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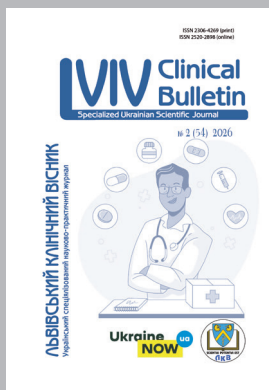


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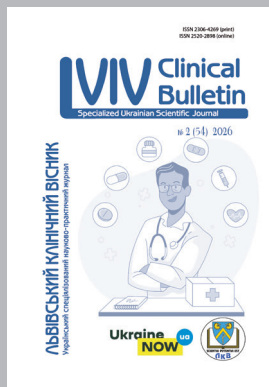
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**I. Dunaieva, O. Kryvoshapka, O. Pautina,  
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# Nutrient Correction of Cardiovascular Diseases: A Modern View of the Role of Dietary Factors in Their Prevention and Complex Treatment (Literature Review)

**Introduction.** Cardiovascular diseases (CVDs) are among the most pressing medical and social problems of modern medicine. According to the World Health Organisation, more than 17 million people die from CVDs every year, accounting for approximately one-third of all deaths worldwide. Particular concern is caused by the trend toward the "rejuvenation" of CVDs, as well as the increasing prevalence of arterial hypertension (AH), obesity, metabolic syndrome, and type 2 diabetes mellitus among people of working age. The high rate of disability, together with substantial economic costs associated with the treatment and rehabilitation of patients with CVDs, determines the exceptional relevance of searching for effective preventive and therapeutic strategies [13].

Cardiovascular lesions are multifactorial and arise from the complex interactions among genetic, metabolic, behavioural, and environmental factors. The main risk factors include AH, dyslipidemia, smoking, physical inactivity, psychoemotional stress, overweight, insulin resistance, and chronic systemic inflammation. At the same time, nutrition occupies a special place among modifiable risk factors, since the composition of the daily diet directly affects the body's metabolic status, lipid profile, blood pressure (BP), functional state of the endothelium, and activity of inflammatory processes [2, 4, 33, 35].

Over the past few decades, attention to the role of nutrients in the pathogenesis of CVDs has increased significantly. Accumulating scientific evidence indicates that deficiencies or imbalances in individual macro- and micronutrients may contribute to the progression of atherosclerosis, impaired vascular tone, oxidative stress, endothelial dysfunction, and myocardial remodelling. Excessive intake of saturated fats, trans fats, salt, and refined carbohydrates is associated with an increased risk of coronary heart disease and cerebrovascular disease.

At the same time, adequate intake of polyunsaturated fatty acids, dietary fibre, antioxidants, potassium, magnesium, and other biologically active substances contributes to reduced cardiovascular risk and improved patient prognosis [15, 28, 33].

Modern nutrition science considers nutrition not only as a source of energy and structural substrates, but also as a powerful regulator of metabolic, hormonal, and immunoinflammatory processes. Dietary factors can modulate gene expression, influence the gut microbiome, alter the state of the vascular wall, and alter systemic inflammation. In this context, nutritional correction is gaining importance as a component of personalized prevention and treatment of CVDs [32].

Of particular interest is the concept of cardiometabolic prevention, which involves early detection of nutrient deficiencies and their timely correction. Rational dietary patterns, particularly the Mediterranean diet and Dietary Approaches to Stop Hypertension (DASH), are associated with a reduced risk of AH, myocardial infarction, stroke, and heart failure. In addition, the role of individual nutraceuticals and functional food components in reducing oxidative stress, improving endothelial function, and stabilising atherosclerotic plaques is being investigated [11, 14, 26].

Despite significant advances in modern pharmacotherapy, nutritional correction remains an important adjunct to pharmacological treatment, as it enables targeted influence on key pathogenetic mechanisms involved in the development of CVDs. A comprehensive approach combining rational nutrition, lifestyle modification, and pharmacological management is the most effective strategy for reducing cardiovascular risk [4, 8, 19, 35].

The high prevalence of CVDs, the significant impact of modifiable risk factors, and the growing role of nutrient disturbances in the pathogenesis of cardiovascular disease

necessitate a deeper investigation of the influence of dietary factors on cardiovascular health [8, 19]. Despite substantial advances in modern pharmacotherapy, the optimisation of nutritional correction as a component of prevention and comprehensive treatment of CVDs remains relevant and requires further scientific substantiation.

