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Article

Awareness and Early Recognition of Hypertension and Its Risk Factors Among Adult Patients: A Cross-Sectional Study

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ABSTRACT

Background: Hypertension is a major global public health concern and a leading modifiable risk factor for cardiovascular morbidity and mortality. Despite the availability of effective screening and treatment, hypertension frequently remains undiagnosed due to limited awareness and delayed recognition, particularly in low- and middle-income countries. **Objectives:** To assess the level of awareness and early recognition of hypertension and its associated risk factors among adult patients attending a tertiary care hospital in Lahore, Pakistan. **Methodology:** A cross-sectional observational study was conducted at Khalid Hospital, Lahore, involving 140 adults aged ≥18 years. Data was collected through a structured interviewer-administered questionnaire covering demographic characteristics, awareness of hypertension, early recognition, and knowledge of risk factors. Descriptive statistics summarized awareness levels, and chi-square tests assessed associations between awareness and selected demographic variables. **Results:** The mean age of participants was 44.3 ± 11.8 years, and 55.7% were male. Good overall awareness was observed in 32.9% of participants, while 27.1% demonstrated poor awareness. Although 68.6% correctly identified hypertension as high blood pressure, only 51.4% recognized that it may be asymptomatic. Higher education and a family history of hypertension were significantly associated with better awareness ($p < 0.05$). **Conclusion:** Awareness and early recognition of hypertension among adult patients were suboptimal, with notable gaps in understanding its silent progression and key risk factors. Strengthening patient education and promoting routine blood pressure screening within healthcare settings are essential to improve early detection and reduce hypertension-related complications.

Keywords: Hypertension; Awareness; Risk factors; Early recognition; Cross-sectional study.

INTRODUCTION

Hypertension remains one of the most prevalent non-communicable diseases worldwide and constitutes a leading modifiable risk factor for cardiovascular morbidity and mortality. It is commonly described as a "silent killer" because a substantial proportion of affected individuals remain asymptomatic for prolonged periods, often until the onset of serious complications such as stroke, ischemic heart disease, heart failure, or chronic kidney disease (1). Globally, more than one billion adults are estimated to live with hypertension, and its contribution to preventable deaths and disability-adjusted life years continues to rise despite the availability of effective screening and treatment strategies (2).

Early recognition and adequate awareness of hypertension and its associated risk factors are central to its prevention and control. Awareness enables individuals to seek timely blood pressure screening, recognize the need for lifestyle modification, and adhere to medical advice when diagnosed. Established risk factors for hypertension include increasing age, obesity, physical inactivity, excessive dietary salt intake, smoking, psychosocial stress, diabetes mellitus, and a positive family history (3). Failure to recognize these factors and the asymptomatic nature of hypertension often leads to delayed diagnosis and poor disease control, increasing the likelihood of adverse cardiovascular outcomes.

The burden of hypertension is particularly pronounced in low- and middle-income countries, where rapid urbanization, sedentary lifestyles, dietary transitions, and limited health literacy contribute to rising prevalence rates (4). In Pakistan, hypertension has emerged as a major public health challenge, with studies reporting high prevalence alongside low levels of awareness, treatment, and control (5). Evidence suggests that a considerable proportion of hypertensive individuals in Pakistan remain undiagnosed or lack adequate understanding of the condition and its risk factors, thereby increasing the risk of long-term complications (6).

Although several community-based studies have explored hypertension awareness at the population level, data focusing on adult patients attending tertiary care hospitals remain limited, particularly in urban centers such as Lahore. Hospital-attending populations represent a critical group for early detection and health education, as they frequently interact with healthcare services and may already possess one or more cardiovascular risk factors. However, the extent to which these patients recognize hypertension, understand its silent progression, and identify modifiable risk factors has not been sufficiently examined in this setting.

Addressing this gap is essential for designing effective patient-centered education strategies and strengthening preventive healthcare services. Therefore, the present study aimed to assess the level of awareness and early recognition of hypertension and its associated risk factors among adult patients attending a tertiary care hospital in Lahore, Pakistan, and to examine how awareness varies across selected demographic characteristics.

MATERIAL AND METHODS

This cross-sectional observational study was conducted at Khalid Hospital, Lahore, Pakistan, a tertiary care healthcare facility that provides outpatient and inpatient services to a diverse adult population. The study was carried out over a defined data collection period after obtaining formal administrative approval from the hospital management. A cross-sectional design was selected as appropriate for estimating awareness levels and examining associations between knowledge-related variables and participant characteristics at a single point in time (7).

