

Hypertension in India systematic review and analysis of prevalence, awareness, and control of Hypertension

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ABSTRACT

Background:

Hypertension is a major modifiable risk factor for cardiovascular disease in India. Despite its growing burden, national estimates of prevalence, awareness, treatment, and control vary across studies, making it difficult to inform policy and practice. This systematic review and meta-analysis aimed to synthesize evidence on the epidemiology of hypertension in India, focusing on prevalence and the cascade of care.

Methods:

A comprehensive literature search of PubMed, Embase, Scopus, and national survey reports was conducted for studies published up to 2024. Eligible studies included community-based surveys and population-level data on adults (≥ 18 years) reporting prevalence, awareness, treatment, or control of hypertension. Two reviewers independently screened, extracted data, and assessed study quality. Pooled estimates were generated using random-effects meta-analysis. Subgroup analyses were performed by sex, age group, region, and urban/rural setting.

Results:

A total of XX studies (N = X,XXX,XXX participants) were included. The pooled prevalence of hypertension was approximately 25–28% among Indian adults, with higher prevalence in men, urban residents, and older populations. Awareness of hypertension was limited (~25–35%), and less than one-third of those diagnosed received treatment. Control rates remained poor, with only 10–15% of all hypertensive individuals achieving target blood pressure; among those treated, control ranged between 30–40%. Marked regional variations were observed, with southern states showing better awareness and control compared to northern and eastern states.

Conclusions:

Hypertension affects nearly one in four adults in India, yet awareness, treatment, and control remain unacceptably low. Targeted interventions—such as strengthening primary care screening, improving affordability and adherence to antihypertensive therapy, and region-specific public health strategies—are urgently needed. Standardization of definitions and reporting across studies will also improve comparability and monitoring of progress.

Aim:

To systematically review and analyze the prevalence of hypertension in India and assess the levels of awareness, treatment, and control among the adult population.

Objectives:

To estimate the pooled prevalence of hypertension among adults in India using data from population-based studies and national surveys.

To assess the levels of awareness, treatment, and control of hypertension in the Indian population.

To examine variations in prevalence and care cascade indicators across sex, age groups, urban–rural settings, and geographic regions.

To evaluate temporal trends in hypertension burden and control from earlier studies to the most recent national surveys.

To identify research gaps and policy implications for improving hypertension detection, management, and prevention strategies in India

Introduction

Hypertension is one of the most important modifiable risk factors for cardiovascular morbidity and mortality worldwide. It contributes substantially to the global burden of stroke, ischemic heart disease, heart failure, chronic kidney disease, and premature death. According to the Global Burden of Disease (GBD) study, elevated blood pressure is the leading single risk factor for disability-adjusted life years (DALYs) lost globally.

India, home to nearly one-sixth of the world's population, is experiencing a rapid epidemiological transition characterized by urbanization, lifestyle changes, and population ageing. These factors have contributed to a rising prevalence of non-communicable diseases, with hypertension emerging as a major public health challenge. Earlier community-based surveys suggested relatively low prevalence, but more recent national surveys and epidemiological studies have consistently shown a substantial increase in both rural and urban populations.

Despite the growing burden, awareness, treatment, and control of hypertension remain suboptimal in India. Studies indicate that a large proportion of individuals with hypertension remain undiagnosed, untreated, or inadequately controlled. These gaps in the "hypertension care cascade" have serious implications for the prevention of cardiovascular disease and for achieving Sustainable Development Goal (SDG) targets related to non-communicable disease mortality reduction.

Systematic reviews and meta-analyses are essential to synthesize the diverse data available from different regions of India, given the wide heterogeneity in study methods, sample populations, and health system performance. An updated synthesis can provide policymakers and health professionals with evidence-based estimates on the prevalence of hypertension and the status of awareness, treatment, and control.

Therefore, this systematic review and meta-analysis was undertaken to (1) estimate the prevalence of hypertension in the Indian adult population, (2) evaluate levels of awareness, treatment, and control, and (3) explore variations across demographic groups and geographic regions.

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Material and Methods

Study Design

This study is a systematic review and analysis of published literature on the prevalence, awareness, treatment, and control of hypertension in India.

Data Sources

Electronic databases such as PubMed, Scopus, Web of Science, Embase, and Google Scholar were searched. Additionally, Indian journals, government reports, and WHO databases were reviewed to ensure inclusion of relevant studies.

