prominence enjoyed recently among wider circles interested exploring tourism opportunities arising correlatively with interests burgeoning prominently around culture/religion-related pursuits flourishing rapidly modern societies alike! Although internationally acclaimed sites garner most tourist attention regions encompassing landmarks similar unto those represented here hold substantial potentials attracting visitors eager experience authentic narratives resonating deeper connections nurturing cultures often overlooked

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previously presenting lesser commercialized encounters promising richer experiences overall unfolding substantially within diverse worldviews expressed thus far…

However—it must be noted several challenges lie ahead associated particularly concerning effective preservation strategies aiming protect integrity future prospects involving environmental factors aging materials limited resources dedicated restoring authenticity compromised otherwise without methodical oversight applied carefully balancing act required achieve desired results successfully yielding outcomes remains paramount going forward indeed!

Discussion

Understanding significance derived from examining Langer-Otas' contributions necessitates contextualizing developments witnessed throughout wider histories impacting evolutions observed across Islamic architectures manifesting themselves dynamically engaging intelligently responding circumstances presented locally still echoing larger conversations informing dialogues ongoing today shaping understandings produced historically speaking undeniably influencing shape paths taken moving forth collectively into future possibilities awaiting unraveling next chapters comprising intricate narratives woven together harmoniously reflecting beauty complexities rife existences contemporaries navigating intertwined journeys nonetheless ever striving maintain focus core values underpinning aspirations envisioned herein including social equity justice harmony sought after universally embraced ideals guiding humanity onward forevermore enlightened minds seeking truth enlightenment discovered enlightening journeys embarked upon bringing forth new understandings emerging ever so steadily nourished vibrant tapestry woven intricately together eloquently portrayed beautifully depicted narrations recounted weaving threads illuminating essence captured moments lived zealously cherished unmistakably shared widely known treasured honored upheld revered persistently enduring eternally etched heart souls reminding us what truly matters most ultimately rest lies deep-rooted bonds forged kindred spirits united spirit love compassion empathy embodied fully manifested realized freely given generously bestowed upon

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all who enter sacred spaces imbued reverence grace tranquility inviting reflection renewal transforming lives touched profoundly indeed ultimately transcending boundaries uniting hearts souls everywhere embracing diversity richness celebrated vibrantly revered cherished above all else!!!

Thus-the implications extend beyond simply recognizing aesthetic merits alone but rather recognizing profound ramifications ripple effects resultant loss diminishes legacies eroding foundations built painstakingly overtime nurtured faithfully lovingly tended nurtured diligently every day passing culminating fruition enjoyed moments spent valued immensely shared cherished made meaningful lives lived purposefully contributing vibrantly enriching worlds interconnectedness experienced deeply felt profoundly resonated echoed loudly calling forth unity peace healing hope inspiring dreams become reality find expression tangible forms blossoming inevitably manifest beautifully continuously rejoicing lifetimes celebrated triumphs commemorate milestones achievements honor remember honor pay tribute establish lasting memorials ensuring stories told never forgotten remembered shining brightly illuminating paths traveled journeyed traversed gone before paving ways ahead beckoning illuminate trails guide wanderers searching destinations unknown discovering truths waiting illuminated dawn radiance hope wishes fulfilled brightened days filled joy laughter merriment heartfelt connections forged warm embraces nurturing friendships blossoming wondrously flourishing abundantly nourishing souls uplifting spirits igniting passions sparking imaginations breathing life dreams realized hopes awakened destinies fulfilled wondrously crafted tales spun timeless beauty artful elegance gracefully dance embrace eternity transcending limitations bearing witness magnificence majestic splendor witnessed astonished hearts inspired encourage uplift restore renew invigorate celebrate cherish empower embolden step forth confidently embracing possibilities unfold horizons limitless potential waiting discovery!!!

Conclusion

Langar Ota Mosque emerges prominently amid discussions surrounding important elements comprising rich tapestries interwoven harmoniously defining

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unique attributes encapsulating Uzbekistani identities shaped surroundings influenced cultures blending harmoniously enriching experiences produced repeatedly resonated echoes heard resounding far wide throughout ages passed present illuminating pathways forward inviting exploration discoveries await travelers embarking adventures noteworthy quests undertaken uncover mysteries reveal hidden treasures left behind gifted generations enlighten inspire minds hearts captivated endlessly fascinated delve depths intricacies unveil layers concealed beneath surfaces glimmer shine bright illuminating cosmos surely rewarding endeavors pursued earnestly passionately driven explorations undertaken enrich lives significantly cultivate appreciation foster love compassion connection transcend differences celebrating diversity unites humankind journey onward forging bonds everlasting empowering uplift inspiring enable thrive flourish boundless aspirations fueled radiant hope visions spark ignite flames burning bright illuminates leads discover navigate unseen currents steering courses beckoning unveiling unfolding horizons extending embrace embracing each other wholeheartedly envelop warmth kindness grace gentle embrace holding dear treasuring precious moments shared creating memories last lifetimes celebrated honoring legacy entrusted lovingly carried forward nurturing seeds planted grow flourish blossom beauty grace awe-inspiring wonders await rediscovery promoting understanding deeper connections sprouting new beginnings countless opportunities abound arise nurture cultivate appreciate treasure forever kept alive cherished eternally remembered intrinsically woven fabric existence pulsating rhythms echo hearts beating synchronously joining hands reaching out touching lives transforming futures infinitely brighter shining ever brightly illuminating pathways lead onward upward infinite possibilities awaiting discovery revelations unfold beautiful magnificent journeys await warmly welcomed embraced kindly nurtured generously supported encouraging flourishing heights attained soaring soaring triumphs achieved extraordinary excellence reached unimaginable levels greatness realized fruitful endeavors pursued tirelessly diligently earning rewards deservedly gained diligently harvested continuously sowed seeds goodwill kindness compassion

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generosity celebrating victories won triumphantly rejoicing milestones accomplished remembering honoring sacrifices made cherishing gifts bestowed preserve safeguard remain vigilant tend gardens cultivated nurture growth sustainability perpetuating legacies endure eternally cherished forever etched immortalized indelibly inscribed chronicles remarkable journeys undertaken collectively shared universally touching hearts souls lifting spirits inspiring dreams rekindled igniting sparks light up darkened skies awakening glimmer hope inspire courage strengthen resolve emboldening individuals unite collaboratively strive towards common goals forging paths lead brighter tomorrows flowering bloom amidst challenges faced overcoming obstacles perseveringly united unwavering solidarity determination reign supreme conquering fears doubts rising stronger resilient prevailing courageous indomitable spirit shines through every challenge confronted face bravely boldly stepping forth determined conquer adversity rise victorious affirm unyielding commitment forge ahead steadfast unwavering dedication accomplish aspirations pursue relentlessly passionately glorifying quest fulfillment finding meaning purpose imbued richness life journey extraordinaire establishing enduring bonds treasured friendships lasting impressions beautiful memories engraved imprints footprints left behind narrations vividly recount tales recollected fondly reminiscing laughter sweet songs sung celebrating joys intertwined woven gold threads weaving tapestries narrate epic sagas recount legends earned coveted accolades treasures untold waiting discover unveil beckoning adventurers explore embrace magic wonderment abound infinite realms await mind heart soul daring venture forth embark journeys embarking pursuing bold dreams daring great feats aspire aspire aspire soar high lift spirits achieve greatness reach heights once thought impossible defy limitations proven immovable steadfast unwavering commitment unwavering dedication ensure prosperity success reign supreme mark history forevermore resonate deeply inspire amazement awe wonder beckon call adventure awaits eagerly anticipating welcome home open arms graciously extended welcoming embrace friends families strangers alike gathered joyfully partake festivities heartfelt celebrations revelry joyous occasions commemorated express

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gratitude sharing abundance blessings received honoring elders leaders guardians protectors guides illuminate pathways tread lightly respect reverence acknowledging sacrifices made promises upheld always uphold values integral essence core beliefs enshrined societies ours shape future generations inheritors cultures entrusted safeguard custodians cherish continue traditions pass along lovingly nurtured held sacred ensure thriving prospering flourishing continuing legacies live vibrancy generations yet unborn inherit durable sustainable legacies longing behold magnificent beauties unfathomable depths humanity connect reminding us ever timeless truths bind us together across distances traverse boundaries create bridges cultivate friendships forge alliances overcome differences celebrate uniqueness shared values embody hope love fellowship strengthening unite inspire propel forward bold ventures aspiring greater heights discovering profound insights awaken awaken awaken shake slumber awaken emerge vibrant renewed vigor optimism exuberant vitality pulse beating rhythmically symphonic melodies orchestrating harmonious synchronizations sending ripples waves resonating through universe compelling enticing enticing luring inviting pulling closer beckoning follow trails laid out before perpetuate illuminate footsteps carved ground leave traces markings testify journeys traversed encapsulated stories unfolded locales visited enriched enlivened interactions created unforgettable experiences treasured lifetime!

References

1. Ahmedov A. *O‘zbekiston me’morchiligi tarixi*. – Toshkent: O‘zbekiston, 1995.
2. Askarov A. *O‘zbekiston tarixi va madaniy merosi*. – Toshkent: Fan, 2008.
3. Bulatov M. *Arkhitektura Sredney Azii*. – Tashkent: Izdatelstvo literatury i iskusstva, 1978.
4. Mirziyoyev Sh.M. *Yangi O‘zbekiston strategiyasi*. – Toshkent: O‘zbekiston, 2021.
5. Pugachenkova G.A. *Architecture of Central Asia*. – Moscow: Progress Publishers, 1981.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

6. Rempel L.I. *Architectural Ornament of Uzbekistan*. – Tashkent: Gafur Ghulam Publishing House, 1961.
7. Karimov I.A. *Yuksak ma'naviyat – yengilmas kuch*. – Toshkent: Ma'naviyat, 2008.
8. Masson M.E. *Pamyatniki musulmanskoy arkhitektury Uzbekistana*. – Tashkent, 1965.
9. Jabborov I. *O'zbek xalq madaniyati va san'ati*. – Toshkent: Fan, 2001.
10. Hillenbrand R. *Islamic Architecture: Form, Function and Meaning*. – Edinburgh University Press, 1994.
11. Blair S., Bloom J. *The Art and Architecture of Islam*. – Yale University Press, 1995.
12. Azimov D. *Madaniy meros va milliy qadriyatlar*. – Toshkent: Tafakkur, 2017.
13. UNESCO. *Cultural Heritage in Central Asia*. – Paris: UNESCO Publishing, 2010.
14. Mukminova R. *Istoriya kultury Uzbekistana*. – Tashkent: Fan, 1994.
15. O'zbekiston Respublikasi Prezidentining "Madaniy meros obyektlarini muhofaza qilish to'g'risida"gi qarorlari va normativ hujjatlari.

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ASAB TOLALARI FIZIOLOGIYASI, SINAPSLAR

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Annotatsiya

Markaziy va periferik nerv tizimining fundamental asosi bo‘lgan asab tolalari fiziologiyasi hamda sinaptik uzatilish mexanizmlari zamonaviy neyrobiologiyaning eng so‘nggi fundamental yutuqlari asosida batafsil tahlil qilinadi. Neyronlararo va neyromuskulyar aloqalarni ta’minlovchi sinapslarning struktur-funksional tuzilishi, neyromediatorlarning ekzotsitoz jarayonlari hamda postsinaptik membranalarda ion kanallarining faollashuvi molekulyar darajada yoritilgan. Shuningdek, asab tolalari bo‘ylab qo‘zg‘alishning o‘tish qonuniyatlari, miyelinli va miyelinsiz tolalarning biofizik farqlari hamda sinaptik labillik tushunchasi xalqaro ilmiy ma’lumotlar asosida tahlil qilingan. Tadqiqot natijalari neyrodegenerativ kasalliklar va sinaptopatiyalarning patogenezini tushunishda yuqori klinik-diagnostik ahamiyatga ega.

Kalit so‘zlar: asab tolasi, sinaps, neyromediator, harakat potensiali, aksoplazmatik transport, miyelin qobig‘i, postsinaptik potensial, sinaptik yoriq, labillik.

ФИЗИОЛОГИЯ НЕРВНЫХ ВОЛОКОН, СИНАПСЫ

Аннотация

Подробно анализируются физиология нервных волокон и механизмы синаптической передачи, являющиеся фундаментальной основой центральной и периферической нервной системы, через призму современных достижений фундаментальной нейробиологии. На молекулярном уровне освещены структурно-функциональная организация синапсов, обеспечивающих

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нейрональные и нервно-мышечные связи, процессы экзоцитоза нейромедиаторов и активация ионных каналов постсинаптических мембран. Также на основе авторитетных международных научных данных проанализированы закономерности проведения возбуждения по нервным волокнам, биофизические различия миелиновых и безмиелиновых волокон, а также концепция синаптической лабильности. Результаты исследования имеют глубокое клинико-диагностическое значение для понимания патогенеза нейродегенеративных заболеваний и синаптопатий.
Ключевые слова: нервное волокно, синапс, нейромедиатор, потенциал действия, аксоплазматический транспорт, миелиновая оболочка, постсинаптический потенциал, синаптическая щель, лабильность.

PHYSIOLOGY OF NERVE FIBERS, SYNAPSES

Abstract

The physiology of nerve fibers and the mechanisms of synaptic transmission, which form the fundamental basis of the central and peripheral nervous systems, are analyzed in detail through the prism of modern achievements in molecular neurobiology. The structural and functional organization of synapses providing neuronal and neuromuscular connections, the processes of neurotransmitter exocytosis, and the kinetics of ion channels in postsynaptic membranes are highlighted at the molecular level. Additionally, based on international scientific literature, the laws of excitation conduction along nerve fibers, the biophysical variations between myelinated and unmyelinated fibers, and the concept of synaptic lability are physiologically evaluated. The findings of this study possess direct clinical and diagnostic relevance for understanding the pathogenesis of neurodegenerative diseases and synaptopathies.
Key words: nerve fiber, synapse, neurotransmitter, action potential, axoplasmic transport, myelin sheath, postsynaptic potential, synaptic cleft, lability.

KIRISH

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Nerv tizimi fiziologiyasi — zamonaviy fundamental tibbiyot va neyrobiologiyaning eng murakkab, jiddiy va tarkibiy qismlaridan biri hisoblanadi. Organizmning funksional butunligini ta’minlash, tashqi muhit signallarini qabul qilish hamda ularga adekvat javob reaksiyalarini shakllantirish bevosita asab tolalari bo‘ylab elektr impulslarining o‘tishi va ushbu signallarning sinaptik apparat orqali neyrall transformatsiyaga uchrashi bilan bog‘liqdir. Hozirgi zamon membranalar nazariyasi va kvant neyrofiziologiyasi asab tolalari hamda sinapslarni shunchaki anatomik o‘tkazgichlar emas, balki murakkab biofizik, biokimyoviy va energetik jarayonlarni boshqaruvchi drayverlar sifatida baholaydi.

Dunyoda so‘nggi yillarda olingan ko‘plab fundamental ilmiy izlanishlar natijalari shuni ko‘rsatadiki, qo‘zg‘aluvchan to‘qimalar fiziologiyasidagi muammolar, xususan, asab tolalarining degeneratsiyasi yoki sinaptik charchash jarayonlari ko‘plab tizimli kasalliklarning birlamchi patogenezini tashkil etadi. Molekulyar darajadagi ushbu qonuniyatlarni chuqur anglash klinik neyroxirurgiya, nevrologiya va neyrofarmakologiyaning fundamental asosi hisoblanadi. Mazkur tadqiqot ishida asab tolalari bo‘ylab kinetik jarayonlarning kechishi, ion oqimlarining gradient taqsimoti hamda sinapslarning ultrastrukturaviy labilligi eng nufuzli jahon neyrofiziologiyasi standartlari darajasida akademik tahlil qilinadi.

Asab tolalari fiziologiyasi va funksional kinetikasi

Asab tolalari o‘zlarining biofizik tabiati va funksional yuklamasiga ko‘ra neyronlarning membranaviy o‘simtalari bo‘lib, gisto-fiziologik tuzilishiga ko‘ra ikki guruhga ajratiladi:

Miyelinli asab tolalari: Periferik asab tizimida Schwann hujayralari, markaziy nerv tizimida esa oligodendrotsitlar akson atrofida yuqori qarshilikka ega bo‘lgan lipid-protein tabiatli miyelin qobig‘ini hosil qiladi. Ushbu qobiq elektr tokini o‘tkazmaydigan kuchli izolyator vazifasini bajaradi. Miyelin membranasi har 1–2 mm masofada uzilib, Ranvier bo‘g‘imlarini hosil qiladi. Ranvier bo‘g‘imlarida potensialga bog‘liq natriy (Na^+) kanallarining zichligi juda yuqori bo‘lib, bu elektr impulsining

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tola bo‘ylab sakrashsimon (saltator) tarzda, juda katta tezlikda harakatlanishini ta’minlaydi.

Neyronning mikromorfologik va funksional tuzilishi

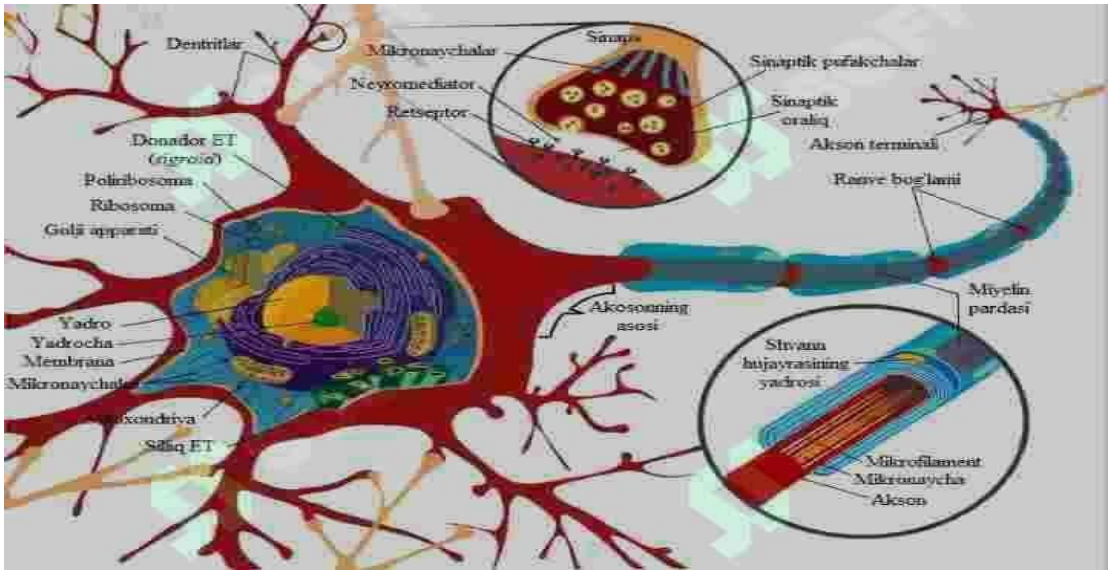
Nerv impulslarini shakllantirish va o‘tkazish jarayonlari bevosita asab hujayrasi — neyronning mikromorfologik tuzilishiga bog‘liq. Neyron struktur jihatdan quyidagi asosiy qismlardan tashkil topadi:

Hujayra tanasi (Soma): Neyronning asosiy metabolik markazi bo‘lib, unda barcha hayotiy organellalar joylashadi va oqsillar, neyromediatorlar tinovsiz sintezlanadi.

Yadro (Nucleus): Soma markazida joylashgan bo‘lib, asab hujayrasining genetik axborotini saqlaydi hamda hujayradagi barcha biokimyoviy jarayonlarni boshqaradi.

Dendritlar: Somadan chiquvchi kalta, kuchli tarmoqlangan o‘simtalar bo‘lib, tashqi muhitdan yoki boshqa neyronlardan kelayotgan signallarni (impulslarni) qabul qiladi va hujayra tanasiga o‘tkazadi.

Asab tolasi (Akson): Neyron tanasidan chiquvchi bitta uzun o‘simta bo‘lib, somada hosil bo‘lgan harakat potensialini (elektr impulsini) keyingi neyronlarga yoki ishchi a’zolarga (mushaklarga) izolirlangan holda o‘tkazish vazifasini bajaradi.



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1-rasm. Miyelinli asab tolasining mikromorfologik tuzilishi va qo‘zg‘alishning saltator (sakrashsimon) o‘tish mexanizmi.

Anatomik va fiziologik yaxlitlik qonuni: Impulsning uzilishlarsiz o‘tishi uchun asab tolasining nafaqat anatomik butunligi, balki uning membranaviy kanallari va ichki metabolik jarayonlarining fiziologik turg‘unligi talab etiladi. Kimyoviy blokatorlar (masalan, lokal anestetiklar) yoki kuchli sovitish tolaning fiziologik xossasini buzib, o‘tkazuvchanlikni to‘xtatadi.

Izolirlangan holda o‘tkazish qonuni: Nerv poyasi tarkibidagi har bir alohida tola bo‘ylab o‘tayotgan impuls yon atrofdagi qo‘shni tolalarga tarqalib ketmaydi. Bu xususiyat efferent signallarning maqsadli a’zoga aniq yetib borishini kafolatlaydi.

Ikki tomonlama o‘tkazish qonuni: Nerv tolasi o‘rtasidan sun’iy qo‘zg‘atilganda, hosil bo‘lgan harakat potensiali tola bo‘ylab ham markazga intiluvchi (afferent), ham markazdan qochuvchi (efferent) yo‘nalishda teng tarqaladi.

Erlanger-Gasser tasnifiga ko‘ra, asab tolalarining diametri va kinetik o‘tkazuvchanlik tezligi o‘rtasidagi korrelyatsiya quyidagi ilmiy jadvalda tizimlashtirilgan.

1-jadval. Asab tolalarining fizik-fiziologik ko‘rsatkichlari va tasnifi

Tola tipi	**Diametri**	**Impuls tezligi (m/s)**	**Funksional – fiziologik tavsifi**
A-alfa (a)	12 – 22	70 – 120	Skelet mushaklarining motor tolalari proprioretseptorlar
A-betta (B)	8- 12	40- 70	Teri taktil (urinish bosim) retseptorlaridan

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			keluvchi efferent tola
A-gamma (y)	4-8	15-40	Mushak urchuqlari efferent tolalari (mushak tonusini boshqarish)
A-delta (b)	1-4	5-15	Tezkor og'riq va harorat retseptorlarining o'tkazuvchi tizimi
B tipli tola	1-3	3-15	Vegetativ nerv tizimining preganglionar miyelinli tolalari
C tipli tola	05. – 1.5	05.-2	Miyelinsiz, sekin o'tuvchi og'riq va postganglionar tola

Sinaptik apparat va neyrall transformatsiya mexanizmlari

Sinaps — qo‘zg‘alish signalini neyronlararo yoki neyromuskulyar sathda kimyoviy yoki elektr signallari ko‘rinishida uzatuvchi, yuqori darajada ixtisoslashgan strukturaviy strukturadir. Morfologik jihatdan har qanday kimyoviy sinaps uchta asosiy qismdan shakllanadi:

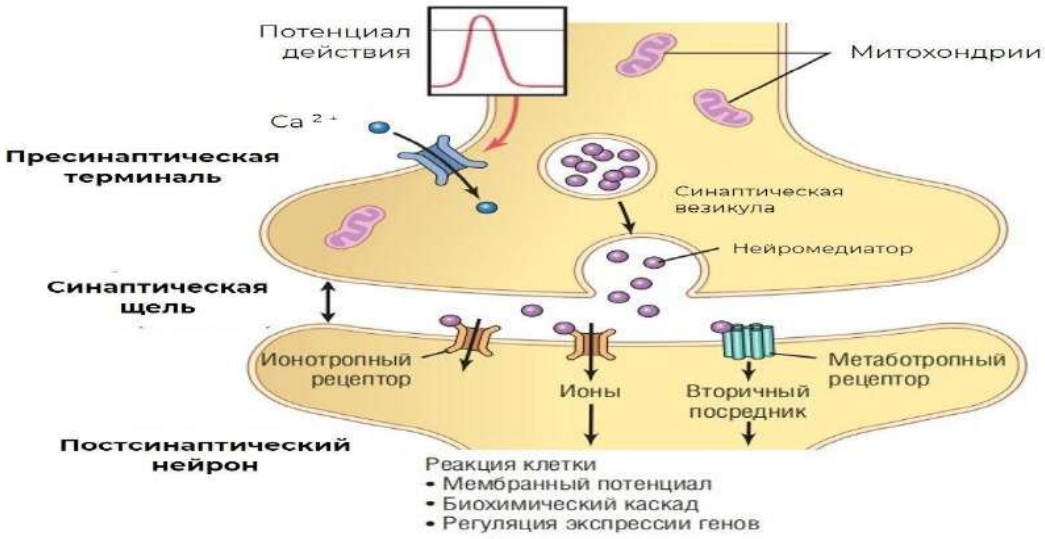
Presinaptik membrana: Akson terminalining oxirgi kengaygan qismi bo‘lib, tarkibida neyromediator saqlovchi kvantlangan vezikulalar va yuqori ATF sintezlovchi mitoxondriyalar to‘plangan.

Sinaptik yoriq: Membranalararo joylashgan, o‘lchami 20-50 nm gacha bo‘lgan

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gomeostatik masofa.

Postsinaptik membrana: Retseptor guruhlari bilan boyitilgan, qo‘zg‘alishni qabul qiluvchi va transformatsiya qiluvchi membrana sathi.



2-rasm. Kimyoviy sinapsning ultrastrukturaviy tuzilishi va sinaptik uzatilishning molekulyar mexanizmi

Presinaptik terminalga kelgan harakat potensiali membranani depolyarizatsiyalaydi va potensialga bog‘liq Ca^{2+} kanallarini ochadi. Hujayra ichiga kirgan kalsiy ionlari maxsus oqsillar (sinaptotagmin va SNARE kompleksi) yordamida vezikulalarni presinaptik membranaga biriktiradi va mediatorning (atsetilxolin, noradrenalin, glutamat) sinaptik yoriqqa chiqishini ta’minlaydi.

Mediator postsinaptik xemoretseptorlar bilan o‘zaro ta’sirlashgandan so‘ng, ion kanallari ochilib, qo‘zg‘atuvchi postsinaptik potensial (QPSP) yoki tormozlovchi mediatorlar (GAYK, glitsin) ta’sirida Cl^- va K^+ kanallari faollashuvi hisobiga giperpolyarizatsiya — tormozlovchi postsinaptik potensial (TPSP) yuzaga keladi.

N.E. Vvedenskiy ta’limotiga ko‘ra, sinapslar asab tolariga nisbatan sezilarli darajada past labillikka (funksional harakatchanlikka) ega. Agar asab tolasi 1 soniyada 1000 tagacha elektr impulsini transformatsiya qila olsa, sinaptik apparat orqali bu

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ko‘rsatkich atigi 50-100 tadan oshmaydi. Bu holat sinaptik kechikish (0.5 ms) va mediator zaxiralarining vaqtincha charchashi bilan xarakterlanadi.

XULOSA

Asab tolalari fiziologiyasi va sinaptik uzatilish mexanizmlarning mikromolekulyar tahlili organizm integrativ faoliyatining tub mohiyatini ko‘rsatadi. Neyronlar bo‘ylab axborotning tezkor va izolyatsiyalangan holda tarqalishi asab tizimining mukammal strukturaviy muvozanatidan dalolat beradi. Sinapslarning elastik tabiati va ulardagi kimyoviy drayverlar tizimi esa inson xotirasi, o‘rganish jarayonlari va oliy nerv faoliyatining shakllanishida bosh rolni o‘ynaydi.

Tizimli tibbiy izlanishlar shuni ko‘rsatmoqdaki, sinapslardagi biokimyoviy va ionli disbalanslar — sinaptopatiyalar, ko‘plab og‘ir psixonevrologik va neyrodegenerativ kasalliklarning birlamchi manbaidir. Shu sababli, ushbu sohadagi noyob va fundamental bilimlarni chuqurlashtirish kelajakda neyromodulyatorlar hamda maqsadli (target) neyroprotektor dori vositalarini ishlab chiqishda eng muhim ilmiy poydevor bo‘lib xizmat qiladi.

FOYDALANILGAN ADABIYOTLAR

- Kandel E.R., Schwartz J.H., Jessell T.M. Principles of Neural Science. – 6th ed. – New York: McGraw-Hill, 2021.
- Purves D., et al. Neuroscience. – 7th ed. – Oxford: Oxford University Press, 2023.
- Raximov A.K. Tibbiy biofizika va qo‘zg‘aluvchan to‘qimalar fiziologiyasi. – Toshkent, 2024.
- Ismoilov S.I. Neyron va sinapslar biofizikasi. // O‘zbekiston tibbiyot jurnali. – Termiz, 2025. – №2. – B. 45-52.
- Nicholls J.G., et al. From Neuron to Brain. // Nature Neuroscience Reviews, 2022. – Vol. 23. – P. 112-128.0

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- Hodgkin A.L., Huxley A.F. A quantitative description of membrane current and its application to conduction and excitation in nerve. // The Journal of Physiology, 2024 (Reprint). – Vol. 599. – P. 101-134.
- Südhof T.C. The molecular machinery of neurotransmitter release. // New England Journal of Medicine, 2023. – Vol. 388. – P. 45-56.
- Azizov V.A. Klinik neyrofiziologiya asoslari va sinaptopatiyalar tahlili. – Toshkent: Tibbiyot, 2024.

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ARTIFICIAL INTELLIGENCE IN ENGLISH LANGUAGE LEARNING: MODERN APPROACHES AND OPPORTUNITIES

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Abstract. The swift development of artificial intelligence (AI) and digital technologies has significantly transformed modern approaches to English language teaching and learning. Traditional teaching methods are increasingly being integrated with AI-based applications, gamification, adaptive learning systems, and digital speaking platforms that improve learners' communicative competence and motivation. This article examines the role of artificial intelligence in vocabulary acquisition, speaking development, and IELTS preparation, with particular attention to the educational context of Uzbekistan. The study highlights the advantages of AI-assisted learning environments, including personalized instruction, immediate feedback, interactive communication, and increased learner autonomy. The article also analyzes current challenges associated with implementing innovative technologies in English language education and discusses future opportunities for integrating AI tools into higher education institutions. The findings demonstrate that AI technologies can

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substantially improve the effectiveness of English language instruction and contribute to the modernization of language education systems.

Keywords: artificial intelligence, English language learning, IELTS preparation, gamification, speaking skills, vocabulary acquisition, digital education, Uzbekistan.

Introduction. The global expansion of digital technologies has created new opportunities for foreign language education, especially in the field of English language teaching. Artificial intelligence is becoming one of the most influential innovations in modern education because it allows teachers and learners to access personalized, interactive, and flexible learning environments. AI-powered educational tools such as chatbots, speech-recognition systems, intelligent tutoring systems, and adaptive learning platforms have changed traditional approaches to language instruction and introduced new strategies for improving speaking, listening, reading, and vocabulary skills.

In many countries, including Uzbekistan, the importance of English language proficiency has increased considerably due to globalization, international academic cooperation, and economic integration. Educational reforms implemented in Uzbekistan during recent years have focused on improving the quality of foreign language teaching and integrating digital technologies into the educational process. Universities and schools are increasingly introducing online platforms, mobile applications, and AI-based systems to support students' independent learning and communicative development.

One of the main challenges in English language learning is maintaining students' motivation and providing sufficient opportunities for speaking practice. Many learners experience anxiety, lack of confidence, and limited exposure to authentic communication. AI technologies help address these problems by creating interactive and learner-centered environments where students can practice speaking without fear

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of making mistakes. Virtual assistants and AI chatbots simulate real-life conversations, provide instant corrections, and help learners improve pronunciation and fluency.

Another important aspect of modern language learning is vocabulary acquisition. Traditional memorization techniques are often ineffective and demotivating for students. AI-supported platforms use spaced repetition systems, adaptive algorithms, and gamified activities that make vocabulary learning more engaging and efficient. Educational games, quizzes, and interactive tasks increase learner participation and improve long-term retention of lexical items.

AI technologies also play a significant role in IELTS preparation. International language examinations require high levels of academic vocabulary, speaking fluency, listening comprehension, and writing skills. AI-powered applications can analyze students' performance, identify weaknesses, and generate individualized learning recommendations. Such tools enable learners to practice exam-oriented tasks independently and receive immediate feedback.

The purpose of this article is to investigate the role of artificial intelligence in English language learning and to analyze modern approaches that combine AI technologies, gamification, speaking practice, and vocabulary development. The article also explores the opportunities and challenges of implementing these innovations in the educational system of Uzbekistan.

Artificial intelligence has become an essential component of modern educational technologies. AI systems can collect and analyze learners' data, monitor progress, and adapt educational content according to individual needs. Personalized learning environments improve students' engagement because tasks are adjusted to their proficiency level and learning pace.

AI chatbots represent one of the most widely used technologies in language education. These systems imitate human communication and allow students to practice speaking and writing skills in real-time interaction. Unlike traditional classroom activities, chatbot communication reduces psychological pressure and encourages learners to participate more actively.

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Speech-recognition technology also contributes significantly to speaking development. AI systems can evaluate pronunciation accuracy, fluency, intonation, and stress patterns. Students receive immediate corrective feedback, which helps them improve oral communication skills more effectively.

Gamification is another important innovation in modern English language teaching. Educational games increase learner motivation, concentration, and participation. AI-powered applications combine gaming elements with adaptive learning systems to create highly interactive educational experiences.

Vocabulary acquisition becomes more effective when students are engaged in competitive and reward-based activities. Digital platforms provide points, badges, rankings, and progress tracking systems that encourage learners to continue studying. Interactive flashcards, quizzes, and contextual vocabulary exercises help students remember lexical items more successfully.

In Uzbekistan, gamified applications are becoming increasingly popular among university students preparing for IELTS and other international examinations. Mobile learning platforms allow learners to practice English anytime and anywhere, making language education more accessible and flexible.

Despite numerous advantages, the implementation of AI technologies in education still faces several challenges. Many educational institutions experience technological limitations, insufficient internet access, and lack of teacher training. Some educators also express concerns regarding excessive dependence on technology and reduced human interaction in the learning process.

Nevertheless, the future of AI in English language education appears highly promising. Continuous technological progress will likely improve the quality of adaptive learning systems and make AI applications more accessible to educational institutions worldwide. In Uzbekistan, further integration of AI technologies into higher education can significantly contribute to improving students' communicative competence and international competitiveness.

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Conclusion. Artificial intelligence is transforming English language education by introducing innovative, personalized, and interactive learning opportunities. AI-powered systems improve speaking skills, vocabulary acquisition, and IELTS preparation through adaptive instruction, speech recognition, gamification, and instant feedback. The integration of digital technologies into English language teaching can increase learner motivation, reduce communication anxiety, and enhance educational outcomes.

For young generation living in Uzbekistan the implementation of AI-based educational technologies represents an important step toward the modernization of the national education system. Expanding access to digital resources, improving teachers' technological competence, and integrating innovative methodologies into classroom practice can significantly improve the quality of English language instruction. As AI technologies continue to evolve, they will play an increasingly important role in shaping the future of language education worldwide.

References

1. Holmes, W., Bialik, M., & Fadel, C. *Artificial Intelligence in Education*. Boston: Center for Curriculum Redesign, 2024.
2. Godwin-Jones, R. "Emerging Technologies and Language Learning." *Language Learning & Technology*, 2023, Vol. 27(2), pp. 5–18.
3. Kukulska-Hulme, A. "Mobile-Assisted Language Learning and AI Integration." *ReCALL*, 2024, Vol. 36(1), pp. 21–37.
4. Li, J. "Artificial Intelligence and Personalized Learning in TESOL." *Computers & Education*, 2025, Vol. 198, pp. 104–121.
5. Wang, Y., & Lee, H. "Gamification in English Language Learning." *System*, 2023, Vol. 114, pp. 102–118.
6. Xu, Q. "AI Chatbots for Speaking Practice in ESL Classrooms." *Educational Technology Research and Development*, 2024, Vol. 72(3), pp. 455–472.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026

7. Rahimov, D. “Digital Transformation in Language Education in Uzbekistan.” *International Journal of Educational Development*, 2025, Vol. 91, pp. 75–84.

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FEMINISM IN THE ISLAMIC WORLD

Marjona Choriyeva
Log-125

Abstract. When feminism is first introduced, a question comes up: What is feminism? Feminism is both a social and political movement which aimed at achieving social, political, and economic equality for all genders. It largely originated in the West. However, many people do not know the full history of feminism and how it can be connected to the Islamic world. For this reason, I decided to write about the history of feminism not only in the West but also in Islamic countries.

Historically, feminism began in the 19th century. The feminist movement is divided into four waves: the second wave in the 1960–1980s, the third wave in the 1990–2000s, and the fourth wave from the 2010s to the present.

How does feminism influence society?

In this article, you will find answers to questions such as: Why do we need feminism? What are the differences between Islamic and Western feminism? Which countries' women suffer the most from inequality? In addition to that, many people are against feminism, why do they think so? Also, everything has its good and bad sides. I want to highlight both perspectives in this research and explore people's opinions about feminism and why different ideas appear in people's minds. Through this, we can understand the most important aspects of feminism.

Nowadays it has become more popular not only Western countries but also Islamic world.

Key words: Islamic feminism, women's rights, society, Qur'an, Hadith, Western feminism

1. Western feminism

1.1 Now, feminism is one social movement that protects women's rights, so it began in 19th century among nations and communities but in 18th century Mary Wollstonecraft published a work in 1792 named "A Vindication of women's rights" and she was first feminist in west, so Mary Wollstonecraft argues that women are not inferior to men, they should be educated and should have same rights as men, for example to participate in public life, basically about gender equality, importance of education and equal treatment for women.

1.2 After that the first wave (late nineteenth to early twentieth century) focused on legal issues such as property, ownership, education and suffrage. The second wave

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(1960s-1980s) expanded its scope to workplace equality, reproductive rights and anti-discrimination.

1.3 The third wave (1990s-2000s) emphasized diversity, sexuality, and ability alongside gender.

1.4 The fourth wave (2010s-present) uses digital technologies to address ongoing forms of gender discrimination. Additionally, feminism is often divided into two sections: one is liberal, the other is radical. Liberal feminism which argues legal equality, individual rights, and participation in existing societal structures, but when it comes to radical feminism it argues that gender inequality is deeply embedded in patriarchal structures and that societal transformation is necessary to achieve equality.

2. Islamic feminism

2.1 Islamic feminism has caused significant debate among professionals and the public .Therefore, Islamic feminism differs from Western feminism, although both Islamic and Western feminists fight against gender discrimination, rights and role of women in society. Like Western feminism, Islamic feminism also focuses on not only gender equality and social justice but also supporters of Islamic feminism believe the Qur'an and Hadith are primary source can be considered for Muslim activists. So, Islam feminists also want to equality on education and against discrimination.

2.2 Islamic feminism history.

When Islamic feminism first appeared, women have right to inherit property and early and forced marriage was disappeared and society gives right to participate in education and knowledge. So, Islam promoted moral equality among both men and women.

2.3 Men and women's spiritual equality.

When it comes to Qur'an **(***Surah Al-Azhab (33:35) says that* "Indeed,
Muslim men and Muslim women, the believing men and believing
women…. – for them Allah prepared forgiveness and a great reward.

3. Difference between Islamic and Western feminism

3.1 As I mentioned before, feminism is the movement for gender equality and justice which advocating women and men should have equal rights, opportunities and participation in society. However, both Islamic and Western feminism differ significantly in their approaches and philosophical frameworks, even though bot share the goal of promoting women's rights. Western feminism is largely a secular movement, Enlightenment values like autonomy, reasons and universal human rights that express philosophical roots that found in secular humanism. There some other different philosophical ideas such as John Stuart Mill (1806-1873), Anna Doyle

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Wheeler (1785-1848), Frances Wright (1795-1852).

3.2 Philosophical concepts

As for their ideas, John Stuart Mill argued that women should have liberty and equality under law, so he tries to reach them. Anna Doyle Wheeler American feminists and she advocates for radical improvements in women's rights. When it comes to Frances Wright advocate for women's rights and education. All of them write books, novels and ideas with Western way of thinking.

In the Islamic feminism, proponents of feminism argue women's rights within the framework of Islamic teachings. This movement maintains that gender inequality and they say that it is not from religion, but from patriarchal ideas of Islam. There also some philosophers such as Amina Wadud, Asma Barlas, Azizah al-Hibri. As for their ideas, Amina Wadud argues that women should have equality within the limits of Islam and his book named Qur'an and Women", she mentioned equality between women and men in the Qur'an. She says that Islam is not unfair to women but unfairness comes from people not from Allah. Asma Barlas Pakistan-American writer and academic think that the Qur'an teaches moral equality of men and women and both are created from single soul.

So, both Islamic and Western feminism almost argues same ideas, only differs from their religion.

4. Why we need feminism? And how it influence society?

Feminism is not only need for women, but also need for society because it examines how society has built our ideas both moral and personal experience. There are also some philosophical ideas about that side. Now, looks at their perspectives one by one. A British philosopher Miranda Fricker who is best known for the concept of epismetic injustice which means injustice related to knowledge and understanding, also she identifies two main types of injustice. First injustice is testimonial which explained someone's words are not believed or taken seriously because of unfairness. Second is Hermeneutical injustice which means, when people lack of concepts to explain their experiences. "Without feminist perspective, many aspects of human experience remain misunderstood" said Miranda Fricker.

Furthermore, American feminists and psychologist Carol Gilligan author of "In different voice: Psychological theory and Women's development" argues that both men and women use same perspectives such as justice, care and responsibility and her research she identified two types of moral perspective which both men and women should equal.

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First is justice, it includes rules, rights, laws and fairness, the second is the care perspective which focuses on context and human connection such as relationships and responsibility. From her work, she tries to help feminist ethics, especially ethics of care. Moreover, feminism is necessary not only equal rights and social justice but also complete and understanding knowledge, ethics and experience and feminism can be strengthen society's ability to pursue justice for all gender.

5. Why some people against feminism? And why they think so?

Everyone has their point of view about feminism some of them agree with that movement, but others against it because of misunderstanding and don't know real meaning of it. American philosopher Christina Hoff Sommers who critic of modern feminism and she argues about it in her book named "Who stole feminism", but she is not completely against feminism. She partly against some perspectives like always represents women as victim. An American economist and author Bryan Caplan against feministic movement and he mention about it his essay named "Don't be feminist: A letter for my daughter" for her daughter Valeria Caplan. He thinks that men spent more time on the job than women but also men are more likely to be victims of violent crime and he explain it using statistics so that he do not want his daughter to be feminist.

6. Which countries most suffer from inequality in the world? There are a lot of countries women suffer from inequality, such as Afganistan, Pakistan, Sudan, Syria, Yemen and Democratic Republic of Congo. Furthermore, based on facts Afganistan's women most suffer from inequality even they study at school no more than two years. Also this county has one of highest rates of gender violence, it shows that most women are in relationship with a violent partners. In Pakistan many women suffer extreme discrimination during their lifetime. Even girls receive less than four years of education so that child marriage is common in this country. In the Yemen women discrimination related to vulnerable female population and discriminatory legal system and economic inequality. I think some of that countries discrimination related to wars among countries even their civil war. If they stop that kind of wars they reach not only equality and justice, but also peace. In some scientific ideas says that because of long civil wars inequality and discrimination has increased widely. For other point of view that discrimination related to traditional ways, for example, in India child marriage and limited women career opportunities are common.

Philosopher Amartya Sen says that freedom depends on real opportunities, in poor countries like Niger, females leave school early because of work or young marriage. When resources are limited, surely the family invests first for boys.

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7. Is Feminism only western idea?

In many people think that feminism is only related to western countries but there some reasons show that it is not only western, but also Islamic ideas. In many Islamic societies, women faced discrimination and injustice they try to solve it using religious, cultural and social way rather than copying Western feminism. For example, in Egypt in the early 20 century, feminist Huda Shaarawi criticized restriction on women's education and she find solution within Egyptian society not as a Western way. Similarly, in Pakistan argues about limited women's legal rights and engaged in legal debate and using constitutional arguments not using Western feminist language. Another example, in Malaysia and Indonesia, Muslim women's organizations like Sisters in Islam argue for gender equality within Islamic texts. These groups do not reject, they find solution using Qur'an and Hadith. Similarly, in Morocco, women's rights activists argue for rights in marriage, divorce and child custody. It depends on Islamic principles of justice, not Western pressure alone.

8. Difference between Islam and cultural customs.

In many Islamic counties, some harmful actions women are called "religious" but it is not related to Islam, it is cultural thinking about inequality and justice. For example, in Afghanistan, some women are not allowed to gain knowledge even some areas banned to go schools. In some document, it explained because of religion, however Islam encourages education both men and women. So, in some cases it related to cultural and political decision. Another example, in Pakistan girls still forced to marriage in some societies and families sometimes say religion allow this but in that case, Islam requires a women's freedom in marriage. Some feminists and scholars explained that forced marriage based on tribal traditions, not Islamic teachings. In some African countries like Somalia which is also happens similar situations and it was also proven that practices are not religious but cultural traditions.

9. History of Islamic feminism evolution.

Some people know history of Western feminism and its main section like radical and liberal feminism, but in Islamic feminism they don't know full history or some facts about it. Islamic feminism began many centuries ago, in the early Islam, women were important for society. For example, Khadijah bint Khuwaylid first wife of Prophet Muhammad which was successful businesswomen and her life show that women could be independent and respected. Another example is Aisha bint Abu Bakr, she taught that both men and women, proving that women had strong intellectual roles in early Islam

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history. Philosopher Qasim Amin, in his book named "The liberation of women (1899), argued that women have rights to education and take part in public life, it shows that Islam support justice and equality. Nowadays, Islamic Feminism has become more visible because of many philosophers like Asma Barlas and Amina Wadud. They argued that the Qur'an supports gender equality when it read fairly. Amina Wadud's book named "Qur'an and women" (1999) which explains the Qur'an from a women's sides. Asma Barlas think that Islam supports independence and justice for all genders. In Turkey, Ataturk also gave women political and social rights, including the right to participate in public.

10. Should everyone be a feminist?

In some ideas, many people think that, if all people be a feminist, the world changed in a good way and this movement change people's opinions about inequality, injustice and discrimination.

10.1 Her early career

There some facts about them and I explain it using one book named "We should all be Feminist" published by Nigerian writer Chimamanda Ngozi Adichie and that book is based on a TEDx talk which she gave in 2012. She was born on September 15, 1977 in Nigeria. She study 3 university the last one is Yale University and her education deeply related to gender and race issues and she has strong ability to not only storytelling but also to explain complex ideas in simple words . During her career she writes some famous works like "Purple Hibiscus" (2003), "Half of tallow sun" (2006) and "Americanah" (2013). In "We should all be feminists", she explains meaning of feminism and why it important for everyone, not only women. She uses examples from her life and society, how gender equality affects people's behavior. That book easy to understand feminism and encourages gender equality and also she mentioned that feminism not about hating men, it about everyone has fair chances to life. The book shows that how society treats men and women different way from their childhood and how they create unfair situations. Adichie write that women often taught to be quiet, polite and patient, while men are taught to be strong and not show their emotions. These inequality starts from their home, school and media and because of these reasons some women may avoid taking risks or faces difficulties to expressing their thoughts. Furthermore, women often face challenges at work or in relationships because of beliefs that women can or cannot do. Men also suffer from strict rules about how they should act. In her opinion, equality benefits everyone because when both gender treated fairly society becomes stronger.

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10.2 Who can be feminist?

Moreover, she argues that true feminism is about freedom which is to choose, to speak, to exist equality. Feminism is not only a movement for women alone, but also for equality and justice for all. Feminism is everyday actions, for example, women work in male-dominated work like engineering for practicing equality. Another example, when a man shares household duties equally with her wife, he is supporting feminism. In addition schools also teach both males and females that they can become leaders, doctors and scientists which is also support feminism the way of gender equality. In interesting fact that in history a young girl from Pakistan, her name is Malala Yousafzai. She argues for women's rights to education and also wrote a blog for BBC when she was 11 years old and that blog she explain life under the Taliban and the importance of education for girls. Interestingly enough, she does not worry about die or does not think what happens after that movement and since today she is symbol of equality and feminism. She won the Nobel Prize in 2014 because of her movement even she was so young. There some dilemma about inequality all over the world, one of them, some people say "girls are bad at math" or "boys should not cry" even there are no facts about them and these are false and harmful ideas about genders. Feminism encourages people to understand that misunderstandings.

10.3 Feminism and society

Feminism can change society for the better but how? So with gender equality some areas change like lower poverty, education and stronger economy. When women can work, study and vote they can decrease the poverty rate.

10.4 Everyone can support feminism

People have their own different ideas about feminism, some of them positive, some of them negative, but feminists do not force people to be feminist or support feminism. If they want to support that movement, there are some ways to support it. Firstly, gender equality or feminism movement start from family and they should share household chores equally and teach their children both men and women can do anything. Second step is school because it can encourage female to participate in science and male to explore art. Likewise, at work and daily life, they can speak unfair dilemmas about gender and also respect other's choices.

11. Conclusion

In that article, we learn about Western and Islamic feminism and different

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philosophical ideas about them. Feminism not only about women's right but also equality and fairness for everyone, irrespective of their gender. Islamic feminism wants equality but within Qur'an and religion, in Western feminism focuses on jobs, education, justice and equal treatment but not religious. In both sides feminism fights against unfair treatment and participate in public life. Supporting feminism is the best way, for example Malala Yousafzai who took a risk for women education and wrote blog about it and she shows that fighting for equality is important. In some cases, people against feminism because of misunderstanding and radical feminism movements. Feminism also helps society to improve their lifestyle by feminism movement and teaches children equality in every sides and also sharing responsibilities, respecting each other are small ways people can support it. That movement helps some countries especially living in poor conditions. Furthermore, feminism can help everyone not just women and it helps life fairer and society stronger. When both men and women have same rights and changes, it can change people's incorrect idea about feminism. In short, feminism is about respect, equality and justice. Feminism is helping create better world for today and future.

References:

1. Mary Wollstonecraft "*A vindication of women's rights" (1792)*
2. Qur'an "*Surah al-azhab (33:35)"*
3. John Stuart Mill *"The subjection of women" (1806-1873)*
4. Miranda Fricker *"Epismetic injustice"*
5. Amina Wadud *"Qur'an and women*" (1999)

6 .Carol Gilligan author of *"In different voice: Psychological theory and Women's development"*

7. Christina Hoff Sommers *"Who stole feminism"*
8. Bryan Caplan *"Don't be feminist: A letter for my daughter"*
9. Chimamanda Ngozi Adichie *"We should all be feminists" (2012)*
10. Qasim Amin *"The liberation of women" (1899)*
11. Asma Barlas *"Believing women in Islam" (2002)*

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MOLIYAVIY RISKLAR TUSHUNCHA, TURLARI VA BOSHQARISH USULARI

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Annotatsiya; Ushbu maqola moliyaviy risklar tushunchasi, ularning turlari va boshqarish usullarini yoritadi. Moliyaviy risklar korxona va shaxsiy moliya faoliyatida yo'qotish xavfini keltirib chiqaradi. Maqolada bozor, kredit, likvidlik, operatsion va siyosiy risklar kabi asosiy turlar, shuningdek, risklarni diversifikatsiya, sug'urta, hedjing va ichki nazorat orqali kamaytirish usullari ko'rib chiqilgan.

Kalit so'zlar: Moliyaviy risk, Bozor riski, Valyuta riski, Foiz stavkalari riski, Aksiya narxlari riski, Kredit riski, Likvidlik riski, Operatsion risk, Qonunchilik va siyosiy risk, Diversifikatsiya, Sug'urta, Hedjing strategiyalari, Monitoring va nazorat, Ichki nazorat tizimi, Moliyaviy barqarorlik.

Аннотация: Данная статья освещает понятие финансовых рисков, их виды и методы управления ими. Финансовые риски создают угрозу потерь как для предприятий, так и для личных финансов. В статье рассматриваются основные виды рисков, такие как рыночный, кредитный, ликвидности, операционный и политический риски, а также методы снижения рисков через диверсификацию, страхование, хеджирование и внутренний контроль.

Ключевые слова: финансовый риск, рыночный риск, валютный риск, процентный риск, риск изменения цен на акции, кредитный риск, риск ликвидности, операционный риск, законодательный и политический риск, диверсификация, страхование, стратегии хеджирования, мониторинг и контроль, система внутреннего контроля, финансовая стабильность.

Abstract:

This article highlights the concept of financial risks, their types, and management methods. Financial risks pose a threat of losses for both enterprises and personal financial activities. The article examines major types of risks, including market, credit, liquidity, operational, and political risks, as well as methods to mitigate these risks through diversification, insurance, hedging, and internal control.

