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ASSESSMENT OF KNOWLEDGE OF RISK FACTORS OF HYPERTENSION AMONG GENERAL POPULATION OF PESHAWAR

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ABSTRACT

Background: *Hypertension is a leading global health concern and a major risk factor for cardiovascular disease. Adequate public knowledge regarding its risk factors is crucial for effective prevention and control. In Pakistan, where the burden of hypertension is rising, understanding the level of awareness in the general population is essential for designing targeted health interventions.*

Aim: *This study aimed to assess the level of knowledge regarding the risk factors of hypertension among the general population of Peshawar, Khyber Pakhtunkhwa, Pakistan.*

Methodology: *A cross-sectional descriptive study was conducted with a sample of 100 adult residents of Peshawar. Data were collected using a structured, pre-tested questionnaire that captured demographic information and assessed knowledge of hypertension risk factors (including high salt intake, obesity, physical inactivity, smoking, stress, family history, and alcohol consumption) and preventive practices. Knowledge scores were calculated and categorized as poor, moderate, or good. Data were analyzed using SPSS version 26, employing descriptive statistics and chi-square tests to explore associations.*

Results: *The study found that 72% of participants had heard of hypertension, with 64% correctly defining it as high blood pressure. Awareness of specific risk factors was moderate: 71% recognized high salt intake, 68% identified obesity, and 65% acknowledged physical inactivity as risk factors. However, knowledge gaps were evident, with only 60% recognizing family history and 57% identifying alcohol consumption as risk factors. While 76% believed hypertension is preventable, misconceptions about lifestyle modifications persisted. A statistically significant association was found between higher education levels and better knowledge scores.*

Conclusion: *The general population of Peshawar possesses a moderate level of knowledge about hypertension risk factors, but significant gaps remain, particularly regarding non-modifiable and certain lifestyle risks. The findings underscore an urgent need for targeted, community-based health education programs to improve awareness and promote preventive behaviors to curb the growing burden of hypertension.*

Introduction

Hypertension is one of the most prevalent chronic health conditions and remains a major contributor to the global burden of disease. Worldwide, nearly 1.39 billion people are affected by hypertension, and the condition is responsible for approximately 10.4 million premature deaths each year. It is estimated that about 32% of adults aged 30–79 years are living with hypertension. Therefore, effective

prevention strategies, early detection, and proper management are essential to improve public health outcomes and reduce hypertension-related complications (Ahmad et al., 2025).

Hypertension (HTN) is influenced by several modifiable and non-modifiable risk factors. Common modifiable factors include obesity, excessive salt intake, alcohol consumption, and physical inactivity. If left uncontrolled, hypertension can damage vital organs such as the kidneys and the brain, leading to severe health complications (Riaz et al., 2026).

Furthermore, hypertension is recognized as one of the leading causes of mortality associated with cardiovascular diseases. Epidemiological studies indicate that the risk of cardiovascular disease increases progressively with elevated blood pressure levels. Importantly, this relationship often begins early in life. For instance, increased blood pressure during childhood can predict the development of hypertension in adulthood. Additionally, elevated blood pressure in children may lead to early cardiovascular changes, including alterations in vascular structure and function. Conditions such as left ventricular hypertrophy have already been observed among young individuals with high blood pressure (Shaikh et al., 2011).

Global data also demonstrate a substantial rise in the prevalence of uncontrolled hypertension. The number of individuals with uncontrolled blood pressure (greater than 140/90 mmHg) increased from approximately 600 million in 1980 to nearly 1 billion in 2008. Moreover, projections suggest that this number may reach 1.56 billion by 2025, representing nearly 29% of the world's adult population (Alshammari et al., 2023).

Despite the high prevalence of hypertension, many individuals still lack sufficient knowledge and awareness regarding appropriate lifestyle modifications and adherence to treatment regimens. Several barriers contribute to poor disease management, including misinformation, financial constraints, and limited access to health education. Consequently, many patients find it difficult to adopt recommended behavioral changes, which often results in poorly controlled blood pressure and an increased risk of severe health complications (Kalam et al., 2025).