**The aim of the study.** To summarise current scientific evidence on the role of nutrients in the prevention and comprehensive treatment of cardiovascular diseases, as well as to assess the potential of nutritional correction in reducing cardiovascular risk and improving patient prognosis.

**Materials and methods.** An analytical review of the scientific literature was conducted, incorporating elements of systematic data synthesis on the role of nutrients in the prevention and treatment of CVDs. The analysis included contemporary national and international scientific publications, clinical guidelines, meta-analyses, systematic reviews, and results from randomised clinical trials focused on the effects of dietary patterns and macro- and micronutrients on cardiometabolic risk, lipid metabolism parameters, blood pressure, endothelial function, and systemic inflammation.

The literature search was performed in international scientometric databases, including PubMed, Scopus, Web of Science, and Google Scholar, using the following keywords: cardiovascular diseases, nutrition, nutrients, Mediterranean diet, DASH diet, cardiometabolic risk, micronutrients, and endothelial dysfunction. Publications from the last 10 years were predominantly included in the analysis, along with fundamental studies of substantial scientific significance.

The study employed bibliosemantic, analytical, comparative, and generalisation methods. The processing and systematisation of the obtained data were carried out using methods of descriptive statistics and logical analysis.

**Results and discussion.** *The role of nutrition in the pathogenesis of CVDs.* Nutrition is one of the key modifiable risk factors for the development of CVDs and plays an important role in the formation of metabolic, vascular, and inflammatory disorders. Current scientific studies confirm that dietary patterns have a direct influence on the functional state of the cardiovascular system, blood pressure regulation, lipid and carbohydrate metabolism, and the activity of systemic inflammation and oxidative stress [8, 19].

Unbalanced nutrition is associated with the development of dyslipidemia, obesity, insulin resistance, endothelial dysfunction, and chronic low-grade inflammation, which are important links in the pathogenesis of atherosclerosis and coronary heart disease. Excessive intake of saturated fats, trans fats, refined carbohydrates, sodium chloride, and highly processed foods leads to increased levels of low-density lipoproteins, triglycerides, and blood glucose, accompanied by vascular wall damage and progression of the atherosclerotic process [2, 15, 19, 28].

One of the leading mechanisms in the development of CVDs is endothelial dysfunction. Under the influence of proatherogenic dietary factors, nitric oxide bioavailability decreases, vascular spasm increases, and thrombogenesis

and inflammation are activated. Excessive sodium intake leads to fluid retention, increased peripheral vascular resistance, and the development of arterial hypertension. At the same time, deficiency of potassium, magnesium, and calcium may aggravate disturbances in vascular tone and the electrophysiological stability of the myocardium [10, 15, 21, 23].

Oxidative stress, defined as an imbalance between the production of free radicals and the body's antioxidant defence, plays an important role in the pathogenesis of CVDs. Excessive consumption of fatty and high-calorie foods triggers lipid peroxidation, cell membrane damage, and the progression of atherosclerosis. Oxidative stress is closely associated with chronic systemic inflammation, which is characterised by increased levels of proinflammatory cytokines, macrophage activation, and vascular wall remodelling [2, 34].

Disordered eating behaviour is also an important factor in the development of obesity and metabolic syndrome. Excessive caloric intake, low physical activity, and the predominance of high-glycemic-index foods contribute to the development of insulin resistance, hyperinsulinemia, and abdominal obesity. In such cases, adipose tissue acquires the properties of an active endocrine organ and produces proinflammatory mediators that adversely affect the vasculature and the myocardium [9].

Deficiency of individual macro- and micronutrients is of particular importance. Insufficient intake of omega-3 polyunsaturated fatty acids (PUFAs) is associated with an increased risk of arrhythmias, thrombosis, and progression of atherosclerosis. Magnesium deficiency may provoke cardiac rhythm disturbances, increased vascular tone, and arterial hypertension. Hypokalemia is associated with an increased risk of stroke and heart failure, whereas deficiencies of coenzyme Q10 and antioxidants lead to energetic dysfunction of cardiomyocytes and an intensification of oxidative damage [3, 10, 23, 25].

In recent years, considerable attention has been paid to the role of the gut microbiome in the development of CVDs. Nutrition affects the composition and functional activity of the gut microbiota, which plays a role in regulating lipid metabolism, synthesising biologically active substances, and modulating the immune response. Dysbiotic changes may promote systemic inflammation and atherogenesis by generating proatherogenic metabolites [6, 31, 32].

