The influence of lifestyle (diet, physical activity, stress) on blood pressure

La influencia del estilo de vida (dieta, actividad física, estrés) sobre la presión arterial

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Abstract

This article discusses the influence of various lifestyle factors on blood pressure, such as diet, physical activity and stress. Arterial hypertension is one of the leading risk factors for cardiovascular disease, and adjusting daily habits can significantly improve a person's health status. The role of a balanced diet, including limiting salt and saturated fat, eating foods rich in potassium and magnesium, in lowering blood pressure is discussed. An active lifestyle and regular physical activity help to improve cardiovascular health, reduce stress levels and lower overall blood pressure levels. Stress, in turn, is a key factor that can both directly increase blood pressure and indirectly through negative effects on habits such as diet and activity. The article analyses current research data and offers recommendations for the prevention and control of arterial hypertension through lifestyle changes.

Keywords: blood pressure, hypertension, nutrition, physical activity, stress, lifestyle, cardiovascular disease, prevention, health, pressure reduction.

Resumen

Este artículo analiza la influencia de diversos factores del estilo de vida sobre la presión arterial, como la dieta, la actividad física y el estrés. La hipertensión arterial es uno de los principales factores de riesgo de enfermedad cardiovascular y ajustar los hábitos diarios puede mejorar significativamente el estado de salud de una persona. Se analiza el papel de una dieta equilibrada, que incluye limitar la sal y las grasas saturadas y comer alimentos ricos en potasio y magnesio, para reducir la presión arterial. Un estilo de vida activo y una actividad física regular ayudan a mejorar la salud cardiovascular, reducir los niveles de estrés y disminuir los niveles generales de presión arterial. El estrés, a su vez, es un factor clave que puede aumentar la presión arterial tanto directamente como indirectamente a través de efectos negativos en hábitos como la dieta y la actividad. El artículo analiza datos de investigaciones actuales y ofrece recomendaciones para la prevención y el control de la hipertensión arterial mediante cambios en el estilo de vida.

Palabras clave: presión arterial, hipertensión, nutrición, actividad física, estrés, estilo de vida, enfermedad cardiovascular, prevención, salud, reducción de presión.

Introduction

Arterial hypertension (high blood pressure) is one of the most common diseases of the cardiovascular system and a major risk factor for the development of serious complications such as stroke, myocardial infarction, heart failure and renal failure. According to the World Health Organization (WHO), about 1.13 billion people worldwide suffer from hypertension, and this figure continues to rise. In the context of modern life, characterised by low physical activity, high levels of stress and widespread unbalanced nutrition, the problem of arterial hypertension is becoming increasingly important.

One of the key aspects of controlling arterial hypertension understands he impact of lifestyle on blood pressure levels. Numerous studies have shown that factors such as diet, physical activity and stress levels have a significant impact on blood pressure regulation. Modern recommendations for the prevention and treatment of hypertension increasingly include not only drug approaches, but also lifestyle modification as an integral part of comprehensive therapy.

Nutrition plays an important role in maintaining normal blood pressure. A diet high in salt, saturated fat and low in potassium and magnesium is associated with higher blood pressure and increased risk of cardiovascular disease. Conversely, a balanced diet that includes vegetables, fruits, whole grains and lean sources of protein helps lower blood pressure and improve overall health. Special attention is given to low-sodium diets such as the DASH (Dietary Approaches to Stop Hypertension) diet, which has been proven to be effective in controlling hypertension.

Physical activity is another important element in blood pressure control[1]. Regular moderate to vigorous physical activity strengthens the cardiovascular system, improves blood flow and helps to reduce both systolic and diastolic blood pressure. In contrast, the lack of movement characteristic of a sedentary lifestyle is associated with an increased risk of hypertension and other cardiovascular diseases[2].

Stress, as a psychological factor, also has a significant impact on blood pressure levels. Under conditions of chronic stress, hormones such as adrenaline and cortisol are released, which can cause blood vessels to constrict and blood pressure to rise. Moreover, stress often affects behaviour, leading to negative changes in diet and decreased physical activity, which exacerbates hypertension[3].