Hypertension is generally classified into two main types: primary (essential) hypertension and secondary hypertension. Primary hypertension accounts for nearly 90% of all cases and develops without a clearly identifiable pathophysiological cause. Although it cannot usually be completely cured, it can be effectively managed through lifestyle modifications and appropriate medication. In contrast, secondary hypertension, which accounts for approximately 10% of cases, occurs due to identifiable underlying conditions such as chronic kidney disease, hyperparathyroidism, Cushing syndrome, primary aldosteronism, and hyperthyroidism. Additionally, certain medications, including corticosteroids, estrogens, non-steroidal anti-inflammatory drugs (NSAIDs), amphetamines, cyclosporine, and erythropoietin, may also lead to secondary hypertension. Unlike primary hypertension, secondary hypertension may be potentially reversible or curable when the underlying cause is properly treated (Helen et al., 2022).

Similarly, several studies have evaluated public awareness regarding lifestyle factors related to hypertension management. For example, an analytical cross-sectional study conducted in Saudi Arabia between August 2022 and February 2023 reported that 72.8% of participants correctly recognized that individuals with hypertension should avoid alcohol consumption, while 68.9% were aware that hypertensive patients should refrain from smoking (Riaz et al., 2026).

Research Questions

What is the level of knowledge regarding risk factors of hypertension among the general population of Peshawar?

Research Objective

To assess the knowledge of risk factors of hypertension among the general population of Peshawar.

Research Hypotheses

Null Hypothesis (H_0)

There is no significant association between demographic characteristics and the level of knowledge about hypertension risk factors among the general population of Peshawar.

Alternative Hypothesis (H_1)

There is a significant association between demographic characteristics and the level of knowledge about hypertension risk factors among the general population of Peshawar.

Literature Review

Hypertension is a significant public health concern and a major risk factor for cardiovascular diseases. Its prevalence is increasing worldwide, particularly in low- and middle-income countries, due to factors such as age, obesity, physical inactivity, smoking, and unhealthy diets (Gul et al., 2023).

Studies indicate that knowledge and awareness of hypertension and its risk factors remain limited in many populations. In Bangladesh, less than half of the population demonstrated adequate awareness of hypertension risk factors, including high salt intake, stress, and sedentary lifestyle (Sultana et al., 2025). Similarly, rural communities often fail to recognize modifiable risk factors like physical inactivity and family history (He et al., 2016).

In Pakistan, awareness of hypertension is insufficient. Research in Karachi revealed that although some patients had moderate knowledge, only 64.8% maintained controlled blood pressure, highlighting gaps in preventive behaviors (Nadeem et al., 2019). A study in Peshawar also found limited patient knowledge and attitude toward hypertension management (Shah & Basir, 2025). National data suggest that sociodemographic factors, such as age, education, smoking, diabetes, and family history, influence both hypertension risk and awareness (Haq et al., 2024).

Overall, public knowledge of hypertension, especially regarding modifiable lifestyle risk factors and preventive strategies, remains inadequate. Awareness varies with education and other sociodemographic variables, emphasizing the need for targeted health education programs to reduce the burden of hypertension, particularly in regions like Peshawar (Sultana et al., 2025).

Research Methodology

The present study adopts a cross-sectional descriptive design to assess the knowledge of risk factors of hypertension among the general population of Peshawar. This design was chosen as it allows data collection at a single point in time, providing a clear snapshot of the population's awareness and understanding. The study will be conducted in various urban and peri-urban areas of Peshawar, including residential communities, markets, parks, and other public gathering places, ensuring representation from diverse age groups and socioeconomic backgrounds.

The study population consists of adult residents of Peshawar aged 18 years and above who can communicate in Urdu or English and provide informed consent. Inclusion criteria are: adults aged 18 years or older, residents of Peshawar for at least six months, able to understand and respond to the questionnaire, and willing to participate voluntarily. Exclusion criteria include: individuals below 18 years, those with serious illness or cognitive impairment preventing accurate responses, unwilling participants, and healthcare professionals whose knowledge may bias results.

The sample size was calculated using the Raosoft calculator with a 95% confidence level and 5% margin of error, resulting in a minimum of 100 participants. A convenience sampling method will be used to recruit participants from public areas, workplaces, and community centers, ensuring inclusion of diverse ages, genders, and educational backgrounds.