The analysed data indicate that nutrition plays an important role in the pathogenesis of CVDs. Nutrient imbalance, excessive caloric intake, and deficiency of biologically active substances provoke metabolic and vascular disorders that underlie atherosclerosis, arterial hypertension, and heart failure. Dietary correction and optimisation of nutritional status are important components of the prevention and comprehensive treatment of CVDs [8, 19].

*Key nutrients in the correction of cardiovascular diseases.* Omega-3 PUFAs, primarily eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), are among the most important nutrients in the prevention and comprehensive



correction of CVDs. Their positive effect on the cardiovascular system has been confirmed by numerous clinical and epidemiological studies. Omega-3 fatty acids are components of cell membranes, influence the synthesis of biologically active substances, and regulate inflammatory responses and the functional state of the vascular wall.

The cardioprotective effects of omega-3 PUFAs are mediated through several mechanisms. They reduce plasma triglyceride levels by inhibiting hepatic triglyceride synthesis and enhancing fatty acid oxidation. In addition, omega-3 fatty acids improve endothelial function, increase vascular wall elasticity, and reduce the severity of systemic inflammation, which plays an important role in the pathogenesis of atherosclerosis [1, 25].

An important effect of omega-3 PUFAs is their influence on the hemostatic system. They reduce platelet aggregation and may lower the risk of thrombosis. They also possess antiarrhythmic properties, stabilise the electrical activity of cardiomyocytes, and reduce the risk of ventricular arrhythmias and sudden cardiac death. Regular consumption of fatty marine fish at least 1-2 times per week is associated with a reduced risk of coronary heart disease, myocardial infarction, and cerebrovascular complications. The highest amounts of omega-3 fatty acids are found in salmon, mackerel, herring, sardines, and tuna. In cases of insufficient dietary intake, pharmacological medicinal products or dietary supplements may be used [1]. At the same time, the evidence base for pharmacological omega-3 supplementation remains heterogeneous; its effects depend on the composition of the medicinal product, the dose, and the clinical context [1, 22].

Special attention is paid to the omega-6-to-omega-3 fatty acid ratio. Excessive intake of omega-6 fats in the presence of omega-3 deficiency may sustain chronic inflammation and promote atherosclerosis. Therefore, current recommendations emphasise increasing the proportion of omega-3 PUFAs in the diet [25, 28].

Magnesium is one of the most important macroelements required for the normal functioning of the cardiovascular system. It participates in more than 300 enzymatic reactions, including energy metabolism, protein synthesis, regulation of neuromuscular conduction, and maintenance of electrolyte balance. Magnesium is particularly important for the cardiovascular system, as it regulates vascular tone and influences myocardial contractile function. It acts as a natural calcium antagonist, thereby promoting relaxation of vascular smooth muscle and vasodilation. This helps reduce peripheral vascular resistance and maintain normal blood pressure.

Magnesium deficiency may be accompanied by arterial hypertension, tachycardia, extrasystoles, and other rhythm disturbances. In addition, magnesium insufficiency is associated with increased vascular reactivity, endothelial dysfunction, and intensified oxidative stress. Insufficient magnesium intake is often observed in patients with unbalanced nutrition, chronic stress, diabetes mellitus, obesity, and heart failure. The risk of deficiency increases with long-term use of diuretics, alcohol consumption, and certain other medicinal products.

The main dietary sources of magnesium are nuts, seeds, legumes, spinach, broccoli, whole-grain products, cocoa, and mineral waters with a high magnesium content. In clinical practice, magnesium preparations are used as an additional component in the management of arterial hypertension, coronary heart disease, arrhythmias, and increased neuromuscular excitability [23].

Potassium is one of the key intracellular electrolytes required for maintaining normal cardiac and vascular function. It participates in the formation of the cellular membrane potential, ensures nerve impulse conduction, and regulates the contraction of muscle fibres, including the myocardium [10].

Adequate potassium intake is important for preventing arterial hypertension. Potassium promotes the elimination of excess sodium from the body, thereby helping to reduce fluid retention and lower blood pressure. In addition, it has a positive effect on endothelial function and vascular wall elasticity. Insufficient potassium intake is associated with an increased risk of stroke, coronary heart disease, and cardiac rhythm disturbances. The combination of excessive sodium intake and insufficient potassium intake, which is typical of the modern diet rich in ultra-processed foods, is particularly dangerous [10, 21].

