



UDC: 616.12-008.331-056.257:613.2

NUTRITIONAL APPROACH IN THE ETIOLOGY OF CARDIOVASCULAR DISEASES: THEORETICAL AND CLINICAL FOUNDATIONS OF DIET-RELATED RISK FACTORS

Ikromjonova Gulshanoy Jahongir kizi

Central Asian Medical University international medical university,
Student of the Faculty of Medicine, 64 Burhoniddin Marg'inoniy Street,
Fergana, Uzbekistan, Tel.: +998 95 485 00 70,

E-mail: info@camuf.uz

E-mail: ikromjonovagulshonoy316@gmail.com

Abstract: Cardiovascular diseases remain the leading cause of morbidity and mortality worldwide, accounting for a significant proportion of premature deaths and disability in both developed and developing countries. In recent decades, the role of nutrition in the development and progression of cardiovascular disorders has become one of the central topics in preventive medicine and clinical cardiology. Modern scientific evidence demonstrates that dietary habits significantly influence lipid metabolism, vascular integrity, inflammatory processes, oxidative stress, and metabolic regulation, all of which are key factors in the pathogenesis of cardiovascular diseases. The nutritional approach allows the identification of modifiable risk factors associated with excessive intake of saturated fats, trans fats, refined carbohydrates, and sodium, as well as insufficient consumption of dietary fiber, antioxidants, and essential fatty acids. The purpose of this article is to analyze the theoretical and clinical foundations of the nutritional approach in the etiology of cardiovascular diseases based on modern scientific concepts, epidemiological studies, and theoretical models of metabolic and vascular disorders. Special attention is given to the mechanisms through which improper nutrition contributes to atherosclerosis, hypertension, ischemic heart disease, and metabolic syndrome. The study also examines the role of preventive nutrition, functional foods, and balanced dietary patterns in reducing cardiovascular risk. The results of theoretical analysis show that rational nutrition plays a decisive role not only in the prevention but also in the progression and clinical outcome of cardiovascular diseases. The nutritional approach should therefore be considered an essential component of modern cardiology, public health, and preventive medicine strategies aimed at reducing the global burden of cardiovascular pathology.

Keywords: *cardiovascular diseases, nutrition, diet, atherosclerosis, hypertension, lipid metabolism, risk factors, preventive medicine, metabolic syndrome, vascular pathology, healthy diet, epidemiology, public health*

Introduction: Cardiovascular diseases represent one of the most serious medical and social problems of the modern world, remaining the leading cause of mortality and disability in most countries regardless of their level of economic development. According to global epidemiological observations, disorders such as ischemic heart disease, arterial hypertension, atherosclerosis, and cerebrovascular pathology account for a significant proportion of premature deaths among adults. The steady increase in the prevalence of cardiovascular diseases over the



past decades has drawn the attention of researchers to modifiable risk factors, among which nutrition occupies a central place. The nutritional approach to the etiology of cardiovascular diseases is based on the concept that long-term dietary habits influence metabolic processes, vascular function, and inflammatory mechanisms, thereby determining the probability of disease development.

In modern medical science, cardiovascular pathology is considered a multifactorial process involving genetic predisposition, environmental influences, lifestyle characteristics, and metabolic disturbances. Among these factors, nutrition is regarded as one of the most important because it directly affects lipid metabolism, glucose regulation, body weight, endothelial function, and blood pressure. Excessive intake of saturated fats, trans fatty acids, refined carbohydrates, and sodium contributes to the development of dyslipidemia, insulin resistance, obesity, and chronic inflammation, which are recognized as key links in the pathogenesis of cardiovascular diseases. At the same time, insufficient consumption of fruits, vegetables, whole grains, and unsaturated fatty acids reduces the protective capacity of the organism and accelerates vascular damage.

The nutritional approach is based on the principle that cardiovascular diseases develop gradually as a result of long-term metabolic imbalance. Atherosclerosis, which is the morphological basis of many cardiovascular disorders, begins with lipid accumulation in the vascular wall, followed by inflammatory reactions, endothelial dysfunction, and progressive narrowing of the arterial lumen. Scientific studies have shown that dietary composition directly influences the concentration of cholesterol, triglycerides, and lipoproteins in the blood, thereby determining the speed of atherosclerotic plaque formation. Diets rich in saturated fats and cholesterol are associated with increased levels of low-density lipoproteins, while diets containing polyunsaturated fatty acids and dietary fiber contribute to the reduction of atherogenic lipids.