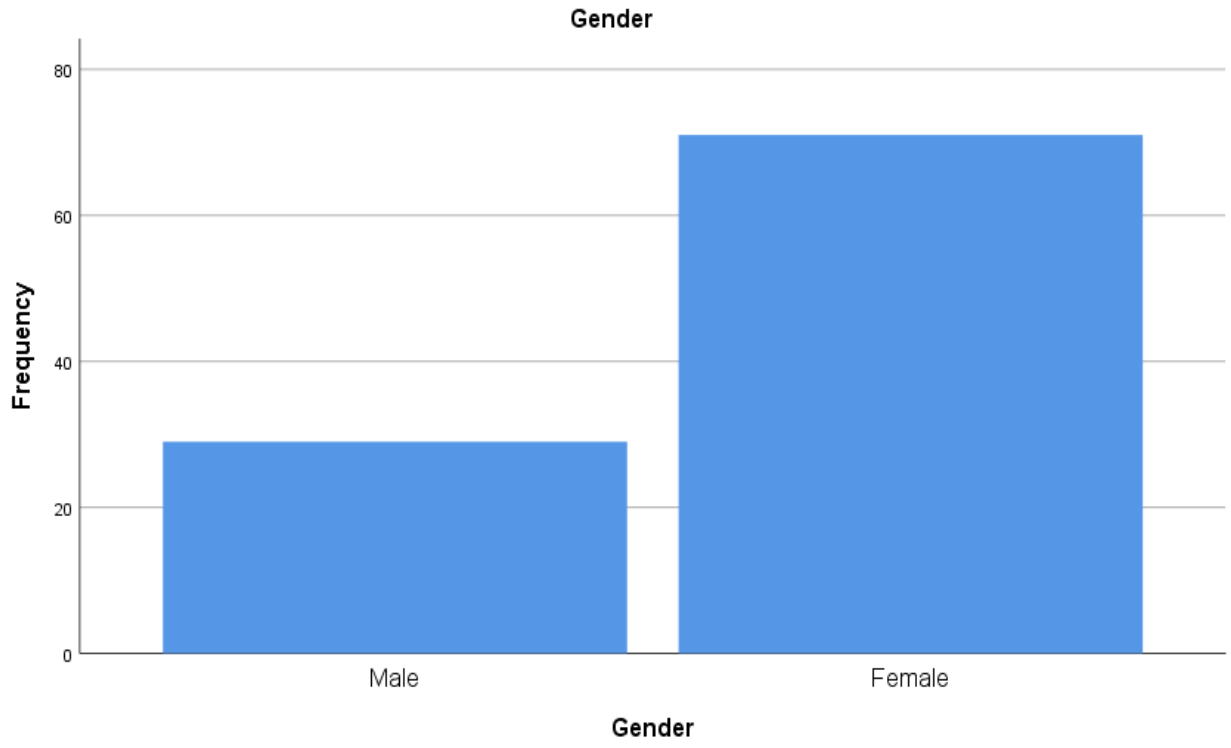
Data will be collected through a structured, self-administered questionnaire divided into four sections: demographic information, awareness of hypertension, knowledge of risk factors using Likert-scale items (high salt intake, obesity, physical inactivity, smoking, stress, family history, and alcohol consumption), and preventive