The main sources of potassium are vegetables, leafy greens, fruits, legumes, and dried fruits. Significant amounts of potassium are found in bananas, avocado, potatoes, beans, spinach, dried apricots, and pumpkin. At the same time, in patients with chronic kidney disease receiving potassium-sparing medicinal products, monitoring of blood potassium levels is necessary to prevent hyperkalemia [10].

Coenzyme Q10 (ubiquinone) is a fat-soluble compound that plays a key role in cellular energy metabolism. It participates in the synthesis of adenosine triphosphate in mitochondria and provides the energy needs of cells, especially in tissues with high metabolic activity, particularly the myocardium. In addition to its energetic function, coenzyme Q10 has pronounced antioxidant properties. It protects cells from free radical damage, reduces the intensity of oxidative stress, and helps stabilise cell membranes.

In patients with heart failure, the concentration of coenzyme Q10 in myocardial tissues is often reduced. This may be accompanied by deterioration of cardiac contractile function and decreased exercise tolerance. Additional administration of coenzyme Q10 may improve cardiomyocyte energy supply, increase ejection fraction, and reduce clinical manifestations of heart failure [3, 12].

The relationship between statin therapy and coenzyme Q10 levels is of certain interest. Since statins inhibit the synthesis of mevalonate, a precursor of coenzyme Q10, their long-term use may be accompanied by a decrease in its concentration in the body. This may partly explain the occurrence of muscle weakness and myalgia in some patients [3].

Despite positive results reported in individual studies, coenzyme Q10 is generally regarded as an adjunct to comprehensive treatment rather than an independent approach to CVD management [3, 12].

Vitamin D is a fat-soluble biologically active substance that not only performs its classical role in the regulation of calcium and phosphorus metabolism, but also participates in the functioning of the cardiovascular system. Vitamin D receptors have been identified in cardiomyocytes, endothelial cells, and vascular smooth muscle [5, 16].

Vitamin D insufficiency is associated with an increased risk of arterial hypertension, atherosclerosis, heart failure, and metabolic disorders. Vitamin D affects the activity of the renin-angiotensin-aldosterone system and participates in the regulation of vascular tone and myocardial remodelling. In addition, vitamin D has immunomodulatory and anti-inflammatory properties. Its insufficiency may promote chronic systemic inflammation, which is an important link in the pathogenesis of atherosclerosis and CVDs.

The main source of vitamin D is its synthesis in the skin under the influence of ultraviolet radiation. It is also found in fatty fish, eggs, cod liver, and fortified foods. At the same time, vitamin D deficiency is highly prevalent worldwide, especially during winter [16].

Current recommendations emphasise the need for individualised vitamin D supplementation. Its administration is appropriate after laboratory determination of 25(OH) D levels and assessment of risk factors for deficiency [16]. At the same time, routine vitamin D supplementation solely for the purpose of reducing cardiovascular risk lacks convincing evidence support; therefore, it should be justified by laboratory-confirmed deficiency and individual risk factors [5].

Oxidative stress is a key mechanism in the development of CVDs. Excessive formation of free radicals is accompanied by damage to cell membranes, vascular endothelium, and low-density lipoproteins (LDL). Oxidation of LDL plays an important role in the formation of atherosclerotic plaques, progression of chronic inflammation, and development of endothelial dysfunction [2, 34].

Antioxidants are substances that neutralise free radicals and reduce the adverse effects of oxidative stress on the cardiovascular system. The main antioxidants include vitamin C, vitamin E, carotenoids, polyphenols, flavonoids, coenzyme Q10, and selenium [3, 34].

Vitamin C is a water-soluble antioxidant that helps protect cells from oxidative damage, maintain normal endothelial function, and support collagen synthesis in the vascular wall. In addition, it may reduce the intensity of inflammatory responses and positively influence vascular permeability.

Vitamin E is a fat-soluble antioxidant that protects lipid components of cell membranes from peroxidation. Its action is particularly important in preventing the oxidation of low-density lipoproteins, a key step in atherogenesis [34].

