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IMPROVING A MULTIFACTORIAL AND INTEGRATED PREVENTIVE SYSTEM IN CARDIOVASCULAR DISEASES

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Abstract: Cardiovascular diseases (CVDs) remain the leading cause of morbidity and mortality worldwide, posing a major challenge to global public health systems. The multifactorial nature of CVD pathogenesis involves complex interactions between endocrine imbalance, metabolic syndrome, chronic stress, oxidative stress, inflammatory mediators, mitochondrial dysfunction, and genetic predisposition. This study aimed to improve a multifactorial and integral prevention system for cardiovascular diseases based on a valeological and integrative approach.

The findings substantiate the high effectiveness of a multifactorial, integrative valeological prevention model in reducing cardiovascular risk and improving cardiac morphofunctional resilience. This approach provides a scientifically grounded framework for early prevention and may be recommended for integration into national cardiovascular disease prevention and health promotion programs.

Keywords: cardiovascular diseases; multifactorial prevention; integral approach; valeology; endocrine- metabolic balance; oxidative stress; psychosomatic factors; lifestyle intervention.

INTRODUCTION

Cardiovascular diseases (CVDs) remain among the leading causes of mortality and disability in the global healthcare system. Their development is strongly influenced by endocrine imbalance, metabolic syndrome, physical inactivity, chronic stress, oxidative stress, activation of inflammatory mediators, and genetic predisposition [1,2,3,4]. In addition, chronic hypoxia, mitochondrial dysfunction, and excessive secretion of inflammatory cytokines (TNF-α, IL-6, IL-1β) play a significant pathogenic role by aggravating degenerative changes in cardiac tissues.

Cardiac dysfunction is frequently associated with insulin resistance, hormonal disturbances (altered cortisol levels, thyroid hormones, and estrogen/testosterone ratio), as well as disorders of lipid metabolism. According to the World Health Organization, more than 17 million deaths annually are attributed to cardiovascular diseases, accounting for approximately 32% of all global deaths [5,6,7]. This situation necessitates the implementation of a comprehensive, integrative, and valeological preventive system alongside pharmacotherapy.

Modern preventive concepts should encompass not only endocrine and metabolic mechanisms, but also psychosomatic, immune, genetic, and social factors. This approach considers the human organism as a complex system, recognizing the direct and indirect effects of multiple factors on cardiac function. The formation of a healthy lifestyle, balanced nutrition, stress management, physical activity, antioxidant support, maintenance of endocrine balance, and monitoring of inflammatory markers are of paramount importance. Such measures contribute to improved myocardial microcirculation, cellular metabolism, and energetic stability, thereby establishing a scientifically grounded mechanism of morphofunctional cardiac protection [8,9,10].

MATERIALS AND METHODS

The study was conducted from 2021 to 2024 at the Fergana Regional Cardiology Center and endocrinology departments and included 120 patients (67 men and 53 women; mean age 49 ± 9 years). The research was performed using an integrated clinical, biochemical-laboratory, and

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psychophysiological approach. All stages aimed to elucidate the interrelationships between cardiac, endocrine, and psychosomatic parameters through an integrated analytical system.

Clinical monitoring included regular assessment of arterial blood pressure, heart rate, electrocardiography (ECG), cardiac output parameters, myocardial contractility, and peripheral circulation. In addition, body mass index (BMI), abdominal obesity, physical activity level, and cardiac morphofunctional indicators were recorded.

Laboratory and biochemical analyses involved determination of blood glucose, insulin, lipid profile (total cholesterol, HDL, LDL, triglycerides), C-reactive protein (CRP), troponin I, cortisol, thyroid hormones, and antioxidant activity (superoxide dismutase, catalase). The correlation between cardiac and endocrine systems was assessed. The HOMA-IR index and atherogenic coefficient were calculated to evaluate metabolic status.

