International Journal of Community Medicine and Public Health
Baoum SO et al. Int J Community Med Public Health. 2025 Jan;12(1):565-569
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20244074

Review Article

Evaluating the impact of lifestyle modifications on hypertensive heart disease

Shada Omar Baoum[1]*, Faris Mansour Anbarserri[2], Shahad Emad Alhassan[3], Hassan Fuad Al Hani[4], Faisal Nashmi Almutairi[5], Mohammad Laith Sulayman[6], Jumana Laith Alfadhli[6], Omar Adel Nass[7], Abdulaziz Omar Alsehemi[3], Wail Mohammed Albeetar[8]

[1]Department of Family Medicine, East Jeddah Hospital, Jeddah, Saudi Arabia
[2]College of Medicine, Charles University, Pilsen, Czechia
[3]College of Medicine, Ibn Sina National College, Jeddah, Saudi Arabia
[4]College of Medicine, Alexandria University, Alexandria, Egypt
[5]Department of Internal Medicine, Madinah General Hospital, Medina, Saudi Arabia
[6]Surgical Department, Al-Adan Hospital, Hadiya, Kuwait
[7]Department of Family Medicine, Rabigh General Hospital, Rabigh, Saudi Arabia
[8]Department of Family Medicine, Dr. Soliman Fakeeh Hospital, Jeddah, Saudi Arabia

Received: 24 December 2024
Accepted: 27 December 2024

***Correspondence:**
Dr. Shada Omar Baoum,
E-mail: baoum.shada@gmail.com

ABSTRACT

Hypertensive heart disease (HHD) is a significant cause of cardiovascular morbidity and mortality, resulting from chronic hypertension and leading to complications such as left ventricular hypertrophy, heart failure, and ischemic heart disease. Lifestyle modifications, including dietary changes, physical activity, weight management, stress reduction, and smoking cessation, are essential non-pharmacological interventions that can effectively manage hypertension and prevent the progression to HHD. The DASH diet, reduced sodium intake, regular exercise, and weight loss have been shown to lower blood pressure and improve cardiovascular health. Additionally, stress management techniques like yoga, meditation, and cognitive-behavioral therapy contribute to better BP control. Smoking cessation provides immediate benefits, lowering both blood pressure and cardiovascular risk. This review evaluates the impact of these lifestyle modifications on hypertensive heart disease, highlighting their role in reducing blood pressure, preventing left ventricular hypertrophy, and improving heart function. While pharmacological treatments remain important, lifestyle changes should be prioritized as part of a comprehensive approach to managing hypertension and mitigating cardiovascular risks. Ongoing research is crucial for further understanding the long-term benefits of these interventions in individuals with hypertensive heart disease.

Keywords: Hypertensive heart disease, Hypertension, Lifestyle modifications, Blood pressure, Cardiovascular health, Lifestyle interventions

INTRODUCTION

Hypertensive heart disease (HHD) is a major contributor to global cardiovascular morbidity and mortality, linked directly to uncontrolled hypertension over prolonged periods. This condition encompasses a spectrum of heart diseases including left ventricular hypertrophy (LVH), heart failure (HF), and ischemic heart disease (IHD), all of which can arise from sustained high blood pressure (BP).[1] Hypertension affects an estimated 1.13 billion people globally, and its role as a primary risk factor for cardiovascular diseases (CVD) has been well-documented.[2] With the growing prevalence of

hypertension, particularly in low- and middle-income countries, addressing this condition through lifestyle modifications is becoming increasingly important in mitigating its cardiovascular consequences. The pathophysiological effects of hypertension on the heart are multifaceted, involving direct structural and functional changes to the heart and vasculature. These include the thickening of the left ventricular wall, increased afterload, and eventually, the progression to heart failure with preserved ejection fraction (HFpEF) or systolic dysfunction.[3] Given the chronic nature of hypertension, preventive strategies and therapeutic interventions are essential to manage the disease and prevent its escalation into hypertensive heart disease.

This review aims to evaluate the impact of various lifestyle modifications in the management of hypertensive heart disease, focusing on interventions such as dietary changes, physical activity, weight management, stress reduction, and smoking cessation. Through examining the available evidence, this paper will assess how effective these modifications are in controlling blood pressure and improving heart health in individuals with hypertension.

METHODS

This study is based on a comprehensive literature search conducted on December 4, 2024, in the Medline and Cochrane databases, utilizing the medical topic headings (MeSH) and a combination of all available related terms, according to the database. To prevent missing any possible research, a manual search for publications was conducted through Google Scholar, using the reference lists of the previously listed papers as a starting point. We looked for valuable information in papers that discussed evaluation of the impact of lifestyle modifications on hypertensive heart disease. There were no restrictions on date, language, participant age, or type of publication.