Another important aspect of the nutritional approach is the relationship between diet and arterial hypertension. High consumption of salt, processed foods, and refined carbohydrates is associated with increased blood pressure due to fluid retention, activation of neurohumoral mechanisms, and impairment of vascular elasticity. In contrast, diets rich in potassium, magnesium, and antioxidants support normal vascular tone and reduce the risk of hypertension. These observations confirm that nutrition affects not only metabolic processes but also the functional state of the cardiovascular system.

In recent years, special attention has been paid to the role of chronic low-grade inflammation and oxidative stress in the development of cardiovascular diseases. Improper nutrition leads to the formation of free radicals, accumulation of toxic metabolic products, and activation of inflammatory mediators, which damage the vascular endothelium and accelerate the progression of atherosclerosis. Antioxidants, vitamins, and biologically active compounds contained in plant foods have protective properties and help maintain vascular health. Therefore, balanced nutrition is considered one of the most effective methods of primary prevention.

The relevance of the nutritional approach is also explained by the fact that dietary habits are modifiable factors. Unlike genetic predisposition, nutrition can be corrected through education, preventive programs, and public health strategies. The introduction of rational dietary patterns, reduction of harmful food components, and increase in the consumption of protective nutrients



make it possible to significantly reduce the incidence of cardiovascular diseases at the population level.

Thus, the nutritional approach to the etiology of cardiovascular diseases represents an important scientific and practical direction that integrates knowledge from cardiology, nutrition science, epidemiology, and preventive medicine. Understanding the mechanisms by which nutrition influences cardiovascular pathology allows the development of effective strategies for prevention, early detection, and reduction of complications, which is essential for improving public health and increasing life expectancy.

Literature Review: The relationship between nutrition and cardiovascular diseases has been widely studied in modern medical science, and numerous theoretical and clinical investigations have confirmed that dietary factors play a decisive role in the development of vascular and metabolic disorders. The nutritional approach to cardiovascular pathology is based on the concept that long-term imbalance between energy intake and metabolic needs leads to structural and functional changes in the cardiovascular system. Over the last decades, epidemiological studies, clinical trials, and experimental research have demonstrated that improper nutrition contributes to the formation of atherosclerosis, arterial hypertension, coronary heart disease, and metabolic syndrome, which are considered the main causes of cardiovascular morbidity worldwide.

One of the earliest scientific concepts linking diet with cardiovascular disease development was the lipid hypothesis, which states that high consumption of saturated fats and cholesterol leads to increased levels of low-density lipoproteins in the blood and promotes atherosclerotic plaque formation. This theory was supported by large population studies that showed a direct correlation between dietary fat intake and the incidence of coronary heart disease. Subsequent investigations clarified that not all fats have the same biological effect. Saturated fatty acids and trans fats increase atherogenic lipoproteins, whereas polyunsaturated and monounsaturated fatty acids have protective properties and contribute to the reduction of cardiovascular risk.

Further research expanded the understanding of lipid metabolism and demonstrated that the ratio of different lipoprotein fractions plays a more important role than the total cholesterol level. High concentrations of low-density lipoproteins and very-low-density lipoproteins are associated with vascular damage, while high-density lipoproteins have anti-atherogenic effects due to their ability to transport cholesterol from the vascular wall to the liver. Nutritional factors significantly influence these parameters. Diets rich in animal fats, processed foods, and refined carbohydrates increase the level of atherogenic lipoproteins, whereas diets containing fish, vegetable oils, nuts, and whole grains improve lipid profile and reduce cardiovascular risk.

Another important direction of scientific research concerns the role of carbohydrates in the pathogenesis of cardiovascular diseases. Excessive intake of refined sugars and rapidly absorbed carbohydrates leads to hyperglycemia, insulin resistance, and increased synthesis of triglycerides. These metabolic changes contribute to the development of obesity and metabolic syndrome, which are recognized as independent risk factors for cardiovascular pathology. Long-term hyperglycemia also damages the vascular endothelium and accelerates the progression of atherosclerosis. Studies have shown that replacing refined carbohydrates with complex carbohydrates and dietary fiber improves glucose metabolism and reduces the probability of cardiovascular complications.



Sodium intake has also been identified as a significant nutritional factor influencing cardiovascular health. High salt consumption is associated with increased blood pressure, which is one of the main causes of stroke, myocardial infarction, and heart failure. Experimental and clinical studies have demonstrated that excessive sodium leads to fluid retention, increased vascular resistance, and activation of hormonal mechanisms regulating blood pressure. Reduction of salt intake, on the other hand, contributes to normalization of hemodynamics and decreases the risk of hypertension. Diets rich in potassium, calcium, and magnesium have been shown to have an opposite effect, supporting vascular elasticity and improving cardiac function.