Plant-derived polyphenols and flavonoids attract considerable attention in modern nutrition science. They have pronounced anti-inflammatory, anti-oxidant, and endothelioprotective properties. Polyphenols can improve nitric oxide synthesis in the vascular endothelium, enhance microcirculation, and promote vasodilation. Of particular

importance are polyphenols contained in olive oil, berries, grapes, pomegranate, green tea, cocoa, and nuts. Regular consumption of these foods is associated with a reduced risk of cardiovascular complications and slowing of atherosclerosis progression [20].

The Mediterranean diet plays an important role in the prevention of CVDs and is characterised by a high content of natural antioxidants. This dietary pattern is based on vegetables, fruits, leafy greens, legumes, fish, whole-grain products, olive oil, and nuts. The Mediterranean diet is associated with reduced systemic inflammatory activity, improved lipid profile, and decreased risk of myocardial infarction and stroke [14, 26, 27].

Considerable attention is paid to the relationship between oxidative stress and ageing of the vascular wall. Chronic endothelial damage caused by free radicals leads to loss of vascular elasticity, calcification, and progression of arterial hypertension. Therefore, adequate intake of natural antioxidants is an important component of cardiometabolic prevention [34].

At the same time, clinical studies indicate that uncontrolled use of high-dose antioxidant supplements does not always demonstrate convincing cardiovascular benefits. Therefore, preference is given to obtaining antioxidants from natural dietary sources as part of a balanced diet [18, 19].

*Current principles of nutritional correction.* Modern nutrition science considers nutrition not only as a source of energy and structural substances, but also as an important tool for the prevention and comprehensive treatment of CVDs. Nutritional correction is now an integral component of cardiometabolic prevention, since dietary patterns substantially influence the pathogenesis of atherosclerosis, arterial hypertension, obesity, diabetes mellitus, and chronic systemic inflammation [8, 18, 19].

One of the most extensively studied and effective approaches to CVD prevention is the Mediterranean diet. Its effectiveness has been confirmed by numerous clinical and epidemiological studies. This dietary pattern is based on vegetables, fruits, leafy greens, legumes, whole-grain products, fish, seafood, nuts, and olive oil as the main source of fat. The Mediterranean diet is characterised by restriction of red meat, trans fats, excessive sugar intake, and ultra-processed foods [14, 19, 26].

The cardioprotective effect of the Mediterranean diet is determined by its high content of monounsaturated fatty acids, omega-3 PUFAs, antioxidants, polyphenols, and dietary fibre. Such a diet contributes to improvements in lipid profile, reduced systemic inflammation, improved endothelial function, and reduced thrombosis risk. Regular adherence to the Mediterranean diet is associated with a reduced risk of myocardial infarction, stroke, and mortality from cardiovascular diseases [14, 26, 27].

The DASH diet is also of great importance and was developed for the prevention and treatment of arterial hypertension. The main principles of the DASH diet include increased intake of vegetables, fruits, whole-grain products, low-fat dairy products, legumes, and fish, along with restriction of sodium chloride, saturated fats, sweets, and foods high in sodium [11, 18].

The effectiveness of the DASH diet is determined by its high content of potassium, magnesium, calcium, and dietary fibre, which positively influence vascular tone and water-salt balance. It has been shown that adherence to the DASH diet lowers blood pressure, improves insulin sensitivity, and reduces the risk of cardiovascular complications [10, 11, 21, 23].

Current approaches to nutritional correction involve not only changes in the overall dietary structure but also the individualised selection of nutrients based on the patient's clinical condition. Assessment of age, sex, level of physical activity, comorbid diseases, laboratory parameters, and pharmacological treatment is of great importance [4, 19, 24, 35].

For example, in patients with arterial hypertension, particular attention is paid to limiting sodium intake and

ensuring adequate intake of potassium, magnesium, and calcium. In patients with dyslipidemia, emphasis is placed on reducing intake of saturated and trans fats, and increasing intake of omega-3 fatty acids and dietary fibre. In patients with heart failure, control of water-electrolyte balance and adequate intake of coenzyme Q10, magnesium, and protein are important [1, 3, 12, 22, 25].

Summarised current approaches to nutritional prevention of CVDs include adherence to the Mediterranean and DASH diets, restriction of saturated fats, trans fats, excess sodium, and simple carbohydrates. A diet rich in vegetables, fruits, fish, whole-grain products, nuts, and unsaturated fatty acids contributes to improvements in lipid profile, reductions in blood pressure, attenuation of systemic inflammation, and reductions in cardiovascular event risk (Fig. 1) [8, 18, 19].

