

Prevalence and Associated Risk Factors of Uncontrolled Hypertension in Urban Communities

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Abstract

Background: Hypertension is a major public health problem and one of the leading risk factors for cardiovascular diseases, stroke, and chronic kidney disease. Despite the availability of effective treatment, a large proportion of hypertensive patients continue to have uncontrolled blood pressure. Urbanization, unhealthy lifestyles, obesity, excessive salt intake, poor medication adherence, and inadequate health education contribute to poor hypertension control. Identifying the prevalence and associated risk factors of uncontrolled hypertension is essential for planning effective preventive and therapeutic interventions.

Aim: To determine the prevalence of uncontrolled hypertension and to identify the factors associated with uncontrolled hypertension among adults residing in urban communities.

Materials and Methods: A community-based cross-sectional study was conducted among 150 adults with diagnosed hypertension residing in selected urban communities. Participants were selected using convenient sampling. Data were collected using a structured and pre-tested questionnaire covering socio-demographic characteristics, dietary habits, lifestyle factors, clinical profile, medication adherence, and healthcare utilization. Blood pressure was measured using a calibrated digital sphygmomanometer following standard procedures. Participants with systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg despite antihypertensive treatment were classified as having uncontrolled hypertension. Data were analyzed using SPSS version 26.0. Descriptive statistics were used to summarize the findings, while Chi-square test and multivariable logistic regression analysis were performed to identify factors associated with uncontrolled hypertension. A p-value < 0.05 was considered statistically significant.

Results: Among the 150 study participants, 102 (68.0%) had uncontrolled hypertension, whereas 48 (32.0%) had controlled blood pressure. Participants aged more than 50 years showed significantly higher odds of uncontrolled hypertension (Adjusted OR=1.96; 95% CI: 1.01–3.83; $p=0.047$). Additional dietary salt intake (Adjusted OR=3.18; 95% CI: 1.34–7.52; $p=0.009$), obesity (Adjusted OR=2.67; 95% CI: 1.08–6.59; $p=0.033$), lack of health education (Adjusted OR=2.94; 95% CI: 1.22–7.08; $p=0.016$), and poor medication adherence (Adjusted OR=4.82; 95% CI: 1.61–14.40; $p=0.005$) were identified as significant independent predictors of uncontrolled hypertension. Poor medication adherence emerged as the strongest predictor. Lifestyle factors such as inadequate fruit and vegetable intake, smoking, alcohol consumption, and physical inactivity were associated with uncontrolled hypertension but did not achieve statistical significance.

Conclusion: The prevalence of uncontrolled hypertension was high among adults in urban communities. Increasing age, obesity, additional dietary salt intake, absence of health education, and poor medication adherence were identified as significant predictors of uncontrolled hypertension. Strengthening community-based hypertension screening, promoting healthy lifestyle modifications, improving patient education, and enhancing medication adherence may substantially improve blood pressure control and reduce the burden of cardiovascular diseases.

Keywords: Hypertension; Uncontrolled Hypertension; Urban Community; Risk Factors; Medication Adherence; Blood Pressure Control; Cross-Sectional Study.

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Introduction

Hypertension is one of the leading modifiable risk factors for cardiovascular diseases, stroke, chronic kidney disease, and premature mortality

worldwide. Despite the availability of effective antihypertensive medications and evidence-based management guidelines, a substantial proportion of

individuals continue to have uncontrolled blood pressure, increasing the risk of adverse cardiovascular outcomes. According to the World Health Organization, hypertension affects more than one billion people globally and remains a major public health challenge, particularly in low- and middle-income countries where awareness, treatment, and control rates are often inadequate.[1] The global burden of hypertension has increased considerably over the past three decades due to rapid urbanization, population aging, unhealthy dietary habits, physical inactivity, obesity, and psychosocial stress.[2,3] Urban communities are especially vulnerable because of sedentary lifestyles, excessive salt consumption, tobacco and alcohol use, and increasing prevalence of metabolic disorders. Although treatment options are widely available, achieving optimal blood pressure control remains difficult because of poor medication adherence, inadequate follow-up, therapeutic inertia, and lifestyle-related risk factors.[4-6]

India has witnessed a rapid epidemiological transition with hypertension emerging as one of the most prevalent non-communicable diseases. Several studies have reported a growing prevalence of hypertension in urban populations, accompanied by low rates of awareness, treatment adherence, and blood pressure control.[7,8] Inadequate control of hypertension contributes significantly to cardiovascular morbidity, mortality, and healthcare expenditure. Therefore, identifying factors associated with uncontrolled hypertension is essential for designing targeted interventions and strengthening primary healthcare services.

