



REVIEW ARTICLE ON WORLDWIDE PREVALENCE OF HYPERTENSION

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ABSTRACT

Hypertension, commonly known as high blood pressure, is a significant public health issue globally, affecting millions of individuals and contributing to severe cardiovascular diseases and mortality. This review article examines the worldwide prevalence of hypertension, differentiates between its various types, and highlights the critical aspects of awareness and control. We delve into the risk factors associated with hypertension, its symptoms and signs, and the methods employed for its diagnosis and screening. Furthermore, we explore the current treatment options available, including lifestyle modifications and pharmacological interventions. By providing a comprehensive overview of hypertension, this article aims to enhance understanding and management of this pervasive condition, ultimately contributing to improved public health outcomes.

Key Words: Hypertension, Global Prevalence, Cardiovascular Diseases, Blood Pressure, Risk Factors, Diagnosis

INTRODUCTION

Higher blood pressure (BP) level has been the main reason for death across the world, with an estimated 10 million deaths a year. In 2010, a study was conducted to estimate the statistical viewpoint of hypertension which found out that globally almost one and a half billion people were suffering from hypertension at that time with 517,000 people in the United States passing away from hypertension in 2019 (Zhou *et al.* 2017).

Hypertension (HTN) is a major risk factor for cardiovascular disease (CVD), which is the leading cause of morbidity and mortality worldwide. One billion of the world's population has HTN, resulting in four million deaths per year. In fact, HTN is the third leading cause of death in the world, and is responsible for one in every eight deaths worldwide, with a mortality rate of 13% (World Health Organization, 2004). In addition, it is estimated that one-third of the

world's population (1.5 billion people) will have HTN by 2025 as a result of aging and increased obesity (Libby and Braunwald, 2008). The prevalence of HTN is increasing, despite effective drug therapy and lifestyle modification programs that target hypertensive patients. Uncontrolled blood pressure (BP) can lead to coronary heart disease, congestive heart failure, stroke, and renal failure (Lakhani *et al.*, 2016).

In an analysis of worldwide data for the global burden of HTN, 20.6% of Indian men and 20.9% of Indian women were suffering from HTN in 2005 (Kearney *et al.*, 2005). The rates for HTN in percentage are projected to go up to 22.9 and 23.6 for Indian men and women, respectively by 2025. Recent studies from India have shown the prevalence of HTN to be 25% in urban and 10% in rural people in India (Thankappan *et al.*, 2006). According to the WHO 2008 estimates, the prevalence of raised BP in Indians was 32.5%

(33.2% in men and 31.7% in women). However, only about 25.6% of treated patients had their BP under control, in a multicenter study from India on awareness, treatment, and adequacy of control of HTN (Hypertension Study Group, 2001).

Hypertension

High blood pressure, often known as hypertension, frequently goes unnoticed but can increase the risk of heart disease, stroke, and other grave illnesses. Hypertension can be controlled with medication and lifestyle modifications. Blood pressure is the force exerted by a person's blood on the walls of their blood vessels. This pressure is determined by blood vascular resistance and the amount of work the heart must accomplish. This pressure is determined by blood vascular resistance and the amount of work the heart must accomplish. This pressure may increase due to various medical disorders, drugs, and health issues. Blood pressure that is routinely more than 140 over 90 millimeters of mercury (mm Hg) is referred to be hypertension. The 130 mm Hg systolic value denotes the pressure experienced as the heart circulates blood throughout the body. The 80 mm Hg diastolic reading represents the pressure experienced as the heart relaxes and fills with blood (Roerecke *et al.*, 2019; Pan *et al.*, 2020).

Types of Hypertensions

Hypertension, or high blood pressure, can be classified into two main types based on the underlying cause of the condition (Imam *et al.*, 2023):

1. Primary (essential) hypertension: This is the most common type of hypertension, also known as essential hypertension. Primary hypertension develops gradually over time

and has no identifiable cause. It is often related to lifestyle factors such as obesity, a diet high in salt and saturated fats, physical inactivity, and stress

2. Secondary hypertension: This type of hypertension is caused by an underlying medical condition such as kidney disease, adrenal gland disorders, thyroid problems, or obstructive sleep apnea. Treatment of the underlying condition may help to lower blood pressure (Hegde *et al.*, 2023).

Prevalence, awareness, and control

The overall crude prevalence of HTN (BP 140/90 mmHg and/or use of antihypertensive medication) reported in 11 studies (n = 45,379) was 29.5%. Two studies used a higher cut-off point of HTN as BP 160/95 mmHg (n = 1502) and reported a lower prevalence of HTN prevalence compared to the other studies (n = 43 877, 17.9% vs 29.9%). No study reported an incidence of HTN in Arab countries. HTN prevalence varied widely between and within countries. Between countries, the prevalence of HTN ranged from 16.3% in Jordan (BP 160/95 mmHg) to 44% in Algeria (Jaddou *et al.*, 2000), while within countries, the prevalence varied from 35.3% to 44% in Algeria (Temmar *et al.*, 2007). For national studies, HTN prevalence ranged from 25.2% (Oman) to 39.6% (Morocco) (Al Riyami and Afifi, 2003).

