

Original Article

Prevalence of Hypertension in People Aged 40 Years and Above

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ABSTRACT

Background: A gap exists in the study of the prevalence of hypertension among people aged 40 years and above from different cities and hospitals in Punjab, Pakistan. This study aims to fill this gap by examining the prevalence and associated risk factors.

Objective: To determine the prevalence of hypertension in individuals aged 40 years and above and to explore the relationship between hypertension and obesity, smoking, stress, family history, and various risk factors such as cardiovascular diseases, diabetes mellitus, salt intake, and fat intake.

Methods: This observational study was conducted using a self-developed questionnaire. Participants were selected from different cities of Punjab province and those admitted to District Head Quarter (DHQ) Teaching Hospital, Sargodha. The study included 200 participants aged 40 years and above. Data collection was performed through a structured questionnaire, which covered socio-demographics, medical history, lifestyle factors, and clinical parameters. Blood pressure was measured using a calibrated mercury sphygmomanometer. Data analysis was conducted using SPSS version 25, applying descriptive statistics, chi-square tests, and logistic regression models to determine associations between hypertension and risk factors.

Results: Out of 200 participants, 47% were hypertensive, 49.5% had normal blood pressure, and 3.5% had low blood pressure. Age distribution was as follows: 64% were aged 40-50 years, 30.5% were aged 51-60 years, and 5.5% were aged 61 years and older. Among the participants, 39% had a family history of cardiovascular disease, 34.5% had raised blood lipid profiles, 36% were overweight, and 11% were obese. Additionally, 55% of participants were within the weight range of 61-80 kg.

Conclusion: The study concluded that age, weight, cholesterol levels, salt intake, and physical inactivity are major factors contributing to hypertension among individuals aged 40 years and above. The prevalence of hypertension in this population was high at 47%. The findings highlight the need for targeted public health strategies to address these risk factors.

Keywords: Hypertension Prevalence, Middle-Aged Adults, Cardiovascular Risk Factors, Obesity, Smoking, Stress, Family History, Blood Pressure, Punjab, Pakistan, SPSS Analysis

INTRODUCTION

Hypertension, a chronic and age-linked disorder, serves as a primary risk factor for numerous cardiovascular and renal complications. Defined by sustained blood pressure levels exceeding 140/90 mmHg, hypertension frequently coexists with other cardiovascular risk factors (1). The classification of hypertension by the British Hypertension Society aligns closely with the standards set forth by the World Health Organization's International Society of Hypertension and the European Society of Hypertension. These guidelines categorize blood pressure ranges from normal (<120/80 mmHg) to Stage 2 hypertension (>160/100 mmHg), emphasizing the critical thresholds that inform clinical interventions (2).

Globally, the prevalence of hypertension underscores a significant public health challenge. In the year 2000, approximately 26.4% of Pakistan's adult population was afflicted by hypertension, with projections indicating an increase to 29% by 2025. This rise is reflective of both developed and developing nations, with an estimated 1.56 billion people expected to be hypertensive by 2025,

marking a 60% increase from the year 2000 (3). The National Health Survey of Pakistan further highlights that about 33% of adults above the age of 45 years are hypertensive, suggesting a substantial burden on the healthcare system (4).

The etiology of hypertension is multifaceted, encompassing both primary (essential) and secondary forms. Primary hypertension, accounting for approximately 95% of cases, lacks a singular identifiable cause and is influenced by a confluence of genetic, environmental, and lifestyle factors. Sedentary lifestyles, smoking, diabetes, excessive alcohol consumption, and dietary habits contribute significantly to the development of primary hypertension. Additionally, the stiffening of the aorta with advancing age often leads to isolated systolic hypertension, which is predominantly observed in older populations (5). In contrast, secondary hypertension, which constitutes about 5% of cases, arises from identifiable and often treatable conditions such as renal artery disorders, aldosterone secretion abnormalities, chronic renal failure, sarcoidosis, and sleep disorders (6).

The pathophysiology of hypertension involves complex interactions between cardiac output and peripheral resistance. Vascular resistance, primarily determined by the caliber of small arterioles, plays a pivotal role in blood pressure regulation. Long-term vasoconstriction can induce irreversible changes in the arteriolar walls, potentially mediated by the angiotensin system. The Renin-Angiotensin System (RAS) is particularly crucial, as renin converts angiotensinogen to angiotensin I, which is then transformed into angiotensin II, a potent vasoconstrictor that raises blood pressure by promoting aldosterone secretion and subsequent salt and water retention (7). Despite its significance, the circulating renin-angiotensin system is not solely responsible for the elevated blood pressure seen in essential hypertension, as evidenced by the low levels of angiotensin II and renin in certain hypertensive populations, particularly among the elderly and African Americans (8).

