# Epidemiological Study of Patients Suffering from Hypertension

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***Abstract*—Hypertension is one of the most prevalent non-communicable diseases worldwide and one of the major causes of cardiovascular diseases, stroke, and renal failure. However, a large number of people either remain undiagnosed or are poorly treated, particularly in developing countries like India, where effective therapies are available. The review throws light on the global and national burden of hypertension, epidemiological determinants, complications, and management strategies with emphasis on chlorthalidone as a preferred therapeutic option. Real-world case studies of a few patients also illustrate the clinical variation and day-to-day practical challenges in the management of hypertensive patients in hospital settings. Early diagnosis, efficient treatment, and lifestyle modification have to be complemented with patient compliance and health awareness for a reduction in the impact of hypertension on global health.***

***Index Terms*—Hypertension, Blood Pressure, Epidemiology, Chlorthalidone, Public Health.***

## I. INTRODUCTION

India and other middle-income countries face an increasing burden of non-communicable diseases, alongside the challenge of infectious disorders. Of these, hypertension is considered the foremost preventable cause of cardiovascular disease and early death. It is estimated that 1.3 billion adults aged 30-79 years have hypertension worldwide; awareness and control rates remain very low. Less than half of those affected are diagnosed, while less than 25% achieve adequate blood pressure control.

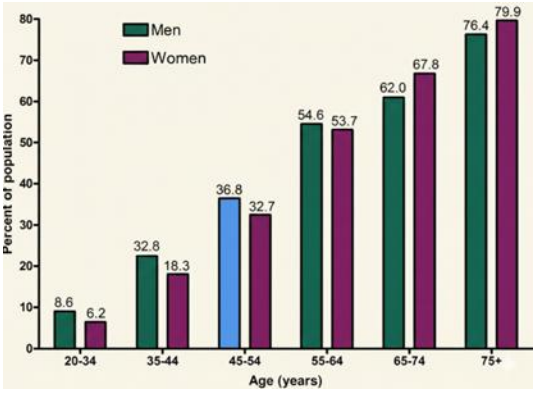
Limited screening, poor access to care, and a lack of sustained adherence to medication compound the problem in low-income settings. Uncontrolled hypertension culminates in devastating complications such as heart failure, stroke, and chronic kidney disease, causing over 9 million deaths every year. South Asian nations, especially India and Pakistan, have also been reporting rapid increases in prevalence during the last three decades due to factors such as sedentary lifestyles, high salt intake, urban stress, and an aging population.

## II. EPIDEMIOLOGY

Hypertension is a condition in which arterial blood pressure is consistently high, traditionally considered at or above 140/90 mmHg. Most recent guidelines, however, classify even 130/80 mmHg or above as hypertensive. One in three adults worldwide is affected, and the likelihood increases notably with increasing age.

The contributory factors for the development of hypertension include excess salt intake, obesity, physical inactivity, smoking, alcohol consumption, and genetic predisposition. Sedentariness of lifestyle, shifting dietary patterns, and increased levels of stress associated with rapid urbanization have accentuated this problem in India. Less than half of those affected are aware of their condition, according to epidemiological studies, and suboptimal adherence to therapy remains a problem, especially among males and younger adults.

Though usually asymptomatic, hypertension causes widespread damage and is responsible for nearly 50% of cases of ischemic heart disease and about two-thirds of strokes. Community-based prevention programs are essential to reduce this growing health hazard; these can be based on lifestyle modification, dietary adjustment, and regular blood pressure evaluation.




## III. DEFINITION

Hypertension is a chronic condition characterized by arterial pressure that is persistently raised beyond normal physiological limits.

A person is diagnosed as hypertensive if the systolic pressure ≥ 130 mmHg or if the diastolic pressure ≥ 80 mmHg, on two or more separate readings.

## IV. TYPES OF HYPERTENSION

1. Primary (Essential) Hypertension –Accounts for nearly 90% of all cases; arises from multiple genetic and lifestyle interactions without a single identifiable cause.
2. Secondary Hypertension – It is developed from other medical problems or something in the environment. It mainly results from kidney disorders, hormonal imbalance, and could also be brought forth by intake of drugs. Most often, treatment of the underlying problem helps to regulate blood pressure in such individuals.

## V. RISK FACTORS

- Genetic predisposition: Strong familial linkage.
- Age: There is an increase in vascular stiffness and arterial tone with advancing age.
- LIFESTYLE: High intake of sodium, obesity, stress, sedentary habits, smoking, and alcohol intake.
- Associated diseases include diabetes mellitus, chronic kidney disease, and sleep apnea.