Table 1: Impact of lifestyle modifications on blood pressure reduction in hypertensive individuals.[16]

Lifestyle modification	Impact on systolic BP (mmHg)	Impact on diastolic BP (mmHg)	Additional Benefits
DASH diet	-5 to -10	-3 to -6	Improved heart health, reduced risk of heart failure, enhanced endothelial function
Reduced sodium intake	-2 to -8	-1 to -4	Reduced arterial stiffness, decreased risk of left ventricular hypertrophy
Regular physical activity	-5 to -7	-3 to -4	Improved cardiovascular fitness, weight management, reduced risk of stroke
Weight loss (5-10%)	-5 to -20	-3 to -10	Reduced strain on heart, improved insulin sensitivity, reduced risk of heart failure
Smoking cessation	-4 to -7	-2 to -4	Lower cardiovascular risk, improved vascular health

Table 2: Summary of lifestyle modifications for managing hypertensive heart disease.[8]

Lifestyle modification	Recommended strategy	Effect on hypertensive heart disease
Dietary changes	Follow DASH or Mediterranean diet, reduce sodium intake, increase potassium-rich foods	Reduces blood pressure, prevents left ventricular hypertrophy, improves heart health
Physical activity	Engage in at least 150 minutes of moderate-intensity aerobic exercise per week	Reduces blood pressure, enhances endothelial function, decreases risk of heart failure
Weight management	Achieve and maintain a healthy body weight through diet and exercise	Lowers blood pressure, reduces risk of cardiovascular events, prevents heart failure progression
Stress reduction	Practice yoga, meditation, or cognitive-behavioral therapy	Lowers blood pressure, improves heart function, reduces inflammation
Smoking cessation	Quit smoking and avoid second hand smoke exposure	Lowers blood pressure, reduces vascular damage, decreases heart disease risk

DISCUSSION

Hypertension places significant strain on the heart and vasculature. The increased systemic vascular resistance forces the heart to work harder to maintain adequate blood flow to organs and tissues. Over time, this leads to maladaptive changes in the myocardium. One of the earliest manifestations is left ventricular hypertrophy (LVH), which occurs due to the increased workload on the heart. LVH is a marker for increased cardiovascular risk, as it is associated with a higher incidence of heart failure, arrhythmias, and sudden cardiac death.[4]

Another common consequence of sustained hypertension is the development of heart failure. Hypertension can lead to both types of heart failure, heart failure with reduced ejection fraction (HFrEF) and heart failure with preserved ejection fraction (HFpEF).[5] HFpEF, in particular, is frequently seen in patients with long-standing hypertension and is characterized by impaired relaxation and diastolic dysfunction, where the heart becomes stiff and less able to fill with blood during the relaxation phase. Hypertension also increases the risk of coronary artery disease (CAD), which, when combined with other risk factors, can lead to ischemic heart disease.[6]

In addition to structural and functional heart changes, hypertension accelerates atherosclerosis and endothelial dysfunction.[7] High BP promotes vascular stiffness, which exacerbates the burden on the heart, contributing to the vicious cycle of hypertensive heart disease. This intricate relationship between hypertension and heart disease highlights the need for effective interventions to manage blood pressure and prevent further damage to the cardiovascular system.

The role of lifestyle modifications in managing hypertensive heart disease

Lifestyle modifications have become a cornerstone in the prevention and management of hypertension and its complications, including hypertensive heart disease.8 These non-pharmacological interventions can not only help lower blood pressure but also improve overall cardiovascular health. Below is an evaluation of various lifestyle modifications and their impact on hypertensive heart disease.

Dietary modifications

Dietary changes are among the most recommended lifestyle interventions for managing hypertension. The most well-known dietary approach for managing high blood pressure is the DASH (Dietary Approaches to Stop Hypertension) diet.[9]

This diet emphasizes the consumption of fruits, vegetables, whole grains, lean proteins, and low-fat dairy products while reducing the intake of saturated fats, refined sugars, and sodium. Numerous studies have shown that adherence to the DASH diet leads to significant reductions in both systolic and diastolic blood pressure, particularly in individuals with prehypertension or stage 1 hypertension.

