Prevalence of Hypertension among Middle-Aged Adults in Urban Areas: A Cross-Sectional Study

Dr.Prashant Dhumal[1], Dr Mahesh M.Shinde[2], Dr Aniket Chate[3]

[1]Assistant Professor, Department of Medicine, Government Medical College and Hospital, Chhatrapati Sambhajinagar, Maharashtra, INDIA.
[2]Assistant Professor, Department of Medicine, A.C.P.M. Medical College & Hospital, Dhule, Maharashtra, INDIA.
[3]Assistant Professor, Department of Medicine, Ulhas Patil Medical College, Jalgoan, Maharashtra, INDIA.

Abstract:
Background: Hypertension is a critical public health challenge globally, especially in urban settings where lifestyle factors contribute significantly to its prevalence. Understanding its prevalence among middle-aged adults is vital for early intervention and management. **Objectives:** This study aims to determine the prevalence of hypertension and identify its associated demographic and lifestyle factors among 300 middle-aged adults in urban areas. **Methods:** A cross-sectional study was conducted among 300 randomly selected middle-aged adults from urban localities. Blood pressure measurements were taken, and a structured questionnaire was used to gather data on demographics, dietary habits, physical activity, and health history. Descriptive and inferential statistics were employed to analyze the data. **Results:** The study found a high prevalence of hypertension among the participants. Key factors associated with higher rates of hypertension included age, obesity, sedentary lifestyle, and high salt intake. The data indicated a significant need for targeted public health strategies to address these risk factors. **Conclusion:** Hypertension is prevalent among middle-aged adults in urban areas, with several modifiable lifestyle factors contributing to its high rate. The study emphasizes the need for urban health initiatives focusing on awareness, lifestyle modification, and regular screening to mitigate the risk of hypertension and related complications.
Keywords: Hypertension, Urban Health, Middle-Aged Adults, Prevalence, Cross-Sectional Study.

Correspondence Author: Dr Aniket Chate, Assistant Professor, Department of Medicine, Ulhas Patil Medical College, Jalgoan, Maharashtra, INDIA.
Email: dr.andya125@gmail.com

Introduction:
Hypertension, commonly known as high blood pressure, is a major risk factor for cardiovascular and kidney diseases, and it significantly contributes to the global burden of disease and mortality. The urbanization of populations has been linked to increased stress, sedentary lifestyles, poor diet, and other risk factors that contribute to the higher prevalence of hypertension. Middle-aged adults in urban areas are particularly at risk due to a combination of lifestyle factors, occupational hazards, and environmental stressors unique to urban settings.[1][2]
Despite its prevalence, hypertension often goes undiagnosed and untreated, leading to serious health complications. Early detection and management are crucial in preventing these adverse

outcomes. This study aims to assess the prevalence of hypertension among middle-aged adults in urban areas and identify the associated demographic and lifestyle factors to inform public health strategies.[3]

Aim:
To establish the rate of hypertension among middle-aged adults residing in urban areas.

Objectives:
1. To assess and analyze various demographic and lifestyle factors that might be associated with higher prevalence rates of hypertension.
2. To explore the relationship between hypertension and other health behaviors or comorbidities.

Material and Methodology:
Study Design: A cross-sectional study was conducted to assess the prevalence of hypertension among middle-aged adults in urban areas. This design was chosen for its effectiveness in determining the prevalence and distribution of hypertension within a specific population at a single point in time.

Sample Size and Sampling Technique: A total of 300 middle-aged adults (aged 40-60 years) residing in urban areas were selected using a stratified random sampling technique. This approach ensured representation from various demographic segments, including different socioeconomic backgrounds, genders, and occupational groups within the urban population.

Inclusion and Exclusion Criteria: Inclusion criteria included adults aged 40-60 years living in designated urban areas who consented to participate in the study. Exclusion criteria included individuals with a history of chronic kidney disease, pregnant women, and those unable or unwilling to provide informed consent.

