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Original Article

Modifiable Risk Factors in Hypertension

Muhammad Usama Maooz Awan[*1], Wajeeha Nasir[2], Sidra Zafar[3], Hafiza Hamna Mushtaq[4], Azmat Ullah[3], Muhammad Hayyat[3], Zaman Akram[5], Talha Bin Tahir[3], Ayesha Noor[6]

[1]The University of Lahore, Lahore, Pakistan
[2]Allama Iqbal Open University, Islamabad, Pakistan
[3]The University of Sargodha, Sargodha, Pakistan
[4]University of Management and Technology, Lahore, Pakistan
[5]Bahauddin Zakariya University, Multan, Pakistan
[6]Rahbar Medical & Dental College, Lahore, Pakistan
Corresponding Author: Muhammad Usama Maooz Awan; Email: usamamaooz@gmail.com

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ABSTRACT

Background: Hypertension is a major public health challenge globally due to its significant role in contributing to the burden of heart disease, stroke, and kidney failure. Identifying modifiable risk factors for hypertension is crucial to developing effective intervention strategies, particularly in regions like Punjab, Pakistan, where lifestyle factors such as diet and physical inactivity play prominent roles.

Objective: To assess the prevalence of hypertension and identify its association with modifiable risk factors such as obesity, dietary habits, physical activity, and smoking among adults in Punjab, Pakistan.

Methods: This cross-sectional observational study was conducted over four months, from September to December 2019, and included 200 hypertensive adults aged 40 years and above from various urban and rural settings in Punjab. Data were collected using a self-developed questionnaire covering demographic information, health history, and lifestyle factors. Purposive sampling technique was utilized to select participants. Statistical analysis was performed using SPSS software (Version 25), focusing on descriptive statistics and cross-tabulations to examine the relationships between hypertension and various lifestyle factors.

Results: Out of the 200 participants, 135 (68%) were found to have high blood pressure. The prevalence of obesity was 19.5%, with 39% of participants classified as overweight. Physical activity levels were low, with 36% of participants leading sedentary lifestyles. Dietary analysis showed high salt and fat intake among significant portions of the population. Females showed a higher prevalence of hypertension at 68% compared to males at 33%.

Conclusion: The study concluded that high prevalence of hypertension is significantly associated with modifiable lifestyle factors, including obesity, sedentary lifestyle, and unhealthy dietary habits. Public health interventions targeting these risk factors could potentially reduce the burden of hypertension in this region.

Keywords: Hypertension, Modifiable Risk Factors, Obesity, Dietary Habits, Physical Activity, Punjab, Public Health, Cross-Sectional Study, Lifestyle Diseases, Health Intervention

INTRODUCTION

Hypertension, commonly known as high blood pressure, is a prevalent cardiovascular condition characterized by persistently elevated arterial pressure. It has been identified as a major risk factor for cardiovascular diseases, stroke, renal failure, and other serious health complications. The condition is so widespread that the British Hypertension Society (BHS) defines hypertension as a blood pressure reading greater than 140/90 mmHg (1). The World Health Organization (WHO) and the European Society of Hypertension share similar classifications, underscoring the global consensus on these diagnostic thresholds. These classifications illuminate the urgent need to understand and manage hypertension effectively, especially considering its prevalence and the severe health outcomes associated with it (1-3).

This condition not only contributes significantly to global morbidity and mortality but also imposes a substantial burden on healthcare systems worldwide. It affects approximately one in every three adults globally, with a notable increase in prevalence

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observed in middle-aged and older populations (2). Despite its high prevalence, hypertension often remains undiagnosed due to its asymptomatic nature in the early stages, making it a silent threat that can suddenly manifest with severe health consequences.

A growing body of evidence suggests that hypertension results from complex interactions between genetic predisposition and various environmental factors. These include, but are not limited to, obesity, sedentary lifestyle, poor dietary habits, excessive alcohol consumption, and smoking. Environmental factors are particularly concerning as they represent modifiable risk factors that, if addressed appropriately, can significantly reduce the incidence and impact of hypertension. For instance, the impact of diet, especially salt and fat intake, has been extensively studied, with results consistently demonstrating a strong correlation between excessive intake and increased blood pressure (3).