Previous studies have identified multiple determinants of uncontrolled hypertension, including increasing age, male gender, obesity, diabetes mellitus, dyslipidemia, smoking, alcohol consumption, physical inactivity, excessive dietary salt intake, poor compliance with antihypertensive therapy, and socioeconomic inequalities.[9,10] These factors often coexist in urban settings and substantially reduce the effectiveness of hypertension management strategies. Understanding the prevalence and associated risk factors of uncontrolled hypertension in urban communities is essential for planning effective prevention and control measures. Identifying high-risk individuals and modifiable determinants can assist healthcare professionals and policymakers in developing community-based interventions aimed at improving blood pressure control and reducing the burden of cardiovascular diseases.

Aim: To determine the prevalence of uncontrolled hypertension and to identify the factors associated with uncontrolled hypertension among adults residing in urban communities.

Material and Methods

Study Design: A community-based cross-sectional observational study was conducted to estimate the prevalence of uncontrolled hypertension and identify its associated risk factors among adults residing in urban communities.

Study Area: The study was conducted in selected urban communities within the study area. Data collection was carried out through household visits using a structured and pretested questionnaire.

Study Population: Adults aged 18 years and above with a previous diagnosis of hypertension and currently receiving or having received antihypertensive treatment were considered eligible for inclusion.

Sample Size: A total of 150 participants were included in the study using a convenient sampling technique. The sample size was considered adequate to estimate the prevalence of uncontrolled hypertension and assess associated risk factors within the study population.

Inclusion Criteria

- Adults aged 18 years and above.
- Previously diagnosed with hypertension by a registered medical practitioner.
- Resident of the selected urban community for at least six months.
- Willing to provide written informed consent.

Exclusion Criteria

- Pregnant women.
- Individuals with severe illness or cognitive impairment preventing participation.
- Participants who declined consent.

Data Collection Tool: Data were collected using a structured questionnaire consisting of:

- Sociodemographic characteristics (age, gender, education, occupation, socioeconomic status).
- Lifestyle factors (smoking, alcohol consumption, dietary salt intake, physical activity).
- Clinical characteristics (duration of hypertension, diabetes, body mass index, family history, medication adherence, antihypertensive therapy).
- Blood pressure measurements.

Blood pressure was measured using a calibrated digital sphygmomanometer after the participant had rested for at least five minutes in a seated position. Two readings were obtained five minutes apart, and the average reading was considered for analysis. Participants with systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg despite antihypertensive treatment were classified as having uncontrolled hypertension.

Study Variables: Dependent Variable:
Uncontrolled hypertension.

Independent Variables

- Age
- Gender
- Educational status
- Occupation
- Body Mass Index
- Smoking
- Alcohol consumption
- Physical activity
- Dietary salt intake
- Diabetes mellitus
- Duration of hypertension
- Family history of hypertension
- Medication adherence

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences (SPSS) version 26.0. Descriptive statistics were expressed as frequency, percentage, mean, and standard deviation. Associations between uncontrolled hypertension and categorical variables were assessed using the Chi-square test. Variables showing statistical significance were considered associated with uncontrolled hypertension. A p-value <0.05 was considered statistically significant.

Ethical Considerations: Ethical approval was obtained from the Institutional Ethics Committee before commencement of the study. Written informed consent was obtained from all participants. Confidentiality and anonymity of participant information were maintained throughout the study, and data were used exclusively for research purposes.

Results

Table 1 shows the association between socio-demographic and economic characteristics and hypertension control among the study participants. Of the 150 participants, 102 (68.0%) had uncontrolled hypertension, while 48 (32.0%) had controlled hypertension.

A significantly higher proportion of participants aged more than 50 years had uncontrolled hypertension (72.5%) compared with those aged 50 years or younger (58.3%) (OR=1.89; 95% CI: 1.01–3.55; $p<0.05$). Participants who were not working also demonstrated significantly higher odds of uncontrolled hypertension than those who were employed (OR=2.24; 95% CI: 1.12–4.49; $p<0.05$). Although females, participants with lower educational status, and those belonging to lower socioeconomic groups exhibited a greater

proportion of uncontrolled hypertension, these associations were not statistically significant.

Table 2 presents the association between dietary habits, lifestyle factors, and hypertension control. Participants reporting additional salt intake had significantly higher odds of uncontrolled hypertension compared with those who did not consume additional salt (80.8% vs. 61.2%; OR=2.75; 95% CI: 1.23–6.11; $p<0.05$). Obese participants also showed significantly greater odds of uncontrolled hypertension compared with those having normal body mass index (OR=2.69; 95% CI: 1.15–6.27; $p<0.05$). Lower fruit and vegetable intake, physical inactivity, smoking, and alcohol consumption were associated with a higher prevalence of uncontrolled hypertension; however, these associations did not reach statistical significance.

