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

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20261064

Original Research Article

Hypertension and obesity in adults: evidence from a cross-sectional study at a tertiary care hospital in Punjab

Kamlesh K. Sharma, Simarjeet Kaur, Narinder K. Walia*, Navjot Kaur, Atul Sharma, Nagdeep, Tanya Gandhi

Institute of Nursing Education and Research, All India Institute of Medical Sciences, Bathinda, Punjab, India

Received: 13 March 2026
Revised: 23 March 2026
Accepted: 02 April 2026

***Correspondence:**
Dr. Narinder K. Walia,
E-mail: narinder_120kaur@hotmail.com

ABSTRACT

Background: Hypertension and obesity are two of the most significant non-communicable diseases (NCDs) contributing to the global burden of morbidity and mortality. India is experiencing a rapid epidemiological transition with rising prevalence of lifestyle-related disorders. Punjab, known for its dietary patterns rich in fats and reduced physical activity levels, shows an even higher prevalence of both conditions compared to the national average. This study aims to investigate the burden of hypertension and obesity among adults at tertiary care hospital, Bathinda Punjab.
Methods: A cross-sectional research design was adopted to assess the burden of hypertension and obesity among 265 adults visiting the outpatient areas of tertiary care hospital, Bathinda, Punjab. Participants were recruited via consecutive sampling technique. Data collection relied on self-structured questionnaires and statistical analysis performed using statistical package for the social sciences (SPSS) version 23.
Results: The findings revealed a concerning high prevalence of hypertension, with 24.2% was in hypertension stage II followed by 22.6% were in pre-hypertension stage etc. It was also found that 36.9% of the participants were overweight and 18.9% of them were obese. The correlation of hypertension with obesity was found statistically significant (r=0.23 as p value<0.01 level of significance).
Conclusions: This study highlights the significant burden of hypertension and obesity in the study population, emphasizing the need for comprehensive management and prevention strategies. Targeted interventions and health literacy enhancement are crucial for improving hypertension outcomes. Early action can mitigate long-term complications.

Keywords: Adults, Hypertension, Obesity, Prevalence, Public health

INTRODUCTION

India's healthcare landscape is grappling with the dual challenge of hypertension and obesity, which continues to pose significant public health concerns despite notable advancements in healthcare and policy implementation.

The World Health Organization (WHO) identifies them as major modifiable risk factors for cardiovascular diseases, stroke, diabetes, and chronic kidney disorders. Worldwide, an estimated 1.28 billion adults aged 30–79 years are hypertensive, with the majority living in low- and middle-income countries, while obesity has nearly tripled since 1975, affecting over 650 million adults. To combat this growing health challenge, global efforts aim to reduce hypertension prevalence by 33% by 2030, underscoring the need for enhanced awareness, detection, and management strategies.[1]

Obesity is also a significant concern, with the prevalence of overweight and obesity increasing by 35.6% and 24.7%, respectively, between 1990 and 2016.[2] The economic burden of hypertension and obesity is substantial, with

estimates suggesting that India loses approximately 6.2% of its GDP annually due to non-communicable diseases.[3]

A study published in The Lancet estimated that the total cost of hypertension in India was approximately ₹1.4 trillion (USD 19.5 billion) in 2016, with a significant proportion of these costs being borne by households.[4]

According to the latest data from the National Family Health Survey (NFHS) 2023, approximately 33.8% of adults in urban areas live with hypertension, while around 27.6% of adults in rural areas live with hypertension.[5] Another study focusing on adults aged 15-49 years found a prevalence of 12.5% in urban areas and 10.6% in rural areas.[6] Similarly, the prevalence of obesity has been increasing, with 20.7% of adults in urban areas and 13.4% in rural areas being obese.[7]

Therefore, this study was undertaken to assess the burden of hypertension and obesity among adults attending a tertiary care hospital in Punjab, with the aim of generating evidence that could guide interventions to reduce the risk of associated complications and improve overall health outcomes.