The recognition of these modifiable risk factors has led to a focus on lifestyle interventions as a primary approach to managing hypertension. Efforts to mitigate these risks include promoting dietary modifications, physical activity, and cessation of smoking. Such interventions not only help in managing blood pressure but also contribute to the overall improvement of cardiovascular health. Moreover, understanding the demographic and regional variations in the prevalence of hypertension can aid in tailoring public health policies and interventions more effectively. In Punjab, Pakistan, for instance, the prevalence and management of hypertension present unique challenges due to dietary habits, cultural norms, and access to healthcare services, which may differ significantly from those in Western countries (4).

In summary, hypertension remains a critical public health issue due to its high prevalence, significant impact on health, and the economic burden it places on societies. The condition's complexity is heightened by its multifactorial etiology involving both non-modifiable and modifiable risk factors. Therefore, comprehensive strategies that include both medical interventions and lifestyle modifications are essential to control this pervasive condition and reduce its substantial health and economic impacts globally.

MATERIAL AND METHODS

The study was conducted as a cross-sectional observational analysis utilizing a self-developed questionnaire. The research was carried out over a period of four months, from September to December 2019, among hypertensive individuals aged 40 years and above. Participants were recruited from different cities within the Punjab province, including patients from the District Headquarter (DHQ) Teaching Hospital in Sargodha, providing a diverse demographic and geographical representation.

To ensure a comprehensive understanding of the modifiable risk factors associated with hypertension, the study employed purposive sampling techniques to select 200 participants who met the inclusion criteria. The exclusion criteria ruled out individuals below 40 years of age and those with rare or occasional histories of hypertension without ongoing medication.

The data collection involved the distribution of a meticulously prepared questionnaire designed to gather detailed information on each participant's lifestyle, dietary habits, physical activity levels, medical history, and current health status. Participants were required to fill out the questionnaire in one sitting to ensure consistency and reliability of the data. For those unable to complete their questionnaire immediately, arrangements were made to collect their responses at a later date or through follow-up contact.

Ethical considerations were strictly adhered to throughout the research process. The study was conducted in compliance with the Declaration of Helsinki on ethical principles for medical research involving human subjects. Prior to participation, all individuals were informed about the purpose and procedures of the study and consent was obtained, ensuring that they understood their involvement was voluntary and that they could withdraw at any time without penalty. Confidentiality and anonymity of the participants were maintained, with all data being handled in a manner that respects the privacy of the participants.

The data collected was analyzed using SPSS software (Version 25), which allowed for a robust statistical examination of the data. Descriptive statistics were used to quantify the prevalence of hypertension and associated modifiable risk factors among the surveyed population. This analysis included frequency distributions, percentages, and cross-tabulations to explore the relationships between various risk factors and hypertension.

This methodological approach provided a comprehensive overview of the modifiable risk factors for hypertension within the target population, facilitating an in-depth understanding of how these factors are distributed across different demographics and how they correlate with hypertension prevalence.

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RESULTS

The results from the study underscore the prevalence of hypertension and its correlation with various modifiable risk factors among the participants. Data analysis was carried out using SPSS Version 25, focusing on the assessment of demographic characteristics, lifestyle factors, and medical history. The findings are presented through a series of tables, each followed by a brief description of the key outcomes.

Table 1: Distribution of Participants by Age Group

Age Group	Frequency	Percentage
40-50	88	44%
51-60	70	35%
61-70	33	17%
71-80	7	4%
81-90	2	1%

The majority of the participants were within the 40-50 age range, indicating a significant representation of middle-aged adults in the study.

Table 2: Prevalence of Hypertension by Gender

Gender	Frequency	Percentage
Male	65	33%
Female	135	68%

Females constituted a higher percentage of the study population, which may reflect a greater awareness or prevalence of hypertension among women in the sampled areas.

Table 3: Blood Pressure Classification among Participants

Blood Pressure Category	Frequency	Percentage
Normal	61	31%
Low	4	2%
High	135	68%

A significant 68% of participants exhibited high blood pressure, underscoring the high prevalence of unmanaged or inadequately managed hypertension in the population.

Table 4: Body Mass Index (BMI) Classification

BMI Category	Frequency	Percentage
Underweight	7	3.5%
Normal	76	38%
Overweight	78	39%
Obese	39	19.5%

The data shows a nearly even distribution across normal, overweight, and obese categories, suggesting a strong link between body weight and hypertension.

