

Urban Lifestyle and Hypertension: An Institution-based Study among Staff and Students of University of Lucknow

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Abstract

Introduction: Hypertension is a major non-communicable disease and an important public health concern worldwide. Rapid urbanization and lifestyle changes, including physical inactivity, unhealthy diet, obesity, tobacco use, alcohol consumption, stress, and excess salt intake, have increased the risk of hypertension among urban populations.

Objective: This study aimed to assess the prevalence of hypertension and its association with socio-demographic and urban lifestyle factors among staff and students of the University of Lucknow.

Methods: An institution-based cross-sectional study was conducted among 200 staff and students of the University of Lucknow. Data were collected using a structured pre-tested questionnaire. Anthropometric measurements and blood pressure readings were recorded using standard procedures. Data were analyzed using Microsoft Excel. Frequencies, percentages, and chi-square tests were used to assess associations.

Results: The prevalence of hypertension was 19.5%, while 11.5% of participants were pre-hypertensive. Hypertension was significantly higher among staff members compared to students. Significant associations were found between hypertension and increasing age, physical inactivity, higher BMI, high-risk Waist-Hip Ratio, tobacco use, alcohol consumption, extra salt intake, and family history of hypertension.

Conclusion: The study concludes that urban lifestyle factors play an important role in hypertension among university populations. Regular screening, health education, lifestyle modification, physical activity promotion, dietary control, and stress management programs are recommended to reduce hypertension risk within academic institutions.

Keywords: Hypertension, urban lifestyle, BMI, Waist-Hip Ratio, tobacco use.

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INTRODUCTION

Hypertension is one of the most common non-communicable diseases and a leading cause of cardiovascular morbidity and mortality worldwide. It is a major modifiable risk factor for coronary artery disease, stroke, heart failure, chronic kidney disease, and premature death. According to the World Health Organization (WHO), approximately 1.28 billion adults aged 30–79 years are living with hypertension globally, and nearly two-thirds of these individuals reside in low- and middle-income countries.¹ The growing burden of hypertension has become a serious public health challenge, particularly in rapidly urbanizing countries such as India.

Urbanization has significantly transformed patterns of living, occupational structures, dietary habits, and physical activity.

While urban development has improved access to education, healthcare, and economic opportunities, it has also contributed to unhealthy lifestyle behaviors such as sedentary living, high consumption of processed foods, obesity, psychological stress, tobacco use, and alcohol intake. These lifestyle transitions are strongly associated with the increasing prevalence of hypertension and other metabolic disorders.²

In India, hypertension has emerged as a major health concern due to rapid epidemiological transition from communicable diseases to non-communicable diseases. National studies and surveys indicate that hypertension prevalence is considerably higher in urban populations compared to rural populations because of lifestyle-related risk factors. The National Family Health Survey (NFHS-5) reported

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increasing prevalence of elevated blood pressure among Indian adults, highlighting the urgent need for preventive interventions and early detection strategies.³

University populations represent an important urban subgroup exposed to multiple hypertension-related risk factors. Academic staff frequently experience occupational stress, prolonged sitting, and limited physical activity due to desk-based work. Similarly, students are increasingly adopting unhealthy lifestyle behaviors including irregular eating patterns, fast-food consumption, excessive screen time, inadequate sleep, and reduced physical activity. Academic competition and psychological stress further contribute to cardiovascular risk among young adults. These changing lifestyle patterns make university environments an important setting for studying hypertension and associated determinants.

Hypertension is often referred to as a “silent killer” because individuals may remain asymptomatic for years until serious complications develop. Persistent elevation of blood pressure gradually damages blood vessels and target organs, leading to severe cardiovascular and renal complications.⁴ Despite increasing awareness regarding hypertension, many individuals fail to adopt healthy preventive behaviors, resulting in a significant gap between knowledge and practice.