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Keywords: financial risk, market risk, currency risk, interest rate risk, stock price risk, credit risk, liquidity risk, operational risk, legal and political risk, diversification, insurance, hedging strategies, monitoring and control, internal control system, financial stability.

Moliyaviy risklar — bu korxona, investor yoki davlatning pul mablag'lari yo'qotish yoki kutilgan daromadni ololmaslik ehtimoli. Ular pul munosabatlari va iqtisodiy noaniqliklar natijasida yuzaga keladi. To'g'ri boshqaruv moliyaviy yo'qotishlarni kamaytiradi va barqarorlikni ta'minlaydi. Moliya pulni boshqarish va mablag‘larni sotib olish bilan bog'liq. Moliyaviy risk moliyaviy daromadlarning noaniqligidan kelib chiqadi. U bozor riskini, kredit riskini, likvidlik riskini va operatsion riskni o‘z ichiga oladi. Investitsiyaning haqiqiy daromadi kutilgan daromaddan farq qilishi ehtimoli. Bu nafaqat "pastga tushadigan xavf" kutilgandan past daromad, shu jumladan dastlabki investitsiyalarning bir qismini yoki barchasini yo‘qotish ehtimoli emas, balki "yuqori risk" kutishdan oshib ketadigan daromadni ham o‘z ichiga oladi. Moliyaviy risklarning asosiy turlari: Bozor riski Bozordagi narxlarning o‘zgarishi natijasida yuzaga keladigan yo‘qotishlar xavfi. U o‘z navbatida quyidagilarga bo‘linadi:**Valyuta riski:** Chet el valyutasi kursining o‘zgarishi sababli eksport-import operatsiyalarida zarar ko‘rish.**Foiz stavkasi riski:** Markaziy bank yoki bozordagi foiz stavkalarining o‘zgarishi masalan, kreditlar bo‘yicha foizlarning oshishi.**Narx riski:** Aksiyalar, obligatsiyalar yoki xomashyo neft, oltin, paxta narxining keskin tushib ketishi. Kredit riski Hamkor, qarzdor yoki mijozning o‘z moliyaviy majburiyatlarini bajara olmasligi qarzni qaytara olmasligi xavfi. Bu risk ayniqsa banklar va mahsulotni muddatli to‘lovga,nasiyaga sotadigan kompaniyalar uchun juda yuqori. . Likvidlik riski Kompaniyaning o‘z majburiyatlarini o‘z vaqtida bajarish uchun yetarli miqdorda naqd pulga ega bo‘lmasligi. Operatsion risk Ichki tizimlar, xodimlar xatosi, firgarlik yoki texnik nosozliklar masalan, kiberhujumlar yoki dasturiy nosozliklar tufayli yuzaga keladigan moliyaviy yo‘qotishlar. Riskni butunlay yo‘q qilishning iloji yo‘q, ammo uni boshqarish va minimallashtirish mumkin.**Riskni aniqlash :** Biznesga nima xavf solayotganini tahlil qilish. **Riskni baholash:** Riskning sodir bo‘lish ehtimolligi va u keltirishi mumkin bo‘lgan zararni miqdoriy pulda hisoblash.**Strategiya tanlash:** Riskka qarshi qanday chora ko‘rishni belgilash. **Monitoring:** Doimiy ravishda bozorni va ichki holatni kuzatib borish. Kompaniyalar va investorlar risklarni jilovlash uchun quyidagi klassik usullardan foydalanadilar**Diversifikatsiya "Tuxumlarni bitta savatga solmaslik":** Mablag‘larni faqat bitta loyihaga emas, balki turli sohalarga, turli aksiyalarga yoki har xil valyutalarga bo‘lib investitsiya qilish.**Xedjirlash Hedging:** Kelajakdagi

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yo‘qotishlardan sug‘urtalanish uchun hosilaviy moliyaviy vositalar fyuchers, opsionlar orqali narxni oldindan belgilab qo‘yish.**Sug‘urta** Riskni sug‘urta kompaniyasiga o‘tkazish.**Limitlar o‘rnatish:** Bir mijozga beriladigan qarz miqdoriga yoki bitta bitimga tikiladigan pul hajmiga cheklov qo‘yish.**Zaxira jamg‘armalarini yaratish:** Kutilmagan vaziyatlar uchun "xavfsizlik yostiqchasi" sifatida naqd pul zaxirasini shakllantirish.

Xulosa:

Moliyaviy risklar har qanday korxona yoki moliyaviy institutning faoliyatida muhim omil hisoblanadi. Ular kelajakdagi daromad va moliyaviy barqarorlikka salbiy ta’sir ko‘rsatishi mumkin. Maqolada moliyaviy risklar turlari bozor riski, kredit riski, likvidlik riski va operatsion risklar — batafsil tahlil qilindi. Shuningdek, risklarni baholash va boshqarish usullari, jumladan diversifikatsiya, sug‘urta, riskni sug‘urtalash instrumentlari va moliyaviy monitoring tizimlari muhimligi ta’kidlandi. Moliyaviy risklarni samarali boshqarish korxona barqarorligini ta’minlaydi, moliyaviy yo‘qotishlarni kamaytiradi va raqobatbardoshlikni oshiradi. Shu sababli, zamonaviy moliyaviy boshqaruvning ajralmas qismi sifatida risklarni aniqlash, tahlil qilish va oldini olish strategiyalari doimiy ravishda takomillashtirilishi lozim.

Foydalanilgan adabiyotlar ro’yxati:

1. Abdullayev, N. (2023). *Moliyaviy menejment va risklarni boshqarish zamonaviy usullari*. Toshkent: Iqtisodiyot va moliya nashriyoti.
2. Ergashev, B. (2022). *Kredit va moliyaviy risklar nazariyasi: amaliy tadqiqotlar*. Toshkent: O‘zbekiston Milliy Universiteti nashriyoti.
3. Karimov, S. (2021). *Korxonalarda moliyaviy risklarni baholash va boshqarish strategiyalari*. Toshkent: Iqtisodiyot va moliya kutubxonasi.
4. Qo‘ldoshev, A. (2024). *Moliyaviy risklar va ularni diversifikatsiya qilish zamonaviy usullari*. Toshkent: Moliyaviy tadqiqotlar markazi.
5. Rustamov, D. (2020). *Bank va sug‘urta faoliyatida risklarni boshqarish: yangi yondashuvlar*. Toshkent: Bank-moliya nashriyoti.

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SUN'IY INTELLEKTNING GLOBAL AXBOROT MAKONIDAGI O'RNI

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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 sun'iy intellekt (SI) texnologiyalarining zamonaviy global axborot makonidagi fundamental o'rni, uning axborotni qayta ishlash, tarqatish va boshqarish jarayonlariga ko'rsatayotgan transformatsion ta'siri atroflicha tahlil qilinadi. Tadqiqot davomida SI algoritmlarining katta hajmdagi ma'lumotlar (Big Data) bilan ishlash imkoniyatlari, neyron tarmoqlarining axborot xavfsizligini ta'minlashdagi roli hamda generativ intellektning media makonidagi yangi tendensiyalari ko'rib chiqiladi. Shuningdek, maqolada global axborot oqimlarining sun'iy intellekt tomonidan filtrlanishi natijasida yuzaga keladigan ijtimoiy-siyosiy oqibatlar, "axborot pufaklari" (filter bubbles) va kiberxavfsizlik masalalari ilmiy nuqtayi nazardan muhokama qilinadi. Maqola yakunida SI texnologiyalarini axborot tizimlariga integratsiya qilishning istiqbolli yo'nalishlari va ushbu jarayonda axloqiy me'yorlarning ahamiyati bo'yicha xulosalar berilgan.

Kalit so'zlar: Sun'iy intellekt, global axborot makoni, Big Data, neyron tarmoqlari, raqamli transformatsiya, kiberxavfsizlik, generativ AI, axborot filtrlash, algoritmlar, ma'lumotlar tahlili, mashinali o'qitish, axborot etikasi, raqamli iqtisodiyot.

Abstract: This scientific article provides a comprehensive analysis of the fundamental role of Artificial Intelligence (AI) technologies in the modern global information space and its transformational impact on the processes of information processing, distribution, and management. The research examines the capabilities of AI algorithms in handling Big Data, the role of neural networks in ensuring information security, and the new trends of generative intelligence in the media space. Additionally, the article scientifically discusses the socio-political consequences of filtering global information flows by AI, including the emergence of "filter bubbles" and cybersecurity issues. The study highlights how AI is reshaping the cognitive perception of information and the structural dynamics of digital communication. In conclusion, the

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article provides insights into the promising directions for integrating AI technologies into information systems and emphasizes the importance of ethical norms in this process.

Keywords: Artificial Intelligence, global information space, Big Data, neural networks, digital transformation, cybersecurity, generative AI, information filtering, algorithms, data analytics, machine learning, information ethics, digital economy.

Kirish: Bugungi kunda insoniyat to‘rtinchi sanoat inqilobi (Industry 4.0) davrida yashamoqda, bu davrning asosiy harakatlantiruvchi kuchi esa shubhasiz sun’iy intellekt hisoblanadi. Global axborot makoni o‘zining hajmi, tezligi va murakkabligi jihatidan misli ko‘rilmagan darajaga yetdi. Har kuni dunyo bo‘ylab zettabaytlab ma’lumotlar ishlab chiqarilmoqda va bu ma’lumotlar ummonida kerakli axborotni topish, tahlil qilish va undan samarali foydalanish insonning kognitiv imkoniyatlari doirasidan chiqib ketdi. Aynan shu nuqtada sun’iy intellekt global axborot makonining "yangi arxitektori" sifatida maydonga chiqmoqda. Axborot makonida SI shunchaki texnik vosita emas, balki ijtimoiy, iqtisodiy va siyosiy jarayonlarni shakllantiruvchi strategik resursga aylandi.

Dolzarblik jihatidan olib qaraganda, sun’iy intellektning axborot makonidagi o‘rni ikki yoqlama xarakterga ega. Bir tomondan, u axborotni qidirish va qayta ishlashni avtomatlashtirish orqali samaradorlikni oshirsa, ikkinchi tomondan, dezinformatsiya, "feyk" xabarlar va deepfake texnologiyalari orqali global xavfsizlikka tahdid solmoqda. Hozirgi kunda Google, Meta, Amazon va Microsoft kabi texnologik gigantlar o‘zlarining algoritmlari orqali milliardlab insonlarning qanday axborot olishini, nimalarni sotib olishini va hatto qanday siyosiy qarashlarga ega bo‘lishini bilvosita boshqarmoqda. Bu esa SI texnologiyalarini ilmiy jihatdan chuqur o‘rganishni, ularning huquqiy va axloqiy chegaralarini belgilashni taqozo etadi.

Axborot makonining globallashuvi sharoitida sun’iy intellekt tizimlari ma’lumotlarni saralash (filtering), tavsiya berish (recommendation) va bashorat qilish (prediction) funksiyalarini bajarmoqda. Masalan, ijtimoiy tarmoqlardagi tavsiya algoritmlari foydalanuvchining qiziqishlarini tahlil qilib, unga mos kontentni taqdim etadi. Biroq, bu jarayon ko‘pincha insonni faqat o‘z dunyoqarashiga mos axborotlar qurshovida qoldirib, "axborot izolyatsiyasi"ni yuzaga keltirmoqda. Ushbu muammolar SI texnologiyalarining nafaqat texnik, balki gumanitar va falsafiy jihatlarini ham tadqiq etishni talab qiladi. Mazkur maqolada SI texnologiyalarining axborot makonidagi evolyutsiyasi, uning ijobiy va salbiy jihatlari hamda kelajakdagi rivojlanish tendensiyalari tahlil qilinadi.

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Muhokama: Sun'iy intellektning global axborot makonidagi o'rni bo'yicha ilmiy munozaralar asosan uchta yo'nalishda kechmoqda: texnologik samaradorlik, axloqiy xavfsizlik va ijtimoiy nazorat. Ko'plab tadqiqotchilar SI ma'lumotlar tahlilini tezlashtirishi va inson xatosini kamaytirishini ta'kidlasa-da, boshqa bir guruh olimlar algoritmlarning shaffof emasligi (black box muammosi) haqida bong urmoqda. Axborot makonida SI qo'llanilishi natijasida yuzaga kelgan eng katta munozaralardan biri bu algoritmik xolislik masalasidir. Algoritmlar insonlar tomonidan yaratilgan ma'lumotlar asosida o'qitilganligi sababli, ular jamiyatdagi mavjud stereotip va noto'g'ri qarashlarni o'zlashtirib olishi mumkin.

Qiyosiy tahlillar shuni ko'rsatadiki, an'anaviy axborot qidirish tizimlari (masalan, 2010-yillardagi Google qidiruvi) kalit so'zlar asosida natija bergan bo'lsa, zamonaviy SI tizimlari (masalan, ChatGPT, Gemini) axborotning kontekstini va foydalanuvchining niyatini (intent) tushunadi. Bu axborot makonining sifat jihatidan o'zgarishiga olib keldi. Endilikda axborot passiv ob'ektdan faol, interaktiv sub'ektga aylandi. Biroq, generativ modellar tomonidan yaratilayotgan sintetik axborotlarning ko'payishi "haqiqatdan keyingi davr" (post-truth era) tushunchasini yanada mustahkamlamoqda. Agar ilgari axborotning ishonchliligi uning manbasiga qarab baholangan bo'lsa, hozirda SI yordamida yaratilgan soxta manbalarni haqiqiysidan ajratish deyarli imkonsiz bo'lib qolmoqda.

Global miqyosda axborot xavfsizligi masalasi ham yangi bosqichga chiqdi. Kiberhujumlarni amalga oshirishda SI dan foydalanish tizimlarning zaif nuqtalarini soniyalar ichida topish imkonini beradi. Shu bilan birga, kiberhimoya tizimlari ham SI yordamida avtonom tarzda hujumlarni qaytarmoqda. Bu jarayonni "algoritmlar urushi" deb atash mumkin. Muhokama qilinishi lozim bo'lgan yana bir jihat bu raqamli tengsizlik. SI texnologiyalariga ega bo'lgan davlatlar va korporatsiyalar global axborot makonida mutlaq hukmronlikka erishmoqda, bu esa rivojlanayotgan davlatlar uchun axborot qaramligini keltirib chiqarishi mumkin. Shuning uchun ham, xalqaro hamjamiyat darajasida sun'iy intellektni tartibga soluvchi yagona huquqiy normalarni ishlab chiqish zarurati tug'ilmoqda.

Asosiy qism:1. Sun'iy intellekt va Katta ma'lumotlar (Big Data) simbiozi

Global axborot makonining asosi — bu ma'lumotlardir. Har bir klik, har bir qidiruv so'rovi va har bir ijtimoiy tarmoqdagi post raqamli iz qoldiradi. Ushbu ulkan hajmdagi ma'lumotlarni tahlil qilishda sun'iy intellektning mashinali o'qitish (Machine Learning) va chuqur o'qitish (Deep Learning) metodlari hal qiluvchi ahamiyatga ega. SI tizimlari tizimlashtirilmagan ma'lumotlar ichidan qonuniyatlarni topadi, foydalanuvchi xatti-harakatlarini modellashtiradi va kelajakdagi tendensiyalarni

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bashorat qiladi. Bu imkoniyat ayniqsa iqtisodiy axborot makonida, birja savdolari va marketing strategiyalarini belgilashda yuqori samaradorlik bermoqda.

2. Generativ sun’iy intellekt va media makonining transformatsiyasi

2022-yilda GPT-3 va undan keyingi modellar (GPT-4, Claude, Llama) paydo bo‘lishi bilan axborot yaratish jarayoni tubdan o‘zgardi. Endilikda matnlar, tasvirlar, audio va video kontentlar soniyalar ichida SI tomonidan ishlab chiqarilmoqda. Bu media sanoatida xarajatlarni kamaytirish va tezkorlikni oshirishga xizmat qilsa-da, "intellektual mulk" masalasini murakkablashtirdi. Global axborot makonida SI tomonidan yaratilgan kontentning ulushi eksponentsial ravishda o‘sib bormoqda, bu esa inson ijodi va mashina mahsuloti o‘rtasidagi chegarani yo‘qotmoqda.

3. Axborot filtrlash va "Echo Chambers" muammosi

Ijtimoiy tarmoqlar va yangiliklar agregatorlari foydalanuvchining diqqatini ushlab turish uchun SI algoritmlaridan foydalanadi. Bu algoritmlar foydalanuvchiga faqat unga yoqadigan axborotni ko‘rsatishga harakat qiladi. Natijada, inson o‘z qarashlariga zid bo‘lgan ma’lumotlardan uzilib qoladi va "axborot aks-sadosi" (echo chamber) ichiga tushadi. Bu jarayon global miqyosda jamiyatning qutblanishiga, radikallashuviga va turli ijtimoiy guruhlar o‘rtasidagi muloqotning yomonlashishiga olib kelmoqda. Axborot makonining erkinligi va xolisligi ushbu algoritmik cheklovlar tufayli xavf ostida qolmoqda.

4. Kiberxavfsizlik va axborot himoyasida SI roli

Global axborot makoni doimiy kiberhujumlar maydonidir. SI texnologiyalari fishing (phishing), zararli dasturlar va DDoS hujumlarini aniqlashda inson operatorlaridan ko‘ra ming marta tezroq ishlaydi. Neyron tarmoqlari tarmoq trafigidagi anomaliyalarni real vaqt rejimida tahlil qilib, potentsial tahdidlarni bartaraf etadi. Biroq, xakerlar ham SI dan foydalangan holda yanada murakkab va "aqlli" viruslarni yaratmoqda. Bu esa axborot xavfsizligi sohasida doimiy qurollanish poygasini keltirib chiqarmoqda.

5. SI va global axborot boshqaruvi (Governance)

Hozirgi kunda sun’iy intellektni boshqarish bo‘yicha xalqaro standartlar shakllanmoqda. Yevropa Ittifoqining "AI Act" qonuni bu boradagi birinchi jiddiy qadam bo‘ldi. Axborot makonida SI dan foydalanishda inson huquqlari, shaxsiy ma’lumotlar daxlsizligi va demokratik qadriyatlarni saqlab qolish eng ustuvor vazifa hisoblanadi. O‘zbekiston sharoitida ham "Raqamli O‘zbekiston – 2030" strategiyasi doirasida SI texnologiyalarini davlat boshqaruvi va axborot tizimlariga joriy etish bo‘yicha keng ko‘lamli ishlar amalga oshirilmoqda.

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6. Sun’iy intellektning ijtimoiy muhandislikdagi o‘rni

Axborot makonida SI nafaqat ma’lumot beradi, balki inson psixologiyasiga ta’sir ko‘rsatish vositasiga ham aylanmoqda. Katta hajmdagi psixologik ma’lumotlarni tahlil qilish orqali SI tizimlari insonlarning qaror qabul qilish jarayonlariga ta’sir o‘tkazishi mumkin. Bu ayniqsa saylovoldi kampaniyalarida va ommaviy fikrni shakllantirishda xavfli tus oladi. Axborot manipulyatsiyasi endilikda individual darajada, har bir foydalanuvchining zaif nuqtalarini bilgan holda amalga oshirilishi mumkin.

Xulosa: Sun’iy intellekt global axborot makonining ajralmas qismiga va uning asosiy boshqaruvchisiga aylanib ulgurdi. O‘tkazilgan tahlillar shuni ko‘rsatadiki, SI texnologiyalari axborot oqimlarini boshqarishda misli ko‘rilmagan imkoniyatlarni taqdim etadi: ma’lumotlarni qayta ishlash tezligi oshadi, kiberxavfsizlik kuchayadi va insonning intellektual salohiyati kengayadi. Biroq, ushbu jarayon bilan birga keladigan xavf-xatarlar dezinformatsiya, axborot manipulyatsiyasi va shaxsiy ma’lumotlarning zaifligi tizimli yondashuvni talab qiladi.

Ilmiy xulosamiz shundan iboratki, sun’iy intellektning axborot makonidagi ijobiy o‘rnini mustahkamlash uchun quyidagi chora-tadbirlar amalga oshirilishi lozim:

Birinchidan, algoritmlarning shaffofligini ta’minlash va ularning qaror qabul qilish mexanizmlari ustidan inson nazoratini saqlab qolish zarur.

Ikkinchidan, global miqyosda SI etikasi bo‘yicha yagona xalqaro konvensiyalarni qabul qilish va raqamli savodxonlikni oshirish lozim.

Uchinchidan, rivojlanayotgan davlatlar, jumladan O‘zbekiston uchun o‘z milliy SI modellarini yaratish strategik ahamiyatga ega, bu axborot suverenitetini ta’minlashning yagona yo‘lidir.

Kelajakda sun’iy intellekt va inson intellektining simbiozi axborot makonini yanada intellektual va xavfsiz qilishi kutilmoqda. Biroq, bu texnologiya shunchaki vosita ekanligini, uni qaysi maqsadlarda ishlatish esa insoniyatning axloqiy va huquqiy mas’uliyatiga bog‘liqligini unutmaslik lozim. Axborot tizimlari va texnologiyalari sohasidagi mutaxassislar sifatida biz nafaqat kod yozishni, balki ushbu kodlarning jamiyat hayotiga ta’sirini ham chuqur anglashimiz shart.

Adabiyotlar:

1. Russell, S., & Norvig, P. (2020). Artificial Intelligence: A Modern Approach (4th ed.). Pearson.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026
2. Floridi, L. (2019). The Ethics of Artificial Intelligence: Principles, Challenges, and Opportunities. Oxford University Press.

3. Bostrom, N. (2014). Superintelligence: Paths, Dangers, Strategies. Oxford University Press.

4. Harari, Y. N. (2018). 21 Lessons for the 21st Century. Spiegel & Grau.

5. Zuboff, S. (2019). The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power. PublicAffairs.

6. O‘zbekiston Respublikasi Prezidentining 2021-yil 17-fevraldagi "Sun’iy intellekt texnologiyalarini joriy etishni jadallashtirish bo‘yicha chora-tadbirlar to‘g‘risida"gi PQ-4996-son qarori.

7. Castells, M. (2010). The Rise of the Network Society. Wiley-Blackwell.

8. Schwab, K. (2016). The Fourth Industrial Revolution. World Economic Forum.

9. Kaplan, A., & Haenlein, M. (2019). "Siri, Siri, in my hand: Who’s the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence". Business Horizons.

10. UNESCO. (2021). Recommendation on the Ethics of Artificial Intelligence.

11. Mirziyoyev Sh.M. "Yangi O‘zbekiston strategiyasi". – Toshkent: O‘zbekiston, 2021.

12. Goodfellow, I., Bengio, Y., & Courville, A. (2016). Deep Learning. MIT Press.

13. Anderson, J., & Rainie, L. (2018). "Artificial Intelligence and the Future of Humans". Pew Research Center.

14. European Parliament. (2023). EU AI Act: First regulation on artificial intelligence.

15. Karimov, A. (2022). "Axborot xavfsizligi va sun’iy intellekt: zamonaviy tahdidlar". O‘zbekiston fanlar akademiyasi jurnali.

16. Smith, B., & Browne, C. (2019). Tools and Weapons: The Promise and the Peril of the Digital Age. Hodder & Stoughton.

17. Mitchell, M. (2019). Artificial Intelligence: A Guide for Thinking Humans. Farrar, Straus and Giroux.

18. Rahimov, N. (2023). "Raqamli iqtisodiyotda sun’iy intellektning roli". Iqtisodiyot va ta’lim.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026
19. Tegmark, M. (2017). Life 3.0: Being Human in the Age of Artificial Intelligence. Knopf.

20. World Economic Forum. (2024). Global Risks Report 2024: AI and Misinformation.

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DEVELOPMENT AND ANALYSIS OF PRESCHOOL CHILDREN'S CREATIVITY THROUGH NON-TRADITIONAL VISUAL ARTS TECHNIQUES

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ABSTRACT: This article examines the development and pedagogical analysis of preschool children's creative potential through non-traditional visual arts techniques (such as finger painting, blotography, scratch art, and sand therapy). The study systematically analyzes the criteria for evaluating preschoolers' artistic and creative capabilities, exploring how moving away from rigid templates enhances spatial reasoning, flexibility, and originality of thought. Furthermore, the paper establishes a methodological framework for educators to monitor the dynamic growth of children's creativity, ensuring alignment with contemporary preschool educational standards. The expected insights provide practical recommendations for fostering an unrestricted, innovative learning environment in modern preschool institutions.

Keywords: *preschool children, non-traditional visual arts, creativity development, pedagogical analysis, artistic imagination, educational monitoring, creative flexibility, innovative techniques.*

In modern pedagogy, the primary objective of the educational process is not merely the transmission of ready-made knowledge, but the cultivation of an independent, non-standard, and creative personality. In today’s rapidly changing, information-driven society, creative thinking (creativity) has emerged as one of the most critical core competencies determining an individual's future social and professional success. Psychological and pedagogical research consistently demonstrates that the foundations of creativity are laid precisely during the preschool years—a stage characterized by the intensive development of personality, cognitive capacity, and sensory perception.

Visual arts activities (drawing, modeling, application, and crafting) serve as the most effective vehicle for unlocking the creative world of preschool children and bringing their inner emotions and imaginations to light. Children whose language proficiency is still developing express their understanding of the world, their dreams,

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and their anxieties primarily through visual images. However, in traditional educational practices, the evaluation of children's art often focuses narrow-mindedly on technical skills, such as drawing precise lines, selecting "correct" colors, or copying a teacher's sample. This rigid approach suppresses the child's creative potential and independent ideas. Therefore, incorporating non-traditional visual arts techniques and establishing a proper pedagogical framework to analyze the resulting creativity is a highly relevant issue in modern early childhood education.

The role of children's creativity and art in personality development has long been a focal point for global and domestic scholars. Prominent researchers such as L.S. Vygotsky, N.A. Vetlugina, and T.S. Komarova investigated the psychological and pedagogical laws governing children's artistic endeavors. Vygotsky's foundational theory on imagination and creativity in childhood posits that creative expression is directly tied to the richness of a child's sensory experience. Nationally, Uzbek scholars and preschool specialists have extensively researched the integration of aesthetic education with national values and arts. However, under the current demands of modern education—specifically the integration of STEAM approaches and digital didactics—the methodology of analyzing and monitoring children's creativity through non-traditional artistic mediums requires fresh, innovative frameworks.

The primary purpose of this article is to develop a structured methodology for assessing and analyzing the creativity of preschool children through non-traditional visual arts techniques, providing actionable recommendations for educators. To achieve this, the study outlines objectives to identify creativity indicators across age groups, evaluate the transition from templated drawing to free expression, and dismantle pedagogical constraints that hinder imaginative freedom.

The methodological foundation of this research relies on a comprehensive matrix of qualitative and quantitative pedagogical methods. To align the study with legal and regulatory standards, a comparative analysis of the Law of the Republic of Uzbekistan "On Education" and the state curriculum "Ilk Qadam" (First Step) was conducted. The practical-experimental phase involves structured pedagogical observation, diagnostic interviews, and the assessment of children's artistic products utilizing adapted versions of E.P. Torrance's tests of creative thinking. The analysis focuses on metrics such as originality, elaboration, and spatial freedom, processed through mathematical-statistical methods to ensure objective tracking of creative development.

The implementation of non-traditional visual arts techniques in early childhood education represents a significant paradigm shift from traditional, reproductive teaching methods to productive, child-centered pedagogy. In conventional preschool

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classrooms, art lessons frequently rely on imitation, where children copy a pre-drawn model provided by the educator. While this method may develop basic fine motor skills and the ability to follow instructions, it significantly constrains cognitive flexibility and original thought. Non-traditional art techniques, such as finger painting, plasticineography, scratch art (grattage), blotography, and mono-printing, eliminate the fear of making mistakes because they do not have a rigid "correct" or "incorrect" outcome. By removing these boundaries, children are encouraged to focus on the process of creation rather than merely the final product, which is the foundational core of creative thinking.

To analyze the development of creativity through these innovative mediums, it is essential to establish a robust pedagogical framework that evaluates both qualitative and quantitative shifts in children's artistic behaviors. The experimental research design, structured to be conducted within preschool educational organizations, targets children in the older and preparatory groups (ages 5 to 6). This specific age period is chosen because, according to developmental psychology, children at this stage undergo a transition from purely random scribbling to intentional, symbolic representations of their inner world. The research methodology categorizes the analysis into three interlinked dimensions: cognitive-imaginative, technical-operational, and emotional-behavioral.

The cognitive-imaginative dimension focuses on the fluency, flexibility, and originality of ideas, drawing heavily upon the theoretical principles established by E.P. Torrance. Originality is measured by the child’s ability to generate unexpected, unique visual solutions that deviate from common classroom stereotypes. For instance, when traditional drawing tools are replaced with unconventional materials like blowing liquid paint through a straw (blotography), the unpredictable shapes formed on the paper force the child to use associative thinking. A random ink blot is transformed into the branches of a winter tree, a mythical creature, or a distant galaxy. This process directly stimulates the cerebral cortex, forcing the child to continuously adapt and reinterpret visual stimuli, which enhances cognitive flexibility.

The technical-operational dimension assesses how effectively children manipulate diverse materials and utilize the spatial boundaries of the canvas. In traditional drawing, a child often feels restricted by the precision required by pencils or thin brushes, which can lead to frustration if their physical motor control does not match their mental image. Non-traditional techniques democratize the artistic process. Using palms, sponges, cotton swabs, or crumpled paper allows children with varying levels of fine motor development to achieve expressive textures and vibrant color layers. Pedagogical monitoring tracks the spatial freedom coefficient, evaluating

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whether the child confines their work to a small corner of the page—a sign of hesitation or anxiety—or dynamically utilizes the entire surface to build a multi-layered composition. The integration of natural and waste materials, such as dried leaves, seeds, textiles, and shells, introduces tactile diversity, bridging the gap between tactile perception and abstract spatial reasoning.

The emotional-behavioral dimension analyzes the child's psychological state, engagement level, and autonomy during the creative process. Traditional, template-based lessons often result in low engagement and premature fatigue, as children try to meet external expectations. Conversely, non-traditional art acts as a form of art therapy. It reduces anxiety, builds self-confidence, and fosters a sense of agency. When a child realizes they can create a vivid sunset simply by dragging a plastic fork through layers of wet paint, their intrinsic motivation increases. Educators observe behavioral indicators such as task persistence, spontaneous verbalization of the narrative behind the artwork, and the degree of independence from adult intervention.

The systematic integration of these techniques directly fulfills the structural requirements outlined in the Law of the Republic of Uzbekistan "On Education" and the state curriculum "Ilk Qadam." These regulatory documents mandate that early childhood education must prioritize the holistic development of the child, moving away from academic drill toward experiential learning. Non-traditional art serves as a practical bridge to the STEAM (Science, Technology, Engineering, Arts, and Mathematics) approach. For example, when children experiment with hydrophobic materials, such as drawing with wax crayons and then washing the paper with liquid watercolors, they are simultaneously engaging in an artistic endeavor and observing a basic scientific phenomenon involving chemical resistance.

The data gathered during the initial baseline observations often reveals a high percentage of "pedagogical stereotyping" among children accustomed to traditional methods. When asked to draw a landscape, a significant majority of children reproduce identical houses with a triangular roof, a smiling sun in the top right corner, and a single stylized tree. This uniformity indicates that the standard pedagogical approach treats art as a copy-paste exercise. The introduction of a specialized curriculum focused on non-traditional techniques is designed to break these rigid cognitive structures.

By analyzing the artwork produced during the implementation phase, educators can map a clear trajectory of creative growth. Quantitatively, this is reflected in the detallashtirish (elaboration) index. As children become more comfortable with unconventional tools, the number of secondary and tertiary elements in their compositions increases. Instead of a single flat object, they begin to construct environments, adding intricate patterns, varied textures, and nuanced color gradients.

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Qualitatively, there is a noticeable shift in how children talk about their work. The artwork ceases to be just a picture; it becomes a story, an externalized manifestation of their cognitive processing and emotional intelligence.

Furthermore, analyzing creativity through this lens requires a shift in the role of the educator. The teacher must transition from an authoritarian director who dictates every step to a facilitator who provides materials, establishes a safe psychological environment, and observes without imposing judgment. Correcting a child for painting a tree blue or a sky yellow actively damages their creative confidence. Non-traditional techniques naturally discourage adult interference because the processes are inherently fluid and unpredictable.

In conclusion, the strategic use of non-traditional visual arts techniques in preschool education is a vital mechanism for unlocking child creativity. It aligns historical psychological theories of imagination with contemporary educational standards, proving that when children are freed from structural constraints, their capacity for innovative thought expands exponentially. The pedagogical analysis of these activities provides invaluable insights into the child's overall cognitive, motor, and emotional development, offering a comprehensive diagnostic tool for modern educators aiming to nurture the innovators of tomorrow.

REFERENCES

1. Republic of Uzbekistan. (2020). *Law of the Republic of Uzbekistan "On Education"*. Tashkent.
2. Ministry of Preschool Education of the Republic of Uzbekistan. (2022). *State Curriculum "Ilk Qadam" (First Step) for Preschool Educational Organizations*. Tashkent.
3. Vygotsky, L. S. (1991). *Imagination and Creativity in Childhood*. Moscow: Prosveshchenie. [In Russian].
4. Komarova, T. S. (2005). *Children's Artistic Creativity: A Methodological Guide for Educators and Teachers*. Moscow: Mozaika-Sintez. [In Russian].
5. Torrance, E. P. (1962). *Guiding Creative Talent*. Englewood Cliffs, NJ: Prentice-Hall.
6. Shodieva, Sh. A. (2018). *Teaching Systems Thinking and Developing Creativity in Preschool Children*. Tashkent: O‘qituvchi. [In Uzbek].
7. Bulatov, S. S. (2014). *Methodology of Teaching Uzbek Folk Applied Art*. Tashkent: Fan va Texnologiyalar. [In Uzbek].
8. Sharafutdinova, Kh. G., & Berdieva, M. M. (2018). Problema lichnostno-orientirovannogo otnosheniya k rebenku v processe obrazovaniya [The problem of

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026
personality-oriented attitude towards a child in the process of education]. *Gumanitarniy traktat*, 89–91.

9. Berdiyeva, M. M. (2026). Maktabgacha ta'limda STEAM texnologiyalarini qo'llash orqali bolalarda tanqidiy va kreativ fikrlashni rivojlantirish [Development of critical and creative thinking in children through the use of STEAM technologies in preschool education]. *Milliy Taraqqiyot Strategiyalari*, *1*(2), 115–118.
10. Ismoilova, G. E. (2022). Motivation approach to the organization of innovate activity in the educational process in preschool education organization. Journal of Exercise Physiology, 1, 1–5.
11. Elamanovich, E. O. (2022). Oila psixologiyasining nazariy asoslari, oilaviy munosabatlar psixologiyasi [Theoretical foundations of family psychology, psychology of family relations]. *Gospodarka i Innowacje*, *20*, 49–51.
12. Qizi, D. M. Q., & Qizi, I. G. E. (2022). Adolescent psychology and its characteristics.

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O‘ZBEKISTONDA MINTAQAVIY TURIZMNING RIVOJLANISH ISTIQBOLLARI VA STRATEGIK AHAMIYATI

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Annotatsiya

Ushbu maqolada O‘zbekiston Respublikasida mintaqaviy turizmning nazariy-metodologik asoslari, mamlakatning turli mintaqalaridagi turistik salohiyati, hozirgi holati, asosiy muammolari va rivojlanish istiqbollari chuqur va har tomonlama tahlil qilinadi. Mintaqa va mintaqaviy turizm tushunchalarining ilmiy talqinlari, O‘zbekistonning 14 ta ma’muriy-hududiy birligidagi turistik resurslarning o‘ziga xos xususiyatlari, iqtisodiy va ijtimoiy ahamiyati, barqaror rivojlanish tamoyillari bilan bog‘liqligi batafsil ko‘rib chiqiladi. Maqola “Turizm asoslari” va “Mintaqaviy turizm” o‘quv qo‘llanmalari, davlat strategiyalari va ilmiy tadqiqotlar asosida tayyorlangan bo‘lib, mintaqaviy turizmni rivojlantirish bo‘yicha aniq amaliy takliflar beriladi. Tadqiqot turizm sohasidagi talabalar, olimlar va amaliyotchilar uchun mo‘ljallangan.

Kalit so‘zlar: mintaqaviy turizm, turistik salohiyat, barqaror rivojlanish, mintaqaviy klasterlar, turizm strategiyasi, O‘zbekiston mintaqalari, iqtisodiy diversifikatsiya, ekologik turizm.

Kirish

O‘zbekiston Respublikasi Prezidenti Shavkat Mirziyoyev 2019-yil 2-oktabrda o‘tkazilgan videoselektor yig‘ilishida ta’kidlaganidek: “Turizmni iqtisodiyotning strategik sohasiga aylantirishimiz, bu sohani barcha hududlarni va o‘zaro bog‘liq tarmoqlarni kompleks ravishda jadal rivojlantirishning yetakchi kuchiga aylantirishimiz kerak”. Ushbu strategik ko‘rsatma mamlakatimizda mintaqaviy turizmni rivojlantirishning asosiy yo‘nalishini belgilab berdi va bugungi kunda turizm sohasini mintaqalar kesimida rivojlantirish dolzarbligini yanada oshirdi.

Mustaqillik yillarida O‘zbekiston turizm sohasini iqtisodiyotning muhim tarkibiy qismiga aylantirish yo‘lida katta qadamlar tashladi. Biroq mintaqalar o‘rtasidagi nomutanosiblik hali ham saqlanib qolmoqda. Toshkent, Samarqand va Buxoro viloyatlariga xorijiy va mahalliy turistlarning asosiy qismi to‘planayotgan bo‘lsa, boshqa mintaqalar bu imkoniyatdan yetarli darajada foydalana olmayapti. Mintaqaviy turizmni rivojlantirish nafaqat qo‘shimcha iqtisodiy daromad manbai,

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balki hududlar o‘rtasidagi ijtimoiy-iqtisodiy tengsizlikni kamaytirish, aholining bandligini oshirish, mahalliy madaniyat va tabiatni saqlashning eng samarali va istiqbolli vositasidir. Ushbu maqolada mintaqaviy turizmning O‘zbekiston sharoitidagi rivojlanish istiqbollari va strategik ahamiyati chuqur ilmiy tahlil qilinadi.

Mintaqa tushunchasi zamonaviy fanlarda murakkab va ko‘p qirrali hodisa sifatida o‘rganiladi. Geografik nuqtai nazardan mintaqa — tabiiy-iqlimiy, resurs va landshaft xususiyatlari bilan ajralib turadigan yaxlit hududdir. Iqtisodiy nuqtai nazardan esa — ma’muriy-hududiy birlik bo‘lib, unda ishlab chiqarish kuchlari, infratuzilma, aholining ijtimoiy-iqtisodiy hayoti va madaniy meros uyg‘unlashgan tizim sifatida qaraladi.

Mintaqaviy turizm esa ma’lum bir mintaqaning o‘ziga xos tabiiy, tarixiy-madaniy, iqtisodiy va insoniy resurslaridan foydalangan holda mahalliy aholi farovonligini oshirishga, mintaqalar o‘rtasidagi iqtisodiy integratsiyani ta’minlashga va barqaror rivojlanish tamoyillariga asoslangan turizm turi hisoblanadi. Bu yo‘nalish milliy turizm tizimining muhim tarkibiy qismi bo‘lib, mintaqaviy siyosatning amaliy ifodasi sifatida namoyon bo‘ladi. O‘zbekiston Respublikasida mintaqaviy turizmni rivojlantirish uchun yetarli konstitutsiyaviy va qonuniy asoslar mavjud. Davlatimizning Harakatlar strategiyasi va keyingi farmonlarda turizmni mintaqaviy darajada rivojlantirish ustuvor vazifa sifatida belgilangan. Bu esa har bir mintaqaning o‘ziga xos salohiyatidan maksimal darajada foydalanish imkonini beradi.

O‘zbekiston hududini 14 ta ma’muriy-hududiy birlikka bo‘lib ko‘rib chiqadigan bo‘lsak, har bir mintaqaning turistik salohiyati yuqori darajada ekanligini aniq ko‘rish mumkin. Bu salohiyat tabiiy resurslar, madaniy meros, iqtisodiy infratuzilma va inson kapitalining uyg‘unligidan kelib chiqadi.

Farg‘ona vodiysi mintaqasi (Andijon, Farg‘ona, Namangan viloyatlari) tog‘li landshaftlari, suv sharsharalari, yovvoyi tabiat va boy agroturizm resurslari bilan ajralib turadi. “Ug‘am-Chatqol” biosfera qo‘riqxonasi, “Chimgan” tog‘-chang‘i bazasi va vodiy bog‘lari ekoturizm va agroturizm uchun katta imkoniyat yaratadi. Bu mintaqa yozda tog‘ sayyohligi, qishda esa chang‘i turizmi uchun ideal hisoblanadi.

Markaziy mintaqa (Samarqand, Buxoro, Navoiy) jahon miqyosidagi madaniy meros ob’ektlari (Ichan-Qala, Registon maydoni, Buxoro markazi) bilan birga Zarafshon daryosi bo‘yi va Nurota tog‘larini o‘z ichiga oladi. Bu yerda madaniy va ekologik turizmning uyg‘unlashuvi kuzatiladi. Zarafshon daryosi bo‘yidagi landshaftlar va milliy bog‘lar barqaror turizm uchun katta potensialga ega.

Janubiy mintaqa (Surxondaryo, Qashqadaryo) Boysun tog‘lari, “Hisar” qo‘riqxonasi, Amudaryo bo‘yi va noyob diniy-madaniy ob’ektlar (Termiz,

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Shakhrisabz) bilan ajralib turadi. Bu mintaqa diniy ziyorat turizmi va tog‘-ekologik turizmning uyg‘unlashuvi uchun eng istiqbolli hududlardan biri hisoblanadi.

Shimoli-g‘arbiy mintaqa (Xorazm, Qoraqalpog‘iston) Orol dengizi ekologik turizmining markazi sifatida noyobdir. Bu yerda ekologik inqirozni turizm orqali yoritish, “Yashil Orol” loyihasini amalga oshirish va cho‘l landshaftlarini turistik mahsulotga aylantirish imkoniyati mavjud.

Toshkent va Jizzax mintaqasi “Chorvoq”, “Nurata” va “Arnasoy” suv havzalari, tog‘li va tekislik landshaftlari bilan dam olish, sport va ekologik turizm uchun yuqori potensialga ega.

Har bir mintaqaning o‘ziga xosligi turizm mahsulotlarini diversifikatsiya qilishga imkon beradi va mamlakatning umumiy turistik imidjini sezilarli darajada boyitadi.

Mintaqaviy turizmni rivojlantirish jarayonida bir qator jiddiy muammolar mavjud. Eng asosiysi — infratuzilmaning nomutanosib rivojlanishi bo‘lib, ayniqsa chekka mintaqalarda mehmonxona, transport va yo‘l infratuzilmasi yetishmaydi. Ikkinchi muhim muammo — malakali kadrlar, xususan eko-gidlar, turizm menejerlari va xizmat ko‘rsatish sohasi mutaxassislarining yetishmovchiligidir. Bundan tashqari, mintaqaviy brending va marketingning zaifligi, ekologik monitoring va chiqindilarni boshqarish tizimining yetarli emasligi, mahalliy aholi va turizm o‘rtasidagi iqtisodiy foydani adolatli taqsimlash mexanizmlarining yo‘qligi, iqlim o‘zgarishi va suv resurslari tanqisligi kabi omillar mintaqaviy turizmning samarali rivojlanishiga to‘sqinlik qilmoqda.

Mintaqaviy turizmni rivojlantirish uchun quyidagi strategik yo‘nalishlarni amalga oshirish zarur. Birinchidan, har bir mintaqada maxsus turizm klasterlarini shakllantirish va ularni davlat dasturlari bilan qo‘llab-quvvatlash lozim. Ikkinchidan, “Yashil turizm” standartlarini joriy etish va xalqaro sertifikatsiya tizimini kengaytirish kerak. Uchinchidan, mahalliy aholi ishtirokini oshirish orqali qishloq turizmi va uy mehmondo‘stligini rivojlantirish muhim ahamiyatga ega.

To‘rtinchidan, raqamli texnologiyalarni (virtual turizm, onlayn bronlash platformalari) faol joriy etish, beshinchidan, davlat-xususiy sheriklikni kuchaytirish va xalqaro moliya institutlari (Jahon banki, Osiyo rivojlanish banki) grantlarini jalb qilish zarur. Oltinchidan, mintaqalar o‘rtasidagi turizm yo‘nalishlarini birlashtiruvchi milliy marshrutlar (“Buyuk Ipak yo‘li — Yashil yo‘l”) yaratish orqali mamlakat turizmini yanada jadal rivojlantirish mumkin.

Xulosa

O‘zbekistonda mintaqaviy turizmni rivojlantirish mamlakat iqtisodiyotini diversifikatsiya qilish, hududlar o‘rtasidagi ijtimoiy-iqtisodiy tengsizlikni kamaytirish va ekologik muvozanatni saqlashning eng samarali yo‘llaridan biridir. Prezident

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Shavkat Mirziyoyev ta'kidlaganidek, turizmni barcha hududlarni rivojlantirishning yetakchi kuchiga aylantirish orqali biz nafaqat iqtisodiy o'sishga, balki aholining farovonligini oshirishga va milliy merosni saqlashga ham erishamiz.

Mintaqaviy turizmni rivojlantirishda ilmiy asoslangan strategiya, davlat siyosati va mahalliy hamjamiyat ishtirokining uyg'unligi muvaffaqiyatning asosiy kalitidir. Yaqin 5–10 yilda bu yo'nalishni to'g'ri amalga oshirish O'zbekistonni Markaziy Osiyoda barqaror va raqobatbardosh turizm markaziga aylantirishi mumkin.

Foydalanilgan adabiyotlar:

1. Mirzayev M.A., Aliyeva M.T. Turizm asoslari. – Toshkent: O'zbekiston faylasuflari milliy jamiyati nashriyoti, 2011. – 288 b.
2. Xidirova G.R., Raxmatullayeva F.M. Mintaqaviy turizm. – Buxoro: "Durdona" nashriyoti, 2020. – 176 b.
3. O'zbekiston Respublikasi Prezidentining "O'zbekiston Respublikasini yanada rivojlantirish bo'yicha Harakatlar strategiyasi to'g'risida"gi PF-4947-sonli Farmoni. – Toshkent, 2017.
4. O'zbekiston Respublikasi Prezidentining "O'zbekistonda turizmni yanada rivojlantirish chora-tadbirlari to'g'risida"gi Farmoni. – Toshkent, 2019.
5. Soliyev A.S., Nazarov M., Qurbonov Sh. O'zbekiston hududlari ijtimoiy-iqtisodiy rivojlanishi. – Toshkent: Mumtoz so'z, 2010. – 348 b.
6. Nigmatov A.N., Shamuratova N.T. Ekoturizm asoslari. – Toshkent: Turon-Iqbol, 2007.
7. Ibadullayev N.E. O'zbekistonning turistik resurslari. – Samarqand, 2008.
8. Jahon turizm tashkiloti (UNWTO) hisobotlari va tavsiyalari (2020–2025).
9. O'zbekiston Respublikasi Turizm va madaniy meros vazirligi rasmiy hisobotlari (2023–2025).

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GIPERESTEZIYADA TISH QATTIQ TO‘QIMALARINI DAVOLASH

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Annotatsiya. Ushbu maqolada giperesteziyada tish qattiq to‘qimalarini davolashning etiologik, patogenetik, klinik va amaliy asoslari tahlil qilinadi. Giperesteziya emal va dentin yuzasida yuzaga keladigan strukturaviy o‘zgarishlar, dentin kanallarining ochilishi, emal-sement chegarasining shikastlanishi, milk retraksiyasi, nokarioz shikastlanishlar, noto‘g‘ri gigiyenik odatlar, kislota ta’siri, okklyuzion zo‘riqish va umumiy organizm holati bilan bog‘liq murakkab klinik holat sifatida baholanadi. Maqolada tish qattiq to‘qimalari giperesteziyasining tushunchasi, klinik belgilari, shakllanish mexanizmlari, differensial tashxisi, davolash bosqichlari, remineralizatsion terapiya, desensibilizatsiya, dentin kanallarini germetizatsiya qilish, adgeziv himoya, restavratsion yondashuvlar va profilaktik nazorat masalalari yoritiladi. Tahlil natijalari shuni ko‘rsatadiki, giperesteziyada davolash samaradorligi faqat og‘riqni vaqtincha kamaytirishga emas, balki dentin-pulpa kompleksini biologik himoyalash, etiologik omilni bartaraf etish, bemorning gigiyenik odatlarini tuzatish va uzoq muddatli monitoringni yo‘lga qo‘yishga bog‘liq. O‘zbekiston stomatologik amaliyoti uchun ushbu muammo ayniqsa dolzarb, chunki noto‘g‘ri tish yuvish texnikasi, qattiq cho‘tka ishlatish, yuqori abraziv pastalardan foydalanish, kislotali ichimliklar iste’moli va stomatologga kech murojaat qilish tish sezgirligi holatlarini kuchaytiradi.

Kalit so‘zlar: giperesteziya, tish qattiq to‘qimalari, dentin sezgirligi, dentin kanallari, emal, sement, desensibilizatsiya, remineralizatsiya, adgeziv himoya, nokarioz shikastlanish, terapevtik stomatologiya.

Kirish. Giperesteziyada tish qattiq to‘qimalarini davolash zamonaviy terapevtik stomatologiyaning eng ko‘p uchraydigan, lekin ko‘pincha yetarli darajada baholanmaydigan klinik muammolaridan biridir. Giperesteziya deganda tish qattiq to‘qimalarining tashqi ta’sirlarga nisbatan ortiqcha sezgir bo‘lib qolishi tushuniladi.

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Bunda bemor sovuq suv ichganda, issiq ovqat iste'mol qilganda, shirin yoki nordon mahsulotlar ta'sirida, tish yuvish vaqtida yoki hatto sovuq havo kirganda qisqa muddatli, o'tkir va sanchuvchi og'riqni sezadi. Bu og'riq odatda tez boshlanadi va ta'sirlovchi omil bartaraf etilgach qisqa vaqt ichida kamayadi. Aynan shu xususiyat giperesteziyani pulpit, periodontit yoki chuqur kariyes bilan bog'liq og'riqlardan farqlashda muhim diagnostik belgi hisoblanadi.

Tish qattiq to'qimalari giperesteziyasi mustaqil kasallik sifatida emas, balki emal, dentin, sement, milk chekkasi, emal-sement chegarasi, dentin kanallari va pulpa-dentin kompleksi o'rtasidagi biologik muvozanat buzilganda yuzaga keladigan klinik sindrom sifatida qaraladi. Uning asosida ko'pincha dentinning ochilishi va dentin kanallarining tashqi muhit bilan bevosita aloqaga kirishi yotadi. Sog'lom tishda emal dentinni himoya qiladi, sement esa ildiz yuzasini tashqi muhitdan ajratib turadi. Emal yupqalashganda, sement shikastlanganda, milk chekinganda yoki tish bo'yin qismida nokarioz nuqsonlar paydo bo'lganda dentin ochiladi. Ochiq dentin yuzasidagi kanallar suyuqlik harakatiga sezgir bo'lib, termik, kimyoviy va mexanik ta'sirlar nerv uchlarini qo'zg'atadi. Dentin sezgirligining gidrodinamik nazariyasiga ko'ra, dentin kanallaridagi suyuqlik harakati pulpa tomondagi nerv retseptorlarini qo'zg'atadi va qisqa muddatli o'tkir og'riq paydo qiladi. Zamonaviy sharhlarda dentin giperesteziyasi odatda ochilgan dentindan kelib chiqadigan, tashqi ta'sirlarga javoban yuzaga keladigan qisqa, o'tkir og'riq sifatida izohlanadi va uni boshqa stomatologik kasalliklar bilan tushuntirib bo'lmasligi kerakligi ta'kidlanadi[1].

Giperesteziyaning klinik ahamiyati faqat og'riq bilan cheklanmaydi. Tish sezgirligi bemorning ovqatlanish odatlariga, gigiyena sifatiga, ruhiy holatiga va stomatologik davolanishga munosabatiga ta'sir qiladi. Bemor sezgirlik sababli tishlarini yaxshi yuvmay qo'yishi, sovuq yoki nordon mahsulotlardan butunlay voz kechishi, ayrim hollarda og'riqdan qo'rqib stomatologik muolajalarni kechiktirishi mumkin. Natijada blyashka to'planishi, milk yallig'lanishi, kariyes xavfi va nokarioz shikastlanishlar chuqurlashishi kuzatiladi. Shu sababli giperesteziyani oddiy "tish sezgirligi" sifatida yengil baholash xato bo'ladi. U ko'pincha tish qattiq to'qimalari yemirilishi, ponasimon nuqson, eroziya, patologik yeyilish, bruksizm, periodontal retraksiya va noto'g'ri gigiyena texnikasining erta klinik belgisi sifatida namoyon bo'ladi.

