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Research Article

A PREVALENCE STUDY OF HYPERTENSION AND ITS RISK FACTORS IN URBAN FIELD PRACTICE AREA OF B.J. MEDICAL COLLEGE, AHMEDABAD

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ABSTRACT

Background: Hypertension is a major non-communicable disease and an important risk factor for cardiovascular morbidity and mortality worldwide. With rapid urbanization and lifestyle changes, the burden of hypertension is increasing significantly in urban populations in India.
Methods: A community-based cross-sectional study was conducted from September 2017 to November 2018 in the urban field practice area of B.J. Medical College, Ahmedabad. A total of 1000 individuals aged more than 5 years were included using systematic random sampling. Data were collected using a predesigned and pretested questionnaire based on the WHO STEPS approach. Anthropometric measurements and blood pressure were recorded using standard procedures. Hypertension was classified according to JNC-7 guidelines. Data were analyzed using Microsoft Excel 2007, and Chi-square test was applied to assess associations, with p-value <0.05 considered statistically significant.
Results: The overall prevalence of hypertension was 36.8%, while 22.3% participants were pre-hypertensive. Hypertension was more prevalent among males (45.3%) compared to females (28.6%) and increased with advancing age, particularly in the 46–55 years age group (69.6%). Among modifiable risk factors, alcohol consumption (77.4%), smoking (50.5%), tobacco chewing (48.8%), high body mass index (>25 kg/m²) (47.1%), and diabetes mellitus (49.1%) showed strong association with hypertension. Non-modifiable factors such as family history of hypertension (37.2%) and diabetes (49.1%) were also significantly associated.
Conclusion: The study highlights a high prevalence of hypertension and pre-hypertension in the urban population, with strong associations with both lifestyle and genetic risk factors. Early detection through community-based screening and targeted interventions focusing on lifestyle modification are essential to reduce the burden of hypertension.

Keywords*: Hypertension, Prevalence, Risk factors, Urban population.*

INTRODUCTION

Non-communicable diseases (NCDs) have emerged as a major global public health concern, contributing significantly to morbidity and mortality worldwide. The Global Burden of Disease study highlighted that NCDs account for a substantial proportion of deaths and disability-adjusted life years, with cardiovascular diseases being a leading contributor [1]. Over the past few decades, rapid urbanization, lifestyle changes, and demographic transitions have led to a marked increase in the prevalence of NCDs, particularly in developing countries like India [2].

Hypertension is one of the most important modifiable risk factors for cardiovascular diseases, including coronary artery disease, stroke, heart failure, and renal disorders. It is often referred to as a "silent killer" because it remains asymptomatic for long periods and is frequently detected only after complications develop. According to the World Health Organization, hypertension affects approximately one billion people globally and is responsible for nearly 9.4

million deaths each year, making it a major public health challenge [3]. Earlier global health reports have also emphasized the increasing burden of hypertension as part of the rising epidemic of chronic diseases [4].

The growing burden of hypertension is closely associated with lifestyle and behavioral risk factors such as unhealthy diet, physical inactivity, obesity, tobacco use, and alcohol consumption. These risk factors, along with genetic predisposition and environmental influences, contribute to the development and progression of hypertension [5]. In addition, epidemiological evidence suggests that both modifiable and non-modifiable risk factors play a crucial role in determining the prevalence and distribution of hypertension in different populations [6].

Standardized guidelines such as the Seventh Joint National Committee (JNC-7) classification provide a framework for the diagnosis and management of hypertension and emphasize the importance of early detection and control to reduce cardiovascular risk [7]. Despite these guidelines, hypertension remains inadequately controlled in many parts of the world, particularly in low- and middle-income countries.

Epidemiological studies have shown that the prevalence of hypertension is increasing globally, with significant variations across regions. Studies have reported rising trends in prevalence, incidence, and poor control of hypertension over time, highlighting the need for effective preventive strategies [8]. In India, hypertension has become a major public health problem, with increasing prevalence observed in both urban and rural populations. Rapid urbanization, changing dietary patterns, and sedentary lifestyles have contributed to this rising trend [9].