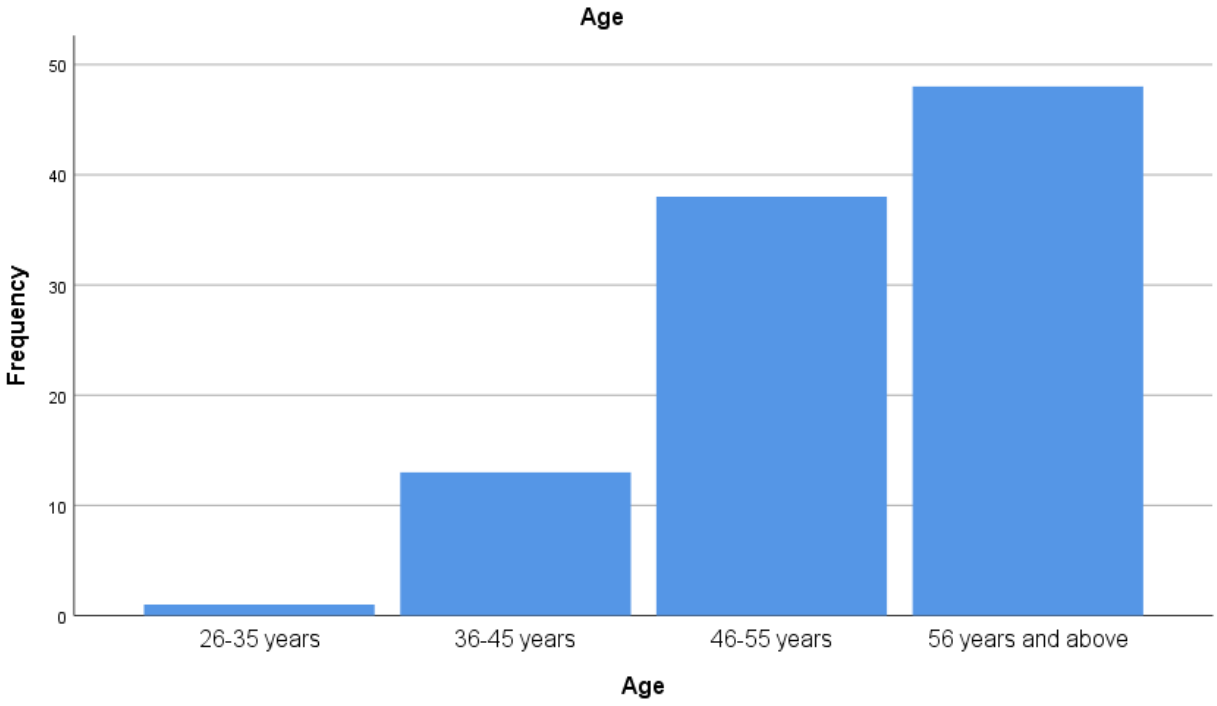
knowledge regarding lifestyle modifications. The questionnaire was pre-tested on 20 participants, and the pilot study demonstrated a CVI above 0.8 and excellent Cronbach's alpha, indicating high validity and reliability.

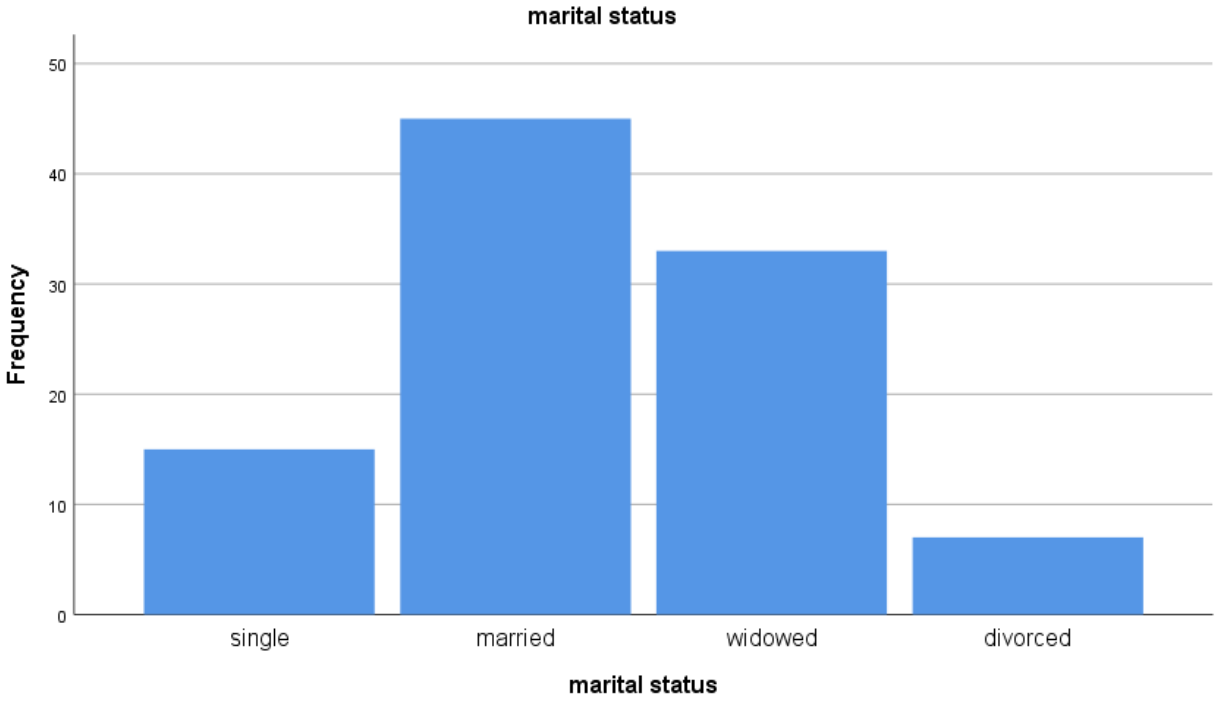
Collected data will be analyzed using SPSS version 26. Descriptive statistics (frequencies, percentages, mean, and standard deviation) will summarize demographic characteristics and responses. Knowledge scores will assign 1 point for correct answers and 0 for incorrect or unknown responses, classifying knowledge as poor (0–7), moderate (8–14), or good (15–20). Chi-square tests will examine associations between demographic variables and knowledge levels, with p-values <0.05 considered statistically significant. Findings will be presented using tables, charts, and graphs for clarity.