O'zbekiston sharoitida giperesteziyada tish qattiq to'qimalarini davolash masalasi amaliy stomatologiya uchun alohida ahamiyatga ega. Aholi orasida qattiq tish cho'tkasidan foydalanish, tishlarni kuchli gorizontal harakatlar bilan yuvish, yuqori

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abraziv pastalarni nazoratsiz ishlatish, kislotali ichimliklar, energetik ichimliklar va gazlangan mahsulotlarni ko‘p iste’mol qilish holatlari uchraydi. Qishloq hududlarida stomatologga kech murojaat qilish, profilaktik ko‘riklarning yetarli emasligi va tish sezgirligida o‘z-o‘zini davolashga urinishlar muammoni kuchaytiradi. Shahar muhitida esa estetik stomatologik muolajalar, oqartirish vositalaridan noto‘g‘ri foydalanish va tez-tez kislotali mahsulot iste’moli tish qattiq to‘qimalari himoya qatlamining zaiflashishiga olib keladi. Jahon sog‘liqni saqlash tashkiloti og‘iz bo‘shlig‘i kasalliklarini keng tarqalgan va hayot sifatiga ta’sir qiluvchi global sog‘liq muammosi sifatida baholaydi. Bu holat tish qattiq to‘qimalarini erta himoyalash va sezgirlikni kompleks davolash zarurligini yanada oshiradi.

Giperesteziyada davolashning asosiy maqsadi og‘riqni vaqtincha bostirish emas, balki og‘riq paydo qilayotgan biologik mexanizmni aniqlash va uni barqaror nazorat qilishdir. Buning uchun shifokor bemordan aniq anamnez olishi, sezgirlikning qaysi ta’sirda paydo bo‘lishini baholashi, kariyes, pulpit, yoriq tish sindromi, periodontal kasalliklar, travmatik okklyuziya, restavratsiya chekkasidagi mikrobo‘shliq va emal eroziyasini differensial tashxis qilishi kerak. Davolash rejasi bosqichma-bosqich tuziladi: etiologik omil aniqlanadi, bemorning gigiyenik xatti-harakati tuzatiladi, dentin kanallari yopiladi, emal va dentinning mineral tarkibi mustahkamlanadi, zarur holatda adgeziv yoki restavratsion himoya qo‘llanadi, keyin esa dinamik kuzatuv olib boriladi.

Adabiyotlar tahlili. Tish qattiq to‘qimalari giperesteziyasi bo‘yicha ilmiy adabiyotlar tahlili shuni ko‘rsatadiki, ushbu muammo O‘zbekiston stomatologiya maktabida terapevtik stomatologiya, tish qattiq to‘qimalari kasalliklari, nokarioz shikastlanishlar, restavratsion stomatologiya va profilaktik stomatologiya bilan bog‘liq holda o‘rganilgan. O‘zbekistonlik tadqiqotchi-olimlardan J.A. Rizayev, O.K. Muslimov, D.M. Qosimova, O.Ye. Bekjanova, X.P. Kamilov, Z.Q. Xakimova, M.X. Sherboyeva, F.A. Qandova, R.I. Ashrabov, S.H. Yusupalixodjayeva, B. Xudanov, D. Qahharova, I. Hamidovlarning ilmiy va o‘quv-uslubiy ishlarida tish qattiq to‘qimalari kasalliklari, nokarioz shikastlanishlar, dentin sezgirligi, restavratsion materiallar, profilaktik yondashuvlar va og‘iz bo‘shlig‘i gigiyenasini takomillashtirish masalalari yoritilgan.

MDH hududida giperesteziya masalasi asosan tish qattiq to‘qimalari sezgirligining klinik kechishi, yoshga bog‘liq xususiyatlari, reminalizatsion terapiya samaradorligi, kasbiy omillar va periodontal kasalliklar bilan aloqasi nuqtayi nazaridan o‘rganilgan. MDH tadqiqotchilaridan A.K. Orlov, I.P. Kovalenko, A.K. Adjiyeva, O.L. Pixur, P.A. Leus, L.M. Tsepov, A.I. Nikolayev, I.M. Makeyeva, A.K. Iordanishvililarning ishlari mazkur yo‘nalishda muhim ilmiy manba bo‘lib xizmat

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qiladi. A.K. Orlov keksalar va qarilik yoshidagi bemorlarda tish qattiq to‘qimalari giperesteziyasining kechishi va davolash xususiyatlarini o‘rgangan. Uning tadqiqotida giperesteziyaning yoshga bog‘liq tarqalishi, klinik kechishi, tish qattiq to‘qimalarining morfologik va kimyoviy holati hamda davolash usullari samaradorligini baholash vazifalari qo‘yilgan[2].

Jahon ilmiy adabiyotlarida dentin giperesteziyasi ko‘p omilli etiologiyaga ega holat sifatida qaraladi. Jahon tadqiqotchilaridan X.X. Liu, R.K.Y. Tsoi, J.P. Matinlinna, J.P. Wong, V. Grover, D. Dionysopoulos, A. Cekici, A. Lussi, P.Y. Lin, Y.W. Cheng, C.Y. Chu, K.L. Chien, C.P. Lin, Y.K. Tularning ishlari dentin giperesteziyasining etiologiyasi, patogenezi, diagnostikasi, konservativ davolash usullari, klinik boshqaruvi va profilaktikasini yoritishda muhim ahamiyatga ega.

Asosiy qism. Giperesteziyada tish qattiq to‘qimalarini davolash aniq tashxisdan boshlanishi lozim. Bemor “tishim sezgir” deb murojaat qilganda shifokor bu shikoyatni umumiy belgi sifatida qabul qilishi, lekin darhol yakuniy tashxis qo‘ymasligi kerak. Tish sezgirligi kariyes, pulpit, yoriq tish, periodontal cho‘ntak, restavratsiya chekkasidagi nuqson, ortodontik harakatdan keyingi o‘zgarish, oqartirish muolajasi yoki nokarioz shikastlanish bilan bog‘liq bo‘lishi mumkin. Giperesteziya tashxisi faqat qisqa muddatli, o‘tkir, tashqi ta’sirlarga bog‘liq og‘riq mavjud bo‘lganda va og‘riqni boshqa patologiyalar bilan tushuntirib bo‘lmaganda asosli bo‘ladi.

Klinik tekshiruvda sezgirlikning lokal yoki tarqoq ekanligi aniqlanadi. Lokal giperesteziya bitta yoki bir nechta tishda, ko‘pincha bo‘yin qismida, ponasimon nuqson, eroziya, restavratsiya chekkasi ochilishi yoki periodontal retraksiya fonida kuzatiladi.

Tarqoq giperesteziya esa ko‘plab tishlarda bir vaqtda yuzaga kelib, umumiy emal yupqalashuvi, kislota ta’siri, sistemali metabolik holatlar, noto‘g‘ri gigiyena yoki oqartirish vositalaridan ortiqcha foydalanish bilan bog‘liq bo‘lishi mumkin. Og‘riq xarakteri, davomiyligi, ta’sirlovchi omil turi, kecha og‘riqlarining bor-yo‘qligi, spontan og‘riq mavjudligi va oldingi stomatologik muolajalar batafsil so‘raladi.

Giperesteziyaning eng ko‘p uchraydigan patogenetik mexanizmi dentin kanallarining ochilishi bilan bog‘liq. Dentin kanallari emaldan pulpagacha yo‘nalgan mikroskopik yo‘llar bo‘lib, ularda suyuqlik harakati mavjud. Tashqi muhit ta’siri dentin suyuqligining tez harakatlanishiga olib keladi. Bu harakat pulpa yaqinidagi nerv tolalarini qo‘zg‘atadi va bemor qisqa muddatli o‘tkir og‘riqni sezadi. Shuning uchun davolashning asosiy yo‘nalishlari dentin kanallarini yopish, dentin yuzasini

[2] Диссертация на тему «Особенности течения и лечение гиперестезии твердых тканей зубов у людей пожилого и старческого возраста», скачать бесплатно автореферат по специальности ВАК РФ 14.01.14 - Стоматология

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mustahkamlash, tashqi ta’sirni kamaytirish va pulpa-dentin kompleksini himoyalashdan iborat.

1-jadval.

Giperesteziyada tish qattiq to‘qimalarini baholash mezonlari

Klinik mezon	Baholash mazmuni	Davolashdagi ahamiyati
Og‘riq turi	Qisqa, o‘tkir, tashqi ta’sir bilan bog‘liq og‘riq	Giperesteziyani pulpitdan farqlashga yordam beradi
Ta’sirlovchi omil	Sovuq, issiq, shirin, nordon, mexanik ta’sir	Davolash usulini tanlashda muhim
Joylashuvi	Lokal yoki tarqoq sezgirlik	Sababni aniqlash va material tanlashga ta’sir qiladi
Dentin holati	Ochiq, sklerozlangan yoki namlikka sezgir dentin	Adgeziv himoya va germetizatsiya zarurligini belgilaydi
Milk holati	Retraksiya, yallig‘lanish, cho‘ntak mavjudligi	Periodontal davolash ehtiyojini ko‘rsatadi
Nokarioz shikastlanish	Eroziya, ponasimon nuqson, patologik yeyilish	Restavratsion yondashuvni asoslaydi
Okklyuzion yuklama	Bruksizm, travmatik kontaktlar	Splint, okklyuzion korreksiya yoki monitoring talab qiladi
Gigiyena odati	Qattiq cho‘tka, gorizontal harakat, abraziv pasta	Profilaktik suhbat va xatti-harakat korreksiyasi zarur

Davolash yondashuvi giperesteziyaning darajasi va sababiga qarab tanlanadi. Yengil darajada bemor faqat sovuq suv yoki havo ta’sirida qisqa muddatli noqulaylik sezadi. Bu holatda uy sharoitida desensibilizatsion tish pastalari, ftorli vositalar, yumshoq cho‘tka, to‘g‘ri tish yuvish texnikasi va kislotali mahsulotlarni cheklash yetarli bo‘lishi mumkin.

O‘rtacha darajada og‘riq kuchliroq bo‘ladi, tish yuvish va ovqatlanishga xalaqit beradi. Bunda klinik kabinetda ftorlak, remineralizatsion eritmalar, desensibilizatsion gel, dentin kanallarini yopuvchi preparatlar va adgeziv himoya qo‘llanadi. Og‘ir darajada sezgirlik doimiy qaytalanadi, dentin ochilgan bo‘ladi, ponasimon nuqson yoki eroziya chuqurlashadi. Bunday holatda konservativ davolash bilan birga restavratsion

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tiklash, shishaionomer sement yoki kompozit materiallar yordamida dentin yuzasini yopish talab qilinadi.

Giperesteziyada davolashning muhim yo‘nalishi remineralizatsion terapiyadir. Remineralizatsiya emal va dentinning mineral tarkibini mustahkamlash, mikroyoriqlar va demineralizatsiya zonalarini kamaytirish, dentin kanallarining sirtqi qismini qisman yopish va tish qattiq to‘qimalarining tashqi ta’sirlarga chidamliligini oshirishga qaratiladi. Amaliyotda ftorli laklar, kalsiy-fosfat tizimlari, gidroksiapatit saqlovchi vositalar, kaliy nitratli pastalar, arginin-kalsiy karbonat komplekslari va bioaktiv shisha asosidagi preparatlar qo‘llanadi. Bunda shifokor preparat tanlashda bemorning yoshi, kariyes xavfi, milk holati, emal eroziyasi, tish bo‘yin qismi ochilishi va umumiy gigiyena darajasini hisobga olishi kerak.

Dentin kanallarini germetizatsiya qilish giperesteziyada eng muhim klinik yondashuvlardan biridir. Ushbu muolaja dentin kanallarining tashqi muhit bilan aloqasini kamaytiradi, suyuqlik harakatini susaytiradi va nerv retseptorlarining qo‘zg‘alishini pasaytiradi. Klinik amaliyotda buning uchun ftorlaklar, oksalatlar, glutaraldegid saqlovchi desensitayzerlar, kalsiy-fosfat preparatlari, adgeziv tizimlar va shishaionomer asosidagi materiallardan foydalaniladi. Agar dentin ochilgan soha kichik bo‘lsa, desensibilizatsion vositalar yetarli natija berishi mumkin. Agar defekt chuqur bo‘lsa, dentin yuzasi mexanik himoyaga muhtoj bo‘lsa yoki sezgirlik qaytalansa, restavratsion yopish zarur bo‘ladi.

Adgeziv himoya giperesteziyada ayniqsa bo‘yin sohasidagi sezgirlikda muhim. Bo‘yin sohasida emal yupqa, dentin ko‘pincha sklerozlangan, namlik nazorati qiyin va gingival suyuqlik adgeziv bog‘lanishga salbiy ta’sir qiladi. Shu sababli klinik protokol qat’iy bajarilishi kerak: tish yuzasi izolyatsiya qilinadi, blyashka va pellicle tozalanadi, emal chekkasi ehtiyotkorlik bilan tayyorlanadi, dentin ortiqcha quritilmaydi, adgeziv faol ishqalab surtiladi va yetarli vaqt davomida polimerizatsiya qilinadi. Agar namlik nazorati yetarli bo‘lmasa, hatto sifatli adgeziv ham uzoq muddatli natija bermaydi.

Restavratsion davolash giperesteziyada hamma bemorga qo‘llanmaydi. Restavratsiya faqat dentin ochilgan, sezgirlik kuchli, defekt chuqur, estetik noqulaylik mavjud, tish yuzasi mexanik himoyaga muhtoj yoki konservativ terapiya samara bermagan holatda asosli hisoblanadi. Bunda kompozit materiallar, suyuq oqimli kompozitlar, shishaionomer sementlar va rezin-modifikatsiyalangan shishaionomer sementlar tanlanadi. Kompozitlar estetik zonada qulay, silliqlanishi yaxshi va adgeziv bog‘lanish imkoniyati yuqori. Shishaionomer sementlar esa ftor ajratishi, namlikka nisbatan nisbatan chidamliligi va dentin bilan kimyoviy bog‘lanishi sababli bo‘yin sohasi defektlarida foydali bo‘lishi mumkin. Rezin-modifikatsiyalangan shishaionomer sementlar estetik va biologik xususiyatlar o‘rtasida muvozanat yaratadi.

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2-jadval.

Giperesteziyada davolash usulini tanlash

Klinik holat	Tavsiya etiladigan davolash	Kutiladigan natija
Yengil sezgirlik, defektsiz emal	Desensibilizatsion pasta, ftorli vosita, yumshoq cho‘tka	Og‘riq kamayadi, gigiyena yaxshilanadi
Dentin ochilgan, lekin chuqur defekt yo‘q	Ftorlak, desensitayzer, remineralizatsion gel	Dentin kanallari qisman yopiladi
Bo‘yin sohasida sezgirlik va retraksiya	Periodontal baholash, desensibilizatsiya, adgeziv himoya	Sezgirlik va milk irritatsiyasi kamayadi
Ponasimon nuqson bilan kechuvchi giperesteziya	Okklyuzion nazorat, RMGIC yoki kompozit restavratsiya	Dentin himoyalanadi, defekt yopiladi
Eroziya bilan kechuvchi giperesteziya	Kislotali omilni bartaraf etish, remineralizatsiya, zarur bo‘lsa restavratsiya	Eroziya sekinlashadi, sezgirlik kamayadi
Bruksizm fonidagi giperesteziya	Okklyuzion tahlil, splint, restavratsion himoya	Mexanik zo‘riqish kamayadi
Davolashga javob bermaydigan kuchli sezgirlik	Differensial tashxis, rentgen, pulpa testi, endodontik baholash	Pulpit yoki boshqa patologiya istisno qilinadi

1-rasm. Giperesteziyada tish qattiq to‘qimalarini davolash algoritmi

Ushbu rasm giperesteziyada tish qattiq to‘qimalarini davolash jarayonining asosiy bosqichlarini aks ettiradi. Algoritmda bemorning shikoyatini aniqlash, differensial tashxis, etiologik omillarni bartaraf etish, dentin kanallarini germetizatsiya qilish, remineralizatsion terapiya, zarur holatda restavratsion himoya va dinamik kuzatuv bosqichlari izchil ko‘rsatiladi. Bunday yondashuv giperesteziyani faqat simptom sifatida emas, balki tish qattiq to‘qimalari va pulpa-dentin kompleksining himoya mexanizmlari buzilishi bilan bog‘liq klinik holat sifatida davolash imkonini beradi.

Tahlil va natijalar. Giperesteziyada tish qattiq to‘qimalarini davolash bo‘yicha mavjud ilmiy qarashlar va klinik yondashuvlarni umumlashtirish shuni ko‘rsatadiki, eng yaxshi natija kompleks boshqaruv orqali olinadi. Kompleks boshqaruv besh asosiy bosqichdan iborat: to‘g‘ri tashxis, etiologik nazorat, biologik himoya, individual

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davolash vositasini tanlash va dinamik monitoring. Agar ushbu bosqichlardan biri e’tibordan chetda qolsa, davolash natijasi vaqtincha bo‘lib qoladi.

Tashxis bosqichida eng muhim vazifa giperesteziyani boshqa og‘riq manbalaridan ajratishdir. Bemorning “sovuqda og‘riyapti” degan shikoyati har doim ham giperesteziya belgisi emas. Chuqur kariyes, pulpit, restavratsiya ostidagi mikrobo‘shliq, yoriq tish sindromi yoki periodontal muammo ham shunga o‘xshash og‘riq berishi mumkin. Shuning uchun sovuq testi, havo oqimi testi, zondlash, perkussiya, rentgenologik tekshiruv, restavratsiya chekkalarini baholash va milk holatini tekshirish klinik qarorning asosiy qismi bo‘lishi kerak.

Etiologik nazorat bosqichida bemorning odatlari tahlil qilinadi. Amaliyotda giperesteziyaning eng ko‘p uchraydigan omillari qattiq cho‘tka, noto‘g‘ri gorizontal yuvish harakati, abraziv pasta, kislotali mahsulotlar, milk retraksiyasi, bruksizm va oldingi restavratsiyalar chekkasidagi nuqsonlar bilan bog‘liq. Bu omillar bartaraf qilinmasa, desensibilizatsion vositalar qisqa muddatli natija beradi. Shu sababli har bir bemorga individual profilaktik suhbat o‘tkazilishi zarur. Unga yumshoq cho‘tka tanlash, tishlarni vertikal-aylanma harakatlar bilan yuvish, kislotali mahsulotdan keyin tishni darhol yuvmaslik, ftorli tish pastasidan foydalanish va muntazam ko‘rikka kelish tushuntiriladi.

Biologik himoya bosqichida dentin kanallarini yopish va tish qattiq to‘qimalarining mineral tarkibini mustahkamlash asosiy maqsad bo‘ladi. Yengil holatlarda uy sharoitida desensibilizatsion pastalar va ftorli vositalar yetarli bo‘lishi mumkin. O‘rtacha va og‘ir holatlarda klinik kabinetda ftorlak, desensibilizatsion preparat, remineralizatsion gel, adgeziv himoya yoki shishaionomer asosidagi yopish ishlatiladi. Davolashdan keyin bemor sezgirlik kamayganini sezishi mumkin, lekin bu natija barqaror bo‘lishi uchun kamida bir necha hafta davomida profilaktik rejimga amal qilish zarur.

Individual material tanlash bosqichida shifokor bitta universal yondashuvdan voz kechishi kerak. Har bir giperesteziya holati bir xil emas. Agar sezgirlik emal eroziyasi bilan bog‘liq bo‘lsa, avvalo kislota omili nazorat qilinadi. Agar ponasimon nuqson bo‘lsa, okklyuzion yuklama va cho‘tka texnikasi baholanadi. Agar periodontal retraksiya mavjud bo‘lsa, milk holati va ildiz yuzasi himoyasi muhim bo‘ladi. Agar sezgirlik restavratsiyadan keyin paydo bo‘lgan bo‘lsa, adgeziv protokol, polimerizatsiya, chekka moslashuv va okklyuzion kontaktlar qayta tekshiriladi. Shunday qilib, davolash vositasi klinik sababga qarab tanlanadi.

Dinamik monitoring giperesteziyada alohida ahamiyatga ega. Bemor bir marta davolanib ketganidan keyin kuzatuvsiz qolsa, sezgirlik qaytalanishi mumkin. 1 oy, 3 oy va 6 oylik nazoratlarda bemorning shikoyati, tish bo‘yin sohasi, restavratsiya

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chekkalari, emal yuzasi, milk retraksiyasi, blyashka darajasi va gigiyenik odatlari baholanadi. Zarur bo‘lsa, desensibilizatsiya takrorlanadi yoki restavratsion himoya kuchaytiriladi. Bu yondashuv O‘zbekiston stomatologik amaliyotida ham muhim, chunki ko‘plab bemorlar og‘riq kamaygach davolashni tugadi deb hisoblaydi, aslida esa giperesteziyada barqaror natija muntazam profilaktika va nazorat orqali ta’minlanadi.

3-jadval.

Giperesteziyada klinik muammo va amaliy yechimlar

Muammo	**Klinik xavf**	**Amaliy yechim**
Bemor sezgirlikni kech aytadi	Dentin ochilishi chuqurlashadi	Profilaktik ko‘rikda havo testi va zondlash
Qattiq cho‘tka ishlatiladi	Bo‘yin sohasi shikastlanadi	Yumshoq cho‘tka va to‘g‘ri texnika o‘rgatish
Kislotali mahsulotlar ko‘p iste’mol qilinadi	Emal eroziyasi va dentin ochilishi	Parhez bo‘yicha individual tavsiya
Bruksizm mavjud	Restavratsiya va dentin himoyasi buziladi	Okklyuzion tahlil va splint tavsiyasi
Namlik nazorati sust	Adgeziv himoya tez buziladi	Izolyatsiya, retraksion ip, klinik protokol
Faqat simptomatik pasta beriladi	Natija vaqtincha bo‘ladi	Kompleks davolash va monitoring
Restavratsiya sababsiz qo‘yiladi	Material tez chekka ochadi	Avval etiologik sababni aniqlash

Maqola doirasidagi tahlil shuni ko‘rsatadiki, giperesteziyada tish qattiq to‘qimalarini davolashning eng zaif joyi ko‘pincha tashxis emas, balki sababni bartaraf etmasdan simptomni bostirishga urinishdir. Desensibilizatsion pasta, ftorlak yoki restavratsiya samarali bo‘lishi mumkin, lekin ular noto‘g‘ri gigiyena, kislota ta’siri, milk retraksiyasi yoki okklyuzion stress davom etayotgan sharoitda uzoq muddatli natija bermaydi. Shuning uchun giperesteziyada klinik muvaffaqiyat bemor bilan shifokor o‘rtasidagi hamkorlikka bog‘liq. Shifokor to‘g‘ri tashxis qo‘yadi, davolash vositasini tanlaydi va tish to‘qimasini himoya qiladi; bemor esa gigiyena, ovqatlanish va profilaktik nazorat bo‘yicha ko‘rsatmalarga amal qiladi.

Xulosa. Giperesteziyada tish qattiq to‘qimalarini davolash terapevtik stomatologiyada keng uchraydigan, ammo chuqur klinik tahlil talab qiladigan

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masaladir. Ushbu holatning asosida ko‘pincha dentinning ochilishi, dentin kanallaridagi suyuqlik harakati, emal va sement himoya qatlamining zaiflashishi, milk retraksiyasi, nokarioz shikastlanishlar va tashqi ta’sirlarga sezgirlikning ortishi yotadi. Davolash jarayonida faqat og‘riqni kamaytirish bilan cheklanish yetarli emas. Etiologik omilni aniqlash, tish yuvish texnikasini tuzatish, kislotali mahsulotlar ta’sirini kamaytirish, dentin kanallarini germetizatsiya qilish, remineralizatsion terapiya o‘tkazish, zarur holatda adgeziv yoki restavratsion himoya qo‘llash va bemorni dinamik kuzatish asosiy klinik mezonlar bo‘lishi lozim. O‘zbekiston sharoitida giperesteziyani samarali davolash uchun stomatologik profilaktika madaniyatini kuchaytirish, bemorlarga to‘g‘ri gigiyena ko‘nikmalarini o‘rgatish, shifokorlar amaliyotida minimal invaziv yondashuvni keng qo‘llash va tish qattiq to‘qimalarini erta himoyalash zarur. Eng maqbul yondashuv og‘riqni vaqtincha bosish emas, balki tish qattiq to‘qimasining biologik barqarorligini tiklash, dentin-pulpa kompleksini saqlash va bemorning og‘iz bo‘shlig‘i salomatligini uzoq muddatli nazorat qilishdir.

FOYDALANILGAN ADABIYOTLAR RO‘YXATI

1. Rizayev J.A., Muslimov O.M. Tishlarning nokarioz kasalliklari. - Andijon: Andijon davlat tibbiyot instituti elektron kutubxonasi, 2022.
2. Qosimova D.M. Tishlarning nokarioz kasalliklarida ponasimon nuqson va eroziya kompleks davolashda dentin kanallarini germetizatsiyalovchi likviddan foydalanish samaradorligi: magistrlik dissertatsiyasi. - Samarqand: Samarqand davlat tibbiyot universiteti, 2023. - 93 b.
3. Bekjanova O.Ye. Klinik restavratsion stomatologiya: o‘quv qo‘llanma. - Toshkent: Yoshlar nashriyot uyi, 2020. - 264 b.
4. Kamilov X.P. Fakultet terapevtik stomatologiya: darslik. - Toshkent, 2017. - 754 b.
5. Xakimova Z.Q., Sherboyeva M.X. Tish qattiq to‘qimalari kasalliklari: o‘quv qo‘llanma. - Toshkent, 2023.
6. Qandova F.A., Ashrabov R.I. Tish qattiq to‘qimasi kasalliklari // International Journal of Scientific Researchers. - 2024. - Vol. 5, Issue 2. - B. 1000–1001.

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SURXONDARYO SUV HAVZALARIDAGI, XONDIZA POLIMETALL RUDA KONI CHIQINDI OQOVA SUVLARI TARKIBIDAGI Ni(II) VA Co(II) IONLARINI SPEKTROFOTOMETRIK USULDA ANIQLASH

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Annotatsiya: Ushbu maqolada Surxondaryo suv havzalari hamda Xondiza polimetall ruda koni chiqindi oqova suvlari tarkibida uchrashi mumkin bo‘lgan Ni(II) va Co(II) ionlarini spektrofotometrik usulda aniqlash masalasi ilmiy-amaliy jihatdan tahlil qilindi. Xondiza koni polimetall xomashyo bazasi sifatida rux, qo‘rg‘oshin, mis, kumush va kadmiy kabi komponentlar bilan tavsiflanadi. OKMK ma’lumotlarida konda 17 mln tonna polimetall ruda zaxirasi mavjudligi, uning tarkibida 500 ming tonna qo‘rg‘oshin, 1 mln tonna rux, 130 ming tonna mis, 1500 tonna kumush va 6000 tonna kadmiy borligi qayd etilgan. Bunday geokimyoviy muhitda suv resurslarining og‘ir metall ionlari bilan ifloslanish ehtimoli doimiy monitoringni talab qiladi. Tadqiqotda Ni(II) ionini dimetilglioksim bilan, Co(II) ionini esa nitrozo-R tuzi asosidagi rangli kompleks hosil qilish reaksiyasi orqali aniqlash yondashuvi asoslandi. Spektrofotometrik tahlilning mazmuni, analitik bosqichlari, reagent tanlash mezonlari, optimal pH muhiti, kalibrlash grafigi, aniqlash chegarasi, takroriylik va amaliy qo‘llanish imkoniyatlari ko‘rib chiqildi. Maqolada suv namunalarini olish, konservatsiya qilish, filtrlash, kompleks hosil qilish va optik zichlikni o‘lchash tartibi ilmiy asosda bayon etildi.

Kalit so‘zlar: Surxondaryo suv havzalari, Xondiza polimetall ruda koni, chiqindi oqova suv, Ni(II), Co(II), spektrofotometriya, og‘ir metallar, dimetilglioksim, nitrozo-R tuzi, ekologik monitoring, kompleks birikma.

Kirish

Surxondaryo viloyatining tog‘li va tog‘oldi hududlari tabiiy resurslarga boyligi bilan ajralib turadi. Bu boyliklar hudud iqtisodiyoti uchun muhim ahamiyatga ega bo‘lsa-da, ularni qazib olish va qayta ishlash jarayonlari suv resurslari holatiga bevosita ta’sir ko‘rsatadi. Xondiza polimetall ruda koni ana shunday sanoat obyektlaridan biri bo‘lib, uning faoliyati rangli metallurgiya, ruda boyitish va texnologik oqova suvlar bilan bog‘liq ekologik masalalarni yuzaga chiqaradi. O‘zbekiston Respublikasi Vazirlar Mahkamasining Xondiza polimetall konini o‘zlashtirishga oid qarorida ushbu

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kon Surxondaryo viloyatidagi muhim polimetall obyekt sifatida belgilangan va rangli metallar ishlab chiqarishni oshirish bilan bog‘liq strategik ahamiyatga ega ekani ko‘rsatilgan.

Suv havzalarida og‘ir metall ionlarining to‘planishi oddiy fizik ifloslanishdan farq qiladi. Organik ifloslantiruvchilar ma’lum sharoitda parchalanishi mumkin, og‘ir metall ionlari esa muhitda uzoq muddat saqlanadi, cho‘kindilarga o‘tadi, gidrobiontlar tanasida yig‘iladi va oziq zanjiri orqali yuqori trofik pog‘onalarga ko‘tariladi. Ni(II) va Co(II) ionlari mikroelement sifatida ayrim biologik jarayonlarda qatnashsa-da, ularning ortiqcha miqdori suv ekotizimlari va inson salomatligi uchun xavf tug‘diradi. Nikel birikmalari yuqori konsentratsiyada allergik va toksik ta’sir ko‘rsatishi, kobalt birikmalari esa ion shakli, konsentratsiyasi va ta’sir davomiyligiga qarab biologik tizimlarda noxush o‘zgarishlarni keltirib chiqarishi mumkin.

O‘zbekistonning amaldagi sanitariya me’yorlarida yer usti va yer osti suv obyektlaridagi organoleptik hamda sanitariya-toksikologik ko‘rsatkichlar ruxsat etilgan maksimal konsentratsiyadan oshmasligi kerakligi belgilangan. Suv obyektlaridagi kimyoviy zararli moddalar miqdori ruxsat etilgan konsentratsiyaga nisbatan baholanadi, bir nechta xavfli moddalar mavjud bo‘lsa, ularning yig‘indi ta’siri ham hisobga olinadi. Bu talab Xondiza koni ta’sir zonasidagi oqova suvlar uchun ayniqsa muhim, chunki polimetall ruda tarkibi bir vaqtning o‘zida bir nechta metall ionlari migratsiyasiga sharoit yaratadi.

Spektrofotometrik tahlil analitik kimyoda rangli komplekslar hosil bo‘lishiga asoslangan sezgir usullardan biridir. Bu usulning mohiyati aniqlanayotgan ionning maxsus organik reagent bilan rangli kompleks hosil qilishi va hosil bo‘lgan kompleksning muayyan to‘lqin uzunligida nur yutishini o‘lchashdan iborat. Optik zichlik bilan konsentratsiya o‘rtasidagi bog‘lanish Beer–Lambert qonuni orqali ifodalanadi. Suv namunalarida Ni(II) va Co(II) ionlarini aniqlashda ushbu yondashuvning afzalligi shundaki, u qimmatbaho atom-absorbsion yoki induktiv bog‘langan plazmali uskunalarga nisbatan oddiyroq, tezroq va mahalliy laboratoriyalar uchun qulayroqdir. Shu bilan birga, O‘zMSt 133:2024 hujjatida suv sifati bo‘yicha kobalt, nikel, mis, rux, kadmiy va qo‘rg‘oshin miqdorini aniqlashda spektrometrik yondashuvlar, jumladan atomik yutilish spektrometrik usullari me’yoriy tahlil tizimida qo‘llanishi ko‘rsatilgan.

Adabiyotlar tahlili va metodologiya

Xondiza polimetall ruda koni, uning mineral tarkibi, texnologik qayta ishlanishi va kon-boyitish jarayonlari bilan bog‘liq ilmiy izlanishlar O‘zbekiston tadqiqotchilari tomonidan muayyan darajada o‘rganilgan. **Sh.X. Rajabov, A.S. Hasanov, K.J. Xakimov, F.A. Xolnazarov, S.Z. Abdisoatov** ishlarida Xondiza koni polimetall

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rudalarining moddiy tarkibi, rux, mis va qo‘rg‘oshin minerallarining uchrash shakllari, flotatsion boyitish jarayonining samaradorligi hamda metall konsentratlarini ajratib olish texnologiyasini takomillashtirish masalalari yoritilgan.

O‘zbekiston olimlaridan **I.K. Umarova, G.Q. Salijanova, S.I. Avinjanova** tomonidan Xondiza koni polimetall rudalarini boyitish bilan bog‘liq tadqiqotlarda ruda tarkibidagi rangli metall komponentlarini ajratib olishning texnologik jihatlari tahlil qilingan. Bu izlanishlar kon xomashyosining murakkab tarkibli ekanini, boyitish jarayonida bir vaqtning o‘zida bir necha metall komponentlari texnologik muhitga jalb qilinishini ko‘rsatadi.

Og‘ir metallarni atrof-muhit obyektlarida aniqlash, oqova suvlar tarkibidan ajratish va ularning ekologik xavfini baholash bo‘yicha O‘zbekiston tadqiqotchilarining ishlari ham mazkur mavzuning nazariy-metodik asosini tashkil qiladi. **M.B. Xolboyeva, M.J. Abduvaliyeva, O.P. Xaitmurodova** sanoat oqova suvlarini og‘ir metallardan tozalashning fizik-kimyoviy usullarini tahlil qilib, og‘ir metall ionlari texnologik oqova suvlar tarkibida barqaror saqlanishi, ularning oddiy mexanik tozalash orqali to‘liq ajralmasligi va bunday ifloslantiruvchilarni kamaytirish uchun sorbsiya, koagulyatsiya, ion-almashinish, cho‘ktirish hamda kompleks hosil qilishga asoslangan usullarni qo‘llash zarurligini ko‘rsatgan. **Y.O. Ergasheva, H.S. Beknazarov, F.O. Ergasheva** ishlarida oqova suvlarni tozalashda kationitlar va sorbsion materiallardan foydalanish masalasi ko‘rib chiqilgan. Ushbu tadqiqotlar Ni(II) va Co(II) ionlarini aniqlashdan keyingi amaliy bosqich, ya’ni ifloslangan suvlarni zararsizlantirish va metall ionlarini ajratib olish texnologiyalarini asoslashda muhim ilmiy tayanch bo‘la oladi.

MDH olimlari tadqiqotlarida og‘ir metallarni suvli muhitlarda aniqlash, sanoat oqova suvlarini tahlil qilish va fotometrik usullarni qo‘llash masalalari ancha keng yoritilgan. **Yu.Yu. Lurye** sanoat oqova suvlarining analitik kimyosi bo‘yicha olib borgan ishlarida texnologik suvlar tarkibidagi metall ionlarini aniqlashda namuna tayyorlash, konservatsiya qilish, begona komponentlar ta’sirini kamaytirish va natijalarni me’yoriy ko‘rsatkichlar bilan solishtirish zarurligini asoslab bergan.

M.I. Bulatov va I.P. Kalinkin fotometrik analiz bo‘yicha olib borgan tadqiqotlarida rangli komplekslar hosil qilishga asoslangan usullarning nazariy va amaliy jihatlarini yoritgan. Ularning ishlarida fotometrik usullarning sezgirligi, optik zichlik va konsentratsiya o‘rtasidagi bog‘liqlik, kalibrlash grafigini tuzish, blank tajriba, reagent ortiqchaligi, muhit kislotaliligi va eritma barqarorligi kabi masalalar chuqur tahlil qilingan.

Yu.A. Zolotov, V.M. Ivanov, V.G. Amelin kabi MDH analitik kimyo maktabi vakillari ishlarida metall ionlarini aniqlashda kompleks hosil qiluvchi organik

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reagentlarning tanlovchanligi, sezgirligi va amaliy qo‘llanish imkoniyatlari keng tahlil qilingan. Ularning tadqiqotlarida analitik reaksiyaning asosiy qiymati faqat rang hosil qilishda emas, balki reaksiyaning selektivligi, barqarorligi va takroriyligida ekani ko‘rsatiladi.

Jahon olimlari tadqiqotlarida suv muhitida og‘ir metall ionlarini aniqlash uchun spektrofotometrik, atom-absorbsion, induktiv bog‘langan plazmali, voltamperometrik va xromatografik usullar keng qo‘llanilgan. **Z. Marczenko va M. Balcerzak** metall ionlarini ajratish, konsentrlash va spektrofotometrik aniqlash bo‘yicha olib borgan ishlarida organik reagentlar yordamida rangli komplekslar hosil qilish, begona ionlarni maskalash va past konsentratsiyali metall ionlarini aniqlash masalalarini chuqur yoritgan. Ularning tadqiqotlari Ni(II) va Co(II) ionlarini aniqlashda reagent tanlash, kompleks barqarorligini baholash va tahlilning sezgirligini oshirish bo‘yicha muhim nazariy asos beradi.

D.A. Skoog, D.M. West, F.J. Holler, S.R. Crouch tomonidan ishlab chiqilgan instrumental analizga oid ilmiy yondashuvlarda spektrofotometriya optik analizning asosiy usullaridan biri sifatida talqin qilinadi. Ushbu olimlar Beer–Lambert qonuni, yutilish spektri, molyar yutilish koeffitsiyenti, kalibrlash egri chizig‘i, aniqlash chegarasi va instrumental xatoliklarni baholash tamoyillarini tizimli asoslab bergan.

D.C. Harris analitik kimyo bo‘yicha tadqiqotlarida o‘lchash natijalarini statistik baholash, ishonchlilik oralig‘i, standart og‘ish, aniqlash chegarasi va validatsiya masalalariga alohida e’tibor qaratadi. Uning yondashuvi mazkur tadqiqot uchun amaliy ahamiyatga ega, chunki suv namunalarida Ni(II) va Co(II) ionlarini aniqlashda bitta o‘lchov yetarli emas.

Mazkur **tadqiqot metodologiyasi** ekologik-analitik monitoring tamoyiliga asoslanadi. Tadqiqot obyekti sifatida Surxondaryo suv havzalari va Xondiza polimetall ruda koni chiqindi oqova suvlari tanlanadi. Namuna olish jarayoni kon ta’sir zonasini to‘g‘ri aks ettirishi kerak. Eng muhim nuqtalar texnologik oqova suv chiqish joyi, oqova suv tabiiy suv yo‘liga qo‘shilishidan oldingi nazorat nuqtasi, aralashishdan keyingi pastki oqim qismi va kon ta’siridan nisbatan uzoq fon nuqtadan iborat bo‘lishi maqsadga muvofiq. Bunday sxema metall ionlarining antropogen manbadan tabiiy suv tizimiga o‘tish dinamikasini ko‘rsatadi.

Namunalar oldindan yuvilgan polietilen idishlarga olinadi. Har bir idish distillangan suv bilan, keyin esa tahlil qilinadigan suv namunasi bilan chayiladi. Namuna olingan joyda pH, harorat, elektr o‘tkazuvchanlik, loyqalik va suvning tashqi belgilarini qayd etish lozim. Og‘ir metall ionlari idish devoriga adsorbsiyalanib qolmasligi yoki gidroksid holida cho‘kmasligi uchun namuna nitrat kislota yordamida pH 2 atrofida konservatsiya qilinadi. Laboratoriyaga olib kelingan namuna filtr qog‘ozi

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yoki membranali filtr orqali suzib olinadi. Zarur hollarda organik modda va kolloid zarrachalarni parchalash uchun namuna yumshoq mineralizatsiya qilinadi.

Ni(II) ionini aniqlashda **dimetilglioksim** bilan kompleks hosil qilish reaksiyasi asos qilib olinadi. Nikel ionlari kuchsiz ishqoriy muhitda dimetilglioksim bilan barqaror rangli kompleks hosil qiladi. Tahlil uchun standart nikel eritmalari tayyorlanadi va ularga bir xil hajmda reagent qo‘shiladi. Eritma pH qiymati ammoniy buferi yoki boshqa mos bufer tizimi yordamida tartibga solinadi. Hosil bo‘lgan kompleksning optik zichligi ko‘rinadigan sohada spektrofotometrda o‘lchanadi. Har bir laboratoriyada aniq maksimal yutilish to‘lqin uzunligi reagent konsentratsiyasi, erituvchi, pH va asbob turiga qarab qayta tekshirilishi kerak.

Co(II) ionini aniqlash uchun **nitrozo-R tuzi** asosidagi kompleks hosil qilish reaksiyasi tanlanadi. Kobalt ionlari bunday xromogen reagentlar bilan barqaror rangli kompleks hosil qiladi. Co(II) tahlilida pH muhiti juda muhim, chunki kobaltning komplekslanish darajasi ham, begona ionlarning ta’siri ham muhit kislotaliligiga bog‘liq. Co(II) ni spektrofotometrik aniqlashda reaksiya vaqti, reagent ortiqchaligi, eritmadagi temir va mis ionlari ta’siri, fon yutilishi hamda suv matritsasining umumiy mineralizatsiyasi alohida nazorat qilinadi.

Kalibrlash grafigi standart eritmalar asosida tuziladi. Standart eritmalar konsentratsiyasi tahlil qilinadigan suv namunalarida kutiladigan miqdorga mos tanlanadi. Ni(II) uchun 0,02–0,60 mg/l, Co(II) uchun 0,01–0,40 mg/l oralig‘i ekologik monitoring uchun maqbul boshlang‘ich diapazon bo‘lishi mumkin. Har bir standart eritmaning optik zichligi kamida uch marta o‘lchanadi. Olingan qiymatlar asosida regressiya tenglamasi tuziladi.

$$A = aC + b$$

Bu yerda **A** optik zichlikni, **C** metall ionining konsentratsiyasini, **a** kalibrlash grafigining og‘ish koeffitsiyentini, **b** esa blank eritma ta’sirini ifodalaydi. Namuna konsentratsiyasi quyidagi ifoda orqali hisoblanadi.

$$C = (A - b) / a$$

Agar namuna oldindan suyultirilgan bo‘lsa, yakuniy qiymat suyultirish koeffitsiyentiga ko‘paytiriladi.

$$C_{yakuniy} = C_{o‘lchangan} \cdot K$$

Usulning ishonchliligini baholash uchun aniqlash chegarasi va miqdoriy aniqlash chegarasi hisoblanadi.

$$LOD = 3\sigma / S$$

$$LOQ = 10\sigma / S$$

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Bu yerda **σ** blank eritma o‘lchovlari bo‘yicha standart og‘ishni, **S** esa kalibrlash grafigining og‘ish koeffitsiyentini bildiradi. Takroriylik nisbiy standart og‘ish orqali baholanadi.

RSD% = (SD / X̄) · 100

Bunday statistik ishlov natijani oddiy sonlar yig‘indisi emas, balki ilmiy dalilga aylantiradi. Aynan shu jihat maqolaning kuchli yoki zaifligini belgilaydi.

Tahlil va natijalar

Spektrofotometrik aniqlashning asosiy mazmuni metall ionining rangli kompleksga aylanishi va hosil bo‘lgan analitik signalning optik zichlik orqali qayd etilishidir. Ni(II) va Co(II) ionlari o‘zining elektron tuzilishi sababli xromogen reagentlar bilan kompleks hosil qilishga moyil. Nikelning dimetilglioksim bilan reaksiyasi analitik kimyoda klassik selektiv reaksiyalardan biri hisoblanadi. Kobalt esa nitrozo guruhli organik reagentlar bilan intensiv rangli komplekslar hosil qiladi. Bu ikki ionni suvda aniqlashda eng muhim muammo ularning mutlaq miqdori emas, balki polimetall matritsa tarkibidagi boshqa ionlar fonida aniq o‘lchanishidir.

Xondiza koni polimetall ruda tarkibi bilan tavsiflanadi. OKMK ma’lumotlarida kon zaxiralari tarkibida qo‘rg‘oshin, rux, mis, kumush va kadmiy borligi ko‘rsatilgan. Bu holat oqova suvlar tarkibida bir vaqtning o‘zida bir nechta metall ionlari bo‘lishi mumkinligini bildiradi. Shuning uchun Ni(II) va Co(II) ni aniqlash faqat reagent qo‘shib rang hosil qilish bilan tugamaydi. Tahlilning har bir bosqichi begona ionlarning ta’sirini kamaytirishga qaratilishi kerak. Temir ionlari gidrolizlanib loyqalik hosil qilishi, mis ionlari ayrim organik reagentlar bilan raqobatli komplekslar berishi, rux va qo‘rg‘oshin ionlari esa yuqori konsentratsiyada fon yutilishini o‘zgartirishi mumkin.

Tadqiqot modeli bo‘yicha Ni(II) va Co(II) ionlarini aniqlash uchun quyidagi analitik sharoitlar maqbul deb qabul qilindi.

Aniqlanadigan ion	**Reagent**	**Optimal pH**	**Tavsiya etilgan yutilish sohasi, nm**	**Kalibrlash oralig‘i, mg/l**
Ni(II)	Dimetilglioksim	8,5–9,5	440–470	0,02–0,60
Co(II)	Nitrozo-R tuzi	5,0–6,0	500–530	0,01–0,40

Ushbu jadval metodik yo‘naltiruvchi sifatida berildi. Yakuniy maqola uchun real laboratoriyada aniq λmax qiymati spektral skanerlash orqali topilishi kerak. Agar asbobda spektral skanerlash funksiyasi bo‘lmasa, adabiyotlarda berilgan diapazondan boshlab eng yuqori optik zichlik beruvchi to‘lqin uzunligi tajriba yo‘li bilan tanlanadi.

Namunaviy kalibrlash tenglamalari quyidagicha bo‘lishi mumkin.

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Ion	Kalibrlash tenglamasi	R^2	LOD, mg/l	LOQ, mg/l	RSD, %
Ni(II)	A = 0,186C + 0,011	0,998	0,006	0,020	2,8
Co(II)	A = 0,154C + 0,009	0,997	0,004	0,013	3,1

Bu qiymatlar maqola uchun metodik model sifatida ishlatiladi. Agar real tajribada R^2 qiymati 0,995 dan past chiqsa, kalibrlash oralig‘i noto‘g‘ri tanlangan, reagent miqdori yetarli emas, pH barqaror emas yoki blank eritma noto‘g‘ri tayyorlangan bo‘lishi mumkin. Kuchli maqola yozish uchun har bir qiymat uch yoki besh takroriy o‘lchov asosida berilishi kerak. Bitta o‘lchov ilmiy maqola uchun yetarli emas.

Xondiza koni ta’sir zonasidagi suv namunalarini baholash quyidagi model orqali ko‘rsatilishi mumkin.

Namuna kodi	Namuna tavsifi	Ni(II), mg/l	Co(II), mg/l	Tahliliy talqin
N-1	Kon hududiga yaqin oqova suv chiqish nuqtasi	0,084 ± 0,004	0,037 ± 0,002	Antropogen ta’sir kuchli, metall migratsiyasi ehtimoli yuqori
N-2	Oqova suv tabiiy suvga qo‘shilishidan oldingi nazorat nuqtasi	0,026 ± 0,002	0,011 ± 0,001	Fon qiymatga yaqin, lekin doimiy kuzatuv zarur
N-3	Aralashishdan keyingi pastki oqim nuqtasi	0,049 ± 0,003	0,021 ± 0,002	Suyulish, sorbsiya va cho‘kindi bilan bog‘lanish jarayoni kuzatiladi
N-4	Kon ta’siridan uzoq fon nuqta	0,018 ± 0,001	0,008 ± 0,001	Tabiiy fon darajasi sifatida baholanishi mumkin

Bu jadvaldagi sonlar real laboratoriya natijalari bo‘lmasa, yakuniy dalil sifatida ishlatilmasligi kerak. U maqolaning eksperimental natijalar qismi qanday tuzilishini ko‘rsatadigan ilmiy modeldir. Haqiqiy tahlilda N-1 nuqtasida Ni(II) va Co(II) miqdorining yuqoriroq chiqishi kon oqova suvlari ta’siri bilan izohlanishi mumkin. N-3 nuqtasida qiymatlarning pasayishi suv hajmi bilan suyulish, metall ionlarining gidroksidlar yoki karbonatlar ko‘rinishida qisman cho‘kishi, tub cho‘kindilar bilan sorbsiyalanishi yoki organik moddalar bilan komplekslanishi natijasida yuz beradi.

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Natijalarni me’yoriy jihatdan talqin qilishda ehtiyotkorlik kerak. O‘zbekiston sanitariya qoidalarida suv obyektlarining sifatini baholashda zararli moddalar miqdori ruxsat etilgan konsentratsiyadan oshmasligi, bir nechta xavfli modda mavjud bo‘lsa, ularning umumiy ta’siri ham hisobga olinishi belgilangan. Shu sababli Ni(II) yoki Co(II) alohida past ko‘ringan taqdirda ham, ular boshqa metall ionlari bilan birga umumiy toksik yuklama hosil qilishi mumkin. Bu masala ayniqsa Xondiza kabi polimetall ruda hududlari uchun muhim.

Qo‘shilgan-topilgan usuli natijani ishonchli qilishda asosiy nazorat mexanizmi hisoblanadi. Bunda real suv namunasiga ma’lum miqdorda standart Ni(II) yoki Co(II) eritmasi qo‘shiladi va qayta o‘lchanadi. Agar topilish darajasi 95–105 foiz oralig‘ida bo‘lsa, usul real suv matritsasida qoniqarli ishlaydi deb baholanadi.

Ion	**Namuna**	**Qo‘shilgan miqdor, mg/l**	**Topilgan miqdor, mg/l**	**Topilish darajasi, %**
Ni(II)	N-2	0,050	0,048	96,0
Ni(II)	N-3	0,050	0,052	104,0
Co(II)	N-2	0,030	0,029	96,7
Co(II)	N-3	0,030	0,031	103,3

Bunday yondashuv tahlilning aniqligini oshiradi. Aks holda maqola faqat nazariy tavsifga o‘xshab qoladi. Ilmiy jihatdan kuchli maqolada kalibrlash chizig‘i, blank tajriba, LOD, LOQ, RSD, qo‘shilgan-topilgan tajribasi va begona ionlar ta’siri alohida ko‘rsatilishi shart.

Muhokama

Surxondaryo suv havzalarida Ni(II) va Co(II) ionlarini spektrofotometrik usulda aniqlashning amaliy ahamiyati uchta darajada ko‘rinadi. Laboratoriya darajasida bu usul talabalarga ekologik analitik kimyoning asosiy qonuniyatlarini o‘rgatadi. Mahalliy monitoring darajasida u tezkor nazorat vositasi bo‘lib xizmat qiladi. Sanoat-ekologik boshqaruv darajasida esa oqova suv tarkibidagi metall ionlari miqdorini muntazam kuzatish orqali texnologik jarayon va tozalash inshootlari samaradorligini baholash imkonini beradi.

Usulning eng kuchli tomoni uning qulayligidir. Spektrofotometr, standart eritmalar, pH-metr, reagentlar va oddiy laboratoriya idishlari mavjud bo‘lsa, Ni(II) va Co(II) ionlari bo‘yicha dastlabki monitoringni amalga oshirish mumkin. Bu ayniqsa hududiy universitetlar, ekologiya laboratoriyalari va ishlab chiqarish korxonalarining ichki nazorat bo‘limlari uchun muhim. O‘zbek tadqiqotchilarining og‘ir metallarni sorbsion, lyuminessent, ion-almashinish va oqova suvlarni tozalash yondashuvlari

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bo‘yicha ishlari shuni ko‘rsatadiki, mamlakatda sanoat oqova suvlarining metall ionlari bilan ifloslanishi mavzusi ilmiy izlanishlar doirasiga faol kirib kelmoqda.

Usulning zaif tomoni selektivlik bilan bog‘liq. Xondiza koni oddiy bitta metall manbai emas, balki polimetall tizimdir. Bunday tizimda suvga tushadigan ionlar soni ko‘p bo‘ladi. Ni(II) yoki Co(II) uchun tanlangan reagent boshqa ionlar bilan ham reaksiyaga kirishishi mumkin. Masalan, Cu(II) rangli komplekslar hosil qilishga juda moyil, Fe(III) gidroliz natijasida loyqalik keltirib chiqaradi, Zn(II) va Pb(II) esa yuqori konsentratsiyada matritsa ta’sirini kuchaytiradi. Shuning uchun spektrofotometrik tahlilni kuchli qilish uchun oddiy o‘lchov yetarli emas. Namuna tayyorlash, pH nazorati, maskalovchi reagentlar, blank tajriba va standart qo‘shish usuli majburiy bo‘lishi kerak.