Only five studies reported the level of HTN awareness (Ibrahim *et al.*, 1995; Ghannem and Fredj, 1997). In four studies, almost two-thirds of participants with detected HTN were unaware of their high BP (not diagnosed with HTN), ranging from 62.5% in Egypt to 79.8% in Syria. Even though one study conducted in Jordan reported that most hypertensive

patients (82%) were aware of their diagnosis (Jaddou *et al.*, 2000), more than two-thirds of hypertensive patients did not achieve controlled BP. This rate of uncontrolled HTN is similar to the findings of other studies in Arab countries, where uncontrolled rates ranged from 56% (Tunisia) to 92% (Egypt and Syria) (Tazi *et al.*, 2003; Bener *et al.*, 2004). However, none of these studies accounts for the lower BP control for diabetic individuals (< 130/90 mmHg).

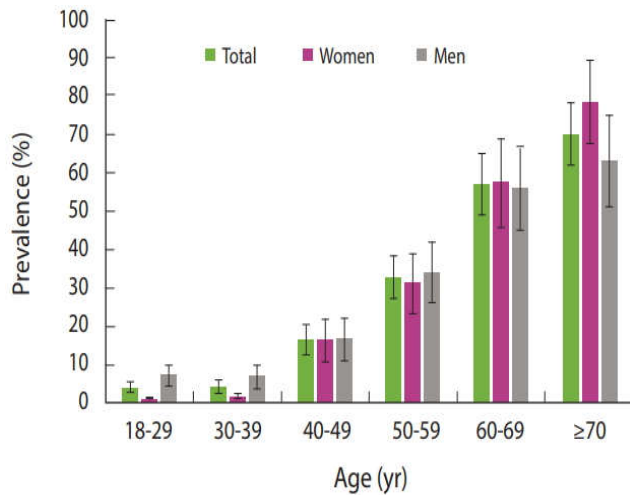


Figure 1: Hypertension prevalence in different age (yr)

Risk element

The risk of hypertension is influenced by several factors (Mills *et al.*, 2020; Noordegraaf *et al.*, 2016).

Age: People above the age of 65 are more likely to have hypertension. As the blood vessels harden and narrow as we age because of plaque formation, blood pressure may gradually rise.

Ethnicity: Some ethnic groups are predisposed to hypertension more than others. African Americans are more in danger than other ethnic groups.

Weight: Obesity is a leading cause of hypertension.

Tobacco and alcohol use: Consuming high amounts of alcohol or smoking on a regular basis might raise blood pressure.

Sex: Males have a larger risk of acquiring hypertension than females, according to a 2018 analysis. However, this is only true until women approach menopause.

Existing medical conditions: Hypertension can be caused by cardiovascular disease, diabetes, chronic renal disease, and excessive cholesterol levels, especially as people age.

Complications of uncontrolled hypertension: Uncontrolled hypertension, commonly known as high blood pressure, can lead to a number of health problems throughout the body. The following are some of the most prevalent complications of uncontrolled hypertension:

Cardiovascular illness: Hypertension is a substantial risk factor for cardiovascular disease, stroke, and other conditions. Blood pressure that remains elevated for an extended period of time can damage the arteries that carry blood to the heart and brain, resulting in illnesses such as coronary artery disease, heart attack, and stroke.

Kidney failure: Uncontrolled hypertension can harm the filtration mechanism of the kidneys, resulting in chronic kidney disease and kidney failure.

Eye injury: High blood pressure can damage the microscopic blood vessels in the eyes, resulting in retinopathy, vision loss, and even blindness.

Peripheral arterial disease (PAD): Elevated blood pressure can induce arterial narrowing in the legs and arms, resulting in peripheral

artery disease, which can cause pain, numbness, and paralysis in the limbs.

Sexual impotence: Erectile dysfunction in men and diminished libido in women can be caused by hypertension.

Impaired cognition: Uncontrolled high blood pressure has been linked to cognitive impairment and an increased risk of dementia.

Symptoms and Signs of Hypertension

Hypertension is usually asymptomatic until complications develop in target organs. Dizziness, facial flushing, headache, fatigue, epistaxis, and nervousness are not caused by uncomplicated hypertension (Goodhart, 2016). Severe hypertension (typically defined as systolic blood pressure ≥ 180 mm Hg and/or diastolic blood pressure ≥ 120 mm Hg) can be asymptomatic (hypertensive urgency). When severe hypertension causes severe cardiovascular, neurologic, renal, and retinal symptoms (eg, symptomatic coronary atherosclerosis, heart failure, hypertensive encephalopathy, renal failure), it is referred to as a hypertensive emergency.