Thus, lifestyle management is a key component in the prevention and treatment of arterial hypertension. The introduction of healthy habits into daily life, such as a balanced diet, regular physical activity and stress management, can significantly reduce the risk of hypertension and improve overall health. This article is devoted to the consideration of mechanisms of lifestyle influence on blood pressure and analysis of modern approaches to the correction of these factors for effective prevention and treatment of hypertension.

Materials and methods

In the process of writing the paper, we collected and systematized scientific studies and publications related to arterial hypertension, its causes and the influence of lifestyle factors, as well as analyzed data from medical and physiological studies, clinical guidelines on hypertension and synthesized information to identify general trends and dependencies between lifestyle (nutrition, physical activity, stress) and blood pressure levels.

In addition, the data were summarized to create a holistic picture of the impact of different aspects of lifestyle on blood pressure. For example, identifying key characteristics of a healthy diet and their impact on blood pressure, and establishing a relationship between the level of physical activity and the risk of hypertension.

A comparison of different strategies and approaches to blood pressure correction through lifestyle changes has also been carried out - for example, comparing the effectiveness of the DASH diet with other dietary regimes or comparing the effect of different types of physical activity on blood pressure. On the basis of the data collected, a comparative analysis of the results of clinical trials on the effects of stress and stress management methods on blood pressure was initiated.

Results

Blood pressure is one of the key indicators of cardiovascular health and is influenced by many lifestyle factors. Among these factors, nutrition, physical activity, and stress are of particular importance[4]. Let us consider how each of these components affects blood pressure levels and what mechanisms underlie their effects.

Excessive salt intake is one of the main causes of high blood pressure. Sodium retains water in the body, increasing the volume of circulating blood, which leads to increased pressure on the arterial walls. Limiting sodium

in the diet has been proven to lower blood pressure, especially in people with hypertension.

The popular DASH (Dietary Approaches to Stop Hypertension) diet, which aims to reduce salt, saturated fat intake and increase the proportion of vegetables, fruits, whole grains and lean proteins in the diet, it plays also an important role in this issue[5].

Potassium and magnesium play an important role in regulating blood pressure. Potassium helps to balance sodium levels in the body and promotes vasodilation, which lowers blood pressure. Deficiencies of magnesium and calcium are also associated with increased blood pressure, as these elements are involved in contraction and relaxation of vascular walls[6].

Consumption of foods high in saturated and trans fats contributes to obesity and metabolic disorders, which are directly related to high blood pressure. Being overweight increases the load on the heart, which leads to high blood pressure. Therefore, reducing caloric intake and maintaining a healthy weight helps to normalize blood pressure.

Physical activity is one of the most effective ways to control blood pressure. Regular exercise, especially aerobic exercise (running, swimming, walking), strengthens the cardiovascular system and improves blood circulation. This leads to a reduction in systolic and diastolic blood pressure, which is especially important for people with high blood pressure. It is recommended to engage in physical activity for at least 150 minutes per week, which helps to maintain normal blood pressure and improves general health[7].

A sedentary lifestyle is associated with an increased risk of hypertension. Physical inactivity leads to a weakened cardiovascular system, poor metabolism and increased body weight, which in turn contributes to high blood pressure. Exercise also helps reduce stress levels, which indirectly improves blood pressure readings.

Research shows that not only aerobic exercise, but also strength training has a positive effect on blood pressure. Although intense strength training may raise blood pressure in the short term, in the long term it helps to strengthen the heart muscle, improve metabolism and lower overall blood pressure levels.

Stress is one of the most significant non-medicinal factors affecting blood pressure. In stressful situations, the body produces hormones such as adrenaline and cortisol, which cause temporary vasoconstriction of blood vessels and an increase in heart rate, leading to an increase in blood pressure. With chronic stress, this mechanism can lead to persistent high blood pressure and the development of hypertension.