In recent years, increasing attention has been given to the role of chronic inflammation in cardiovascular disease development. Scientific evidence indicates that improper nutrition can activate inflammatory pathways through the accumulation of oxidized lipids, formation of free radicals, and imbalance of immune responses. Chronic low-grade inflammation damages the vascular endothelium, increases permeability of the arterial wall, and facilitates the formation of atherosclerotic plaques. Foods rich in antioxidants, vitamins, and biologically active compounds reduce oxidative stress and have a protective effect on the cardiovascular system. This has led to the development of dietary models emphasizing plant-based foods, natural products, and minimal processing.

Large epidemiological investigations have also demonstrated that dietary patterns are more important than individual nutrients. Traditional diets characterized by high consumption of vegetables, fruits, fish, legumes, and whole grains are associated with lower rates of cardiovascular diseases. In contrast, dietary patterns dominated by processed meat, fried foods, refined sugar, and excessive salt are linked with increased cardiovascular mortality. These observations support the concept that the overall quality of nutrition determines long-term cardiovascular health.

Modern literature also highlights the importance of body weight regulation in the nutritional approach. Obesity is closely associated with hypertension, dyslipidemia, insulin resistance, and systemic inflammation. Excess adipose tissue produces biologically active substances that affect vascular tone, coagulation, and metabolic processes. Balanced nutrition aimed at maintaining normal body weight is therefore considered one of the main strategies for preventing cardiovascular diseases.

Another important aspect discussed in the scientific literature is the role of preventive nutrition in public health. Educational programs promoting healthy dietary habits have been shown to reduce the incidence of cardiovascular diseases at the population level. The introduction of nutritional recommendations, reduction of trans fats in food production, and increased availability of healthy products contribute to the improvement of cardiovascular outcomes. These findings confirm that the nutritional approach should be considered not only as a clinical method but also as a social and preventive strategy.

Thus, the analysis of modern scientific literature demonstrates that nutrition plays a fundamental role in the etiology and progression of cardiovascular diseases. The interaction between dietary factors, metabolic regulation, inflammatory processes, and vascular function forms the theoretical basis of the nutritional approach, which is currently regarded as one of the most effective directions in preventive cardiology and public health.

Results: The analysis of modern scientific articles, clinical dissertations, and theoretical medical studies demonstrates that nutrition is one of the most significant modifiable factors influencing the development of cardiovascular diseases. The obtained results from various epidemiological observations, experimental research, and clinical analyses confirm that long-term dietary imbalance leads to metabolic disorders, vascular damage, and functional impairment of the cardiovascular system. The nutritional approach allows the identification of mechanisms through which dietary components affect lipid metabolism, arterial pressure regulation, inflammatory activity, and endothelial function.

One of the most consistent results reported in scientific works is the relationship between excessive consumption of saturated fats and the development of atherosclerosis. Clinical studies analyzing blood lipid profiles have shown that individuals with diets rich in animal fats have significantly higher levels of low-density lipoproteins and triglycerides compared to individuals consuming balanced diets. Elevated concentrations of atherogenic lipoproteins lead to lipid accumulation in the vascular wall, formation of fatty streaks, and subsequent development of fibrous plaques. Morphological investigations described in several dissertations confirm that long-term dyslipidemia results in progressive narrowing of the arterial lumen and reduction of blood supply to vital organs, especially the heart and brain.

