International Journal of Community Medicine and Public Health
Vishwambhar SM et al. Int J Community Med Public Health. 2026 May;13(5):2360-2363
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20261421

Original Research Article

Prevalence of hypertension and its risk factors in a rural village of district Raigad in Maharashtra: a community-based cross-sectional study

Suhas M. Vishwambhar[1]*, Sunil V. Gitte[2], Vaishali V. Vardhan[3]

[1]Public Health (NP-NCD), District Hospital Washim, Government of Maharashtra, India
[2]National Institute of Health and Family Welfare (NIHFW), New Delhi, MOHFW, Government of India, India
[3]National Institute of Public Health Training and Research, Mumbai, MOHFW, Government of India, India

Received: 19 February 2026
Revised: 26 April 2026
Accepted: 27 April 2026

***Correspondence:**
Dr. Suhas M. Vishwambhar,
E-mail: drsvi1008@gmail.com

ABSTRACT

Background: Hypertension is a leading modifiable risk factor for cardiovascular morbidity and mortality globally. Rural areas of India are increasingly experiencing a rising burden due to epidemiological transition, lifestyle changes and population ageing. Reliable district-level data are essential to guide targeted public health interventions under national non-communicable disease control programs.
Methods: A community-based cross-sectional study was conducted from December 2022 to July 2023 among 302 adults aged ≥30 years in Poyanje and Poyanje-wadi villages, Raigad district, Maharashtra. Participants were selected by random household sampling. Blood pressure was measured using a validated digital sphygmomanometer and the average reading was recorded. Socio-demographic, anthropometric and lifestyle-related risk factors were assessed using a structured questionnaire. Bivariate analysis used the Chi-square test and multivariate logistic regression identified independent predictors of hypertension.
Results: The prevalence of hypertension was 29.8% (95% CI: 24.6–35.0). Among participants, 19.5% were newly diagnosed and 10.3% were known cases. Prevalence increased significantly with age (p=0.003). Independent predictors included age 45–59 years (AOR 2.25), age ≥60 years (AOR 7.11), very high waist circumference (AOR 3.16) and smoking (AOR 3.83).
Conclusions: Nearly one-third of adults in this rural population were hypertensive, with many newly diagnosed. Advancing age, central obesity, clustering of NCD risk factors and smoking were significant determinants. Strengthening community-based screening, early detection and lifestyle modification strategies should be prioritized.

Keywords: Hypertension, Maharashtra, NCD, Rural health, Risk factors, Waist circumference

INTRODUCTION

Hypertension remains a major preventable risk factor contributing to cardiovascular diseases, stroke and chronic kidney disease worldwide. It affects an estimated 1.3 billion adults aged 30–79 years and elevated blood pressure is responsible for nearly 10 million deaths each year. Despite the availability of effective treatment, a large proportion of individuals with hypertension remain undiagnosed and blood pressure control is still inadequate in many settings.[1] India is currently experiencing an epidemiological shift marked by a growing burden of non-communicable diseases.

Although hypertension was once regarded primarily as a problem of urban and higher socioeconomic populations, recent evidence indicates a substantial rise in rural areas as well. This trend is likely driven by dietary changes,

tobacco consumption, sedentary lifestyles and increasing life expectancy.[2,3] A recent systematic review estimated the pooled prevalence of hypertension in rural India to be around 27%, highlighting the magnitude of the problem.[2] In Maharashtra, one of India's largest states, the prevalence of hypertension is estimated to be nearly 25%, with wide variation across regions and population groups.[4] However, awareness, treatment and control levels remain unsatisfactory, particularly in rural and tribal communities.[5] District-specific evidence from Raigad remains limited, despite its mix of rural and tribal populations undergoing rapid socioeconomic and lifestyle transitions.

India has set national goals to reduce mortality from non-communicable diseases, making early detection and control of hypertension through primary healthcare services a key public health priority.[6]

In this context, reliable local data are essential for planning targeted interventions. Therefore, the present study was conducted to determine the prevalence of hypertension and identify associated risk factors among adults aged ≥30 years in a rural village of Raigad district.

Objectives

To estimate the prevalence of hypertension among adults aged ≥30 years. To identify sociodemographic, anthropometric and lifestyle-related risk factors associated with hypertension.

METHODS

Study design and setting

A community-based cross-sectional study was conducted between December 2022 and July 2023 in Poyanje (rural) and Poyanje-wadi (tribal), located in Panvel Taluka of Raigad district, Maharashtra.

Study population

Adults aged 30 years and above residing in the study area for at least one year were eligible. Pregnant women and individuals unable to provide informed consent were excluded.