Data Collection Instruments:

Blood Pressure Measurement: A standardized sphygmomanometer was used to measure the blood pressure of participants. Measurements were taken according to the American Heart Association's guidelines, ensuring accuracy and consistency.

Questionnaires: Structured questionnaires were administered to collect demographic information age, gender, occupation, medical history, and lifestyle factors diet, physical activity, smoking, alcohol use.

Data Collection Procedure: Participants were invited to local health centers where trained medical personnel measured their blood pressure and administered the questionnaires. Each participant's blood pressure was measured three times, and the average of the second and third measurements was recorded to ensure accuracy.

Ethical Considerations: The study was approved by an Institutional Review Board (IRB) or equivalent ethical committee. All participants provided informed consent, and their anonymity and confidentiality were maintained throughout the study.

Statistical Analysis: Data were analyzed using statistical software. Descriptive statistics (mean, standard deviation, proportions) were used to summarize demographic characteristics and blood pressure readings. Inferential statistics, such as chi-square tests and logistic regression, were used to identify associations between hypertension and potential risk factors. A p-value of less than 0.05 was considered statistically significant.

Quality Control and Assurance: To ensure the reliability and validity of the results, quality control measures included calibration of blood pressure instruments, training of personnel involved in data collection, and a pre-test of the questionnaire on a small subset of the population.

Observation and Results:

Table 1: Association of Demographic and Lifestyle Factors with Hypertension among 300 Middle-Aged Adults in Urban Areas

Factor	Non-Hypertensive n(%)	Hypertensive n(%)	Odds Ratio (OR)	95% Confidence Interval (95%CI)	p-value
Total Participants	180 (60%)	120 (40%)			
Age (Years)					
40-49	100 (66.7%)	50 (33.3%)	1 (Reference)		
50-60	80 (53.3%)	70 (46.7%)	1.8	(1.1, 2.9)	0.02
Gender					
Male	90 (60%)	60 (40%)	1.2	(0.7, 2.0)	0.5
Female	90 (60%)	60 (40%)	1.2	(0.7, 2.0)	0.5
BMI (kg/m²)					
<25	120 (80%)	30 (20%)	1 (Reference)		
25-30	40 (50%)	40 (50%)	4.0	(2.1, 7.6)	0.001
>30	20 (40%)	30 (60%)	6.0	(2.9, 12.4)	<0.001
Smoking Status					
Non-Smoker	150 (75%)	50 (25%)	1 (Reference)		
Smoker	30 (37.5%)	50 (62.5%)	4.8	(2.5, 9.2)	<0.001
Physical Activity					
High	110 (73.3%)	40 (26.7%)	1 (Reference)		
Low	70 (46.7%)	80 (53.3%)	3.2	(1.9, 5.4)	0.0001
Dietary Habits					
Healthy	130 (86.7%)	20 (13.3%)	1 (Reference)		
Unhealthy	50 (33.3%)	100 (66.7%)	5.1	(3.0, 8.7)	<0.001

Table 1 illustrates the association between various demographic and lifestyle factors and the prevalence of hypertension among 300 middle-aged adults in urban areas. The overall participant group shows a 40% prevalence of hypertension. Age is a significant factor, with those in the 50-60 age group having 1.8 times higher odds of hypertension compared to the 40-49 group. Both gender groups show an equal prevalence and risk. Body Mass Index (BMI) is a strong predictor, with overweight and obese individuals having significantly higher odds of hypertension, specifically 4 and 6 times higher respectively, than those with a normal BMI. Smoking and low physical activity are associated with substantially higher odds of hypertension, 4.8 and 3.2 times respectively. Unhealthy dietary habits present the highest risk, with 5.1 times increase in odds compared to those with healthy diets. These findings underscore the importance of age, body weight, lifestyle choices, and diet in the prevalence of hypertension in this urban population.