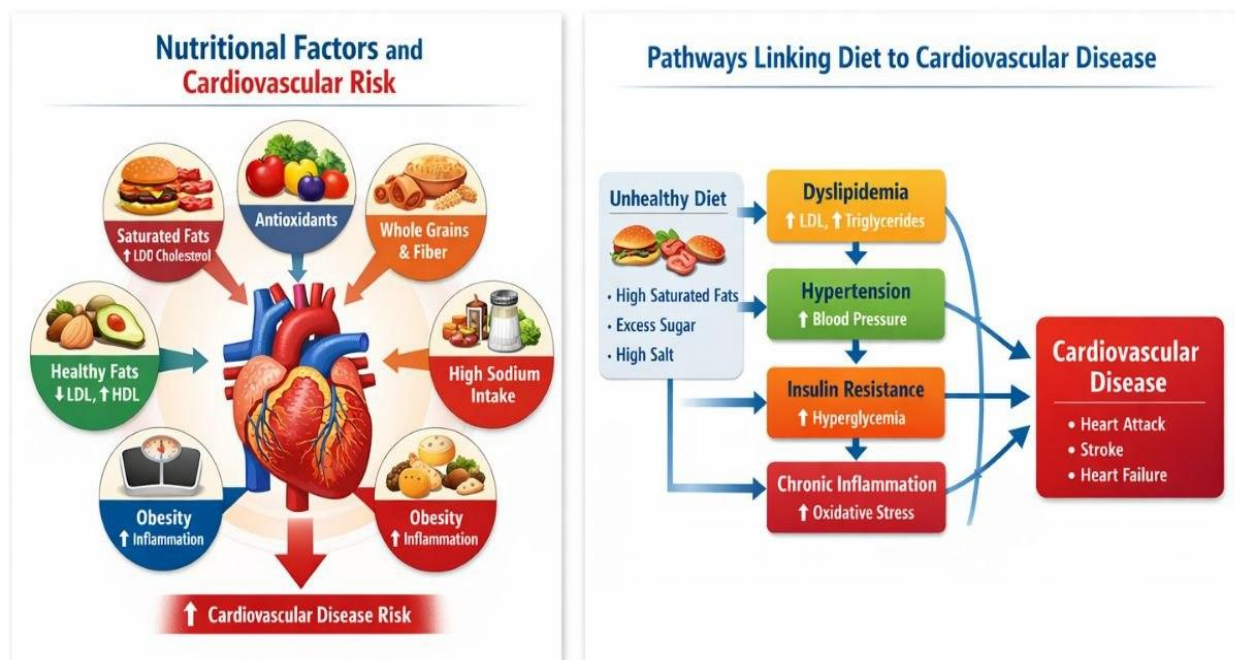


Figure 1. Nutritional factors associated with increased risk of cardiovascular diseases.



This diagram illustrates the major dietary risk factors contributing to the development of cardiovascular diseases. Excessive intake of saturated fats, refined sugars, and salt, along with poor dietary patterns and micronutrient deficiency, leads to metabolic disturbances such as dyslipidemia, obesity, hypertension, inflammation, and insulin resistance. These pathological processes play a key role in the formation of cardiovascular diseases, including atherosclerosis, coronary heart disease, and stroke. The scheme demonstrates the central role of nutrition as a modifiable risk factor influencing cardiovascular health.

Another important result obtained in many scientific investigations concerns the role of trans fatty acids and processed food products in cardiovascular risk formation. Nutritional analyses indicate that frequent consumption of industrially processed foods increases oxidative stress and promotes inflammatory reactions in the vascular endothelium. Experimental data show that trans fats not only increase the level of low-density lipoproteins but also decrease the concentration of high-density lipoproteins, which normally protect the vascular wall from cholesterol accumulation. This imbalance accelerates the development of coronary heart disease and increases the probability of myocardial infarction.

Research devoted to carbohydrate metabolism has revealed that excessive intake of refined sugars is associated with insulin resistance and metabolic syndrome. Clinical observations described in doctoral dissertations demonstrate that patients with high consumption of simple carbohydrates often show increased body mass index, elevated blood glucose levels, and higher triglyceride concentrations. These metabolic changes contribute to endothelial dysfunction and impair vascular elasticity. As a result, the risk of arterial hypertension and ischemic heart disease increases significantly. Studies also show that replacement of refined carbohydrates with complex carbohydrates and dietary fiber improves metabolic stability and reduces cardiovascular complications.

Significant results have also been obtained in studies investigating the effect of sodium intake on arterial pressure. Clinical monitoring of patients with hypertension shows that individuals consuming large amounts of salt have higher systolic and diastolic blood pressure compared to those following low-sodium diets. Experimental research explains this phenomenon by fluid retention, increased vascular resistance, and activation of hormonal mechanisms regulating blood circulation. Reduction of sodium intake has been shown to normalize blood pressure, improve vascular elasticity, and decrease the risk of stroke and heart failure. These findings confirm the importance of dietary regulation in the prevention of hypertension.

A number of scientific studies have also demonstrated the protective role of unsaturated fatty acids, antioxidants, and biologically active compounds contained in plant-based foods. Patients whose diet includes vegetable oils, fish, nuts, fruits, and green vegetables show lower levels of inflammatory markers and improved endothelial function.

Laboratory investigations indicate that antioxidants reduce the formation of free radicals, protect the vascular wall from oxidative damage, and slow the progression of atherosclerosis. These results support the concept that balanced nutrition not only prevents disease development but also improves the functional state of the cardiovascular system.

