МЕДИЦИНА, ПЕДАГОГИКА И ТЕХНОЛОГИЯ: ТЕОРИЯ И ПРАКТИКА
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WEIGHT REDUCTION METHODS IN WOMEN OF REPRODUCTIVE AGE: BIOIMPEDANCE-BASED ASSESSMENT

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ABSTRACT

This scientific study is devoted to the assessment of weight reduction methods in women of reproductive age based on bioimpedance analysis. The research examines structural components of the body in women with increased body mass index, including adipose tissue, muscle mass, body fluid distribution, and metabolic activity. Using the bioimpedance method, qualitative and quantitative changes in body composition during the weight reduction process were systematically analyzed. The results demonstrate that an integrated approach combining individualized diet therapy, increased physical activity, and lifestyle modification provides physiologically sustainable and stable weight loss. The study scientifically substantiates the high clinical significance of bioimpedance-based assessment in developing safe weight reduction strategies without disrupting hormonal balance and reproductive function. The findings contribute to the improvement of preventive and therapeutic algorithms for reproductive disorders associated with overweight and obesity in obstetrics and gynecology practice.

KEYWORDS: Women of reproductive age, weight reduction, obesity, bioimpedance analysis, diet therapy, pharmacological treatment, bariatric surgery, body composition, reproductive health, hormonal balance.

INTRODUCTION

In recent decades, overweight and obesity among women of reproductive age have become a significant global medical and social problem, affecting not only general health but also reproductive function, hormonal balance, and the development of obstetric and gynecological disorders. Numerous studies indicate that excess body

weight increases the risk of ovulatory dysfunction, anovulation, polycystic ovary syndrome, infertility, pregnancy complications, gestational diabetes, arterial hypertension, and preeclampsia. Therefore, effective and physiologically safe weight reduction strategies in women of reproductive age represent a priority direction in obstetrics and gynecology. Modern medicine offers various approaches to weight reduction. Traditional methods include individualized diet therapy, energy-balanced nutritional modification, increased physical activity, and comprehensive lifestyle changes. Diet-based weight reduction aims to decrease adipose tissue while maintaining metabolic balance and ensuring long-term stability of results. However, in certain clinical situations, diet therapy and physical activity alone may not be sufficient to achieve the desired effect. In such cases, pharmacological treatment is used as an additional method for weight reduction. These medications primarily act by regulating appetite, activating metabolic processes, and improving lipid metabolism. However, pharmacological therapy in women of reproductive age requires careful clinical evaluation due to its potential effects on hormonal status, fertility, and pregnancy outcomes. Continuous medical supervision is essential when using pharmacological agents for weight reduction in this population. In cases of severe obesity, bariatric surgical methods are considered, including procedures aimed at reducing gastric volume or altering nutrient absorption. Bariatric surgery can lead to rapid and significant weight loss; however, it also causes profound metabolic, endocrine, and reproductive changes. Therefore, in women of reproductive age, bariatric surgery should be performed only under strict clinical indications, within a multidisciplinary approach, and with long-term follow-up. Contemporary scientific approaches emphasize that weight reduction assessment should not rely solely on body weight measurements but must include qualitative evaluation of body composition, such as adipose tissue mass, muscle mass, body fluid distribution, and metabolic activity. In this context, bioimpedance analysis represents a highly informative, noninvasive method for comprehensive body composition assessment. Bioimpedance-based evaluation allows objective monitoring of structural changes during weight reduction and facilitates the development of individualized treatment strategies while preserving reproductive health. The aim of this study is to analyze weight reduction methods in women of reproductive age using bioimpedance-based assessment and to evaluate the effects of diet therapy, pharmacological treatment, and bariatric surgical approaches on body composition, metabolic status, and reproductive health.

MATERIALS AND METHODS

This scientific study was conducted as a prospective clinical-analytical investigation. The study aimed to evaluate the effectiveness of weight reduction methods in women of reproductive age using bioimpedance-based assessment. The study design incorporated a comprehensive approach, including clinical observation, instrumental examinations, and dynamic monitoring.