Retinal changes may include arteriolar narrowing, hemorrhages, exudates, and, in patients with encephalopathy, papilledema (hypertensive retinopathy) (Adnan *et al.*, 2018). Changes are classified (according to the Keith, Wagener, and Barker classification) into 4 groups with increasingly worse prognosis:

- Grade 1: Constriction of arterioles only
- Grade 2: Constriction and sclerosis of arterioles
- Grade 3: Hemorrhages and exudates in addition to vascular changes
- Grade 4: Papilledema

Diagnosis and screening

Essential or primary hypertension is usually asymptomatic; thus, in clinical practice all adults should have their BP measured at regular office visits. Hypertension is most commonly diagnosed based on repeated BP measurements in a clinical office setting. Accurate measurement and recording of BP is essential to categorize the level of BP, ascertain BP-related CVD risk and guide management. Since 2010, methods to measure out-of-office BP have been increasingly introduced to guide diagnosis and treatment of hypertension. These include home BP monitoring (HBPM) and ambulatory BP monitoring (ABPM) (Patel and Barman, 2021).

Additional tests, such as 24-hour blood pressure monitoring or ambulatory blood pressure monitoring, may be used to confirm the diagnosis. Wearing a device that measures blood pressure at regular intervals throughout the day and night is required for these tests (Charles *et al.*, 2017). Additional tests, such as blood tests to check for kidney or thyroid problems, or imaging tests to check for abnormalities in the heart or blood vessels, may be required in some cases to determine the underlying cause of hypertension (Gabb *et al.*, 2016).

Treatment for hypertension may include lifestyle changes as well as drugs. Dietary changes, regular exercise, weight loss, restricting alcohol use, and stress reduction are examples of lifestyle improvements. Diuretics, ACE inhibitors, betablockers, calcium channel blockers, and other medications as suggested by a healthcare provider may be prescribed to reduce blood pressure (Jordan *et al.*, 2018).

Table 1: Hypertension diagnosis

Blood Pressure Category	Systolic (mmHg)	Diastolic (mmHg)
Optimal blood pressure	Less than 120	Less than 80
Normal	120-129	80-84
Prehypertension	130-139	85-89
High blood pressure (stage 1 hypertension)	140-159	90-99
High blood pressure (stage 2 hypertension)	160-179	100-109
High blood pressure (stage 3 hypertension)	Higher than 180	Higher than 110

Treatment

Beta-blocker is one of a drug used to reduce hypertension. It works by making our heart beat more slowly and with less force, thereby reducing blood pressure. But they are found to be less effective than other treatments. Calcium channel blockers are very helpful because they keep calcium from entering the muscle cells of the heart and blood vessels. This method widens the arteries and reduces the blood pressure (Nandhini, 2014).

Drugs used in hypertension:

In the previous 60 years, antihypertensive medication therapy has advanced dramatically. Throughout this time span, various drug classes have gained importance. The drugs used in the treatment of hypertension are mentioned below (Davis and Oparil, 2018; Ojha et al., 2022).

i. Diuretics

Thiazides: Hydrochlorothiazide, Chlorthalidone, Indapamide.

High ceiling: Furosemide.

K+ Sparing: Spironolactone, Amiloride.

ii. Inhibitor of ACEC: captopril, Enalapril, Lisinopril, Perindopril, Ramipril, are examples of ACE inhibitors.

iii. Angiotensin (AT1 receptor) blockers: Losartan, Candesartan, Valsartan, Telmisartan.

iv. Direct renin inhibitor: Aliskiren

v. Calcium channel blockers

Phenyl alkylamine: Verapamil

Benzothiazepine: Diltiazem

Dihydropyridines: Nifedipine, Felodipine, Amlodipine, Nitrendipine, Lacidipine.

vi. Sympathetic inhibitors: β - adrenergic blocker: Propranolol, Metoprolol, Atenolol

$\alpha + \beta$ adrenergic blocker: Labetalol, Carvedilol
 α - adrenergic blocker: Prazosin, Terazosin, Doxazosin, Phentolamine

Central sympatholytic: Clonidine, Methyldopa

vii. Vasodilators: Arteriolar dilator: Hydralazine, Minoxidil

Arteriolar + Venodilator: Nitroprussidesodium

CONCLUSION

Hypertension is the leading preventable cause of illness and premature death worldwide and as the population ages, more and more people get hypertension. Current efforts are aimed at detecting and treating hypertension in middle and elderly age. Because the prevalence of hypertension rises linearly with age, measures to prevent hypertension, such as a healthy diet and regular physical activity, should begin early in life. Early detection and treatment of hypertension is critical for individuals who have already developed it. Because existing antihypertensive drugs are not ideal on their own, a combination of drugs is required in a large proportion of patients.

DECLARATION OF INTEREST

The authors declare no conflicts of interests. The authors alone are responsible for the content and writing of this article.

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