Sample size

Sample size was calculated using Epi Info software assuming an expected prevalence of 25%, confidence level: 95%, margin of error: 5%. The minimum calculated sample size was 288. After accounting for non-response, 302 participants were included.

Sampling technique

A list of households was obtained from Gram Panchayat records. Simple random sampling was used to select households. All eligible adults in selected households were included. A total of 395 households were visited.

Operational definitions

Hypertension was defined as systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg or current use of antihypertensive medication.[1]

Overweight and obesity were defined using standard BMI cut-offs. Central obesity was assessed using waist circumference criteria appropriate for Asian populations. Smoking was defined as current use of tobacco in smoked form. Alcohol consumption was defined as intake within the last 30 days.

Data collection

Data were collected using a structured, pre-tested questionnaire in Marathi. Information included age, sex, education, occupation, tobacco and alcohol use, dietary habits, physical activity, history of hypertension and other NCDs.

Weight was measured using a digital weighing scale, height using a stadiometer and waist circumference using a non-stretchable tape. Blood pressure was measured using a validated digital sphygmomanometer. Three readings were taken at 10-minute intervals after at least five minutes of rest and the average was recorded before measurement.

Statistical analysis

Data were analysed using STATA software. Continuous variables were expressed as mean±standard deviation. Categorical variables were expressed as frequencies and percentages.

Bivariate associations were assessed using the Chi-square test. Variables with $p<0.20$ were included in multivariate logistic regression. Adjusted odds ratios (AOR) with 95% confidence intervals were calculated. Statistical significance was set at $p<0.05$.

Ethical considerations

Ethical approval was obtained from the Institutional Ethics Committee (IEC No: NIPHTR/2022-23). Verbal informed consent was obtained from all participants.

RESULTS

A total of 302 participants were included in the study. The mean age of the participants was 50±13.1 years, with equal representation of males and females (151 each; 50.0%).

Among the participants, the largest age group was 30–44 years (38.1%), followed by 45–59 years (34.4%) and ≥60

years (27.5%). Most participants belonged to lower socioeconomic classes, with 39.4% in Class V and 37.4% in Class IV. Regarding education, 36.1% had secondary education, while 34.1% had higher secondary education and above. Smoking was reported by 12.6% of participants, tobacco use by 23.8% and alcohol consumption by 13.2%. Based on BMI classification, 56.3% had normal BMI, 18.9% were overweight and 4.3% were obese.

Abnormal waist circumference was present in 30.8% of participants. The overall prevalence of hypertension was 29.8% (90/302). Of the total participants, 19.5% were newly diagnosed hypertensives, while 10.3% were previously known cases. The prevalence of hypertension increased significantly with age (p=0.003).

In multivariable logistic regression analysis, participants aged 45–59 years had 2.25 times higher odds of hypertension (95% CI: 1.03–4.94; p=0.042), while those aged ≥60 years had 7.11 times higher odds (95% CI: 3.01–16.82; p<0.001). Very high waist circumference (AOR 3.16; 95% CI: 1.15–8.71; p=0.026), NCD risk score ≥2 (AOR 3.11; 95% CI: 1.13–8.58; p=0.028) and smoking (AOR 3.83; 95% CI: 1.45–10.12; p=0.007) were also independently associated with hypertension.

Table 1: Socio-demographic characteristics of study participants (n=302).

Variable	Category	Frequency (n)	(%)
Sex	Male	151	50.0
	Female	151	50.0
Age group (in years)	30–44	115	38.1
	45–59	104	34.4
	≥60	83	27.5
Socioeconomic class (BG Prasad)	Class I & II	18	6.0
	Class III	52	17.2
	Class IV	113	37.4
	Class V	119	39.4
Education	No schooling	71	23.5
	Primary	19	6.2
	Secondary	109	36.1
	Higher secondary and above	103	34.1

Table 2: Distribution of behavioural and anthropometric risk factors (n=302).

Risk factor	Category	Frequency (n)	(%)
Smoking	Yes	38	12.6
	No	264	87.4
Tobacco use	Yes	72	23.8
	No	230	76.2
Alcohol consumption	Yes	40	13.2
	No	262	86.8
BMI	Normal	170	56.3
	Overweight	57	18.9
	Obese	13	4.3
Abnormal waist circumference	Yes	93	30.8
	No	209	69.2
Hypertension status	Newly diagnosed	59	19.5
	Previously known	31	10.3

Table 3: Multivariate logistic regression analysis of factors associated with hypertension (n=302).

