



HYPERTENSION AND CARDIOVASCULAR RISK: A GLOBAL HEALTH CHALLENGE THAT OFTEN GOES UNNOTICED

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Abstract Raised arterial pressure is among the most influential modifiable causes of cardiovascular illness and death. Many people with high blood pressure feel well, so the condition can remain unrecognised for years while silently harming the heart, blood vessels, brain, kidneys, and other organs. Long-term elevation of blood pressure places continuous strain on the circulation, leading to impaired endothelial function, structural changes in arteries, atherosclerotic plaque development, and damage to target organs. As a result, hypertension raises the likelihood of coronary heart disease, myocardial infarction, heart failure, stroke, atrial fibrillation, and chronic kidney disease. The worldwide impact is enormous: the World Health Organization estimates that about 1.4 billion adults aged 30–79 years were living with hypertension in 2024, and many were either unaware of their diagnosis or had insufficient blood pressure control. (World Health Organization) Good management depends on correct measurement, early recognition, evaluation of total cardiovascular risk, healthy lifestyle changes, and drug treatment when needed. Modern international guidelines increasingly base decisions on overall cardiovascular risk rather than on blood pressure numbers alone. (Escardio) This review discusses the link between hypertension and cardiovascular risk and stresses the value of prevention, timely diagnosis, and sustained blood pressure control.

Keywords: Hypertension; blood pressure; cardiovascular disease; cardiovascular risk; coronary artery disease; heart failure; stroke; prevention; lifestyle modification; antihypertensive therapy.

Background

Hypertension is a long-term medical disorder in which pressure inside the arteries remains abnormally high. Blood pressure is produced by the relationship between the amount of blood the heart pumps and the resistance encountered in the blood vessels. It is regulated by complex interactions involving the nervous system, hormones, kidneys, and blood vessel walls. When pressure stays elevated, the heart and vessels are forced to work under persistent mechanical load.

Hypertension is often called a silent condition because it frequently causes no obvious symptoms. However, feeling normal does not mean that harm is not occurring. WHO estimates that 1.4 billion adults between 30 and 79 years of age had hypertension in 2024, and roughly 44% did not know they had it. (World Health Organization)

Cardiovascular disease remains the leading cause of death worldwide. WHO estimated that cardiovascular diseases caused about 19.8 million deaths in 2022, with heart attacks and strokes making up most of these deaths. (World Health Organization) Hypertension is a major modifiable factor behind this global burden.

For this reason, hypertension should not be understood only as a number recorded during a clinic visit. Persistent high pressure can set off or speed up changes in the heart and blood vessels that eventually lead to serious cardiovascular disease.

Purpose and Objectives

The purpose of this review is to examine how hypertension relates to cardiovascular risk and to discuss the mechanisms, main complications, risk factors, and preventive approaches that matter for cardiovascular health.

Objectives

1. To describe the worldwide burden of hypertension.
2. To explain how long-standing high blood pressure damages the cardiovascular system.
3. To identify the major cardiovascular complications linked with hypertension.

4. To discuss modifiable and non-modifiable risk factors.
5. To highlight the value of early detection and regular blood pressure monitoring.
6. To describe lifestyle and pharmacological approaches that reduce cardiovascular risk.

Approach and Sources

This paper was written as a narrative review based on current guidance and authoritative publications about hypertension and cardiovascular disease. The main sources were the World Health Organization, the European Society of Cardiology, and the American Heart Association/American College of Cardiology. Current recommendations and epidemiological data were reviewed and combined into an original discussion focused on hypertension-related cardiovascular risk, prevention, and management.

Worldwide Impact

Hypertension is a major global health problem. According to WHO, about 1.4 billion adults aged 30–79 years had hypertension in 2024, which is approximately one-third of people in that age range. Around two-thirds of affected adults live in low- and middle-income countries. (World Health Organization)

The problem is not only how many people have hypertension. Detection and control are also serious concerns. Many people do not know their blood pressure is high, while others know they have hypertension but do not achieve adequate control.