Several studies have demonstrated strong associations between urban lifestyle factors and hypertension. Physical inactivity has been identified as one of the major contributors to elevated blood pressure and cardiovascular disease.⁵ Similarly, obesity, particularly central obesity assessed through Waist-Hip Ratio (WHR), has shown strong correlation with hypertension risk. Tobacco use and alcohol consumption further increase blood pressure through sympathetic stimulation and vascular damage.⁶ Chronic stress associated with urban and occupational environments also contributes significantly to hypertension through activation of neuroendocrine pathways.⁷

Although numerous community-based studies on hypertension have been conducted in India, institution-based research focusing on university staff and students remains limited, particularly in North India. Most available studies either focus exclusively on students or on older working populations, leaving a gap in understanding the combined influence of urban lifestyle behaviors within academic settings. Therefore, the present study titled “Urban Lifestyle and Hypertension: An Institution-Based Study among Staff and Students of University of Lucknow” was undertaken to assess the prevalence of hypertension and examine its association with modifiable urban lifestyle factors.

The findings of this study are expected to contribute to the development of institution-based health promotion strategies, regular screening programs, and lifestyle modification interventions aimed at reducing the burden of hypertension and improving cardiovascular health within academic communities.

MATERIALS AND METHODS

Study Design

This study followed an institution-based cross-sectional study design to assess the association between urban lifestyle factors and hypertension among staff and students at University of Lucknow.

Area of the Study

The present study was conducted at University of Lucknow, one of the major academic institutions in North India. The study included both students and staff members of the university. Data collection was carried out within the university premises over a period of two months from March 2026 to April 2026. The institution-based setting was selected to assess the influence of urban lifestyle factors on hypertension among individuals exposed to academic, occupational, and sedentary lifestyle patterns commonly observed in urban university environments.

Sample Size

The sample size for the study was calculated using the Kish and Leslie formula for single population proportion:

$$n = \frac{Z^2 pq}{d^2}$$

Where:

- n = Required sample size
- Z = Standard normal deviate at 95% confidence interval (1.96)
- p = Estimated prevalence of hypertension (15%)
- $q = 1 - p$
- d = Margin of error (5%)

Using these parameters, the calculated sample size was approximately 196 participants. After adding 10% to account for possible non-response and incomplete data, the final sample size was estimated to be 216 participants. However, complete responses from 200 participants were obtained and included in the final analysis.

Data Collection Tool

Data collection was carried out after obtaining prior permission from the concerned university authorities and ethical approval from the institutional review body. The participants were approached within the university campus during working and academic hours. The purpose and objectives of the study were clearly explained to all eligible participants, and written informed consent was obtained before data collection.

A structured and pre-tested questionnaire was used to collect information regarding socio-demographic characteristics, lifestyle practices, dietary habits, physical activity, tobacco and alcohol consumption, family history of hypertension, and health-seeking behavior. Face-to-face interviews were conducted to ensure accuracy and completeness of responses. The questionnaire mainly consisted of close-ended and multiple-choice questions to facilitate uniformity in data recording and statistical analysis. Anthropometric measurements including height, weight, waist circumference, and hip circumference were measured using standard procedures and calibrated instruments. Body Mass Index (BMI) and Waist-Hip Ratio (WHR) were calculated using standard formulas.

Blood pressure was measured using a standardized digital sphygmomanometer under resting conditions. Participants were advised to remain seated quietly for at least five minutes before measurement. Two blood pressure readings were recorded, and the average value was

considered for analysis. All measurements were taken systematically to maintain consistency and reliability of data.

Statistical Analysis

Collected data were entered into Microsoft Excel and analyzed using descriptive and inferential statistical methods. Frequency, percentage, mean, and cross-tabulation were used to summarize data. Associations between lifestyle factors and hypertension status were assessed using chi-square test and comparative analysis wherever applicable.

Ethical Considerations

The study was conducted in accordance with standard ethical principles for human research. Participation was entirely voluntary, and informed consent was obtained from all participants before data collection. Confidentiality and anonymity of participants were strictly maintained throughout the study. Participants were informed that the collected data would be used only for academic and research purposes. Individuals identified with elevated blood pressure were advised regarding further medical consultation and lifestyle modification.