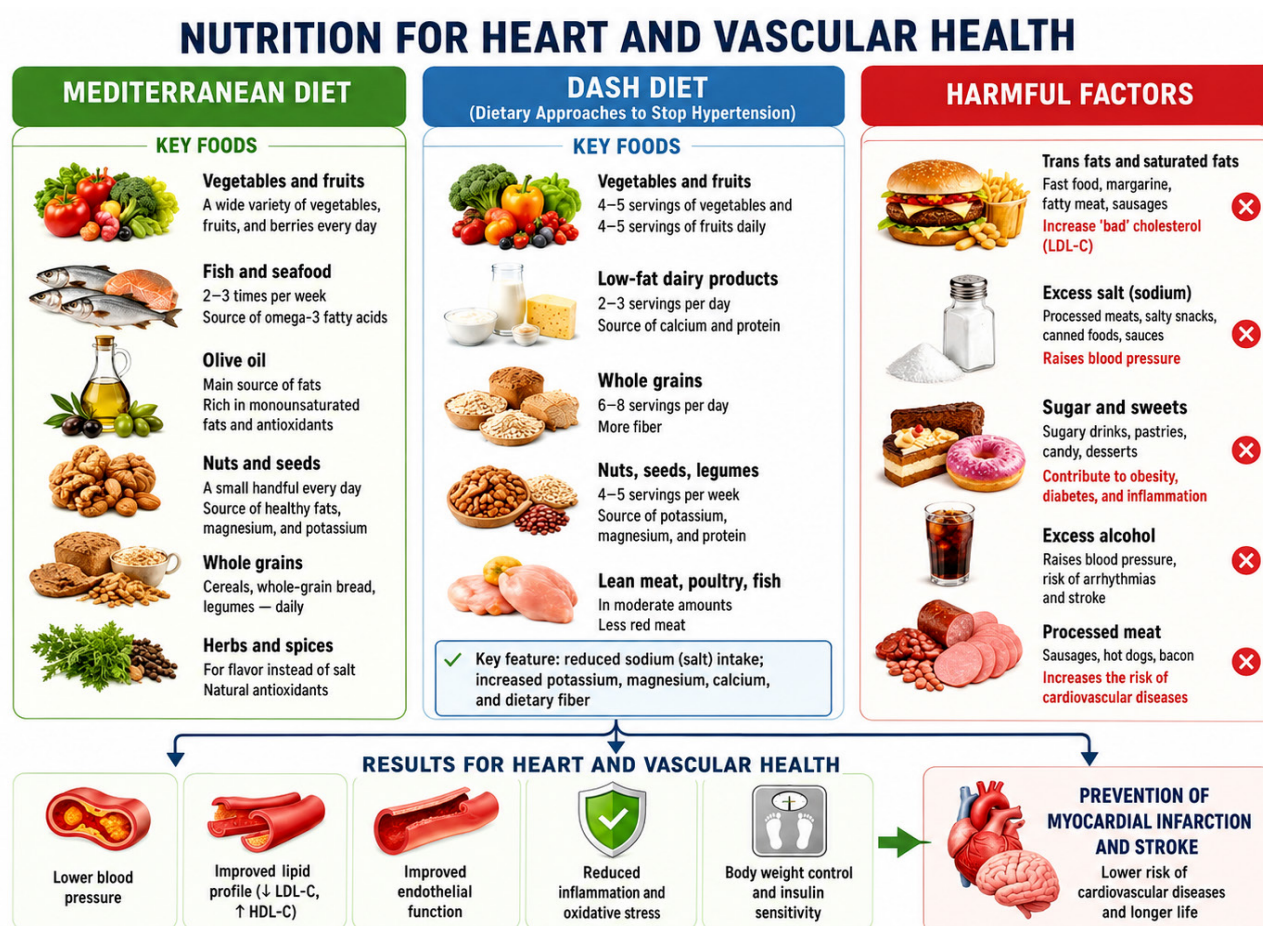


Fig. 1. Nutrition for heart and vascular health.

The concept of personalised nutrition is gaining particular importance, as it takes into account genetic, metabolic, and microbiome-related characteristics of the organism. Current studies demonstrate that identical dietary patterns may have different effects on patients depending on genetic predisposition, gut microbiota composition, and individual metabolic features.