The study population comprised adult patients aged 18 years and above attending outpatient clinics or admitted to inpatient wards during the study period. Participants were eligible if they were able to communicate effectively and willing to provide informed consent. Patients who were critically ill, had documented cognitive impairment, or were unable to participate in an interview due to physical or mental limitations were excluded to ensure the reliability of responses. A total sample size of 140 participants was achieved using a non-probability convenience sampling approach, which was considered feasible given the clinical setting and study objectives. The sample size was deemed adequate to provide stable estimates of awareness levels and to allow subgroup comparisons based on demographic variables, consistent with similar hospital-based cross-sectional studies (8).

Participants were recruited consecutively during routine clinical visits. Prior to enrollment, each eligible participant received a clear explanation of the study purpose, procedures, potential benefits, and voluntary nature of participation. Written informed consent was obtained from all participants before data collection commenced. Ethical principles in accordance with the Declaration of Helsinki were strictly followed, and participant confidentiality and anonymity were maintained throughout the study process.

Data were collected using a structured, interviewer-administered questionnaire developed based on previously published literature and standard hypertension awareness frameworks (9). The questionnaire consisted of three domains: demographic characteristics, awareness and early recognition of hypertension, and knowledge of hypertension risk factors. Awareness and early recognition were operationally defined as the participant's ability to correctly identify hypertension as elevated blood pressure, recognize its asymptomatic nature, acknowledge potential complications, and understand the importance of regular blood pressure screening. Knowledge of risk factors included recognition of both modifiable and non-modifiable factors such as dietary salt intake, physical inactivity, obesity, smoking, stress, diabetes mellitus, and family history. Responses were recorded as correct or incorrect based on predefined criteria.

Each correct response was assigned one point, and cumulative scores were calculated to generate an overall awareness score for each participant. Based on score distribution and previously used cutoffs, awareness levels were categorized as poor, fair, or good (10). To minimize interviewer bias, data collectors were trained in standardized interview techniques, and the same questionnaire was used consistently for all participants.

Data were entered into statistical software and subjected to quality checks to ensure accuracy and completeness. Descriptive statistics were used to summarize demographic characteristics and awareness levels, with results expressed as frequencies, percentages, means, and standard deviations as appropriate. Associations between awareness levels and selected demographic variables were examined using chi-square tests. Statistical significance was set at a p-value of less than 0.05. All analyses were conducted in accordance with standard epidemiological and biostatistical practices to ensure transparency, reproducibility, and data integrity (11).

RESULTS

The study included 140 adult participants with a mean age of 44.3 ± 11.8 years. The largest age group was 31–45 years, accounting for 38.6% of the sample, followed by participants aged 46–60 years (28.6%). Males constituted 55.7% of the study population, while females represented 44.3%. With respect to educational status, 41.4% of participants had secondary-level education and 32.9% had attained higher education, whereas 25.7% had only primary education. A family history of hypertension was reported by 37.1% of participants.

Awareness regarding hypertension showed moderate overall levels across key domains. While 68.6% of participants correctly identified hypertension as elevated blood pressure, only 51.4% recognized that hypertension can remain asymptomatic. Awareness of major cardiovascular complications such as heart disease and stroke was reported by 60.0% of participants, whereas 55.7%

acknowledged the importance of regular blood pressure monitoring. These findings indicate notable gaps in early recognition despite reasonable general awareness.

Knowledge of hypertension risk factors varied by factor type. High dietary salt intake was the most frequently recognized risk factor (65.7%), followed by obesity (61.4%) and physical inactivity (57.1%). Awareness of smoking as a risk factor was reported by 52.9% of participants, while only half identified psychological stress as contributory. Diabetes mellitus was the least recognized risk factor, identified by just 44.3% of participants, underscoring limited understanding of metabolic contributors to hypertension.

Overall awareness scores demonstrated that 32.9% of participants had good awareness, 40.0% had fair awareness, and 27.1% exhibited poor awareness. Statistically significant associations were observed between awareness level and educational status, with participants possessing higher education demonstrating significantly better awareness compared to those with primary education ($p = 0.002$). Similarly, participants with a family history of hypertension showed higher awareness levels than those without such history ($p = 0.018$). These findings suggest that educational exposure and personal or familial experience with hypertension play an important role in shaping awareness and early recognition.