RESULTS

Data from 200 participants were analyzed to assess the prevalence of hypertension and its association with socio-demographic and urban lifestyle factors among staff and students of the University of Lucknow. The mean age of participants was 37.18 ± 13.39 years.

Socio-demographic characteristics of study participants

The majority of participants were male 132 (66.0%), while females constituted 68 (34.0%) of the study population. Staff members represented 120 (60.0%) participants, whereas students accounted for 80 (40.0%). The largest proportion of participants belonged to the ≤ 25 years age group 59 (29.5%), followed by the 46–55 years age group 44 (22.0%).

Table 1: Socio-demographic characteristics of study participants.

Variable	Category	Frequency	Percentage
Age group	≤ 25 years	59	29.5%
	26–35 years	37	18.5%
	36–45 years	39	19.5%
	46–55 years	44	22.0%
	≥ 56 years	21	10.5%
Sex	Male	132	66.0%
	Female	68	34.0%
Participant category	Staff	120	60.0%
	Student	80	40.0%

Prevalence of hypertension among study participants

The overall prevalence of hypertension among the participants was 19.5%, while 11.5% were found to be pre-hypertensive. Most participants 138 (69.0%) had normal blood pressure.

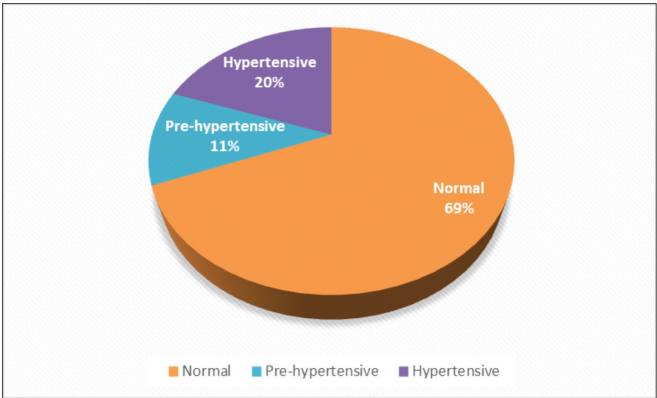


Figure 1: Prevalence of hypertension among study participants.

Overall, 31.0% of the study population had either pre-hypertension or hypertension, indicating a considerable cardiovascular risk within the university population.

Table 2: Prevalence of hypertension among study participants.

Blood Pressure Status	Frequency	Percentage
Normal	138	69.0%
Pre-hypertensive	23	11.5%
Hypertensive	39	19.5%
Total	200	100.0%

Blood pressure status according to participant category

Hypertension was much higher among staff members 38/120 (31.7%) compared to students 1/80 (1.3%). Pre-hypertension was also more common among staff members. The association between participant category and hypertension was statistically significant $\chi^2 = 26.39$, $p < 0.001$. This suggests that occupational lifestyle, work-related stress, sedentary behavior, and age-related factors may contribute to higher hypertension risk among staff members.

Table 3: Blood pressure status according to participant category.

Participant Category	Total	Normal	Pre-hypertensive	Hypertensive	χ^2	p -value
Staff	120	62	20	38	26.39	< 0.001
Student	80	76	3	1		
Total	200	138	23	39		

Association between lifestyle and health-related factors with hypertension

A statistically significant association was found between age group and hypertension. Hypertension increased with advancing age, from 0.0% among participants aged ≤ 25 years to 47.6% among participants aged ≥ 56 years. Physical inactivity was significantly associated with hypertension. Participants who did not perform regular physical activity had a higher prevalence of hypertension 36.7% compared to physically active participants 13.9%.

Table 4: Association between lifestyle and health-related factors with hypertension.