Furthermore, studies conducted in India have demonstrated significant urban-rural differences in the prevalence of NCD risk factors, including hypertension. Urban populations tend to have higher exposure to lifestyle-related risk factors such as obesity, high salt intake, and reduced physical activity, leading to a higher burden of hypertension compared to rural populations [10]. These findings underscore the importance of conducting region-specific studies to understand the magnitude of the problem and identify associated risk factors.

Given the increasing burden of hypertension and its associated complications, it is essential to assess its prevalence and identify contributing risk factors in specific populations. The urban field practice area of B.J. Medical College, Ahmedabad, provides a suitable setting for such an assessment due to its diverse population and exposure to various lifestyle-related risk factors. Therefore, the present study was undertaken to determine the prevalence of hypertension and its associated risk factors in this population, which would help in planning targeted preventive and control measures.

MATERIALS AND METHODOLOGY

This study was conducted as a community-based cross-sectional study in the urban field practice area of B.J. Medical College, Ahmedabad, over a period from September 2017 to November 2018. The study population comprised individuals aged more than 5 years residing in the selected area. Participants who provided informed consent were included, while those who did not consent and children below 5 years of age were excluded from the study.

The sample size was calculated using the formula $n = 4pq/L^2$, where the prevalence (p) of hypertension was considered as 30% based on previous meta-analysis studies, q = 70%, and the allowable error (L) was taken as 10% of p. The calculated sample size was 934, which was rounded off to 1000 participants to account for non-response. The study area consisted of approximately 3000 households, and systematic random sampling was employed by selecting every 15th house. Eligible individuals from the selected households were enrolled until the desired sample size was achieved.

Data were collected using a predesigned and pretested questionnaire based on the WHO STEPS approach, which included details on sociodemographic characteristics and risk factors for hypertension. Each participant was interviewed after obtaining informed consent. The instruments used for data collection included a mercury sphygmomanometer, stethoscope, measuring tape, and weighing scale.

Anthropometric measurements were carried out following standard procedures. Height was measured with the participant standing erect on a level surface without footwear, with heels together and head positioned in the Frankfort plane, and was recorded to the nearest centimeter. Weight was measured using a standardized weighing scale placed on a firm surface after ensuring proper calibration, and participants were asked to remove footwear and heavy clothing; the measurement was recorded to the nearest kilogram. Waist circumference was measured midway between the lower rib margin and iliac crest using a non-elastic measuring tape, while hip circumference was measured at the widest portion of the buttocks; both were recorded in centimeters.

Blood pressure was measured using a mercury sphygmomanometer following standard guidelines. Participants were seated comfortably with their back supported and arm at heart level after resting for at least 5 minutes. The right arm was used for consistency, and an appropriately sized cuff covering at least 80% of the arm circumference was applied. Initially, systolic blood pressure was estimated by the palpatory method, followed by measurement using the auscultatory method. The cuff was inflated to 30 mm Hg above the palpatory systolic pressure and deflated at a rate of 2 –3 mm Hg per second. The first Korotkoff sound (Phase I) was recorded as systolic blood pressure and the disappearance of sound (Phase V) as diastolic blood pressure. Three readings were taken for each participant, and the average was considered for analysis. Hypertension classification for adults aged 18 years and above was based on JNC-7 criteria, while for children and adolescents, classification guidelines by the U.S. Department of Health and Human Services were used.

Data entry and analysis were performed using Microsoft Excel 2007. Continuous variables were expressed as mean ± standard deviation, and categorical variables were presented as proportions and percentages. The Chi-square test was applied to assess the association between hypertension and various risk factors, and a p-value of less than 0.05 was considered statistically significant.

RESULT

A total of 1000 individuals aged more than 5 years were included in this study from the urban field practice area. The study population comprised 490 (49.0%) males and 510 (51.0%) females. The largest proportion of participants belonged to the 6–15 years age group (25.4%), followed by 16–25 years (24.4%) and 36–45 years (23.3%). The mean age of the study population was 29.63 ± 17.35 years. Nearly half of the participants were married (49.1%), while 48.6% were unmarried. In terms of educational status, the majority had primary school education (27.9%), followed by less than primary education (23.2%) and high school education (20.9%). Socioeconomically, most participants belonged to Class IV (69.5%) and Class III (18.7%), indicating a predominance of lower socioeconomic status.