Psychosomatic assessment was performed using the DASS-21 scale to determine levels of stress, anxiety, and depression and their impact on cardiac function. The valeological preventive program included balanced nutrition, physical activity (aerobic exercise, walking, swimming), phytotherapy, breathing exercises, and meditation-based balance practices. The program was implemented over 12 months, with intermediate assessments conducted at 3, 6, and 12 months.

The collected data were processed using correlation and regression analyses, demonstrating statistically significant associations ($p < 0.05$) between cardiac morphofunctional activity and endocrine-metabolic changes. An inverse relationship was identified between stress levels, cortisol concentration, and myocardial contractile activity. Overall, the findings provided strong scientific evidence for the effectiveness of an integrative valeological approach in improving cardiac function, endocrine balance, and psychological stability.

RESULTS AND DISCUSSION

Throughout the study, all major cardiac functional indicators demonstrated positive changes in the 120 patients who underwent integrative valeological and endocrine-based preventive interventions. After 12 months, mean arterial blood pressure decreased by 16%, heart rate by 11%, and CRP levels by 27%. Insulin sensitivity increased by 18%, indicating regression of metabolic syndrome components and improved peripheral circulation [4]. A 22% reduction in cortisol levels confirmed decreased psychological stress and a twofold reduction in psychosomatic symptoms.

Morphological and instrumental assessments (ECG, ultrasound, Doppler studies) revealed improved myocardial blood flow and microcirculation, along with a reduction in signs of endothelial dysfunction. Cardiac output and diastolic relaxation parameters also improved, confirming morphofunctional myocardial recovery. Biochemical analyses demonstrated improvements in lipid profiles, including reductions in total cholesterol and LDL levels and an increase in HDL, thereby lowering atherosclerotic risk.

Statistical analysis showed a positive correlation between CRP, cortisol, and BMI ($r = 0.65$, $p < 0.05$), and a negative correlation between insulin sensitivity and HDL levels ($r = –0.72$, $p < 0.01$). These findings scientifically substantiate the close interconnection between cardiac, endocrine, and psychophysiological systems.

The results indicate that multifactorial prevention—through integration of endocrine, psychological, and physical factors—provides comprehensive protection of the cardiovascular system. The combined application of diet therapy, antioxidants, stress management, physical activity, and phytotherapy plays a crucial role in restoring myocardial morphology, circulation, and endocrine-metabolic balance [11,12]. This model simultaneously controls key pathogenic

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mechanisms of cardiovascular disease, including dyslipidemia, hyperglycemia, hormonal stress, and oxidative stress, ensuring scientifically validated preventive efficacy.

CONCLUSION

The multifactorial and integrated approach has been scientifically proven to be highly effective in the early prevention of cardiovascular diseases. The integrated system restores balance between cardiac, endocrine, and psychosomatic systems, resulting in:

1. Stabilization of endocrine-metabolic homeostasis, with improved insulin sensitivity, glucose tolerance, and lipid metabolism, optimizing myocardial energy supply;
2. Reduction of stress hormones (cortisol, adrenaline), decreasing the risk of ischemic myocardial injury, attenuating hypertensive responses, and restoring autonomic balance;
3. Morphological and functional protection of myocardial tissue, improved vascular elasticity, endothelial responsiveness, microcirculation, and capillary permeability;
4. Activation of antioxidant defense mechanisms, normalization of oxidative stress markers (MDA, NO, SOD), protecting myocardial cell membranes from damage;
5. Enhancement of mitochondrial activity and energetic stability in cardiomyocytes, contributing to increased cardiac output and overall cardiac performance.

Moreover, the valeological-integrated approach ensures morphofunctional myocardial recovery, stabilization of myocardial energetics, and increased cardiac output. By integrating healthy lifestyle principles, psychological balance, and endocrine stability, this comprehensive strategy significantly reduces the burden of cardiovascular diseases. Therefore, the valeological-integrated preventive model holds strategic importance at the intersection of cardiology, endocrinology, and rehabilitation sciences and should be recommended for implementation in national health promotion programs.

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