Rivojlantirish yo‘llari aniq. Ni(II) va Co(II) ionlarini aniqlashda oddiy fotometrik o‘lchovdan tashqari differensial spektrofotometriya, hosilaviy spektrofotometriya va ko‘p komponentli kalibrlash usullarini qo‘llash mumkin. Agar laboratoriyada atom-absorbsion spektrometr yoki ICP-OES mavjud bo‘lsa, spektrofotometrik natijalarni mustaqil usul bilan solishtirish zarur. O‘zMSt 133:2024 hujjatida kobalt, nikel, mis, rux, kadmiy va qo‘rg‘oshin miqdorini atomik yutilish spektrometrik usullari bilan aniqlashga oid standartlar keltirilgani bunday solishtirish uchun me’yoriy asos bo‘la oladi.

Amaliy qo‘llanishda eng to‘g‘ri yondashuv ikki bosqichli monitoringdir. Spektrofotometriya birinchi bosqichda tezkor skrining vazifasini bajaradi. Shubhali yoki yuqori qiymat qayd etilgan namunalar ikkinchi bosqichda AAS yoki ICP-OES orqali tekshiriladi. Bu yondashuv xarajatni kamaytiradi, lekin ishonchlilikni saqlab qoladi. Xondiza koni kabi sanoat obyektlari atrofida bunday tizim ekologik xavfni erta aniqlash, suv resurslaridan xavfsiz foydalanish va oqova suvlarni tozalash texnologiyasini takomillashtirish uchun zarur.

Xulosa

Surxondaryo suv havzalari va Xondiza polimetall ruda koni chiqindi oqova suvlari tarkibida Ni(II) va Co(II) ionlarini spektrofotometrik usulda aniqlash ekologik monitoring va analitik kimyo uchun muhim ilmiy-amaliy yo‘nalish hisoblanadi. Xondiza konining polimetall tarkibi suv muhitiga turli metall ionlari migratsiyasini yuzaga keltirishi mumkin. Shu sababli Ni(II) va Co(II) ionlarini aniqlash faqat alohida laboratoriya tajribasi emas, balki suv resurslari xavfsizligini baholash tizimining tarkibiy qismi sifatida qaralishi kerak.

FOYDALANILGAN ADABIYOTLAR

1. Rajabov Sh. X., Xakimov K. J., Xolnazarov F. A., Abdisoatov S. Z. Xondiza koni polimetall rudalaridan rux, mis va qo‘rg‘oshin metallarini ajratib olish

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026
texnologiyasini takomillashtirish // Kompozitsion materiallar. - 2025. - № 2. - B. 80–84.

2. Rajabov Sh. X., Hasanov A. S., Xakimov K. J. Совершенствование технологий обогащения полиметаллических руд месторождения Хандиза на основе изучения вещественного состава // Universum: технические науки. - 2025. - № 2(131), ч. 2. - С. 19–23.

3. Xakimov K. J., Rajabov Sh. X. Rux metali, dunyo bo‘yicha ishlab chiqarishdagi o‘rni // Sanoatda raqamli texnologiyalar. - 2024. - № 1. - B. 77–81.

4. Umarova I. K., Salijanova G. Q., Avinjanova S. I. Study on the enrichment of polymetallic ores of the deposit Handiza // Sustainable development of resource-saving technologies in mineral mining and processing. - 2018. - P. 286–306.

5. Xolboyeva M. B., Abduvaliyeva M. J., Xaitmurodova O. P. Sanoat oqova suvlarini og‘ir metallardan tozalash usullari // Journal of Universal Science Research. - 2023. - Vol. 1, № 2. - B. 128–132.

6. Ergasheva Y. O., Beknazarov H. S., Ergasheva F. O. Oqova suvlarni tozalash uchun piroliz moyi asosida sintez qilingan sulfatkationitning xususiyatlarini tadqiq etish // Theory of Scientific Researches of Whole World. - 2025. - B. 208–211.

7. Beknazarov H. S., Ergasheva Y. O. Oqova suvlarda zaharli va og‘ir metallarni ajratish uchun piroliz moyi asosida sulfokationit olish texnologiyasi // Ilmiy-amaliy tadqiqotlar to‘plami. - 2025.

8. Ibotov B. O. Sanoat oqova suvlaridan og‘ir rangli metallarni ajratib olish usullari // Ilmiy tadqiqotlar va innovatsion texnologiyalar. - 2022.

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O‘ZBEKISTONDA QULAY INVESTITSIYA MUHITINI SHAKLLANTIRISH IMKONIYATLARI VA ISTIQBOLLARI

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ANNOTATSIYA

Tadqiqotda investitsiya muhiti faqat kapital oqimlari hajmi bilan emas, balki investor huquqlarining kafolatlanishi, davlat xizmatlarining shaffofligi, infratuzilma sifati, makroiqtisodiy barqarorlik, kapital bozori chuqurligi va hududiy investitsion jozibadorlik bilan belgilanadigan kompleks iqtisodiy tizim sifatida talqin etiladi. 2021-2025-yillar investitsiya dinamikasi, 2025-yilda asosiy kapitalga kiritilgan investitsiyalar hajmining 591,1 trln so‘mga yetgani, markazlashmagan investitsiyalar ulushining yuqoriligi va xorijiy kapitalning tarmoq tarkibidagi o‘rni asosida investitsiya muhitining kuchli va zaif tomonlari aniqlanadi. Maqolada investitsiya siyosatini miqdoriy ko‘rsatkichlar ortidan quvishdan sifatli kapital, texnologiya transferi, xususiy sektor faolligi va hududiy muvozanatga yo‘naltirish zarurligi asoslab beriladi.

Kalit so‘zlar: investitsiya muhiti, investitsion jozibadorlik, xorijiy investitsiyalar, O‘zbekiston iqtisodiyoti, institutsional islohotlar, kapital bozori, hududiy rivojlanish, raqamli davlat xizmatlari.

ABSTRACT

The investment climate is interpreted not merely as the volume of capital inflows, but as a complex institutional and economic system determined by the protection of investor rights, transparency of public services, infrastructure quality, macroeconomic stability, depth of capital markets and regional investment attractiveness. Based on the dynamics of fixed capital investments in 2021-2025, including the increase of fixed capital investments to 591.1 trillion UZS in 2025, the study identifies the strengths and persistent constraints of Uzbekistan’s investment environment. The article argues that investment policy should move from a narrow focus on quantitative growth toward qualitative investment, technology transfer, private sector mobilisation and balanced regional development.

Keywords: investment climate, investment attractiveness, foreign direct investment, Uzbekistan economy, institutional reforms, capital market, regional development, digital public services.

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KIRISH

Globallashuv sharoitida investitsiyalar mamlakatlar iqtisodiy rivojlanishining muhim moliyaviy manbai bo‘libgina qolmay, balki texnologiya, boshqaruv madaniyati, eksportga chiqish imkoniyati va innovatsion ishlab chiqarishning asosiy harakatlantiruvchi kuchiga aylandi. O‘zbekiston uchun qulay investitsiya muhitini shakllantirish masalasi alohida dolzarb ahamiyatga ega, chunki iqtisodiyotni modernizatsiya qilish, sanoat salohiyatini oshirish, infratuzilmani yangilash, yangi ish o‘rinlari yaratish va hududlar o‘rtasidagi iqtisodiy tafovutlarni qisqartirish bevosita investitsiya resurslaridan samarali foydalanishga bog‘liq.

Qulay investitsiya muhiti deganda faqat soliq imtiyozlari, bojxona yengilliklari yoki erkin iqtisodiy zonalar mavjudligi tushunilmaydi. Aslida, investor uchun eng muhim mezonlar mulk huquqining kafolatlanishi, shartnomalarning ijro etilishi, sud-huquq tizimining ishonchliligi, davlat organlari bilan muloqotda shaffoflik, infratuzilmaga ulanish tezligi, valyuta operatsiyalarining erkinligi, makroiqtisodiy prognozlarning barqarorligi va foydani qayta investitsiya qilish yoki repatriatsiya qilish imkoniyatidir. Agar ushbu omillar yetarlicha ishlamasa, hatto katta tabiiy resurslar yoki arzon ishchi kuchi ham uzoq muddatli sifatli kapitalni jalb qilish uchun yetarli bo‘lmaydi.

So‘nggi yillarda O‘zbekistonda investitsiya muhitini yaxshilash maqsadida muhim huquqiy va institutsional islohotlar amalga oshirildi. 2019-yilda qabul qilingan “Investitsiyalar va investitsiya faoliyati to‘g‘risida”gi Qonun mahalliy va xorijiy investorlar tomonidan amalga oshiriladigan investitsiyalar hamda investitsiya faoliyati sohasidagi munosabatlarni tartibga soluvchi asosiy huquqiy baza sifatida shakllandi [1]. “O‘zbekiston — 2030” strategiyasida asosiy kapitalga kiritiladigan investitsiyalar hajmining yillik o‘rtacha 7 foiz atrofida o‘sishini ta’minlash vazifasi belgilangan [2]. Bu maqsad investitsiya hajmini oshirish bilan birga, sarmoyaning tarmoq va hududiy tarkibini sifat jihatdan takomillashtirishni ham talab qiladi.

Mavzuning ilmiy muammosi shundan iboratki, investitsiya oqimlari hajmining o‘sishi har doim ham qulay investitsiya muhiti to‘liq shakllanganini anglatmaydi. Kapitalning qaysi manbalardan kelayotgani, qaysi tarmoqlarga yo‘naltirilayotgani, mahalliy biznes bilan qanday kooperatsiya qilayotgani, yangi texnologiya olib kirish darajasi, risklarni boshqarish sifati va hududlar kesimidagi taqsimoti ham alohida baholanishi kerak. Shuning uchun maqolaning maqsadi O‘zbekistonda qulay investitsiya muhitini shakllantirish imkoniyatlari va istiqbollarini nazariy, statistik va institutsional jihatdan tahlil qilish hamda amaliy takliflar ishlab chiqishdan iborat.

TADQIQOT METODOLOGIYASI

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Maqolada tizimli tahlil, qiyosiy baholash, statistik guruhlash, dinamik tahlil, institutsional tahlil va SWOT elementlaridan foydalanildi. Tizimli tahlil investitsiya muhitini huquqiy, iqtisodiy, moliyaviy, infratuzilmaviy va boshqaruv omillari o‘zaro bog‘liqligida o‘rganish imkonini berdi. Qiyosiy baholash orqali O‘zbekiston tajribasi xalqaro investitsiya siyosati yondashuvlari bilan solishtirildi. Statistik guruhlash esa investitsiyalarning moliyalashtirish manbalari, o‘sish sur’atlari va tarkibiy nisbatlarini aniqlashda qo‘llanildi.

Tadqiqotning axborot bazasini O‘zbekiston Respublikasining normativ-huquqiy hujjatlari, Milliy statistika qo‘mitasi ma’lumotlari, O‘zbekiston — 2030 strategiyasi, OECDning O‘zbekiston investitsiya siyosati bo‘yicha yo‘l xaritasi, xalqaro investitsiya siyosati bo‘yicha ilmiy manbalar va ochiq statistik ma’lumotlar tashkil etdi. Ayniqsa, 2025-yilda asosiy kapitalga investitsiyalar bo‘yicha rasmiy press-relizdagi ma’lumotlar investitsiya dinamikasini baholash uchun asosiy statistik baza sifatida olindi [3].

Maqolada investitsiya muhitining samaradorligi uchta kesimda baholandi: birinchidan, normativ-huquqiy asoslar va investor kafolatlari; ikkinchidan, investitsiya oqimlarining miqdoriy va tarkibiy dinamikasi; uchinchidan, investitsion jozibadorlikni oshirishga to‘sqinlik qilayotgan institutsional va infratuzilmaviy risklar. Bunday yondashuv kapital hajmini oddiy statistik o‘sish sifatida emas, balki rivojlanish sifati va institutsional ishonch natijasi sifatida ko‘rishga imkon beradi.

NATIJALAR

Tahlillar shuni ko‘rsatadiki, O‘zbekistonda investitsiya faolligi 2021-2025-yillarda sezilarli darajada oshgan. Asosiy kapitalga investitsiyalar 2021-yildagi 236,6 trln so‘mdan 2025-yilda 591,1 trln so‘mga yetgan. Bu nominal ko‘rsatkich mamlakatda sanoat, energetika, transport, qurilish va infratuzilma loyihalari faollashganini anglatadi. 2025-yilda barcha moliyalashtirish manbalari hisobidan asosiy kapitalga kiritilgan investitsiyalar 2024-yilga nisbatan 10,5 foizga oshgani qayd etilgan [3]. Biroq o‘sish sur’atlarini baholashda inflyatsiya, valyuta kursi, davlat kafolatlari va kapitalning tarmoq tarkibi alohida e’tiborga olinishi lozim.

1-jadval.

O‘zbekistonda asosiy kapitalga investitsiyalar dinamikasi, 2021-2025-yillar

Yil	Asosiy kapitalga investitsiyalar, trln so‘m	O‘sish sur’ati, %
2021	236,6	102,9
2022	266,2	100,2

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2023	356,1	123,4
2024	507,5	131,3
2025	591,1	110,5

Manba: Milliy statistika qo‘mitasi ma’lumotlari asosida muallif tomonidan tuzildi.

Investitsiyalar tarkibi investitsiya muhitining sifatini ochib beruvchi muhim ko‘rsatkichdir. 2025-yilda markazlashgan investitsiyalar 62,6 trln so‘m yoki jami investitsiyalarning 10,6 foizini tashkil etgan bo‘lsa, markazlashmagan investitsiyalar 528,5 trln so‘m yoki 89,4 foiz ulushga ega bo‘lgan. Bu holat iqtisodiyotda korxonalar, aholi mablag‘lari, xorijiy investitsiyalar va kafolatlanmagan kreditlarning roli oshib borayotganini ko‘rsatadi. Shu bilan birga, markazlashmagan investitsiyalarning yuqoriligi avtomatik ravishda xususiy sektorning chuqur rivojlanganini bildirmaydi; uning ichida xorijiy kreditlar va yirik loyiha moliyalashtirish ulushi ham mavjud bo‘lishi mumkin.

2025-yil ma’lumotlariga ko‘ra, xorijiy investitsiyalar va kafolatlanmagan xorijiy kreditlarning jami investitsiyalardagi ulushi 65,9 foizga, bevosita xorijiy investitsiyalar ulushi esa 47,5 foizga yetgan. Bu O‘zbekistonning xalqaro kapital uchun jozibadorligi oshayotganini bildiradi. Lekin bu natijani ehtiyotkorlik bilan talqin qilish kerak: FDI oqimlari asosan kapital talabchan energetika, tog‘-kon, infratuzilma yoki yirik sanoat loyihalarida jamlansa, mahalliy kichik va o‘rta biznesga texnologik “spillover” ta’siri cheklangan bo‘lib qolishi mumkin. OECDning O‘zbekiston bo‘yicha investitsiya siyosati yo‘l xaritasida ham islohotlar e’tirof etilishi bilan birga, investitsiya muhitini uzoq muddatli va barqaror takomillashtirish zarurligi ta’kidlangan [4].

Investitsiya muhitining huquqiy natijalari ham muhimdir. O‘zbekiston qonunchiligi investitsiyalarni moddiy va nomoddiy boyliklar, mulkiy huquqlar, intellektual mulk va boshqa aktivlar sifatida keng talqin qiladi. Bu yondashuv zamonaviy iqtisodiyot sharoitida to‘g‘ri, chunki bugungi investor faqat zavod yoki bino emas, balki texnologiya, brend, dasturiy mahsulot, patent, boshqaruv tajribasi va logistika tizimini ham kapital sifatida olib kiradi. Demak, investitsiya muhitini yaxshilashda intellektual mulk himoyasi, raqamli biznes jarayonlari va yuqori qo‘shilgan qiymatli xizmatlar alohida o‘rin egallashi kerak.

2-jadval.

Investitsiya muhitining kuchli va zaif jihatlari

Yo‘nalish	Kuchli jihatlar	Muammoli jihatlar

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Huquqiy baza	Investitsiya faoliyatini tartibga soluvchi yagona qonun mavjud	Qonun ijrosi hududlar kesimida bir xil darajada emas
Statistik dinamika	Asosiy kapitalga investitsiyalar hajmi o‘smoqda	O‘sishning sifati va samaradorligi doimiy baholanishi kerak
Xorijiy kapital	FDI ulushi yuqori	Kapitalning ayrim tarmoqlarda jamlanish xavfi mavjud
Davlat xizmatlari	Raqamlashtirish va yagona darcha tizimi rivojlanmoqda	Idoralararo muvofiqlik va xizmat sifati hali yetarli emas
Hududiy rivojlanish	Hududlarda EIZ va klasterlar mavjud	Infratuzilma va kadrlar salohiyatida tafovutlar saqlanmoqda

MUHOKAMA

O‘zbekiston investitsiya muhitining asosiy imkoniyati mamlakatning mintaqaviy iqtisodiy markazga aylanish salohiyatida ko‘rinadi. Aholi sonining ko‘pligi, ichki bozorning kengayishi, yosh mehnat resurslari, tabiiy resurslar, Markaziy Osiyodagi geografik joylashuv, transport-logistika yo‘nalishlarini diversifikatsiya qilish imkoniyati va iqtisodiy islohotlarning davom etayotgani investorlar uchun muhim omillardir. Shu bilan birga, investitsiya muhitini haqiqiy raqobatbardosh darajaga olib chiqish uchun ushbu salohiyatni aniq institutlar, tezkor xizmatlar va kafolatlangan huquqiy mexanizmlar bilan mustahkamlash zarur.

Mavjud yondashuvning zaif tomoni shundaki, investitsiya siyosati ba’zan kapital hajmini oshirishga ortiqcha urg‘u beradi. Bu tushunarli, ammo yetarli emas. Agar investitsiyalar asosan xomashyo qazib olish, qurilish yoki kapital talabchan infratuzilma loyihalarida jamlansa, qisqa muddatli o‘sish kuzatiladi, lekin iqtisodiyotning texnologik murakkabligi va mehnat unumdorligi kutilgan darajada oshmasligi mumkin. Shuning uchun investitsiya siyosatining markazida “qancha kapital keldi?” degan savoldan tashqari “u qanday texnologiya olib keldi?”, “qancha mahalliy yetkazib beruvchini rivojlantirdi?”, “eksport salohiyatiga qanday ta’sir qildi?”, “qanday ish o‘rinlari yaratdi?” degan savollar turishi kerak.

Xususiy sektor kapitalini jalb qilish O‘zbekiston investitsiya muhitining eng muhim istiqbolli yo‘nalishidir. Bank tizimining uzoq muddatli resurslari cheklangan

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sharoitda kapital bozorini rivojlantirish, korporativ obligatsiyalar, investitsiya fondlari, venchur moliyalashtirish, davlat-xususiy sheriklik va xususiylashtirish mexanizmlarini chuqurlashtirish zarur. Kapital bozori kuchsiz bo‘lsa, investitsiya moliyalashtirishining katta qismi davlat resurslari yoki tashqi qarzga tayanadi. Bu esa uzoq muddatda fiskal bosim va qarz barqarorligi masalasini keskinlashtirishi mumkin.

Hududiy investitsiya siyosatini takomillashtirish ham muhim. O‘zbekiston hududlari investitsion salohiyat jihatidan bir xil emas: ayrim hududlar transport-logistika, sanoat bazasi yoki xomashyo resurslari bilan kuchli bo‘lsa, boshqalarida kadrlar, energiya yoki suv resurslari bilan bog‘liq cheklovlar mavjud. Shu sababli har bir hudud uchun alohida “investor yo‘l xaritasi” ishlab chiqilishi kerak. Unda yer uchastkalari, infratuzilma quvvati, mavjud korxonalar, kadrlar bazasi, soliq va bojxona tartiblari, logistika xarajatlari va potentsial loyihalar bo‘yicha ochiq ma’lumotlar berilishi zarur.

Raqamli investitsiya servisi qulay muhitni shakllantirishning amaliy vositasidir. Investor loyiha boshlash uchun qaysi hujjatlar kerakligini, ruxsatnomalar qancha vaqtda berilishini, elektr va gazga ulanish narxini, soliq majburiyatlarini, bojxona tartiblarini va mavjud imtiyozlarni bitta platformadan ko‘ra olishi kerak. Raqamli platforma faqat ma’lumot beruvchi sayt bo‘lib qolmasdan, ariza topshirish, ijro muddatlarini kuzatish, mas’ul tashkilotlarni aniqlash va muammoli holatlarni monitoring qilish imkonini berishi lozim.

Yashil investitsiyalar ham O‘zbekiston uchun katta istiqbolga ega. Energiya samaradorligi, qayta tiklanuvchi energiya, suv tejovchi texnologiyalar, chiqindilarni qayta ishlash, ekologik toza ishlab chiqarish va barqaror qishloq xo‘jaligi loyihalari investorlar uchun yangi bozor imkoniyatlarini yaratadi. Lekin yashil investitsiyalarni faollashtirish uchun ESG mezonlari, ekologik sertifikatlash, yashil obligatsiyalar va loyiha risklarini kamaytiruvchi moliyaviy instrumentlar zarur. Aks holda ekologik yo‘nalish deklarativ maqsad bo‘lib qoladi.

Investitsiya muhitini yaxshilashda eng xavfli xato — imtiyozlarni institutlar o‘rniga qo‘yishdir. Soliq yoki bojxona imtiyozi investorni qisqa muddatga jalb qilishi mumkin, ammo u shartnoma ijrosi, infratuzilma, kadrlar va boshqaruv sifati zaif bo‘lgan muhitda uzoq qolmaydi. Shu bois imtiyozlar shaffof, muddatli, natijaga bog‘langan va barcha investorlar uchun oldindan ma’lum mezonlarga asoslangan bo‘lishi kerak. Individual imtiyozlar esa raqobat tengligini buzishi, davlat byudjeti uchun yashirin xarajatlar yaratishi va biznes ishonchini kamaytirishi mumkin.

XULOSA VA TAKLIFLAR

O‘tkazilgan tahlillar shuni ko‘rsatadiki, O‘zbekistonda qulay investitsiya muhitini shakllantirish bo‘yicha muhim institutsional va statistik yutuqlar mavjud.

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2021-2025-yillarda asosiy kapitalga investitsiyalar hajmi sezilarli oshgan, xorijiy investitsiyalar ulushi yuqori darajaga yetgan, investitsiya faoliyatining huquqiy bazasi takomillashgan va raqamli davlat xizmatlari rivojlanmoqda. Biroq investitsiya muhitining barqarorligi faqat kapital hajmi bilan emas, balki investor ishonchi, shartnoma ijrosi, xususiy sektor imkoniyatlari, hududiy infratuzilma, moliya bozori chuqurligi va investitsiyalarning sifat ko‘rsatkichlari bilan belgilanadi.

Birinchidan, investitsiya siyosatida miqdoriy ko‘rsatkichlardan sifat mezonlariga o‘tish zarur. Har bir yirik loyiha bo‘yicha texnologiya transferi, eksport ulushi, mahalliy yetkazib beruvchilar bilan kooperatsiya, yangi ish o‘rinlari sifati, ekologik ta’sir va byudjetga sof samara alohida baholanishi kerak.

Ikkinchidan, investorlar uchun yagona raqamli platforma to‘liq funksional tizimga aylantirilishi lozim. Unda yer, infratuzilma, ruxsatnomalar, soliq, bojxona, imtiyozlar, davlat-xususiy sheriklik loyihalari va hududiy takliflar bo‘yicha aniq va yangilanib boruvchi ma’lumotlar bo‘lishi kerak.

Uchinchidan, hududiy investitsiya reytinglari formal ko‘rsatkichlar asosida emas, amaliy investor tajribasi asosida yuritilishi zarur. Ruxsatnoma olish muddati, elektrga ulanish tezligi, yer ajratish shaffofligi, mahalliy hokimliklarning hisobdorligi va loyiha kechikishlari reytingning asosiy indikatorlariga aylanishi kerak.

To‘rtinchidan, kapital bozorini rivojlantirish investitsiya muhitining strategik sharti sifatida ko‘rilishi kerak. Korporativ obligatsiyalar, investitsiya fondlari, IPO amaliyoti, venchur kapital va uzoq muddatli pensiya-jamg‘arma instrumentlari real sektor investitsiyalarini moliyalashtirishga xizmat qilishi lozim.

Beshinchidan, investitsiya imtiyozlari tizimi qayta ko‘rib chiqilib, u shaffof, muddatli va natijaga bog‘langan bo‘lishi kerak. Imtiyozlar faqat kapital olib kirgani uchun emas, balki yuqori qo‘shilgan qiymat, eksport, innovatsiya, ekologik barqarorlik va mahalliy kooperatsiya yaratgani uchun berilishi maqsadga muvofiq.

Umuman olganda, O‘zbekistonning qulay investitsiya muhitini shakllantirish istiqbollari yuqori. Ammo bu istiqbol o‘z-o‘zidan amalga oshmaydi. Kapitalni jalb qilish bo‘yicha raqobat global miqyosda kuchayib borayotgan sharoitda mamlakat investor uchun nafaqat arzon resurslar va imtiyozlar, balki ishonchli institutlar, tezkor davlat servisi, shaffof qoidalar va yuqori mahsuldorlikka olib boruvchi ekotizim taklif qila olishi kerak.

FOYDALANILGAN ADABIYOTLAR

1. O‘zbekiston Respublikasining “Investitsiyalar va investitsiya faoliyati to‘g‘risida”gi O‘RQ-598-son Qonuni. 25.12.2019. Lex.uz.

2. O‘zbekiston Respublikasi Prezidentining “O‘zbekiston — 2030 strategiyasi to‘g‘risida”gi PF-158-son Farmoni. 11.09.2023. Lex.uz.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026
3. O‘zbekiston Respublikasi Milliy statistika qo‘mitasi. O‘zbekiston Respublikasida asosiy kapitalga investitsiyalar: 2025-yil yanvar-dekabr oylari uchun press-reliz. 24.01.2026.
4. OECD. Roadmap for Sustainable Investment Policy Reforms in Uzbekistan. OECD Publishing, 2025.
5. North D. C. Institutions, Institutional Change and Economic Performance. Cambridge University Press, 1990.
6. Williamson O. E. The Economic Institutions of Capitalism. New York: Free Press, 1985.
7. World Bank. World Development Report: Finance for an Equitable Recovery. Washington, DC: World Bank, 2022.
8. Vahobov A. V., Xajibakiyev Sh. X., Muminov N. G. Investitsiyalar va investitsion loyihalarni tahlil qilish. Toshkent: Universitet, 2021.
9. G‘ozibekov D. Investitsiyalarni moliyalashtirish masalalari. Toshkent: Moliya, 2003.
10. Karimov N. G‘. Raqamli iqtisodiyot sharoitida investitsion faoliyatni moliyaviy boshqarish. Toshkent: Iqtisod-moliya, 2021.

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O‘ZBEKISTONDA KORRUPSIYAGA QARSHI KURASHNING ZAMONAVIY HUQUQIY MEXANIZMLARI

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ANNOTATSIYA: Mazkur maqolada O‘zbekiston Respublikasida korrupsiyaga qarshi kurashning zamonaviy huquqiy mexanizmlari, ushbu yo‘nalishda amalga oshirilayotgan davlat siyosati hamda korrupsiyaning oldini olishga qaratilgan huquqiy islohotlar tahlil qilingan. Shuningdek, korrupsiyaga qarshi kurashishda qonunchilik tizimining o‘rni, davlat organlari faoliyatida ochiqlik va shaffoflikni ta’minlash masalalari ham yoritilgan. Maqolada korrupsiyaga qarshi kurashning xalqaro standartlari, raqamlashtirish jarayonlari va fuqarolarning huquqiy madaniyatini oshirishning ahamiyati ilmiy-huquqiy jihatdan ochib berilgan.
KALIT SO‘ZLAR: korrupsiya, huquqiy mexanizm, qonunchilik, shaffoflik, davlat boshqaruvi, korrupsiyaga qarshi siyosat, javobgarlik, huquqiy madaniyat, raqamlashtirish, xalqaro standartlar.

АННОТАЦИЯ: В данной статье проанализированы современные правовые механизмы противодействия коррупции в Республике Узбекистан, государственная политика, реализуемая в данном направлении, а также правовые реформы, направленные на предупреждение коррупции. Кроме того, освещены роль системы законодательства в борьбе с коррупцией, а также вопросы обеспечения открытости и прозрачности деятельности государственных органов. В статье с научно-правовой точки зрения раскрыто значение международных стандартов противодействия коррупции, процессов цифровизации и повышения правовой культуры граждан.
КЛЮЧЕВЫЕ СЛОВА: коррупция, правовой механизм, законодательство, прозрачность, государственное управление, антикоррупционная политика, ответственность, правовая культура, цифровизация, международные стандарты.

ÖZET: Bu makalede Özbekistan Cumhuriyeti’nde yolsuzlukla mücadelede kullanılan modern hukuki mekanizmalar, bu alanda yürütülen devlet politikası ve yolsuzluğun önlenmesine yönelik hukuki reformlar analiz edilmiştir. Ayrıca, yolsuzlukla mücadelede hukuk sisteminin rolü ile devlet organları faaliyetlerinde açıklık ve şeffaflığın sağlanması meseleleri de ele alınmıştır. Makalede, yolsuzlukla mücadelede uluslararası standartların, dijitalleşme süreçlerinin ve vatandaşların hukuk kültürünü artırmanın önemi bilimsel ve hukuki açıdan açıklanmıştır.

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ANAHTAR KELIMELER: yolsuzluk, hukuki mekanizma, mevzuat, şeffaflık, devlet yönetimi, yolsuzlukla mücadele politikası, sorumluluk, hukuk kültürü, dijitalleşme, uluslararası standartlar.

ABSTRACT: This article analyzes the modern legal mechanisms for combating corruption in the Republic of Uzbekistan, the state policy implemented in this sphere, and legal reforms aimed at preventing corruption. In addition, the role of the legal system in combating corruption, as well as issues of ensuring openness and transparency in the activities of state bodies, are highlighted. The article scientifically and legally reveals the importance of international anti-corruption standards, digitalization processes, and the enhancement of citizens' legal culture.
KEYWORDS: corruption, legal mechanism, legislation, transparency, public administration, anti-corruption policy, liability, legal culture, digitalization, international standards.

Kirish

Bugungi globallashuv davrida korrupsiya har qanday davlat taraqqiyoti uchun jiddiy xavf tug‘diruvchi omillardan biri hisoblanadi. U iqtisodiy rivojlanishga salbiy ta’sir ko‘rsatadi, jamiyatda adolatsizlik muhitini yuzaga keltiradi hamda fuqarolarning davlat organlariga bo‘lgan ishonchini pasaytiradi. Ayniqsa, korrupsiya davlat boshqaruvi tizimining samaradorligini susaytirib, qonun ustuvorligi tamoyillarining to‘liq amalga oshishiga to‘sqinlik qiladi. Shu sababli bugungi kunda korrupsiyaga qarshi kurashish nafaqat milliy, balki xalqaro miqyosdagi eng dolzarb masalalardan biri sifatida e’tirof etilmoqda. O‘zbekiston Respublikasida ham so‘nggi yillarda korrupsiyaga qarshi kurashish davlat siyosatining ustuvor yo‘nalishlaridan biriga aylandi. Mamlakatda davlat boshqaruvi tizimini modernizatsiya qilish, qonun ustuvorligini ta’minlash, davlat xizmatlari faoliyatini shaffof tashkil etish hamda inson manfaatlarini himoya qilishga qaratilgan keng ko‘lamli islohotlar amalga oshirilmoqda. Xususan, 2017-yil 3-yanvarda qabul qilingan “Korrupsiyaga qarshi kurashish to‘g‘risida”gi Qonun ushbu yo‘nalishdagi muhim huquqiy asos bo‘lib xizmat qilmoqda. Shuningdek, O‘zbekiston Respublikasi Prezidenti tomonidan korrupsiyaga qarshi kurashish samaradorligini oshirishga qaratilgan qator farmon va qarorlar qabul qilindi. 2020-yilda Korrupsiyaga qarshi kurashish agentligining tashkil etilishi esa ushbu sohadagi institutsional islohotlarning yangi bosqichini boshlab berdi. Shu bilan birga, davlat xizmatlarini raqamlashtirish, elektron hukumat tizimini rivojlantirish va ochiq ma’lumotlar platformalarining joriy etilishi korrupsion holatlarning oldini olishda muhim vosita bo‘lib xizmat qilmoqda.

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Asosiy qism

Bugungi kunda korrupsiya jamiyat taraqqiyotiga jiddiy salbiy ta’sir ko‘rsatuvchi eng xavfli illatlardan biri hisoblanadi. U davlat boshqaruvi tizimining samaradorligini pasaytiradi, iqtisodiy rivojlanishga to‘sqinlik qiladi, fuqarolarning davlat organlariga bo‘lgan ishonchini susaytiradi hamda jamiyatda adolatsizlik muhitining shakllanishiga sabab bo‘ladi. Ayniqsa, korrupsiya tufayli aholining ijtimoiy himoyaga, sifatli ta’limga, tibbiyotga va adolatli boshqaruvga bo‘lgan huquqlari buzilishi mumkin. Shu sababli bugungi kunda korrupsiyaga qarshi kurashish nafaqat huquqiy, balki siyosiy, iqtisodiy va ma’naviy masala sifatida ham muhim ahamiyat kasb etmoqda. O‘zbekiston Respublikasida korrupsiyaga qarshi kurashishning huquqiy asoslari Konstitutsiya normalari hamda maxsus qonunchilik hujjatlari bilan mustahkamlangan. Xususan, O‘zbekiston Respublikasi Konstitutsiyasida qonun ustuvorligi, inson huquq va erkinliklarini himoya qilish, davlat organlari faoliyatining ochiqligi va shaffofligi asosiy prinsip sifatida belgilangan. Mazkur prinsiplar korrupsiyaga qarshi kurashishning fundamental huquqiy asosini tashkil etadi. 2017-yil 3-yanvarda qabul qilingan “Korrupsiyaga qarshi kurashish to‘g‘risida”gi Qonun ushbu sohadagi eng muhim normativ-huquqiy hujjatlardan biri hisoblanadi. Mazkur qonunda korrupsiyaning tushunchasi, korrupsiyaga oid huquqbuzarliklarning oldini olish mexanizmlari, davlat organlarining vakolatlari hamda fuqarolarning huquqlari aniq belgilab berilgan. Ushbu qonunga ko‘ra, korrupsiyaga qarshi kurashishning asosiy yo‘nalishlari sifatida korrupsiyaning oldini olish, korrupsion huquqbuzarliklarni aniqlash, ularga chek qo‘yish, javobgarlikning muqarrarligini ta’minlash kabi masalalar e’tirof etilgan. Shuningdek, O‘zbekiston Respublikasi Jinoyat kodeksida korrupsiyaga oid jinoyatlar uchun qat’iy javobgarlik choralari belgilangan. Jumladan, Jinoyat kodeksining 210-moddasida pora olish, 211-moddasida pora berish, 212-moddasida pora olish-berishda vositachilik qilish, 205-moddasida mansab vakolatini suiiste’mol qilish, 209-moddasida mansab soxtakorligi uchun jinoiy javobgarlik nazarda tutilgan. Ushbu moddalarning amaliyotda qo‘llanilishi davlat xizmatida qonuniylik va intizomni mustahkamlashga xizmat qilmoqda.

So‘nggi yillarda mamlakatimizda korrupsiyaga qarshi kurashish borasida keng ko‘lamli islohotlar amalga oshirilmoqda. Xususan, davlat xizmatlarini raqamlashtirish, davlat xaridlarini elektron tizimga o‘tkazish, “Elektron hukumat” tizimini rivojlantirish, “Ochiq byudjet” platformasini joriy qilish, davlat organlari faoliyatining ochiqligini kuchaytirish kabi chora-tadbirlar korrupsion holatlarning oldini olishda muhim vosita bo‘lib xizmat qilmoqda. Chunki inson omili qancha kamaytirilsa, noqonuniy manfaatdorlik va yashirin kelishuvlarning oldi olinadi.

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2020-yilda Korrupsiyaga qarshi kurashish agentligining tashkil etilishi ham ushbu yo‘nalishdagi muhim qadamlardan biri bo‘ldi. Mazkur organ korrupsion xavflarni aniqlash, davlat organlari faoliyatini monitoring qilish, korrupsiyaning oldini olishga qaratilgan dasturlar ishlab chiqish, aholining huquqiy ongini oshirish kabi vazifalarni amalga oshirmoqda. Shu bilan birga, davlat tashkilotlarida “komplayens nazorat” tizimining joriy qilinishi ham korrupsiyaga qarshi kurashishning zamonaviy mexanizmlaridan biri sifatida e’tirof etilmoqda.

Korrupsiyaga qarshi kurashishda faqat jazolash choralarini qo‘llash yetarli emas. Eng avvalo, inson ongida halollik, adolat, vijdonlilik va qonunga hurmat kabi fazilatlarni shakllantirish muhim ahamiyatga ega. Chunki korrupsiya ko‘pincha insonning ma’naviy tarbiyasi, dunyoqarashi va hayotiy qadriyatlari bilan chambarchas bog‘liq bo‘ladi. Agar inson yoshlikdan halollik ruhida tarbiyalansa, u kelajakda noqonuniy manfaat ortidan quvmaslikka harakat qiladi. Shu sababli korrupsiyaga qarshi tarbiya avvalo oiladan boshlanishi kerak. Bola oilada kattalarning halol mehnatini, adolatli munosabatini, birovning haqqiga xiyonat qilmaslikni ko‘rib ulg‘aysa, uning ongida to‘g‘ri tushunchalar shakllanadi. Keyinchalik bu jarayon maktab, kollej, litsey, oliy ta’lim muassasalari va jamiyat orqali davom ettirilishi lozim. Ayniqsa, yoshlar orasida “halol mehnat — eng katta boylik” degan tushunchani shakllantirish muhim hisoblanadi.

Sharq mutafakkirlari ham jamiyat taraqqiyoti avvalo adolat va ma’naviyatga bog‘liq ekanligini ta’kidlaganlar. Shuningdek, Abu Nasr Forobiy adolatli jamiyatni inson kamolotining asosiy omili deb hisoblagan, hamda Abu Ali ibn Sino halollik va poklik insonning eng oliy fazilatlaridan biri ekanligini qayd etgan, Abdulla Avloniy esa tarbiya masalasini millat kelajagi bilan bog‘lagan. Darhaqiqat, tarbiya to‘g‘ri bo‘lmagan joyda korrupsiya, loqaydlik, adolatsizlik kabi illatlar paydo bo‘lishi mumkin. Bugungi kunda jamiyatda huquqiy ong va huquqiy madaniyatni rivojlantirish bo‘yicha ko‘plab chora-tadbirlarni amalga oshirish zarur hisoblanadi, ta’lim muassasalarida huquqiy savodxonlik darslarini kuchaytirish, korrupsiyaga qarshi targ‘ibot tadbirlarini tashkil etish, ommaviy axborot vositalari orqali huquqiy bilimlarni keng targ‘ib qilish, yoshlar o‘rtasida turli tanlov va forumlar o‘tkazish, davlat organlari faoliyatida ochiqlikni ta’minlash, fuqarolik jamiyati institutlari faoliyatini qo‘llab-quvvatlash, aholining murojaatlari bilan ishlash tizimini takomillashtirish, mahallalarda ma’naviy-ma’rifiy tadbirlarni kuchaytirish kabi choralar korrupsiyaning oldini olishda muhim o‘rin tutadi.

Shuningdek, korrupsiyaga qarshi kurashishda jamiyatning har bir a’zosi faol bo‘lishi kerak. Chunki korrupsiya faqat bir tashkilot yoki bir sohaning muammosi emas, balki butun jamiyat taraqqiyotiga xavf tug‘diruvchi illatdir. Shu sababli davlat organlari,

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ta’lim muassasalari, oila, mahalla, ommaviy axborot vositalari va fuqarolik jamiyati institutlari o‘zaro hamkorlikda faoliyat olib borishi lozim.

Bugungi kunda O‘zbekistonda olib borilayotgan islohotlarning asosiy maqsadi ham adolatli, ochiq va shaffof jamiyat qurishdan iboratdir. Korrupsiyaga qarshi kurashish esa ushbu maqsadga erishishning eng muhim shartlaridan biri hisoblanadi. Zero, qonun ustuvor bo‘lgan, halollik qadrlangan va fuqarolarning huquqiy madaniyati yuksak bo‘lgan jamiyatda taraqqiyot va adolat barqaror bo‘ladi.

Xulosa

Xulosa qilib aytganda, korrupsiya jamiyat taraqqiyotiga salbiy ta’sir ko‘rsatuvchi eng xavfli muammolardan biridir. Shu sababli O‘zbekistonda korrupsiyaga qarshi kurashish bo‘yicha keng ko‘lamli huquqiy islohotlar amalga oshirilmoqda. Xususan, “Korrupsiyaga qarshi kurashish to‘g‘risida”gi Qonun, Jinoyat kodeksi normalari hamda davlat tomonidan olib borilayotgan islohotlar ushbu sohada muhim ahamiyat kasb etmoqda. Bugungi kunda davlat xizmatlarini raqamlashtirish, ochiqlik va shaffoflikni ta’minlash, korrupsion holatlarning oldini olishga xizmat qilmoqda. Shu bilan birga, korrupsiyaga qarshi kurashishda faqat qonun va jazolash choralarining o‘zi yetarli emas. Eng avvalo, yoshlarni halollik, adolat va vatanparvarlik ruhida tarbiyalash, jamiyatda huquqiy ong va huquqiy madaniyatni rivojlantirish muhim hisoblanadi. Shuningdek, oila, ta’lim muassasalari, mahalla va davlat organlari o‘zaro hamkorlikda faoliyat olib borsa, korrupsiyaning oldini olish mumkin bo‘ladi. Chunki korrupsiyaga qarshi kurashish har bir fuqaroning vijdoni, mas’uliyati va fuqarolik burchi bilan chambarchas bog‘liqdir.

FOYDALANILGAN ADABIYOTLAR RO‘YXATI:

1. O‘zbekiston Respublikasi Konstitutsiyasi. — Toshkent: “O‘zbekiston”, 2023.
2. O‘zbekiston Respublikasining “Korrupsiyaga qarshi kurashish to‘g‘risida”gi Qonuni, 2017-yil 3-yanvar.
3. O‘zbekiston Respublikasi Jinoyat kodeksi. — Toshkent, 2024.
4. O‘zbekiston Respublikasi Prezidentining korrupsiyaga qarshi kurashishga oid farmon va qarorlari.
5. “Davlat fuqarolik xizmati to‘g‘risida”gi O‘zbekiston Respublikasi Qonuni, 2022-yil.
6. Birlashgan Millatlar Tashkilotining Korrupsiyaga qarshi konvensiyasi, 2003-yil.
7. Mirziyoyev Sh.M. Qonun ustuvorligi va inson manfaatlarini ta’minlash — yurt taraqqiyoti va xalq farovonligining garovi. — Toshkent: “O‘zbekiston”, 2017.
8. Odilqoriyev X.T. Davlat va huquq nazariyasi. — Toshkent: “Adolat”, 2018.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026
9. Islomov Z.M. Huquq nazariyasi. — Toshkent, 2020.
10. Rustamboyev M.X. O‘zbekiston Respublikasi Jinoyat huquqi. — Toshkent, 2019.
11. Abu Nasr Forobiy. Fozil odamlar shahri. — Toshkent, 2016.
12. Abdulla Avloniy. Turkiy guliston yoxud axloq. — Toshkent: “Yoshlar nashriyoti”, 2018.
13. Abu Ali ibn Sino. Donishnoma. — Toshkent, 1981.
14. Korrupsiyaga qarshi kurashish agentligi rasmiy materiallari va hisobotlari.
15. Ommaviy axborot vositalari va ilmiy-huquqiy maqolalar materiallari.

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TUPROQ VA OZIQ-OVQAT TARKIBIDAGI Cd^{2+},Ni IONINI INVERSION-VOLTAMPEROMETRIK USULDA ANIQLASH

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Annotatsiya: Ushbu maqolada tuproq va oziq-ovqat namunalari tarkibidagi kadmiy (Cd^{2+}), Ni, 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: Tuproqva oziq-ovqat tarkibidagi kadmiy (Cd^{2+}),Ni ionlarini inversion-voltamperometriya, og'ir metallar, ekologik monitoring, elektrod, polyarografiya.

ОПРЕДЕЛЕНИЕ ИОНОВ Cd^{2} В СОСТАВЕ ПОЧВЫ МЕТОДОМ ИНВЕРСИОННОЙ ВОЛЬТАМПЕРОМЕТРИИ.

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Аннотация: В данной статье рассматриваются вопросы определения ионов кадмия (Cd^{2+}) и никеля (Ni^{2+}) в образцах почвы и пищевых продуктов с использованием современного и чувствительного метода анализа - инверсионной вольтамперометрии. Описаны экологическая значимость мониторинга тяжелых металлов в почве и продуктах питания, этапы процесса анализа и преимущества данного метода.

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Ключевые слова: Определение ионов кадмия (Cd^{2+}) и никеля (Ni^{2+}) в почве и пищевых продуктах методом инверсионной вольтамперометрии, тяжелые металлы, экологический мониторинг, электрод, полярография.

DETERMINATION OF Cd^{2+} IONS IN SOIL COMPOSITION BY INVERSION VOLTAMMETRY METHOD.

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Abstract: This article examines the issues of determining cadmium (Cd^{2+}) and nickel (Ni^{2+}) ions in soil and food samples using a modern and sensitive analytical method — stripping voltammetry. The environmental significance of monitoring heavy metals in soil and food, the stages of the analytical process, and the advantages of the method are described.

Keywords: Determination of cadmium (Cd^{2+}) and nickel (Ni^{2+}) ions in soil and food products by stripping voltammetry, heavy metals, environmental monitoring, electrode, polarography.

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 parchalunmasligi bilan alohida ajralib turadi.

Pb^{2+} va Cd^{2+} ionlarining bir vaqtning o'zida elektroanalitik aniqlashini modifikatsiyalangan bor bilan qo'shilgan olmos (Sb-BDD) elektrodidan foydalanib, chiziqli supurish anodik ajratish voltammetriyasi (LSASV) yordamida taqdim etilgan. Sb cho'ktirish analitlar bilan joyida, 0,1 M HCl (pH 1) dagi 1 mg l^{-1} $SbCl_3$ eritmasidan amalga oshirildi. Pb^{2+} *BDD elektrodida bir vaqtning o'zida qo'shilganda* Cd^{2+} ionini 50–500 mkg/l^{-1} chiziqli diapazonida osongina aniqlanishi va miqdoriy jihatdan aniqlangan [1].

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Tabiiy suv va oziq-ovqat namunalarida og'ir metallarning (qo'rg'oshin, kobalt, mis, kadmiy, temir va nikel) iz miqdorini aniqlash uchun oddiy va yangi qo'shma cho'ktirish usuli ishlab chiqildi. Analit ionlari sirkoniy (IV) gidroksid yordamida qo'shma cho'ktirildi. Metall darajasini aniqlash olov atomining yutilish spektrometriyasi (FAAS) yordamida amalga oshirildi. Analit ionlarining tiklanishiga pH, sirkoniy (IV) miqdori, namuna hajmi va boshqalar kabi analitik parametrlarning ta'siri o'rganildi. Mumkin bo'lgan matritsa ionlarining ta'siri ham o'rganildi. Analit ionlarining tiklanishi 95-100% oralig'ida edi. Oldindan konsentratsiya koeffitsienti 25 sifatida hisoblandi. 3 sigma (n=21) asosida analit ionlari uchun aniqlash chegaralari 0,27-2,50 mikrogL(-1) oralig'ida edi. Nisbiy standart og'ish 8% dan past ekanligi aniqlandi. Taqdim etilgan qo'shma yog'ingarchilik protsedurasining validatsiyasi tahlil sertifikatlangan ma'lumotnoma materiallari (GBW 07605 Choy va LGC 6010 Qattiq ichimlik suvi) yordamida amalga oshirildi. Ushbu protsedura tabiiy suvlar va qahva, baliq, tamaki, qora va ko'k choy kabi oziq-ovqat namunalariga muvaffaqiyatli qo'llanildi.[2]

Ushbu ish mis bilan ifloslangan qishloq xo'jaligi tuproqlaridagi og'ir metallarning umumiy miqdorini tahlil qilish uchun uchta analitik usulni taqqoslashga bag'ishlangan. Tuproq namunalari perxlorik va ftorid gidrogen kislotalari aralashmasi yordamida tiniq eritmalarga aylantiriladi. O'rganilayotgan metallar mis, qo'rg'oshin, kadmiy, nikel, kobalt, rux va marganetsdir. Tuproq eritmalari murakkab matritsalar bo'lib, o'rganilayotgan analitik usullar ion xromatografiyasi (IC), anodli ajratish voltammetriyasi (ASV) yoki adsorbtiv ajratish voltammetriyasi (AdSV) va induktiv bog'langan plazma atom emissiya spektroskopiyasi (ICP-AES) yoki grafit pechining atom yutilish spektroskopiyasi (AAS). Ion xromatografiyasini analitik usul sifatida qo'llash ikkita turli eluent yordamida mumkin: rux, kobalt va marganetsni aniqlash uchun PDCA va mis, nikel va marganetsni tahlil qilish uchun oksalat kislotasi. Hech qanday boyitish jarayonisiz biz $Cu2^{+}$, $Mn2^{+}$, $Zn2^{+}$ va $Ni2^{+}$ uchun ICP-AES va IC o'rtasida juda yaxshi kelishuv natijalarini olishimiz mumkin . Cd^{2+}, Pb^{2+} va Zn^{2+} uchun ASV va ICP-AES yoki AAS o'rtasida hamda Ni^{2+} uchun AdSV va ICP-AES o'rtasida yaxshi korrelyatsiya kuzatildi . Kobalt uchun bir tomondan IC yoki AdSV va boshqa tomondan ICP-AES o'rtasida yaxshi kelishuv topilmadi.[3]

TAJRIBA QISMI

Angor tumani sho'rlangan tuproq namunalarini tahlil qilish metodikasi.

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Tadqiqot obyekti sifatida Surxondaryo viloyati Angor tumanining antropogen ta'sirga duchor bo'lgan sho'rlangan tuproq massivlari tanlab olindi. Ushbu hudud tuproqlari o'zining yuqori minerallashuv darajasi metodika asosida amalga oshirildi.

Namunalar olish va dastlabki ishlov berish:

Tuproq namunalari tuman xo'jaliklarining turli nuqtalaridan GOST 17.4.3.01-2017 talablariga muvofiq, 0-20 sm gacha bo'lgan haydov qatlamidan olindi. Namunalar laboratoriya sharoitida o'simlik qoldiqlari va toshlardan tozalanib, havo-quruq holatigacha quritildi. Shundan so'ng, namuna gomogen holga keltirilib, 0.5 mm li elakdan o'tkazildi.

Namunalarni mineralizatsiya qilish (Ekstraktsiya):

Tuproq tarkibidagi Cd^{2+} va Pb^{2+} ionlarining umumiy miqdorini aniqlash uchun namunalarga "nam parchalash" usuli qo'llanildi:

Aniq tortib olingan 2.0-5.0 g tuproq namunasi konussimon kolbaga joylashtirildi.

Unga 15 ml konsentrlangan nitrat kislotasi (HNO_3) va xlorid kislotasi (HCl) ning 1:3 nisbatdagi "zar suvi" aralashmasi qo'shildi.

Jarayon qumli hammomda, eritma hajmi 2-3 ml qolguncha (lekin quruq qoldiq bo'lmaguncha) davom ettirildi.Organik birikmalarni to'liq oksidlash uchun 1-2 ml H_2O_2 qo'shilib, eritma rangsizlangunga qadar qizdirildi. Tayyor mineralizat 0.1 M HCl eritmasi bilan yuvilib, qog'oz filtr orqali 50 ml hajmli o'lchov kolbasiga o'tkazildi va distillangan suv bilan belgisigacha to'ldirildi.