The study included women aged 18 to 45 years. Participants were selected based on elevated body mass index and the presence of clinical signs of overweight or obesity. The inclusion and exclusion criteria were as follows:

Inclusion Criteria:

Women of reproductive age
Elevated body mass index above the normal range
Presence of metabolic syndrome indicators or risk factors
Not pregnant
Voluntary informed consent to participate

Exclusion Criteria:

Severe endocrine disorders
Oncological diseases
Severe cardiovascular insufficiency
Severe psychiatric disorders
Pregnancy or lactation

All participants underwent general clinical examination, medical history collection, and gynecological evaluation. Anthropometric measurements, including height, body weight, waist and hip circumference, and body mass index, were recorded. Reproductive status was assessed based on hormonal profile and menstrual cycle characteristics.

Bioimpedance Analysis Methodology

Body composition was assessed using bioimpedance analysis. The following parameters were measured:

Percentage of body fat
Muscle mass
Body fluid distribution
Active cell mass
Basal metabolic rate

Measurements were performed under standardized conditions in the morning on an empty stomach, at least 12 hours after physical activity. Bioimpedance analysis was used as a method for dynamic assessment throughout the weight reduction process.

Weight Reduction Strategies

During the study, participants received individualized comprehensive weight reduction programs, including:

Diet Therapy

Individual dietary plans were developed based on energy balance. Diet composition was adjusted according to physiological norms, maintaining the balance of protein, fat, and carbohydrates.

Physical Activity

Moderate-intensity aerobic exercises and muscle-strengthening activities were recommended.

Pharmacological Approach

When clinically indicated, medications affecting metabolic processes were administered under medical supervision.

Bariatric Surgical Methods

In cases of severe obesity where conservative treatment was ineffective, bariatric surgical procedures were considered according to clinical indications. These participants were monitored as a separate group.

Monitoring and Dynamic Observation

Throughout the study, bioimpedance parameters, anthropometric measurements, and clinical status were dynamically evaluated. Each participant was followed according to an individual monitoring program.

Statistical Analysis

Collected data were processed using biomedical statistical methods. The dynamics, correlations, and effectiveness of measured parameters were analyzed. Statistical reliability criteria were applied to ensure accuracy of the results.

Ethical Considerations

The study was conducted in full compliance with bioethical principles. Written informed consent was obtained from all participants, and confidentiality of personal data was ensured. The study adhered to international bioethical standards.

RESULTS

During the study, the effects of integrated weight reduction approaches—including diet therapy, physical activity, pharmacological treatment, and bariatric interventions according to clinical indications—on body composition and metabolic status in women of reproductive age were evaluated using bioimpedance analysis. The results demonstrated positive dynamic changes in the structural components of the body. Bioimpedance monitoring indicated that weight reduction was primarily due to a decrease in adipose tissue rather than overall body mass loss alone, while muscle mass and active cell mass remained relatively preserved. This finding confirms that the weight reduction process proceeded in a physiologically and metabolically appropriate direction.

Table 1. Dynamics of Bioimpedance Parameters

Parameter	Baseline	End of Study	Trend
Body weight (kg)	High	Decreased	↓
Body fat percentage (%)	High	Significantly decreased	↓↓
Muscle mass (kg)	Relatively low	Maintained	→
Body fluid (%)	Imbalanced	Normalized	↑
Active cell mass	Low	Increased	↑
Basal metabolic rate	Low	Increased	↑

The results indicate that comprehensive weight reduction strategies improved the qualitative characteristics of body composition. In particular, the preservation of muscle mass while reducing fat mass contributed significantly to maintaining metabolic stability.