Special attention is paid to the relationship between the gut microbiome and cardiovascular risk. Alterations

in the gut microbiota may promote systemic inflammation, insulin resistance, and atherosclerosis. In this regard, modern nutrition science is actively investigating the role of probiotics, prebiotics, and fermented foods in maintaining cardiometabolic health [6, 31, 32].

An important direction is body weight correction. Overweight and obesity significantly increase the risk of arterial hypertension, coronary heart disease, heart failure, and diabetes mellitus. Rational nutrition



combined with physical activity can reduce the severity of metabolic disorders and improve prognosis in patients with CVDs [9, 30].

Current recommendations emphasise the need to reduce the consumption of ultra-processed foods, excess sugar, salt, and trans fats. High consumption of such products leads to the development of chronic systemic inflammation, endothelial dysfunction, and accelerated progression of atherosclerosis [18, 19].

In addition, modern cardiovascular nutrition research is actively investigating the role of biologically active plant-derived compounds, including polyphenols, flavonoids, carotenoids, and phytosterols. These compounds are capable of exerting antioxidant, anti-inflammatory, and hypolipidemic effects, which open the door to their use in the prevention of CVDs [7, 17, 20, 29].

An important principle of modern nutritional correction is the integration of dietary recommendations, pharmacological management, and lifestyle modification. Rational nutrition cannot completely replace pharmacotherapy in severe CVDs; however, it can increase treatment efficacy, improve control of risk factors, and reduce the frequency of complications [8, 18].

Thus, nutritional correction is not only an adjunctive component of treatment but also an important strategic direction of modern preventive medicine aimed at preserving cardiovascular health, improving quality of life, and reducing premature mortality in the population [8, 13, 19].

**Conclusions.** The synthesis of current scientific evidence confirmed the important role of nutritional correction in the prevention and comprehensive treatment of cardiovascular diseases. Rational nutrition influences the functional state of the cardiovascular system, lipid and carbohydrate metabolism, systemic inflammation, the severity of oxidative stress, and atherosclerotic changes.

Adequate intake of omega-3 polyunsaturated fatty acids, magnesium, potassium, dietary fibre, antioxidants, and other biologically active substances is associated with improved endothelial function, stabilisation of blood pressure, normalisation of the lipid profile, and a reduced risk of cardiovascular complications.

The most evidence-based dietary patterns for cardiometabolic prevention are the Mediterranean diet and Dietary Approaches to Stop Hypertension, adherence to which reduces the incidence of myocardial infarction, stroke, heart failure, and cardiovascular mortality.

Nutritional correction should be based on an individualised approach, taking into account the patient's age, comorbid diseases, metabolic characteristics, laboratory parameters, physical activity, and pharmacological treatment.

Promising directions in modern cardiovascular nutrition include further investigation of the relationships among nutrition, genetic factors, and the gut microbiome, and the development of personalised nutritional support programs for the prevention and comprehensive correction of cardiovascular diseases.

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## Nutrient Correction of Cardiovascular Diseases: A Modern View of the Role of Dietary Factors in Their Prevention and Complex Treatment (Literature Review)

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**Introduction.** Cardiovascular diseases remain the leading cause of mortality, disability, and premature loss of working capacity worldwide. Nutrition is one of the major modifiable cardiovascular risk factors, as dietary habits directly influence lipid and carbohydrate metabolism, endothelial function, blood pressure regulation, systemic inflammation, and oxidative stress. Excessive intake of salt, saturated fats, trans fats, refined carbohydrates, and ultra-processed foods contributes to dyslipidemia, arterial hypertension, obesity, insulin resistance, and atherosclerosis.

**The aim of the study.** To summarise current scientific evidence regarding the role of nutrients in the prevention and complex treatment of cardiovascular diseases, as well as to evaluate the potential of nutrient correction in reducing cardiovascular risk and improving patient prognosis.

**Materials and methods.** An analytical review of current scientific publications, clinical guidelines, systematic reviews, meta-analyses, and randomised clinical trials was conducted. The effects of dietary patterns, macro- and micronutrients on cardiometabolic risk were analysed.

**Results.** Adequate intake of omega-3 polyunsaturated fatty acids, potassium, magnesium, dietary fibre, antioxidants, and polyphenols was associated with improved lipid profile, endothelial function, blood pressure stabilisation, and reduced inflammatory activity. The Mediterranean diet and Dietary Approaches to Stop Hypertension demonstrated the strongest cardioprotective effects.

