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ASPECTS OF INFLUENCE ON THE MANAGEMENT AND ECONOMIC EFFICIENCY OF PREVENTING CARDIOVASCULAR DISEASES AND PROMOTING A HEALTHY LIFESTYLE

Gaziyeva U. A.
Abdurakhmanov Sh. Z.
School of Public Health, Tashkent State Medical University

Abstract

Cardiovascular diseases (CVD) remain one of the leading causes of mortality and disability worldwide. Despite substantial advances in the diagnosis and treatment of CVD over recent decades, the global burden of these conditions continues to be alarmingly high. This situation is largely attributable to population growth, increased life expectancy, rapid urbanization, and insufficient adherence to healthy lifestyle practices. Consequently, within modern healthcare systems, preventive strategies aimed at reducing the incidence of CVD have become a priority over treatment-oriented approaches.

In this context, the management mechanisms and economic efficiency of promoting healthy lifestyles in the prevention of cardiovascular diseases are critically examined. Given that CVD continues to represent a major cause of death and disability on a global scale, the implementation of effective strategies focused on both primary and secondary prevention is essential to ensure the sustainability and resilience of healthcare systems.

Keywords: Cardiovascular diseases; prevention; healthy lifestyle; management; cost-effectiveness; healthcare system.

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Introduction

In recent years, noncommunicable diseases (NCDs), particularly cardiovascular diseases (CVD), have emerged as the leading causes of morbidity and mortality worldwide. Beyond being a major medical challenge, NCDs represent a significant socio-economic burden, placing substantial financial pressure on healthcare systems [1]. According to statistical data, expenditures related to the treatment, rehabilitation, and disability associated with CVD exert a considerable negative impact on both national budgets and household incomes [2].

Preventive cardiology is a medical discipline focused on reducing the incidence of cardiovascular diseases through the early identification, assessment, and modification of risk factors associated with their development [8]. This approach is closely aligned with lifestyle medicine and provides a comprehensive evaluation of the influence of human behavior, dietary patterns, physical activity, mental health, and social determinants on cardiovascular health. In recent years, the principle that “prevention is easier and more cost-effective than treatment” has become increasingly well established within the field of cardiology [9].

A fundamental component of preventive cardiology is the individualized assessment of cardiovascular risk. Risk assessment facilitates informed and structured communication between patients and healthcare providers, enabling evidence-based decisions regarding lifestyle modification and, when necessary, the initiation of pharmacological therapy [1]. At this stage, the managerial relevance and economic efficiency of promoting a healthy lifestyle become particularly evident, as early preventive interventions have the potential to avert substantial future healthcare expenditures and reduce the long-term burden on the healthcare system .

A number of globally recognized models are employed to assess cardiovascular risk. These models integrate several key risk factors in order to estimate the probability of future cardiovascular events, including myocardial infarction, stroke, or cardiovascular-related mortality [5]. One of the earliest and most

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influential risk assessment systems was developed within the framework of the Framingham Heart Study, which incorporates variables such as age, sex, blood pressure, cholesterol levels, smoking status, and the presence of diabetes mellitus . Subsequently, this model has been adapted for use in numerous countries and has become a cornerstone of preventive cardiology [8].

In preventive cardiology, however, cardiovascular risk assessment extends beyond statistical prediction alone. It also encompasses patient motivation, social circumstances, and readiness to adopt healthier behaviors. From this perspective, lifestyle medicine requires physicians to possess not only strong clinical expertise but also effective communication and psychological skills. The physician's role in promoting a healthy lifestyle is therefore not limited to providing advice; it also involves supporting and guiding patients toward sustained long-term behavioral change . Although global risk scoring systems remain an important initial step in cardiovascular risk stratification, it is well established that a considerable proportion of individuals who experience cardiovascular events present with only one-or none-of the traditional risk factors. Consequently, the accuracy of global risk prediction models has been questioned, as many individuals who later develop cardiovascular disease are initially classified as being at low or intermediate risk [6].