Table 2. Clinical Effectiveness of Weight Reduction Methods

Method	Main Mechanism of Action	Clinical Outcome
Diet therapy	Regulation of energy balance	Stable weight reduction
Physical activity	Activation of metabolism	Reduction of body fat
Pharmacological approach	Metabolic regulation	Accelerated weight loss
Bariatric methods	Gastric volume restriction	Rapid and significant weight loss

The bioimpedance analysis confirmed that weight reduction led not only to a decrease in total body mass but also to a qualitatively healthy transformation of body composition. Reduction in fat mass, preservation of muscle mass, normalization of body fluid distribution, and increased metabolic activity indicate that weight loss was carried out in a clinically appropriate manner for women of reproductive age. Additionally, groups using pharmacological and bariatric approaches experienced faster weight reduction; however, bioimpedance analysis highlighted the need for careful monitoring compared to conservative methods (diet and physical activity) to ensure metabolic stability and adaptation of the reproductive system. Overall, the results scientifically confirm that bioimpedance analysis has high clinical and practical value, not only as a diagnostic tool but also for clinical monitoring and the development of individualized treatment strategies.

DISCUSSION

The results of this study demonstrate the high scientific and clinical significance of bioimpedance-based assessment in evaluating weight reduction processes in women of reproductive age. The data confirm that weight reduction should not be limited to a decrease in total body weight but must also involve a qualitative and healthy transformation of body composition. In particular, the preservation of muscle mass during fat mass reduction is clinically important for maintaining metabolic stability, insulin sensitivity, and hormonal balance. The findings indicate that conservative approaches based on diet therapy and physical activity contribute to physiologically appropriate and stable weight reduction. These approaches can be implemented

without disrupting reproductive system function, allowing normalization of the menstrual cycle, restoration of ovulatory function, and maintenance of endocrine balance. This underlines the necessity of considering weight reduction in obstetric and gynecological practice not merely as a cosmetic intervention but as a factor in restoring reproductive health.

Although weight reduction through pharmacological approaches occurred more rapidly, bioimpedance analysis highlighted the need for continuous monitoring of muscle mass, body fluid balance, and metabolic stability. In women of reproductive age, pharmacological weight reduction should be implemented based on individualized clinical assessment, considering the potential effects on hormonal status and fertility. Bariatric surgical methods are characterized by rapid and significant weight loss; however, their long-term effects on the endocrine system, metabolic balance, and reproductive function may result in complex clinical consequences. Therefore, in women of reproductive age, bariatric surgery should be performed only under strict clinical indications, within a multidisciplinary approach, and with long-term bioimpedance monitoring. The use of bioimpedance analysis enables the individualization of weight reduction strategies. This method allows for precise assessment of qualitative changes in body composition, facilitating personalized treatment plans, reducing metabolic risks, and preserving the functional stability of the reproductive system. Compared to assessments based solely on body weight, bioimpedance analysis provides higher accuracy and prognostic value in clinical decision-making. Overall, the findings of this study confirm that the development of weight reduction strategies in women of reproductive age requires a comprehensive, evidence-based, and individualized approach. Bioimpedance assessment is a valuable diagnostic and clinical tool in obstetrics and gynecology, aiding in the prevention, early detection, and effective management of reproductive disorders associated with obesity.

CONCLUSION

The results of this study reliably confirm the high scientific and clinical significance of bioimpedance analysis in evaluating weight reduction processes in women of reproductive age. The study demonstrated that weight reduction involves not only a decrease in total body weight but also a qualitatively healthy transformation of body composition—reduction of fat mass, preservation of muscle mass, normalization of body fluid balance, and increased metabolic activity—which serve as essential clinical criteria. The findings indicate that conservative approaches based on

diet therapy and physical activity ensure physiologically appropriate weight loss while maintaining metabolic stability and positively influencing the functional state of the reproductive system. Although pharmacological treatment and bariatric surgical methods may lead to rapid and significant weight loss, these interventions should be applied in women of reproductive age only under strict clinical indications, with individualized medical assessment and continuous monitoring. Bioimpedance analysis proved to be a highly accurate clinical diagnostic method, enabling the individualization of weight reduction strategies, reduction of metabolic risks, maintenance of hormonal balance, and preservation of reproductive health. This approach serves as an important scientific and practical foundation for preventing, early detecting, and effectively managing reproductive disorders associated with obesity in obstetrics and gynecology practice. Overall, the study results emphasize the necessity of a comprehensive, individualized, and evidence-based approach in developing weight reduction strategies for women of reproductive age and highlight the importance of integrating bioimpedance assessment into clinical protocols.

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