Stress not only directly affects blood pressure, but is also often associated with unhealthy behavioural habits such as overeating, alcohol abuse, smoking and lack of physical activity. These factors exacerbate the negative effects of stress on the cardiovascular system, increasing the likelihood of developing hypertension [8].

Various stress management techniques such as meditation, deep breathing, yoga and cognitive behavioural therapy can help lower blood pressure. These techniques help reduce stress hormones, improve nervous system function and normalise cardiovascular activity. Stress management through regular relaxation and mindfulness practices has been shown to have a positive effect on blood pressure[9].

Nutrition, physical activity and stress are key lifestyle elements that can have both positive and negative effects on blood pressure levels. Changing dietary habits (salt restriction, increased intake of beneficial micronutrients), regular physical activity and effective stress management are important non-pharmacological measures for the prevention and treatment of hypertension. Implementing these changes in daily life helps not only to reduce the risk of cardiovascular disease, but also to improve the overall quality of life.

Discussion

Arterial hypertension, or high blood pressure, is one of the most significant risk factors for cardiovascular disease, including stroke, myocardial infarction and heart failure. This chronic condition affects millions of people worldwide and its prevalence continues to rise due to increased life expectancy, urbanisation, sedentary lifestyles and dietary changes. One of the main challenges of hypertension is that it is asymptomatic in its early stages, making it a silent killer - a person may not realise they have a problem until serious complications develop.

The realisation that arterial hypertension is manageable through lifestyle modification has opened new horizons in the prevention and treatment of this disease. In contrast to drug approaches, adjusting daily habits offers a more natural and long-term way to control hypertension[10]. Let's take a closer look at how changes in diet, physical activity and stress management can reduce the risk of hypertension and improve overall health.

An important factor affecting blood pressure is nutrition. Inappropriate dietary habits such as high salt intake, saturated fats and lack of fruits and vegetables contribute to the development of hypertension.

One of the most studied factors affecting blood pressure is salt (sodium) intake. An overabundance of sodium in the diet increases blood volume, leading to high blood pressure. Most people consume significantly more salt than recommended by experts. Reducing salt intake to recommended levels can markedly reduce blood pressure, especially in salt-sensitive people. The DASH (Dietary Approaches to Stop Hypertension) diet, which is rich in potassium, magnesium and calcium but low in sodium, has been shown to be effective in lowering blood pressure.

In international medical practice, many organisations pay special attention to lifestyle changes as an important component of prevention and treatment of arterial hypertension[11]. Let us consider a few examples from foreign medical organisations that have successfully implemented programmes aimed at nutritional correction, increased physical activity and stress management to reduce blood pressure.

The DASH (Dietary Approaches to Stop Hypertension) diet is one of the best known programmes designed to reduce blood pressure through dietary changes. The programme was created with the support of the US National Institutes of Health (NIH) and is widely used in the practice of hypertension treatment. The DASH diet aims to reduce salt and saturated fat intake and increase consumption of fruits, vegetables, whole grains, low-fat dairy products, fish and nuts. Special attention is paid to increasing the intake of potassium, calcium and magnesium, which has been shown to be effective in reducing blood pressure[12].

Clinical studies have shown that patients following the DASH diet reduce blood pressure by 8-14 mmHg without the use of medication. This makes the programme an effective measure for the prevention and treatment of mild to moderate hypertension.

Many hospitals and clinics in the US, such as Mayo Clinic, include the DASH diet as part of a comprehensive approach to treating hypertension. Patients are provided with materials on the diet and consultations with dietitians for personalised recommendations.

The UK's National Health Service (NHS) has introduced comprehensive programmes to combat arterial hypertension through lifestyle changes, with a focus on physical activity and stress management. The NHS actively promotes regular exercise as a key component of hypertension prevention. Moderate aerobic activity such as brisk walking, cycling or swimming for 30 minutes a day is recommended.

Patients at high risk of hypertension or with pre-existing problems are offered free stress management courses, including meditation, breathing exercises and cognitive behavioural therapy.