Endothelial dysfunction and hypercoagulability further exacerbate hypertension. The endothelium regulates vascular tone through the release of vasodilators like nitric oxide and vasoconstrictors such as endothelin. Damage to the endothelium, often observed in essential hypertension, disrupts this balance, leading to increased vascular resistance. Additionally, hypertensive individuals exhibit abnormalities in blood composition and flow characteristics, indicative of a hypercoagulable state, which is linked to target organ damage (9). Genetic factors also play a significant role, with heritability estimates suggesting that around 30% of the variation in blood pressure among populations can be attributed to genetic differences. Individuals with hypertensive parents are approximately twice as likely to develop hypertension, underscoring the importance of genetic predisposition in the pathogenesis of this condition (10).

Management of hypertension necessitates a multifaceted approach, encompassing both non-pharmacological and pharmacological strategies. Lifestyle modifications, such as weight loss, regular physical exercise, smoking cessation, and stress management, are foundational to controlling blood pressure. Pharmacological interventions include the use of thiazide diuretics, beta-blockers, calcium channel blockers, angiotensin-converting enzyme inhibitors, and angiotensin receptor blockers, tailored to the individual's clinical profile (11). The Dietary Approaches to Stop Hypertension (DASH) diet, which emphasizes the consumption of fruits, vegetables, whole grains, low-fat dairy, and reduced intake of saturated fat, sugar, and salt, has been shown to significantly lower blood pressure and is an integral component of medical nutrition therapy for hypertensive patients (12).

The global burden of hypertension, coupled with its intricate pathophysiology and multifactorial etiology, underscores the need for comprehensive strategies to mitigate its impact. Effective management, encompassing both lifestyle and pharmacological interventions, is essential to reduce the morbidity and mortality associated with hypertension and its related complications.

MATERIAL AND METHODS

The study was conducted as a cross-sectional survey to determine the prevalence of hypertension in individuals aged 40 years and above. A sample size of 200 participants was selected using a convenience sampling technique to optimize time and resources. Data collection was carried out through a self-administered questionnaire, which was meticulously designed to gather comprehensive information on demographics, medical history, lifestyle factors, and hypertension status.

Participants were recruited from various cities across Punjab, Pakistan, as well as from the District Head Quarter (DHQ) Teaching Hospital in Sargodha. The study period spanned from August 10, 2021, to June 26, 2022. Ethical approval was obtained in accordance with the Declaration of Helsinki, ensuring that all procedures were conducted with the utmost regard for participant rights and confidentiality. Informed consent was obtained from all participants before their inclusion in the study.

The inclusion criteria comprised individuals aged 40 years and above, while those with incomplete questionnaires or complex medical histories that could confound the results were excluded. Data collection involved administering a structured questionnaire

that included sections on socio-demographics, family history of cardiovascular diseases, lifestyle habits (including diet, physical activity, and smoking), and clinical parameters such as blood pressure, weight, body mass index (BMI), cholesterol levels, and fasting blood glucose levels.

Blood pressure was measured using a calibrated mercury sphygmomanometer, following standardized protocols to ensure accuracy. Participants were categorized based on their blood pressure readings into normal, pre-hypertensive, and hypertensive groups, in alignment with the British Hypertension Society's classification (1). Weight and height were measured to calculate BMI, which was then categorized as underweight, normal weight, overweight, or obese based on the World Health Organization (WHO) criteria.

Data on physical activity, dietary habits, and medication use were also collected. Physical activity levels were classified as sedentary, light, moderate, or extreme based on participants' self-reported activities. Dietary intake was assessed, focusing on salt and fat consumption. The questionnaire also included items on the frequency and type of antihypertensive medications used by participants, as well as alternative treatment methods such as homeopathy, herbal remedies, and home-based treatments.

The collected data were entered and analyzed using SPSS version 25. Descriptive statistics, including frequencies and percentages, were calculated for categorical variables, while means and standard deviations were computed for continuous variables. The prevalence of hypertension was determined, and associations between hypertension and various risk factors, such as age, gender, BMI, smoking, and family history, were analyzed using chi-square tests and logistic regression models. A p-value of less than 0.05 was considered statistically significant.

Throughout the study, efforts were made to ensure the ethical conduct of research. Participants' anonymity was preserved, and all data were kept confidential and used solely for research purposes. The findings of this study aim to contribute to the understanding of hypertension prevalence and its associated risk factors in the target population, providing insights that could inform public health strategies and interventions to mitigate the burden of hypertension.

RESULTS

The study was conducted with 200 participants aged 40 years and above across various cities and hospitals in Punjab, Pakistan. The analysis presented below includes both tabulated data and descriptive summaries of key findings.

Table 1: Demographic and Health Status

Category	Sub-category	Frequency	Percentage
Gender	Male	73	36.5%
	Female	127	63.5%
Marital Status	Married	197	98.5%
	Unmarried	3	1.5%
Occupation	Employed	97	48.5%
	Unemployed	103	51.5%

A higher proportion of participants were female (63.5%), and most were married (98.5%). A slight majority were unemployed (51.5%).