A reduction in sodium intake is another key dietary modification in managing hypertension. High sodium consumption is linked to increased blood pressure and is a known contributor to the development of hypertensive heart disease. The American heart association (AHA) recommends reducing sodium intake to less than 2,300 milligrams per day, with an ideal limit of 1,500 milligrams per day, particularly for individuals with hypertension or cardiovascular risk factors.[10]

Evidence supports that reducing sodium intake results in a modest but consistent reduction in BP, which, in turn, reduces the strain on the heart and minimizes the risk of LVH and other cardiovascular complications. The inclusion of potassium-rich foods in the diet is also beneficial. Potassium has been shown to counteract the effects of sodium and lower blood pressure.[11] Foods such as bananas, leafy greens, and potatoes are rich in potassium and can be included as part of a heart-healthy diet. Additionally, the Mediterranean diet, which is high in monounsaturated fats (from olive oil), omega-3 fatty acids (from fish), and antioxidants (from fruits and vegetables), has been associated with improved blood pressure control and reduced cardiovascular events.

Physical activity

Regular physical activity is one of the most effective lifestyle interventions for reducing blood pressure and improving cardiovascular health.[12] Aerobic exercise, in particular, is beneficial for lowering systolic and diastolic blood pressure in individuals with hypertension. Studies have shown that moderate-intensity aerobic exercise, such as brisk walking, cycling, or swimming, can reduce BP by approximately 5-7 mmHg in hypertensive individuals. In addition to BP reduction, regular exercise helps improve endothelial function, reduce arterial stiffness, and decrease the risk of LVH and heart failure.

Resistance training, although less studied in the context of hypertension, has also been shown to contribute to BP control when combined with aerobic exercise. The American college of sports medicine (ACSM) recommends at least 150 minutes of moderate-intensity aerobic exercise per week, alongside muscle-strengthening activities at least two days per week, to manage hypertension.[13]

Physical activity helps manage body weight, improves insulin sensitivity, and reduces systemic inflammation, all of which are important factors in the management of hypertensive heart disease. Additionally, exercise enhances circulation, increases heart efficiency, and helps reduce stress levels, all of which can alleviate the cardiovascular burden associated with hypertension.

Weight management

Obesity is a significant risk factor for the development of hypertension and hypertensive heart disease. Excess body fat, particularly visceral fat, leads to increased sympathetic nervous system activity, insulin resistance, and a pro-inflammatory state, all of which contribute to elevated blood pressure and heart damage.[14] Weight loss through a combination of dietary changes and increased physical activity has been shown to result in significant reductions in blood pressure, with studies demonstrating that even a modest weight loss of 5-10% can lead to meaningful improvements in BP control.

For individuals with obesity-related hypertension, weight loss not only lowers blood pressure but also reduces the risk of developing LVH, heart failure, and other cardiovascular complications.[15] In some cases, weight loss alone may be sufficient to control blood pressure without the need for pharmacological intervention, particularly in individuals with early-stage hypertension.

Stress reduction and behavioral modifications

Chronic stress is a well-established contributor to the development of hypertension and cardiovascular disease. Stress activates the sympathetic nervous system, leading to increased heart rate, vasoconstriction, and elevated blood pressure.[17] Furthermore, stress is often associated with unhealthy coping mechanisms, such as poor dietary habits, lack of exercise, and smoking, which exacerbate the risk of hypertensive heart disease.

Mind-body interventions such as yoga, meditation, and mindfulness-based stress reduction (MBSR) have been shown to lower blood pressure and improve heart health. These techniques promote relaxation, reduce sympathetic nervous system activity, and improve overall mental well-being. Research suggests that regular practice of yoga or meditation can lead to reductions in both systolic and diastolic blood pressure, with some studies reporting sustained benefits even after the cessation of the intervention.[18]

Cognitive-behavioral therapy (CBT) has also been effective in helping individuals manage stress and adopt healthier lifestyle behaviors. CBT can address negative thought patterns, improve coping strategies, and promote adherence to lifestyle modifications, ultimately leading to better blood pressure control.[19]

Smoking cessation

Smoking is a well-known risk factor for both hypertension and cardiovascular disease. The toxic chemicals in cigarette smoke contribute to endothelial dysfunction, increased arterial stiffness, and elevated blood pressure.[20] Moreover, smoking exacerbates the effects of hypertension by promoting atherosclerosis and increasing the risk of heart attack and stroke.

Quitting smoking has immediate and long-term benefits for individuals with hypertension. Within a few months of cessation, blood pressure tends to decrease, and the risk of cardiovascular events is significantly reduced. Smoking cessation, combined with other lifestyle modifications, can play a crucial role in preventing the progression of hypertensive heart disease.

CONCLUSION

Hypertensive heart disease remains a leading cause of morbidity and mortality worldwide. Lifestyle modifications, including dietary changes, physical activity, weight management, stress reduction, and smoking cessation, are critical in the prevention and management of hypertension and its cardiovascular complications. These interventions not only help lower blood pressure but also improve overall cardiovascular health, reduce the risk of left ventricular hypertrophy, and prevent the progression to heart failure and ischemic heart disease.