According to the NHS, physical activity programmes help to reduce the risk of hypertension by 30% and patients with existing hypertension have seen a reduction in blood pressure of 5-10 mmHg with regular activity. The NHS actively works with fitness centres and local sports organisations to deliver education campaigns and physical activity programmes. In some parts of the country, patients with hypertension are offered free access to fitness centres or group exercise classes.

Kaiser Permanente is one of the largest integrated healthcare organisations in the United States, which has developed a successful programme for the treatment of hypertension based on lifestyle changes. The organisation focuses on monitoring patients' blood pressure on a regular basis, accompanied by lifestyle changes, including a healthy diet and physical activity. Patients with hypertension participate in group sessions with nutritionists and trainers, where they are taught the principles of healthy eating, personalised physical activity plans and stress management[13].

The programme reduces patients' blood pressure by an average of 10-15 mmHg, especially through a combination of dietary changes and exercise. Long-term follow-up has shown that patients using the programme are significantly less likely to require hospitalisation for complications of hypertension.

Kaiser Permanente has introduced mobile applications for its patients that help track blood pressure, physical activity and nutrition. These technologies make it much easier for patients to monitor their condition and respond in a timely manner to any deterioration.

The Heart Foundation Australia has developed programmes to combat cardiovascular disease, including hypertension, that emphasise lifestyle changes, physical activity and stress management. The Heart Foundation encourages regular physical activity and has developed specific activity level guidelines for people at high risk of hypertension.

The programme supports awareness of the importance of stress management and offers online tools for meditation and relaxation.

An important focus is on healthy eating, which is based on avoiding processed foods high in salt, sugar and saturated fats.

According to the organisation, patients who follow the Heart Foundation's recommendations show a sustained reduction in blood pressure by 5-10 mmHg, as well as lower cholesterol levels and a reduced risk of cardiovascular complications. The Heart Foundation conducts regular information campaigns to raise awareness of the risk factors for hypertension. It has also developed a network of certified fitness trainers who work with patients on an individual basis to help them develop safe and effective physical activity plans.

One of the most successful examples of preventing arterial hypertension through lifestyle changes can be found

in a public health project in Finland that began in the 1970s and is still ongoing. The aim of the programme was to reduce the high mortality rates from cardiovascular disease in the region by changing the dietary habits of the population, reducing salt, saturated fat and tobacco consumption[14].

The programme included educational campaigns to raise public awareness of the risks of hypertension and cardiovascular disease, and encouraged local producers to reduce salt and fat content in products. Importantly, the programme focused not only on individual changes, but also on systemic health improvement at the community level.

During the first two decades of the project implementation, a significant reduction in mortality from cardiovascular diseases by 80% was achieved. Blood pressure levels in the region decreased by an average of 10 mmHg due to the successful implementation of changes in the population's diet and lifestyle.

The Finnish government has actively supported programmes to reduce salt intake and has worked with food manufacturers to change formulations. This example illustrates the importance of public policy in controlling hypertension at the population level.

Hypertension Canada is a national medical organisation in Canada dedicated to developing guidelines and programmes for the treatment and prevention of arterial hypertension. They actively implement lifestyle modification techniques for patients with hypertension. Hypertension Canada focuses on lowering blood pressure through lifestyle changes such as quitting smoking, moderate alcohol consumption, increasing physical activity and reducing sodium intake.

The organisation conducts regular educational campaigns for patients and health care professionals to raise awareness of the importance of lifestyle changes in hypertension.

The implementation of Hypertension Canada's guidelines has helped reduce the number of patients with uncontrolled hypertension by 16% over the past two decades. The programme has also helped reduce the burden on the health care system by reducing the incidence of cardiovascular complications and hospital admissions.

Hypertension Canada's educational campaigns include distributing materials on how to reduce salt in the diet and how to choose low-sodium foods. This includes working with supermarkets and food manufacturers to label and promote healthy foods.