Table 1. Demographic Characteristics of Participants (n = 140)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	18–30	28	20.0
	31–45	54	38.6
	46–60	40	28.6
	>60	18	12.8
Gender	Male	78	55.7
	Female	62	44.3
Education Level	Primary	36	25.7
	Secondary	58	41.4
	Higher	46	32.9
Family History of Hypertension	Yes	52	37.1
	No	88	62.9

Awareness regarding hypertension showed variability across key knowledge domains, with lower recognition of the asymptomatic nature of the disease and the importance of routine blood pressure monitoring.

Table 2. Awareness Regarding Hypertension (n = 140)

Awareness Item	Yes n (%)	No n (%)
Identifies hypertension as high blood pressure	96 (68.6)	44 (31.4)
Recognizes hypertension can be asymptomatic	72 (51.4)	68 (48.6)
Aware of cardiovascular complications	84 (60.0)	56 (40.0)
Aware of need for regular BP monitoring	78 (55.7)	62 (44.3)

Knowledge of hypertension risk factors was moderate overall, with lifestyle-related risk factors more frequently recognized than medical comorbidities.

Table 3. Awareness of Hypertension Risk Factors (n = 140)

Risk Factor	Aware n (%)	Not Aware n (%)
High salt intake	92 (65.7)	48 (34.3)
Obesity	86 (61.4)	54 (38.6)
Physical inactivity	80 (57.1)	60 (42.9)
Smoking	74 (52.9)	66 (47.1)
Stress	70 (50.0)	70 (50.0)
Diabetes mellitus	62 (44.3)	78 (55.7)

Table 4. Overall Awareness Level of Participants (n = 140)

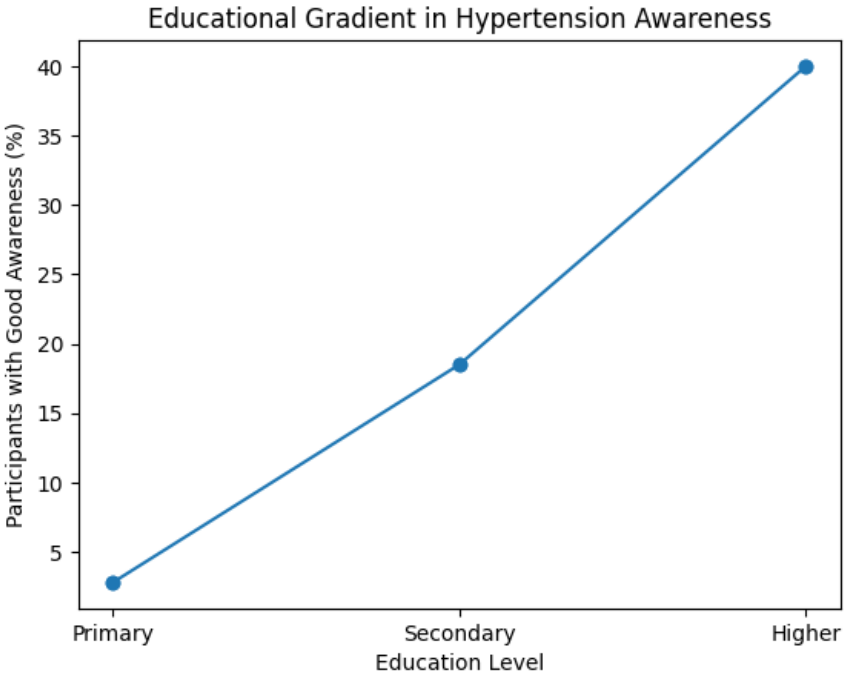
Awareness Level	Frequency (n)	Percentage (%)
Poor	38	27.1
Fair	56	40.0
Good	46	32.9
Total	140	100

Significant associations were observed between overall awareness level and selected demographic variables.

Table 5. Association Between Awareness Level and Selected Demographic Factors (n = 140)

Variable	Awareness Level	n (%)	p-value
Education Level	Poor		
	Primary	18 (50.0)	
	Secondary	14 (24.1)	
	Higher	6 (13.0)	0.002
Family History of Hypertension	Poor		
	Yes	8 (15.4)	
	No	30 (34.1)	0.018

Chi-square testing demonstrated statistically significant associations between higher education level and better awareness, as well as between positive family history of hypertension and improved awareness ($p < 0.05$).