This means that a long period can pass during which high blood pressure quietly damages blood vessels and the heart without causing clear symptoms.

The growing frequency of cardiovascular risk factors—such as obesity, low physical activity, poor diet, and high salt intake—also explains why preventing and controlling hypertension remains so important. (World Health Organization)

Pathways of Cardiovascular Injury

The effects of hypertension on the cardiovascular system usually develop slowly.

Endothelial dysfunction

Constant mechanical pressure on artery walls can disturb the normal function of the endothelium. This inner lining helps regulate vascular tone, inflammation, blood clotting, and vascular stability. When it works poorly, conditions that favour vascular disease can develop.

Arterial remodelling

Long-standing hypertension causes structural changes in the walls of arteries. Arteries may become stiffer, which can raise systolic pressure further. This creates a cycle in which high pressure damages vessels, and stiff vessels help keep blood pressure high.

Left ventricular hypertrophy

The left ventricle must pump with greater force to push blood against increased resistance in the circulation. Over time, this extra workload can cause the heart muscle to thicken.

At first, this thickening may help the heart maintain output. With continuing pressure overload, however, the ventricle can become stiff and less able to fill properly during diastole.

Atherosclerosis

Hypertension injures blood vessels and interacts with other cardiovascular risk factors, including abnormal cholesterol levels, diabetes, and smoking. When these factors occur together, atherosclerotic disease can progress faster.

The results may include coronary artery disease, myocardial infarction, and cerebrovascular disease.

Clinical Consequences

Coronary artery disease

Hypertension helps start and worsen coronary artery disease. Increased vascular stress, endothelial dysfunction, and interaction with other risk factors can encourage atherosclerotic plaques to form.

When the heart muscle does not receive enough blood, angina may occur. If a plaque ruptures and a clot forms, acute myocardial infarction can follow.

Heart failure

Prolonged pressure overload can change both the structure and function of the heart. Left ventricular hypertrophy and poor relaxation may first cause mainly diastolic dysfunction. Over time, ongoing injury and remodelling can lead to symptomatic heart failure.

Therefore, hypertension can contribute to heart failure even before obvious symptoms appear.

Stroke

Hypertension is a major risk factor for both ischaemic and haemorrhagic stroke. Chronic vascular damage can lead to atherosclerosis and small-vessel disease, while severe arterial injury can increase the chance of bleeding inside the brain.

WHO identifies untreated hypertension as an important cause of cardiovascular and cerebrovascular complications. (World Health Organization)

Atrial fibrillation

The structural remodelling caused by hypertension can make the atria enlarge and become electrically unstable. This can make atrial fibrillation more likely.

Atrial fibrillation matters clinically because it increases the risk of thromboembolic stroke.

Chronic kidney disease

The relationship between hypertension and kidney disease works in both directions. Persistently high blood pressure can damage the renal blood vessels and reduce kidney function, while kidney disease can cause or worsen hypertension.

Because of this, checking kidney function is an important part of cardiovascular risk assessment.

Contributing Factors

Hypertension and cardiovascular disease result from a mix of non-modifiable and modifiable factors.

Non-modifiable factors

- Older age
- Family history
- Genetic susceptibility
- Certain underlying medical conditions

Modifiable factors

- High dietary salt
- Poor dietary habits
- Overweight and obesity
- Lack of physical activity
- Tobacco exposure
- Harmful alcohol use
- Poorly controlled diabetes
- Abnormal blood lipids
- Long-term exposure to some environmental risk factors

WHO lists unhealthy diet, physical inactivity, tobacco use, harmful alcohol consumption, and overweight or obesity as important modifiable contributors to hypertension. (World Health Organization)

When several risk factors are present at the same time, overall cardiovascular risk can rise substantially. Hypertension should therefore not be assessed by itself.

Detection and Measurement

Correct blood pressure measurement is essential because poor technique can lead to the wrong diagnosis.

Repeated readings are usually needed when confirming persistent hypertension. Measurements taken outside the clinic, such as home or ambulatory monitoring, can provide extra information and may reveal differences between clinic blood pressure and everyday blood pressure.