While pharmacological treatments remain important in the management of hypertension, lifestyle modifications should be considered as first-line interventions due to their proven efficacy and minimal side effects. Healthcare providers should encourage patients to adopt these healthy habits as part of a comprehensive strategy to manage hypertension and reduce the burden of hypertensive heart disease. Continued research into the long-term benefits of lifestyle changes and their impact on hypertensive heart disease will be crucial in shaping future treatment guidelines and improving patient outcomes.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Huang X, Hu L, Long Z, Wang X, Wu J, Cai J. Hypertensive heart disease: mechanisms, diagnosis and treatment. Rev Cardiovas Med. 2024;25(3):93.
2. Sy RG, Llanes EJB, Punzalan FER, Aherrera JAM, Cheng PVCY. Epidemiology of hypertension in asia. in: hypertension and cardiovascular disease in Asia. Springer; 2022: 1-21.
3. Hall JE, Omoto AC, Wang Z, Mouton A, Li X, Hall ME. Pathophysiology of hypertension. In: Hypertension. Elsevier; 2024: 71-86.
4. Yildiz M, Oktay AA, Stewart MH, Milani RV, Ventura HO, Lavie CJ. Left ventricular hypertrophy and hypertension. Progr Cardiovas Dis. 2020;63(1):10-21.
5. Redfield MM, Borlaug BA. Heart failure with preserved ejection fraction: a review. JAMA. 2023;329(10):827-38.
6. Weber T, Lang I, Zweiker R. Hypertension and coronary artery disease: epidemiology, physiology,

effects of treatment, and recommendations: A joint scientific statement from the Austrian Society of Cardiology and the Austrian Society of Hypertension. Wiener Klinische Wochenschrift. 2016;128:467-79.
7. Brandes RP. Endothelial dysfunction and hypertension. Hypertension. 2014;64(5):924-8.
8. Alsinani TS, Abdullah AA, Alghamdi TA. Lifestyle modifications for hypertension management. The Egyptian J Hospital Med. 2018;70(12):2152-6.
9. Moore TJ, Conlin PR, Ard J, Svetkey LP, Group DCR. DASH (Dietary Approaches to Stop Hypertension) diet is effective treatment for stage 1 isolated systolic hypertension. Hypertension. 2001;38(2):155-158.
10. Oria M, Yaktine AL, Strom BL. Sodium intake in populations: assessment of evidence. 2013.
11. Houston MC. The importance of potassium in managing hypertension. Current hypertension reports. 2011;13(4):309-317.
12. Diaz KM, Shimbo D. Physical activity and the prevention of hypertension. Current hypertension reports. 2013;15:659-668.
13. Maruhashi T, Higashi Y. Combining muscle strengthening activity and aerobic exercise: a prescription for better health in patients with hypertension. Hyper Res. 2024;47(11):3082-4.
14. Majane OHI. Impact of excess adiposity on blood pressure and cardiovascular target organ damage, University of the Witwatersrand; 2009. Available at: https://wiredspace.wits.ac. Accessed on 21 August 2024.
15. Shams E, Kamalumpundi V, Peterson J, Gismondi RA, Oigman W, de Gusmão Correia ML. Highlights of mechanisms and treatment of obesity-related hypertension. J Human Hypert. 2022;36(9):785-93.
16. Svetkey L, Erlinger T, Vollmer W, et al. Effect of lifestyle modifications on blood pressure by race, sex, hypertension status, and age. J Human Hypert. 2005;19(1):21-31.
17. Linden W, Moseley JV. The efficacy of behavioral treatments for hypertension. Applied Psychophysiol and Biofeedback. 2006;31:51-63.
18. Pascoe MC, Thompson DR, Ski CF. Yoga, mindfulness-based stress reduction and stress-related physiological measures: A meta-analysis. Psychoneuroendocrinol. 2017;86:152-68.
19. Walker MS, Figueiredo NR, de Lara Machado W, Costa CA, Feoli AMP. Cognitive-behavioral therapy for treating hypertension: a systematic review and meta-analysis. Psychol, Heal & Med. 2024;29(3):411-26.
20. Virdis A, Giannarelli C, Fritsch Neves M, Taddei S, Ghiadoni L. Cigarette smoking and hypertension. Curr Pharma Des. 2010;16(23):2518-25.

Cite this article as: Baoum SO, Anbarserri FM, Alhassan SE, Hani HFA, Almutairi FN, Sulayman ML, et al. Evaluating the impact of lifestyle modifications on hypertensive heart disease. Int J Community Med Public Health 2025;12:565-9.