A pronounced educational gradient in hypertension awareness is evident across the study population. Participants with primary education demonstrated a very low proportion of good awareness, at approximately 3%, indicating minimal understanding of hypertension and its early recognition. This proportion increased substantially among participants with secondary education, where nearly 19% exhibited good awareness, reflecting a moderate improvement in health knowledge with increased educational exposure. The highest level of awareness was observed among participants with higher education, where 40% demonstrated good awareness of hypertension and its risk factors. The steadily ascending pattern across education levels highlights a strong, positive, and graded relationship between educational attainment and hypertension awareness, reinforcing the statistical findings that education is a significant determinant of early recognition and understanding of hypertension.

DISCUSSION

The present cross-sectional study evaluated awareness and early recognition of hypertension and its risk factors among adult patients attending a tertiary care hospital in Lahore. The findings indicate that while basic awareness of hypertension was present among a majority of participants, substantial gaps existed in recognizing its asymptomatic nature, associated complications, and modifiable risk factors. These results underscore the persistent challenge of inadequate hypertension awareness even among individuals who are already engaged with healthcare services, highlighting missed opportunities for early detection and prevention.

Only about one-third of participants demonstrated good overall awareness, whereas more than one-quarter exhibited poor awareness. This pattern is consistent with previous studies conducted in Pakistan and other low- and middle-income countries, which have reported low awareness and delayed recognition of hypertension despite increasing prevalence (12,13). The limited recognition of hypertension as an asymptomatic condition observed in this study is particularly concerning, as it may discourage routine blood pressure screening and delay diagnosis until complications arise.

Knowledge of hypertension risk factors in the present study was uneven, with lifestyle-related factors such as high salt intake, obesity, and physical inactivity being more commonly recognized than metabolic and psychosocial factors. Awareness of diabetes mellitus and stress as risk factors was notably low, mirroring findings from earlier regional studies that reported insufficient understanding of the multifactorial etiology of hypertension (14,15). This incomplete risk perception may hinder comprehensive lifestyle modification and risk reduction efforts.

Educational attainment emerged as a significant determinant of awareness, with participants having higher education demonstrating markedly better recognition of hypertension and its risk factors. Similar associations have been documented in prior studies, suggesting that education enhances access to health information, improves health literacy, and promotes proactive health-seeking behavior (16,17). Additionally, participants with a family history of hypertension exhibited significantly higher awareness, likely reflecting increased exposure to health information through personal or familial experiences with the disease.

The findings of this study have important implications for public health practice and clinical care. Tertiary care hospitals represent critical settings for patient education and preventive interventions; however, the observed awareness gaps indicate a need for more structured and systematic counseling strategies. Integrating routine hypertension education into outpatient visits, emphasizing the silent nature of the disease, and highlighting both lifestyle and medical risk factors may substantially improve early recognition and preventive behaviors (18).

Several limitations should be acknowledged. The cross-sectional design limits causal inference, and the use of self-reported data may introduce recall or social desirability bias. Furthermore, the single-center nature of the study may restrict generalizability to other healthcare settings. Despite these limitations, the study provides valuable hospital-based evidence on hypertension awareness in an urban Pakistani context and highlights key areas for intervention.

Overall, the findings reinforce the need for targeted, education-focused strategies to improve awareness and early recognition of hypertension, particularly among individuals with lower educational attainment and no family history of the disease. Strengthening patient education at the point of care may play a pivotal role in reducing the long-term burden of hypertension-related complications.

CONCLUSION

This study demonstrates that awareness and early recognition of hypertension and its associated risk factors among adult patients attending a tertiary care hospital in Lahore remain suboptimal. Although a majority of participants had basic knowledge of hypertension, substantial gaps were identified in understanding its asymptomatic nature and the role of key modifiable risk factors, particularly diabetes mellitus and psychosocial stress. Educational attainment and family history of hypertension were significant determinants of awareness, highlighting disparities in health literacy within the patient population. These findings emphasize the need for strengthened patient education initiatives within hospital settings, with a focus on routine blood pressure screening, comprehensive risk factor counseling, and targeted awareness programs for individuals with lower educational levels. Integrating structured hypertension education into routine clinical encounters may facilitate earlier recognition, promote preventive behaviors, and reduce the long-term burden of hypertension-related complications. Future multicenter and longitudinal studies are recommended to further evaluate awareness patterns and to assess the effectiveness of targeted educational interventions across diverse healthcare settings.

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