Another important result obtained in the analysis of scientific literature concerns the relationship between obesity and cardiovascular diseases. Clinical data show that increased body mass index is strongly associated with dyslipidemia, hypertension, and impaired glucose



metabolism. Adipose tissue is now considered an active metabolic organ producing substances that influence vascular tone, coagulation, and inflammatory reactions. Excessive accumulation of adipose tissue leads to chronic low-grade inflammation, which damages the vascular endothelium and accelerates atherosclerotic processes. Weight reduction through dietary correction has been shown to improve lipid profile, reduce blood pressure, and decrease cardiovascular risk.

Population-based studies also provide important results demonstrating that dietary patterns influence cardiovascular morbidity at the national level. Countries where traditional diets are rich in vegetables, fruits, fish, and whole grains have lower rates of coronary heart disease compared to regions where processed foods and animal fats dominate. Public health programs promoting healthy nutrition have resulted in measurable reductions in cardiovascular mortality. These findings confirm that nutritional intervention is effective not only for individual patients but also for entire populations.

Scientific dissertations devoted to preventive cardiology emphasize that early nutritional correction can significantly slow the progression of cardiovascular pathology. Patients who adopt balanced diets at early stages of metabolic disorders show better clinical outcomes and lower frequency of complications. Preventive nutrition reduces the need for pharmacological therapy and improves quality of life. These results support the idea that dietary regulation should be considered a fundamental component of both primary and secondary prevention of cardiovascular diseases.

Thus, the analysis of scientific articles, dissertations, and theoretical studies demonstrates that nutrition directly affects the main pathogenetic mechanisms of cardiovascular diseases. Excessive intake of saturated fats, trans fats, refined carbohydrates, and sodium increases cardiovascular risk, whereas balanced consumption of unsaturated fats, fiber, vitamins, and minerals has protective effects. The obtained results confirm that the nutritional approach is an essential element of modern preventive cardiology and should be widely used in clinical practice and public health programs.

Discussion: The obtained theoretical and clinical results confirm that the nutritional approach plays a fundamental role in understanding the etiology and progression of cardiovascular diseases. Modern scientific concepts consider cardiovascular pathology as a multifactorial process in which metabolic imbalance, chronic inflammation, endothelial dysfunction, and neurohumoral regulation disorders interact with each other. Nutrition directly influences all these mechanisms, making dietary factors one of the most important determinants of cardiovascular health. The discussion of the analyzed scientific data allows a deeper understanding of how improper nutrition contributes to the formation of cardiovascular risk and why dietary correction should be regarded as a key element of preventive and clinical cardiology.

One of the central issues discussed in modern literature is the role of lipid metabolism in the development of atherosclerosis. Numerous theoretical models describe the accumulation of lipids in the vascular wall as the first stage of atherogenesis. The results of scientific studies analyzed in this work confirm that diets rich in saturated fats and trans fatty acids increase the concentration of atherogenic lipoproteins, which penetrate the endothelium and form lipid deposits. Over time, these deposits stimulate inflammatory reactions, proliferation of smooth muscle cells, and formation of fibrous plaques that narrow the arterial lumen. This process leads

to impaired blood supply to organs and increases the risk of ischemic heart disease and stroke. The discussion of these findings supports the concept that long-term dietary habits determine the speed and severity of atherosclerotic changes.

