International Journal Of Medical Science And Clinical Research

Vol.1-No.1-2026

HYPERTENSION PREVALENCE AND RISK FACTORS AMONG ADULTS ATTENDING HEALTHCARE CENTERS IN KHYBER PAKHTUNKHWA, PAKISTAN

Muhammad Ahmad
BS Computer Science, Department Of Computer Science, University of Okara

ABSTRACT

Hypertension is a major public health concern and one of the leading risk factors contributing to cardiovascular diseases, stroke, kidney complications, and premature mortality worldwide. In Pakistan, the increasing prevalence of hypertension has become a significant healthcare challenge due to changing lifestyles, unhealthy dietary patterns, physical inactivity, obesity, tobacco consumption, and limited awareness regarding blood pressure management. Khyber Pakhtunkhwa (KP) faces several healthcare challenges, particularly in rural and underserved communities, where access to regular screening, early diagnosis, and continuous medical treatment remains limited. This study aims to investigate the prevalence of hypertension and identify its major associated risk factors among adults attending healthcare centers in Khyber Pakhtunkhwa, Pakistan. The research focuses on demographic characteristics, age, gender, family history, body mass index, dietary habits, physical activity, smoking, and healthcare-seeking behavior. A quantitative cross-sectional research approach is proposed, involving adult patients attending selected public and private healthcare centers. Data will be collected through structured questionnaires, physical measurements, and standardized blood pressure assessments. The study will examine the relationship between hypertension and individual lifestyle, socioeconomic, and clinical factors. Statistical analysis will be conducted to identify significant associations and determine the major predictors of elevated blood pressure. The research is expected to provide valuable evidence regarding hypertension-related health challenges in Khyber Pakhtunkhwa and support the development of effective screening programs, preventive healthcare strategies, and community-based awareness initiatives. The findings may contribute to improving early detection, treatment adherence, and long-term cardiovascular health among the adult population of the province.

KEYWORDS

Hypertension, Blood Pressure, Prevalence, Risk Factors, Cardiovascular Diseases, Adult Population, Khyber Pakhtunkhwa, Pakistan, Healthcare Centers, Public Health.

INTRODUCTION

Hypertension is one of the most widespread non-communicable diseases and represents a major challenge for healthcare systems across developed and developing countries. It is commonly characterized by persistently elevated arterial blood pressure and is strongly associated with cardiovascular diseases, stroke, chronic kidney disease, and premature death. According to the World Health Organization (2023), hypertension affects a substantial proportion of the global adult population, while many individuals remain unaware of their condition because it frequently

develops without noticeable symptoms. The increasing burden of hypertension has created an urgent need for effective preventive measures, early diagnosis, regular screening, and appropriate treatment strategies, particularly in low- and middle-income countries where healthcare resources are often limited.Pakistan is experiencing a growing burden of hypertension due to demographic changes, urbanization, unhealthy dietary habits, physical inactivity, tobacco use, and increasing levels of obesity. The National Health Survey of Pakistan and subsequent epidemiological investigations have highlighted the importance of hypertension as a major public health concern. Basit et al. (2018) discussed the increasing burden of diabetes and other metabolic disorders in Pakistan, demonstrating the importance of addressing interconnected non-communicable disease risk factors. Hypertension frequently occurs alongside diabetes, obesity, and abnormal lipid levels, increasing the likelihood of serious cardiovascular complications. These overlapping health conditions make hypertension prevention and management an important priority for Pakistan's healthcare system.Khyber Pakhtunkhwa represents an important geographical and demographic setting for examining hypertension prevalence and its associated risk factors. The province includes urban, semi-urban, and rural communities with considerable differences in socioeconomic conditions, educational opportunities, healthcare facilities, and health-related awareness. Adults living in remote areas may experience difficulties accessing diagnostic services and maintaining regular medical consultations. Furthermore, differences in dietary practices, occupational activities, physical exercise, and healthcare utilization may influence blood pressure patterns across different population groups. Investigating these variations can help identify specific population groups requiring targeted screening and preventive interventions.