Regarding blood pressure status, 409 (40.9%) participants were normotensive, while 223 (22.3%) were pre-hypertensive. The overall prevalence of hypertension was 36.8%, with 261 (26.1%) having stage 1 hypertension and 107 (10.7%) having stage 2 hypertension. The mean systolic blood pressure was 119.70 ± 14.40 mm Hg, and the mean diastolic blood pressure was 84.39 ± 11.98 mm Hg, indicating a substantial burden of elevated blood pressure in the study population.

With respect to anthropometric measurements, 371 (37.1%) participants had normal body mass index (BMI), while 326 (32.6%) were overweight and 141 (14.1%) were obese as per Asian standards. A significant proportion (46.7%) had BMI greater than 25 kg/m², among whom 47.11% were hypertensive, suggesting a strong association between increased BMI and hypertension.

Among non-modifiable risk factors, hypertension prevalence was higher with increasing age, particularly in the 46–55 years age group (69.6%). Males showed a higher prevalence of hypertension (45.3%) compared to females (28.6%). Family history also played a significant role, with hypertension present in 37.15% of participants with a family history of hypertension and 49.13% among those with a family history of diabetes mellitus.

Among modifiable risk factors, tobacco use was prevalent, with 9.5% being current smokers and 30.1% tobacco chewers. Hypertension was present in 50.5% of smokers and 48.8% of tobacco chewers. Passive smoking exposure was also notable, with 21.0% exposed at home and 23.4% at the workplace. Alcohol consumption was reported in 9.3% of participants, among whom a high proportion (77.4%) were hypertensive. Dietary factors such as additional salt intake (11.6%) and consumption of processed foods high in salt (27.7%) were observed, contributing to increased hypertension risk. Type A personality traits were present in 67.5% of participants, with 46.2% of them being hypertensive, indicating a possible association with stress-related factors.

Overall, the study demonstrates a high prevalence of hypertension and pre-hypertension in the urban population, with significant associations observed with both modifiable and non-modifiable risk factors, highlighting the need for early detection and targeted preventive strategies.

Table 1: Demographic Profile of Study Participants (n = 1000)

Variable	Category	Frequency (%)
Age Group (years)	6–15	254 (25.4%)
	16–25	244 (24.4%)
	26–35	107 (10.7%)
	36–45	233 (23.3%)
	46–55	69 (6.9%)
	56–65	23 (2.3%)
	66–75	70 (7.0%)
Gender	Male	490 (49.0%)
	Female	510 (51.0%)
Marital Status	Unmarried	486 (48.6%)
	Married	491 (49.1%)
	Widowed	23 (2.3%)
Education	No formal schooling	186 (18.6%)
	Less than primary	232 (23.2%)
	Primary completed	279 (27.9%)
	High school	209 (20.9%)
	Higher secondary	47 (4.7%)
	Graduate	47 (4.7%)
Socioeconomic Status	Class II	47 (4.7%)
	Class III	187 (18.7%)
	Class IV	695 (69.5%)

	Class V	71 (7.1%)

Figure 1: Clinical Outcomes (Blood Pressure Status) (n = 1000)