Primary objective was to estimate the prevalence of hypertension and obesity among adults visiting tertiary care hospital of Bathinda, Punjab.

Secondary objective was to find out the correlation of hypertension and obesity among patients visiting tertiary care hospital of Bathinda, Punjab.

METHODS

Study design and setting

This cross-sectional study was conducted at a tertiary care hospital (AIIMS) of Bathinda, Punjab, India. The study was carried out in the year 2023.

Study population

The study population consisted of adults (18-60 years) visiting various outpatient departments (OPDs) at tertiary care hospital (AIIMS) Bathinda. Adults of all ages and genders were included in the study.

Sampling technique and sample size

All those eligible and willing to participate were included consecutively and total 265 Adults were screened on the occasion of World Heart Day 2023.

Inclusion and exclusion criteria

Adults who visited the OPDs aged 18-60 years and were willing to participate included in the study, and adults who were critically ill or pregnant females were excluded from the study.

Ethical consideration and data collection

Written Informed consent was taken from the study participants. A team of trained researchers collected data from the study participants using a pre-designed questionnaire. The questionnaire included questions on medical history and anthropometric measurements such as height, weight, and blood pressure were recorded. The data was analyzed using statistical package for the social sciences (SPSS) version 23.

Anthropometric measurements

Body weight was measured through an analogue medical scale. Body height was measured using a standard stadiometer. Body weight and height were measured to the nearest 0.1 kg and 0.1 cm, respectively.

BMI was defined as weight (kilograms) divided by the square of height (meters). The BMI cutoffs recommended by the WHO were used. The classes of BMI reported by the WHO are: >18.5 kg/m^2 underweight, 18.5–24.9 kg/m^2 for normal, 25.0–29.9 kg/m^2 for overweight, and >30 kg/m^2, for obesity.[8]

Blood pressure measurements were obtained from all participants after a 5-minute resting period in a seated position and were asked about recent consumption of coffee, nicotine, or other substances that may affect blood pressure readings. Measurements were taken at 30 seconds intervals between cuff inflations, and an average of three measurements was used to ensure accuracy. All measurements were performed in a dedicated area with optimal room temperature and respect for participant privacy.

The World Health Organization (WHO) and International Society of Hypertension (ISH) 1999–2003 guidelines categorizes blood pressure (BP) for adults (≥18 years) as follows.[9,10]

Medical history and lifestyle assessment

Before participating in the study, each participant underwent a comprehensive medical history and lifestyle assessment to identify potential factors that may influence blood pressure readings. Specifically, inquiries were made regarding the following.

Pre-existing medical conditions

Participants were asked if they had a prior diagnosis of hypertension (high blood pressure), diabetes mellitus, anemia, high cholesterol, or kidney disease.

Medication use

Participants were asked if they were currently taking any medications that may affect blood pressure.

Cardiovascular history

Participants were asked if they had a history of heart attack, stroke, or other cardiovascular events.

Lifestyle habits

Participants were asked about their smoking habits, and use of tobacco products.

Other relevant factors

Participants were also asked about other factors that may impact blood pressure.

RESULTS

Table 1 revealed the demographic data that the study population consisted of 63% males and 37% females, with the majority (42.3%) falling within the 32-45-year age group. Most of them were not having personal history of high BP, diabetes, medication use, anemia, high cholesterol, heart attack, stroke, kidney diseases, smoking and tobacco.