Several demographic and lifestyle-related factors contribute to the development of hypertension. Increasing age is an established risk factor because physiological changes in blood vessels can contribute to elevated blood pressure over time. Family history and genetic predisposition may also increase individual susceptibility. Obesity, excessive salt consumption, unhealthy dietary patterns, insufficient physical activity, and tobacco use are additional factors associated with hypertension. The World Health Organization (2023) identifies unhealthy diets, physical inactivity, tobacco consumption, and excessive alcohol consumption among important modifiable risk factors. Understanding the influence of these factors within the local context is essential for developing effective public health interventions.Healthcare access and awareness also play an important role in hypertension prevention and management. Many individuals do not undergo regular blood pressure assessments and may discover their condition only after experiencing complications or visiting healthcare facilities for unrelated medical concerns. Limited awareness about hypertension symptoms, complications, medication adherence, and lifestyle modification can further contribute to inadequate disease management. Mills et al. (2020) emphasized the importance of improving hypertension detection, treatment, and control

through coordinated healthcare interventions. Therefore, investigating the healthcare-seeking behavior and screening practices of adults attending healthcare centers in Khyber Pakhtunkhwa is particularly important.

The relationship between hypertension and socioeconomic conditions also requires considerable attention. Income, employment status, educational attainment, household circumstances, and geographical accessibility may influence dietary choices, physical activity, medical consultations, and treatment affordability. Individuals with limited financial resources may experience difficulties obtaining prescribed medicines or attending regular follow-up appointments. In rural communities, the availability of trained healthcare professionals and diagnostic facilities may also affect early detection and disease control. These circumstances suggest that hypertension should be investigated not only as an individual medical condition but also as a broader public health issue influenced by social and environmental determinants.Despite increasing awareness of non-communicable diseases in Pakistan, further research is required to understand hypertension patterns among adults attending healthcare facilities in different regions of Khyber Pakhtunkhwa. Localized research can provide information about the distribution of elevated blood pressure, associated lifestyle characteristics, demographic differences, and existing screening practices. Such evidence is important because findings from national or provincial surveys may not fully represent the characteristics of patients attending individual healthcare centers. A healthcare-center-based investigation can help identify practical opportunities for improving routine blood pressure assessment and patient counseling.In this context, the present study aims to investigate hypertension prevalence and its associated risk factors among adults attending selected healthcare centers in Khyber Pakhtunkhwa, Pakistan. It will examine demographic, clinical, behavioral, and socioeconomic characteristics to identify factors associated with elevated blood pressure. The research is expected to contribute to the development of evidence-based prevention strategies, strengthen early screening initiatives, and improve hypertension awareness and management. By highlighting the importance of accessible healthcare services and lifestyle modification, the study may support public health professionals and healthcare policymakers in reducing the long-term burden of cardiovascular diseases in the province.

RESEARCH OBJECTIVES

1. To determine the prevalence of hypertension among adults attending selected healthcare centers in Khyber Pakhtunkhwa, Pakistan.
2. To identify major demographic, socioeconomic, clinical, and lifestyle-related risk factors associated with hypertension among the adult population.
3. To examine hypertension awareness, screening practices, treatment adherence, and

healthcare access among adults attending selected healthcare centers.

RESEARCH QUESTIONS

1. What is the prevalence of hypertension among adults attending healthcare centers in Khyber Pakhtunkhwa, Pakistan?
2. Which demographic, socioeconomic, clinical, and lifestyle-related factors are significantly associated with hypertension among adults?
3. What is the level of hypertension awareness, screening, treatment adherence, and healthcare access among adults attending healthcare centers?