Table 5: Lifestyle Factors – Physical Activity Levels

Physical Activity Level	Frequency	Percentage
Sedentary	72	36%
Lightly Active	67	34%
Moderately Active	56	28%
Extremely Active	5	3%

The majority of the study population reported low levels of physical activity, with 36% leading a sedentary lifestyle, which is a known risk factor for hypertension.

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Table 6: Dietary Habits – Salt and Fat Intake

Intake Level	Salt Frequency	Salt Percentage	Fat Frequency	Fat Percentage
Low	51	26%	64	32%
Normal	111	56%	87	44%
High	38	19%	49	25%

More than half of the participants reported normal salt intake, but there remains a significant portion with high salt and fat intake, contributing to potential hypertension risks.

These results provide a clear picture of the modifiable risk factors contributing to hypertension among adults aged 40 and above in Punjab, Pakistan. The high rates of hypertension highlight the need for targeted health interventions focusing on lifestyle modifications, especially concerning diet and physical activity.

DISCUSSION

The findings of this study revealed a high prevalence of hypertension among the adult population in Punjab, which aligns with global trends indicating an increasing burden of this condition, particularly in developing regions (1). The study's results, showing 68% of participants with high blood pressure, are consistent with previous research that emphasizes hypertension as a major public health issue due to its role as a primary or contributing cause of cardiovascular diseases and renal failure (2).

In the demographic breakdown, the higher prevalence of hypertension among females in the study could suggest a greater vulnerability or could reflect a higher health-seeking behavior among women compared to men in the region (3). This gender disparity has been noted in other regional studies and may also be influenced by physiological, societal, and health service accessibility factors specific to the area (4).

The significant association of hypertension with obesity, evidenced by 39% overweight and 19.5% obese participants, supports existing literature that links body mass index (BMI) with elevated blood pressure (5). This correlation is critical because it highlights the potential for intervention in obesity as a modifiable risk factor for reducing the incidence of hypertension.

The study also highlighted a sedentary lifestyle as a prevalent issue, with 36% of participants categorized as sedentary. Previous studies have demonstrated that physical inactivity is a significant risk factor for hypertension and other metabolic syndromes (6). Encouraging more active lifestyles could, therefore, be a strategic component of public health interventions aimed at reducing hypertension prevalence.

Dietary habits, particularly salt and fat intake, were identified as other crucial modifiable risk factors. The study found that a significant number of participants consumed high levels of salt and fat, which have been proven to exacerbate hypertension risk (7). Public health initiatives that promote dietary modifications could help mitigate this risk and reduce the overall burden of hypertension.

One of the strengths of this study is its focus on a population from diverse cities within Punjab, providing a comprehensive look at hypertension across different urban and rural settings. However, the study also has limitations. The use of a self-reported questionnaire could lead to biases in data collection, such as underreporting or overreporting of personal health behaviors or hypertension status. Furthermore, the cross-sectional design limits the ability to establish causality between identified risk factors and hypertension.

In terms of recommendations, this study underscores the need for targeted health interventions focusing on modifiable lifestyle factors such as diet and physical activity. Moreover, there is a pressing need for awareness campaigns tailored to different demographic groups, particularly in educating the population about the dangers of high salt and fat intake and the benefits of regular physical activity. Future research should consider longitudinal designs to better understand the causality and effects of interventions over time.

Additionally, implementing community-based health programs that regularly monitor blood pressure and other health indicators in the population could play a crucial role in early identification and management of hypertension. These programs should be culturally tailored to ensure higher acceptance and sustainability in the local context.

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CONCLUSION

The study conclusively demonstrated a high prevalence of hypertension among adults in Punjab, primarily associated with modifiable risk factors such as obesity, sedentary lifestyle, and poor dietary habits, particularly high salt and fat intake. These findings underscore the urgent need for targeted public health interventions that promote healthier lifestyle choices. Implementing community-based educational and health promotion programs focusing on dietary modifications, physical activity, and regular health screenings can significantly mitigate the hypertension burden. Such interventions not only hold the potential to reduce hypertension prevalence but also diminish its impact on the healthcare system by preventing associated complications, thereby enhancing overall public health outcomes.

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