Table 1: Categories of blood pressure (WHO & ISH: 1999-2003).10

S. no.	Category	Systolic BP (mmHg)	Diastolic BP (mmHg)
1	Normal	<120	<80
2	Pre-hypertension	120–139	80-89
3	Hypertension – stage 1	140–159	90–99
4	Hypertension – stage 2	≥160	≥100
5	Hypertension – stage 3	≥180	≥110

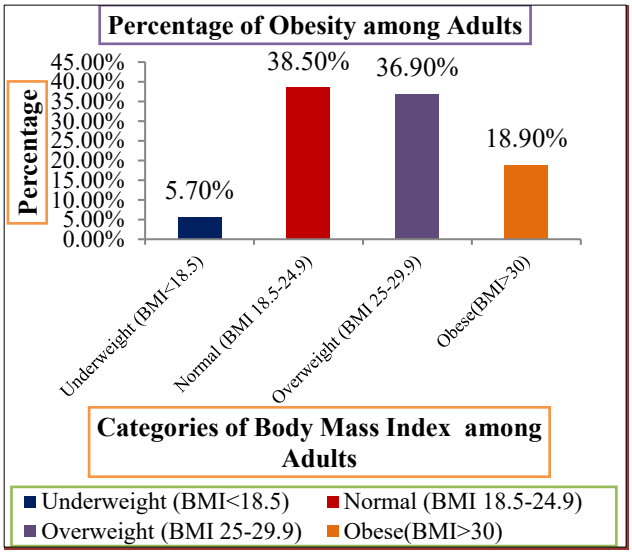

Figure 1: Bar diagram showing percentage of obesity among adults.

Figure 1 depicts BMI categories of patients i.e. about 36.9% of the patients were overweight and 18.9% of them were obese. Majority (38.5%) of patients were normal and only 5.7% of them were underweight.

Table 2 depicts the blood pressure classification revealed that 18.2% (n=48) of the participants had normal blood pressure, while 22.6% (n=60) were pre-hypertensive. Furthermore, 21.9% (n=58) were classified as having stage 1 hypertension, 24.2% (n=64) as stage 2 hypertension, and 13.4% (n=35) as stage 3 hypertension.

Table 2: Distribution of frequency and percentage of adults as per variables (n=265).

Variables	Percentage (frequency)
Age (years)	
18-31	59 (22.3)
32-45	112 (42.3)
46-60	94 (35.4)
Gender	
Male	167 (63)
Female	98 (37)
History of personal high BP	
Yes	117 (44.2)
No	148 (55.8)
Medication use	
Yes	75 (28.3)
No	190 (71.7)
Diabetes	
Yes	25 (9.4)
No	240 (90.6)
Anaemia	
Yes	29 (10.9)
No	236 (89.1)
High cholesterol	
Yes	34 (12.8)
No	231 (87.2)
Heart attack	
Yes	18 (6.8)
No	247 (93.2)
Stroke	
Yes	17 (6.4)
No	248 (93.6)
Kidney disease	
Yes	20 (7.5)
No	245 (92.5)
Smoking	
Yes	23 (8.7)
No	242 (91.3)
Tobacco	
Yes	7 (2.3)
No	258 (97.7)

Table 3 showing the correlation of hypertension with obesity was found statistically significant (r=0.230**) as p

value <0.01 level of significance calculated through Karl Pearson correlation coefficient.

Table 3: Percentage and frequency distribution of hypertension among adults (n=265).

Category	Values	Frequency (%)
Normal	Systolic <120 mmHg Diastolic <80 mmHg	48 (18.2)
Pre-hypertension	Systolic 120-139 mmHg Diastolic 80-89 mmHg	60 (22.6)
Hypertension stage I	Systolic 140-159 mmHg Diastolic 90-99 mmHg	58 (21.5)
Hypertension stage II	Systolic ≥160 mmHg Diastolic ≥100 mmHg	64 (24.2)
Hypertension stage III	Systolic ≥180 mmHg Diastolic ≥110 mmHg	35 (13.4)

Table 4: To find out correlation of hypertension and obesity among adults.

Variables	Mean±SD	r	P value
Hypertension	130.5±19.86	0.230	0.000
Obesity	25.74±4.83		

DISCUSSION

The present cross-sectional study evaluated the prevalence of hypertension and obesity among adults attending a tertiary care hospital in Bathinda, Punjab, and examined the association between these two major non-communicable disease risk factors. The findings reveal a substantial burden of both conditions, highlighting an important public health concern within this population.