Risk Factor	Category	Total	Hypertensive n (%)	Non-hypertensive n (%)	Chi-square	p-value
Age group	≤25 years	59	0 (0.0%)	59 (100.0%)	39.41	<0.001
	26–35 years	37	2 (5.4%)	35 (94.6%)		
	36–45 years	39	11 (28.2%)	28 (71.8%)		
	46–55 years	44	16 (36.4%)	28 (63.6%)		
	≥56 years	21	10 (47.6%)	11 (52.4%)		
Sex	Male	132	31 (23.5%)	101 (76.5%)	3.22	0.073
	Female	68	8 (11.8%)	60 (88.2%)		
Regular physical activity	Yes	151	21 (13.9%)	130 (86.1%)	10.87	0.001
	No	49	18 (36.7%)	31 (63.3%)		
BMI status	Underweight	24	0 (0.0%)	24 (100.0%)	13.51	0.004
	Normal	111	18 (16.2%)	93 (83.8%)		
	Overweight	54	17 (31.5%)	37 (68.5%)		
	Obese	11	4 (36.4%)	7 (63.6%)		
WHR risk status	Low risk	44	1 (2.3%)	43 (97.7%)	13.81	0.001
	Moderate risk	49	8 (16.3%)	41 (83.7%)		
	High risk	106	30 (28.3%)	76 (71.7%)		
Tobacco use	Yes	36	20 (55.6%)	16 (44.4%)	33.61	<0.001
	No	164	19 (11.6%)	145 (88.4%)		
Alcohol consumption	Yes	73	29 (39.7%)	44 (60.3%)	27.97	<0.001
	No	127	10 (7.9%)	117 (92.1%)		
Extra salt intake	Yes	66	23 (34.8%)	43 (65.2%)	13.36	<0.001
	No	134	16 (11.9%)	118 (88.1%)		
Family history of hypertension	Yes	52	25 (48.1%)	27 (51.9%)	34.14	<0.001
	No	148	14 (9.5%)	134 (90.5%)		

BMI status showed a significant association with hypertension. Hypertension was more common among overweight 31.5% and obese 36.4% participants compared to those with normal BMI. Similarly, high-risk WHR was associated with greater hypertension prevalence, highlighting the role of central obesity.

Tobacco use, alcohol consumption, extra salt intake, and family history of hypertension were also significantly associated with hypertension. Sex was not statistically significant at the 5% level $p = 0.073$, although hypertension was comparatively higher among males 23.5% than females 11.8%.

DISCUSSION

The present study assessed the prevalence of hypertension and its association with socio-demographic and urban lifestyle factors among staff and students of the University of Lucknow. The study found that 19.5% of participants were hypertensive and 11.5% were pre-hypertensive. Thus, nearly one-third of the study population had raised blood pressure or were at risk of developing hypertension.

The prevalence of hypertension in the present study was lower than the global estimate reported by the World Health Organization,

which stated that approximately 33% of adults aged 30–79 years worldwide had hypertension in 2024.⁹ This lower prevalence may be due to the inclusion of students and younger participants in the present study, as hypertension is generally less common among younger age groups. However, the finding is comparable with Indian estimates reported by Mohammad *et al.* (2024), who found the overall prevalence of hypertension in India to be 22.6%, with higher prevalence among males than females.¹⁰

In the present study, hypertension was significantly higher among staff members 31.7% compared to students 1.3%. This finding is consistent with the study by Jagtap *et al.* (2024), which reported a high prevalence of hypertension among university employees and found that employees with moderate to high stress levels were more likely to be hypertensive.¹¹ The higher prevalence among staff in the present study may be due to increasing age, occupational stress, prolonged sitting, sedentary work patterns, and reduced physical activity.

Age was significantly associated with hypertension in the present study. Hypertension increased from 0.0% among participants aged ≤25 years to 47.6% among participants aged ≥56 years. Similar findings were reported by Mohammad *et al.* (2024), who observed that hypertension prevalence increased with age in India.¹⁰

This may be explained by age-related vascular changes, reduced arterial elasticity, increased arterial stiffness, and cumulative exposure to behavioral risk factors over time.