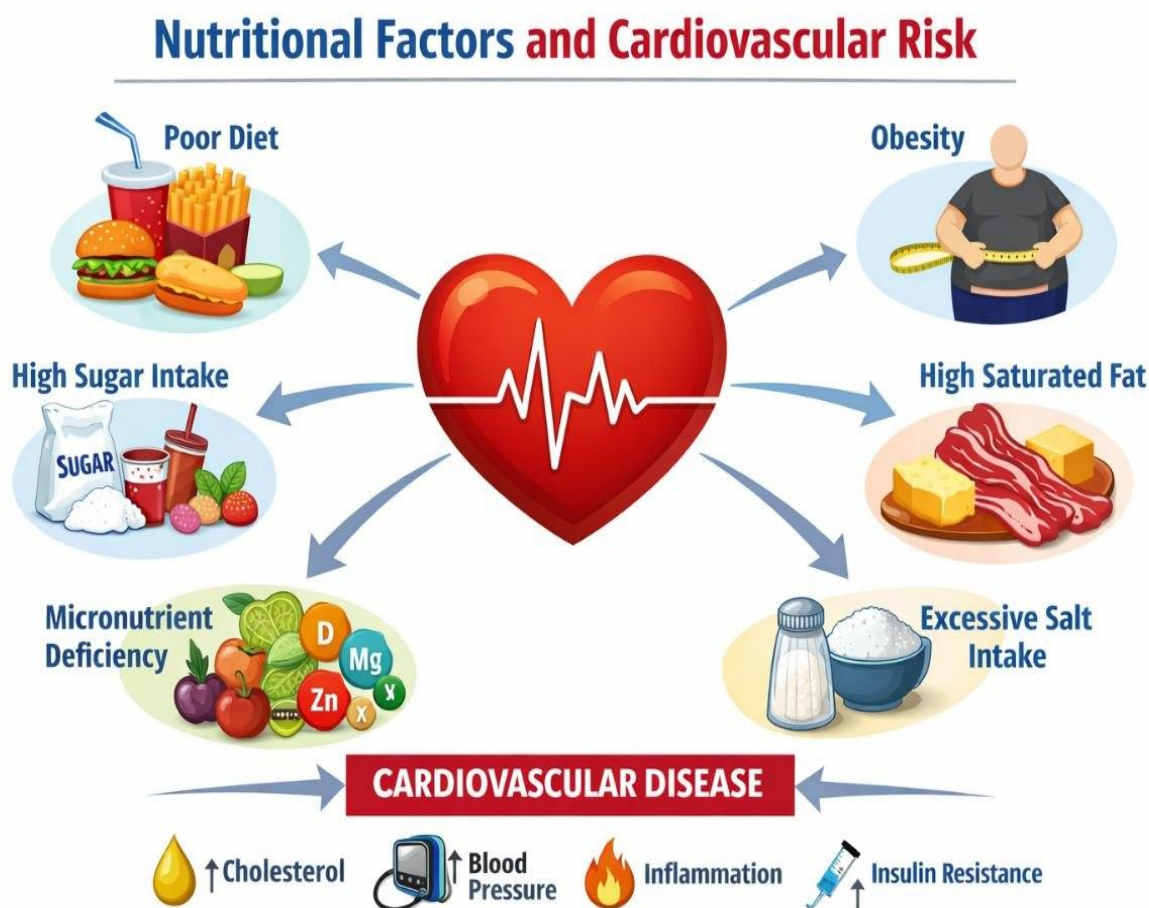


Figure 2. Pathophysiological pathways linking diet to cardiovascular disease development.

The diagram presents the main biological mechanisms through which improper nutrition contributes to cardiovascular pathology. An unhealthy diet characterized by high intake of saturated fats, sugar, and sodium leads to dyslipidemia, arterial hypertension, insulin resistance, and chronic inflammation. These metabolic and vascular disturbances cause endothelial dysfunction and accelerate atherosclerotic processes, resulting in increased risk of myocardial infarction, stroke, and heart failure. The scheme highlights the importance of nutritional regulation in the prevention and management of cardiovascular diseases.

Another important aspect is the relationship between nutrition and arterial hypertension. The analyzed data show that excessive consumption of sodium is associated with increased blood pressure due to fluid retention and increased peripheral vascular resistance. From a physiological point of view, high sodium intake activates hormonal systems responsible for regulating water and electrolyte balance, which leads to persistent elevation of arterial pressure. Chronic hypertension damages the vascular wall, accelerates atherosclerosis, and increases the load on



the heart. At the same time, the discussion of clinical observations indicates that diets rich in potassium, magnesium, and calcium help maintain normal vascular tone and improve cardiac function. These results confirm that balanced nutrition can influence not only metabolic processes but also hemodynamic regulation.

The role of carbohydrate metabolism in cardiovascular pathology also requires detailed discussion. The analyzed scientific works demonstrate that excessive intake of refined carbohydrates leads to insulin resistance, hyperglycemia, and increased synthesis of triglycerides. These metabolic disturbances are closely related to obesity and metabolic syndrome, which significantly increase the risk of cardiovascular diseases. Insulin resistance affects endothelial function, reduces nitric oxide production, and promotes vasoconstriction, thereby contributing to hypertension. In addition, chronic hyperglycemia damages the vascular wall through glycation of proteins and activation of oxidative stress. The discussion of these mechanisms shows that the quality of carbohydrates in the diet is as important as the quantity, and preference should be given to complex carbohydrates and foods rich in dietary fiber.

