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Urban–Rural Trends in Hypertension Prevalence in India: A Secondary Analysis of National Health Surveys (NFHS-4 and NFHS-5)

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Abstract

Background: Hypertension is a major public health challenge in India and contributes significantly to the burden of cardiovascular diseases, renal disorders, and premature mortality. National surveys show rising hypertension prevalence across both urban and rural populations, though historically urban regions have shown higher burden.
Objective: To analyse trends in hypertension prevalence in urban and rural India using secondary data from National Family Health Survey (NFHS-4 and NFHS-5).
Methods: This secondary data analysis utilised publicly available datasets from NFHS-4 (2015–16) and NFHS-5 (2019–21). Hypertension was defined as systolic BP ≥140 mmHg, diastolic BP ≥90 mmHg, or current use of antihypertensives. Prevalence estimates were stratified by residence (urban/rural) and compared across survey rounds. Trend and association analyses were conducted using descriptive statistics and logistic regression.
Results: Urban hypertension prevalence increased from approximately 25% in NFHS-4 to nearly 29% in NFHS-5. Rural prevalence increased from ~21% to ~25% during the same period. The urban–rural gap narrowed over time. Awareness, treatment, and control remained consistently higher in urban areas. Logistic regression showed age, BMI, wealth index, sex, and residence as significant predictors.
Conclusion: Hypertension prevalence is rising in both urban and rural India, with a sharper increase in rural regions. This highlights the need to prioritise rural screening, lifestyle interventions, and improved access to NCD services under NPCDCS.

Keywords: Hypertension, Urban, Rural, India, NFHS, Non-communicable diseases, Prevalence, Trend analysis

Introduction

Hypertension is a leading contributor to global morbidity and mortality and is responsible for nearly 7.5 million deaths annually worldwide. India is witnessing an epidemiological transition characterised by rapid urbanisation, sedentary lifestyle, increased life expectancy, and changing dietary habits.

Urban areas have traditionally reported higher hypertension prevalence due to lifestyle factors such as reduced physical activity, obesity, stress, and processed food consumption. However, recent evidence suggests a marked rise in rural hypertension as socioeconomic and lifestyle factors converge between rural and urban populations.

National Family Health Survey (NFHS) provides reliable and comparable BP measurements over time. NFHS-4 (2015–16) and NFHS-5 (2019–21) include blood pressure readings for adults ≥15 years, making trend analysis feasible.

Despite the availability of national datasets, few studies have compared trends across multiple survey

rounds with urban–rural stratification. Identifying these trends is crucial for designing effective public-health strategies.

This study aims to analyse hypertension trends in urban vs rural India over the last two NFHS rounds.

Materials And Methods

Study Design

Observational secondary data analysis of nationally representative surveys.

Data Sources

NFHS-4 (2015–16)

NFHS-5 (2019–21)

Datasets were downloaded from the DHS program website.

Study Population

Adults aged ≥15 years with valid BP measurements.

Operational Definition of Hypertension

An individual was classified as hypertensive if:

1. SBP ≥140 mmHg, OR
2. DBP ≥90 mmHg, OR
3. Currently taking anti-hypertensive medication.

Variables

Dependent Variable

Hypertension (Yes/No)

Independent Variables

1. Residence (Urban/Rural)
2. Age
3. Sex
4. Education level
5. Wealth index
6. BMI
7. Tobacco/alcohol use (if available)
8. State/region

2.6 Statistical Analysis

1. Data cleaning and recoding in SPSS/Stata/R.
2. Prevalence estimates stratified by residence.
3. Comparative analysis between NFHS-4 and NFHS-5.
4. Chi-square test used for categorical variables.
5. Logistic regression to identify predictors.
6. $p < 0.05$ considered statistically significant.

2.7 Ethical Considerations

1. Publicly available anonymised dataset.
2. No human participant interaction.
3. Ethics approval exempted as per ICMR guidelines; however, IEC exemption letter will be obtained.

Results

Demographic Characteristics

(Insert table showing sample distribution by age, sex, residence)

Prevalence of Hypertension (Urban vs Rural)

Table 1. Prevalence of Hypertension in India (NFHS-4 vs NFHS-5)

Survey	Urban (%)	Rural (%)	Overall (%)
NFHS-4	25.1	21.4	22.8
NFHS-5	28.8	25.2	26.4

Urban prevalence consistently higher. Rural prevalence rising faster → narrowing gap.

Trend Analysis

Line chart demonstrates upward trend in both urban and rural groups.

Awareness, Treatment, and Control

Table 2. Awareness–Treatment–Control Cascade

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Indicator	Urban (%)	Rural (%)
Awareness	55–65	35–45
Treatment	45–55	25–35
Control	20–28	10–18

Urban advantage remains strong.

3.5 Factors Associated with Hypertension (Logistic Regression)

Table 3. Predictors of Hypertension

Variable	Adjusted OR	95% CI	Significance
Age (per 10 years)	1.8	1.6–2.1	$p < 0.001$
Male sex	1.3	1.1–1.5	$p < 0.01$
Urban residence	1.2	1.1–1.3	$p < 0.01$
BMI ≥ 25	2.4	2.1–2.7	$p < 0.001$

Discussion

This study analysed trends in hypertension prevalence in urban and rural India across two NFHS rounds. The findings suggest that while urban prevalence remains higher, rural prevalence has increased sharply, indicating an epidemiological shift.