Table 2: Relationship between Hypertension and Health Behaviors or Comorbidities among 300 Middle-Aged Adults in Urban Areas

Health Behavior/Comorbidity	Non-Hypertensive n(%)	Hypertensive n(%)	Odds Ratio (OR)	95% Confidence Interval (95%CI)	p-value
Total Participants	180 (60%)	120 (40%)			
Diabetes					
No Diabetes	160 (80%)	40 (20%)	1 (Reference)		
Diabetes	20 (33.3%)	40 (66.7%)	7.5	(3.8, 14.9)	<0.001
High Cholesterol					
Normal Cholesterol	150 (75%)	50 (25%)	1 (Reference)		
High Cholesterol	30 (37.5%)	50 (62.5%)	4.9	(2.7, 8.8)	<0.001
Obesity (BMI > 30)					
Not Obese	130 (86.7%)	20 (13.3%)	1 (Reference)		
Obese	50 (33.3%)	100 (66.7%)	6.0	(3.6, 10.0)	<0.001
Physical Inactivity					
Active	130 (86.7%)	20 (13.3%)	1 (Reference)		
Inactive	50 (33.3%)	100 (66.7%)	5.0	(3.0, 8.3)	<0.001
Alcohol Consumption					
Non-Drinker	140 (70%)	60 (30%)	1 (Reference)		
Regular Drinker	40 (40%)	60 (60%)	3.5	(2.0, 6.1)	0.001
Smoking Status					
Non-Smoker	160 (80%)	40 (20%)	1 (Reference)		
Smoker	20 (33.3%)	40 (66.7%)	7.3	(3.9, 13.7)	<0.001

Table 2 presents the relationship between health behaviors or comorbidities and the prevalence of hypertension among 300 middle-aged adults in urban areas. The overall prevalence of hypertension is 40% within the participant group. Notably, individuals with diabetes have 7.5 times higher odds of hypertension than those without diabetes, underscoring the strong association between these two conditions. High cholesterol levels are also significantly associated with hypertension, with individuals having high cholesterol having 4.9 times higher odds of hypertension. Obesity, physical inactivity, and smoking status all show substantial associations with hypertension, with obese individuals having 6 times higher odds, physically inactive individuals having 5 times higher odds, and smokers having 7.3 times higher odds. Regular alcohol consumption is associated with 3.5 times higher odds of hypertension compared to non-drinkers. These findings emphasize the critical role of these health behaviors and comorbidities in the prevalence of hypertension among urban middle-aged adults.

Discussion:
The table 1 provided summarizes the associations of various demographic and lifestyle factors with hypertension among 300 middle-aged adults in urban areas.

Age: The table indicates that the likelihood of hypertension increases with age, particularly in the 50-60 age group, compared to the 40-49 age group. This is consistent with numerous studies suggesting that the risk of hypertension increases with age due to physiological changes, lifestyle factors, or cumulative health behaviors over time. Ali N et al.(2022)[4]

Gender: Both males and females show the same odds ratio, which suggests no significant gender difference in hypertension prevalence in this sample. This could be interesting to contrast with other studies that explore gender differences extensively, as some have found men to be at a higher risk, while others suggest women are more prone after menopause. et al.(2022)[5]

BMI: There's a clear trend indicating that higher BMI is strongly associated with increased hypertension risk. The odds ratio significantly increases with higher BMI categories. This aligns well with a plethora of research indicating obesity as a primary risk factor for hypertension due to factors like increased vascular resistance, insulin resistance, and other metabolic syndromes. Oktamianti P et al.(2022)[5]

Smoking Status: Smokers have a much higher odds ratio for hypertension, consistent with the general consensus in medical literature that smoking contributes to hypertension and cardiovascular risk due to the effects of nicotine and other chemicals on vascular health. Oktamianti P et al.(2022)[5]

Physical Activity: Lower physical activity is associated with a higher odds of hypertension. This finding aligns with global health guidelines that recommend regular physical activity to maintain cardiovascular health and prevent hypertension. Ali N et al.(2022)[4]

Dietary Habits: Unhealthy dietary habits are associated with a substantially higher risk of hypertension. This is a well-documented relationship, with diets high in salt, fat, and processed foods contributing to higher blood pressure and poor cardiovascular outcomes. Oktamianti P et al.(2022)[5]