Table 3 depicts the association between treatment-related factors and hypertension control. Participants who received no health education regarding hypertension had significantly higher odds of uncontrolled hypertension compared with those who had received health education (OR=2.36; 95% CI: 1.18–4.72; $p<0.05$). Poor adherence to antihypertensive medication was strongly associated with uncontrolled hypertension (OR=4.17; 95% CI: 1.49–11.65; $p<0.05$). Participants attending follow-up visits at intervals of six months or more were also more likely to have uncontrolled hypertension than those attending monthly follow-up visits (OR=3.52; 95% CI: 1.34–9.25; $p<0.05$). Although poor knowledge regarding hypertension, use of single-drug therapy, and presence of co-morbidities were associated with higher proportions of uncontrolled hypertension, these associations were not statistically significant.

Table 4 shows the results of multivariable logistic regression analysis for predictors of uncontrolled hypertension. After adjusting for potential confounding variables, additional salt intake (Adjusted OR=3.18; 95% CI: 1.34–7.52; $p=0.009$), absence of health education (Adjusted OR=2.94; 95% CI: 1.22–7.08; $p=0.016$), poor medication adherence (Adjusted OR=4.82; 95% CI: 1.61–14.40; $p=0.005$), obesity (Adjusted OR=2.67; 95% CI: 1.08–6.59; $p=0.033$), and age greater than 50 years (Adjusted OR=1.96; 95% CI: 1.01–3.83; $p=0.047$) remained independent predictors of uncontrolled hypertension. Among these, poor medication adherence emerged as the strongest predictor of uncontrolled hypertension in the study population.

Table 1: Association of socio-demographic and economic factors with uncontrolled and controlled hypertension (N=150)

Variables	Uncontrolled n=102 (%)	Controlled n=48 (%)	OR (95% CI)
Age (years)			
≤50	28 (58.3)	20 (41.7)	1
>50	74 (72.5)	28 (27.5)	1.89 (1.01–3.55)*
Sex			
Female	66 (72.5)	25 (27.5)	1.65 (0.86–3.18)
Male	36 (61.0)	23 (39.0)	1
Marital status			
Living with spouse	44 (67.7)	21 (32.3)	1.18 (0.59–2.34)
Without spouse	58 (68.2)	27 (31.8)	1
Religion			
Hindu	49 (64.5)	27 (35.5)	1
Christian	20 (74.1)	7 (25.9)	1.57 (0.59–4.17)
Muslim	33 (70.2)	14 (29.8)	1.30 (0.58–2.89)
Education			
Graduate & Professional	18 (56.3)	14 (43.7)	1
Secondary & Primary	45 (70.3)	19 (29.7)	1.84 (0.79–4.26)
Illiterate	39 (72.2)	15 (27.8)	2.02 (0.83–4.92)
Occupation			
Working	28 (56.0)	22 (44.0)	1
Not working	74 (74.0)	26 (26.0)	2.24 (1.12–4.49)*
Socioeconomic status			
Upper/Upper-middle	31 (60.8)	20 (39.2)	1
Lower-middle	52 (71.2)	21 (28.8)	1.60 (0.79–3.24)
Lower	19 (73.1)	7 (26.9)	1.75 (0.63–4.87)

Table 2: Association of lifestyle factors with uncontrolled and controlled hypertension (N=150)

Variables	Uncontrolled n=102 (%)	Controlled n=48 (%)	OR (95% CI)
Fruit intake (<4 days/week)	61 (75.3)	20 (24.7)	1.86 (0.93–3.71)
≥4 days/week	41 (59.4)	28 (40.6)	1
Vegetable intake (<3 days/week)	30 (76.9)	9 (23.1)	1.72 (0.73–4.04)
≥3 days/week	72 (64.9)	39 (35.1)	1
Additional salt intake			
Yes	42 (80.8)	10 (19.2)	2.75 (1.23–6.11)*
No	60 (61.2)	38 (38.8)	1
Physical activity			
Inactive	32 (78.0)	9 (22.0)	2.08 (0.90–4.82)
Active	70 (64.2)	39 (35.8)	1
Smoking			
Yes	43 (75.4)	14 (24.6)	1.74 (0.82–3.67)
No	59 (63.4)	34 (36.6)	1
Alcohol consumption			
Yes	24 (77.4)	7 (22.6)	1.76 (0.69–4.50)
No	78 (65.5)	41 (34.5)	1
BMI			
Normal	26 (56.5)	20 (43.5)	1
Overweight	34 (68.0)	16 (32.0)	1.63 (0.72–3.68)
Obese	42 (77.8)	12 (22.2)	2.69 (1.15–6.27)*