#Complications of Hypertension: -

Sustained or uncontrolled hypertension leads to progressive target organ damage:

- Heart Coronary artery disease, myocardial infarction, left ventricular hypertrophy, heart failure
- Brain Stroke, transient ischemic attacks, cognitive decline, vascular dementia
- Kidneys Chronic kidney disease, glomerulosclerosis, renal failure
- Eyes Hypertensive retinopathy, choroidopathy, optic neuropathy
- Blood Vessels Peripheral artery disease, aneurysms, arteriosclerosis

## VI. PHARMACOLOGICAL MANAGEMENT

Management is effective only when pharmacologic therapy is combined with patient education and lifestyle modification. The following are some common drug classes used:
1.Diuretics: Chlorthalidone, hydrochlorothiazide diuretics
2. ACE inhibitors: Enalapril and Lisinopril.
3.Angiotensin II receptor blockers: Losartan, Telmisartan
4. Calcium channel blockers: Amlodipine, Cilnidipine
5. Beta blockers: Metoprolol, Atenolol

Drug of Choice for Hypertension:
Chlorthalidone

## VII. PHARMACOLOGY OF CHLORTHALIDONE

Mechanism of Action:
Chlorthalidone works by inhibiting the sodium-chloride co-transport in the distal convoluted tubule of the nephron, which diminishes sodium reabsorption and thereby increases diuresis. A drop in plasma volume consequently lowers cardiac output and peripheral resistance.

Pharmacokinetics:
• Onset: Within 3 hours after oral dose
• Peak: 2–6 hours
• Half-life: 45-60 hours (supports once-daily use)
Excretion: Primarily renal, mostly unchanged
Adverse Effects:

Adverse effects include hypokalemia, hyponatremia, hyperuricemia, hyperglycemia, and dizziness. Monitoring of electrolytes is necessary with prolonged administration.

Clinical Benefit:
Chlorthalidone offers a superior and more consistent 24-hour blood pressure control compared to hydrochlorothiazide. Clinical evidence indeed supports that not only does it offer superior blood pressure control, but there is also a significant reduction in the risk of stroke and heart failure. These advantages make chlorthalidone a preferred choice in the long-term therapy of chronic hypertension.

## VIII. CASE STUDIES

1. Patient: Kashibai Suryawanshi, 79 years, Female

Kashibai Suryawanshi, 79 years, female, was admitted in ICU with complaints of giddiness, headache, nausea, and vomiting. She had hypertension and diabetes on record. She was found to have very high blood pressure, as high as 200/80 mmHg at the time of admission. She was immediately administered intravenous labetalol, furosemide, and mannitol. Her condition stabilized gradually with improvement in symptoms and better control of blood pressure.

The current case involves hypertensive urgency with neurological symptoms, and treatment must include the immediate use of intravenous therapy and close clinical monitoring to avoid complications.

2. Patient: Usman Shaikh, 60 years, male

A 60-year-old hypertensive male, Usman Shaikh, was admitted after a road traffic accident. On admission, his vital signs were stable; his blood pressure was 130/80 mmHg. This case represents how trauma and stress influence the blood pressures and the necessity of continuation of anti-hypertensive drugs even on non-cardiac hospital admissions.

3. Patient Allabaksh Abdulmanna Attar – Adult Male

Acute exacerbation of respiratory acidosis was diagnosed in the case of Allabaksh Abdulmanna Attar, an adult male, and he was then admitted for the management of respiratory distress. His hospital admission ensured the stabilization of blood pressure. This demonstrates the bidirectional interaction between hypertension and respiratory disorders: one influences the course of the other, and comprehensive care will be required.

4. Patient: Mahesh Ratan Jadhav, Male, 16 years

The 16-year-old male patient, Mahesh Ratan Jadhav, was admitted with a traumatic injury to his hand and had a normal blood pressure reading upon admission: 110/70 mmHg. This represents a good contrast and shows the relative protection of younger individuals against hypertension. It also suggests that baseline blood pressure should be recorded in all cases of hospital admission irrespective of the primary cause for admission.

5. Patient: Asha Ganesh Badgire, 58, Female

Asha Ganesh Badgire, a 58-year-old female patient, was admitted with a diagnosis of bronchopneumonia accompanied by high blood pressure. She had been administered antibiotics, nebulization treatment, and antihypertensive drugs. Her condition gradually improved with regular treatment. This is a case of secondary hypertension due to infection and stress, and hence, there is a great need for monitoring blood pressure in patients suffering from acute respiratory diseases.