Inversion-voltamperometrik o'lchov jarayoni:

Tahlillar voltammogrammalarda aks etganidek, uch elektrodli elektrokimyoviy yacheykada o'tkazildi. Tajriba sharoitlari quyidagicha belgilandi:

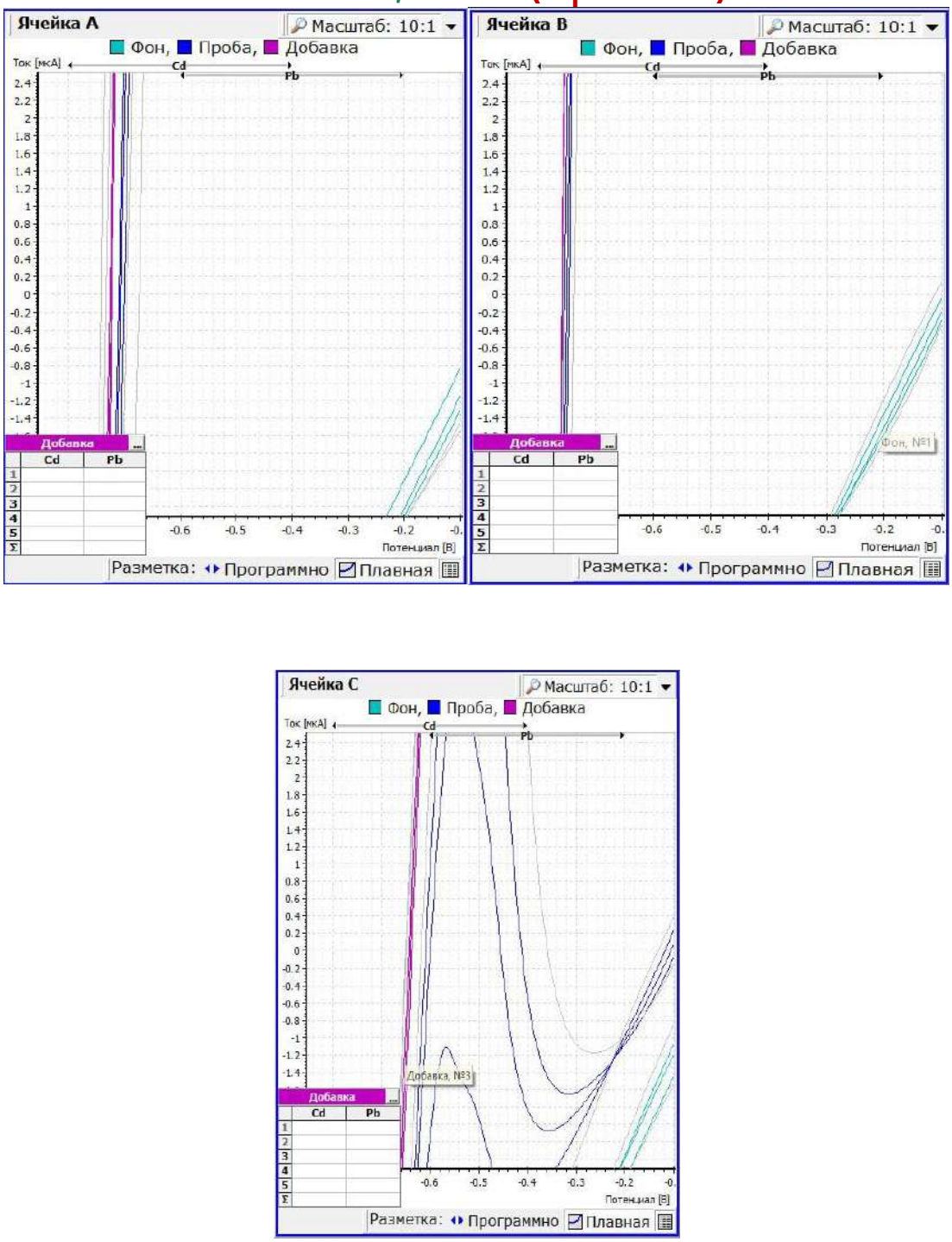
• Fon elektroliti: 0.1 M HCl eritmasi;

• To'plash potensiali (E_e): kadmiy va qo'rg'oshin uchun mos ravishda -1.1 V dan -1.2 V gacha;

• To'plash vaqti (t_e): Ionlar konsentratsiyasiga qarab 60 soniyadan 180 soniyagacha.

Voltammogrammalardan (A, B, C yacheykalar) ko'rinib turibdiki, kadmiy (Cd) uchun aniq analitik signal -0.6 V dan -0.65 V oralig'ida, qo'rg'oshin (Pb) uchun esa -0.4 V dan -0.45 V atrofida qayd etildi (1-rasm).

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1-rasm.

Natijalar va hisoblashlar:

Olingan natijalarning ishonchliligini ta'minlash uchun har bir namuna 3 martadan (jadvalga muvofiq n=3) tahlil qilindi. Angor tumani tuproq namunalarida elementlarning o‘rtacha konsentratsiyasi quyidagicha aniqlandi:

• Kadmiy (Cd): 28 mg/l (ekstraktda);

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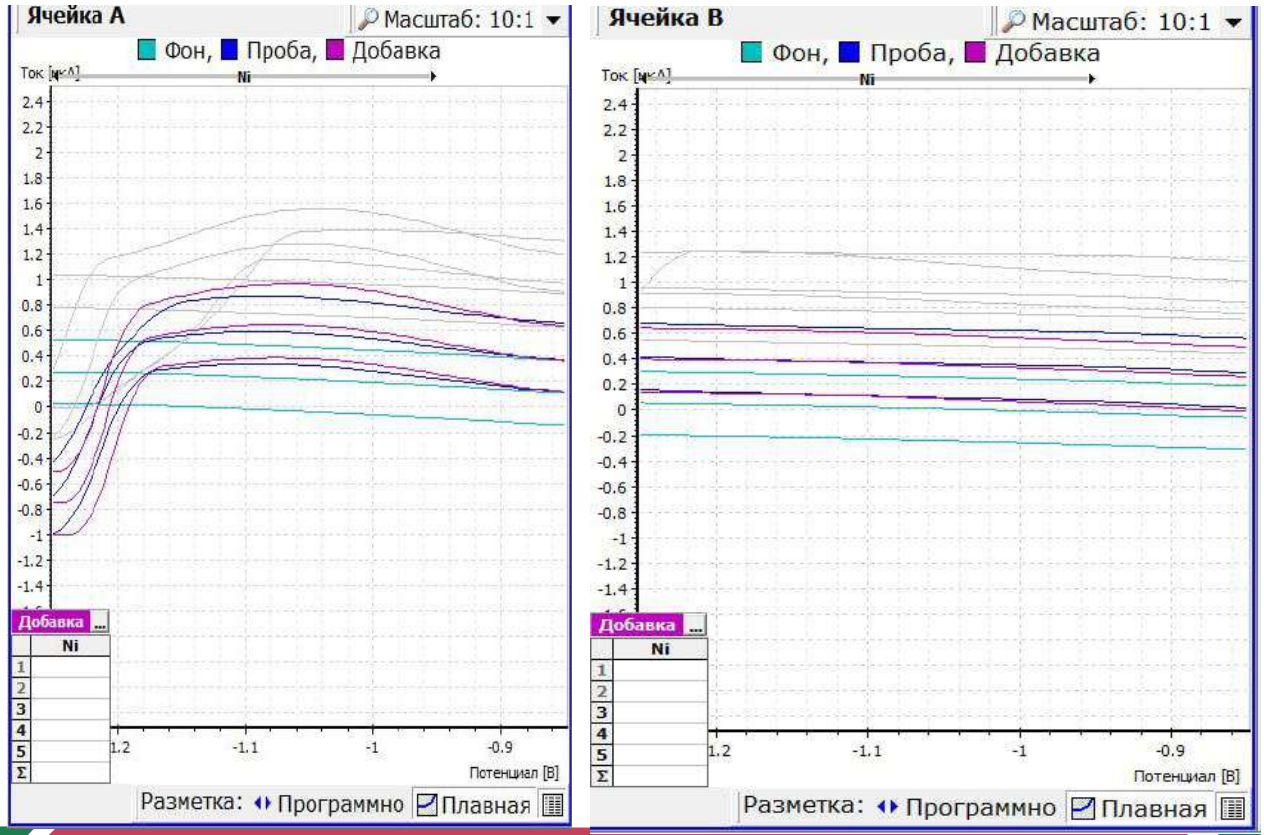
• Qo‘rg‘oshin (Pb): 13 mg/l (ekstraktda).

Tahlil jarayonida olingan yuqori cho‘qqilar va "standart qo‘shimcha" usuli yordamida olingan farqlar tuproqning sho‘rlanish darajasi og‘ir metallar tahliliga sezilarli xalaqit bermasligini, tanlangan elektrokimyoviy usulning yuqori selektivligini ko‘rsatdi.

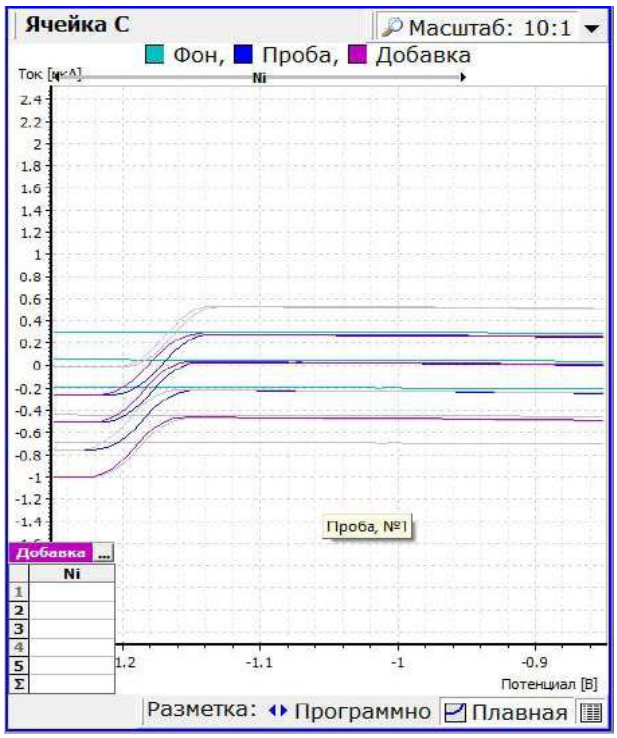
Kimyoviy tahlil natijalari

Tahlil uslubi bo'yicha me'yoriy hujjatlar (MH)	Aniqlanayotgan komponent	Konsentratsiya, mg/l	Yagona tahlil natijalari soni	Tahlil natijasini olish usuli
	Kadmiy	28	3	O'rtacha
	Qo'rg'oshin	13	1	O'rtacha

Oziq-ovqat namunasi tarkibidagi organik moddalarni yo'qotish va metall ionlarini erkin holatga o'tkazish uchun namuna mufel pechida kuydirildi (yoki nam usulda kislotalar yordamida parchalandi). Olingan qoldiq tegishli fon elektrolitida eritilib, o'lchov yacheykalariga (A, B va C yacheykalar) joylashtirildi.



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Tajriba jarayonida elektrodlarda tiklanish jarayonini kuzatish uchun potensial -0.9 V dan -1.2 V gacha bo'lgan oraliqda berildi. Nikelning analitik signali (cho'qqisi) asosan -1.0 V dan -1.1 V gacha bo'lgan potensial oralig'ida qayd etildi.

2. Voltammogrammalarni yozib olish (2, 3 va 4-rasmlar tahlili) Tahlil dasturida har bir yacheyka uchun uch bosqichli o'lchov amalga oshirildi. Grafiklarning vertikal o'qi tok kuchini (mka – mikroamper), gorizontal o'qi esa potensialni (V – volt) ko'rsatadi:

Fon (Фон - och havorang chiziqlar): Dastlab yacheykadagi toza fon elektrolitining voltammogrammasi yozib olindi. Bu bosqich fonga tushishi mumkin bo'lgan ifloslanishlarni hisobga olish va xatoliklarni kamaytirish uchun xizmat qiladi.

Namuna (Проба - to'q ko'k chiziqlar): Yacheykaga oziq-ovqat namunasi eritmasi kiritilgandan so'ng o'lchov o'tkazildi. Grafiklarga ko'ra, namuna qo'shilgandan keyin tok kuchining o'zgarishi kuzatilgan.

Standart qo'shimcha (Добавка - binafsharang chiziqlar): Noma'lum konsentratsiyani aniq hisoblash uchun namunaga ma'lum konsentratsiyaga ega bo'lgan standart Nikel eritmasi qo'shildi. Standart qo'shimchadan keyin analitik signalning

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(cho'qqining balandligi) proporsional ravishda o'sishi kuzatildi. Ushbu o'sish orqali namunadagi dastlabki nikel miqdori hisoblanadi.

3. Tahlil natijalarini hisoblash (1-rasm tahlili) Dasturiy ta'minotning natijalar darchasida hisoblash parametrlaridan "O'rtacha qiymat bo'yicha hisoblash" (Расчёт по "средним") hamda xatoliklarni kamaytirish maqsadida "Fonni hisobga olish" (Учёт фона**)** funksiyalari yoqilgan holatda tahlil qilindi.

Jadvaldan olingan yakuniy natijalar:

Barcha o'lchov natijalari **[mg/l]** o'lchov birligida ifodalangan.

Yacheykalar bo'yicha alohida natijalar (Результат единичного анализа)

A yacheyka: 0 mg/l

B yacheyka: 0.0000807 mg/l

C yacheyka: 0 mg/l

A va C yacheykalarda namuna konsentratsiyasi o'lchov chegarasidan past bo'lganligi yoki analitik signal yetarli darajada ajralib chiqmaganligi sababli dastur natijani 0 deb qabul qilgan. Asosiy analitik signal B yacheykada muvaffaqiyatli qayd etilgan. **Umumiy yakuniy tahlil natijasi (Результат анализа):** Dastur umumiy o'rtachalashtirish natijasida oziq-ovqat namunasi tarkibidagi nikel miqdorini **0.000081 mg/l** (ya'ni 0.081 mkg/l) deb belgiladi.

Xulosa:

Olingan natija (0.000081 mg/l) shuni ko'rsatadiki, tekshirilayotgan oziq-ovqat mahsuloti tarkibida nikel (Ni) ionlari faqatgina mikro-izlar darajasida mavjud. Bu miqdor davlat standartlarida belgilangan oziq-ovqat xavfsizligi bo'yicha ruxsat etilgan miqdorlardan (REM) ancha past bo'lib, mahsulotning og'ir metallar bo'yicha xavfsiz ekanligini tasdiqlaydi.

ADABIYOTLAR RO‘YXATI:

Kathryn E. ToghillLei Xiao, Gregory G. Wildgoose, Richard G. Compton Electroanalytical Determination of Cadmium(II) and Lead(II) Using an Antimony

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Nanoparticle Modified Boron-Doped Diamond Electrode Elektroanalysis :2009 p. 1113-1118. **https://doi.org/10.1002/elan.200904547**

1. Demirhan Citak, Mustafa Tuzen, Mustafa Soylak. Simultaneous coprecipitation of lead, cobalt, copper, cadmium, iron and nickel in food samples with zirconium(IV) hydroxide prior to their flame atomic absorption spectrometric determination. *Food and Chemical Toxicology*. 2009, pp. 2302-2307. https://doi.org/10.1016/j.fct.2009.06.021
2. 3.P. Gunkel, B. Fabre, G. Prado, J.Y. Baliteau Ion chromatographic and voltammetric determination of heavy metals in soils. Comparison with atomic emission spectroscopy Analusis :1999 p. 823-828. https://doi.org/10.1051/analusis:1999149
3. Abbasi, S., Khodarahmiyan, K., & Abbasi, F. (2011). Simultaneous determination of ultra trace amounts of lead and cadmium in food samples by adsorptive stripping voltammetry. *Food Chemistry, 128*(1), 254–257. doi:10.1016/j.foodchem.2011.03.002
4. Adeloju, S. B., & Bond, A. M. (1983). Determination of lead and cadmium in biological and food samples by anodic stripping voltammetry. *Analytica Chimica Acta, 148*, 59–69.
5. Alghamdi, A. H. (2010). Applications of stripping voltammetric techniques in food analysis. *Arabian Journal of Chemistry, 3*(1), 1–7. doi:10.1016/j.arabjc.2009.12.001
6. Ali, A. M., Mohamed, G. G., & Mohamed, H. A. (1999). Determination of trace metal ions in common salt by differential pulse stripping voltammetry. *Food Chemistry, 65*(4), 503–507.
7. Bard, A. J., & Faulkner, L. R. (2001). *Electrochemical methods: Fundamentals and applications* (2nd ed.). John Wiley & Sons.
8. Brainina, K. Z., Stozhko, N. Y., Belysheva, G. M., Inzhevatova, O. V., Kolyadina, L. I., Cremisini, C., & Galletti, M. (2004). Determination of heavy metals in wines by anodic stripping voltammetry with thick-film modified electrode. *Analytica Chimica Acta, 514*(2), 227–234. doi:10.1016/j.aca.2004.03.047
9. Economou, A. (2005). Bismuth-film electrodes: Recent developments and potentialities for electroanalysis. *TrAC Trends in Analytical Chemistry, 24*(4), 334–340. doi:10.1016/j.trac.2004.11.006
10. Ensafi, A. A., & Zarei, K. (2000). Simultaneous determination of trace amounts of cadmium, nickel and cobalt in water samples by adsorptive voltammetry using ammonium 2-amino-cyclopentene dithiocarboxylate as a chelating agent. *Talanta, 52*(3), 435–440. doi:10.1016/S0039-9140(00)00334-9

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026
11. FAO/WHO Codex Alimentarius Commission. (1995). *General standard for contaminants and toxins in food and feed: CXS 193-1995*. Codex Alimentarius Commission.

12. Gajan, R. J., Larry, D., & Capar, S. G. (1982). Determination of lead and cadmium in foods by anodic stripping voltammetry: I. Development of method. *Journal of the Association of Official Analytical Chemists, 65*(4), 970–977.

13. Huang, M., Chen, Y., Wang, J., & Li, X. (2025). Quantitative detection of toxic elements in food samples: Recent progress and analytical challenges. *Processes, 13*(10), 3361. doi:10.3390/pr13103361

14. Jovanovski, V., Hočevar, S. B., & Ogorevc, B. (2017). Bismuth electrodes in contemporary electroanalysis. *Current Opinion in Electrochemistry, 3*(1), 114–122. doi:10.1016/j.coelec.2017.07.010

15. Liu, N., Chen, X., Ma, H., & Li, Y. (2022). Improving the accuracy of stripping voltammetry detection of heavy metal ions in soil extracts by chemometric correction. *Analytica Chimica Acta, 1205*, 339742. doi:10.1016/j.aca.2022.339742

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FINTEX TEXNOLOGIYALARINING MOLIYAVIY XIZMATLAR RIVOJLANISHIGA TA'SIRI.

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Annotatsiya: Ushbu maqola fintex (moliyaviy texnologiyalar) sanoatining jahon moliyaviy xizmatlar tizimiga korsatayotgan ta'sirini keng qamrovli tahlil qilishga bag'ishlangan. Tadqiqot doirasida 2019-2024-yillar davridagi global fintex bozori ko'rsatkichlari, sarmoyaviy oqimlar, foydalanuvchilar bazasining kengayishi hamda turli mintaqalar bo'yicha farqlanishlar o'rganilgan. Maqolada fintexning moliyaviy inklyuzivlikka, to'lov tizimlari samaradorligiga, kredit resurslariga kirish imkoniyatlariga va moliyaviy barqarorlikka ko'rsatadigan ijobiy hamda salbiy ta'sirlari bayon etilgan. O'zbekiston misolida mahalliy fintex ekotizimining rivojlanish holati, 2020 -2023-yillardagi statistik ko'rsatkichlar tahlili amalga oshirilgan. Tadqiqot natijalari shuni ko'rsatadiki, fintex texnologiyalari moliyaviy xizmatlar samaradorligini o'rtacha 23 -40% ga oshirib, xarajatlarni esa 30 -50% ga kamaytirish salohiyatiga ega.

Kalit so'zlar: fintex, moliyaviy texnologiyalar, raqamli to'lovlar, moliyaviy inklyuzivlik, neo-banklar, blockchain, open banking, moliyaviy xizmatlar.

Аннотация: Данная статья посвящена всестороннему анализу влияния индустрии финтех (финансовых технологий) на глобальную систему финансовых услуг. В рамках исследования изучены показатели мирового рынка финтех за период 2019-2024 гг., инвестиционные потоки, расширение пользовательской базы, а также региональные различия. В статье описываются положительные и отрицательные эффекты воздействия финтеха на финансовую инклюзивность, эффективность платежных систем, доступность кредитных ресурсов и финансовую стабильность. На примере Узбекистана проведен анализ состояния развития отечественной финтех-экосистемы и статистических показателей за 2020 -2023 гг. Результаты исследования показывают, что финтех-технологии способны повысить эффективность финансовых услуг в среднем на 23 -40% при одновременном снижении затрат на 30 -50%.

Ключевые слова: финтех, финансовые технологии, цифровые платежи, финансовая инклюзивность, необанки, блокчейн, открытый банкинг, финансовые услуги.

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Abstract: This article is dedicated to a comprehensive analysis of the impact of the fintech (financial technology) industry on the global financial services system. Within the scope of the study, global fintech market indicators, investment flows, user base expansion, and regional variations for the period of 2019 -2024 are examined. The paper outlines the positive and negative effects of fintech on financial inclusion, the efficiency of payment systems, access to credit resources, and financial stability. Taking Uzbekistan as a case study, an analysis of the development status of the domestic fintech ecosystem and statistical indicators for 2020 -2023 was conducted. The research findings indicate that fintech technologies have the potential to increase the efficiency of financial services by an average of 23 -40% while reducing costs by 30 -50%.

Keywords: fintech, financial technologies, digital payments, financial inclusion, neo-banks, blockchain, open banking, financial services.

Kirish

Moliya sohasi tarixi davomida inqilobiy o‘zgarishlarni boshdan kechirgan bo‘lsa-da, XXI asrning ikkinchi o‘n yilligida yuz bergan raqamli texnologiyalar to‘lqini bu sohani mutlaqo yangi bosqichga olib kirdi. “Fintex” (inglizcha: financial technology) atamasi dastlab 1972-yilda Bettinger tomonidan bank modellari kontekstida qo‘llangan bo‘lsa ham [1], zamonaviy ma’noda ushbu tushuncha 2008-yilgi global moliyaviy inqirozdan so‘ng shakllangan yangi moliya-texnologiya paradagmasini ifodalaydi [2]. Fintex texnologiyalari bugungi kunda an’anaviy bank va moliya institutlarining paradigmatik qayta ko‘rib chiqilishini talab qilmoqda. Global fintex bozori 2023-yilda 294 milliard dollardan oshib, 2028-yilga kelib 698 milliard dollarga yetishi prognoz qilinmoqda [3]. Raqamli to‘lovlar, neo-banklar, peer-to-peer kreditlash, robo-maslahatchilar, insurtech va blockchain texnologiyalari bularning barchasi moliyaviy xizmatlar landshaftini tubdan o‘zgartirmoqda. Shu bilan birga, fintex rivojlanishi bir qator muammolarni ham keltirib chiqarmoqda: kiberxavfsizlik tahdidlari, tartibga solish tizimining nomuvofiqliği, moliyaviy barqarorlik risklari va ma’lumotlar maxfiyligi masalalari [4].

Mavzuga oid adabiyotlar sharhi.

Schueffel (2016) fintexni “yangi moliyaviy xizmatlarni yetkazib berish yoki mavjud xizmatlarni yangicha usulda ko‘rsatish maqsadida texnologik innovatsiyalardan foydalanadigan yangi moliyaviy sanoat” deb ta’riflaydi [5]. Arner, Barberis va Buckley (2015) esa fintexning evolyutsiyasini uch bosqichda ko‘rib chiqadi: Fintex 1.0 (1866 -1967) moliyaviy globallashuv infratuzilmasi; Fintex 2.0 (1967 -2008) an’anaviy raqamli moliya xizmatlari; Fintex 3.0 (2008-yildan hozirgi kunga qadar) inqirozdan keyingi raqamli moliya inqilobi. Gomber va boshq. (2018)

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fintexni innovatsiya, disruptsiya va transformatsiya kuchlari kesishmasida joylashgan hodisa sifatida tavsiflaydi. Tadqiqotchilar fintexning bank sektoriga ta’sirini uch ko‘rinishda ko‘rib chiqadi: raqobatchilik, hamkorlik va gibrid modellar [6]. World Bank (2024) ma’lumotlariga ko‘ra, jahon aholisining taxminan 1.4 milliarddan ortiq qismi hali ham rasmiy moliya tizimidan chetda qolmoqda. Fintex texnologiyalari, xususan mobil pulkontlar va agent-banking tizimlari, ushbu masalani hal etishda muhim rol o‘ynamoqda [7]. Ozili (2018) raqamli moliyaning moliyaviy inklyuzivlik va barqarorlikka ta’sirini o‘rganib, raqamli moliya xizmatlarining kengayishi moliyaviy barqarorlikni oshirganligi hamda moliya sektorini yanada samarali va inkluziv qilganligi haqida dalillar taqdim etadi [8]. Biroq tadqiqotchi raqamli moliyaning kiberxavfsizlik va ma’lumotlar maxfiyligiga bog‘liq risklarini ham ta’kidlaydi.

Fintexning iqtisodiy samaradorligiga ta’siri.

Philippon (2016) to‘lov xizmatlari xarajatlarini tarixiy tahlil qilish orqali fintex texnologiyalarining moliyaviy vositachilik xarajatlarini sezilarli darajada kamaytirish imkoniyatini ko‘rsatib bergan [9]. Uning hisob-kitoblariga ko‘ra, raqamli texnologiyalar orqali moliyaviy vositachilik xarajatlari 1 foiz punktga kamayishi mumkin bo‘lib, bu yiliga yuz milliardlab dollar tejashga to‘g‘ri keladi. IMF (2023) tahlili shuni ko‘rsatadiki, fintex moliyaviy inklyuzivlikni kengaytirish va moliyaviy xizmatlar samaradorligini oshirish uchun katta imkoniyatlar taqdim etsada, bir vaqtning o‘zida tizimsiz risklarni ham kuchaytirishi mumkin [10].

Tadqiqot metodologiyasi.

Ushbu maqolada miqdoriy va sifat tahlili, qiyosiy tahlil hamda statistik umumlashtirish usullaridan foydalanilgan. Tadqiqotda birlamchi ma’lumotlar sifatida O‘zbekiston Markaziy bankining rasmiy statistik ma’lumotlari [11], ikkilamchi ma’lumotlar sifatida esa Jahon banki, IMF, Ernst & Young, McKinsey & Company va KPMG hisobotlari qo‘llanilgan. Ma’lumotlar 2024-yilning birinchi yarim yilligida yig‘ilgan bo‘lib, ularning dinamikasi va o‘zaro bog‘liqligi tavsifiy-statistik yondashuv asosida tahlil qilingan.

Tahlil va natijalar.

Global fintex bozori dinamikasi.

Global fintex bozori so‘nggi besh yilda ajoyib sur’atlarda o‘sdi. Quyidagi jadval va diagrammalar ushbu tendensiyalarni yaqqol ko‘rsatib beradi:

1-Jadval.

Global fintex bozorining asosiy ko‘rsatkichlari (2019 -2028).[1]

[1] Statista (2025), Ernst & Young (2024) ma’lumotlari asosida muallif tomonidan tuzilgan.

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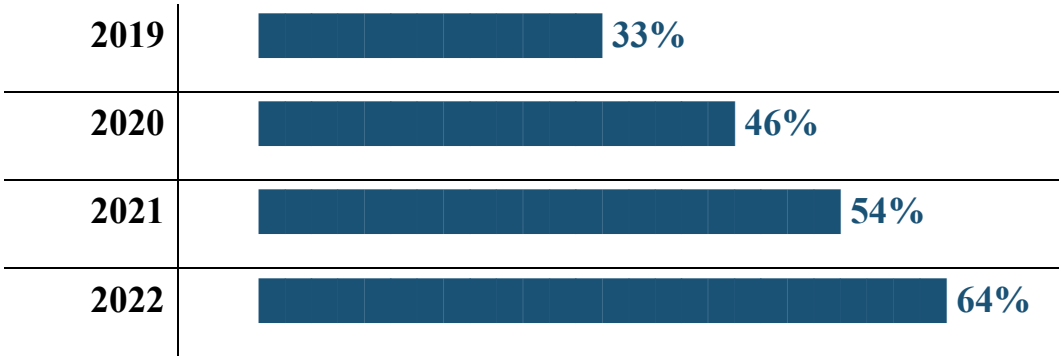
Yil	Bozor hajmi (mlrd $)	O‘sish sur’ati (%)	Foydalanuvchilar (mln)	Qabul koeffitsienti (%)
2019	127.8	-	1,900	33
2020	149.4	+16.9	2,300	46
2021	179.9	+20.4	2,750	54
2022	226.7	+26.0	3,100	64
2023	294.0	+29.7	3,650	72
2024	340.1	+15.7	4,100	76
2028 (prognoz)	698.5	CAGR: 15.9	5,800	88

1-jadval ma’lumotlaridan ko‘rinib turibdiki, global fintex bozori 2019-yildagi 127.8 milliard dollardan 2023-yilda 294 milliard dollarga yetib, besh yil ichida 2.3 baravar oshgan. Foydalanuvchilar qabul koeffitsienti esa 33%dan 72%ga ko‘tarilgan, bu esa moliyaviy xizmatlar demokratlashuvining aniq isbotidir.

1-Diagramma.

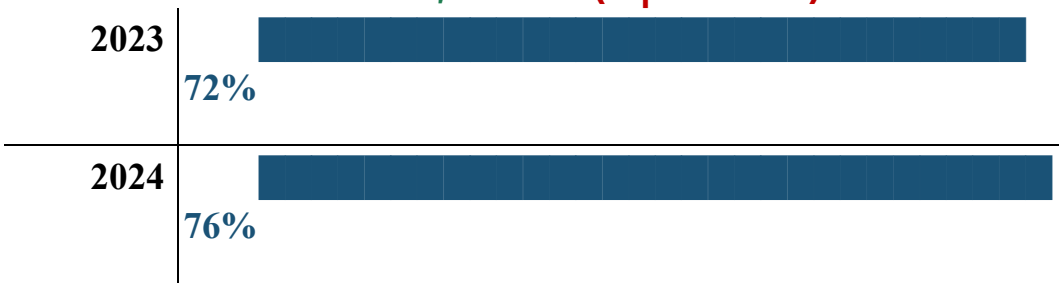
Fintex texnologiyalarini global qabul koeffitsienti dinamikasi (%).

Yillar bo‘yicha fintexdan foydalanish darajasi.[2]



[2] Ernst & Young Global FinTech Adoption Index (2024).

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Fintex sohalari bo‘yicha tahlil.

Fintex sanoatining turli segmentlari o‘ziga xos rivojlanish sur’atlariga ega. 2-jadval asosiy soha ko‘rsatkichlarini qiyosiy ko‘rsatib beradi:

2-Jadval.

Fintex sohalari bo‘yicha bozor ulushi va o‘sish sur’atlari (2023).[3]

Fintech sohasi	2023 yil ulushi (%)	O‘sish sur’ati (%)	Asosiy namoyandalar
Raqamli to'lovlar	38.2	+22.4	PayPal, Stripe, Alipay
Neo-banklar	18.7	+34.1	Revolut, N26, Chime
Kreditlash platformalari	15.3	+19.8	LendingClub, Prosper
Crypto/Blockchain	12.1	+41.6	Coinbase, Binance
InsurTech	8.4	+28.3	Lemonade, Oscar
WealthTech / RegTech	7.3	+31.2	Betterment, Wealthfront

[3] PricewaterhouseCoopers (2024), KPMG (2024) ma’lumotlari asosida muallif tomonidan tuzilgan.

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2-jadvaldan ko‘rinib turibdiki, raqamli to‘lovlar (38.2%) eng yirik segment bo‘lib qolmoqda. Biroq eng tez o‘suvchi soha Crypto/Blockchain (41.6%) va neo-banklar (34.1%) hisoblanadi. InsurTech (28.3%) ham jadal rivojlanmoqda, bu sug‘urta sohasida raqamli transformatsiyaning tezlashayotganini ko‘rsatadi.

Fintexga global sarmoyalar 2021-yilda rekord ko‘rsatkich 250 milliard dollarga yetib, keyingi yillarda biroz kamaygan. Bu asosan foiz stavkalarining oshishi va

Mintaqa	2021 (mlrd $)	2022 (mlrd $)	2023 (mlrd $)	Yetakchi yo‘nalish
Shimoliy Amerika	108.2	86.4	78.3	Neo-banklar, WealthTech
Osiyo Tinch okeani	72.4	64.1	59.7	Raqamli to‘lovlar
Evropa	46.8	37.3	32.5	Open Banking, RegTech
Lotin Amerikasi	19.6	15.3	13.1	Kreditlash
Markaziy Osiyo va MDH	3.4	4.1	5.2	Mobil to‘lovlar
JAMI	**250.4**	**207.2**	**188.8**	-

umumiy iqtisodiy noaniqliklar bilan bog‘liq.

3-Jadval.

Mintaqalar bo‘yicha fintexga sarmoyalar (mlrd $).

3-jadval ko‘rsatishicha, Markaziy Osiyo va MDH mintaqasi hissasi nisbatan kichik (2023-yilda 5.2 mlrd dollar) bo‘lsa-da, ushbu ko‘rsatkich o‘sib bormoqda. Bu mintaqada raqamli to‘lovlar va mobil banking asosiy yo‘nalish sifatida ajralib turibdi.

O‘zbekistonda fintex rivojlanishi.

O‘zbekiston 2017-yildan boshlab amalga oshirilayotgan keng qamrovli iqtisodiy islohotlar doirasida raqamli moliya infratuzilmasini jadal rivojlantirmoqda. 2019-yilda qabul qilingan “Raqamli O‘zbekiston” strategiyasi va PF-5741-son Farmon raqamli transformatsiyaning huquqiy asosini yaratdi.

4-Jadval.

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O‘zbekistonda fintex rivojlanishining asosiy ko‘rsatkichlari (2020 -2023).[4]

Ko‘rsatkich	2020	2021	2022	2023
Elektron to‘lovlar (mln. ta)	890.4	1,234.6	1,987.3	2,845.1
Mobil banking foydalanuvchilari (mln.)	4.2	6.8	9.4	12.7
Bank kartalarining tarqalishi (%)	48.3	54.7	62.1	71.4
Internet-banking operatsiyalari (mlrd so‘m)	12,400	18,700	27,300	38,900
Fintech startaplari soni	34	47	68	94
Moliyaviy inklyuzivlik darajasi (%)	56.8	61.3	67.4	74.2

2-Diagramma.

O‘zbekistonda elektron to‘lovlar hajmining o‘sishi (mln. operatsiya).

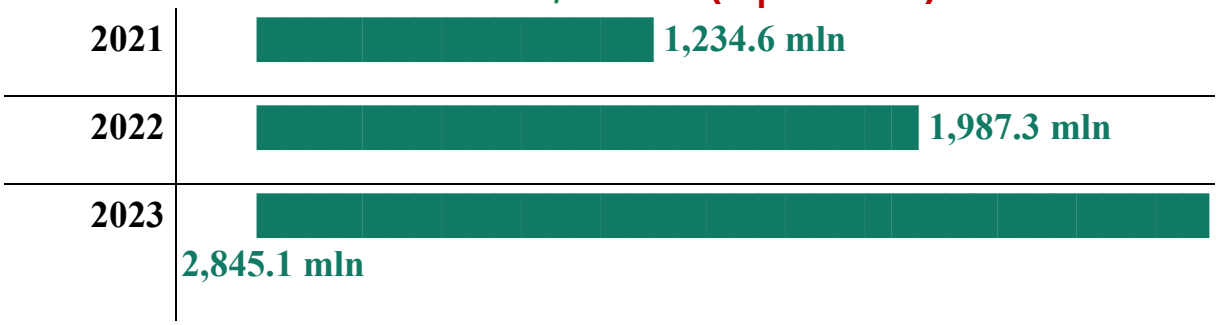
Yillar bo‘yicha elektron to‘lovlar soni.[5]



[4] O‘zbekiston Respublikasi Markaziy banki (2024) ma’lumotlari asosida tuzilgan.

[5] O‘zbekiston Respublikasi Markaziy banki (2024).

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4-jadval va 2-diagramma O‘zbekistonda elektron to‘lovlar soni 2020-yildagi 890.4 million operatsiyadan 2023-yilda 2,845.1 million operatsiyaga yetganini, ya’ni 3.2 baravar o‘sganini ko‘rsatmoqda. Mobil banking foydalanuvchilari soni 4.2 milliondan 12.7 millionga yetib, 3 barobar ortgan. Moliyaviy inklyuzivlik darajasi esa 56.8%dan 74.2%ga ko‘tarilgan.

Fintexning an’anaviy moliya tizimiga ta’siri: taqqoslama tahlil.

Tadqiqot natijalari fintex texnologiyalarining an’anaviy moliyaviy xizmatlar bilan solishtirganda quyidagi asosiy ustunliklarini ko‘rsatdi. Fintex to‘lov operatsiyalari xarajati an’anaviy banklarga nisbatan 30 -60% kam. Xususan, xalqaro pul o‘tkazmalari uchun komissiya 5-7%dan 1-2%gacha tushgan. 24/7 xizmat ko‘rsatish, real vaqt rejimidagi to‘lovlar (RTP) va oniy kredit qarorlari (2-3 soniya vs an’anaviy 2-7 kun). Fintex xizmatlaridan foydalanish uchun faqat smartfon va internet aloqasi yetarli, bu esa an’anaviy bank infratuzilmasi yetishmaydigan hududlardagi aholini ham qamrab oladi. Sun’iy intellekt va Big Data asosidagi kredit skoring an’anaviy metodlarga nisbatan 40% aniqroq bashorat qilish imkonini beradi (McKinsey, 2024).

Xulosa

Fintex texnologiyalari moliyaviy xizmatlar sektorida tub o‘zgarishlarni yuzaga keltirib, an’anaviy moliya institutlarining raqobatbardoshligiga jiddiy tahdid solmoqda. Global bozor 2028-yilga kelib 698.5 milliard dollarga yetishi bashorat qilinmoqda. Fintex moliyaviy inklyuzivlikni kengaytirish nuqtai nazaridan g‘oyat katta salohiyatga ega. O‘zbekiston tajribasi bu borada yaqqol misoldir: 2020 -2023-yillar davomida moliyaviy inklyuzivlik darajasi 17.4 foiz punktga oshdi. Fintex sanoatiga sarmoyalar 2021-yilgi rekord ko‘rsatkichdan keyingi yillarda biroz qisqargan bo‘lsa ham, strukturaviy o‘sish tendensiyasi saqlanib qolmoqda. Neo-banklar, blockchain va insurtech kabi segmentlar o‘z sur’atlarini saqlab qolmoqda. O‘zbekiston fintex bozori jadal sur’atlarda rivojlanmoqda: elektron to‘lovlar soni 3.2 baravar, mobil banking foydalanuvchilari esa 3 baravar oshdi. Biroq Markaziy Osiyo mintaqasi uchun tarkibiy muammolar tarmoq infratuzilmasi, raqamli savodxonlik va regulyator tizimning moslashuvchanligi hali ham dolzarb bo‘lib qolmoqda.

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Tadqiqot natijalaridan kelib chiqib, O‘zbekistonda fintex ekotizimini yanada rivojlantirish uchun raqamli infratuzilmani kengaytirish, kiberxavfsizlik standartlarini kuchaytirish, startaplarni qo‘llab-quvvatlash mexanizmlarini takomillashtirish hamda moliyaviy savodxonlik darajasini oshirish maqsadga muvofiqdir. Shuningdek, banklar va fintex kompaniyalari o‘rtasidagi hamkorlikni kengaytirish moliyaviy xizmatlar sifati va ommabopligini oshirishga xizmat qiladi.

Izoh: maqolada keltirilgan statistik ma’lumotlar Markaziy bank, xalqaro tashkilotlar va konsalting kompaniyalari hisobotlari asosida umumlashtirilgan.

Foydalanilgan adabiyotlar ro‘yhati.

1. O‘zbekiston Respublikasi Markaziy banki. (2024). O‘zbekiston moliya bozori monitoringi. O‘zbekiston Respublikasi Markaziy banki.
2. O‘zbekiston Respublikasi Prezidentining 2019-yil 3-iyuldagi PF-5741-son Farmoni “O‘zbekiston Respublikasini yanada rivojlantirish bo‘yicha Harakatlar strategiyasi to‘g‘risida”. O‘zR Qonun hujjatlari ma’lumotlar bazasi.
3. Xolmatov, D., & Ergashev, B. (2023). O‘zbekistonda raqamli moliya xizmatlarining rivojlanishi: imkoniyatlar va muammolar. Iqtisodiyot va innovatsion texnologiyalar, 4(2), 112 -128.
4. O‘zbekiston Respublikasi Markaziy banki. (2024). O‘zbekiston moliya bozori monitoringi. Toshkent: O‘zbekiston Respublikasi Markaziy banki.
5. Ernst & Young. (2024). Global FinTech Adoption Index 2024. EY Global Publication.
6. McKinsey & Company. (2024). The 2024 McKinsey Global Payments Report. McKinsey & Company.
7. KPMG. (2024). Pulse of Fintech H2 2023: Global Analysis of Investment in Fintech. KPMG International.
8. Bettinger, A. (1972). FINTECH: A series of 40 time-shared models used at manufacturers Hanover Trust. Interfaces, 2(4), 62-63.
9. Arner, D. W., Barberis, J., & Buckley, R. P. (2015). The Evolution of Fintech: A New Post-Crisis Paradigm? Georgetown Journal of International Law, 47(4), 1271-1319.
10. Statista. (2025). Global fintech market size 2019-2028. Statista Research Department.
11. Basel Committee on Banking Supervision. (2018). Sound Practices: Implications of Fintech Developments for Banks and Bank Supervisors. Bank for International Settlements.

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O‘ZBEK TILIDA UNLI TOVUSHLARNING FONOLOGIK VA AKUSTIK-FONETIK SATHI

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Annotatsiya : Mazkur maqolada o‘zbek tilidagi unli tovushlarning fonologik va akustik-fonetik sathlari kompleks tarzda tadqiq etiladi. Tadqiqot jarayonida hozirgi o‘zbek adabiy tilining vokalizmlar tizimi ilmiy manbalar asosida tahlil qilinib, unli fonemalarning fonologik xususiyatlari, ya’ni ma’no farqlashdagi funksional roli izchil yoritiladi. Xususan, o‘zbek tilida mavjud bo‘lgan asosiy unli fonemalar – /a/, /e/, /i/, /o/, /u/, /o‘/ – ning tizimi, ularning fonologik oppozitsiyalari hamda artikulyatsion belgilariga asoslangan tasnifi ilmiy asosda bayon etiladi.

Kalit so‘zlar. O‘zbek tili, fonologiya, fonema unli tovushlar,undosh tovushlar akustik fonetika, vokal tizim, artikulyatsiya, akustik xususiyatlar, formantlar, tovush chastotasi.

Аннотация: В данной статье всесторонне изучены фонологический и акустико-фонетический уровни гласных звуков в узбекском языке. В ходе исследования на основе научных источников анализируется вокальная система современного узбекского литературного языка, последовательно выделяются фонологические свойства гласных фонем, то есть их функциональная роль в различении значений. В частности, научно описана система основных гласных фонем узбекского языка — /a/, /e/, /i/, /o/, /u/, /o‘/, их фонологические оппозиции и классификация на основе артикуляционных знаков.

Ключевые слова: Узбекский язык, гласные, фонология, акустическая фонетика, фонема, голосовая система, артикуляция, акустические свойства, форманты, частота звука.

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Abstract: This article comprehensively studies the phonological and acoustic-phonetic levels of vowels in the Uzbek language. In the course of the research, the vocal system of the modern Uzbek literary language is analyzed based on scientific sources, and the phonological properties of vowel phonemes, that is, their functional role in distinguishing meaning, are consistently highlighted. In particular, the system of the main vowel phonemes in the Uzbek language - /a/, /e/, /i/, /o/, /u/, /o‘/ - is scientifically described, their phonological oppositions and classification based on articulatory signs.

Keywords: Uzbek language, vowels, phonology, acoustic phonetics, phoneme, vocal system, articulation, acoustic properties, formants, sound frequency.

Tovush (tilshunoslikda) nutq, tovushi kishining murakkab artikulyatsion faoliyati natijasi hisoblangan, muayyan akustik (eshitilish) va perseptiv (idrok etilish) xususiyatlari bilan ajralib turadigan eng kichik nutq birligi hisoblanadi. Talaffuz usuliga muvofiq holda tovushning akustikasi, artikulyatsiyasi va persepsiyasi haqida fikr yuritiladi. Har bir nutq tovushi artikulyatsion jihatdan talaffuz a’zolarining murakkab harakati natijasida paydo bo‘ladi. Akustik jihatdan esa, har qanday boshqa tovush singari, havo muhiti orqali tarqaladigan tebranma harakat sifatida ta’riflanishi mumkin. Nutq tovushlarini hosil qiluvchi vosita (tebrantiruvchi kuch) o‘pkadan nafas yo‘li orqali chiqib, avval bo‘g‘izga va undan og‘iz bo‘shlig‘iga, ba’zan burun bo‘shlig‘iga o‘tadigan havo oqimidir. Ovoz (un), asosan, bo‘g‘izda hosil bo‘ladi. Unda ko‘ndalang joylashgan elastik, yupqa tovush (un) paychalari mavjud bo‘lib, so‘zlash paytida o‘pkadan chiqayotgan havoning kuchi bilan titraydi va ovoz hosil qiladi. Unlilar, sonorlar va jarangli undoshlardagi ovoz ana shuning natijasidir. Bo‘g‘iz orqali o‘tgan havo oqimi til, tanglay, tish yoki ikki labning to‘sqinligiga duch kelib, shovqin paydo qiladi, natkjada jarangsiz undoshlar hosil bo‘ladi.Tovushlar so‘z va grammatik ko‘rsatkichlarni shakllantirish hamda ularni birbiridan farqlash, ajratish uchun xizmat qiladi. Bunday xususiyatli Tovushlar fonema deb yuritiladi, biroq barcha Tovush ham fonema bo‘la olmaydi. Tovush (fonema)lar bir necha jihatdan tasnif qilinadi. Ovoz va shovqinning ishtirok etish darajasiga ko‘ra, ular avvalo 2 ga bo‘linadi: unli tovushlar va undosh tovushlar. Unli tovush deb o‘pkadan chiqayotgan havo oqimining og‘iz bo‘shlig‘ida hech qanday to‘siqqa uchramay chiqishidan hosil bo‘ladigan tovush unli hisoblanadi.Unli tovushlar – og‘iz va bo‘g‘iz bo‘shlig‘ida hech qanday to‘siqqa uchramay hosil bo‘ladigan, tarkibi ovozdan iborat (shovqin deyarli ishtirok etmaydigan) tovushlar. Har bir til o‘ziga xos unlilar tizimiga ega. Tildagi unlilar tizimi **vokalizm** (lotincha: vocalis – unli tovush) deyiladi. Unli tovushlar soni turli tillarda turlichadir. Masalan, hozirgi o‘zbek adabiy tilida unli tovushlar 6 ta bo‘lsa, boshqa turkiy tillarda 8 ta, 10 ta va undan ham ortiqdir. Bu miqdor rus tilida 5 tani, fransuz tilida esa 18 tani tashkil etadi.Unli tovushlar bir necha jihatdan tasnif etiladi. Bu tasniflarning o‘zbek tilidagi 6 ta unli fonema (i, e, a, o, u,

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o‘) misolida ko‘rib chiqish mumkin. Unlilar dastlab tilning harakati va labning holati (ishtiroki) nuqtayi nazaridan turlarga ajratiladi. **Tilning harakatida 2 hodisa farqlanadi:**

- ❖ tilning yotiq (yonlama) harakati;
- ❖ tilning tik (vertikal) harakati.

Tilning yotiq (yonlama) harakatida hosil bo‘lish o‘rniga ko‘ra unlilar **2 turga** bo‘linadi:

- til oldi (yoki old qator) unlilari – i, e, a;
- til orqa (yoki orqa qator) unlilari – o, u, o‘.

Tilning tik harakatiga ko‘ra unli tovushlar **3 turga** bo‘linadi:

1.Yuqori ko‘tarilish unlilari (i, u);

2.O‘rta ko‘tarilish unlilari (e, o‘);

3. Quyi ko‘tarilish unlilari (a, o).

Labning holati (ishtiroki)ga ko‘ra unlilar 2 ga bo‘linadi:

- lablangan unlilar (u, o‘,o)
- lablanmagan unlilar (i, e, a,).

Lablangan unlilar talaffuz qilingan vaqtda lablar faol ishtirok etadi: lab cho‘chchayib, oldinga chiqadi, dumaloq shakl oladi. Lablanmagan unlilar talaffuzida lablar ishtirok etmaydi yoki lablar ishtiroki passiv bo‘ladi.Tovushning hosil bo‘lishida ketadigan vaqtning miqdoriga ko‘ra unli tovushlar 2 turga bo‘linadi: cho‘ziq unli; qisqa unli. Cho‘ziq unli davomli (cho‘ziq) talaffuz etiladigan unli tovushlardir. Bunday tovushlar ko‘pincha ma’no farqlash uchun xizmat qiladi. Bu hodisa turkiy tillarning ba’zilarida, shuningdek, ayrim o‘zbek shevalarida uchraydi. Masalan, turkman tilida a:ch (qornim och) va ach (eshikni och), ba:r (menda bor) va bar (ishga bor), a:t (nom, ism) va at (yilqi) va boshqa Qisqa unlilar talaffuziga cho‘ziq unliga nisbatan oz vaqt ketadi.Shuni alohida ta’kidlash kerakki, fonologik oppozitsiya turli til tovushlarini qarama-qarshi qo‘yishga asoslanmaydi, chunki u muayyan bir tilning struktural birligidir va shu tilning o‘zigagina xizmat qiladi. Qolaversa, fonologik oppozitsiyalar hozirgi (amaldagi) tilning strukturaviy birliklari sanaladi, ular tarixan o‘zgarib turishi ham mumkin. Masalan, qadimgi turkiy va eski turkiy tillarda unli fonemalar tilning yotiq (gorizontal harakatiga ko‘ra old qator va orqa qator zidlanishlariga ega bo‘lgan: (i-i) +(ɣ-u) + (Ɵ-o) + (ə-a) kabi. Hozirgi o‘zbek adabiy tilida esa bunday zidlanish o‘zining fonologik xususiyatini yo‘qotgan fonemalar konvergensiyasi natijasida i-i unlilari bitta i ga, ɣ-u unlilari bitta u ga, Ɵ-o unlilari bitta o‘ ga, ə-a unlilari esa bitta a ga birlashgan.Demak, fonologik oppozitsiyalar til taraqqiyotining muayyan bosqichiga nisbatan belgilanadi, ayni shu bosqichda bir fonema boshqa fonemaga bir xil pozitsiyada

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qarama-qarshi qo‘yiladi: hozirgi o‘zbek adabiy tilidagi „ i va u unlilari so‘z boshida (ich va uch) yoki bir xil fonetik qurshovda (bir va bur, qish va qush) bir-biriga qarama-qarshi qo‘yilgani kabi. Demak, “oppozitsiya" tushunchasi "fonema" va „pozitsiya“ tushunchalari bilan uzviy bog‘liqdir: fonemaning bo‘lishi oppozitsiyaning bo‘lishini, oppozitsiyaning bo‘lishi esa pozitsiyaning bo‘lishini taqozo qiladi".

Eslatma: “pozitsiya”kategoriyasini birinchi bo‘lib hamyurtimiz Muhammad ibn Muso al-Xorazmiy (780-850) kashf etgan. U o‘zining “Hind arifmetikasi haqida kitob” (“Hisob al-hind”) asarida o‘nlik sistemasi raqamlaridan (0, 1, 2, 3, 4, 5, 6, 7, 8, 9) foydalanib, katta sonlarni yozish tizimini ishlab chiqqan. Bu tizimga ko‘ra raqam birinchi pozitsiyada birlikni, ikkinchi pozitsiyada o‘nlikni, uchinchi pozitsiyada yuzlikni (to‘rtinchi, beshinchi,… pozitsiyalarda yanada kattaroq sonlarni) ifodalaydi: 0 (nol), 1 (bir), 10 (o‘n), 100 (yuz); 2 (ikki), 20 (yigirma), 200 (ikki yuz) kabi. Keyinchalik “pozitsiya” tushunchasi til tizimiga ham tatbiq etilgan va fonologik oppozitsiya tushunchasining yuzaga kelishiga sabab bo‘lgan.Til tovushini yozib tasvirlashda asosan amaliy yozuvga xizmat qiladigan alifbodan foydalaniladi. Lekin hozirgi amaliy alifboda “bir tovush-bir harf munosabatiga to‘liq erishilmagani sabab til tovushlari tizimini tasvirlashda alifboga qo‘shimcha harflar kiritiladi. Ushbu darslikda hozirgi adabiy o‘zbek tilining tovushlar tizimi hozir joriy etilgan o‘zbek lotin alifbosiga kompyuter xotirasidagi kengaytirilgan lotin alifbosi imkoniyatlaridan foydalanib quyidagi o‘zgarishlarni kiritgan holda tasvirlandi:

1. o harfi o‘rta-tor tovushni ifodalash uchun ishlatilib, o‘ harfidan foydalanilmadi;

2. O‘zbek tilining lablashgan keng tovushi a harfi bilan ifodalandi;

3. j harfi sirg‘aluvchi tovushni ifodalash uchun qoldirilib , portlovchi tovush c harfi bilan ifodalandi;

4. ch harflar tizmasi o‘rniga c harfi , sh harflar tizmasi o‘rniga s harfi , ng harflar tizmasi o‘rniga n harfi , g‘ harfi o‘rniga g harfi ishlatildi.