The 2024 ESC guideline gives greater attention to out-of-office blood pressure assessment, while current American guidance also stresses accurate measurement and home monitoring as parts of effective hypertension care. (Escardio)

For this reason, a diagnosis should not be made casually from a single high reading unless the clinical situation requires immediate evaluation.

Preventive Lifestyle Approaches

Lifestyle changes are a central part of reducing cardiovascular risk.

Healthy eating

A diet rich in vegetables, fruits, and other nutrient-dense foods, with less excess salt and unhealthy fat, can help control blood pressure and support cardiovascular health.

Physical activity

Regular activity can improve blood pressure, body weight, and general cardiovascular fitness.

Weight control

Keeping a healthy body weight matters because overweight and obesity are linked with higher risk of hypertension and cardiovascular disease.

Avoiding tobacco

Tobacco use raises cardiovascular risk through vascular injury and other mechanisms. Avoiding tobacco is therefore an important part of cardiovascular prevention.

Reducing harmful alcohol use

Drinking too much alcohol can contribute to higher blood pressure and greater cardiovascular risk.

Regular blood pressure checks

Because hypertension may cause no symptoms, checking blood pressure regularly is essential for early detection.

These measures should not be seen as short-term fixes. Long-term commitment is needed to keep cardiovascular benefits.

Why Early Recognition Matters

The silent nature of hypertension creates a major challenge. A person may feel completely well while vascular and cardiac changes are already progressing.

Early detection allows treatment to begin before irreversible complications develop.

A useful public health pathway is:

Screen → Confirm → Assess cardiovascular risk → Change lifestyle → Treat when indicated → Monitor → Maintain control

This process needs effort from patients, healthcare professionals, and health systems.

WHO's 2025 Global Report on Hypertension calls for scaling up detection, treatment, and control, especially through primary healthcare, and stresses reliable access to quality-assured medicines and validated blood pressure devices. (World Health Organization)

Discussion

Hypertension is more than an isolated blood pressure abnormality. It is a major driver of cardiovascular disease through vascular injury, increased cardiac workload, arterial remodelling, and interaction with other risk factors.

Its importance is made greater by its often symptomless course. A person can remain unaware of high blood pressure for years while cardiovascular damage slowly accumulates.

The global scale of the problem shows why prevention and early detection matter. The estimated 1.4 billion adults living with hypertension in 2024

demonstrate that hypertension is not only an individual clinical issue but also a major public health challenge. (World Health Organization)

Current guidelines increasingly support risk-based management. The 2024 ESC guideline highlights the continuous relationship between blood pressure and cardiovascular risk, while the 2025 AHA/ACC guideline emphasises cardiovascular risk assessment together with accurate measurement and appropriate treatment. (Escardio)

Effective control therefore requires more than writing a prescription. Healthy eating, physical activity, avoiding tobacco, weight management, accurate blood pressure measurement, suitable drug therapy, and long-term follow-up must all work together.

For medical students and future doctors, understanding hypertension is especially important because its management brings together physiology, pathology, pharmacology, preventive medicine, and clinical cardiology.

Conclusion

Hypertension is one of the most important modifiable factors affecting cardiovascular health and remains a major global burden. Part of its danger comes from its silent progression: serious cardiovascular and target-organ damage may occur before the patient knows they have the condition.

Persistent high blood pressure contributes to endothelial dysfunction, arterial remodelling, left ventricular hypertrophy, and atherosclerotic disease, raising the risk of coronary artery disease, myocardial infarction, heart failure, atrial fibrillation, stroke, and kidney disease.

Preventing these complications depends on early detection, accurate blood pressure assessment, evaluation of overall cardiovascular risk, healthy lifestyle practices, and appropriate drug treatment when needed.

Hypertension should therefore be seen not merely as a number on a blood pressure device, but as a long-term cardiovascular risk that can be modified through timely and sustained action.

Early detection, effective control, and continuous prevention can turn hypertension from a silent cardiovascular threat into a manageable condition.

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