## IX. RISK FACTORS AND PREVENTIVE STRATEGIES

Hypertension is a cumulative result of biological, behavioral, and environmental factors. The most important modifiable risk factors include:

• High consumption of salt and fat

• Obesities and physical inactivity

• Tobacco smoking and alcohol use

Behaviors For preventive strategies, coverage should include both individual and population level interventions, including:

• Community screening and awareness programs

• Promotion of DASH diet (Dietary Approaches to Stop Hypertension) Encouragement of physical activity (≥150 min/week)

• Less than 5g/day of sodium intake

• Regular monitoring of blood pressure and lifelong adherence to medication

## X. CONCLUSION

Hypertension remains one of the major but preventable causes of morbidity and mortality in the world. The burden of disease continues to increase in India, fueled by rapid urbanization, changing lifestyles, and an aging population. Its effective control calls for an integrated approach: early detection, regular use of medications, and long-term lifestyle changes. Chlorthalidone has emerged as a dependable first-line treatment that provides prolonged maintenance of BP levels and excellent cardiovascular protection. The cases presented therefore stress the need for personalized management of patients, strict compliance with therapy, and constant watchfulness for the best results. Further improvements in community awareness, public health measures, and prevention programs will be required to reduce the escalating burden of hypertension in this population.

## REFERENCE


[1] World Health Organization. "Hypertension." WHO Fact Sheets, 2024. https://www.who.int/news-room/fact-sheets/detail/hypertension.

[2] NCD Risk Factor Collaboration (NCD-RisC). "Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019: a pooled analysis of 1201 population-representative studies with 104 million participants." The Lancet, 2021. https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)01330-1/fulltext.

[3] National Institute for Health and Care Excellence (NICE). "Hypertension in adults: diagnosis and management," Updated 2023. https://www.nice.org.uk/guidance/ng136.

[4] Messerli FH, et al. "Role of Chlorthalidone in the Treatment of Hypertension." Journal of the American College of Cardiology, 2022. https://www.jacc.org/doi/10.1016/j.jacc.2022.07.013.

[5] Mills KT, Stefanescu A, He J. "The global epidemiology of hypertension." Nature Reviews Nephrology, 2020. https://www.nature.com/articles/s41581-019-0244-2.

[6] Anand S, Yusuf S. "Hypertension and chronic kidney disease: global perspectives on hypertension and kidney disease." Kidney International, 2011. https://www.kidney-international.org/article/S0085-2538(15)33537-9/fulltext.

[7] Ministry of Health & Family Welfare, Government of India. "India Hypertension Guidelines, 2022." https://nhm.gov.in.

[8] Mills KT, et al. The global epidemiology of hypertension. Nat Rev Nephrol. 2020;16(4):223-237. [PMC Article] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6999025/

[9] earney PM, et al. Worldwide prevalence of hypertension: a systematic review. J Hypertens. 2005;23(1):53-61. https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)01330-1/fulltext

[10] Thakur JS, et al. Hypertension diagnosis, treatment, and control in India: JAMA Network Open. 2023;6(10). https://jamanetwork.com/journals/jama/fullarticle/2809395

[11] Fryar CD, et al. Hypertension prevalence among adults aged 18 and over in the United States, 2017–2018. NCHS Data Brief No. 364. 2020. https://www.cdc.gov/nchs/data/databriefs/db364-H.pdf

[12] World Health Organization. Hypertension Fact Sheet. 2025. https://www.who.int/news-room/fact-sheets/detail/hypertension

[13] Whelton PK, et al. 2017 ACC/AHA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults. Hypertension. 2018;71(6):e13-e115. https://www.ahajournals.org/doi/10.1161/HYPERTENSIONAHA.120.15034

[14] NCD Risk Factor Collaboration (NCD-RisC). Worldwide trends in blood pressure from 1975 to

2015. Lancet. 2017;389(10064):37-55. https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(17)32129-5/fulltext

[15] Gaziano TA, et al. Hypertension prevalence and control in low and middle-income countries. Am J Hypertens. 2014;27(10):1305-1311. https://healthcare-bulletin.co.uk/index.php/HB/article/view/412

[16] Gupta R. Trends in hypertension epidemiology in India. J Hum Hypertens. 2004;18(2):73-78. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10887399/