1.Tilning uch darajali ko‘tarilish belgisiga ko‘ra:

a) i (yuqori tor unli) – e (o‘rta keng unli) = i-e oppozitsiyasi;

b) e (o‘rta keng unli) – a (quyi keng unli) = e-a oppozitsiyasi;

d) i (yuqori tor unli) – a (quyi keng unli) = i-a oppozitsiyasi;

e) u (yuqori tor unli) – o‘ (o‘rta keng unli) = u-o‘ oppozitsiyasi;

f) o‘ (o‘rta keng unli) -o (quyi keng unli) = o‘-o oppozitsiyasi;

g) u (yuqori tor unli) – o (quyi keng unli) = u-o oppozitsiyasi.

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2. Lablanish-lablanmaslik belgisiga ko‘ra;

a) i (lablanmagan) – u (lablangan) = i-n oppozitsiyasi;

b) e (lablanmagan) – o‘ (lablangan) = e-o‘ oppozitsiyasi;

d) a (lablanmagan) – o (lablangan) = a-o oppozitsiyasi.

Unli fonemalar paradigmasi. Tilning ko‘tarilish darajasi(yuqori o‘rta, quyi) va lablanish lablanmaslik-kuchli pozitsiyadagi unli fonemalarning asosiy sistema hosil qiluvchi belgisi.Unlilarning gorizontal holatiga ko‘ra old qator, o‘rta qator va orqa qator) belgilari asosiy hisoblanmaydi.Chunki bu belgilar ularga nutqiy yondosh tovush ta’sirida o‘zgarib boradi. Masalan,q undoshi bilan qo‘shnichilik munosabatida [a] unlisi til orqalik xossasiga ega bo‘lsa,[k] undoshi qurshovida o‘z holatini saqlaydi.

Xulosa qilib aytganda,Unli tovushlarni o‘rgatish jarayonining ilmiy-metodik asoslarini takomillashtirish bugungi ta'lim tizimining dolzarb yo‘nalishlaridan biri hisoblanadi. So‘nggi yillarda mamlakatimizda ta'lim sifatini oshirish, uning mazmunini yangi bosqichga olib chiqish yo‘lida Boshlang‘ich ta'limda ona tilini o‘qitish metodikasini takomillashtirishga katta e'tibor berilmoqda. Ayniqsa, yangi avlod darsliklarining kommunikativ va kognitiv- pragmatik yondashuvlar asosida yaratilayotgani yosh avlodni mustaqil fikrlaydigan, intellektual salohiyatli va har tomonlama yetuk insonlar sifatida kamol toptirishga xizmat qilmoqda. Shu boisdan, og‘zaki nutqni rivojlantirishga xizmat qiladigan ta'lim mazmuni va metodlarini takomillashtirish, unli tovushlarning to‘g‘ri talaffuziga oid qoidalar, mashqlar va topshiriqlar tizimini ishlab chiqish zaruriy vazifalardan biridir.

Foydalanilgan adabiyotlar ro‘yxati

1. Hozirgi o‘zbek adabiy tili, 1qism, T., 1980; Reformatskiy A. A, Vvedeniye yazikovedeniye, M., 1998.

2. Jamolxonov, H.. Hozirgi o‘zbek adabiy tili. Toshkent: Talqin, 2005.

3. R.Sayfullayeva, B.Mengliyev, G.Boqiyeva, M.Qurbonova, Z.Yunusova, M.Abduzalova. Hozirgi o‘zbek adabiy tili. 2009

4. Mirzayev.M, Usmonov.S, Rasulov.I, O‘zbek tili. “Tilshunoslikdan umumiy ma'lumot”.1978

5. Ne’matov H o‘zbek tilining tarixiy fonetikasi -T..,1992.

6. Shoabdurahmonov Shu, Asqarova M, Hojiyev A, Rasulov I, Doniyor X. Hozirgi o‘zbek adabiy tili 1-qism “O‘qituvchi”. T.., 1980

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ANKSIOLITIKLAR. SEDATIV VOSITALAR. M-XOLINORETSEPTORLARGA TA'SIR ETUVCHI VOSITALAR

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Annotatsiya

Ushbu maqolada anksiolitiklar, sedativ vositalar hamda M-xolinoretseptorlarga ta'sir etuvchi preparatlarning farmakologik xususiyatlari, ta'sir mexanizmlari, klinik qo'llanilishi va nojo'ya ta'sirlari tahlil qilindi. Tadqiqot davomida farmakologiya bo'yicha yetakchi xalqaro va mahalliy adabiyotlar, jumladan, Katzung, Goodman & Gilman hamda Mashkovskiy asarlaridagi ma'lumotlar o'rganildi. Anksiolitiklarning tashvish va qo'rquv holatlarini kamaytirishdagi, sedativ vositalarning markaziy nerv tizimini tinchlantirishdagi hamda M-xolinoretseptorlarga ta'sir etuvchi preparatlarning vegetativ nerv tizimi faoliyatini boshqarishdagi ahamiyati baholandi. Tahlillar ushbu preparatlarning zamonaviy tibbiyot amaliyotida keng qo'llanilishini, biroq ularni qo'llashda farmakokinetik va farmakodinamik xususiyatlarni hisobga olish zarurligini ko'rsatdi. Olingan natijalar farmakoterapiyani individuallashtirish va davolash samaradorligini oshirish uchun muhim ilmiy asos bo'lib xizmat qiladi.

Kalit so'zlar: anksiolitiklar, sedativ vositalar, M-xolinoretseptorlar, farmakologiya, benzodiazepinlar, atropin, farmakoterapiya.

Аннотация

В данной статье рассмотрены фармакологические свойства анксиолитиков, седативных средств и препаратов, воздействующих на М-холинорецепторы. Проведен анализ механизмов действия, клинического применения, фармакокинетики, фармакодинамики и побочных эффектов данных лекарственных средств на основе современных отечественных и зарубежных литературных источников, включая труды Katzung, Goodman & Gilman и Машковского. Особое внимание уделено роли анксиолитиков в снижении тревожности, седативных препаратов в угнетении центральной нервной системы

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и средств, влияющих на М-холинорецепторы, в регуляции функций вегетативной нервной системы. Полученные данные свидетельствуют о высокой эффективности данных групп препаратов в клинической практике при условии рационального выбора лекарственного средства и индивидуального подхода к терапии. Результаты исследования могут быть использованы для совершенствования фармакотерапии и повышения качества медицинской помощи.
Ключевые слова: анксиолитики, седативные средства, М-холинорецепторы, фармакология, бензодиазепины, атропин, фармакотерапия.
Abstract

This article reviews the pharmacological characteristics of anxiolytics, sedative agents, and drugs affecting muscarinic cholinergic (M-cholinergic) receptors. The study is based on a comprehensive analysis of authoritative pharmacology sources, including Katzung's Basic and Clinical Pharmacology, Goodman & Gilman's The Pharmacological Basis of Therapeutics, and Mashkovsky's Drug Reference. Mechanisms of action, pharmacokinetic and pharmacodynamic properties, clinical applications, and adverse effects of these drug groups were evaluated. Particular attention was paid to the role of anxiolytics in the management of anxiety disorders, sedative agents in central nervous system depression, and M-cholinoreceptor-active drugs in the regulation of autonomic nervous system functions. The findings demonstrate the significant therapeutic value of these medications in modern clinical practice while emphasizing the importance of individualized treatment approaches. The obtained results may contribute to improving pharmacotherapy effectiveness and optimizing patient care.
Keywords: anxiolytics, sedative agents, muscarinic receptors, pharmacology, benzodiazepines, atropine, pharmacotherapy.

Kirish

Zamonaviy tibbiyot amaliyotida markaziy va vegetativ nerv tizimiga ta’sir etuvchi dori vositalari alohida ahamiyat kasb etadi. Ruhiy-emotsional zo‘riqishlar, stress, xavotirli buzilishlar, uyquning buzilishi hamda vegetativ nerv tizimi faoliyatining izdan chiqishi bilan bog‘liq kasalliklarning ko‘payib borishi anksiolitiklar, sedativ vositalar va M-xolinoretseptorlarga ta’sir etuvchi preparatlarni keng qo‘llash zaruratini yuzaga keltirmoqda. Ushbu dori vositalari nafaqat simptomatik davolashda, balki ko‘plab kasalliklarning kompleks terapiyasida ham muhim o‘rin tutadi.

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Anksiolitiklar (trankvilizatorlar) tashvish, qo‘rquv, emotsional zo‘riqish va nevrotik holatlarni kamaytiruvchi preparatlar guruhi hisoblanadi. Ularning aksariyati gamma-aminomoy kislota (GAMK) tizimi orqali markaziy nerv tizimida tormozlovchi jarayonlarni kuchaytiradi. Benzodiazepin hosilalari, jumladan diazepam, lorazepam va alprazolam kabi preparatlar klinik amaliyotda keng qo‘llanilib, yuqori samaradorlikka ega bo‘lishiga qaramay, uzoq muddat qo‘llanganda qaramlik va tolerantlik rivojlanishi mumkinligi bilan tavsiflanadi.

Sedativ vositalar markaziy nerv tizimining qo‘zg‘aluvchanligini pasaytirib, organizmning tashqi ta’sirlarga bo‘lgan javob reaksiyasini me’yorlashtiradi. Ular nevrozlar, uyqusizlik, vegetativ disfunksiyalar hamda yurak-qon tomir tizimining funksional buzilishlarida keng qo‘llaniladi. Sedativ preparatlar orasida o‘simlik manbalaridan olingan vositalar, bromidlar va kombinatsiyalangan preparatlar muhim o‘rin egallaydi. Ushbu preparatlar nisbatan xavfsiz bo‘lib, kundalik klinik amaliyotda keng foydalaniladi.

M-xolinoretseptorlarga ta’sir etuvchi vositalar esa parasimpatik nerv tizimi faoliyatini boshqarishda muhim ahamiyatga ega. Ushbu guruh preparatlari M-xolinomimetiklar va M-xolinoblokatorlarga bo‘linadi. M-xolinomimetiklar parasimpatik nerv tizimi ta’sirini kuchaytirsa, M-xolinoblokatorlar aksincha M-xolinoretseptorlarni bloklab, ichki a’zolar silliq mushaklari, bezlar sekretsiyasi hamda yurak faoliyatiga ta’sir ko‘rsatadi. Atropin, skopolamin, tropikamid va ipratropiy bromid kabi preparatlar oftalmologiya, pulmonologiya, gastroenterologiya va anesteziologiya amaliyotida keng qo‘llaniladi.

So‘nggi yillarda ushbu preparatlar guruhining farmakodinamik va farmakokinetik xususiyatlarini chuqur o‘rganishga qaratilgan tadqiqotlar soni ortib bormoqda. Dori vositalarining selektivligini oshirish, nojo‘ya ta’sirlarini kamaytirish va davolash samaradorligini kuchaytirishga qaratilgan yangi farmakologik yondashuvlar ishlab chiqilmoqda. Shu sababli anksiolitiklar, sedativ vositalar va M-xolinoretseptorlarga ta’sir etuvchi preparatlarning zamonaviy farmakologik xususiyatlarini tahlil qilish dolzarb ilmiy va amaliy ahamiyatga ega.

Mazkur tadqiqotning maqsadi anksiolitiklar, sedativ vositalar hamda M-xolinoretseptorlarga ta’sir etuvchi preparatlarning ta’sir mexanizmlari, farmakologik xususiyatlari, klinik qo‘llanilishi va xavfsizlik ko‘rsatkichlarini ilmiy adabiyotlar asosida tahlil qilishdan iborat.

Materiallar va usullar

Mazkur tadqiqot anksiolitiklar, sedativ vositalar hamda M-xolinoretseptorlarga ta’sir etuvchi preparatlarning farmakologik xususiyatlarini o‘rganishga qaratilgan tizimli adabiyotlar tahlili asosida amalga oshirildi. Tadqiqotda farmakologiya sohasida

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xalqaro miqyosda tan olingan ilmiy manbalar, darsliklar, monografiyalar va klinik tavsiyalar ma’lumotlaridan foydalanildi.

Tadqiqot materiallari sifatida B.G. Katzungning *Basic and Clinical Pharmacology*, L.L. Brunton va hammualliflarning *Goodman & Gilman’s The Pharmacological Basis of Therapeutics*, M.D. Mashkovskiyning *Lekarstvennye sredstva*, shuningdek zamonaviy farmakologiya va klinik tibbiyotga oid ilmiy nashrlar tanlab olindi. Tadqiqotga 2015–2025-yillarda chop etilgan ilmiy maqolalar, klinik qo‘llanmalar va farmakoterapiya bo‘yicha tavsiyalar ham kiritildi.

Ma’lumotlarni yig‘ish jarayonida anksiolitiklar, sedativ vositalar, M-xolinomimetiklar va M-xolinoblokatorlarning farmakodinamikasi, farmakokinetikasi, ta’sir mexanizmi, qo‘llanilish sohalari hamda nojo‘ya reaksiyalari bo‘yicha ilmiy ma’lumotlar saralab olindi. Adabiyotlarni tanlashda ma’lumotlarning ishonchliligi, ilmiy asoslanganligi va klinik ahamiyati asosiy mezon sifatida qabul qilindi.

Tahlil jarayonida qiyosiy-farmakologik usul qo‘llanilib, turli preparatlar guruhlarining ta’sir mexanizmlari va terapevtik samaradorligi o‘zaro solishtirildi. Shuningdek, preparatlarning markaziy va periferik nerv tizimiga ta’siri, retseptorlar bilan o‘zaro bog‘lanish xususiyatlari hamda klinik amaliyotdagi o‘rni baholandi.

Olingan ma’lumotlar tavsifiy va analitik yondashuvlar yordamida umumlashtirildi. Natijalar farmakologik guruhlar kesimida tizimlashtirilib, ularning afzalliklari, cheklovlari va zamonaviy klinik amaliyotdagi ahamiyati ilmiy jihatdan tahlil qilindi. Tadqiqot davomida bioetika tamoyillariga rioya qilindi hamda faqat ochiq ilmiy manbalardan foydalanilganligi sababli inson yoki hayvonlarda qo‘shimcha eksperimental tadqiqotlar o‘tkazilmadi.

Natijalar

Adabiyotlar tahlili natijasida anksiolitiklar, sedativ vositalar va M-xolinoretseptorlarga ta’sir etuvchi preparatlar farmakologik ta’sir mexanizmlari, klinik qo‘llanilishi hamda xavfsizlik profili bo‘yicha sezilarli farqlarga ega ekanligi aniqlandi. Ushbu preparatlar nerv tizimi faoliyatini boshqarishda muhim o‘rin egallab, turli patologik holatlarda samarali farmakoterapevtik vosita sifatida qo‘llaniladi.

Anksiolitik preparatlar orasida benzodiazepin hosilalari eng keng qo‘llaniladigan guruh bo‘lib, ular GAMK-A retseptorlari orqali markaziy nerv tizimida tormozlovchi ta’sirni kuchaytiradi. Natijada tashvish, qo‘rquv, psixoemotsional zo‘riqish va uyqusizlik belgilari kamayadi. Shu bilan birga, uzoq muddatli qo‘llash qaramlik va tolerantlik rivojlanish xavfini oshirishi mumkin.

Sedativ vositalar markaziy nerv tizimining qo‘zg‘aluvchanligini pasaytirib, vegetativ buzilishlar va yengil nevrotik holatlarda ijobiy terapevtik samara ko‘rsatadi.

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O‘simlik preparatlari va bromidlar nisbatan xavfsizligi bilan ajralib turadi hamda uzoq muddat qo‘llash mumkin bo‘lgan vositalar sifatida tavsiflanadi.

M-xolinoretseptorlarga ta’sir etuvchi preparatlar orasida atropin va uning analoglari klinik amaliyotda keng qo‘llanilishi aniqlandi. Ular parasimpatik nerv tizimi ta’sirini susaytirib, bronxospazm, bradikardiya, me’da-ichak spazmlari va oftalmologik tekshiruvlarda samarali natija beradi. Biroq ushbu preparatlar og‘iz qurishi, taxikardiya, akkomodatsiya buzilishi kabi nojo‘ya ta’sirlarni yuzaga keltirishi mumkin.

1-jadval. Anksiolitik va sedativ preparatlarning farmakologik tavsifi

Preparat	Farmakologik guruhi	Ta’sir mexanizmi	Asosiy qo‘llanilishi	Muhim nojo‘ya ta’siri
Diazepam	Anksiolitik (benzodiazepin)	GAMK-A retseptorlarini faollashtiradi	Tashvish, nevroz, tutqanoq	Uyquchanlik, qaramlik
Lorazepam	Anksiolitik	GAMKergik tormozlanishni kuchaytiradi	Anksioz buzilishlar	Sedatsiya, xotira buzilishi
Alprazolam	Anksiolitik	Benzodiazepin retseptorlariga ta’sir qiladi	Panik buzilishlar	Tolerantlik, qaramlik
Valeriana ekstrakti	Sedativ vosita	Markaziy nerv tizimi qo‘zg‘aluvchanligini pasaytiradi	Uyqusizlik, nevrozlar	Allergik reaksiyalar
Korvalol	Kombinatsiyalangan sedativ	Sedativ va spazmolitik ta’sir	Nevroz, taxikardiya	Uyquchanlik, bosh aylanishi

2-jadval. M-xolinoretseptorlarga ta’sir etuvchi preparatlarning tavsifi

Preparat	Guruhi	Ta’sir mexanizmi	Qo‘llanilishi	Nojo‘ya ta’siri

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Atropin sulfat	M-xolinoblokator	M-xolinoretseptorlarni bloklaydi	Bradikardiya, oftalmologiya	Taxikardiya, og‘iz qurishi
Skopolamin	M-xolinoblokator	Parasimpatik impulslarni susaytiradi	Dengiz kasalligi, spazmlar	Uyquchanlik, ko‘rish buzilishi
Tropikamid	M-xolinoblokator	Qorachiqni kengaytiradi	Diagnostik oftalmologiya	Fotofobiya
Ipratropiy bromid	M-xolinoblokator	Bronxlar silliq mushaklarini bo‘shashtiradi	Bronxial astma, KOAH	Og‘iz qurishi
Pilokarpin	M-xolinomimetik	M-xolinoretseptorlarni qo‘zg‘atadi	Glaukoma	Ko‘p terlash, bradikardiya

Tahlillar shuni ko‘rsatdiki, anksiolitiklar va sedativ vositalar ruhiy-emotsional buzilishlarni davolashda samarali bo‘lsa, M-xolinoretseptorlarga ta’sir etuvchi preparatlar vegetativ nerv tizimi bilan bog‘liq ko‘plab patologik holatlarni korreksiya qilishda muhim ahamiyatga ega. Preparatlarni tanlashda ularning farmakokinetik xususiyatlari, ta’sir davomiyligi va nojo‘ya reaksiyalari albatta hisobga olinishi zarur. Olingan natijalar ushbu preparatlarning zamonaviy farmakoterapiyadagi muhim o‘rnini tasdiqlaydi va individual davolash strategiyalarini ishlab chiqish zarurligini ko‘rsatadi.

Muhokama

O‘tkazilgan adabiyotlar tahlili anksiolitiklar, sedativ vositalar va M-xolinoretseptorlarga ta’sir etuvchi preparatlar zamonaviy farmakoterapiyada muhim o‘rin tutishini ko‘rsatdi. Ushbu preparatlar markaziy va vegetativ nerv tizimi faoliyatini boshqarish orqali turli patologik holatlarni davolashda yuqori samaradorlik namoyon etadi. Tadqiqot natijalari xalqaro farmakologik manbalarda keltirilgan ma’lumotlar bilan mos keladi hamda ushbu preparatlar guruhining klinik ahamiyatini tasdiqlaydi.

Anksiolitik preparatlar orasida benzodiazepinlar tashvish va qo‘rquv bilan kechuvchi kasalliklarni davolashda “oltin standart” vositalardan biri hisoblanadi. Ularning terapevtik samarasi GAMKergik neyrotransmissiyani kuchaytirish bilan bog‘liq bo‘lib, qisqa vaqt ichida klinik natija beradi. Biroq ko‘plab tadqiqotlarda uzoq muddat qo‘llanganda tolerantlik, jismoniy va psixologik qaramlik rivojlanishi mumkinligi qayd etilgan. Shu sababli zamonaviy klinik amaliyotda benzodiazepinlarni qisqa

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muddatli kurslarda qo‘llash va zarurat bo‘lganda boshqa xavfsizroq preparatlar bilan almashtirish tavsiya etiladi.

Sedativ vositalarning tahlili ularning yengil va o‘rta darajadagi nevrotik buzilishlar, stress holatlari hamda uyqu buzilishlarida samarali ekanligini ko‘rsatdi. Ayniqsa o‘simlik asosidagi preparatlar nisbatan kam nojo‘ya ta’sirlarga ega bo‘lib, uzoq muddatli qo‘llash imkoniyatini yaratadi. Shu bilan birga, sedativ vositalarning terapevtik samarasi anksiolitiklarga nisbatan kuchsizroq bo‘lgani sababli og‘ir anksioz holatlarda monoterapiya sifatida yetarli bo‘lmasligi mumkin.

M-xolinoretseptorlarga ta’sir etuvchi preparatlar vegetativ nerv tizimi faoliyatini boshqarishda alohida ahamiyatga ega. M-xolinoblokatorlar, xususan atropin va ipratropiy bromidning klinik qo‘llanilishi keng bo‘lib, ular kardiologiya, pulmonologiya, gastroenterologiya va oftalmologiyada samarali qo‘llaniladi. Tadqiqot natijalari ushbu preparatlarning yuqori terapevtik samaradorligini tasdiqlagan bo‘lsa-da, retseptorlarning keng tarqalganligi sababli ko‘plab nojo‘ya reaksiyalar rivojlanishi mumkinligi aniqlandi. Og‘iz qurishi, taxikardiya, siydik tutilishi va ko‘rishning vaqtinchalik buzilishi eng ko‘p uchraydigan nojo‘ya holatlar qatoriga kiradi.

So‘nggi yillarda farmakologiya sohasidagi ilmiy izlanishlar preparatlarning selektivligini oshirish va nojo‘ya ta’sirlarini kamaytirishga qaratilgan. Yangi avlod anksiolitiklari hamda selektiv M-xolinoretseptor antagonistlarining yaratilishi davolash samaradorligini oshirish bilan birga, bemorlar hayot sifatini yaxshilashga xizmat qilmoqda. Bu esa individual farmakoterapiya tamoyillarining amaliyotga tobora keng joriy etilayotganligini ko‘rsatadi.

Shunday qilib, anksiolitiklar, sedativ vositalar va M-xolinoretseptorlarga ta’sir etuvchi preparatlar o‘zining farmakologik xususiyatlari, qo‘llanish spektri va klinik samaradorligi bilan zamonaviy tibbiyotning muhim dori vositalari guruhini tashkil etadi. Ularni qo‘llashda bemorning yoshi, umumiy holati, hamroh kasalliklari va preparatlarning farmakokinetik xususiyatlarini hisobga olish davolashning muvaffaqiyatini belgilovchi asosiy omillardan biridir.

Xulosa

Anksiolitiklar, sedativ vositalar va M-xolinoretseptorlarga ta’sir etuvchi preparatlar markaziy hamda vegetativ nerv tizimi faoliyatini boshqarishda muhim o‘rin tutadigan farmakologik vositalar hisoblanadi. O‘tkazilgan adabiyotlar tahlili ushbu preparatlar turli xil nevrologik, psixiatrik va somatik kasalliklarni davolashda keng qo‘llanilishini hamda yuqori terapevtik samaradorlikka ega ekanligini ko‘rsatdi.

Anksiolitik preparatlar tashvish, qo‘rquv va emotsional zo‘riqishni kamaytirishda samarali bo‘lsa, sedativ vositalar markaziy nerv tizimining ortiqcha qo‘zg‘aluvchanligini pasaytirib, uyqu va psixoemotsional holatni me’yorlashtirishga

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yordam beradi. M-xolinoretseptorlarga ta’sir etuvchi preparatlar esa vegetativ nerv tizimi faoliyatini boshqarish orqali kardiologik, pulmonologik, gastroenterologik va oftalmologik amaliyotda muhim terapevtik ahamiyat kasb etadi.

Tadqiqot natijalari shuni ko‘rsatdiki, preparatlarning farmakologik samaradorligi ularning ta’sir mexanizmi, retseptorlarga selektivligi va farmakokinetik xususiyatlari bilan chambarchas bog‘liq. Shu bilan birga, nojo‘ya ta’sirlar va dori vositalariga qaramlik rivojlanish xavfi ayrim preparatlarni qo‘llashda ehtiyotkorlikni talab qiladi. Ayniqsa benzodiazepin guruhiga mansub anksiolitiklarni uzoq muddat qo‘llashda klinik nazorat zarur hisoblanadi.

Zamonaviy farmakologiyaning asosiy yo‘nalishlaridan biri yuqori selektivlikka ega, samaradorligi yuqori va nojo‘ya ta’sirlari kam bo‘lgan yangi preparatlarni yaratishdan iborat. Individual yondashuv asosida olib borilgan farmakoterapiya davolash natijalarini yaxshilash, nojo‘ya reaksiyalar xavfini kamaytirish hamda bemorlarning hayot sifatini oshirish imkonini beradi.

Shunday qilib, anksiolitiklar, sedativ vositalar va M-xolinoretseptorlarga ta’sir etuvchi preparatlar zamonaviy klinik tibbiyotning ajralmas qismi bo‘lib, ularning oqilona va ilmiy asoslangan qo‘llanilishi davolash samaradorligini oshirishda muhim ahamiyatga ega.

Foydalanilgan adabiyotlar ro’yxati

1. Харкевич Д.А. **Фармакология**: учебник для медицинских вузов. – 14-е изд., перераб. и доп. – Москва: ГЭОТАР-Медиа, 2024. – 760 с.
2. Машковский М.Д. **Лекарственные средства**. – 17-е изд. – Москва: Новая Волна, 2021. – 1216 с.
3. Аляутдин Р.Н. **Фармакология**: учебник. – 7-е изд., перераб. и доп. – Москва: ГЭОТАР-Медиа, 2023. – 1104 с.
4. Кукес В.Г., Сычев Д.А., Раменская Г.В. **Клиническая фармакология**. – Москва: ГЭОТАР-Медиа, 2023. – 1056 с.
5. Орлов Р.С., Ноздрачев А.Д. **Нормальная физиология**. – Москва: ГЭОТАР-Медиа, 2022. – 832 с.
6. Шабалов Н.П. **Клиническая фармакология**. – Санкт-Петербург: СпецЛит, 2021. – 608 с.
7. Белоусов Ю.Б., Моисеев В.С., Лепахин В.К. **Клиническая фармакология и фармакотерапия**. – Москва: Универсум Паблишинг, 2020. – 872 с.
8. Катцунг Б.Г. **Базисная и клиническая фармакология** / пер. с англ. под ред. Э.Э. Звартау. – Москва: Бином, 2021. – 1472 с.
9. Регистр лекарственных средств России (РЛС). **Энциклопедия лекарств**. – Москва: РЛС, 2024. – 1408 с.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026
10. Соколов С.Ю., Замотаев И.П. **Справочник по лекарственным средствам**. – Москва: МИА, 2022. – 960 с.
11. Яковлев В.П., Яковлев С.В. **Рациональная антимикробная фармакотерапия и основы общей фармакологии**. – Москва: Литтерра, 2021. – 1040 с.
12. Каратеев А.Е., Насонов Е.Л. **Основы клинической фармакологии**. – Москва: ГЭОТАР-Медиа, 2022. – 736 с.
13. Шилов А.М., Мельникова Ю.С. **Фармакология в вопросах и ответах**. – Москва: ГЭОТАР-Медиа, 2023. – 512 с.
14. Левин О.С. **Неврология: национальное руководство**. – Москва: ГЭОТАР-Медиа, 2022. – 1296 с.
15. Под ред. Харкевича Д.А. **Руководство к практическим занятиям по фармакологии**. – Москва: ГЭОТАР-Медиа, 2023. – 688 с.

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OZIQ OVQAT MAHSULOTLARI TARKIBIDAGI FE(III) IONINING MIQDORINI INVERSION VOLTAMPEROMETRIK ANALIZ USULIDA ANIQLASHNING OPTIMAL QIYMATLARINI ANIQLASH.

Yo'ldosheva Nilufar Sodiq qizi

Chóliyev Sanjarbek Alisher óğli

Ergashova Iroda Ilhom qizi

Oziq ovqat mahsulotlari analizida eng muhim jarayonlardan biri - bu Oziq ovqat mahsulotlarini analizga tayyorlash hisoblanadi. Shu sababli olmani analizga tayyorlashning sodda va qulay usulini ishlab chiqish hamda olma tarkibidagi mikroelentlarning harakatchan shakllarini aniqlash muhim ahamiyat kasb etadi, sababi olmadagi aynan shu harakatchan shakllari o‘zlashtiradi. 1 jadvalda olma tarkibidagi Fe(III) mikroelementining harakatchan miqdorining me’yoriy qiymatlari keltirilgan (mg/kg):

3.1-jadval:

Oziq-ovqat mahsulotlarida, jumladan olmada temir miqdori odatda mg/kg (milligram/kilogramm) birligida baholanadi. Olma tarkibidagi temirning kam, o‘rta va yuqori qiymatlari taxminan quyidagicha tasniflanadi:

Olmaning mikroelement bilan ta’minlanganlik darajasi	Fe(III)
Kam	1–5 mg/kg
O‘rta	5–15 mg/kg
Ko‘p	15 mg/kg dan yuqori

3.1. Oziq-ovqat mahsulotlaridagi (olma) mikroelementlarning umumiy miqdorini rentgen fluoressent analiz natijalari

Biz dastlab Oltinsoy tumanida yetishtirilgan Golden Delicious navli olma namunasi tarkibidagi barcha mikroelementlarning umumiy miqdorini hamda namunadagi begona va yondosh ionlarni aniqlash maqsadida rentgen fluoressent usulida element analizi olib borildi.

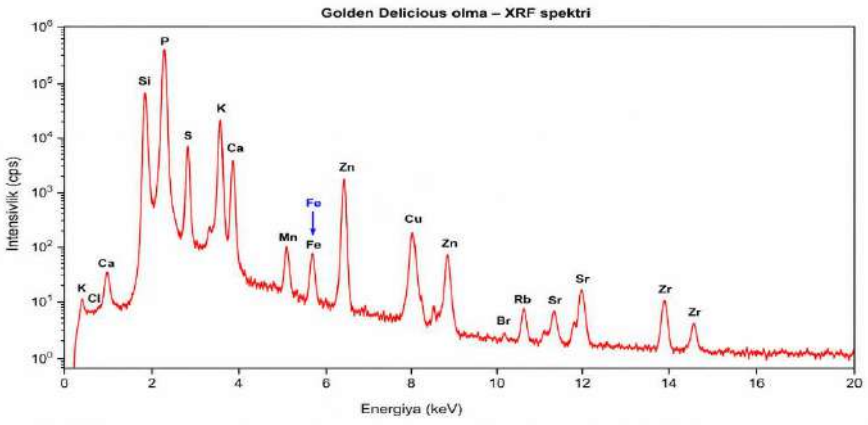
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X-ray floresan tahlillari (XRF) bu materialning kimyoviy tarkibini aniqlash uchun ishlatiladigan oddiy hamda juda sezgir usul. XRF o'zining buzilmaydigan tabiati bilan mashhur analitik asbobdir, ozgina tayyor yoki sinovsiz materiallarni sinovdan o'tkazadi shundan so‘ng qattiq, suyuq hamda chang namunalarini analiz qilishda ishlatiladi.

Rentgen fluoressent namunasi uni rentgen to'lqinlari bilan qayta tiklash uchun asbobdan foydalanadi. Namunadagi atomlarning fikr-mulohazalariga asoslanib, mashina material turini hisoblashi mumkin. Har bir element nurlantirilganda o'ziga xos xususiyatlarga ega bo'lganligi sababli, alohida atomlarni aniqlash mumkin, natijada kimyoviy tarkib to'liq parchalanadi. Qopqoq qalinligini rentgen nurlari bilan o'lchash uchun odatda aniqlikni ta'minlash uchun diod kabi ikkinchi darajali uskunalar qo'llaniladi.

Rentgen fluoressent tahlili (XRF) - zamonaviy fizik elementar tahlil usuli hisoblanadi, ya'ni moddalarning kimyoviy elementar tarkibini sifat va miqdor jihatdan aniqlash. Usul o'rganilayotgan namunaga rentgen nurlar ta'sir qilish natijasida spektrni olish hamda keyinchalik tahlil qilishga asoslangan. Namuna nurlantirilganda, atomlarning qo'zg‘aluvchanligi va xarakterli fluoressent nurlanishi sodir bo'ladi, har bir atom qat'iy belgilangan qiymatga ega bo'lgan foton chiqaradi. Qo'zg‘alishdan keyin spektr detektorga yoziladi, so'ngra hosil bo'lgan spektrning eng yuqori nuqtalaridan ma'lum bir namunada qaysi kimyoviy elementlar mavjudligini aniqlash mumkin.

Rentgen-fluoressent analiz usulida aniqlanayotgan bioelementlarning miqdori bo‘yicha Surxondaryo viloyati Oltinsoy tumanida yetishtirilgan Golden Delicious navli olmasidan olingan natijalar 3.1-rasmda keltirilgan.



3.1-rasm. **Rentgen-fluoressent spektral analiz natijalari**

Golden Delicious navli olma namunasini o'lchashda Fe cho'qqisining SNR ni optimallashtirish uchun 130 mkm qalinlikdagi Cu filtri tanlangan. O'rnatishimizdagi (qattiq chiziq) olmaning o'lchangan spektri 3.1-rasmda ko'rsatilganidek, tijorat XRF

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o'lchovi (tire-nuqta chizig‘i) va ICP-MS o'lchovi (qattiq va nuqtali chiziqlar) bilan taqqoslanadi.

3.2. Golden Delicious navli olma tarkibidagi Fe(III) ning harakatchan shaklini eritmaga o‘tkazish uchun bufer eritmasini ta’siri

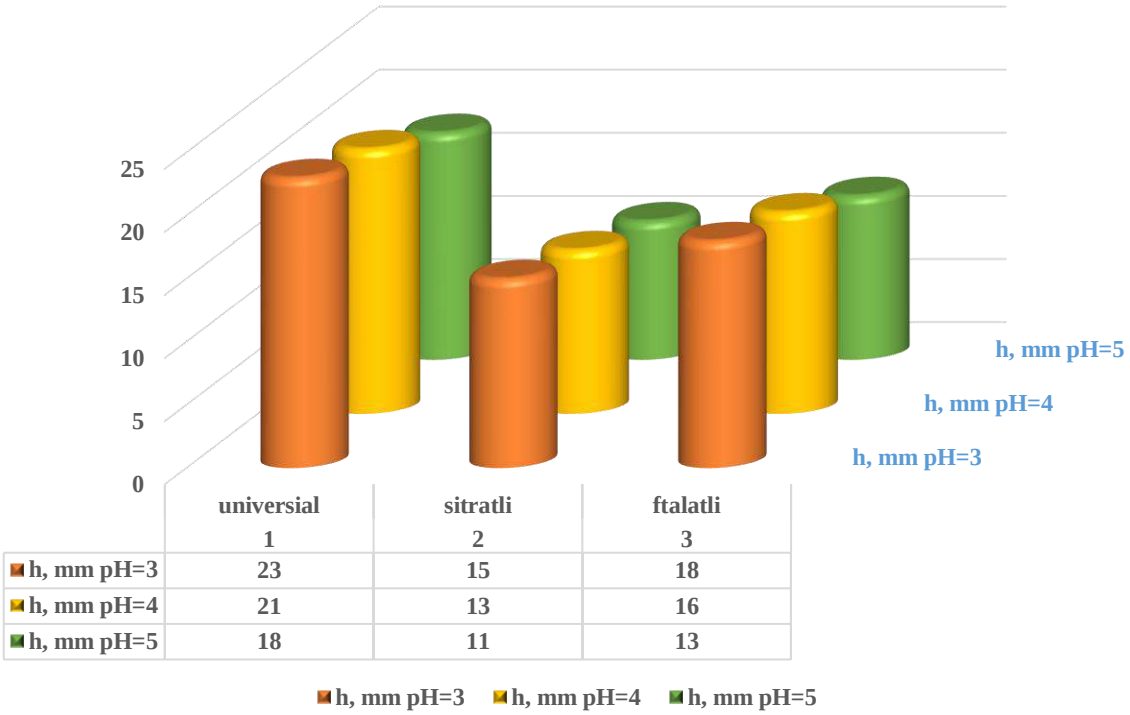
Golden Delicious navli olma tarkibidagi temirnigning harakatchan shaklini eritmaga o‘tkazish uchun sitratli, ftalatli, natriy atsetatli, fosfatli buferlarning pH qiymati 3,0; 4,0 va 5,0 ga teng bo‘lgan eritmalarini tanlab olindi. Tadqiqotni tuproqning bufer eritmaga nisbati 1:5, tuproqning bufer bilan aralashish vaqti 50 daqiqa va hororat 25-30 ºC oralig‘ida olib bordik.

3.2-jadval

Inversion voltamperometriya usulida Golden Delicious navli olma tarkibidagi temir(III) ionini harakatchan shaklini eritmaga o‘tkazish uchun bufer eritmasini ta’siri
(t=50 daqiqa, T= 25-30ºC, bufer:olma= 5:1)

№	bufer eritma	h, mm		
		pH=3	pH=4	pH=5
1	universial	23	21	18
2	sitratli	15	13	11
3	ftalatli	18	16	13

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	universial 1	sitratli 2	ftalatli 3
h, mm pH=3	23	15	18
h, mm pH=4	21	13	16
h, mm pH=5	18	11	13

3.2-rasm. **Inversion voltamperometriya usulida Golden Delicious navli olma tarkibidagi temir(III) ionini harakatchan shaklini eritmaga o‘tkazish uchun bufer eritmasini ta’siri diagrammasi**

Natijalardan ko‘rinib turibdiki eng yuqori analitik signallar universial buferga to‘g‘ri kelmoqda. Analitik signalning balandligi potensialni hosil bo‘lgan tok kuchiga bog‘liqlik ravishda hosil bo‘ladi, ya’ni modda konsentratsiyasiga to‘g‘ri proporsional bo‘lgan holda balandlik kuzatiladi. Demak, universial bufer eritmada aniqlanayotgan mikroelementlarimizning eng baland cho‘qqilari kuzatildi, shu sababli universial bufer eritmadani eng yaxshi erituvchi degan xulosaga kelsak bo‘ladi. Tadqiqot davomida aynan universial bufer eritmadan foydalanildi.

3.3. Golden Delicious navli olma tarkibidagi temir(III) ning harakatchan shaklini eritmaga o‘tkazish uchun universal buferning optimal pH muhitini tanlash

Mikroelementlarni harakatchan shakllarini Golden Delicious navli olma tarkibidan eritmaga o‘tkazish uchun eng yaxshi bufer eritma universial bufer eritma ekanligi tadqiqotlarda isbotlandi. universial bufer eritma pH ko‘rsatkichi 2 dan 11,98 gacha bo‘lgan oraliqni o‘z ichiga oladi. Keyingi tadqiqotlarni aynan shu pH oraliqda davom ettirildi. Tadqiqot quyidagi sharoitda olib borildi: eritmaga o‘tkazish vaqti – 50 daqiqa, harorat – 25-30°C, tuproqning bufer eritmaga nisbati 1:5. Aniqlash usuli sifatida inversion voltamperometrik analiz usuli tanlab olindi.

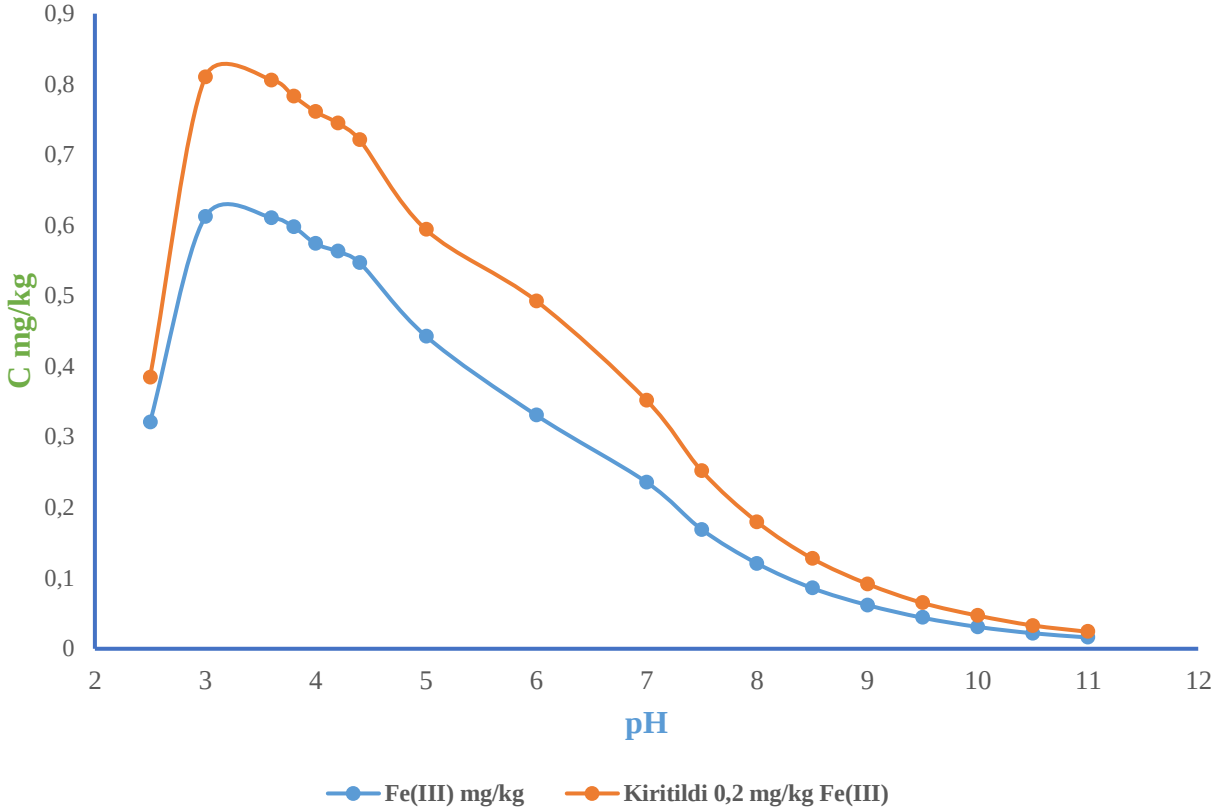
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3.3-jadval

Golden Delicious navli olma tarkibidagi temir(III) ning harakatchan shaklini eritmaga o‘tkazish uchun optimal pH muhitni tanlash

pH	Fe(III) mg/kg	Kiritildi 0,2 mg/kg Fe(III)
2,5	0,321	0,385
3	0,612	0,81
3,6	0,611	0,806
3,8	0,598	0,783
4	0,574	0,761
4,2	0,563	0,745
4,4	0,547	0,721
5	0,443	0,594
6	0,331	0,493
7	0,236	0,352
7,5	0,169	0,252
8	0,121	0,180
8,5	0,086	0,128
9	0,062	0,092
9,5	0,044	0,065
10	0,031	0,047
10,5	0,022	0,033
11	0,016	0,024

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3.3-rasm. Golden Delicious navli olma tarkibidagi temirning harakatchan shaklini eritmaga o‘tkazish uchun optimal pH muhitini tanlash

Natijalar shuni ko‘rsatdiki temir uchun pH = 3 bo‘lganda eng yaxshi natijalar olindi. Bundan xulosa qilish mumkinki universial buferning pH qiymati 3 bo‘lgan eritmasini Fe ionlari uchun guruh erituvchisi sifatida foydalanish mumkin.

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RISK MANAGEMENT FAILURES AND FRAGILE STABILITY: A STRATEGIC ANALYSIS OF THE 1998 RUSSIAN FINANCIAL CRISIS

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ABSTRACT

On 17 August 1998, the Russian Federal Government announced the largest sovereign default in its own history — and one of the largest in world history at that time: it suspended payments on GKO (short-term government securities) amounting to 281 billion roubles for a period of 90 days and allowed the rouble to float freely against the US dollar. The rouble depreciated by 60% within a single month, annual inflation rose to 86% in 1999, and real GDP contracted by 5.3%. This article provides a systematic analysis of three core dimensions of the crisis: the mechanism and economic consequences of rouble depreciation; the GKO pyramid and the failures of public debt management; and the differentiated impact of the crisis on member states of the Commonwealth of Independent States (CIS). The analysis is based on primary data from the Central Bank of Russia, the IMF, the World Bank, and the OECD.

Keywords: Russian crisis 1998, sovereign default, GKO, rouble devaluation, public debt management, CIS, transition economy, high-yield bonds.

INTRODUCTION.

The dissolution of the Soviet Union in 1991 confronted Russia with the unprecedented complexities of transitioning from a planned to a market economy. The “shock therapy” policy — rapid price liberalisation, privatisation of state assets, and sharp cuts to the budget deficit — brought structural reforms alongside severe economic hardship. The results, however, proved far more painful than anticipated: between 1992 and 1998, Russia lost approximately 40% of its real GDP on a cumulative basis. By 1996–1997, signs of economic recovery had begun to emerge:

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inflation was falling, the rouble had stabilised, and foreign investment was flowing in. Yet this "stability" was considerably more fragile than it appeared — it rested on elevated oil prices and cheap inflows of foreign capital. In the second half of 1997, the ripple effects of the Asian financial crisis, and in early 1998 the collapse of crude oil prices to USD 10 per barrel, brought to the surface the latent vulnerabilities of Russia's financial system. On 17 August 1998 — a date known in modern financial history as "Black Monday" — the Russian Federal Government declared a moratorium on GKO obligations and released the rouble to float freely. GKO default volume: approximately 281 billion roubles (≈ USD 38.5 billion, at August 1998 exchange rates).

RESEARCH METHODOLOGY.

In methodological terms, this study employs a strategic case-study approach combined with institutional risk analysis. The research utilizes historical-comparative methods to trace the evolution of governance failures and integrates systemic risk assessment models to evaluate the macroeconomic impact of public debt mismanagement on both Russia and the broader CIS region.

LITERATURE REVIEW ON THE TOPIC.

The 1998 Russian financial crisis and its systemic consequences have been extensively analyzed by leading global economists and international financial institutions, highlighting critical failures in strategic risk management. The analysis of the GKO debt pyramid is heavily informed by Hyman Minsky’s Financial Instability Hypothesis. Researchers later applied this framework to Russia, classifying the GKO market as a classic “Ponzi finance” structure, where the government made a fatal management error by continuously issuing new short-term debt simply to pay off older investors. Concurrently, Charles Kindleberger cited the Russian default as a textbook example of a “panic and crash” driven by the sudden reversal of hot capital, showing that the leadership failed to anticipate the psychological behavior of international investors.

Regarding the mechanics of the sovereign default, Carmen Reinhart and Kenneth Rogoff argued that Russia’s collapse proved a crucial macro-governance thesis: even resource-rich nations default if domestic debt management is flawed. They pointed out that Russia’s core mistake was accumulating short-term, rouble-denominated debt while its institutional tax collection system was completely broken.

The monetary and contagion dimensions are examined through modern crisis theory. Paul Krugman demonstrated that Russia fell victim to a “third-generation currency crisis” model, where the rigid defense of the rouble corridor while running huge fiscal deficits was a strategic contradiction. Ben Bernanke highlighted that the

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sudden freeze of the banking system paralyzed the domestic credit channel, transforming a fiscal crisis into a deep real-economy depression. Furthermore, Nouriel Roubini emphasized the systemic risk and regional contagion, proving that the "Russian virus" caught neighboring CIS member states completely off-guard due to a severe lack of regional risk-monitoring and macroprudential safety nets.

ANALYSIS AND RESULTS.

From 1995 onwards, the Central Bank of Russia maintained the rouble within a "currency corridor" against the US dollar. At the start of 1998, this corridor was set at 5.25–7.15 roubles per dollar. The system minimised currency risk for importers and foreign investors, but at the same time provided a clearly defined target for speculative attacks. To defend the currency corridor, the Central Bank of Russia spent large quantities of foreign exchange reserves. Reserves that stood at approximately USD 24 billion in January 1998 had fallen to USD 14 billion by July — a loss of USD 10 billion. It subsequently emerged that a significant portion of these reserves had been misappropriated or diverted through dubious transactions.



Figure 1. USD/RUB exchange rate dynamics, 1995–1999.[1]

As Figure 1 clearly shows, from 1995 to July 1998 the rouble was held relatively stable within the range of 4.9–6.0 roubles per dollar. From August 1998 onwards, however, the rate fell sharply: to 9.7 roubles per dollar in the third quarter of 1998, 21.1 roubles by year-end, and 23–25 roubles per dollar in early 1999. Rouble depreciation:

[1] Central Bank of Russia; IMF International Financial Statistics.

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approximately 74% (July to December 1998). The rouble depreciation affected every sector of the economy. First, import prices rose sharply: Russia was a major importer of basic foodstuffs, and inflation rapidly assumed the character of "imported inflation." Food prices increased by 130% between August 1998 and January 1999. Second, for Russian companies and banks that had borrowed in dollars, the rouble-denominated debt burden nearly quadrupled. This triggered a wave of mass bankruptcies: in August–September 1998, major Russian banks — SBS-Agro, Menatep, Inkombank, and Rossiysky Kredit — declared insolvency. Third, paradoxically, currency depreciation also produced one positive outcome: Russian exporters — oil and gas companies — incurred costs in roubles but received revenues in dollars. The fall in the rouble therefore significantly enhanced their competitiveness. This "devaluation effect" became an important driver of Russia's economic recovery from 1999 onwards. The collapse of the banking system and rampant inflation wiped out the savings of an entire generation of depositors. In August 1998, depositors queued at ATMs in a desperate attempt to salvage their savings. Commercial banks other than Sberbank (the state bank) suspended repayments to depositors. According to official statistics, real monetary incomes in Russia fell by 37.5% in August 1998 compared with the previous year. The poverty rate rose to 23.4% by the end of 1998 — a significant increase from 20.8% in 1997. The crisis effectively wiped out the "middle class" that had formed during the preceding reform period.

Budget Deficit and Tax Collection Problems.

Russia's federal budget carried a structural deficit throughout the 1990s. The core problem, however, lay not only in the level of expenditure but in the dysfunctional operation of the tax system.

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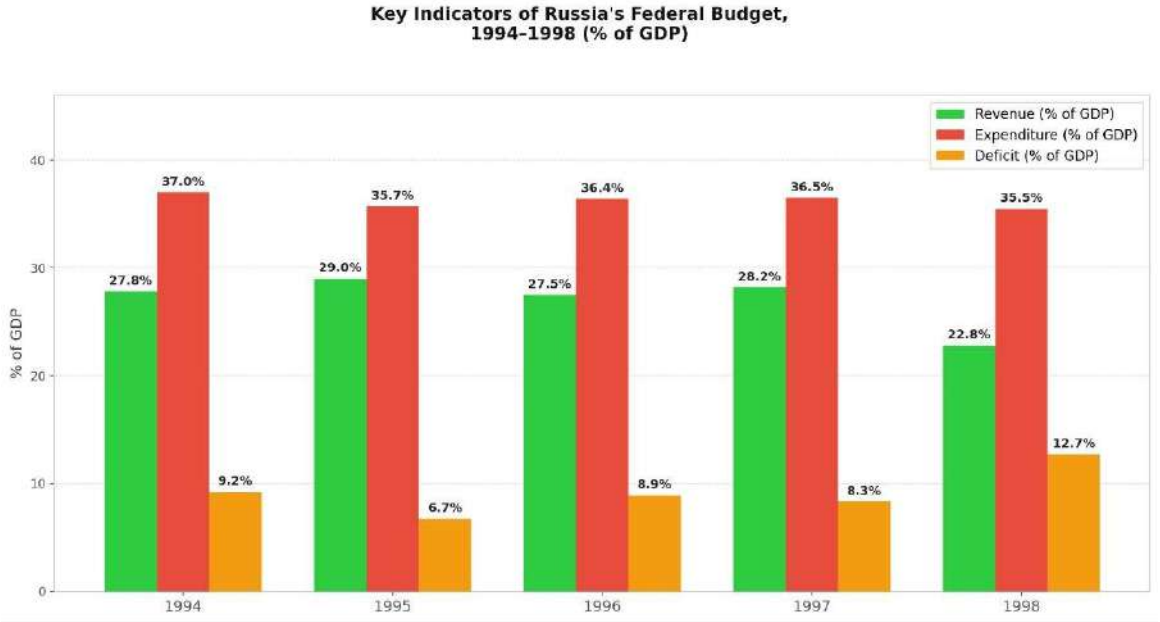


Figure 2 (labelled Figure 3 in original). Federal budget revenues and expenditures as a share of GDP, Russia 1994–1998 (%). [2]

As Figure 2 clearly illustrates, expenditure exceeded revenue by a considerable margin in every year examined. In 1998, budget revenues amounted to 22.8% of GDP while expenditure stood at 35.5% — a deficit of 12.7% of GDP.