In South Korea, the Ministry of Health and Welfare has developed a national programme called "My Life, My Blood Pressure" to combat hypertension by promoting lifestyle changes. The programme focuses on preventing arterial hypertension in the population by raising awareness of the harms of excessive salt intake and physical inactivity.

The programme includes mass campaigns to reduce consumption of salty foods and reduce stress levels through yoga, meditation and breathing exercises. Special attention is given to young people and the working population to prevent the future development of hypertension.

Over several years, the programme has been able to reduce salt intake among the Korean population by 10-15%, resulting in significant reductions in blood pressure levels among adults.

The programme has also raised awareness of the importance of regular physical activity and stress control.

The South Korean Ministry of Health is actively co-operating with food manufacturers and the restaurant business to reduce salt content in dishes. Free outdoor exercise and stress management courses are organised in cities, where residents can learn free breathing techniques and meditation.

Japan has implemented a large-scale programme to reduce salt intake, known as the Salt War Project, which was part of a government policy to combat hypertension and cardiovascular disease. The programme aims to reduce salt consumption among Japanese people, which historically has been very high due to a traditional diet rich in salty foods (e.g. soy sauce, miso soup, pickled vegetables).

The project involved educational campaigns and promotion of low-salt alternative foods. Educational programmes on the harms of excessive salt consumption were introduced through schools, television and other media.

The programme resulted in a 25% reduction in salt intake in Japan, which significantly reduced the incidence of hypertension and related cardiovascular disease in the Japanese population. Mortality from strokes and other diseases associated with high blood pressure has also decreased[15].

Japanese food manufacturers have actively supported this initiative and have developed many salt-reduced products, an important step in the nationwide fight against hypertension.

These examples from international practice show that approaches to the treatment and prevention of hypertension through lifestyle changes can be diverse and systemic. They include government initiatives, local community programmes and private initiatives by health care organisations. Regardless of the format, programmes aimed at reducing salt intake, increasing physical activity and managing stress have been shown to be effective in controlling arterial hypertension and reducing cardiovascular disease globally.

Conclusions

The influence of lifestyle on blood pressure is one of the key areas in the prevention and treatment of arterial hypertension. Based on analyses of various aspects - such as nutrition, physical activity and stress - several important conclusions can be drawn:

Scientific research and medical practice show that changing eating habits, increasing physical activity levels and effective stress management can significantly reduce blood pressure. The most important aspects are reducing sodium intake, reducing saturated fat and increasing intake of potassium, magnesium and fibre.

Diet plays an important role in blood pressure control. Programmes such as the DASH diet have been used successfully in many countries and have been shown to reduce blood pressure by 8-14 mmHg. Limiting salt to 5-6 grams per day is an important strategy. In addition, increasing the intake of fruits, vegetables and whole grains helps to improve patient outcomes.

Regular physical activity helps both to prevent hypertension and to lower blood pressure in people with diagnosed hypertension. Moderate aerobic activity such as walking, swimming or cycling for 30-60 minutes a day is recommended and can help to reduce blood pressure by 5-10 mmHg.

Chronic stress is a significant risk factor for high blood pressure. Effective stress management techniques such as yoga, meditation and cognitive behavioural therapy can help to reduce blood pressure and improve patients' general well-being. Programmes targeting psycho-emotional health can help prevent exacerbations of hypertension.

Programmes that incorporate multiple components of lifestyle change, such as NHS programmes, Hypertension Canada and projects in Finland, have been shown to be most effective in reducing blood pressure and improving long-term health outcomes. The combination of dietary change, physical activity and psychological well-being is more effective than using any one of these methods alone.

Examples from Finland, Japan and South Korea show that government initiatives and mass education campaigns can significantly change the behavioural habits of the population and reduce hypertension. It is important to engage government and community structures for a systematic approach to hypertension control.

Lifestyle intervention, including proper nutrition, physical activity and stress management, is a powerful and effective way to prevent and control arterial hypertension. Combined programmes at the individual patient and community levels can significantly reduce cardiovascular disease risks and improve quality of life for millions of people.

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