Physical inactivity was significantly associated with hypertension. Participants who did not perform regular physical activity had a higher prevalence of hypertension 36.7% compared to physically active participants 13.9%. This finding is supported by previous evidence showing that sedentary lifestyle is an important modifiable risk factor for hypertension, especially among urban and working populations. Office-based and white-collar workers are more likely to experience hypertension due to long working hours, lack of exercise, and sedentary lifestyle.¹²

The present study also found a significant association between BMI and hypertension. Hypertension was more common among overweight 31.5% and obese 36.4% participants compared to those with normal BMI. This finding is consistent with earlier Indian studies and systematic reviews, which identified obesity and high BMI as important risk factors for hypertension.¹³ Excess body weight may increase blood pressure through insulin resistance, sympathetic nervous system activation, sodium retention, and increased vascular resistance.

Waist-Hip Ratio was also significantly associated with hypertension. Participants with high-risk WHR had a higher prevalence of hypertension 28.3% compared to participants with low-risk WHR 2.3%. This finding supports the role of central obesity as an important cardiovascular risk factor. Central fat accumulation is associated with metabolic abnormalities, inflammation, and increased vascular resistance, which may contribute to elevated blood pressure.

Tobacco use showed a strong association with hypertension in the present study. More than half of tobacco users 55.6% were hypertensive compared to 11.6% among non-users. Similar findings have been reported in previous studies, where smoking and tobacco use were significantly associated with hypertension. Tobacco may increase blood pressure through sympathetic stimulation, endothelial dysfunction, arterial stiffness, and vascular injury. A systematic review of Indian studies also identified smoking and tobacco use as major risk factors for hypertension.¹³

Alcohol consumption was significantly associated with hypertension. In the present study, 39.7% of alcohol consumers were hypertensive compared to 7.9% of non-consumers. This finding is similar to earlier studies that reported a higher prevalence of hypertension among alcohol users. Alcohol can increase blood pressure by activating the sympathetic nervous system, altering vascular tone, increasing cortisol levels, and affecting sodium balance. Borah et al. (2021) also identified alcohol consumption as an important risk factor for hypertension among Indian adults.¹³

Extra salt intake was another significant factor associated with hypertension. Participants who consumed extra salt had a higher prevalence of hypertension 34.8% compared to those who did not consume extra salt 11.9%. This finding is consistent with previous studies that have identified excessive salt intake as a major dietary determinant of hypertension. High sodium intake contributes to water retention, increased blood volume, and increased peripheral vascular resistance, leading to raised blood pressure.

Family history of hypertension was significantly associated with hypertension in the present study. Nearly half of the participants with a positive family history 48.1% were hypertensive compared to 9.5% among those without a family history. This finding is supported by previous evidence showing that family history is an important non-modifiable risk factor for hypertension. The association may be due to genetic predisposition as well as shared family lifestyle practices such as dietary habits, salt intake, physical inactivity, and obesity.

Sex was not statistically significant at the 5% level in the present study, although hypertension was higher among males 23.5% than females 11.8%. This pattern is similar to the national-level findings of Mohammad *et al.* (2024), who reported higher hypertension prevalence among men 24.1% compared to women 21.2% in India.¹⁰ The higher prevalence among males may be related to behavioral risk factors such as tobacco use, alcohol consumption, occupational stress, and lower health-seeking behavior.

Limitations

The study was conducted in a single institution, so the findings may not be generalizable to other university populations. Some lifestyle-related information, such as physical activity, tobacco use, alcohol consumption, and salt intake, was self-reported and may be affected by recall or reporting bias. The sample size was limited to 200 participants, which may affect the wider applicability of the findings.

CONCLUSION

The study found that hypertension was present among 19.5% of participants, while 11.5% were pre-hypertensive. Hypertension was more common among staff members than students. Increasing age, physical inactivity, overweight/obesity, high-risk WHR, tobacco use, alcohol consumption, extra salt intake, and family history were significantly associated with hypertension. The findings highlight the need for regular blood pressure screening, health education, lifestyle modification, physical activity promotion, and stress management programs within university settings.

Declaration of Competing Interests

The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this study.

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