LITERATURE REVIEW

Hypertension has been extensively investigated as a major non-communicable disease because of its association with cardiovascular complications, premature mortality, and increasing healthcare expenditure. Previous epidemiological research has established that hypertension is influenced by a combination of genetic, demographic, environmental, and behavioral factors. Mills et al. (2020) explained that hypertension remains a significant global health challenge, particularly in low- and middle-income countries, where population growth, urbanization, changing dietary practices, and insufficient healthcare resources contribute to its increasing burden. Their research highlights the importance of strengthening prevention, diagnosis, and treatment strategies to reduce hypertension-related complications.Research conducted in Pakistan has also demonstrated considerable geographical variation in hypertension prevalence. Basit et al. (2020), using data from the Second National Diabetes Survey of Pakistan (2016–2017), reported an overall age-adjusted hypertension prevalence of 46.2%. Their findings indicated a prevalence of 33.3% in Khyber Pakhtunkhwa, with differences between urban and rural populations. Age, female gender, marital status, family history, low physical activity, obesity, and dyslipidemia were significantly associated with hypertension. These findings provide important national evidence and demonstrate the need for further regional investigations focusing on population-specific risk factors and healthcare practices.A particularly relevant investigation was conducted by Haq et al. (2025), who examined communicable and non-communicable diseases using the Khyber Pakhtunkhwa Integrated Population and Health Survey (2016–2017). Their study included information from 20,704 respondents across 24 districts of the province. Hypertension was identified as the most prevalent non-communicable disease, affecting 29.2% of the surveyed population. The prevalence was higher among females than males, with reported proportions of 32.7% and 25.0%, respectively. Furthermore, hypertension prevalence increased considerably with age, reaching 40.4% among individuals aged 50 years and above. These findings demonstrate the importance of age- and gender-specific screening programs in Khyber

Pakhtunkhwa.Khan et al. (2015) investigated cardiovascular disease risk factors among adults living in rural areas of Khyber Pakhtunkhwa. Their community-based cross-sectional research included 2,569 participants and reported a hypertension prevalence of 26.7%, including 11.1% newly identified cases. The study also identified tobacco consumption, physical inactivity, abdominal obesity, and other cardiovascular risk factors within the rural population. The findings highlighted the importance of community-level health assessments and regular blood pressure screening. This research is particularly relevant because it demonstrates that a considerable proportion of individuals may have previously undiagnosed hypertension, emphasizing the need for accessible preventive healthcare services.

The global epidemiological evidence also demonstrates considerable inequalities in hypertension diagnosis and management. Mills et al. (2016) examined hypertension prevalence and control across 90 countries and identified substantial differences between high-income and low- and middle-income countries. Their findings highlighted that limited awareness, inadequate treatment, and insufficient blood pressure control contribute to the continuing global burden of hypertension. These differences suggest that healthcare accessibility, availability of affordable medication, and effective primary healthcare services are essential components of hypertension prevention and management.The World Health Organization (2023) emphasized that hypertension frequently remains undetected because many affected individuals do not experience noticeable symptoms. Its global report highlighted the importance of regular blood pressure measurements, standardized diagnostic procedures, and improved treatment services. The WHO also emphasized the contribution of excessive salt consumption, unhealthy dietary habits, tobacco use, physical inactivity, and obesity to elevated blood pressure. These recommendations are particularly relevant to Pakistan, where lifestyle-related risk factors and unequal healthcare access may contribute to delayed diagnosis and inadequate disease management.More recent evidence from the World Health Organization (2025a) indicates that approximately 1.4 billion adults aged 30–79 years worldwide were living with hypertension in 2024. Its Pakistan hypertension profile further estimates that 42% of adults aged 30–79 years have hypertension, while only 12% of affected individuals have their blood pressure controlled (World Health Organization, 2025b). These estimates demonstrate the continuing public health importance of hypertension in Pakistan and the need for stronger screening and treatment initiatives. Overall, the reviewed literature establishes a significant relationship between hypertension and demographic, behavioral, clinical, and healthcare-related factors. However, additional healthcare-center-based research is needed to examine these relationships among adults attending selected facilities in Khyber Pakhtunkhwa and to identify practical opportunities for improving local hypertension prevention and management.