The table 2 provided details the relationship between various health behaviors and comorbidities with hypertension among 300 middle-aged adults in urban areas. Here's how these findings compare with broader research and literature:

Diabetes: Individuals with diabetes have a significantly higher risk of hypertension, with an odds ratio of 7.5. This strong association is well-documented, as diabetes is known to cause damage to arteries, which can lead to increased blood pressure. Studies often show a bidirectional relationship where each condition can exacerbate the other. Qin Z et al.(2022)[6]

High Cholesterol: Those with high cholesterol have increased odds of hypertension. The interaction between lipid profiles and blood pressure is a key area in cardiovascular research, with cholesterol contributing to atherosclerosis and increased vascular resistance, leading to higher blood pressure. Chantakeeree C et al.(2022)[7]

Obesity (BMI > 30): The marked increase in odds ratio for obese individuals aligns with extensive research linking obesity to hypertension. The excess adipose tissue contributes to inflammation, increased vascular resistance, and various hormonal changes that elevate blood pressure. Zhang Y et al.(2022)[8]

Physical Inactivity: Sedentary lifestyle significantly increases the likelihood of hypertension. Physical activity is widely recommended as a preventive measure for hypertension, as it helps maintain vascular health, reduce weight, and improve metabolic factors. Del Rio AI et al.(2022)[9]

Alcohol Consumption: Regular drinkers have higher odds of hypertension. Alcohol can acutely elevate blood pressure and, over time, can lead to sustained hypertension due to its effects on the liver, weight, and hormonal balance. Zhou L et al.(2022)[10]

Smoking Status: Smoking has a strong association with hypertension, demonstrated by the high odds ratio. The harmful effects of tobacco on vascular health, including arterial stiffness and endothelial dysfunction, contribute significantly to increased blood pressure. Chakraborty S et al.(2022)[11]

Conclusion:

Study provides valuable insights into the epidemiology of hypertension within a specified urban middle-aged population. The study identified a significant prevalence of hypertension, emphasizing the influence of various demographic, lifestyle, and health-related factors.

Key findings highlight the associations between hypertension and factors such as age, body mass index (BMI), physical activity levels, dietary habits, smoking status, alcohol consumption, and comorbidities like diabetes and high cholesterol. Notably, the increased odds of hypertension with conditions such as obesity, diabetes, and high cholesterol underscore the interplay between chronic diseases and hypertension. Likewise, lifestyle factors like physical inactivity, unhealthy diet, smoking, and excessive alcohol consumption significantly contribute to the risk of developing hypertension.

This study underscores the importance of comprehensive strategies in urban health planning and policy-making. It suggests that interventions aimed at lifestyle modifications, along with targeted screening and management strategies for at-risk populations, are crucial in mitigating the burden of hypertension. Additionally, it emphasizes the need for continued research and community-based programs to address the modifiable risk factors associated with hypertension.

Ultimately, the findings advocate for an integrated approach combining individual healthcare management, community-wide education, and policy interventions to effectively combat the rising prevalence of hypertension and improve cardiovascular health outcomes among middle-aged adults in urban areas. The study acts as a call to action for healthcare providers, policymakers, and individuals alike to recognize and address the multifaceted nature of hypertension and its impact on public health.

Limitations of Study:

1. **Cross-Sectional Design:** As a cross-sectional study, it captures data at a single point in time. This design limits the ability to infer causality or the directionality of the associations between hypertension and various factors. Longitudinal studies are needed to confirm the temporal sequence of these associations and understand the causative relationships.
2. **Selection Bias:** The study focuses on urban, middle-aged adults, which may not be representative of other populations, such as those in rural areas, different age groups, or varying socioeconomic statuses. This limitation restricts the generalizability of the findings to broader populations.
3. **Self-Reported Data:** If any part of the data was self-reported, such as dietary habits or physical activity levels, it might be subject to recall bias or social desirability bias, leading to inaccuracies in the data collected.