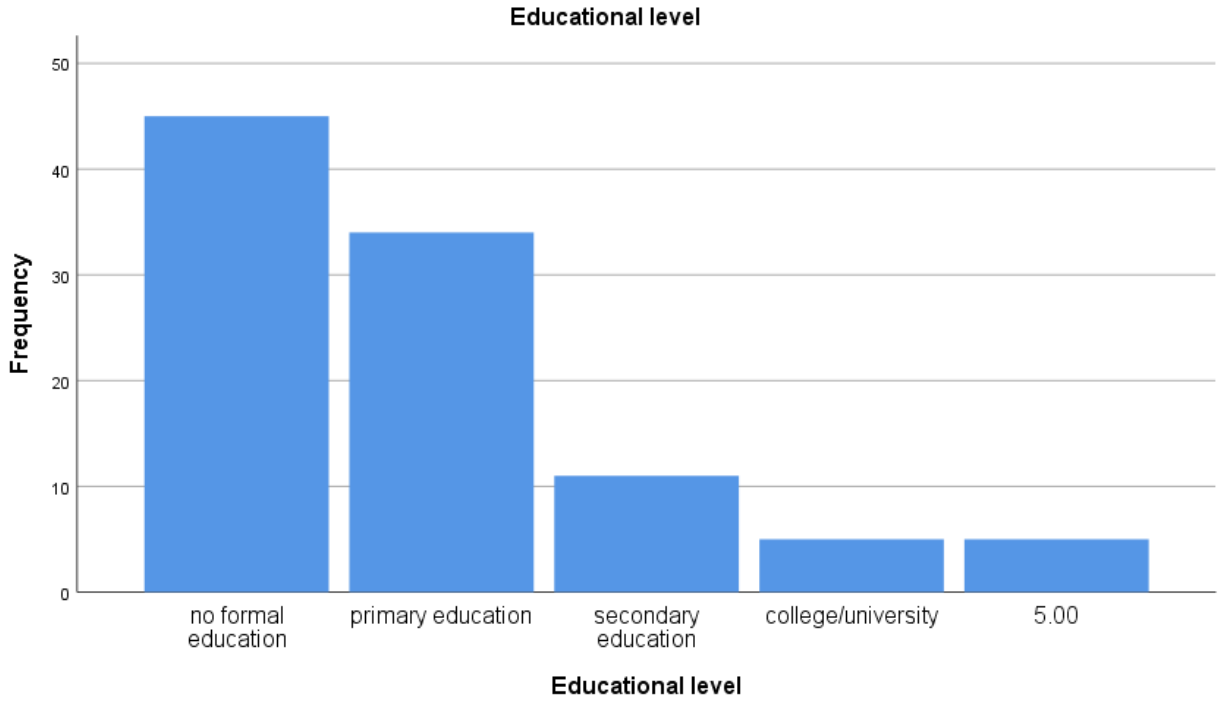
Ethical considerations include obtaining written informed consent, maintaining confidentiality by coding and securely storing data, and ensuring voluntary participation with the right to withdraw at any time. Ethical approval will be obtained from the relevant ethical review committee in Peshawar prior to the study.