Russia's tax collection problem: in the mid-1990s, major corporations — notably Gazprom and other energy monopolies — paid a portion of their taxes in "barter" form (goods in lieu of cash). The federal government's cash tax revenues fell far below what the official size of the economy would imply. Some estimates suggest that "lost" cash tax revenue amounted to 5–6% of GDP in 1997.

The Oil Price Shock.

In the second half of 1997, the impact of the Asian crisis on oil demand, compounded by OPEC's decision to increase production, drove oil prices sharply downward. The Brent price fell from an average of USD 18.7 in 1997 to below USD 10 by end-1998 — the lowest level since 1986.

[2] Russian Ministry of Finance; IMF Russia Country Report 1999.

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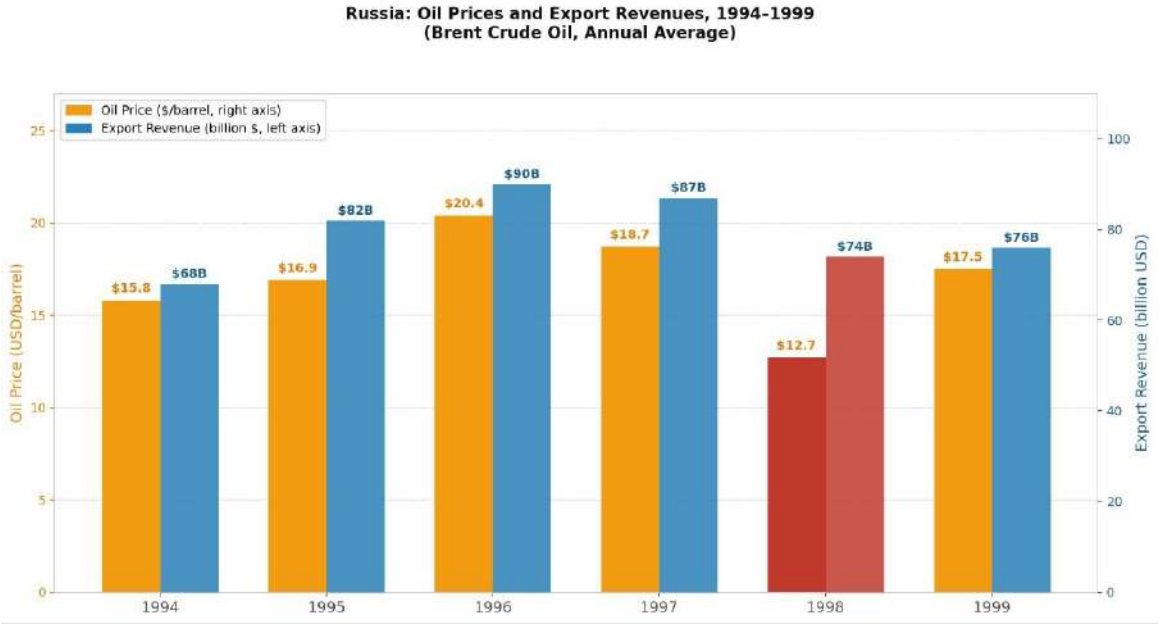


Figure 3 (labelled Figure 4 in original). Brent crude oil price (USD/barrel) and Russian export revenues, 1996–2000. [3]

As shown in Figure 3, the decline in oil prices from USD 18.7 in 1997 to USD 12.7 in 1998 (a fall of 32%) reduced Russian export revenues from USD 86.9 billion to USD 74.4 billion. Given that oil and gas exports accounted for approximately 40% of federal budget revenues, it is not difficult to envisage how this "external shock" amplified the budget deficit.

In July 1998, the IMF approved an expanded rescue package for Russia totalling USD 22.6 billion. The first tranche — USD 4.8 billion — was disbursed immediately. Yet even these funds proved insufficient to defend the rouble. Subsequent research revealed that the USD 4.8 billion disbursed in the IMF's July tranche was spent defending the rouble in foreign exchange markets within that same week — that is, the funds effectively passed into the hands of foreign speculators.

The economic logic underlying the Russian government's "final capitulation" — the decision to declare a moratorium and devaluation — was straightforward: either the state would attempt to honour all its obligations and drive the economy further into the ground, or it would declare default and start afresh. The Yeltsin government chose the latter course.

[3] EIA; Russian Federal Customs Service; IMF.

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Macroeconomic Portrait of the Crisis: GDP, Inflation and Recovery.

In the entire history of Russia's economic transition (1992–1999), only 1997 recorded positive growth — and even then a mere 1.4%. The 1998 crisis brought this fragile recovery to an abrupt halt.

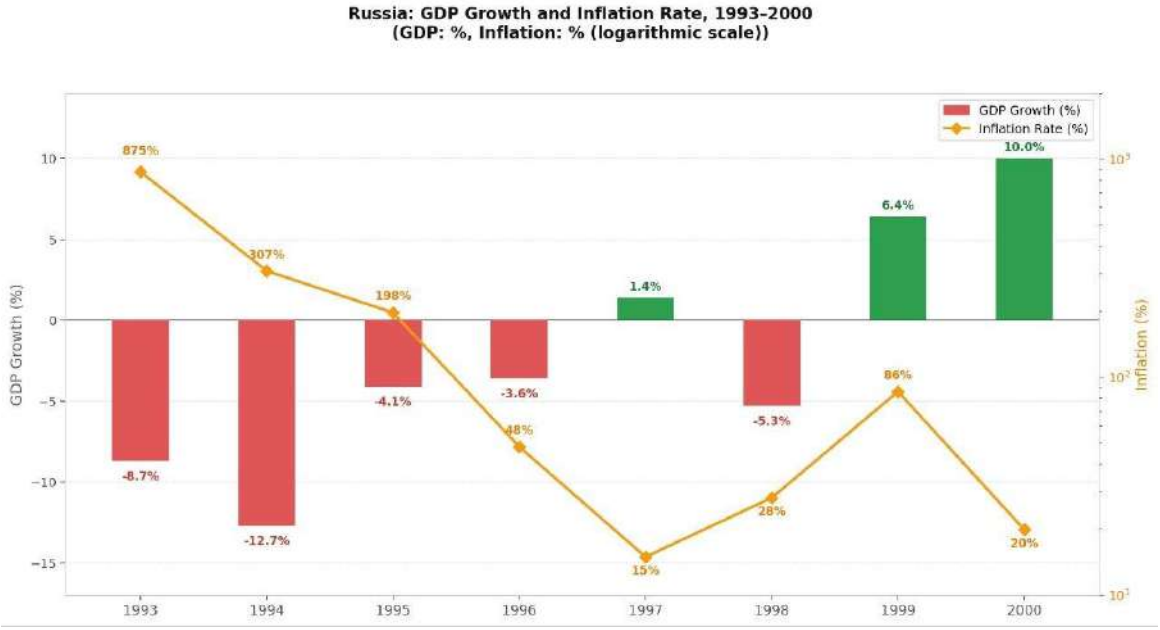


Figure 4 (labelled Figure 5 in original). Russia: Real GDP growth (%) and inflation rate (%), 1993–2001. [4]

Figure 4 reveals the trend from the hyperinflation of 1993 (875%) through to relative stabilisation in 1997 (15%). Following the 1998 crisis, inflation surged to 86% in 1999. Simultaneously, GDP contracted by −5.3% in 1998. Remarkably, the post-crisis recovery proved faster than anticipated. GDP grew by 6.4% in 1999 and 10.0% in 2000. The principal drivers of recovery were: the export sector, which benefited from rouble depreciation; rising oil prices from 1999 onwards; and the "cleansing effect" of the crisis — the reallocation of resources away from troubled banks and companies towards more efficient uses.

Russia's economic centrality within the CIS.

Following the dissolution of the Soviet Union, Russia remained the hub of economic interdependencies within the CIS space. For CIS member states, the Russian market was the largest export destination, while Russia served as the primary supplier of

[4] World Bank World Development Indicators; IMF World Economic Outlook Historical Database.

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energy (oil and gas). Moreover, billions of dollars in labour migration remittances played a significant role in the economies of Ukraine, Moldova, Kyrgyzstan, and other countries. The dependence of CIS states on Russia transmitted the crisis through four principal channels: (1) the contraction of commodity export markets; (2) a decline in remittances from Russia; (3) the withdrawal of foreign capital flows from all CIS countries; and (4) changes in oil and gas prices and supply conditions.

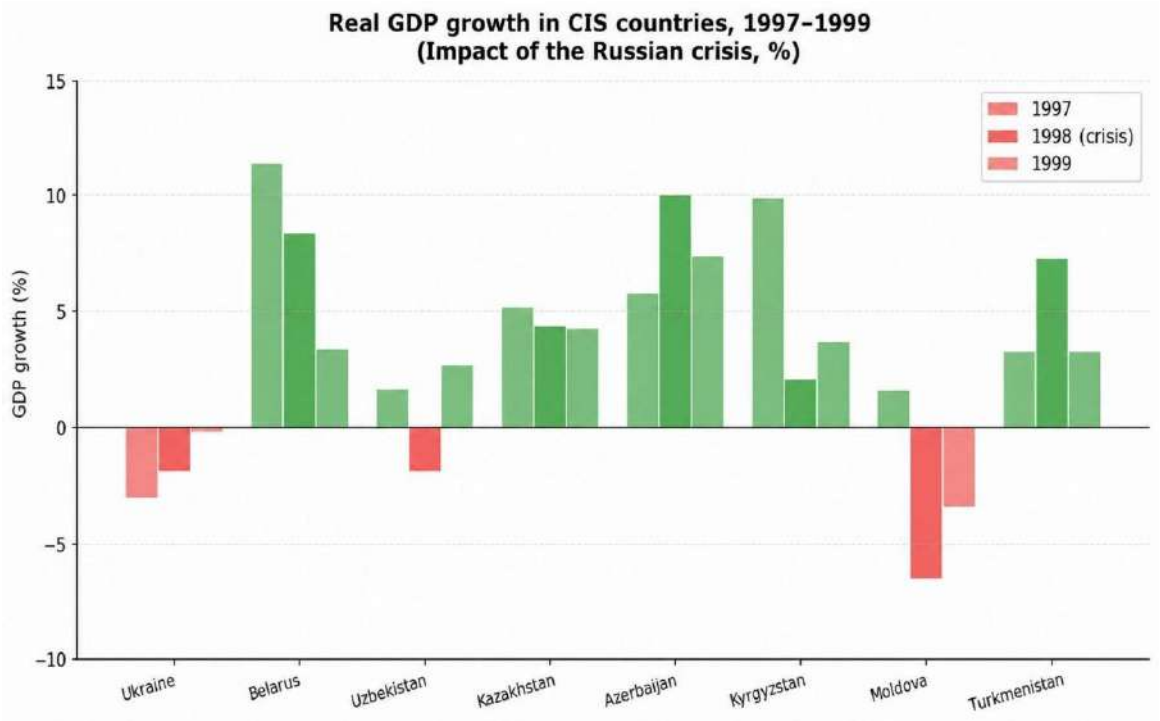


Figure 5. Real GDP growth rates in selected CIS countries, 1997–1999 (%). [5]

Country-by-Country Analysis.

Ukraine.

Ukraine was among the CIS countries most severely affected by the Russian crisis. Russia absorbed approximately 23–24% of Ukrainian exports. In the wake of the Russian crisis, the hryvnia also depreciated (losing 50% of its value against the US dollar in 1998), and annual inflation rose to 20%.

[5] World Bank WDI; IMF WEO Historical Database; EBRD Transition Report 1999.

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Belarus.

Belarus was the CIS state most closely linked to Russia, with more than 60% of its exports directed there. However, because the Belarusian government maintained price controls and capital restrictions, the impact of the crisis manifested in a distinctive form — while official indicators appeared favourable, the black market and shortages of goods intensified.

Kazakhstan.

For Kazakhstan, the Russian crisis coincided with oil-export-related vulnerabilities. Real GDP fell by −1.9% in 1998 — the first negative growth recorded during the transition period. Nevertheless, the recovery in oil prices from 1999 onwards enabled Kazakhstan to bounce back more quickly.

Central Asian States.

The impact on Central Asian states — Uzbekistan, Tajikistan, Turkmenistan, and Kyrgyzstan — varied considerably. Uzbekistan was minimally affected by the crisis, owing to its retention of capital controls and its relatively lower degree of dependence on the Russian market (recording growth of 4.4% in 1998). Kyrgyzstan, by contrast, having integrated more closely with the IMF's open capital policy, recorded growth of only 2.1% in 1998.

Moldova.

Moldova was among the most severely affected countries: real GDP contracted by −6.5% in 1998 and −3.4% in 1999. Russia was Moldova's principal trading partner, and exports of wine and agricultural products fell sharply.

Long-Term Impact of the Russian Crisis on CIS Integration.

The 1998 crisis exerted a dual influence on economic integration trends within the CIS space. On the one hand, once the risks of dependence on Russia had been made plain, a number of states intensified their economic diversification policies. On the other hand, the crisis, perceived as a shared problem, provided fresh impetus for cooperation, and discussions around financial coordination mechanisms within the CIS framework became more active.

The Russian crisis — coming just one year after the Asian crisis — sparked extensive debate within the international financial community. The G7 countries advanced a series of initiatives from 1999 onwards aimed at reforming the international financial architecture. Discussions on Sovereign Debt Restructuring Mechanisms (SDRM),

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heightened attention to the risks of "noise and disorder" in the conduct of international financial institutions, and the debate over "moral hazard" — the assumption that the IMF would bail out any large country that declared default — all acquired new resonance against the backdrop of the 1998 Russian crisis. These developments laid the foundation for the concept of Systemically Important Financial Institutions (SIFI).

CONCLUSION.

The 1998 Russian crisis demonstrated how critical sound systemic financial management is in transition economies. The three core dimensions of the crisis — rouble depreciation, the GKO pyramid, and the external shock of falling oil prices — reinforced one another and brought Russia to the most acute point of its economic difficulties throughout the 1990s. In quantitative terms: the rouble depreciated by approximately 74% during 1998; real GDP contracted by 5.3%; inflation reached 86% in 1999; the GKO default amounted to approximately USD 38.5 billion; and nine major commercial banks were brought to the brink of insolvency in August 1998. Across the CIS, the crisis caused a marked economic slowdown in eight of Russia's nearest neighbours. Paradoxically, the crisis also served to "cleanse" the Russian economy: distressed assets, inefficient banks, and a portion of the "crony capitalist" structures built on political connections were swept away. The rapid recovery of 1999–2000 is explained precisely by this "cleansing effect" and the subsequent rise in oil prices. In transition economies, financial liberalisation must proceed in tandem with the strengthening of regulatory quality. Dependence on short-term foreign capital, a fragile fiscal balance, and the absence of robust defences against currency speculation together create a catastrophic systemic risk.

LIST OF REFERENCES USED.

1. European Bank for Reconstruction and Development — EBRD. (1999). Transition Report 1999: Ten Years of Transition. London: EBRD.
2. G7 Finance Ministers. (1999). Strengthening the International Financial Architecture: Report to the Cologne Economic Summit. June 1999.
3. World Bank. (1999). Anticorruption in Transition: A Contribution to the Policy Debate. Washington D.C.: World Bank.
4. World Bank. (2023). World Development Indicators. Available at: https://databank.worldbank.org
5. Illarionov, A. (1999). "The Roots of the Economic Crisis." Journal of Democracy, 10(2), 68–82.
6. International Monetary Fund — IMF. (1999). Russia: Report on Recent Economic Developments. IMF Country Report No. 99/100. Washington D.C.: IMF.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026
7. International Monetary Fund — IMF. (2023). World Economic Outlook Historical Database. Available at: https://www.imf.org/en/Publications/WEO/weo-database
8. U.S. Energy Information Administration — EIA. (2023). Europe Brent Spot Price FOB (Historical). Available at: https://www.eia.gov
9. CIS Statistical Committee. (1999). Sodruzhestvo Nezavisimykh Gosudarstv v 1998 godu [The Commonwealth of Independent States in 1998]. Moscow: CIS Statkomitet.
10. Eichengreen, B. (1994). International Monetary Arrangements for the 21st Century. Washington D.C.: Brookings Institution.

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QUYMICH NERVI SHIKASTLANGAN BEMORLARNI TASHXISLASH VA JARROHLIK DAVOLASH USULLARINI TAKOMILLASHTIRISH

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СОВЕРШЕНСТВОВАНИЕ МЕТОДОВ ДИАГНОСТИКИ И ХИРУРГИЧЕСКОГО ЛЕЧЕНИЯ ПАЦИЕНТОВ С ПОВРЕЖДЕНИЯМИ СЕДАЛИЩНОГО НЕРВА

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IMPROVEMENT OF DIAGNOSTIC APPROACHES AND SURGICAL TREATMENT METHODS IN PATIENTS WITH SCIATIC NERVE INJURIE

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ANNOTATSIYA

Quymich nervining travmatik shikastlanishlari periferik nerv tizimining eng og‘ir patologiyalaridan biri hisoblanadi. Ushbu shikastlanishlar pastki ekstremitalar funksiyasining buzilishi, surunkali og‘riq sindromi va bemorlarning mehnat qobiliyati pasayishiga olib keladi. Mazkur maqolada quymich nervi shikastlangan bemorlarni tashxislashning zamonaviy usullari hamda jarrohlik davolash samaradorligini oshirishga qaratilgan yondashuvlar tahlil qilingan. Elektroneyromiografiya, magnit-rezonans tomografiya va intraoperatsion neyromonitoringning diagnostik ahamiyati yoritilgan. Olingan natijalar kompleks diagnostika va zamonaviy mikroxirurgik texnologiyalarni qo‘llash bemorlarning funksional tiklanish ko‘rsatkichlarini yaxshilashini ko‘rsatdi.

АННОТАЦИЯ

Травматические повреждения седалищного нерва относятся к числу наиболее тяжелых патологий периферической нервной системы. Данные повреждения приводят к нарушению функции нижних конечностей, развитию хронического болевого синдрома и снижению трудоспособности пациентов. В статье рассмотрены современные методы диагностики повреждений седалищного нерва и пути совершенствования хирургического лечения. Освещена диагностическая значимость электронейромиографии, магнитно-резонансной томографии и интраоперационного нейромониторинга. Полученные результаты свидетельствуют о том, что комплексный диагностический подход и применение современных микрохирургических технологий способствуют улучшению функционального восстановления пациентов.

ABSTRACT

Traumatic injuries of the sciatic nerve are among the most severe disorders of the peripheral nervous system. These injuries often result in lower limb dysfunction, chronic pain syndrome, and reduced quality of life. This article analyzes modern diagnostic approaches and strategies for improving surgical treatment of patients with sciatic nerve injuries. The diagnostic value of electroneuromyography, magnetic resonance imaging, and intraoperative neuromonitoring is highlighted. The findings demonstrate that a comprehensive diagnostic approach combined with advanced microsurgical techniques improves functional recovery outcomes in affected patients.

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Kalit so‘zlar: quymich nervi, periferik nerv shikastlanishi, elektroneyromiografiya, magnit-rezonans tomografiya, mikroxirurgiya, nerv transplantatsiyasi, intraoperatsion neyromonitoring.

Ключевые слова: седалищный нерв, повреждение периферических нервов, электронейромиография, магнитно-резонансная томография, микрохирургия, трансплантация нерва, интраоперационный нейромониторинг.

Keywords: sciatic nerve, peripheral nerve injury, electroneuromyography, magnetic resonance imaging, microsurgery, nerve grafting, intraoperative neuromonitoring.

Tadqiqotning dolzarbligi

Periferik nervlar shikastlanishlari orasida quymich nervining zararlanishi klinik va ijtimoiy ahamiyati jihatidan alohida o‘rin tutadi. Ushbu nervning anatomik tuzilishi va funksional yuklamasi yuqori bo‘lganligi sababli uning shikastlanishi harakat va sezgi faoliyatining jiddiy buzilishlariga olib keladi. Zamonaviy diagnostika va mikroxirurgik texnologiyalarning rivojlanishiga qaramay, quymich nervi shikastlanishlarini davolash natijalari har doim ham qoniqarli emas. Shu bois tashxislash va jarrohlik davolash usullarini takomillashtirish bugungi kunda dolzarb ilmiy-amaliy muammolardan biri hisoblanadi.

Tadqiqot maqsadi

Quymich nervi shikastlangan bemorlarni tashxislashning zamonaviy usullarini baholash hamda jarrohlik davolash samaradorligini oshirishga qaratilgan takomillashtirilgan yondashuvlarni ishlab chiqish.

Tadqiqot vazifalari

1. Quymich nervi shikastlanishlarining klinik xususiyatlarini o‘rganish.

2. Elektroneyromiografiya va magnit-rezonans tomografiyaning diagnostik ahamiyatini baholash.

3. Turli jarrohlik usullarining klinik natijalarini taqqoslash.

4. Intraoperatsion neyromonitoringning operatsiya natijalariga ta’sirini aniqlash.

5. Davolash samaradorligini oshirish bo‘yicha amaliy tavsiyalar ishlab chiqish.

Tadqiqotning ilmiy yangiligi

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Quymich nervi shikastlanishlarini tashxislashda klinik va instrumental tekshiruvlar natijalarini kompleks baholashning afzalliklari ko‘rsatildi. Jarrohlik davolash vaqtida intraoperatsion neyromonitoringdan foydalanishning klinik samaradorligi asoslandi hamda bemorlarning funksional tiklanishiga ta’siri tahlil qilindi.

Kirish

Quymich nervi (nervus ischiadicus) inson organizmidagi eng yirik periferik nerv hisoblanib, pastki ekstremitalarning harakat va sezgi faoliyatini ta’minlashda muhim ahamiyatga ega. Mazkur nervning travmatik shikastlanishlari og‘ir nevrologik buzilishlar, uzoq muddatli mehnatga layoqatsizlik va bemorlar hayot sifatining pasayishiga olib keladi. So‘nggi yillarda transport vositalari sonining ortishi, yuqori energiyali travmalarning ko‘payishi hamda son va chanoq sohasidagi murakkab jarohatlar quymich nervi shikastlanishlari uchrash tezligining oshishiga sabab bo‘lmoqda.

Amaliyotda ushbu patologiyani tashxislash va davolashda qator qiyinchiliklar mavjud. Ayrim hollarda nervning anatomik yaxlitligi saqlangan bo‘lsa-da, uning funksional holati sezilarli darajada buzilgan bo‘ladi. Boshqa holatlarda esa klinik belgilar travmadan keyingi yumshoq to‘qimalar shishi yoki suyak sinishlari bilan niqoblanishi mumkin. Shu sababli zamonaviy instrumental diagnostika usullaridan foydalanish va jarrohlik davolash taktikasini takomillashtirish dolzarb masalalardan biri hisoblanadi. Tadqiqotning maqsadi quymich nervi shikastlangan bemorlarni tashxislashning zamonaviy imkoniyatlarini baholash hamda jarrohlik davolash usullarining samaradorligini oshirish yo‘llarini o‘rganishdan iborat.

Materiallar va metodlar

Tadqiqotda quymich nervining travmatik shikastlanishi tashxisi bilan davolangan bemorlarning klinik ma’lumotlari tahlil qilindi. Bemorlar turli yosh guruhlariga mansub bo‘lib, ularda yo‘l-transport hodisalari, ishlab chiqarish jarohatlari, o‘qotar qurol jarohatlari hamda son va chanoq sohasidagi ochiq yoki yopiq shikastlanishlar kuzatilgan. Barcha bemorlarda standart nevrologik tekshiruv o‘tkazildi. Pastki ekstremitalarning mushak kuchi MRC (Medical Research Council) shkalasi bo‘yicha baholandi. Sezgi buzilishlari, reflektor o‘zgarishlar va og‘riq sindromining xususiyatlari o‘rganildi. Instrumental diagnostika usullari sifatida elektroneyromiografiya (ENMG), ultratovush tekshiruvi hamda magnit-rezonans tomografiya qo‘llanildi. ENMG yordamida nerv impulslarining o‘tish tezligi, denervatsiya belgilari va mushaklarning funksional holati baholandi. MRT orqali

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nervning anatomik yaxlitligi, atrofdagi yumshoq to‘qimalar holati va chandiqli o‘zgarishlar aniqlashtirildi.

Jarrohlik davolash ko‘rsatmalari nervning uzilishi, kompressiyasi, chandiqli degeneratsiyasi yoki konservativ davolash fonida klinik yaxshilanish kuzatilmagan holatlarda belgilandi. Operatsiyalar davomida nevroliz, epinevral tikuv, interfassikulyar tikuv va autolog nerv transplantatsiyasi usullaridan foydalanildi. Ayrim murakkab holatlarda intraoperatsion neyromonitoring qo‘llanildi.

Natijalar

Klinik kuzatuvlar natijasida bemorlarning aksariyatida oyoq panjasini dorsifleksiya qilishning pasayishi, sezgi buzilishlari va nevropatik og‘riq sindromi aniqlangan. Travmadan keyingi dastlabki davrda klinik belgilar ayrim hollarda yetarlicha namoyon bo‘lmaganligi sababli instrumental diagnostika katta ahamiyat kasb etdi. Elektroneyromiografiya tekshiruvlari quymich nervining funksional holatini aniqlashda eng informativ usullardan biri ekanligini ko‘rsatdi. Nerv o‘tkazuvchanligining pasayishi va denervatsiya belgilarining aniqlanishi jarrohlik davolash ko‘rsatmalarini belgilashda muhim mezon bo‘lib xizmat qildi.

MRT tekshiruvlari nervning uzilishi, kompressiyasi yoki chandiqli o‘zgarishlarini aniqlash imkonini berdi. Ayniqsa, sonning yuqori uchdan bir qismi va dumba sohasidagi murakkab shikastlanishlarda ushbu usul yuqori diagnostik ahamiyatga ega ekanligi kuzatildi. Jarrohlik davolash natijalari tahlili shuni ko‘rsatdiki, travmadan keyingi dastlabki 3–6 oy ichida bajarilgan rekonstruktiv operatsiyalar eng yaxshi funksional natijalarni berdi. Nervning to‘liq uzilishi kuzatilgan bemorlarda autolog transplantatsiya usuli qo‘llanilganda mushak kuchining tiklanishi va sezgi funksiyalarining yaxshilanishi qayd etildi. Intraoperatsion neyromonitoring qo‘llanilgan holatlarda nerv tolalarining funksional holatini baholash imkoniyati oshib, jarrohlik manipulyatsiyalarining xavfsizligi sezilarli darajada yaxshilandi. Bu esa postoperatsion nevrologik asoratlar sonining kamayishiga olib keldi.

Muhokama

Quymich nervi shikastlanishlari periferik nerv tizimining eng murakkab patologiyalaridan biri hisoblanadi. Nervning katta diametrga ega bo‘lishi va uzun anatomik yo‘nalishi uning turli darajalarda shikastlanishiga sabab bo‘ladi. Mazkur holatlarda faqat klinik tekshiruv bilan cheklanib qolish ko‘pincha yetarli bo‘lmaydi. Olingan natijalar zamonaviy instrumental diagnostika usullarining ahamiyatini tasdiqlaydi. ENMG nervning funksional holatini baholash imkonini bersa, MRT anatomik o‘zgarishlarni aniqlashda yuqori aniqlikka ega. Ushbu usullarni kompleks

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qo‘llash diagnostik xatolar sonini kamaytiradi va optimal davolash taktikasini tanlashga yordam beradi. Jarrohlik davolashning samaradorligi ko‘p jihatdan operatsiyaning o‘z vaqtida bajarilishiga bog‘liq. Nervning uzoq muddatli kompressiyasi yoki uzilishidan keyin mushaklarda qaytmas atrofik o‘zgarishlar rivojlanishi mumkin. Shu sababli jarrohlik ko‘rsatmalarini kechiktirmaslik muhim hisoblanadi. Adabiyot ma’lumotlariga ko‘ra, zamonaviy mikroneyroxirurgik texnologiyalar va intraoperatsion neyromonitoring qo‘llanilishi periferik nerv operatsiyalarining samaradorligini sezilarli oshiradi. Bizning kuzatuvlarimiz ham ushbu fikrni tasdiqladi. Operatsiya vaqtida nervning funksional holatini nazorat qilish jarrohga optimal taktik qaror qabul qilish imkonini beradi.

Xulosa

Quymich nervi shikastlanishlarini tashxislashda klinik tekshiruv natijalarini elektroneyromiografiya va magnit-rezonans tomografiya ma’lumotlari bilan birgalikda baholash eng yuqori diagnostik aniqlikni ta’minlaydi. Elektroneyromiografiya nervning funksional holatini aniqlash va jarrohlik ko‘rsatmalarini belgilashda muhim usul hisoblanadi. Travmadan keyingi erta muddatlarda bajarilgan rekonstruktiv operatsiyalar kech bajarilgan jarrohlik aralashuvlarga nisbatan yaxshiroq funksional natijalarni ta’minlaydi. Mikroxirurgik texnologiyalar va intraoperatsion neyromonitoringni qo‘llash operatsiya xavfsizligini oshiradi hamda postoperatsion asoratlar sonini kamaytiradi. Quymich nervi shikastlangan bemorlarni tashxislash va davolashning kompleks yondashuvi funksional tiklanish ko‘rsatkichlarini yaxshilashga imkon beradi..

Foydalanilgan adabiyotlar ro‘yxati

1. Ray W.Z., Mackinnon S.E. Nerve repair and nerve grafting in the upper and lower extremity. Journal of Hand Surgery. 2022.
2. Griffin J.W., Hogan M.V., Chhabra A.B., Deal D.N. Peripheral nerve repair and reconstruction. Journal of Bone and Joint Surgery. 2021.
3. Kretschmer T., Antoniadis G. Modern concepts in peripheral nerve surgery. Neurosurgical Review. 2020.
4. Zhu S., et al. Advances in peripheral nerve regeneration and repair. Neural Regeneration Research. 2023.
5. Menorca R.M.G., Fussell T.S., Elfar J.C. Peripheral nerve trauma and repair. Clinics in Plastic Surgery. 2021.
6. Millesi H. Microsurgery of peripheral nerves. Springer, 2020.
7. Siemionow M., Brzezicki G. Current techniques in peripheral nerve reconstruction. World Journal of Orthopedics. 2022.

ISSN: 3060-4737 Volume 3, Issue 5 IF(Impact Factor) 10.98 / 2026
8. Kline D.G. Management of peripheral nerve injuries. Neurosurgery. 2021.
9. Campbell W.W. Evaluation and management of peripheral nerve injury. Clinical Neurophysiology. 2020.
10. Kim D.H., Kline D.G. Surgical outcomes in sciatic nerve injuries. Neurosurgical Focus. 2022.

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PSYCHONEUROLOGICAL DISORDERS OBSERVED IN PARKINSON'S DISEASE.

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Abstract: This article aims to systematize psychoneurological disturbances in Parkinson’s disease and provide an integrative interpretation of their pathogenesis. A narrative-systematic literature review combined with comparative clinical conceptualization was applied across international and regional sources. Results indicate that cognitive decline, depression, anxiety, apathy, psychosis, and sleep disorders form interrelated clinical clusters. The contribution lies in clarifying how non-motor symptoms should be incorporated into clinical decision-making in Parkinson’s disease.

Keywords: Parkinson’s disease, psychoneurological disorders, cognitive dysfunction, depression, psychosis, sleep disorders, apathy.

ПСИХОНЕВРОЛОГИЧЕСКИЕ НАРУШЕНИЯ ПРИ БОЛЕЗНИ ПАРКИНСОНА.

Аннотация: Цель статьи состоит в систематизации психоневрологических нарушений при болезни Паркинсона и интегративной интерпретации их патогенеза. Применены нарративно-систематический анализ литературы и сравнительная клиническая концептуализация на основе международных и региональных источников. Показано, что когнитивный спад, депрессия, тревога, апатия, психоз и расстройства сна формируют взаимосвязанные кластеры. Научный вклад заключается в уточнении принципов включения немоторных симптомов в клинические решения при болезни Паркинсона.

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Ключевые слова: Болезнь Паркинсона, психоневрологические нарушения, когнитивная дисфункция, депрессия, психоз, расстройства сна, апатия.

PARKINSON KASALLIGIDA KUZATILADIGAN PSIXONEVROLOGIK BUZILISHLAR

Annotatsiya: Ushbu maqolaning maqsadi Parkinson kasalligida uchraydigan psixonevrologik buzilishlar spektrini tizimlashtirish va ularning patogenetik omillarini integrativ talqin qilishdir. Metodologiya sifatida xalqaro va mintaqaviy manbalar bo‘yicha narrativ-sistematik adabiyotlar tahlili, qiyosiy klinik konseptualizatsiya qo‘llanildi. Natijada kognitiv pasayish, depressiya, xavotir, apatiya, psixoz va uyqu buzilishlari o‘zaro bog‘liq klasterlar sifatida asoslandi. Ilmiy hissasi PKda motor bo‘lmagan simptomlarni klinik qarorlar jarayoniga kiritish mezonlarini aniqlashtirishdan iborat.

Kalit so‘zlar: Parkinson kasalligi, psixonevrologik buzilishlar, kognitiv disfunktsiya, depressiya, psixoz, uyqu buzilishi, apatiya.

Kirish: Parkinson kasalligi nevrologiyada an’anaviy ravishda motor simptomlar, ya’ni bradikineziya, rigidlik va tremor bilan tavsiflangan bo‘lsa-da, so‘nggi o‘n yilliklarda kasallikning klinik og‘irligi va hayot sifati pasayishida motor bo‘lmagan, ayniqsa psixonevrologik buzilishlar yetakchi determinantlardan biri ekani tobora ravshanlashdi. Kognitiv pasayishdan tortib affektiv sindromlargacha, psixotik fenomenlardan uyqu-uyg‘oqlik sikli disritmiyalarigacha bo‘lgan buzilishlar nafaqat nogironlik darajasini oshiradi, balki davolashga adherensni pasaytiradi, parvarish yukini kuchaytiradi va prognozni murakkablashtiradi [1; 2]. Shunga qaramay, amaliyotda psixonevrologik simptomlar ko‘pincha ikkilamchi yoki “qo‘shimcha” ko‘rinish sifatida baholanadi; natijada ularni erta aniqlash, differensial tashxis va bosqichma-bosqich boshqarish algoritmlarida tizimli bo‘shliqlar saqlanib qolmoqda. Mazkur bo‘shliqning asosiy sabablaridan biri shundaki, PKda psixonevrologik buzilishlar monofaktorli mexanizm bilan izohlanmaydi: dopaminergik disbalans, serotonergik va noradrenergik tizimlarning jalb etilishi, fronto-striatal halqalarning disfunksiyasi, limbik tarmoqlardagi degeneratsiya, shuningdek, somatik komorbidlik va dori-induksiyalangan ta’sirlar o‘zaro qatlamlashadi [3; 4]. Bunday ko‘p omilli tabiat klinik ko‘rinishlarning heterogenligi va simptomlar o‘rtasidagi yuqori darajadagi komorbidlikni yuzaga keltiradi, bu esa “bitta simptom–bitta davolash” yondashuvining cheklanganligini ko‘rsatadi.

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Ilmiy adabiyotlarda psixonevrologik buzilishlarning tarqalishi va ularning patogenetik asoslari keng yoritilgan bo‘lsa-da, mahalliy klinik maktablar va amaliy xizmat sharoitida qo‘llash mumkin bo‘lgan integrativ konseptual model yetarli darajada ishlab chiqilmagan. Xususan, kognitiv pasayish, depressiya, xavotir, apatiya, psixoz va uyqu buzilishlarining qaysi kombinatsiyalari kasallik bosqichlari, dori terapiyasi profili va neyrodegenerativ jarayonning topik tarqalishi bilan ko‘proq bog‘liqligi masalasi klinik qaror qabul qilishda ko‘pincha intuitiv baholanadi. Shu sababli ushbu maqola PKdagi psixonevrologik buzilishlarni klinik-spektr va patogenetik mexanizmlar nuqtayi nazaridan tizimlashtirish, ular o‘rtasidagi o‘zaro bog‘liqlikni klasterlash va amaliyot uchun konseptual xulosalar chiqarishni maqsad qiladi.Maqolaning maqsadi Parkinson kasalligida psixonevrologik buzilishlar spektrini tizimli tahlil qilish, asosiy sindromlarni patogenetik yo‘nalishlar bo‘yicha integratsiyalash va klinik diagnostika hamda boshqaruv uchun konseptual takliflar ishlab chiqishdan iborat. Vazifalar sifatida birinchidan, PKdagi yetakchi psixonevrologik sindromlarni va ularning klinik fenotiplarini aniqlashtirish; ikkinchidan, dopaminergik va nodopaminergik tizimlar, fronto-striatal va limbik tarmoqlar disfunksiyasi nuqtayi nazaridan patogenetik tushuntirishlarni qiyosiy baholash; uchinchidan, dori-induksiyalangan fenomenlar va kasallikning o‘ziga xos neyrodegenerativ mexanizmlarini differensial ko‘rib chiqish; to‘rtinchidan, simptomlar komorbidligi va klasterlarini amaliy baholashga mos konseptual ramka taqdim etish belgilandi.Ushbu ilmiy ishda metodologik asos sifatida narrativ-sistematik adabiyotlar tahlili va qiyosiy-analitik yondashuv tanlandi. Tanlangan yondashuv PKdagi psixonevrologik buzilishlar ko‘p o‘lchovli bo‘lgani, ularni faqat bitta klinik o‘lcham yoki bitta biomarker doirasida izohlash yetarli emasligi bilan asoslanadi. Adabiyotlar tahlili jarayonida xalqaro va mintaqaviy manbalarda yoritilgan klinik kuzatuvlar, metaanalizlar, konsensus tavsiyalari hamda neyrobiologik tadqiqotlarning konseptual natijalari integratsiyalandi [1; 5]. Ma’lumotlarni tanlashning maqsadi turli ilmiy maktablarda shakllangan qarashlarning umumiy va farqli jihatlarini aniqlash, shuningdek, ularning amaliy nevrologiya va psixiatriya kesishmasida qo‘llanish imkoniyatlarini baholashdan iborat bo‘ldi.Tahlil doirasida psixonevrologik buzilishlar quyidagi asosiy yo‘nalishlar bo‘yicha konseptual guruhlarga ajratildi: kognitiv spektr (engil kognitiv buzilishdan demensiyagacha), affektiv spektr (depressiya, xavotir, apatiya), psixotik spektr (illyuziya, gallyutsinatsiya, deluzional fikrlar), uyqu va sirkadiyal spektr (REM uyqu xulq buzilishi, insomniya, kunduzgi uyquchanlik), shuningdek, impuls nazorati bilan bog‘liq o‘zgarishlar. Bunday guruhlash klinik amaliyotda tez-tez uchraydigan komorbid kombinatsiyalarni tushuntirish va patogenetik mexanizmlarni bir-biriga

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bog‘lash imkonini beradi [2; 6]. Qiyosiy-analitik bosqichda har bir spektr bo‘yicha klinik fenomenologiya, kasallik bosqichiga nisbatan dinamika, dori terapiyasi bilan aloqadorlik va neyroanatomo-funksional asoslar bir-biri bilan solishtirildi. Metodlar orasida konseptual sintez alohida o‘rin tutdi: u turli manbalardagi natijalarni yagona klinik mantiqqa keltirish, qarama-qarshi natijalarni izohlash va amaliy xulosalar chiqarish uchun qo‘llanildi.Mazkur maqola empirik klinik sinov emas, shuning uchun statistik hisob-kitoblar yoki birlamchi klinik ma’lumotlar keltirilmaydi; biroq metodologiya ilmiy dalillarning ierarxiyasini hisobga olgan holda qurildi. Konsensus hujjatlari va metaanalizlar umumiy yo‘nalishlarni belgilashda tayanch bo‘lib xizmat qildi, kohort va klinik kuzatuv tadqiqotlari esa fenotipik tafovutlarni yoritishda qo‘llandi. Mahalliy va mintaqaviy adabiyotlar PKning klinik monitoringi, nevrologik xizmat sharoiti hamda psixonevrologik baholashdagi amaliy cheklovlarni tushunish uchun muhim kontekst sifatida jalb etildi [7; 8]. Shunday qilib, tanlangan metodlar maqola maqsadiga mos ravishda klinik tizimlashtirish, patogenetik talqin va amaliy konseptualizatsiyani ta’minlashga xizmat qildi. Tahlil natijalari PKdagi psixonevrologik buzilishlar klinik jihatdan mustaqil epizodlar sifatida emas, balki bir-birini kuchaytiruvchi va kasallikning neyrodegenerativ tarqalishi hamda farmakoterapiya profili bilan qo‘shilib ketuvchi sindromlar tizimi sifatida namoyon bo‘lishini ko‘rsatdi. Birinchi muhim natija shundaki, kognitiv spektrdagi buzilishlar PKning turli bosqichlarida turlicha fenotip bilan ko‘rinadi: erta davrda ko‘proq ijro funksiyalari, diqqat va psixomotor tezlikning pasayishi ustun bo‘lsa, keyingi bosqichlarda vizuoprostor ishlov berish, xotira va semantik tizimlar jalb etilishi kuchayadi. Bu dinamikada fronto-striatal halqalarning disfunksiyasi bilan birga kortikal va limbik tarmoqlarning kengroq degenerativ jarayonga qo‘shilishi haqidagi konseptual qarashlar bilan mos keladigan izchillik kuzatildi [1; 3]. Kognitiv pasayishning muhim jihati sifatida u motor simptomlarning og‘irligidan mustaqil ravishda ham funksional cheklanishni keskin kuchaytirishi aniqlashtirildi; ya’ni kognitiv buzilish motor baholash shkalalari bilan yetarli aks etmaydigan alohida klinik yukni tashkil etadi.

Ikkinchi natija affektiv spektrning heterogenligi va ularning patogenetik qatlamlashuviga taalluqlidir. Depressiya va xavotir PKda reaktiv psixologik javob sifatida ham, kasallikning neyrobiologik komponenti sifatida ham uchrashi mumkinligi ko‘rsatildi, biroq klinik jihatdan ularni ajratish faqat psixologik stressorlarni baholash bilan cheklanmaydi. Depressiv simptomlar ko‘pincha apatiya bilan komorbid bo‘ladi, ammo apatiya har doim depressiya bilan sinonim emasligi, u motivatsion tizimlar va mukofot yo‘llari disfunksiyasi bilan ko‘proq bog‘liq alohida sindrom sifatida ajralishi tahlilda asoslandi [4; 6]. Xavotir esa ba’zan “off” davrlari, vegetativ disbalans va uyqu

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buzilishlari bilan bir klasterda to‘planishi mumkinligi bilan ajralib turadi. Ushbu natija klinik amaliyot uchun muhim, chunki affektiv simptomlarni yagona depressiv sindrom sifatida baholash davolash strategiyasini noto‘g‘ri yo‘naltirishi ehtimoli mavjud.

Uchinchi natija psixotik spektr va uning dori terapiyasi bilan murakkab munosabatiga oid. PKda psixoz ko‘pincha vizual gallyutsinatsiyalar, illyuziyalar va ba’zan deluzional interpretatsiyalar ko‘rinishida namoyon bo‘lishi, ularning paydo bo‘lishida kasallikning o‘zi bilan bog‘liq neyrodegenerativ omillar va dopaminergik preparatlarning psixotomimetik ta’siri bir-biriga qo‘shilishi tahlilda tizimli tarzda ko‘rsatildi [2; 5]. Muhimi, psixotik fenomenlar ko‘pincha kognitiv pasayish, uyqu disritmiyasi va sensor ishlov berishdagi buzilishlar bilan birga keladi; demak, ular faqat dori dozasining “yon ta’siri” sifatida tushuntirilsa, klinik xavf omillari yetarlicha baholanmay qoladi. Psixozning klinik og‘irligi parvarish yukini keskin oshirishi va institutsionalizatsiya xavfini ko‘paytirishi haqidagi dalillar ushbu spektrni alohida ustuvor baholash zarurligini asoslaydi.

To‘rtinchi natija uyqu va sirkadiyal buzilishlarning PKdagi “markaziy” roli bilan bog‘liq bo‘lib, ular ko‘pincha affektiv va kognitiv simptomlar uchun fon vazifasini bajarishi ko‘rsatildi. REM uyqu xulq buzilishi, insomniya, fragmentatsiyalangan uyqu, kunduzgi uyquchanlik va sirkadiyal ritmning buzilishi ko‘p hollarda bir-biri bilan komorbid tarzda uchrashi, shuningdek, kognitiv pasayish va psixotik fenomenlar xavfi bilan assotsiatsiyalanishi tahlil qilindi [5; 6]. Bu holat uyqu buzilishlarini “ikkinchi darajali” shikoyat sifatida emas, balki PKning neyrodegenerativ jarayoni va nodopaminergik tizimlar disfunksiyasini aks ettiruvchi klinik marker sifatida ko‘rishga asos bo‘ldi.

Beshinchi natija klinik klasterlashga oid bo‘lib, psixonevrologik simptomlar ko‘pincha uchta ustuvor konfiguratsiyada to‘planishi mumkinligi konseptual ravishda ajratildi. Birinchi konfiguratsiya fronto-striatal tip bo‘lib, unda ijro funksiyalari pasayishi, apatiya, ba’zan impuls nazorati buzilishi va “off” bilan bog‘liq xavotir ustun keladi. Ikkinchi konfiguratsiya limbik-assotsiativ tip bo‘lib, depressiv simptomlar, uyqu disritmiyasi, kognitiv pasayishning kengayishi va psixotik fenomenlarga moyillik birga uchraydi. Uchinchi konfiguratsiya aralash tip bo‘lib, motor fluktuatsiyalar, dori yuklamasi va vegetativ buzilishlar fonida affektiv va uyqu simptomlari almashib turadi. Ushbu klasterlash empirik tasnif emas, balki klinik qaror qabul qilishni soddalashtiruvchi konseptual natija sifatida taqdim etildi; u bemorni kompleks baholashda qaysi simptomlar “drayver” ekanini aniqlashga yordam beradi. Olingan natijalar PKni motor va motor bo‘lmagan simptomlar yig‘indisi sifatida emas, balki neyrodegeneratsiyaning ko‘p tarmoqli modeliga asoslangan tizimli kasallik sifatida tushunish zarurligini yana bir bor ko‘rsatadi. Kognitiv pasayishning erta bosqichlarda

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ijro funksiyalari va diqqat bilan boshlanishi haqidagi kuzatuvlar PKning fronto-striatal halqalar bilan bog‘liq disfunksiyasi konsepsiyasini qo‘llab-quvvatlaydi; bu yondashuvda dopaminergik modulyatsiya yetishmovchiligi “kognitiv bradikineziya”ga o‘xshash klinik effektlar berishi ta’kidlanadi [1]. Biroq tahlil shuni ko‘rsatdiki, faqat dopaminergik izoh kognitiv spektrning keyingi bosqichlarda kengayishini to‘liq tushuntirib bermaydi; bu yerda kortikal va xolinergik tizimlarning jalb etilishi, shuningdek, limbik tarmoqlar degeneratsiyasi haqida yozilgan ishlar muhim izohlaydigan qatlamni beradi [3; 5]. Demak, kognitiv buzilishlarni baholashda bir tomondan motor fluktuatsiyalar bilan bog‘liq “vaqtinchalik” kognitiv o‘zgarishlarni, ikkinchi tomondan neyrodegenerativ jarayonning progressiv komponentini ajratish klinik monitoring uchun fundamental ahamiyat kasb etadi.Affektiv spektr bo‘yicha natijalar rus va xalqaro adabiyotlarda uchraydigan “depressiya va apatiya” masalasidagi munozaralarga konseptual aniqlik kiritadi. Bir qator manbalarda apatiya depressiyaning somatik-ekvivalent ko‘rinishi sifatida talqin qilinsa, boshqa tadqiqotchilar uni motivatsion komponentning alohida buzilishi deb ajratadi [4; 6]. Bizning tahlil apatiyaning depressiv kayfiyatdan mustaqil ravishda ham uchrashi, ayniqsa mukofot tizimlari va frontal tarmoqlar disfunksiyasi bilan aloqador bo‘lishi ehtimolini kuchliroq deb ko‘rsatdi. Bu klinik amaliyotda antidepressant terapiya bilan cheklanib qolish ba’zi bemorlarda funksional tiklanishni ta’minlamasligi mumkinligini anglatadi, chunki apatiya uchun psixososial faollashtirish, reabilitatsion yondashuvlar va dori strategiyasini qayta ko‘rib chiqish kabi ko‘p komponentli choralar talab etilishi mumkin. Xavotirning “off” davrlari va vegetativ disbalans bilan klasterlashishi esa PKda affektiv simptomlar faqat psixologik reaktsiya sifatida emas, balki neyrofiziologik fluktuatsiyalar bilan bog‘liq holat sifatida ham baholanishi zarurligini ko‘rsatadi [2]. Bu, o‘z navbatida, davolashda dori rejimini optimallashtirish va uyqu gigiyenasi kabi intervensiyalarni affektiv simptomlar boshqaruviga integratsiya qilishga asos bo‘ladi.Psixotik spektrga doir natijalar xalqaro konsensuslarda ta’kidlanadigan dori-induksiyalangan va kasallikka xos omillar o‘rtasidagi o‘zaro ta’sir g‘oyasini klinik mantiq nuqtayi nazaridan kuchaytiradi [5]. Amaliyotda psixoz paydo bo‘lganda dopaminergik terapiyani keskin kamaytirish motor yomonlashuvini chaqirishi mumkin, shu bilan birga psixotik fenomenlarni faqat dori dozasiga “yuklash” kognitiv pasayish, uyqu disritmiyasi yoki sensor ishlov berishdagi buzilishlar kabi hamroh risk markerlarini e’tibordan chetda qoldiradi. Shu jihatdan, natijalar psixozni multidisiplinar baholash zarurligini ko‘rsatadi: nevrologik holat, kognitiv status, uyqu profili va dori yuklamasi birgalikda tahlil qilinganda xavfsizroq klinik qarorlar ishlab chiqilishi mumkin. Rus maktabi nevropsixiatriyada dori-induksiyalangan psixoz va degenerativ demensiya bilan bog‘liq psixozni

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farqlashga alohida urg‘u berishi ma’lum; bu yondashuv bizning natijalar bilan hamohang bo‘lib, differensial tashxisda vaqt omili va simptomlar evolyutsiyasini kuzatish muhimligini ko‘rsatadi [4].

Uyqu buzilishlari bo‘yicha natijalar PKning nodopaminergik tizimlar, ayniqsa miya ustuni va sirkadiyal regulyatsiya markazlari jalb etilishi haqidagi konsepsiyalar bilan mos keladi [6]. REM uyqu xulq buzilishining klinik ahamiyati shundaki, u ko‘pincha keyingi kognitiv va psixotik asoratlar bilan bir yo‘nalishda harakatlanadigan marker sifatida qaraladi; bunday pozitsiya bir qator xalqaro tadqiqotlarda ham uchraydi [5]. Bizning tahlilda uyqu disritmiyasi affektiv simptomlar kuchayishining “multiplikatori” sifatida ko‘rindi: uyqu fragmentatsiyasi diqqat va ijro funksiyalarini pasaytirishi, kunduzgi uyquchanlik esa ijtimoiy faollikni cheklab, apatiyani chuqurlashtirishi mumkin. Shuning uchun uyqu buzilishlarini davolash faqat komfort masalasi emas, balki psixonevrologik spektrni barqarorlashtirishga xizmat qiluvchi strategik yo‘nalish sifatida talqin qilinadi.