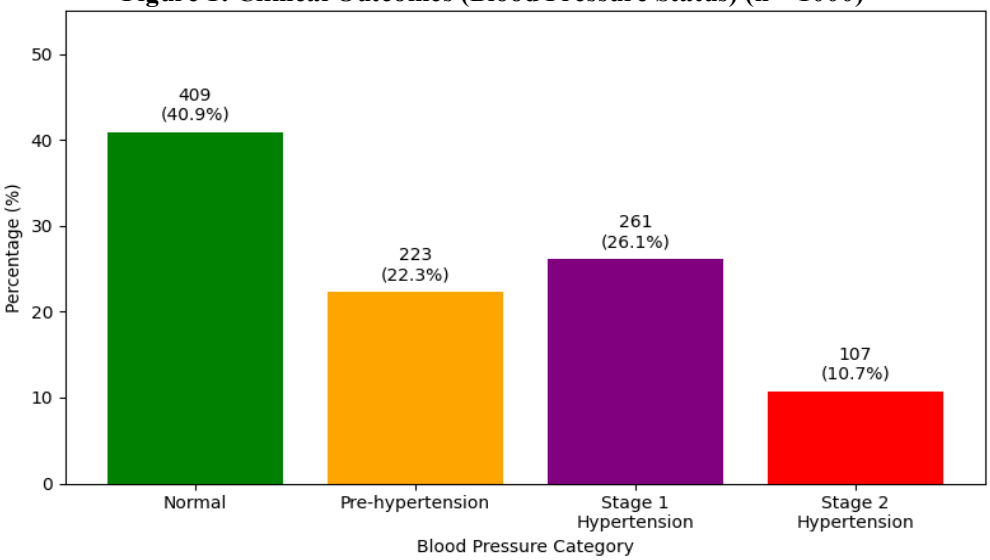

Table 2: Prevalence of Modifiable Risk Factors (n = 1000)

Risk Factor	Frequency (%)	Hypertensive among them n (%)
Current smoker	95 (9.5%)	48 (50.5%)
Tobacco chewing	301 (30.1%)	147 (48.8%)
Passive smoking (home)	210 (21.0%)	71 (33.8%)
Passive smoking (workplace)	234 (23.4%)	118 (50.4%)
Alcohol intake	93 (9.3%)	72 (77.4%)
Additional salt intake	116 (11.6%)	48 (41.4%)
Processed food intake	277 (27.7%)	27 (9.8%)
Type A personality	675 (67.5%)	312 (46.2%)
Diabetes mellitus	346 (34.6%)	170 (49.1%)
BMI >25 kg/m²	467 (46.7%)	220 (47.1%)

Table 3: Prevalence of Non-Modifiable Risk Factors (n = 1000)

Risk Factor	Category	Total n (%)	Hypertensive n (%)
Age Group (years)	6–15	254 (25.4%)	52 (20.5%)
	16–25	244 (24.4%)	94 (38.5%)
	26–35	107 (10.7%)	51 (47.7%)
	36–45	233 (23.3%)	91 (39.1%)
	46–55	69 (6.9%)	48 (69.6%)
	56–65	23 (2.3%)	5 (21.7%)
	66–75	70 (7.0%)	27 (38.6%)
Gender	Male	490 (49.0%)	222 (45.3%)
	Female	510 (51.0%)	146 (28.6%)
Family History	Hypertension	463 (46.3%)	172 (37.2%)
	Cardiovascular disease	209 (20.9%)	56 (26.8%)
	Diabetes mellitus	346 (34.6%)	170 (49.1%)

DISCUSSION

In the present community-based cross-sectional study, the overall prevalence of hypertension was **36.8%**, with **26.1% stage 1 hypertension** and **10.7% stage 2 hypertension**, while **22.3%** participants were pre-hypertensive. This prevalence was higher than the findings of a study from an urban field practice area where hypertension prevalence was **33.6%** [11], and also higher than a study reporting an overall prevalence of **32.13%** [12]. However, it was comparable to recent urban screening data from Ahmedabad, where high blood pressure was observed among **35%** of screened participants [13]. This suggests that hypertension is highly prevalent in urban populations and remains an important public health problem requiring active screening and prevention strategies.

In this study, hypertension was more common among males **222/490 (45.3%)** compared to females **146/510 (28.6%)**. Similar male predominance was reported in another study where hypertension prevalence was higher among males **34%**

[12]. In contrast, Ingale et al. reported a higher prevalence among females **33.3%** compared to males **16.8%** [14]. This variation may be due to differences in age structure, lifestyle pattern, obesity distribution, and health-seeking behavior across study populations.

Age-wise, the highest proportion of hypertension in the present study was observed in the **46–55 years age group (69.57%)**, followed by **26–35 years (47.66%)** and **36–45 years (39.06%)**. Similar findings were reported by Murarkar et al., where the risk of hypertension increased with age above 50 years [15]. Another study also reported higher prevalence among the **51–60 years age group (49.5%)** [12]. This supports the established relationship between increasing age and hypertension, probably due to vascular stiffness, cumulative exposure to risk factors, and metabolic changes.

The present study found that hypertension was present among **37.15%** of participants with a family history of hypertension and **49.13%** among those with a family history of diabetes mellitus. Similar findings were observed in another study where family history of hypertension was significantly associated with hypertension, with an odds ratio of **2.41** [12]. This indicates that genetic predisposition and shared family lifestyle factors may contribute to hypertension risk.