A large proportion of participants demonstrated elevated blood pressure levels, including those classified as pre-hypertensive and hypertensive. Most individuals belonged to the 32–45 years and 46–60-year age groups, indicating that middle-aged adults are particularly vulnerable to hypertension and excess body weight. This observation is consistent with longitudinal evidence indicating a progressive rise in blood pressure with advancing age, particularly when accompanied by increased body weight.[11,12]

Multimorbid conditions were also noteworthy, with diabetes present in 9.4% of participants, dyslipidemia in 12.8%, and kidney disease in 7.5%. These findings are consistent with the report by Dalal et al, which demonstrated that the coexistence of hypertension, type 2 diabetes, and dyslipidemia substantially increases cardiovascular and metabolic risk.[13] The present findings also align with Raheja et al, who reported a significant association between increased body mass index and hypertension, identifying obesity as a major contributor to elevated blood pressure.[14]

Despite the high prevalence of hypertension, only 28.3% of participants were receiving antihypertensive medication, highlighting gaps in awareness, initiation of treatment, and long-term adherence. Similar findings have been reported by Sudharsanan et al, who documented substantial treatment discontinuation and irregular antihypertensive drug intake among diagnosed adults in urban India.[15]

In the current study, 22.6% of adults were pre-hypertensive, while 21.9–24.2% had stage 1–2 hypertension. In contrast, Geevar et al reported 33.3% pre-hypertension and 11.2% hypertension among young adults in Kerala, suggesting higher pre-hypertension but lower clinical hypertension in younger populations.[16]

Notably, 24.2% and 13.4% of participants were found to have stage 2 and stage 3 hypertension, respectively, conditions associated with a high risk of cardiovascular and renal complications. This is supported by hospital-based evidence from Kashmir, where hypertensive patients exhibited high rates of stroke, diabetes, dyslipidemia, kidney disease, and heart disease, underscoring the severe morbidity associated with advanced or poorly controlled hypertension.[17] Overweight and obesity were prevalent in the study population, with 36.9% classified as overweight and 18.9% as obese. Comparable rates of abdominal obesity have been reported among adults in Ludhiana district, supporting the widespread nature of excess body weight across Punjab.[18]

A statistically significant positive correlation was observed between obesity and hypertension ($r=0.230$, $p<0.01$), indicating that higher body mass index is associated with increased blood pressure. This observation is consistent with national urban trends and large pooled analyses demonstrating strong associations between both general and abdominal adiposity and hypertension across diverse populations.[11,12]

In conclusion, the present study highlights the prevalence of hypertension and obesity along with reinforcement of significant co-relation between obesity and hypertension among adults attending a tertiary care hospital. Although the observed correlation was moderate, it is clinically meaningful and highlights the importance of weight management strategies in the prevention and control of hypertension.

Limitations

Sample may not be representative of the general population of setting due to opportunistic research. There can be self- reported biases in reporting of lifestyle habits, and medical history.

CONCLUSION

This study emphasizes the need for comprehensive hypertension management and prevention strategies in

India, particularly among high-risk groups such as middle-aged individuals and those with obesity/overweight. Targeted interventions, health literacy enhancement, and financial and logistical support are crucial to improving hypertension outcomes and reducing the burden of cardiovascular disease. Policymakers and healthcare providers should prioritize these strategies to address the growing burden of hypertension and obesity at regional and national level.