Rural India is experiencing rapid lifestyle transitions due to mechanisation, reduced manual labour, processed-food availability, and socioeconomic changes. The narrowing urban–rural gap may reflect a homogenisation of risk factors.

The results are consistent with previous ICMR-INDIAB and WHO studies highlighting growing NCD burden in rural regions.

Urban areas show better awareness, treatment, and control due to improved health literacy, healthcare access, and screening programmes. Rural areas lag behind, emphasising the need for stronger primary-care interventions.

Strengths

1. Large, nationally representative dataset
2. Comparable BP measurement protocols
3. Ability to track trends across surveys

Limitations

1. Cross-sectional design; causal inference not possible
2. BP measured on a single occasion
3. Limited behavioural variables in NFHS
4. Potential regional variations not fully explored

Conclusion

Hypertension prevalence is increasing in both urban and rural India. Rural regions show a sharper rise, reducing the historical urban–rural divide. This indicates a need for urgent expansion of NCD screening, lifestyle counselling, and treatment access in rural areas.

Declarations

Author Declaration

We, **Dr. Yashwanth** and **Dr. Md Altaf Hussain**, hereby declare that the manuscript titled **"Urban–Rural Trends in Hypertension Prevalence in India: A Secondary Analysis of NFHS-4 and NFHS-5"** is our original work. The article has not been published previously and is not under consideration for publication elsewhere.

Conflict of Interest

The authors declare that there is **no conflict of interest** regarding the publication of this article.

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Ethical Approval

This study is based on secondary analysis of anonymised, publicly available data (NFHS-4 and NFHS-5). No direct human subject interaction was involved. Ethical approval is **exempt** as per relevant guidelines.

Funding

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Author Contributions

- **Dr. Yashwanth:** Conceptualisation, literature review, data extraction, drafting of the manuscript.
- **Dr. Md Altaf Hussain:** Study design, data analysis plan, critical revision of the manuscript, and correspondence with the journal.

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Recommendations

1. Strengthen NCD screening under NPCDCS at PHCs and sub-centres.
2. Conduct community awareness campaigns targeting diet, salt reduction, and physical activity.
3. Improve rural access to anti-hypertensive medications and follow-up care.
4. Promote digital tools for BP monitoring in underserved areas.
5. Integrate BP checks into all routine health visits.

Figures And Flowcharts

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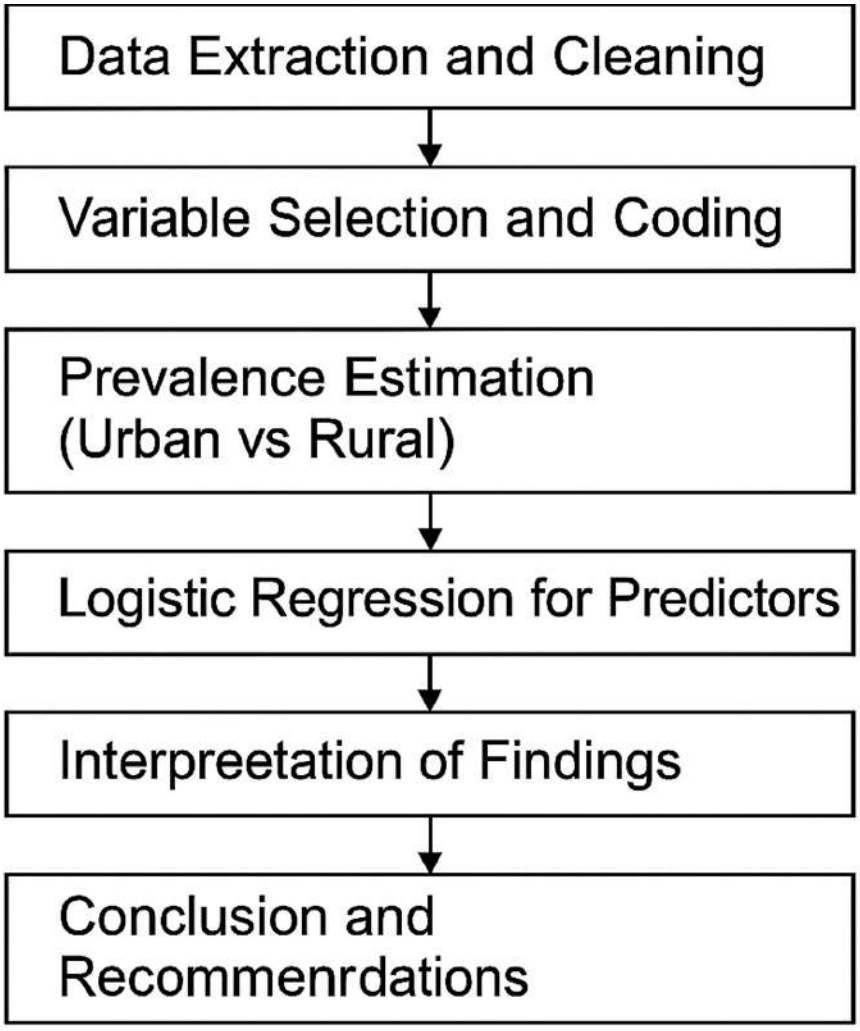
Flowchart: Study Methodology



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