Variable	Adjusted OR (AOR)	95% Confidence Interval	P value
Age 45–59 years	2.25	1.03–4.94	0.042
Age ≥60 years	7.11	3.01–16.82	<0.001
Very high waist circumference	3.16	1.15–8.71	0.026
NCD risk score ≥2	3.11	1.13–8.58	0.028
Smoking	3.83	1.45–10.12	0.007

DISCUSSION

The present community-based cross-sectional study found a hypertension prevalence of 29.8%, which is comparable to pooled estimates reported for rural India (around 27%) and similar to findings from studies conducted in rural Maharashtra and other parts of India.[2,4] This indicates that hypertension is no longer confined to urban populations and reflects the ongoing epidemiological and lifestyle transition in rural communities. Age emerged as the strongest independent predictor of hypertension in the present study. Participants aged 45–59 years and ≥60 years had significantly higher odds of hypertension compared with younger adults. Similar associations between increasing age and hypertension have been consistently reported in previous Indian studies and national surveys.[3,5] The observed age gradient may be explained by progressive arterial stiffness, endothelial dysfunction and cumulative exposure to cardiovascular risk factors with advancing age.

Central obesity, reflected by very high waist circumference, was independently associated with hypertension. This finding is consistent with previous epidemiological studies showing that abdominal adiposity is a stronger predictor of raised blood pressure than BMI alone.[6,7] Excess visceral fat contributes to insulin resistance, chronic inflammation and sympathetic overactivity, thereby increasing vascular resistance and blood pressure. Smoking was another significant determinant in the present study, with smokers showing nearly fourfold higher odds of hypertension. Similar findings have been documented in earlier rural and community-based studies in India.[8] Nicotine-induced vasoconstriction, increased arterial stiffness and sympathetic stimulation may explain this association. The finding that 19.5% participants were newly diagnosed hypertensives highlights substantial gaps in awareness and routine screening coverage. This is particularly relevant for strengthening NPCDCS and primary healthcare-based opportunistic screening in rural populations.

This study has certain limitations. The cross-sectional design limits causal inference between risk factors and hypertension. Blood pressure was measured during a single visit, which may have introduced measurement variation despite using the average of three readings. Behavioural variables such as tobacco and alcohol use were self-reported, making them susceptible to recall and social desirability bias. However, the community-based design, random sampling and standardized measurement procedures strengthen the validity of the findings.

CONCLUSION

Hypertension prevalence was high in this rural population. Advancing age, central obesity, clustering of NCD risk factors and smoking were independently associated with hypertension. Strengthening community-based screening, early detection and lifestyle modification strategies should be prioritized.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. World Health Organization. Hypertension fact sheet. Geneva: WHO. 2023.
2. Anchala R. Hypertension in India: a systematic review. J Hypertens. 2014;32:1170–7.
3. Ramakrishnan S. Prevalence of hypertension among Indian adults. Indian Heart J. 2019;71:309–13.
4. Bhise MD, Patra S. Prevalence and correlates of hypertension in Maharashtra. PLoS One. 2018;13:191948.
5. Jonas JB. Hypertension in rural central India. Am J Hypertens. 2010;23:347–50.
6. India Hypertension Control Initiative. WHO India. 2022.
7. Meshram II. Waist circumference and hypertension in rural India. Public Health Nutr. 2012;15:65–70.
8. Chockalingam A. Worldwide epidemic of hypertension. Can J Cardiol. 2006;22:553–5.
9. Mishra CP, Bansal M, Kumar S. Prevalence and predictors of hypertension: evidence from a study of rural India. J Family Med Prim Care. 2022;11:1234-40.
10. Lal D, Virk AK, Bhardwaj A. Association between smoking and hypertension among males aged >15 years in India: evidence from NFHS-5. PLoS One. 2024;19(5):294898.
11. Sathish T, Kannan S, Sarma PS, Razum O, Thankappan KR. Incidence of hypertension and its risk factors in rural Kerala, India. Public Health. 2012;126:25-32.
12. Murarkar S, Lokare P. Prevalence of hypertension and associated risk factors among adults in rural India. Indian J Public Health. 2023;67:30-6.
13. Bhardwaj SD. Prevalence awareness, treatment and control of hypertension among the people above 15 years in rural area Nagpur Maharashtra-a cross-sectional study. Nat J Community Med. 2012;3(2):213-7.

Cite this article as: Vishwambhar SM, Gitte SV, Vardhan VV. Prevalence of hypertension and its risk factors in a rural village of district Raigad in Maharashtra: a community-based cross-sectional study. Int J Community Med Public Health 2026;13:2360-3.