**Conclusions.** Nutrient correction is an important component of cardiovascular prevention and complex treatment. Rational nutrition should be combined with lifestyle modification, individualised dietary recommendations, and evidence-based pharmacotherapy.

**Keywords:** cardiovascular diseases, nutrient correction, cardiometabolic prevention, Mediterranean diet, Dietary Approaches to Stop Hypertension diet, micronutrients, oxidative stress, endothelial dysfunction.

## Нутрієнтна корекція серцево-судинних хвороб: сучасний погляд на роль харчових чинників у їхній профілактиці та комплексному лікуванні (огляд літератури)

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**Вступ.** Серцево-судинні хвороби – основна причина смертності, інвалідизації та передчасної втрати працездатності населення у більшості країн світу. Важлива роль серед модифікованих чинників серцево-судинного ризику належить харчуванню, позаяк характер щоденного раціону безпосередньо впливає на ліпідний і вуглеводний обмін, функційний стан ендотелію, регуляцію артеріального тиску, активність системного запалення та оксидативного стресу. Нутрієнтний дисбаланс, надмірне споживання кухонної соли, насичених жирів, трансжирів, рафінованих вуглеводів і ультраоброблених продуктів провокують дисліпідемію, артеріальну гіпертензію, ожиріння, інсулінорезистентність, атеросклероз. Водночас достатнє надходження біологічно активних речовин і дотримання кардіопротекторних моделей харчування асоціюються зі зниженням ризику серцево-судинних ускладнень.

**Мета.** Узагальнити сучасні наукові дані щодо ролі нутрієнтів у профілактиці та комплексному лікуванні серцево-судинних хвороб, а також оцінити можливості нутрієнтної корекції у зниженні кардіоваскулярного ризику та поліпшенні прогнозу якості життя.

**Матеріали й методи.** Проведено аналітичний огляд сучасних наукових джерел, клінічних рекомендацій, систематичних оглядів, метааналізів та рандомізованих клінічних досліджень, присвячених впливу дієтичних моделей, макро- і мікронутрієнтів на кардіометаболічний ризик. Проаналізовано дані щодо ролі омега-3 поліненасичених жирних кислот, магнію, калію, коензиму Q10, вітаміну D, антиоксидантів, поліфенолів, харчових волокон, середземноморської дієти й дієт і методів зупинення гіпертонії у профілактиці й комплексному лікуванні серцево-судинних хвороб.

**Результати.** З'ясовано, що харчування відіграє важливу роль у патогенезі серцево-судинних хвороб через вплив на ендотеліальну функцію, ліпідний обмін, системне запалення, оксидативний стрес і метаболічні про-

цеси. Достатнє надходження омега-3 поліненасичених жирних кислот, калію, магнію, харчових волокон, поліфенолів, антиоксидантів та інших біологічно активних речовин асоціюється з поліпшенням ліпідного профілю, стабілізацією артеріального тиску, зменшенням активності системного запалення та поліпшенням функції ендотелію. Найбільш обґрунтованими дієтичними моделями є середземноморська дієта й дієти і методи зупинення гіпертонії, ефективність яких пов'язана з високим вмістом рослинних продуктів, риби, цільнозернових компонентів, ненасичених жирних кислот та обмеженням натрію, трансжирів і ультраобробленої їжі. Сучасні підходи до нутрієнтної корекції передбачають індивідуальний добір харчових рекомендацій з урахуванням супутніх хвороб, метаболічних особливостей, лабораторних показників і медикаментозного лікування.

**Висновки.** Узагальнення сучасних наукових даних підтвердило важливу роль нутрієнтної корекції у профілактиці та комплексному лікуванні серцево-судинних хвороб. Рациональне харчування сприяє поліпшенню функційного стану серцево-судинної системи, нормалізації ліпідного й вуглеводного обміну, зменшенню активності системного запалення та оксидативного стресу. Найбільш обґрунтованими моделями харчування у кардіометаболічній профілактиці є середземноморська дієта, а також дієти й методи зупинення гіпертонії. Нутрієнтна корекція має ґрунтуватися на принципах доказової медицини, персоналізованого підходу й поєднуватися з модифікацією способу життя і медикаментним лікуванням.

**Ключові слова:** серцево-судинні хвороби, нутрієнтна корекція, кардіометаболічна профілактика, середземноморська дієта, дієти й методи зупинення гіпертонії, мікронутрієнти, оксидативний стрес, ендотеліальна дисфункція.

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