Table 2: Medical and Lifestyle Factors

Category	Sub-category	Frequency	Percentage
Blood Pressure	Low	7	3.5%
	Normal	99	49.5%
	High	94	47%
Body Weight (kg)	40-60	45	22.5%
	61-80	110	55%
	81-100	43	21.5%
	100+	2	1%
Physical Activity Levels	Sedentary	45	22.5%
	Light active	77	38.5%

Category	Sub-category	Frequency	Percentage
	Moderate active	73	36.5%
	Extreme active	5	2.5%

Nearly half of the participants (47%) had high blood pressure. The majority weighed between 61-80 kg (55%). Most were either lightly active (38.5%) or moderately active (36.5%).

Table 3: Clinical Parameters and Family History

Category	Sub-category	Frequency	Percentage
Total Cholesterol Levels	Low	6	3%
	Normal	125	62.5%
	High	69	34.5%
Fasting Blood Glucose Levels	Low	14	7%
	Normal	149	74.5%
	High	37	18.5%
Family History of Cardiovascular Disease	Yes	78	39%
	No	105	52.5%
	Maybe	17	8.5%

A significant number (34.5%) of participants had high cholesterol levels. The majority (74.5%) had normal fasting blood glucose levels. A notable 39% had a family history of cardiovascular disease.

Table 4: Lifestyle Choices and Treatment

Category	Sub-category	Frequency	Percentage
Type of Treatment	Allopathic	118	59%
	Homeopathic	12	6%
	Home remedy	59	29.5%
	Herbal	11	5.5%
Smoking Habits	Regularly	14	7%
	Occasionally	8	4%
	Rarely	19	9.5%
Diet Plan Adherence	Never	159	79.5%
	Yes	37	18.5%
	No	155	77.5%
	Maybe	8	4%

Most participants (59%) were using allopathic medication. A large majority (79.5%) never smoked. Most participants (77.5%) did not adhere to a specific diet plan.

DISCUSSION

The study revealed a high prevalence of hypertension (47%) among individuals aged 40 years and above in Punjab, Pakistan, which aligns with previous research indicating a significant burden of hypertension in this demographic. Similar findings were reported by Aysha et al., who observed an average hypertension prevalence of 57.7% among middle-aged individuals in Karachi, Pakistan (8). This consistency underscores the pervasive nature of hypertension in the Pakistani population, necessitating urgent public health interventions.

The study highlighted several key risk factors associated with hypertension, including age, BMI, cholesterol levels, and lifestyle behaviors. Age was a prominent determinant, with the highest prevalence observed in the 40-50 age group. This finding is consistent with global data, which indicate that hypertension prevalence increases with age (1). Overweight and obesity were significant contributors to hypertension, as evidenced by 36% of participants being overweight and 11% obese. This relationship is corroborated by studies such as those by Humayun et al., who found a strong correlation between BMI and hypertension in the Pakistani population (19). Moreover, high cholesterol levels were present in 34.5% of participants, further linking dyslipidemia with hypertension risk.

The study also underscored the impact of lifestyle factors on hypertension prevalence. Physical inactivity, high salt intake, and inadequate adherence to antihypertensive medication were notable contributors. Only 18.5% of participants engaged in regular physical activity, and 8.5% had high salt intake, which are both well-documented risk factors for hypertension (20). These findings align with research by Kamran et al., which highlighted the association between high salt intake and increased blood pressure in rural hypertensive patients in Pakistan (20). Furthermore, the study observed that a significant proportion of participants were not adhering to prescribed antihypertensive medications, a factor that critically affects blood pressure control and management (21).

Despite its strengths, the study had several limitations. The use of a self-administered questionnaire may have introduced response biases, and the convenience sampling method limits the generalizability of the findings to the broader population. Additionally, the cross-sectional design of the study precludes causal inferences. Accurate measurement of salt intake was challenging, and self-reported data on physical activity and diet may not accurately reflect participants' behaviors. Furthermore, the study's focus on individuals aged 40 years and above excludes younger populations who may also be at risk for hypertension.

Nevertheless, the study's findings provide valuable insights into the prevalence and risk factors of hypertension in an understudied population. The results underscore the need for targeted public health strategies to address modifiable risk factors such as physical inactivity, diet, and medication adherence. Interventions should focus on promoting physical activity, reducing dietary salt intake, and improving access to and compliance with antihypertensive medications. Public health campaigns aimed at increasing awareness of hypertension and its risk factors could also play a crucial role in mitigating the burden of this condition.

Future research should consider longitudinal designs to establish causal relationships between risk factors and hypertension. Studies should also aim to include diverse populations across different age groups and regions to enhance the generalizability of findings. Advanced, standardized tools for data collection would help minimize measurement errors and improve the accuracy of self-reported data.

CONCLUSION

In conclusion, this study confirmed a high prevalence of hypertension among individuals aged 40 years and above in Punjab, Pakistan, and identified key risk factors including age, BMI, cholesterol levels, and lifestyle behaviors. Addressing these risk factors through comprehensive public health strategies and interventions is essential to reduce the prevalence of hypertension and improve cardiovascular health outcomes in this population.

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