While addressing conventional risk factors represents a critical component of prevention, many experts argue that direct assessment of atherosclerosis at its subclinical stage-prior to the onset of clinical events-offers the most promising approach for improving the prediction of future cardiovascular outcomes [3]. Key criteria for novel screening tests aimed at detecting subclinical atherosclerosis include:

1. adequate sensitivity and specificity for disease detection;
2. sufficient reproducibility;
3. the ability to identify individuals who are likely to benefit from early intervention; and

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4. superior predictive value compared with conventional risk assessment performed in outpatient settings.

Accordingly, contemporary health policy increasingly prioritizes the prevention of cardiovascular diseases-particularly through the promotion and adoption of healthy lifestyles-over treatment-focused strategies.

Traditional cardiovascular risk factors include arterial hypertension, dyslipidemia, diabetes mellitus, obesity, smoking, and physical inactivity. Although each of these factors independently contributes to an increased risk of cardiovascular disease, they frequently coexist and interact, thereby amplifying overall risk [2,5]. Metabolic disorders, especially those arising from unhealthy dietary patterns and sedentary lifestyles, pose a particularly serious threat to cardiovascular health [2].

The prevalence and distribution of cardiovascular risk factors vary substantially according to sociodemographic characteristics. Evidence indicates marked differences between men and women, as well as between urban and rural populations. For instance, urban residents exhibit higher rates of obesity and dyslipidemia, largely attributable to sedentary behavior and unhealthy dietary habits. In contrast, in rural areas, limited access to healthcare services may constitute a significant factor contributing to elevated cardiovascular risk.

Life's Essential 8 indicators play a crucial role in assessing cardiovascular risk among children and adolescents. These indicators include diet quality, physical activity, exposure to nicotine, sleep health, body weight, blood pressure, lipid profile, and glucose metabolism [7,10]. Research findings indicate that insufficient physical activity and sleep disturbances are the most prevalent cardiovascular risk factors in pediatric and adolescent populations. This highlights the necessity of initiating preventive interventions at an early age [7].

Failure to adhere to a healthy lifestyle results not only in adverse medical outcomes but also in substantial economic losses associated with cardiovascular diseases [11]. The development of CVD among the working-age population leads

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to reduced labor productivity, temporary and permanent disability, and increased healthcare expenditures [2]. Consequently, the management of cardiovascular risk factors represents a strategic priority for healthcare systems.

Contemporary scientific evidence suggests that a significant proportion of cardiovascular risk factors can be effectively controlled through the adoption of a healthy lifestyle. Regular physical activity, balanced nutrition, adequate sleep, and avoidance of harmful habits contribute to the reduction of metabolic syndrome components. Such an approach not only improves individual health outcomes but also reduces the overall population-level burden of cardiovascular disease [12].

The effective organization of cardiovascular disease prevention requires a robust management framework. This process includes:

• assessment of population-level cardiovascular risk factors;
• planning and implementation of programs promoting healthy lifestyles;
• coordination between healthcare institutions and primary care services;
• continuous monitoring and evaluation of preventive interventions.

From a management perspective, the promotion of healthy lifestyles should not be confined solely to the healthcare sector. Integrated, multisectoral approaches involving educational institutions, communities, mass media, and workplaces have been shown to be more effective [10]. In particular, early detection and management of hypertension, smoking, physical inactivity, and unhealthy dietary patterns at the primary healthcare level are essential components of CVD prevention [6].

A healthy lifestyle encompasses a combination of factors, including regular physical activity, balanced nutrition, smoking and alcohol cessation, and effective stress management [2,9]. Scientific studies demonstrate that adherence to a healthy lifestyle:

• lowers arterial blood pressure;
• improves blood lipid profiles;

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• reduces the risk of diabetes mellitus and obesity;
• significantly decreases overall and cardiovascular mortality.

From a societal perspective, widespread promotion of healthy lifestyles enhances workforce participation, reduces disability rates, and positively influences overall social well-being [11].

