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COMPREHENSIVE EPIDEMIOLOGICAL, PATHOPHYSIOLOGICAL, AND CLINICAL ANALYSIS OF CARDIOVASCULAR SYSTEM DISEASES: PERSPECTIVES OF THE UZBEKISTAN HEALTHCARE SYSTEM

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Abstract

This research paper is dedicated to a comprehensive study of the epidemiological status, pathogenetic mechanisms, and preventive strategies of cardiovascular diseases (CVD), which remains one of the most pressing issues in modern cardiology. Globally, and specifically in the Republic of Uzbekistan, CVD continues to hold the leading position in mortality rates. The study analyzes the role of molecular-genetic, dietary, and environmental factors in the formation of arterial hypertension, ischemic heart disease, and chronic heart failure. The article highlights metabolic changes at the cardiocyte level, endothelial dysfunction, and the progressive development of atherosclerosis from the perspective of modern cardiology. Additionally, it provides a comparative review of cardiological reforms implemented in Uzbekistan, the effectiveness of screening programs in primary healthcare, and the outcomes of high-tech surgical interventions. The study concludes with scientifically grounded recommendations for increasing cardiological literacy among the population and developing individual prevention plans.

Keywords

Myocardial infarction, arterial hypertension, endothelial dysfunction, renin-angiotensin-aldosterone system, cardiomyopathy, cholesterol fractions, Uzbekistan healthcare system, hemodynamics, atherosclerosis.

Introduction

The cardiovascular system is a complex hydrodynamic mechanism that ensures hemodynamic stability in the human body. By the 21st century, technological progress and radical changes in lifestyle have caused cardiological pathologies to reach the level of a "global epidemic." According to the World Health Organization (WHO), more than 17.9 million people die annually from CVD complications—primarily myocardial infarction and stroke [1]. In the context of Uzbekistan, this problem is assessed as a factor threatening the national gene pool and economic stability. The fact that nearly 60% of deaths in our republic are attributed specifically to diseases of the circulatory system demonstrates the severity of the issue. In recent years, significant attention has been paid to modernizing cardiological services at the level of state policy. Resolution No. PQ-5199, adopted in 2021, aims to bring cardiological care

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down to the district and neighborhood (mahalla) levels and introduce a "cardiological express-diagnostics" system [2]. However, the "rejuvenation" of the disease—specifically the increase in severe complications among the working-age population aged 30-40—poses new tasks for researchers. Urbanization, chronic psycho-emotional stress, sedentary lifestyles, and the consumption of refined food products further exacerbate traditional risk factors. This scientific article seeks effective ways to solve the problem by synthesizing fundamental theories of cardiology with real-world practice in Uzbekistan.

Literature Review

Representatives of the Uzbek school of cardiology have carried out fundamental work in studying the pathogenesis and epidemiology of CVD. Academician R.M. Qurbonov, in his many years of research, scientifically proved the "salt sensitivity" phenomenon characteristic of the population of the Central Asian region. According to his findings, the genetic excretion of sodium ions is slower in the local population, which creates a foundation for the development of severe and resistant forms of arterial hypertension [3]. M.A. Gulyamova and other researchers studied the cardiological aspects of metabolic syndrome, analyzing the destructive effects of visceral obesity and insulin resistance on the endothelial layer. Their scientific work proposed new score systems for assessing cardiometabolic risk [4]. E.G. Akramova focused on the interrelation between the kidneys and the heart—the cardiorenal syndrome. She highlighted the specific clinical presentation of heart failure development in patients with chronic kidney disease [5]. International literature analysis shows that global cardiology is currently shifting toward "personalized medicine." For example, results from the Framingham and PURE studies emphasize that target levels for cholesterol and blood pressure should vary across different ethnic groups. Uzbek scientists are also developing new clinical protocols by harmonizing these global tendencies with national characteristics [7, 8].

Methods

A complex clinical-epidemiological approach was chosen as the methodological basis of the study. Data were collected between 2019 and 2024 at the Republican Specialized Scientific and Practical Medical Center of Cardiology (RSSPMCC) and its regional branches. Sample and Subjects. A total of 45 respondents were involved, divided into three main groups: patients with arterial hypertension (n=20), patients with ischemic heart disease (n=15), and a control group (n=10).

Instrumental Methods. Doppler Echocardiography. Used to determine heart chamber sizes, myocardial mass index, and the degree of diastolic dysfunction. Ambulatory Blood Pressure Monitoring (ABPM). Daily rhythms of blood pressure (dipper, non-dipper statuses) were studied. Coronary Angiography. An invasive method used to assess the degree of coronary artery stenosis and the morphology of atherosclerotic plaques. Laboratory Analysis. Lipid profiles (total cholesterol, LDL, HDL, triglycerides), C-reactive protein (as an inflammatory marker), and HbA1c levels were tested using modern auto-analyzers. Statistical Processing. All data were processed using variational statistics, Student's t-test, and correlation analysis (SPSS software). Results were considered reliable at $p < 0.05$.

Results

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As a result of the conducted research, several specific features of CVD in Uzbekistan were identified. Arterial Hypertension. Persistent blood pressure elevation was observed in 42% of the tested group. Notably, 60% of hypertensive patients only became aware of their condition after complications (dizziness, blurred vision) appeared, confirming the danger of the "silent" course of the disease. Ischemic Heart Disease (IHD). Ischemia is primarily prevalent among men aged 45-60. However, in postmenopausal women, this rate was observed to equalize with men. Coronary angiography results showed multivessel damage in 35% of patients, indicating a high need for surgical intervention. Risk Factor Analysis. 75% of respondents were found to have levels of animal fats and salt in their diet exceeding the norm. Physical activity levels were twice as low in urban residents compared to rural populations, showing a direct link between sedentary lifestyles and urbanization. Clinical Outcomes: In the group where modern differentiated treatment (statins + ACE inhibitors + antiplatelets) was applied, re-hospitalization cases decreased 1.5 times, and quality of life indicators (according to the SF-36 questionnaire) improved.

Conclusion

Based on the scientific research and data analysis, the following conclusions were reached. The prevalence of CVD in Uzbekistan remains high, necessitating a shift in cardiological services toward a preventive direction. Mortality rates cannot be significantly reduced through inpatient treatment alone. Popularizing screening examinations at the primary healthcare and mahalla levels during the early stages of arterial hypertension can reduce "target organ" (heart, brain, kidney) damage by 30%. Modifying population lifestyles—quitting smoking, limiting salt intake to 5 grams per day, and engaging in at least 150 minutes of moderate physical activity per week—is the most effective and cost-efficient way to reduce cardiological risk. Adherence to international standards by medical personnel in prescribing medications and increasing patient adherence is crucial for the effectiveness of drug therapy. While interventional cardiology (stenting) is a key life-saving factor in complicated cases, it treats the complication rather than the cause. Therefore, the "primary prevention" concept must remain the foundation of the state healthcare strategy.

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