METHODOLOGY

The proposed study will employ a quantitative methodology to investigate hypertension prevalence and associated risk factors among adults attending selected public and private healthcare centers in Khyber Pakhtunkhwa, Pakistan. The target population will consist of adult patients aged 18 years and above visiting participating healthcare facilities during the data collection period. A sample of approximately 400 participants will be considered, subject to formal sample-size calculation, anticipated hypertension prevalence, confidence level, precision, and adjustment for non-response. Participants will be selected through an appropriate sampling procedure, preferably systematic or consecutive sampling, depending on patient attendance and facility arrangements. Individuals who provide informed consent and meet the eligibility criteria will be included, while those unable to provide reliable information or participate in blood pressure assessment will be excluded where appropriate.Data will be collected using a structured questionnaire designed according to the study objectives and relevant hypertension research literature. The questionnaire will obtain information regarding age, gender, educational background, employment, income, residential location, family history of hypertension, previous medical diagnoses, dietary habits, physical activity, tobacco consumption, and healthcare-seeking behavior. Clinical measurements will include blood pressure, height, weight, and body mass index. Blood pressure will be measured using a validated digital or manual sphygmomanometer, following standardized measurement procedures, including adequate rest before assessment and appropriate cuff selection. Where feasible, repeated measurements and follow-up assessment on a separate day will be used to improve diagnostic accuracy. Participants with previously diagnosed hypertension and those identified through the study assessment will be considered separately. The study will follow accepted diagnostic criteria, using systolic blood pressure of 140 mmHg or higher and/or diastolic blood pressure of 90 mmHg or higher, while considering current antihypertensive medication use. Ethical approval will be obtained from the relevant institutional review committee, and informed consent, confidentiality, voluntary participation, and secure data handling will be maintained throughout the research process.

RESEARCH DESIGN

A descriptive analytical cross-sectional research design will be adopted to assess hypertension prevalence and examine its associated risk factors at a specific period. This design is appropriate because it enables the researcher to collect demographic, socioeconomic, behavioral, and clinical information from a defined adult population without requiring long-term follow-up. The study will be conducted at selected healthcare centers located in representative urban and rural areas of Khyber Pakhtunkhwa. Healthcare facilities will be selected according to their accessibility, patient attendance, geographical coverage, and willingness to participate in the research. The

sampling strategy will aim to include individuals from different age groups, genders, educational backgrounds, and socioeconomic categories to improve the representativeness of the study population.The independent variables will include age, gender, family history, body mass index, dietary practices, physical activity, tobacco consumption, socioeconomic status, and previous medical conditions. Hypertension status will serve as the principal dependent variable. Additional outcome measures will include awareness of hypertension, previous screening, treatment utilization, and adherence to prescribed medication. Data collection instruments will be reviewed by relevant healthcare and research professionals to establish content validity, while a pilot study will be conducted to identify potential problems in questionnaire wording and data collection procedures. Standardized blood pressure measurement techniques will be applied to minimize measurement errors. The overall design will enable the researcher to examine associations between hypertension and different risk factors while recognizing that a cross-sectional study cannot establish temporal relationships or prove causation.

DATA ANALYSIS

The collected data will be entered, coded, cleaned, and analyzed using the Statistical Package for the Social Sciences (SPSS) or an equivalent statistical software program. Descriptive statistical techniques will be applied to summarize participant characteristics, including frequencies, percentages, means, and standard deviations. Hypertension prevalence will be calculated as the proportion of participants meeting the study's operational definition of hypertension, including individuals currently receiving antihypertensive treatment. The prevalence estimates will also be examined according to age, gender, residential location, educational attainment, and socioeconomic characteristics to identify differences between population groups.Inferential statistical procedures will be used to investigate relationships between hypertension and potential risk factors. Chi-square tests will examine associations between categorical variables, while independent-sample t-tests or appropriate non-parametric alternatives will be applied to compare continuous variables. Binary logistic regression will be performed to identify independent predictors of hypertension after adjusting for relevant demographic, socioeconomic, and clinical characteristics. Adjusted odds ratios with 95% confidence intervals will be reported to demonstrate the strength and precision of observed associations. Statistical significance will be assessed using a conventional threshold of p less than .05. The analysis will also examine hypertension awareness, screening history, treatment utilization, and medication adherence among participants identified as hypertensive. Missing observations will be assessed carefully, and appropriate statistical procedures will be selected according to their extent and pattern. The resulting analysis will provide a structured understanding of hypertension prevalence and its associated risk factors among adults attending the selected healthcare centers.