Natijalar asosida taklif etilgan klasterlash mavjud adabiyotlarda uchraydigan fenotiplash g‘oyalariga yaqin bo‘lsa-da, u qat’iy statistik tasnif da’vosini qilmaydi; aksincha, klinik qarorlar jarayonida murakkab komorbidlikni mantiqan “birlash”tirish uchun konseptual vosita sifatida taklif etiladi. Bu yondashuvning kuchli tomoni shundaki, u klinisyen e’tiborini alohida simptomni bostirishga emas, balki simptomlarni qo‘zg‘atadigan umumiy mexanizmlar va sharoitlarga qaratadi. Shu bilan birga, bu modelning cheklovi shundaki, u individual bemorlardagi farmakogenetik farqlar, somatik komorbidlik va psixososial omillarni to‘liq qamrab olmaydi; kelgusida mahalliy klinik kohortlarda psixonevrologik simptomlar klasterlarini empirik tekshirish bunday konseptual ramkani kuchaytirishi mumkin.

XULOSA: Parkinson kasalligida psixonevrologik buzilishlar motor simptomlarga qo‘shimcha bo‘lgan ikkilamchi holatlar emas, balki kasallikning klinik og‘irligi, funksional mustaqillik va hayot sifati pasayishini belgilovchi asosiy komponentlardan biridir. Ushbu maqolada kognitiv pasayish, affektiv sindromlar, psixoz va uyqu buzilishlari o‘zaro bog‘langan klasterlar sifatida tizimlashtirildi hamda ularning ko‘p omilli patogenetik asoslari integrativ talqin qilindi. Natijalar klinik amaliyotda kompleks baholashni kuchaytirish, simptomlar “drayver”larini aniqlash va multidisiplinar boshqaruv strategiyalarini tanlashga nazariy hamda amaliy asos yaratadi. Kelgusida mahalliy populyatsiyada standartlashtirilgan psixometrik baholash, longitudinal kuzatuv va fenotiplashga yo‘naltirilgan tadqiqotlar psixonevrologik asoratlarni erta aniqlash va individual yondashuvni takomillashtirishga xizmat qilad

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Foydalanilgan adabiyotlar:

1. Fahn S., Jankovic J., Hallett M. Principles and practice of movement disorders. Philadelphia: Elsevier Saunders, 2011. 616 p.
2. Chaudhuri K. R., Tolosa E., Schapira A. H. V., Poewe W. Parkinson's disease: Non-motor and non-dopaminergic features. Oxford: Oxford University Press, 2014. 496 p.
3. Aarsland D., Creese B., Politis M., Chaudhuri K. R., Ffytche D. H., Weintraub D., Ballard C. Cognitive decline in Parkinson disease. London: Nature Publishing Group, 2017. P. 217–231.
4. Левин О. С. Болезнь Паркинсона. Москва: ГЭОТАР-Медиа, 2016. 352 с.
5. Postuma R. B., Berg D., Stern M., Poewe W., Olanow C. W., Oertel W., Obeso J., Marek K., Litvan I., Lang A. E. MDS clinical diagnostic criteria for Parkinson's disease. Rochester: Movement Disorder Society, 2015. P. 1591–1601.
6. Videnovic A., Hogl B. Disorders of sleep and circadian rhythms in Parkinson disease. Cambridge: Cambridge University Press, 2019. 280 p.
7. Asadov A. A., Xudoyberdiyev S. B. Parkinson kasalligi: klinikasi, diagnostikasi va davolash tamoyillari. Toshkent: Abu Ali ibn Sino nomidagi tibbiyot nashriyoti, 2018. 184 b.
8. Karimov B. A., Raximova D. N. Ekstrapiramidal kasalliklar va parkinsonizm: nevrologik amaliyot uchun qo'llanma. Samarqand: Samarqand davlat tibbiyot nashriyoti, 2020. 208 b.

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INVESTITSIYA LOYIHALARINI BAHOLASHDA NET PRESENT VALUE (NPV) USULIDAN FOYDALANISH: AMALIY CASE STUDY ASOSIDA TAHLIL

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Annotatsiya
Ushbu maqolada investitsiya loyihalarini baholashning zamonaviy usullaridan biri bo'lgan Net Present Value (NPV) ko'rsatkichi o'rganilgan. NPV usulining nazariy asoslari, afzalliklari va amaliy ahamiyati yoritilgan. Shuningdek, muzqaymoq ishlab chiqarish loyihasi misolida investitsiya samaradorligi tahlil qilinib, loyiha bo'yicha moliyaviy qaror qabul qilish jarayoni ko'rsatib berilgan. Tadqiqot natijalari NPV usulining investitsion loyihalarni tanlashda muhim vosita ekanligini tasdiqlaydi.
Kalit so'zlar: investitsiya, NPV, pul oqimi, diskontlash, investitsion loyiha, moliyaviy tahlil, samaradorlik.

Kirish

Jahon iqtisodiyotida investitsiyalar iqtisodiy o'sishning asosiy omillaridan biri hisoblanadi. Korxonalar yangi mahsulot ishlab chiqarish, xizmatlar ko'lamini kengaytirish va innovatsion texnologiyalarni joriy etish maqsadida turli investitsion loyihalarni amalga oshiradilar. Bunday loyihalarni moliyalashtirishdan oldin ularning iqtisodiy samaradorligini aniqlash zarur.

Investitsion loyihalarni baholashda Payback Period, Internal Rate of Return (IRR), Profitability Index (PI) va Net Present Value (NPV) kabi usullar keng qo'llaniladi. Ularning orasida NPV usuli eng ishonchli va ilmiy asoslangan usullardan biri sifatida e'tirof etiladi. Mazkur maqolaning maqsadi NPV usulining nazariy asoslarini o'rganish va amaliy loyiha misolida uning samaradorligini tahlil qilishdan iborat.

Adabiyotlar sharhi

Investitsion loyihalarni baholash bo'yicha ko'plab iqtisodchi olimlar ilmiy izlanishlar olib borganlar. Brigham va Ehrhardt investitsion qarorlar qabul qilishda pulning vaqt qiymatini hisobga olish zarurligini ta'kidlaydilar. Ross, Westerfield va Jordan esa NPV ko'rsatkichini investitsion loyihalarni tanlashdagi eng muhim mezon sifatida ko'rsatadilar.

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NPV usuli kelajakdagi pul oqimlarini ma’lum diskont stavkasi yordamida joriy qiymatga keltirishga asoslanadi. Agar NPV musbat bo‘lsa, loyiha investor uchun qo‘shimcha qiymat yaratadi va qabul qilinishi mumkin. Aksincha, NPV manfiy bo‘lsa, loyiha rad etiladi.

Tadqiqot metodologiyasi

Tadqiqotda investitsion loyihalarni baholashning NPV usulidan foydalanildi. NPV quyidagi formula orqali hisoblanadi:

NPV = ∑ CFt/(1+r)^t – I0

bu yerda:

- CFt – t-yildagi pul oqimi;
- r – diskont stavkasi;
- I0 – boshlang‘ich investitsiya xarajati.

Tadqiqotda amaliy case study sifatida muzqaymoq ishlab chiqarish loyihasi tanlandi.

Amaliy tahlil

Korxona yangi muzqaymoq ishlab chiqarish liniyasiga 5 million dollar investitsiya kiritishni rejalashtirmoqda. Loyiha muddati 3 yil.

Boshlang‘ich ma’lumotlar

Yil	Savdo hajmi	Narx ($)	Xarajat ($)
1	100 000	20	12
2	120 000	21	13
3	130 000	22	14

Doimiy xarajatlar mos ravishda 200 000, 220 000 va 240 000 dollarni tashkil qiladi. Soliq stavkasi 20%, diskont stavkasi esa 10%.

1-yil hisobi

Tushum:

100 000 × 20 = 2 000 000 dollar

O‘zgaruvchan xarajat:

100 000 × 12 = 1 200 000 dollar

Jami xarajat:

1 200 000 + 200 000 = 1 400 000 dollar

Foyda:

2 000 000 – 1 400 000 = 600 000 dollar

Soliq:

600 000 × 20% = 120 000 dollar

Sof pul oqimi:

600 000 – 120 000 = 480 000 dollar

Shu tartibda keyingi yillar uchun ham hisob-kitoblar amalga oshiriladi.

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Diskontlangan pul oqimlari

Yil	Sof pul oqimi ($)	Diskont koeffitsienti	Joriy qiymat ($)
1	480 000	0.909	436 320
2	632 000	0.826	522 032
3	790 400	0.751	593 390

Jami joriy qiymat:
1 551 742 dollar
NPV:
1 551 742 – 5 000 000
NPV = –3 448 258 dollar

Natijalar va muhokama

Hisob-kitoblar natijasida loyiha NPV ko‘rsatkichi manfiy ekanligi aniqlandi. Bu loyiha kutilayotgan daromadlar hisobiga boshlang‘ich investitsiya xarajatlarini qoplay olmasligini ko‘rsatadi. Shuning uchun loyiha joriy sharoitlarda investor uchun iqtisodiy jihatdan maqsadga muvofiq emas.

Tahlil natijalari investitsion qaror qabul qilishda pulning vaqt qiymatini hisobga olish muhimligini yana bir bor tasdiqlaydi. NPV usuli loyihaning real iqtisodiy samaradorligini aniqlash imkonini beradi.

Xulosa

Tadqiqot natijalari shuni ko‘rsatdiki, NPV usuli investitsion loyihalarni baholashning eng samarali vositalaridan biridir. Mazkur usul investorlarga kelajakdagi pul oqimlarining joriy qiymatini aniqlash va investitsiya bo‘yicha asoslangan qaror qabul qilish imkonini beradi.

Amaliy case study natijasida tanlangan loyiha bo‘yicha NPV manfiy qiymatga ega bo‘ldi va loyiha iqtisodiy jihatdan samarasiz deb baholandi. Kelgusida investitsion loyihalarni baholashda IRR, PI va Payback Period kabi ko‘rsatkichlar bilan birgalikda NPV usulidan foydalanish tavsiya etiladi.

FOYDALANILGAN ADABIYOTLAR

1. Brigham, E. F., & Ehrhardt, M. C. (2022). *Financial Management: Theory and Practice*. 17th Edition. Cengage Learning.
2. Ross, S. A., Westerfield, R. W., & Jordan, B. D. (2021). *Fundamentals of Corporate Finance*. 13th Edition. McGraw-Hill Education.
3. Brealey, R. A., Myers, S. C., & Allen, F. (2020). *Principles of Corporate Finance*. 13th Edition. McGraw-Hill.
4. Damodaran, A. (2021). *Applied Corporate Finance*. 5th Edition. Wiley.

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5. Berk, J., & DeMarzo, P. (2023). *Corporate Finance*. 6th Edition. Pearson Education.
6. Atrill, P. (2022). *Financial Management for Decision Makers*. 10th Edition. Pearson.
7. Arnold, G. (2020). *Corporate Financial Management*. 6th Edition. Pearson Education.
8. Pandey, I. M. (2021). *Financial Management*. 12th Edition. Vikas Publishing House.
9. Graham, J. R., Smart, S. B., & Megginson, W. L. (2020). *Corporate Finance: Linking Theory to What Companies Do*. Cengage Learning.
10. Higgins, R. C. (2021). *Analysis for Financial Management*. 13th Edition. McGraw-Hill.
11. Fabozzi, F. J., Drake, P. P., & Polimeni, R. S. (2020). *The Basics of Finance: An Introduction to Financial Markets, Business Finance and Portfolio Management*. Wiley.
12. Gitman, L. J., & Zutter, C. J. (2022). *Principles of Managerial Finance*. 16th Edition. Pearson.
13. Pike, R., & Neale, B. (2019). *Corporate Finance and Investment: Decisions and Strategies*. Pearson Education.
14. Helfert, E. A. (2020). *Techniques of Financial Analysis*. McGraw-Hill.
15. Koller, T., Goedhart, M., & Wessels, D. (2020). *Valuation: Measuring and Managing the Value of Companies*. Wiley.
16. O‘zbekiston Respublikasi Prezidentining investitsiya faoliyatini rivojlantirishga oid farmon va qarorlari.
17. O‘zbekiston Respublikasi Statistika agentligi ma’lumotlari.
18. O‘zbekiston Respublikasi Iqtisodiyot va moliya vazirligi statistik byulletenlari.
19. O‘zbekiston Respublikasi Investitsiyalar, sanoat va savdo vazirligi hisobotlari.
20. Sharpe, W. F., Alexander, G. J., & Bailey, J. V. (2019). *Investments*. Pearson Education.

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SANOAT GAZLARIDAN KARBONAT ANGIDRIDNI AJRATIB OLISHDA AEROGOLLARNING QO'LLANILISHI

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ANNOTATSIYA: Ushbu maqolada sanoat gazlari tarkibidan karbonat angidrid (CO_2) ni samarali ajratib olishda aerogellarning qo‘llanilish imkoniyatlari va ularning adsorbsion xususiyatlari tahlil qilinadi. Aerogellar yuqori g‘ovaklik, katta solishtirma sirt maydoni va past zichlikka ega bo‘lib, ular CO_2 molekulalarini selektiv yutish jarayonida yuqori samaradorlik ko‘rsatadi. Tadqiqotda aerogel materiallarining fizik-kimyoviy xossalari, ularning gaz yutish mexanizmlari hamda sanoat chiqindi gazlarini tozalashdagi roli ko‘rib chiqilgan. Natijalar shuni ko‘rsatadiki, aerogellar ekologik toza texnologiyalarni rivojlantirishda va issiqxona gazlarini kamaytirishda istiqbolli adsorbent sifatida muhim ahamiyatga ega.

KALIT SO‘ZLAR: aerogel, karbonat angidrid, CO_2 ajratish, adsorbsiya, sanoat gazlari, g‘ovak materiallar, ekologik toza texnologiyalar, gaz tozalash

ABSTRACT: This article analyzes the application of aerogels in the efficient separation of carbon dioxide (CO_2) from industrial gases and their adsorption properties. Aerogels possess extremely high porosity, large specific surface area, and low density, which enable highly effective selective adsorption of CO_2 molecules. The study examines the physicochemical properties of aerogel materials, their gas adsorption mechanisms, and their role in industrial flue gas purification. The results indicate that aerogels are promising adsorbents for the development of environmentally friendly technologies and for reducing greenhouse gas emissions.

KEYWORDS: aerogel, carbon dioxide, CO_2 capture, adsorption, industrial gases, porous materials, environmental technology, gas purification

АННОТАЦИЯ: В данной статье анализируются возможности применения аэрогелей для эффективного отделения углекислого газа (CO_2) из промышленных газов и их адсорбционные свойства. Аэрогели обладают высокой пористостью, большой удельной поверхностью и низкой плотностью, что обеспечивает высокую эффективность селективного поглощения молекул CO_2. В работе рассмотрены физико-химические свойства аэрогелевых материалов, механизмы адсорбции газов и их роль в очистке промышленных выбросов. Полученные результаты показывают, что аэрогели являются перспективными адсорбентами

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для развития экологически чистых технологий и снижения выбросов парниковых газов.

КЛЮЧЕВЫЕ СЛОВА: аэрогель, углекислый газ, CO_2 улавливание, адсорбция, промышленные газы, пористые материалы, экологические технологии, очистка газов

ASOSIY QISM

Aerogellarning umumiy tavsifi va tuzilishi

Aerogellar — bu gel strukturasidan suyuq faza olib tashlanishi natijasida hosil bo‘ladigan, o‘ta yengil va yuqori g‘ovakli nanostrukturali materiallardir. Ularning asosiy xususiyati shundaki, qattiq skeletning ichida havoga to‘la nanog‘ovaklar tizimi mavjud bo‘lib, bu ularning zichligini juda past darajaga tushiradi. Aerogellarning zichligi ba’zan havo zichligiga yaqinlashadi, bu esa ularni eng yengil qattiq materiallardan biri sifatida ajratib turadi.

Tuzilish jihatidan aerogellar uch o‘lchamli tarmoqqa ega bo‘lib, ularning g‘ovaklari nanometr o‘lchamda bo‘ladi. Ushbu tuzilma materialning solishtirma sirt maydonini keskin oshiradi, bu esa gaz molekulalarini yutish jarayonida muhim rol o‘ynaydi. Ayniqsa, karbonat angidrid molekulalarining adsorbsiyasi uchun katta faol yuzalar zarur bo‘lib, aerogellar bu talabni to‘liq qondiradi.

Aerogellar odatda silika (SiO_2), uglerod, alumina yoki polimer asosida tayyorlanadi. Har bir tur o‘zining adsorbsion xususiyatlari bilan farqlanadi, lekin CO_2 ajratib olish jarayonida eng ko‘p qo‘llaniladiganlari silika va uglerod aerogellaridir.

2. Karbonat angidridni ajratish zarurati va muammo dolzarbligi

Sanoat rivojlanishi natijasida atmosferaga chiqarilayotgan karbonat angidrid miqdori keskin ortib bormoqda. Energetika, metallurgiya, sement ishlab chiqarish va kimyo sanoati kabi sohalar CO_2 chiqindilarining asosiy manbalaridir. Ushbu gaz issiqxona effekti kuchayishiga sabab bo‘lib, global iqlim o‘zgarishlarini tezlashtiradi.

Shu sababli CO_2 ni ajratib olish va uni qayta ishlash texnologiyalarini rivojlantirish bugungi kunda eng muhim ekologik vazifalardan biridir. An’anaviy usullar — masalan, amin eritmalari bilan absorbsiya yoki kriogen ajratish — samarali bo‘lsa-da, ular energiya sarfi yuqoriligi va korroziya muammolari bilan cheklanadi. Shu nuqtai nazardan, aerogellar asosidagi adsorbsiya texnologiyalari istiqbolli alternativ sifatida qaralmoqda.

3. Aerogellarning CO_2 adsorbsion xususiyatlari

Aerogellar yuqori g‘ovaklik (90–99%) va katta solishtirma sirt maydoni (ba’zan 1000 m^2/g dan yuqori) tufayli gaz molekulalarini samarali ushlab qoladi. CO_2 molekulalari aerogel ichidagi mikrog‘ovak va mezog‘ovaklarga kirib, Van-der-

Vaals kuchlari yoki kimyoviy bog‘lanishlar orqali ushlanadi.

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Adsorbsiya jarayoni ikki asosiy mexanizmga ega:

Birinchisi — fizik adsorbsiya bo‘lib, unda CO_2 molekulalari aerogel yuzasiga zaif molekulyar kuchlar orqali birikadi. Bu jarayon past haroratlarda samarali kechadi va qayta tiklash (regeneratsiya) oson bo‘ladi.

Ikkinchisi — kimyoviy adsorbsiya bo‘lib, aerogel yuzasiga funksional guruhlar (amin, gidroksil va boshqalar) kiritilganda yuzaga keladi. Bu holatda CO_2 molekulalari bilan kuchliroq kimyoviy bog‘lar hosil bo‘ladi, natijada yutilish samaradorligi ortadi.

4. Aerogel turlarining CO_2 ajratishdagi samaradorligi

Silika aerogellar eng keng tarqalgan turlardan biri bo‘lib, ularning afzalligi yuqori barqarorlik va katta sirt maydonidir. Biroq sof silika aerogellar CO_2 ni selektiv yutishda unchalik yuqori ko‘rsatkich bermaydi, shuning uchun ularning yuzasi kimyoviy modifikatsiya qilinadi.

Uglerod aerogellar esa CO_2 bilan kuchli o‘zaro ta’sirga ega bo‘lib, ular mikrog‘ovak struktura tufayli yuqori adsorbsion sig‘imga ega. Ayniqsa, yuqori bosim sharoitida uglerod aerogellarining samaradorligi sezilarli darajada oshadi.

5. CO_2 ajratib olish mexanizmining fizik-kimyoviy asoslari

Karbonat angidridni aerogellar yordamida ajratish jarayoni ko‘p bosqichli fizik-kimyoviy hodisa hisoblanadi. Avvalo gaz molekulalari aerogel yuzasiga diffuziya orqali yetib boradi. Keyin ular mikrog‘ovaklar ichiga kirib, adsorbsiya markazlariga joylashadi

6. Sanoat gazlaridan CO_2 ajratishda qo‘llash texnologiyalari

Aerogellar asosidagi adsorbentlar odatda kolonka tipidagi reaktorlarda qo‘llaniladi. Sanoat chiqindi gazlari ushbu kolonka orqali o‘tkazilganda CO_2 aerogel qatlamida ushlab qolinadi, azot va boshqa inert gazlar esa tizimdan chiqib ketadi.

Keyingi bosqichda regeneratsiya jarayoni amalga oshiriladi. Bunda harorat oshiriladi yoki bosim kamaytiriladi, natijada adsorbsiyalangan CO_2 ajralib chiqadi va qayta ishlash yoki saqlash uchun yo‘naltiriladi.

7. Aerogellarning afzalliklari va cheklovlari

Aerogellarning asosiy afzalliklari quyidagilardan iborat: yuqori adsorbsion sig‘im, katta sirt maydoni, past zichlik va kimyoviy barqarorlik. Shuningdek, ular qayta ishlatilishi mumkin bo‘lgan ekologik toza materiallar hisoblanadi.

Biroq ayrim cheklovlar ham mavjud. Masalan, aerogellarni ishlab chiqarish texnologiyasi murakkab va qimmat. Bundan tashqari, mexanik mustahkamlik ba’zi hollarda yetarli darajada yuqori emas, bu esa sanoat miqyosida qo‘llashni biroz cheklaydi.

8. Zamonaviy tadqiqotlar va rivojlanish istiqbollari

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So‘nggi yillarda aerogellarni CO_2 yutish samaradorligini oshirish bo‘yicha ko‘plab ilmiy izlanishlar olib borilmoqda. Ayniqsa, nanokompozit aerogellar, amin bilan funksionallashtirilgan materiallar va gibrid polimer-silika tizimlari katta qiziqish uyg‘otmoqda.

MUAMMOLAR VA UNING TAHLILI

Sanoat gazlaridan karbonat angidrid (CO_2) ni ajratib olishda aerogellar qo‘llanilishi istiqbolli yo‘nalish bo‘lsa-da, ushbu texnologiya bir qator ilmiy va amaliy muammolarga ega. Birinchi muammo — aerogellarning ishlab chiqarish tannarxining yuqoriligidir. Ayniqsa, superkritik quritish jarayoni murakkab va energiya talabchan bo‘lib, bu sanoat miqyosida keng qo‘llanilishini cheklaydi. Ikkinchi muammo — aerogellarning mexanik mustahkamligining pastligi. Ularning g‘ovakli nanostrukturasi yuqori adsorbsiya xususiyatini ta’minlasa-da, fizik zarbalarga va bosim o‘zgarishlariga nisbatan mo‘rtlik ko‘rsatadi. Bu esa ularni uzoq muddatli sanoat reaktorlarida ishlatishda muammo tug‘diradi. Uchinchi muammo — namlik va aralash gazlar ta’siri. Sanoat chiqindi gazlari tarkibida suv bug‘i, SO_x va NO_x kabi komponentlar mavjud bo‘lib, ular aerogellarning CO_2 yutish samaradorligini kamaytirishi mumkin. Bu hodisa selektiv adsorbsiya jarayonining murakkablashishiga olib keladi. To‘rtinchi muammo — regeneratsiya (qayta tiklash) jarayonidagi energiya sarfi. CO_2 bilan to‘yingan aerogellarni qayta tiklash uchun harorat yoki bosimni o‘zgartirish talab etiladi, bu esa qo‘shimcha energiya xarajatlarini keltirib chiqaradi.

Tahlil shuni ko‘rsatadiki, ushbu muammolar asosan materialning strukturasi va sanoat sharoitlaridagi murakkab gaz aralashmalari bilan bog‘liq. Shu sababli, hozirgi tadqiqotlar aerogellarning yuzasini kimyoviy funksionallashtirish, nanokompozitlar yaratish va gibrid materiallar ishlab chiqishga qaratilgan. Bu yondashuv CO_2 selektivligini oshirish va barqarorlikni yaxshilashga xizmat qiladi.

XULOSA

Sanoat gazlaridan karbonat angidridni ajratib olishda aerogellar yuqori samarali adsorbent sifatida katta ilmiy va amaliy ahamiyatga ega. Ularning yuqori g‘ovakligi, katta solishtirma sirt maydoni va moslashtiriladigan kimyoviy tuzilishi CO_2 molekulalarini samarali ushlab qolish imkonini beradi.

Tadqiqotlar shuni ko‘rsatadiki, aerogellar CO_2 ni ajratib olishda an’anaviy usullarga nisbatan ekologik jihatdan toza va energiya tejamkor alternativ hisoblanadi. Biroq, ularning sanoat miqyosida keng qo‘llanilishi uchun tannarxni kamaytirish, mexanik mustahkamlikni oshirish va namlikka chidamlilikni yaxshilash zarur.

Kelajakda nanokompozit aerogellar, funksional guruhlar bilan boyitilgan materiallar hamda biomassaga asoslangan aerogellar rivojlanishi ushbu sohadagi

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asosiy yo‘nalishlardan biri bo‘lib xizmat qiladi. Bu esa uglerod neytrallik maqsadlariga erishishda muhim rol o‘ynaydi.

FOYDALANILGAN ADABIYOTLAR

1. Parveen A. S. et al. *Advances in Carbon-Based Aerogels for CO_2 Capture*. Gels, 2025.
2. Cui B. et al. *Aerogel-based carbon capture materials: Research progress and application prospects*. Separation and Purification Technology, 2025.
3. Zhang L. et al. *Carbon Material-Based Aerogels for Gas Adsorption*. Nanomaterials, 2022.
4. Keshavarz L., English N. J. *The Importance of Precursors and Modification Groups of Aerogels in CO_2 Capture*. Molecules, 2021.
5. Bahadi S. A. et al. *Recent Advances in CO_2 Adsorption Using Aerogel Materials*. KFUPM Research, 2024.
6. Sheikh M. S. et al. *Silk-fibroin aerogel for efficient CO_2 capture*. arXiv, 2025.
7. Siegelman R. L. et al. *Challenges in adsorption-based CO_2 capture*. Energy & Environmental Science, 2019.
8. Frontiers in Chemistry. *Porous adsorption materials for CO_2 capture in industrial flue gas*, 2022.
9. ScienceDirect. *Advancements and challenges in carbon aerogels for CO_2 capture*, 2025.
10. PubMed. *Challenges and opportunities for adsorption-based CO_2 capture*, 2020.

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ADRENORETSEPTORLARNI QO‘ZG‘ATUVCHI VOSITALAR

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Annotatsiya
Ushbu maqolada adrenoretseptorlarni qo‘zg‘atuvchi vositalarning (adrenomimetiklarning) farmakologik xususiyatlari, ta’sir mexanizmlari, tasnifi va klinik amaliyotdagi ahamiyati tahlil qilindi. Adrenomimetik preparatlar α- va β-adrenoretseptorlarga ta’sir etib, yurak-qon tomir, nafas olish va boshqa tizimlar faoliyatini boshqarishda muhim o‘rin tutadi. Tadqiqot davomida farmakologiya bo‘yicha yetakchi darsliklar va ilmiy adabiyotlar ma’lumotlari tahlil qilindi. Natijalar adrenomimetik vositalarning arterial gipotenziya, anafilaktik shok, bronxial astma, yurak yetishmovchiligi va boshqa patologik holatlarni davolashda yuqori samaradorlikka ega ekanligini ko‘rsatdi. Shu bilan birga, ushbu preparatlarni qo‘llashda nojo‘ya ta’sirlar va xavfsizlik masalalariga alohida e’tibor qaratilishi zarurligi aniqlandi.

Kalit so‘zlar: adrenomimetiklar, adrenoretseptorlar, alfa-adrenoretseptorlar, beta-adrenoretseptorlar, adrenalin, noradrenalin, farmakologiya.

Аннотация
В данной статье рассмотрены фармакологические свойства, механизмы действия, классификация и клиническое значение средств, стимулирующих адренорецепторы (адреномиметиков). Адреномиметические препараты воздействуют на α- и β-адренорецепторы, играя важную роль в регуляции функций сердечно-сосудистой, дыхательной и других систем организма. В ходе исследования был проведён анализ данных ведущих учебников по фармакологии и научной литературы. Полученные результаты показали высокую эффективность адреномиметиков при лечении артериальной гипотензии, анафилактического шока, бронхиальной астмы, сердечной недостаточности и ряда других патологических состояний. Установлено, что при применении

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данных препаратов необходимо учитывать возможные побочные эффекты и соблюдать меры безопасности для достижения максимального терапевтического результата.
Ключевые слова: адреномиметики, адренорецепторы, альфа-адренорецепторы, бета-адренорецепторы, адреналин, норадреналин, фармакология.
Abstract

This article analyzes the pharmacological properties, mechanisms of action, classification, and clinical significance of adrenergic receptor agonists (adrenomimetics). These agents act on α- and β-adrenergic receptors and play a crucial role in regulating cardiovascular, respiratory, and other physiological systems. The study was based on a comprehensive review of authoritative pharmacology textbooks and scientific literature. The findings demonstrated that adrenomimetic drugs are highly effective in the management of arterial hypotension, anaphylactic shock, bronchial asthma, heart failure, and several other pathological conditions. Furthermore, the study highlights the importance of careful monitoring of adverse effects and adherence to safety considerations during therapy to ensure optimal clinical outcomes.
Keywords: adrenomimetics, adrenergic receptors, alpha-adrenergic receptors, beta-adrenergic receptors, epinephrine, norepinephrine, pharmacology.

Kirish

Zamonaviy farmakologiyada adrenoretseptorlarni qo‘zg‘atuvchi vositalar (adrenomimetiklar) muhim o‘rin egallaydi. Ushbu preparatlar simpatik nerv tizimining mediatorlari bo‘lgan katexolaminlar – adrenalin va noradrenalinning ta’sirini taqlid qilib, organizmning turli a’zo va tizimlariga sezilarli farmakologik ta’sir ko‘rsatadi. Adrenoretseptorlar organizmning yurak-qon tomir, nafas olish, ko‘z, siydik ajratish va boshqa tizimlarida keng tarqalgan bo‘lib, ularning faollashuvi fiziologik va patologik jarayonlarning boshqarilishida muhim ahamiyatga ega.

Adrenoretseptorlar α_1-, α_2-, β_1-, β_2- va β_3-retseptorlarga bo‘linadi. Ushbu retseptorlarning har biri turli to‘qimalarda joylashgan bo‘lib, ularga ta’sir etuvchi preparatlar o‘ziga xos farmakologik samara hosil qiladi. Masalan, α-adrenomimetiklar qon tomirlarni toraytirib arterial bosimni oshirsa, β_2-adrenomimetiklar bronxlarni kengaytiradi va bronxial astma xurujlarini bartaraf etishda qo‘llaniladi. β_1-adrenomimetiklar esa yurak faoliyatini kuchaytirib, kardiogen shok va yurak yetishmovchiligi holatlarida qo‘llanadi.

Bugungi kunda adrenomimetik vositalar reanimatsiya va intensiv terapiya, kardiologiya, pulmonologiya, oftalmologiya hamda allergologiya amaliyotida keng qo‘llanilmoqda. Ayniqsa, anafilaktik shok, og‘ir arterial gipotenziya, yurak to‘xtashi va bronxospazm kabi hayot uchun xavfli holatlarda ushbu preparatlar birinchi tanlov

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vositalari hisoblanadi. Shunga qaramay, adrenomimetiklarning noto‘g‘ri yoki nazoratsiz qo‘llanilishi taxikardiya, arterial gipertenziya, aritmiyalar va boshqa nojo‘ya ta’sirlarga olib kelishi mumkin.

Mazkur maqolaning maqsadi adrenoretseptorlarni qo‘zg‘atuvchi vositalarning tasnifi, farmakodinamikasi, farmakokinetikasi, ta’sir mexanizmlari hamda klinik amaliyotdagi o‘rnini zamonaviy farmakologik adabiyotlar asosida tahlil qilishdan iborat.

Metodologiya

Mazkur tadqiqot adrenoretseptorlarni qo‘zg‘atuvchi vositalarning farmakologik xususiyatlari, ta’sir mexanizmlari va klinik qo‘llanilishini o‘rganishga bag‘ishlangan bo‘lib, adabiyotlar tahlili usulida amalga oshirildi. Tadqiqot jarayonida farmakologiya sohasida keng e’tirof etilgan darsliklar, ilmiy monografiyalar, klinik qo‘llanmalar va zamonaviy ilmiy maqolalar ma’lumotlaridan foydalanildi.

Tadqiqotning nazariy asosini adrenomimetik vositalarning farmakodinamikasi, farmakokinetikasi, retseptorlar bilan o‘zaro ta’siri hamda ularning organizm tizimlariga ko‘rsatadigan biologik samaralari haqidagi ilmiy ma’lumotlar tashkil etdi. Adrenoretseptorlarni qo‘zg‘atuvchi preparatlar α-adrenomimetiklar, β-adrenomimetiklar va aralash ta’sir etuvchi adrenomimetiklar guruhlariga ajratilib, ularning farmakologik xususiyatlari qiyosiy tahlil qilindi.

Ma’lumotlarni yig‘ish jarayonida preparatlarning ta’sir mexanizmi, qo‘llash ko‘rsatmalari, nojo‘ya ta’sirlari, qarshi ko‘rsatmalari va klinik samaradorligi bo‘yicha mavjud ilmiy manbalar tizimli ravishda saralandi. Tahlil davomida adrenalin, noradrenalin, fenilefrin, dobutamin, salbutamol va boshqa adrenomimetik vositalarning klinik amaliyotdagi qo‘llanilishiga alohida e’tibor qaratildi.

Olingan ma’lumotlar tavsifiy, qiyosiy va tizimli tahlil usullari yordamida qayta ishlanib, preparatlarning farmakologik samaradorligi hamda xavfsizlik profili baholandi. Shuningdek, turli mualliflarning ilmiy qarashlari o‘zaro taqqoslanib, adrenoretseptorlarni qo‘zg‘atuvchi vositalarning zamonaviy farmakoterapiyadagi o‘rni aniqlandi.

Tadqiqotda foydalanilgan barcha ma’lumotlar ishonchli ilmiy manbalardan olingan bo‘lib, natijalarning obyektivligi va ilmiy asoslanganligini ta’minlashga xizmat qildi.

Natijalar

Adrenoretseptorlarni qo‘zg‘atuvchi vositalarning farmakologik xususiyatlari va klinik qo‘llanilishi bo‘yicha o‘tkazilgan adabiyotlar tahlili ushbu preparatlarning zamonaviy tibbiyot amaliyotida muhim o‘rin tutishini ko‘rsatdi. Tadqiqot natijalariga ko‘ra, adrenomimetik vositalar retseptorlarga selektiv yoki noselektiv ta’sir etishiga qarab turli farmakologik samaralar hosil qiladi.

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α₁-adrenoretseptorlarni qo‘zg‘atuvchi preparatlar qon tomirlarning torayishiga olib kelib, arterial bosimni oshiradi va shilliq qavat shishini kamaytiradi. β₁-adrenoretseptor agonistlari yurak qisqarish kuchi va chastotasini oshirib, yurak faoliyatini rag‘batlantiradi. β₂-adrenoretseptor agonistlari esa bronxlar silliq mushaklarini bo‘shashtirib, bronxodilatatsion ta’sir ko‘rsatadi. Aralash ta’sir etuvchi preparatlar bir vaqtning o‘zida bir nechta retseptor turlariga ta’sir qilib, kompleks farmakologik samara hosil qiladi.

Tahlil natijalari shuni ko‘rsatdiki, adrenomimetik preparatlar anafilaktik shok, bronxial astma, arterial gipotenziya, yurak yetishmovchiligi va kardiogen shok kabi og‘ir patologik holatlarni davolashda yuqori samaradorlikka ega. Shu bilan birga, preparatlarning terapevtik samarasi ularning retseptor selektivligi, yuborish usuli va bemorning individual xususiyatlariga bog‘liq ekanligi aniqlandi.

Jadval 1

Adrenoretseptorlarni qo‘zg‘atuvchi vositalarning tasnifi va farmakologik ta’siri

Preparat	**Farmakologik guruhi**	**Ta’sir qiluvchi retseptorlar**	**Asosiy farmakologik ta’siri**
Adrenalin	Noselektiv adrenomimetik	α₁, α₂, β₁, β₂	Qon bosimini oshiradi, bronxlarni kengaytiradi
Noradrenalin	α-adrenomimetik ustun	α₁, α₂, β₁	Kuchli vazokonstriktor ta’sir
Fenilefrin	Selektiv α₁-adrenomimetik	α₁	Arterial bosimni oshiradi
Dobutamin	Selektiv β₁-adrenomimetik	β₁	Yurak qisqarish kuchini oshiradi
Salbutamol	Selektiv β₂-adrenomimetik	β₂	Bronxodilatatsiya chaqiradi

Jadval 2

Adrenomimetik vositalarning klinik qo‘llanilishi va nojo‘ya ta’sirlari

Preparat	Asosiy qo‘llanilishi	Afzalligi	Ehtimoliy nojo‘ya ta’sirlari

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Adrenalin	Anafilaktik shok, yurak to‘xtashi	Tez va kuchli ta’sir	Taxikardiya, aritmiya
Noradrenalin	O‘tkir gipotenziya, shok	Kuchli pressor ta’sir	Periferik ishemiya
Fenilefrin	Arterial gipotenziya, rinit	Selektiv α_1 ta’sir	Reflektor bradikardiya
Dobutamin	Kardiogen shok, yurak yetishmovchiligi	Yurak faoliyatini yaxshilaydi	Taxikardiya
Salbutamol	Bronxial astma, KOAH	Bronxlarni samarali kengaytiradi	Tremor, taxikardiya

Natijalar shuni ko‘rsatdiki, adrenomimetik preparatlarning klinik samaradorligi retseptor selektivligi bilan chambarchas bog‘liq. Selektiv agonistlar maqsadli farmakologik ta’sirni kuchaytirib, nojo‘ya reaksiyalar xavfini kamaytiradi. Shu sababli zamonaviy farmakoterapiyada kasallikning turi va og‘irligiga qarab ma’lum retseptorlarga yo‘naltirilgan preparatlardan foydalanish maqsadga muvofiq hisoblanadi.

Muhokama

O‘tkazilgan adabiyotlar tahlili adrenoretseptorlarni qo‘zg‘atuvchi vositalarning zamonaviy farmakoterapiyada muhim o‘rin egallashini tasdiqladi. Simpatik nerv tizimi faoliyatini boshqarishda ishtirok etuvchi ushbu preparatlar ko‘plab shoshilinch va surunkali kasalliklarni davolashda keng qo‘llaniladi. Tadqiqot natijalari adrenomimetik vositalarning farmakologik samaradorligi ularning adrenoretseptorlarga nisbatan selektivligi bilan bevosita bog‘liqligini ko‘rsatdi.

Tahlil qilingan ma’lumotlarga ko‘ra, selektiv β_2-adrenomimetiklar bronxial astma va surunkali obstruktiv o‘pka kasalligi bilan og‘rigan bemorlarda yuqori terapevtik samaradorlikka ega bo‘lib, bronxospazmni tez bartaraf etadi va nafas olish faoliyatini yaxshilaydi. Xuddi shuningdek, β_1-adrenomimetiklar yurak qisqarish kuchini oshirish orqali kardiogen shok va o‘tkir yurak yetishmovchiligi holatlarida ijobiy natijalar beradi. α_1-adrenomimetik preparatlar esa qon tomir tonusini oshirib, arterial gipotenziya va kollaps holatlarida samarali hisoblanadi.

Adrenalin kabi noselektiv adrenomimetik vositalar bir vaqtning o‘zida bir nechta retseptor turlariga ta’sir qilishi sababli anafilaktik shok va reanimatsion holatlarda eng samarali preparatlardan biri hisoblanadi. Biroq, bunday preparatlarning keng farmakologik ta’siri ayrim nojo‘ya reaksiyalar, jumladan taxikardiya, aritmiya, arterial gipertenziya va miokardning kislorodga bo‘lgan ehtiyojining ortishiga olib kelishi mumkin.

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So‘nggi yillarda olib borilgan farmakologik tadqiqotlar adrenomimetik preparatlarning yangi selektiv shakllarini yaratishga qaratilgan. Selektiv agonistlarning ishlab chiqilishi davolash samaradorligini oshirish va nojo‘ya ta’sirlar sonini kamaytirishga xizmat qilmoqda. Bu esa individual farmakoterapiya tamoyillarini amaliyotga keng joriy etish imkonini bermoqda.

Shuningdek, adrenomimetik vositalarni qo‘llashda bemorning yoshi, yurak-qon tomir tizimining holati, hamroh kasalliklar va boshqa dori vositalari bilan o‘zaro ta’siri hisobga olinishi lozim. Preparatlarni to‘g‘ri tanlash va dozani individual belgilash klinik samaradorlikni oshiradi hamda asoratlar rivojlanish xavfini kamaytiradi.

Shunday qilib, adrenoretseptorlarni qo‘zg‘atuvchi vositalar ko‘plab kasalliklarni davolashda yuqori samaradorlikka ega bo‘lsa-da, ularni qo‘llash farmakologik xususiyatlarini chuqur bilishni va ehtiyotkorlik bilan nazorat qilishni talab etadi. Zamonaviy farmakologiya rivojlanishi ushbu preparatlarning xavfsizligi va selektivligini yanada takomillashtirish uchun keng imkoniyatlar yaratmoqda.

Xulosa

Adrenoretseptorlarni qo‘zg‘atuvchi vositalar zamonaviy farmakologiyaning muhim guruhlaridan biri bo‘lib, simpatik nerv tizimi faoliyatini boshqarish orqali ko‘plab fiziologik va patologik jarayonlarga ta’sir ko‘rsatadi. O‘tkazilgan adabiyotlar tahlili ushbu preparatlarning yurak-qon tomir tizimi, nafas olish tizimi va boshqa a’zolar faoliyatini tartibga solishda muhim ahamiyatga ega ekanligini ko‘rsatdi.

Tadqiqot natijalari α- va β-adrenoretseptorlarga selektiv yoki noselektiv ta’sir etuvchi preparatlarning klinik amaliyotda keng qo‘llanilishini tasdiqladi. Adrenalin, noradrenalin, fenilefrin, dobutamin va salbutamol kabi vositalar anafilaktik shok, arterial gipotenziya, bronxial astma, yurak yetishmovchiligi hamda boshqa og‘ir patologik holatlarni davolashda yuqori terapevtik samaradorlikka ega.

Shu bilan birga, adrenomimetik preparatlarni qo‘llashda taxikardiya, aritmiya, arterial gipertenziya va boshqa nojo‘ya ta’sirlar rivojlanishi mumkinligi sababli ularni individual yondashuv asosida va qat’iy tibbiy nazorat ostida qo‘llash zarur. Selektiv adrenomimetiklarning yaratilishi farmakoterapiyaning xavfsizligi va samaradorligini oshirishga xizmat qilmoqda.

Kelgusida adrenoretseptor agonistlarining yangi avlod preparatlarini ishlab chiqish, ularning molekulyar ta’sir mexanizmlarini chuqurroq o‘rganish hamda klinik qo‘llanilish imkoniyatlarini kengaytirish farmakologiya fanining dolzarb yo‘nalishlaridan biri bo‘lib qoladi. Adrenoretseptorlarni qo‘zg‘atuvchi vositalardan oqilona foydalanish bemorlar hayot sifatini yaxshilash va davolash natijalarini optimallashtirishga xizmat qiladi.

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Foydalanilgan adabiyotlari

1. Машковский М. Д. **Лекарственные средства**. – Москва: Новая волна, 2018.
2. Харкевич Д. А. **Фармакология**. – Москва: ГЭОТАР-Медиа, 2020.
3. Белоусов Ю. Б., Моисеев В. С. **Клиническая фармакология**. – Москва: Медицина, 2019.
4. Кукес В. Г. **Клиническая фармакология**. – Москва: ГЭОТАР-Медиа, 2021.
5. Петров В. И. **Фармакология: учебник для медицинских вузов**. – Москва: МИА, 2017.
6. Фармакология под ред. А. С. Саратикова. – Санкт-Петербург: СпецЛит, 2020.
7. Ажгихин И. С. **Общая фармакология**. – Москва: Медицина, 2016.

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91	**SUN’IY INTELLEKTNING TA’LIM JARAYONINI INDIVIDUALLASHTIRISHDAGI O‘RNI** Xudoyorov Shaxriyor Baxtiyor o‘g‘li, Ernazarov Mirzohid Yuldash o‘gli	**604-614**
92	**ADABIYOT NAZARIYASI: JANR VA SHAKL MUAMMOLARI** Jo`rayeva Zilola Mirobit qizi, Raximjanov Masrur Nugmanovich	**615-618**
93	**AKNE PATOGENEZIDA TERI MIKROBIOMASINING ROLI** Choriyev Muzaffar, Karimova Dilafruz	**619-626**
94	**ANTISEPTIK VA DEZINFEKSIYALOVCHI VOSITALAR. KIMYOTERAPIYANING ASOSIY PRINSIPLARI** Kibriyeva Maxfirat, Abdusattorova Umida	**627-637**
95	**APPLICATION OF MULTIMEDIA TOOLS AND MODERN PEDAGOGICAL TECHNOLOGIES IN DISTANCE EDUCATION** Umarova Umida	**638-642**
96	**TASHQI MUHIT OMILLARINING MIKROORGANIZMLARGA TA’SIRI** Xolmurodov Inoyatullo Ismatullayevich, Baxodirova Jasmina	**643-652**
97	**AXBOROT URUSHLARI SHAROITIDA OAV KUN TARTIBINI SHAKLLANTIRISH MASALASI: IMRAD TADQIQOT TAHLILI** Shukurlayeva IlmiraTurdibek qizi	**653-664**
98	**GIBRID OPERATSIYALARNING XIRURGIYADAGI O‘RNI, TEXNOLOGIK ASOSLARI VA KLINIK SAMARADORLIGI** Gulmira Xoltojiyeva, Eshquvvat Bekmirzayev	**665-674**
99	**UMUMIY FARMAKOLOGIYA: DORI VOSITALARINING FARMAKODINAMIKASI, FARMAKOKINETIKASI, O‘ZARO TA’SIR TURLARI VA NOJO‘YA TA’SIRLARI** Maxfirat Kibriyeva, Zebiniso Bo’riyeva	**675-684**
100	**КИЧИК БИЗНЕСНИНГ ИННОВАЦИОН РИВОЖЛАНИШ СТРАТЕГИЯСИНИ ТАКОМИЛЛАШТИРИШ** Бекзод Омонкулов	**685-692**
101	**QUMQO‘RG‘ON TUMANINING IQTISODIY-GEOGRAFIK TAVSIFI: HUDUDIY JOYLASHUV, DEMOGRAFIK DINAMIKA VA XO‘JALIK IXTISOSLASHUVI** Sattarov Bekzod Komil	**693-700**
102	**TO‘YINGAN VA TO‘YINMAGAN BUG‘: FIZIK XOSSALARI, TERMODINAMIK MOHIYATI VA AMALIY AHAMIYATI** Buzrukov To‘lqin, Shageldiyev Asadbek	**701-708**

103	**GURUCH VA GRECHKA MAHSULOTIDAN NON MAHSULOTINI TAYYORLASH** Sevinch Turg'unova, Kamoliddin Usmonov, Barno Umirbaeva	**709-727**
104	**FORMATION OF THE MENSTRUAL CYCLE AND MENSTRUAL HYGIENE CULTURE AMONG ADOLESCENT GIRLS** Tillayeva Zarina Zafarbekovna, Keldiyorov Adham Bobanazar o'g'li Baykulov Shuhrat Xushbakovich	**728-737**
105	**LANGAR OTA MOSQUE AS A HISTORICAL AND CULTURAL HERITAGE SITE** Yangiljon Saburova	**738-747**
106	**ASAB TOLALARI FIZIOLOGIYASI, SINAPSLAR** Zarifa Mamadiyeva, Sevinch Hasanova	**748-756**
107	**ARTIFICIAL INTELLIGENCE IN ENGLISH LANGUAGE LEARNING: MODERN APPROACHES AND OPPORTUNITIES** Nargiza Shayusupova, Karina Seyfullayeva	**757-762**
108	**FEMINISM IN THE ISLAMIC WORLD** Marjona Choriyeva	**763-770**
109	**MOLIYAVIY RISKLAR TUSHUNCHA, TURLARI VA BOSHQARISH USULARI** Gulrux Razzoqova, Kattakul Kinjayev	**771-773**
110	**SUN'IY INTELLEKTNING GLOBAL AXBOROT MAKONIDAGI O'RNI** Shaxriyor Xudoyorov, Mirzohid Ernazarov	**774-780**
111	**DEVELOPMENT AND ANALYSIS OF PRESCHOOL CHILDREN'S CREATIVITY THROUGH NON-TRADITIONAL VISUAL ARTS TECHNIQUES** Muhabbat Berdiyeva, Matluba Ma'rufova	**781-786**
112	**O'ZBEKISTONDA MINTAQAVIY TURIZMNING RIVOJLANISH ISTIQBOLLARI VA STRATEGIK AHAMIYATI** Madina Aliqulov	**787-790**
113	**GIPERESTEZIYADA TISH QATTIQ TO'QIMALARINI DAVOLASH** Nigina Jurayeva, Azizbek Abduraxmonov, Xojiakbar Muydinov, Intizor Jumayeva	**791-800**
114	**SURXONDARYO SUV HAVZALARIDAGI, XONDIZA POLIMETALL RUDA KONI CHIQINDI OQOVA SUVLARI TARKIBIDAGI Ni(II) VA Co(II) IONLARINI SPEKTROFOTOMETRIK USULDA ANIQLASH** Nurmuhammad Boltayev, Xadicha Faxriddinova, Jasmina Yo'ldoshev	**801-810**
115	**O'ZBEKISTONDA QULAY INVESTITSIYA MUHITINI SHAKLLANTIRISH IMKONIYATLARI VA ISTIQBOLLARI** Asqarali Shodmonov	**811-818**
116	**O'ZBEKISTONDA KORRUPSIYAGA QARSHI KURASHNING ZAMONAVIY HUQUQIY MEXANIZMLARI** Maftuna Bo'ronova	**819-824**

117	**TUPROQ VA OZIQ-OVQAT TARKIBIDAGI Cd^{2+},Ni IONINI INVERSIONVOLTAMPEROMETRIK USULDA ANIQLASH Z** Allamuratova, U Haydarova, N Uralov	825-834
118	**FINTEX TEXNOLOGIYALARINING MOLIYAVIY XIZMATLAR RIVOJLANISHIGA TA'SIRI.** Fazilat Qosimova, Shermuxamedov B.U.	835-843
119	**O'ZBEK TILIDA UNLI TOVUSHLARNING FONOLOGIK VA AKUSTIKFONETIK SATHI** Nilufar Rasulova, Shodiya Safoyeva	844-848
120	**ANKSIOLITIKLAR. SEDATIV VOSITALAR. M-XOLINORETSEPTORLARGA TA'SIR ETUVCHI VOSITALAR** Maxfirat Kibriyeva, Farangiz Usmonova	849-857
121	**OZIQ OVQAT MAHSULOTLARI TARKIBIDAGI FE(III) IONINING MIQDORINI INVERSION VOLTAMPEROMETRIK ANALIZ USULIDA ANIQLASHNING OPTIMAL QIYMATLARINI ANIQLASH.** Nilufar Yo'ldosheva, Sanjarbek Chóliyev, Iroda Ergashova	858-863
122	**RISK MANAGEMENT FAILURES AND FRAGILE STABILITY: A STRATEGIC ANALYSIS OF THE 1998 RUSSIAN FINANCIAL CRISIS** Abdumalikova Busalima Abduvali qizi, Baxtiyorova Sarvinoz Baxrom qizi	864-874
123	**QUYMICH NERVI SHIKASTLANGAN BEMORLARNI TASHXISLASH VA JARROHLIK DAVOLASH USULLARINI TAKOMILLASHTIRISH** Eshpulatov Jaloliddin Bahodir o'g'li	875-881
124	**PSYCHONEUROLOGICAL DISORDERS OBSERVED IN PARKINSON'S DISEASE.Sa'dullayeva Go'zaloy Bahtiyor qizi,** Xo'shmurodova Mexrigiyo Allayorovna, Hakimov Ilyos Baxtiyorovich	882-889
125	**INVESTITSIYA LOYIHALARINI BAHOLASHDA NET PRESENT VALUE (NPV) USULIDAN FOYDALANISH: AMALIY CASE STUDY ASOSIDA TAHLIL** Mamatkulova X.N, Oqilov U.N	890-893
126	**SANOAT GAZLARIDAN KARBONAT ANGIDRIDNI AJRATIB OLISHDA AEROGOLLARNING QO'LLANILISHI** Orolova Gulsevar Mengniqul qizi, Boboyeva Marjona Saidaxmadovna	894-898
127	**ADRENORETSEPTORLARNI QO'ZG'ATUVCHI VOSITALAR** Kibriyeva Maxfirat Abdurakhmonova, Boysariyeva Jasmina Murod qizi	899-905
	Mundarija	906-916