Adequate physical activity and adherence to a heart-healthy diet contribute to significant reductions in body weight, blood pressure, blood glucose, and cholesterol levels, thereby lowering cardiovascular risk. The steady increase in obesity prevalence over recent decades has been largely driven by the widespread availability of high-calorie foods and beverages, declining physical activity, and increased sedentary behavior. Currently, approximately 40% of the population in the United States is classified as obese, which is particularly concerning given that obesity is an independent risk factor for metabolic syndrome and cardiovascular disease [4].

Both non-pharmacological, pharmacological, and surgical interventions aimed at reducing excess adipose tissue in overweight and obese individuals have been shown to significantly decrease the risk of developing type 2 diabetes mellitus. Caloric restriction, increased physical activity, and behavioral modification remain first-line interventions for all overweight and obese individuals, promoting weight loss, preventing further weight gain, and reducing cardiovascular risk [4,9].

The principal cardiovascular risk factors are closely associated with sociodemographic characteristics, and their effective management requires a comprehensive, multilevel approach. Incorporating age, sex, living environment, and occupational factors into the development of preventive strategies enhances the effectiveness of healthy lifestyle promotion. These approaches hold substantial scientific and practical significance in the prevention of cardiovascular diseases [12].

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One of the most significant advantages of cardiovascular disease prevention is its high cost-effectiveness. Preventive measures-particularly those focused on promoting healthy lifestyles-are several times less expensive than treatment-based approaches [1,2]. For example:

• increased physical activity and improved nutrition reduce the risk of myocardial infarction and stroke, thereby decreasing expenditures on costly medications and inpatient care [3,11];

• reductions in smoking prevalence lower healthcare costs associated not only with CVD but also with numerous other chronic conditions.

Every investment in healthy lifestyle promotion programs yields long-term returns through reduced healthcare costs and increased labor productivity.

According to the World Health Organization (WHO), inpatient treatment, pharmacotherapy, and rehabilitation of patients with myocardial infarction and stroke represent the greatest financial burden on healthcare systems. In developed countries, the cost of treating and rehabilitating a single stroke patient has been reported to be 10-15 times higher than the average annual expenditure on population-level health promotion programs [1].

In contrast, programs aimed at promoting healthy lifestyles-such as increasing physical activity, encouraging healthy dietary habits, and reducing smoking-are widely recognized as low-cost yet highly effective preventive interventions [8]. Scientific evidence indicates that regular physical activity and balanced nutrition:

• reduce the risk of arterial hypertension, dyslipidemia, and diabetes mellitus;

• significantly lower the incidence of myocardial infarction and stroke;

• decrease long-term reliance on inpatient care and expensive pharmacological treatments.

Studies published by the American Heart Association (AHA) and *The Lancet* demonstrate that increasing physical activity levels can reduce direct medical costs related to cardiovascular disease by 20-30%. Furthermore, improved

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physical activity enhances work capacity and reduces days of temporary disability, generating substantial indirect economic benefits [1,9].

Smoking remains one of the most powerful modifiable risk factors for cardiovascular disease. According to WHO estimates, smoking-related cardiovascular conditions impose billions of dollars in costs on healthcare systems worldwide. Preventive strategies aimed at reducing smoking-including taxation policies, mass media campaigns, and smoking cessation counseling-are among the most cost-effective public health interventions. Evidence shows that the risk of myocardial infarction among individuals who quit smoking declines markedly within the first 2-3 years, thereby preventing substantial future healthcare expenditures [2].

Every investment in healthy lifestyle promotion programs yields substantial long-term economic benefits. According to analyses conducted by the World Bank and the OECD:

• every dollar invested in preventive programs generates approximately 3-5 dollars in future economic returns;

• these benefits arise from reduced healthcare costs, increased productivity, and prevention of premature mortality.

In addition, cardiovascular disease prevention contributes positively to state budgets by reducing disability prevalence and lowering expenditures on social benefits and long-term care.

Conclusion

In conclusion, strategies aimed at preventing cardiovascular diseases-particularly those focused on promoting healthy lifestyles-represent one of the most medically effective, socially significant, and economically sustainable approaches to reducing the burden of cardiovascular disease. The systematic implementation of these preventive measures across all levels of the healthcare system has the

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potential to substantially decrease the economic and societal costs associated with cardiovascular diseases.

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