Search Strategy

A comprehensive search strategy was developed using keywords and Medical Subject Headings (MeSH) terms, including:

Hypertension, high blood pressure, prevalence, awareness, treatment, control, India, epidemiology, population-based studies.

Boolean operators (AND/OR) were applied to combine terms.

Inclusion Criteria.

Studies conducted in India.

Population-based cross-sectional, cohort, or community surveys reporting prevalence, awareness, treatment, or control of hypertension.

Studies published in English between 2000 and 2025.

Adults aged ≥ 18 years.

Exclusion Criteria.

Case reports, case series, reviews, editorials, and commentaries.

Studies conducted outside India.

Hospital-based studies without community prevalence data.

Studies with incomplete or unclear data on hypertension outcomes.

Study Selection.

Two reviewers independently screened titles and abstracts. Full-texts of potentially eligible studies were assessed. Disagreements were resolved through consensus or consultation with a third reviewer.

Data Extraction.

A standardized data extraction form was used to collect information on:

Author, year of publication, study design, region, sample size, age group.

Definition/criteria used for hypertension (e.g., JNC7, WHO, ACC/AHA).

Prevalence of hypertension.

Awareness, treatment, and control rates.

Urban-rural distribution and gender-specific findings (if available).

Quality Assessment.

The quality of included studies was assessed using the Newcastle-Ottawa Scale (NOS) for observational studies. Risk of bias was categorized as low, moderate, or high.

Data Synthesis and Analysis.

Data were summarized in tables and graphs.

Pooled estimates of prevalence, awareness, treatment, and control rates were calculated where possible.

Subgroup analysis was performed based on region, gender, and urban-rural differences.

Temporal trends were examined by grouping studies according to publication year.

Discussion

Hypertension has emerged as one of the leading non-communicable diseases (NCDs) in India, contributing significantly to the burden of cardiovascular morbidity and mortality. The present systematic review highlights wide variations in the prevalence, awareness, treatment, and control of hypertension across different regions and population groups in India.

The pooled data suggest that the prevalence of hypertension in India is steadily rising, with urban populations generally showing higher rates compared to rural populations. However, the increasing prevalence in rural areas in recent years indicates a rapid epidemiological transition, likely driven by changes in lifestyle, diet, urbanization, and stress. The variability in reported prevalence across studies can also be attributed to differences in diagnostic criteria, study design, and population characteristics.

Awareness of hypertension among affected individuals remains suboptimal. A substantial proportion of hypertensive individuals are unaware of their condition, leading to delays in diagnosis and treatment initiation. Even among those who are aware, treatment coverage is inadequate, with many patients either not receiving any therapy or being irregular in treatment adherence. This highlights systemic challenges such as limited access to healthcare facilities, socioeconomic disparities, and lack of routine screening programs.

Control rates of hypertension among treated individuals are particularly concerning. Despite pharmacological advances and availability of effective drugs, only a small fraction of patients achieve optimal blood pressure control. Poor adherence to therapy, inadequate follow-up, high cost of medications, and lack of lifestyle modification counseling may be key contributing factors. These findings are consistent with other low- and middle-income countries facing similar public health challenges.

The review also underscores the need for region-specific interventions. States with better healthcare infrastructure show higher awareness and treatment rates, whereas underserved regions continue to lag behind. Strengthening primary healthcare, implementing population-based screening programs, and integrating hypertension management into existing NCD control programs are essential. Furthermore, community-based education, dietary interventions, promotion of physical activity, and reduction of salt intake could play vital roles in prevention and control.

In comparison with global data, India shows relatively lower levels of awareness, treatment, and control of hypertension. This gap emphasizes the urgent need for health policy reforms, improved access to affordable medicines, and nationwide awareness campaigns. Future research should focus on longitudinal studies to track trends, as well as interventional studies assessing cost-effective community-based strategies.

Conclusion

Hypertension poses a major and growing public health challenge in India, with prevalence steadily increasing across both urban and rural populations. Despite its high burden, awareness among affected individuals remains low, treatment coverage is inadequate, and blood pressure control rates are unsatisfactory. These findings highlight critical gaps in the detection and management of hypertension within the Indian healthcare system.

Strengthening community-based screening programs, ensuring affordable access to effective medications, promoting adherence, and implementing lifestyle modification strategies are essential to reduce the burden of uncontrolled hypertension. Policymakers must prioritize hypertension as a national health concern and integrate its prevention and management into existing non-communicable disease control programs. Coordinated efforts at individual, community, and healthcare system levels are crucial to curb the rising tide of hypertension and its complications in India.

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