FINDINGS

As the proposed study has not yet involved actual participant recruitment or primary data collection, its findings cannot be reported as observed research results. The expected findings are anticipated to provide a detailed understanding of hypertension prevalence and its distribution among adults attending selected healthcare centers in Khyber Pakhtunkhwa. Based on previous provincial and national investigations, hypertension is expected to represent an important health concern, particularly among older adults and individuals with obesity, limited physical activity, a family history of hypertension, and unhealthy dietary practices. Previous research by Basit et al. (2020) and Haq et al. (2025) provides a relevant evidence base for examining these potential associations within the province.The study is also expected to identify differences in hypertension awareness and screening practices among participants from different demographic and socioeconomic backgrounds. Individuals with limited educational opportunities, lower household income, and restricted access to healthcare services may demonstrate greater difficulties in obtaining regular blood pressure assessments and maintaining continuous treatment. The analysis is expected to clarify the relationship between previous hypertension diagnosis, medication utilization, and blood pressure control. Furthermore, comparisons between urban and rural healthcare-center attendees may provide information about differences in health awareness, screening opportunities, and healthcare-seeking behavior. These findings will only be confirmed after statistical analysis of actual collected data and should not be interpreted as established results.

CONCLUSION

Hypertension represents a major public health challenge in Pakistan and requires particular attention because of its association with cardiovascular diseases, stroke, kidney complications, and premature mortality. The proposed research aims to investigate hypertension prevalence and its associated demographic, socioeconomic, clinical, and lifestyle-related risk factors among adults attending healthcare centers in Khyber Pakhtunkhwa. By examining blood pressure measurements alongside individual characteristics, dietary practices, physical activity, family history, and healthcare-seeking behavior, the study will provide an opportunity to understand the factors contributing to hypertension within the selected healthcare settings.The research is expected to contribute to improved understanding of hypertension screening, early diagnosis, treatment adherence, and healthcare accessibility in the province. Its findings may assist healthcare professionals in identifying vulnerable population groups and developing appropriate preventive interventions. Strengthening routine blood pressure screening, improving public awareness, encouraging healthier dietary practices, promoting physical activity, and ensuring access to affordable treatment are important measures for reducing the burden of hypertension.

Furthermore, collaboration between healthcare institutions, public health authorities, and community organizations may support more effective prevention and disease-management initiatives. Overall, the study may provide useful regional evidence for strengthening healthcare services and improving cardiovascular health among adults in Khyber Pakhtunkhwa, Pakistan.

REFERENCES

Awan, A. I., Tariq, M., Siddiqui, A., Ashfaq, M., Kamran, F., & Aziz, M. (2026). Prevalence and risk factors of hypertension among young adults in urban Pakistan: A cross-sectional study. Review Journal of Neurological & Medical Sciences Review, 4(6), 102–112.

Ayub, A., Ullah, I., Ullah, S., Ali, N., Khan, A., Ali, S., Salih, Y., & Ullah, H. (2026). Prevalence of hypertension and associated risk factors among young adults at Saidu Group of Teaching Hospital, Saidu Sharif, Swat: A cross-sectional study. Pakistan Journal of Medical & Cardiological Review, 5(2), 3357–3369.

Badat, S. A., Haque, C. E., Hossain, S., Katz, A., & Ahsan, G. U. (2026). Prevalence and risk factors of hypertension in rural Bangladesh: A population-based cross-sectional study. PLOS ONE, 21(7), Article e0351569.

Olson, P. S. (2026). Hypertension prevalence in the Asia-Pacific region: A systematic analysis of population-based studies. Journal of Pharmaceutical Policy and Practice, 19, Article 2727205.

Ranasinghe, P., Rathnayake, N., Manchanayake, M., Meegoda, V. J., Wanigasuriya, V., Weerasekara, P., & Munasinghe, S. (2026). Prevalence and trends of hypertension among South Asian adults: A systematic review and meta-analysis. Journal of Human Hypertension, 40(10), 778–786.

Tahir, A., & Tahir, M. (2026). Hypertension prevalence and its associated risk factors among adults visiting outpatient clinics: A cross-sectional study. International Journal of Disease and Medical Research, 4(1).

Zafar, M. A., Ahmad, A., Uddin, A., Din, I., Ali, S., Masood, I., Bonilla Arauz, A. C. C., & Noor, A. (2026). Evaluation of antihypertensive medication adherence and its association with blood pressure control among hypertensive patients attending outpatient clinics in Khyber Pakhtunkhwa, Pakistan: A cross-sectional study. Cureus, 18(6), Article e111179