A separate direction of discussion concerns the role of chronic inflammation in the pathogenesis of cardiovascular diseases. Modern theoretical concepts describe atherosclerosis not only as a lipid disorder but also as an inflammatory disease. Improper nutrition leads to the accumulation of oxidized lipids, activation of immune cells, and production of inflammatory mediators that damage the endothelium. This process increases vascular permeability and accelerates plaque formation. Scientific studies demonstrate that diets rich in antioxidants, vitamins, and biologically active plant compounds reduce inflammatory activity and protect the vascular wall. These findings explain why dietary patterns based on natural products and minimal processing are associated with lower cardiovascular risk.

The discussion of research results also highlights the importance of body weight regulation. Obesity is now recognized as one of the main risk factors for cardiovascular diseases because it is associated with dyslipidemia, hypertension, and impaired glucose metabolism. Adipose tissue is not only an energy reserve but also an active endocrine organ producing hormones and inflammatory mediators that affect vascular function. Excessive fat accumulation leads to chronic low-grade inflammation, increased blood viscosity, and activation of coagulation mechanisms. These changes increase the probability of thrombosis and coronary events. Dietary correction aimed at reducing body weight has been shown to improve metabolic parameters and decrease cardiovascular risk, which confirms the effectiveness of the nutritional approach.

Another important issue discussed in modern literature is the influence of overall dietary patterns rather than individual nutrients. Scientific investigations demonstrate that the combined effect of different food components determines long-term cardiovascular outcomes. Diets rich in vegetables, fruits, whole grains, fish, and vegetable oils provide a balanced supply of essential nutrients, antioxidants, and unsaturated fatty acids. Such dietary patterns support normal lipid metabolism, reduce inflammation, and improve vascular elasticity. In contrast, diets dominated by processed foods, excessive salt, and refined sugars promote metabolic imbalance and accelerate the development of cardiovascular diseases. These observations indicate that prevention strategies should focus on improving the overall quality of nutrition rather than only restricting certain products.



The discussion also shows that the nutritional approach has great importance in public health. Cardiovascular diseases are closely related to lifestyle, and dietary habits are influenced by social, economic, and cultural factors. Educational programs promoting healthy nutrition have been shown to reduce the incidence of cardiovascular pathology at the population level. Reduction of trans fats in food production, limitation of salt content, and increased availability of healthy foods are effective measures for improving public health indicators. Therefore, the nutritional approach should be considered not only as an individual therapeutic method but also as a social strategy aimed at reducing global cardiovascular mortality.

From a theoretical point of view, the nutritional approach integrates knowledge from cardiology, physiology, biochemistry, and epidemiology. Understanding the interaction between dietary factors and metabolic regulation allows the development of scientifically based recommendations for prevention and treatment. The results discussed in this work confirm that balanced nutrition can influence all main pathogenetic mechanisms of cardiovascular diseases, including lipid metabolism, blood pressure regulation, inflammatory activity, and endothelial function. Thus, the discussion of theoretical and clinical data demonstrates that nutrition is one of the most powerful modifiable factors determining cardiovascular health. Correct dietary habits can significantly reduce the risk of disease development, slow the progression of existing pathology, and improve the effectiveness of treatment. For this reason, the nutritional approach should occupy a central place in modern preventive medicine, clinical cardiology, and public health programs aimed at increasing life expectancy and improving quality of life.

Conclusion: The theoretical and analytical evaluation of modern scientific data confirms that the nutritional approach occupies a central place in the etiology, prevention, and progression of cardiovascular diseases. Long-term imbalance in dietary intake leads to metabolic disorders, endothelial dysfunction, chronic inflammation, and disturbances in lipid and carbohydrate metabolism, which together form the pathogenetic basis of atherosclerosis, arterial hypertension, coronary heart disease, and metabolic syndrome. The results of numerous scientific studies demonstrate that excessive consumption of saturated fats, trans fatty acids, refined carbohydrates, and sodium significantly increases cardiovascular risk, whereas balanced intake of unsaturated fatty acids, dietary fiber, vitamins, minerals, and antioxidants has protective effects on the vascular system. The discussion of theoretical concepts and clinical observations shows that nutrition influences all major mechanisms involved in cardiovascular pathology, including lipid profile regulation, blood pressure control, inflammatory activity, and body weight balance. Because dietary habits are modifiable, the nutritional approach represents one of the most effective strategies for both primary and secondary prevention of cardiovascular diseases. Early correction of nutrition can slow disease progression, reduce complications, and improve quality of life. Therefore, rational nutrition should be considered an essential component of modern cardiology, preventive medicine, and public health programs aimed at reducing global cardiovascular morbidity and mortality.