Table 3: Association of treatment-related factors with uncontrolled hypertension (N=150)

Variables	Uncontrolled n=102 (%)	Controlled n=48 (%)	OR (95% CI)
Type of medicine			
Single drug	68 (73.9)	24 (26.1)	2.10 (0.99–4.47)
Combination therapy	34 (58.6)	24 (41.4)	1
Regular follow-up			
≥6 months	37 (84.1)	7 (15.9)	3.52 (1.34–9.25)*
3 months	28 (66.7)	14 (33.3)	1.60 (0.68–3.73)
Monthly	37 (57.8)	27 (42.2)	1
Health education received			
Yes	34 (56.7)	26 (43.3)	1
No	68 (75.6)	22 (24.4)	2.36 (1.18–4.72)*
Knowledge regarding hypertension			
Poor	74 (74.7)	25 (25.3)	1.94 (0.93–4.02)
Good	28 (54.9)	23 (45.1)	1
Medication adherence			
Poor	31 (86.1)	5 (13.9)	4.17 (1.49–11.65)*
Good	71 (62.3)	43 (37.7)	1
Co-morbidity present			
Yes	46 (74.2)	16 (25.8)	1.71 (0.84–3.47)
No	56 (63.6)	32 (36.4)	1

Table 4: Multivariable logistic regression analysis for predictors of uncontrolled hypertension

Variable	Adjusted OR	95% CI	p-value
Additional salt intake	3.18	1.34–7.52	0.009*
No health education	2.94	1.22–7.08	0.016*
Poor medication adherence	4.82	1.61–14.40	0.005*
Obesity	2.67	1.08–6.59	0.033*
Age >50 years	1.96	1.01–3.83	0.047*

Discussion

The present study assessed the prevalence of uncontrolled hypertension and its associated risk factors among adults residing in urban communities. The findings revealed that 68.0% of hypertensive individuals had uncontrolled blood pressure despite receiving treatment, indicating a substantial burden of poor hypertension control in the study population. Similar observations have been reported in previous studies, which highlighted that inadequate blood pressure control remains a major public health challenge despite improvements in the availability of antihypertensive therapy and clinical management guidelines.[11,12]

Age was found to be significantly associated with uncontrolled hypertension, with participants aged more than 50 years showing higher odds of poor blood pressure control. Advancing age is associated with increased arterial stiffness, vascular remodeling, and the presence of multiple comorbidities, all of which contribute to difficulty in achieving optimal blood pressure control. Similar findings have been reported in previous epidemiological studies that identified older age as an important determinant of uncontrolled hypertension. [12,14]

The present study also demonstrated that obesity was significantly associated with uncontrolled hypertension. Excess body weight contributes to increased sympathetic nervous system activity, insulin resistance, activation of the renin-angiotensin-aldosterone system, and endothelial dysfunction, thereby making blood pressure control more difficult. Similar associations between obesity and uncontrolled hypertension have been documented in international studies. [11,15]

Dietary behaviour was another important determinant identified in the study. Participants who reported consuming additional dietary salt were significantly more likely to have uncontrolled hypertension. Excess sodium intake is known to increase blood pressure by promoting fluid retention and increasing peripheral vascular resistance. This finding is consistent with current hypertension management recommendations that strongly advocate sodium restriction as an effective lifestyle intervention for blood pressure control. [11,13]

Poor adherence to antihypertensive medication emerged as the strongest independent predictor of uncontrolled hypertension in the present study. Participants with poor adherence were significantly more likely to have uncontrolled blood pressure compared to those with good adherence.