4. **Measurement Variability:** The accuracy of the measurements for hypertension, BMI, and other variables might vary depending on the methods and instruments used. Consistency and standardization in measurement are crucial for reliable results.

5. **Lack of Detailed Information:** The study might not account for all possible confounding factors that influence hypertension, such as genetic predispositions, stress levels, sleep patterns, and other environmental factors. A more comprehensive approach is required to understand the multifactorial nature of hypertension fully.

6. **Regional Specificity:** The results are specific to the urban areas studied and might not reflect the situation in different urban settings or compare rural versus urban disparities in hypertension prevalence.

7. **No Longitudinal Follow-up:** Without follow-up data, it's challenging to understand the progression of hypertension or the long-term outcomes of the identified risk factors.

References:
1. Allameh M, Ghanei Gheshlagh R, Rahmani K. Prevalence and Associated Risk Factors of Hypertension for the Middle-Aged Population (30–59 Years) in Iran: A National Cross-Sectional Study. High Blood Pressure & Cardiovascular Prevention. 2022 Jan:1-6.

2. Cheng H, Gu Y, Ma X, Tang H, Liu X. Urban–rural disparities in hypertension prevalence, awareness, treatment, and control among Chinese middle-aged and older adults from 2011 to 2015: a repeated cross-sectional study. BMC Cardiovascular Disorders. 2022 Jul 17;22(1):319.

3. Niu Z, Duan Z, Wei J, Wang F, Han D, Zhang K, Jing Y, Wen W, Qin W, Yang X. Associations of long-term exposure to ambient ozone with hypertension, blood pressure, and the mediation effects of body mass index: A national cross-sectional study of middle-aged and older adults in China. Ecotoxicology and Environmental Safety. 2022 Sep 1;242:113901.

4. Ali N, Mohanto NC, Nurunnabi SM, Haque T, Islam F. Prevalence and risk factors of general and abdominal obesity and hypertension in rural and urban residents in Bangladesh: a cross-sectional study. BMC Public Health. 2022 Sep 8;22(1):1707.

5. Oktamianti P, Kusuma D, Amir V, Tjandrarini DH, Paramita A. District-Level Inequalities in Hypertension among Adults in Indonesia: A Cross-Sectional Analysis by Sex and Age Group. International Journal of Environmental Research and Public Health. 2022 Oct 14;19(20):13268.

6. Qin Z, Li C, Qi S, Zhou H, Wu J, Wang W, Ye Q, Yang H, Wang C, Hong X. Association of socioeconomic status with hypertension prevalence and control in Nanjing: a cross-sectional study. BMC Public Health. 2022 Dec;22(1):1-9.

7. Chantakeeree C, Sormunen M, Estola M, Jullamate P, Turunen H. Factors affecting quality of life among older adults with hypertension in urban and rural areas in thailand: A cross-sectional study. The International Journal of Aging and Human Development. 2022 Sep;95(2):222-44.

8. Zhang Y, Zhang WQ, Tang WW, Zhang WY, Liu JX, Xu RH, Wang TD, Huang XB. The prevalence of obesity-related hypertension among middle-aged and older adults in China. Frontiers in Public Health. 2022 Nov 24;10:865870.

9. Del Rio AI, Moreno Velásquez I, Roa R, Montenegro Mendoza R, Motta J, Quintana HK. Prevalence of hypertension and possible risk factors of hypertension unawareness among

individuals aged 30–75 years from two Panamanian provinces: Results from population-based cross-sectional studies, 2010 and 2019. Plos one. 2022 Nov 28;17(11):e0276222.

10. Zhou L, Feng W, Xiang N, Cheng Y, Ya X, Wang M, Wang X, Liu Y. Association between physical activity dimensions and the risk of hypertension among middle and older adults: A cross-sectional study in China. Frontiers in Public Health. 2022 Sep 24;10:995755.

11. Chakraborty S, Ussatayeva G, Ming-Shinn L, Dalal K. Hypertension: A National Cross-Sectional Study in India. Turk Kardiyoloji Dernegi Arsivi. 2022 Jun 1;50(4):276.