Among modifiable risk factors, alcohol intake showed the highest proportion of hypertension in this study, with **72/93 (77.42%)** alcohol users being hypertensive. A comparable association was reported in another study where alcohol use was significantly associated with hypertension, with an odds ratio of **1.8** [12]. Similarly, other urban studies also identified alcohol consumption as an important risk factor for hypertension [16]. These findings highlight the importance of alcohol reduction as part of hypertension prevention programs.

Tobacco use was also an important risk factor in the present study. Hypertension was seen among **48/95 (50.53%)** current smokers and **147/301 (48.84%)** tobacco chewers. Similar findings were reported in an urban field practice study where hypertension had a significant association with smoking and tobacco use [11]. Another study also reported smoking as a significant risk factor with an odds ratio of **1.78** [12]. These results indicate that both smoked and smokeless tobacco contribute substantially to hypertension burden.

Body mass index was another major factor in this study, where **467 (46.7%)** participants had BMI >25 kg/m², and **220 (47.11%)** of them were hypertensive. Similar findings were reported in a systematic review of hypertension risk factors in India, where increasing BMI was identified as a common risk factor [17]. A study from an urban population also identified higher BMI as one of the important risk factors for hypertension [16]. This shows the role of overweight and obesity in increasing blood pressure through insulin resistance, sympathetic activation, and vascular changes.

Additional dietary salt intake was reported among **116 (11.6%)** participants, of whom **48 (41.38%)** were hypertensive. Another urban field practice study reported a significant association between hypertension and high salt intake [11]. Similarly, a study reporting risk factors for hypertension found high salt intake to be significantly associated with hypertension, with an odds ratio of **3.2** [12]. These findings support the need for salt-reduction counseling at the community level.

Type A personality was present among **675 (67.5%)** participants, and **312 (46.22%)** of them were hypertensive. Although psychological stress was not directly measured using a detailed stress scale, Type A personality may reflect stress-prone behavior. Similar studies have reported stress and lifestyle-related behavioral factors as significantly associated with hypertension [11]. This indicates that behavioralcounseling and stress management may be important components of hypertension control.

Overall, the present study findings are consistent with previous Indian studies showing that hypertension is highly prevalent in urban populations and is associated with both non-modifiable factors such as age, sex, and family history, and modifiable factors such as tobacco use, alcohol consumption, high BMI, salt intake, and stress-related behavior. The high prevalence of pre-hypertension **22.3%** also indicates a large at-risk population, emphasizing the need for early lifestyle modification, regular blood pressure screening, and community-based intervention programs.

CONCLUSION

The present study revealed a high prevalence of hypertension (36.8%) among individuals aged more than 5 years in the urban field practice area, with a substantial proportion (22.3%) also categorized as pre-hypertensive, indicating a large at-risk population. Hypertension was found to be significantly associated with both non-modifiable factors such as increasing age, male gender, and family history, as well as modifiable risk factors including tobacco use, alcohol consumption, high body mass index, high salt intake, and stress-related behavior. These findings highlight that hypertension is not only widely prevalent but also strongly linked to lifestyle-related determinants, emphasizing the need for early detection, preventive strategies, and lifestyle modification interventions at the community level.

LIMITATIONS

However, the study had certain limitations. Being a cross-sectional study, it could not establish causal relationships between risk factors and hypertension. The study was conducted in a single urban field practice area, which may limit the generalizability of the findings to other populations, particularly rural settings. Some data, especially related to behavioral risk factors such as tobacco use, alcohol intake, and dietary practices, were self-reported and may be subject

to recall bias or underreporting. Additionally, certain factors such as detailed dietary patterns, physical activity levels, and psychological stress were not explored in depth.

RECOMMENDATIONS

Based on the findings, it is recommended that regular community-based screening programs be strengthened for early detection of hypertension and pre-hypertension. Health education and behavior change communication strategies should be implemented to promote healthy lifestyles, including reduction of salt intake, cessation of tobacco and alcohol use, maintenance of optimal body weight, and stress management. Integration of hypertension screening and counseling into primary healthcare services should be emphasized. Furthermore, family-based and community-based interventions should be encouraged to address shared risk factors. Future studies should consider multicentric and longitudinal designs to better understand causal relationships and evaluate the effectiveness of intervention strategies.

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