Medication non-adherence may result from inadequate awareness, forgetfulness, adverse drug effects, financial constraints, or complex treatment regimens. Similar observations have been reported by previous studies emphasizing that improving medication adherence is essential for achieving optimal hypertension control and reducing cardiovascular complications. [11,13]

The findings further indicated that participants who had not received health education regarding hypertension were significantly more likely to have uncontrolled blood pressure. Health education enhances patients' understanding of disease progression, medication compliance, dietary modification, physical activity, and regular follow-up, thereby improving treatment outcomes. Previous studies have similarly highlighted the positive impact of patient education and counselling on hypertension control and long-term cardiovascular risk reduction. [13,14]

Although lower fruit and vegetable intake, smoking, alcohol consumption, physical inactivity, lower educational status, and presence of comorbidities were associated with a higher prevalence of uncontrolled hypertension in the present study, these relationships did not achieve statistical significance. Nevertheless, these factors have consistently been identified as important contributors to poor blood pressure control in larger population-based studies, suggesting that comprehensive lifestyle modification remains an integral component of hypertension management. [11,12,15]

The findings of this study emphasize the need for strengthening community-based hypertension screening programmes, promoting healthy lifestyle practices, ensuring regular follow-up, improving medication adherence, and delivering structured health education to individuals with hypertension. Such interventions may substantially improve blood pressure control and reduce the burden of cardiovascular diseases in urban populations.

Conclusion

The present study demonstrated a high prevalence of uncontrolled hypertension among adults residing in urban communities. Increasing age, obesity, additional dietary salt intake, lack of health education, and poor medication adherence were identified as significant predictors of uncontrolled hypertension, with poor medication adherence emerging as the strongest independent risk factor.

These findings highlight the importance of comprehensive hypertension management strategies that combine pharmacological treatment with lifestyle modification, regular follow-up, and patient education. Strengthening community-based awareness programmes, promoting healthy dietary

practices, improving adherence to antihypertensive therapy, and encouraging periodic blood pressure monitoring may contribute significantly to better hypertension control and reduction of cardiovascular morbidity and mortality.

Further large-scale multicentric studies are recommended to validate these findings and support evidence-based public health interventions.

References

1. World Health Organization. Hypertension. Geneva: World Health Organization; 2023.
2. Mills KT, Stefanescu A, He J. The global epidemiology of hypertension. *Nat Rev Nephrol.* 2020;16(4):223-237.
3. Zhou B, Carrillo-Larco RM, Danaei G, Riley LM, Paciorek CJ, Stevens GA, et al. Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019: A pooled analysis of 1201 population-representative studies with 104 million participants. *Lancet.* 2021;398(10304): 957-980.
4. Whelton PK, Carey RM, Aronow WS, Casey DE Jr, Collins KJ, Dennison Himmelfarb C, et al. 2017 ACC/AHA Guideline for the prevention, detection, evaluation, and management of high blood pressure in adults. *Hypertension.* 2018;71(6):e13-e115.
5. Williams B, Mancia G, Spiering W, Agabiti Rosei E, Azizi M, Burnier M, et al. 2018 ESC/ESH Guidelines for the management of arterial hypertension. *Eur Heart J.* 2018; 39(33):3021-3104.
6. Unger T, Borghi C, Charchar F, Khan NA, Poulter NR, Prabhakaran D, et al. 2020 International Society of Hypertension Global Hypertension Practice Guidelines. *Hypertension.* 2020;75(6):1334-1357.
7. Gupta R, Xavier D. Hypertension: The most important noncommunicable disease risk factor in India. *Indian Heart J.* 2018;70(4):565-572.
8. Anchala R, Kannuri NK, Pant H, Khan H, Franco OH, Di Angelantonio E, et al. Hypertension in India: A systematic review and meta-analysis of prevalence, awareness, and control of hypertension. *J Hypertens.* 2014;32(6):1170-1177.
9. Geldsetzer P, Manne-Goehler J, Marcus ME, Ebert C, Zhumadilov Z, Wessch CS, et al. The state of hypertension care in 44 low-income and middle-income countries: A cross-sectional study of nationally representative individual-level data. *Lancet.* 2019;394(1019 9):652-662.
10. Burnier M, Egan BM. Adherence in hypertension. *Circ Res.* 2019;124(7):1124-1140.
11. Carey RM, Muntner P, Bosworth HB, Whelton PK. Prevention and control of hypertension:

- JACC Health Promotion Series. J Am Coll Cardiol. 2018;72(11):1278-1293.
12. Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global burden of hypertension: Analysis of worldwide data. Lancet. 2005;365(9455):217-223.
 13. Beaney T, Schutte AE, Stergiou GS, Borghi C, Burger D, Charchar F, et al. May Measurement Month 2019: The global blood pressure screening campaign of the International Society of Hypertension. Hypertension. 2020;76(2):333-341.
 14. Gupta R, Gaur K, Ram CVS. Emerging trends in hypertension epidemiology in India. J Hum Hypertens. 2019;33(8):575-587.
 15. NCD Risk Factor Collaboration (NCD-RisC). Worldwide trends in blood pressure from 1975 to 2015: A pooled analysis of 1479 population-based measurement studies with 19.1 million participants. Lancet. 2017;389(10064):37-55.