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. 2023. Available at: https://www.who.int/news-room/fact-sheets/detail/hypertension#:~:text=Modifiable%20risk%20factors%20include%20unhealthy. Accessed on 18 January 2026.
2. Gupta R, Gupta S. Prevalence of Overweight and Obesity in India: A Systematic Review. J Clin Diagn Res. 2018;12(9):OE01-6.
3. Reddy KS, Patel V, Jha P. The burden of non-communicable diseases in India. Lancet. 2019;394(10193):213-23.
4. Patel V, Chatterji S, Chisholm D. The economic burden of hypertension in India. Lancet. 2019;394(10193):224-35.
5. Kumar S, Kumar A, Singh AK. Obesity: A major risk factor for non-communicable diseases. Indian J Community Med. 2019;44(3):141-4.
6. Ministry of Health and Family Welfare. National Family Health Survey (NFHS-5) 2019-21. Government of India. 2022. Available at: https://mohfw.gov.in/sites/default/files/NFHS-5_Phase-II_0.pdf. Accessed on 18 January 2026.
7. Singh S, Kumar A, Kumar S. Early detection and management of hypertension: A review. J Clin Diagn Res. 2018;12(9):OE07-11.
8. World Health Organization. Global Health Observatory data repository. Available at: https://www.who.int/data/gho/data/themes/topics/topic-details/GHO/body-mass-index. Accessed on 18 January 2026.
9. World Health Organization. WHO Technical Specifications for Automated Non-Invasive Blood Pressure Measuring Devices with Cuff. 2020. Available at: https://iris.who.int/bitstream/handle/10665/372965/9789240077348-eng.pdf?sequence=1. Accessed on 18 January 2026.
10. Iqbal AM, Jamal SF. Essential Hypertension. In: StatPearls. Treasure Island (FL): StatPearls Publishing. 2023.
11. Singh A, Let S, Tiwari S, Chakrabarty M. Spatiotemporal variations and determinants of overweight/obesity among women of reproductive age in urban India during 2005–2021. BMC Public Health. 2023;23:1933.
12. NCD Risk Factor Collaboration (NCD-RisC). General and abdominal adiposity and hypertension in eight world regions: a pooled analysis of 837 population-based studies with 7·5 million participants. Lancet. 2024;404(10455):851-63.
13. Dalal J, Chandra P, Chawla R, Kumar V, Abdullakutty J, Natarajan V, et al. Clinical and Demographic Characteristics of Patients with Coexistent Hypertension, Type 2 Diabetes Mellitus, and Dyslipidemia: A Retrospective Study from India. Drugs Real World Outcomes. 2024;11(1):167-76.
14. Raheja L, Sachan D, Bajpai PK, Singh NP, Kumar A, Srivastava DK, et al. Prevalence of Overweight and Obesity Among Adults and Their Association With Diabetes, Hypertension, and Dyslipidemia: A Comparative Cross-Sectional Study in Urban and Rural Areas of the Etawah District. Cureus. 2025;17(6):e86946.
15. Sudharsanan N, Ali MK, McConnell M. Hypertension knowledge and treatment initiation, adherence, and discontinuation among adults in Chennai, India. BMJ Open. 2021;11:e040252.
16. Geevar Z, Krishnan MN, Venugopal K, Sanjay G, Harikrishnan S, Mohanan PP, et al. Prevalence, Awareness, Treatment, and Control of Hypertension in Young Adults (20-39 Years) in Kerala, South India. Front Cardiovasc Med. 2022;9:765442.
17. Ahmad SN, Gul I, Sultan ST. Prevalence and associated factors of hypertension complications among hypertensive patients: a hospital-based study. Int J Acad Med Pharm. 2023;5(1):34-8.
18. Kaur P, Kaur G, Singh A. Comparison of prevalence of metabolic disorders of urban and rural adults of Punjab, India. Indian J Public Health. 2023;67(4):520-2.

Cite this article as: Sharma KK, Kaur S, Walia NK, Kaur N, Sharma A, Nagdeep, et al. Hypertension and obesity in adults: evidence from a cross-sectional study at a tertiary care hospital in Punjab. Int J Community Med Public Health 2026;13:xxx-xx.