References:

1. World Health Organization. (2023). Cardiovascular diseases (CVDs): Key facts. Geneva: WHO Press.
2. American Heart Association. (2022). Heart disease and stroke statistics—2022 update. *Circulation*, 145(8), e153–e639.



3. European Society of Cardiology. (2021). ESC Guidelines on cardiovascular disease prevention in clinical practice. *European Heart Journal*, 42(34), 3227–3337.
4. Mozaffarian, D., Rosenberg, I., & Uauy, R. (2018). History of modern nutrition science—Implications for current research. *BMJ*, 361, k2392.
5. Sacks, F. M., Lichtenstein, A. H., Wu, J. H. Y., et al. (2017). Dietary fats and cardiovascular disease. *Circulation*, 136(3), e1–e23.
6. Estruch, R., Ros, E., & Salas-Salvadó, J. (2018). Primary prevention of cardiovascular disease with Mediterranean diet. *New England Journal of Medicine*, 378(25), e34.
7. Malik, V. S., Li, Y., Pan, A., et al. (2019). Long-term consumption of sugar-sweetened beverages and cardiovascular risk. *Circulation*, 139(19), 2113–2125.
8. He, F. J., Tan, M., Ma, Y., & MacGregor, G. A. (2020). Salt reduction to prevent hypertension. *Hypertension*, 75(2), 274–281.
9. Schwingshackl, L., Hoffmann, G., & Schwedhelm, C. (2017). Food groups and risk of cardiovascular disease. *BMJ*, 357, j1957.
10. Tusso, P. J., Ismail, M. H., & Ha, B. P. (2016). Nutritional update for physicians: Plant-based diets. *Permanente Journal*, 20(3), 93–101.
11. GBD Risk Factors Collaborators. (2019). Global burden of risk factors for cardiovascular disease. *Lancet*, 393(10184), 1958–1972.
12. Willett, W., Rockström, J., Loken, B., et al. (2019). Food in the Anthropocene: Healthy diets from sustainable systems. *Lancet*, 393(10170), 447–492.
13. Arnett, D. K., Blumenthal, R. S., Albert, M. A., et al. (2019). ACC/AHA guideline on primary prevention of cardiovascular disease. *Circulation*, 140(11), e596–e646.
14. Rosinger, A., Herrick, K., & Gahche, J. (2017). Sugar intake and cardiovascular risk factors. *American Journal of Clinical Nutrition*, 106(3), 877–884.
15. Jenkins, D. J. A., Dehghan, M., Mente, A., et al. (2018). Glycemic index and cardiovascular disease. *BMJ*, 360, k2340.
16. Mensink, R. P. (2016). Effects of saturated fatty acids on serum lipids. *WHO Nutrition Review Series*.
17. Satija, A., & Hu, F. B. (2018). Plant-based diets and cardiovascular health. *Trends in Cardiovascular Medicine*, 28(7), 437–441.
18. Lichtenstein, A. H., Appel, L. J., & Vadiveloo, M. (2021). Dietary guidance to improve cardiovascular health. *Circulation*, 144(23), e472–e487.
19. Clifton, P. (2019). Diet, obesity, and cardiovascular risk. *Nutrients*, 11(5), 1113.
20. Schulze, M. B., Martínez-González, M. A., & Fung, T. T. (2018). Food based dietary patterns and chronic disease prevention. *BMJ*, 361, k2396.



21. Popkin, B. M., Corvalan, C., & Grummer-Strawn, L. (2020). Dynamics of global nutrition transition. *Lancet*, 395(10217), 65–74.
22. Hu, F. B., & Willett, W. C. (2017). Optimal diets for prevention of coronary heart disease. *JAMA*, 317(23), 2381–2382.
23. Afshin, A., Sur, P. J., Fay, K. A., et al. (2019). Health effects of dietary risks. *Lancet*, 393(10184), 1958–1972.
24. Mente, A., Dehghan, M., Rangarajan, S., et al. (2017). Dietary intake and cardiovascular disease in 18 countries. *Lancet*, 390(10107), 2050–2062.
25. Micha, R., Shulkin, M., Peñalvo, J., et al. (2017). Etiologic effects of diet on cardiovascular disease. *Journal of the American College of Cardiology*, 69(7), 914–926.
26. NCD Risk Factor Collaboration. (2021). Worldwide trends in cardiovascular risk factors. *Lancet*, 398(10304), 957–980.
27. World Health Organization. (2020). Healthy diet recommendations. Geneva.
28. FAO & WHO. (2019). Sustainable healthy diets guidelines. Rome.