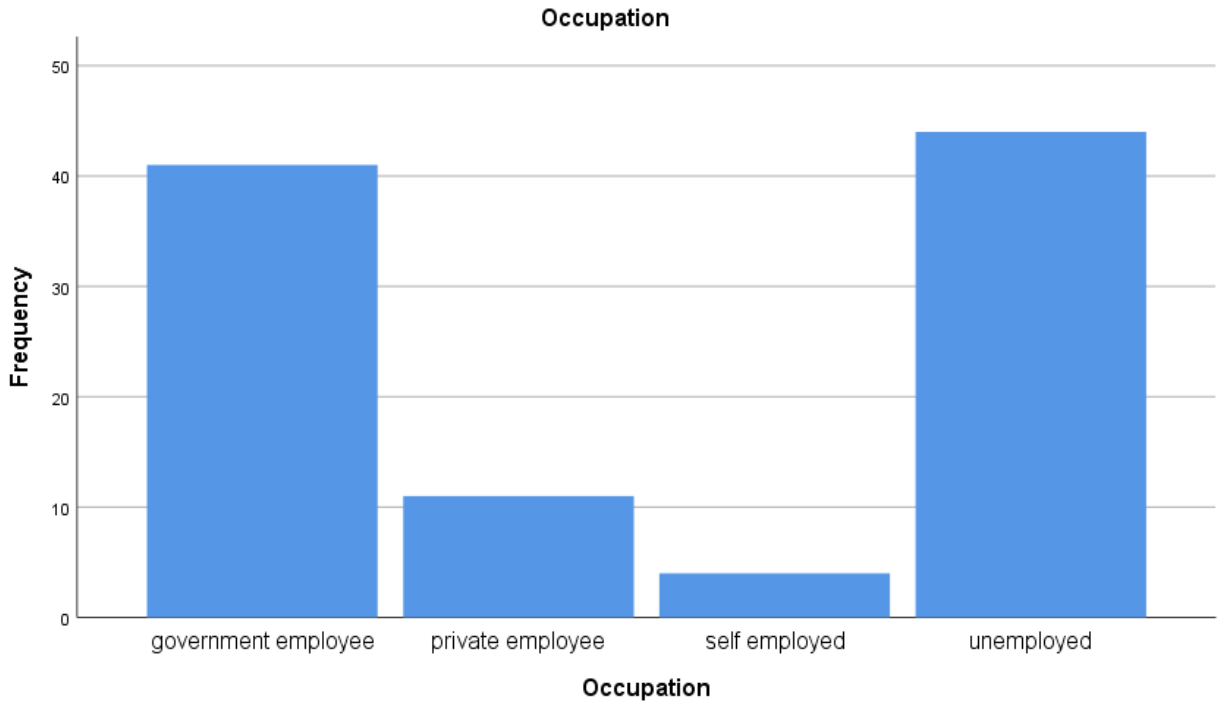
Result:

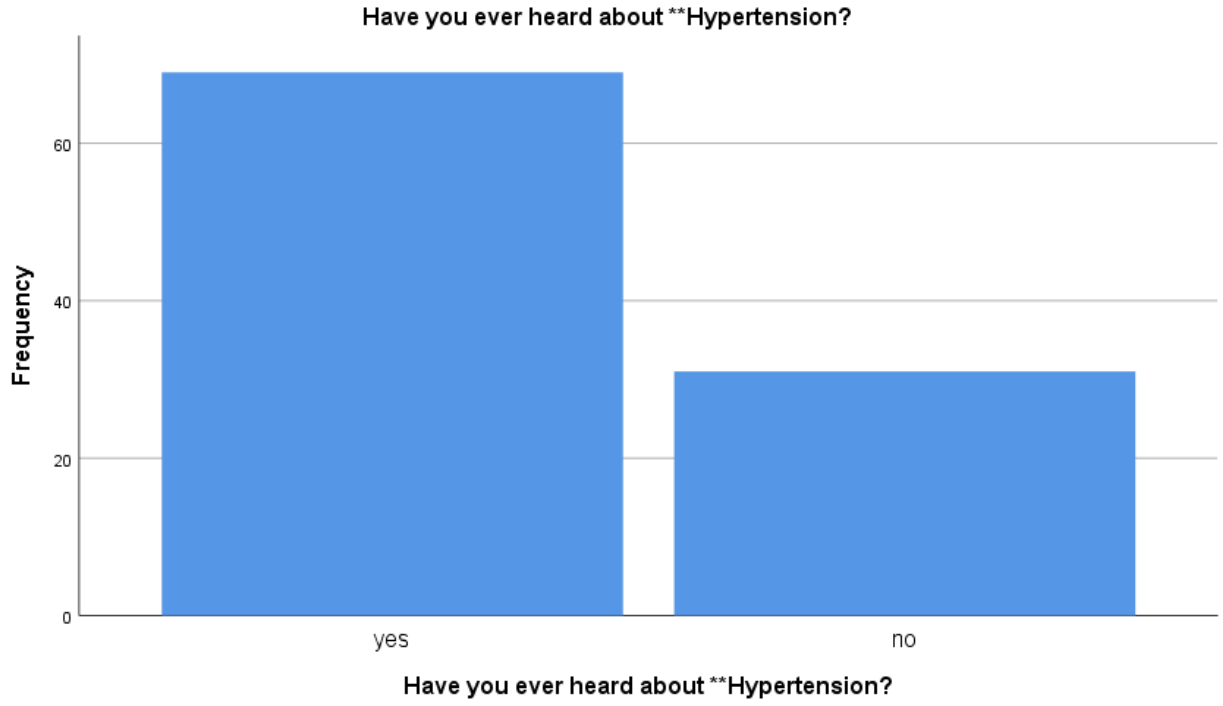


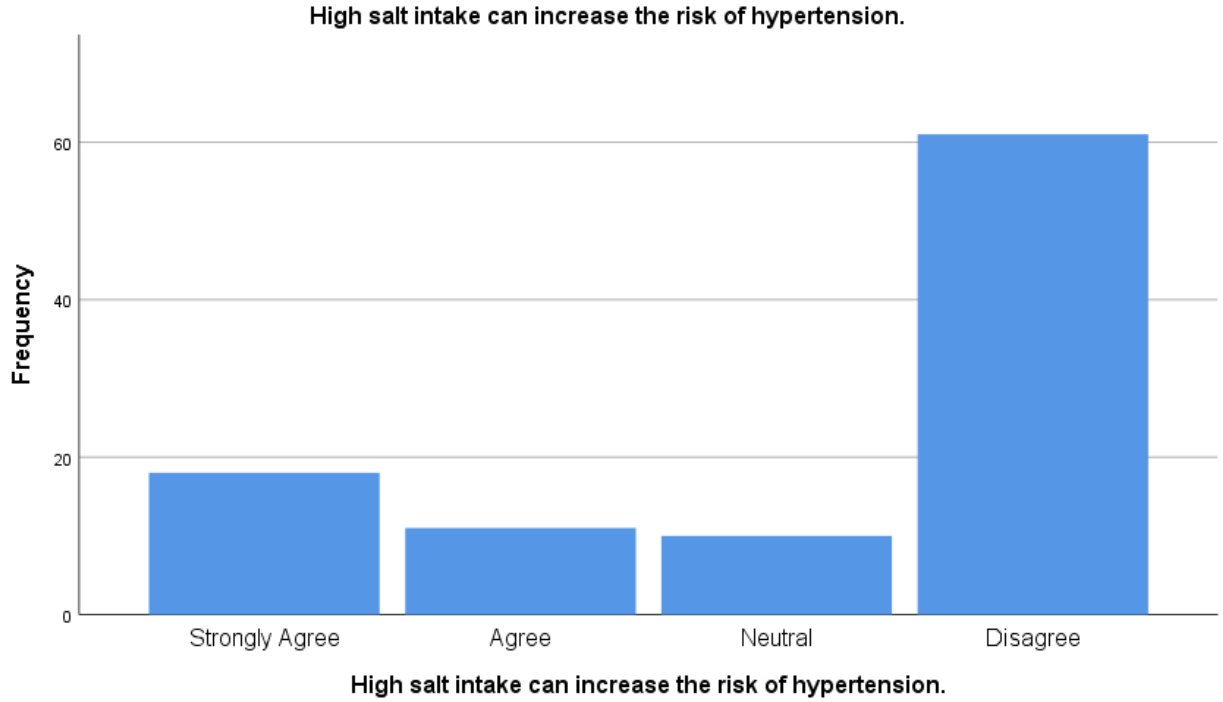

Age
Frequency
50
40
30
20
10
0
26-35 years
36-45 years
46-55 years
56 years and above
Age

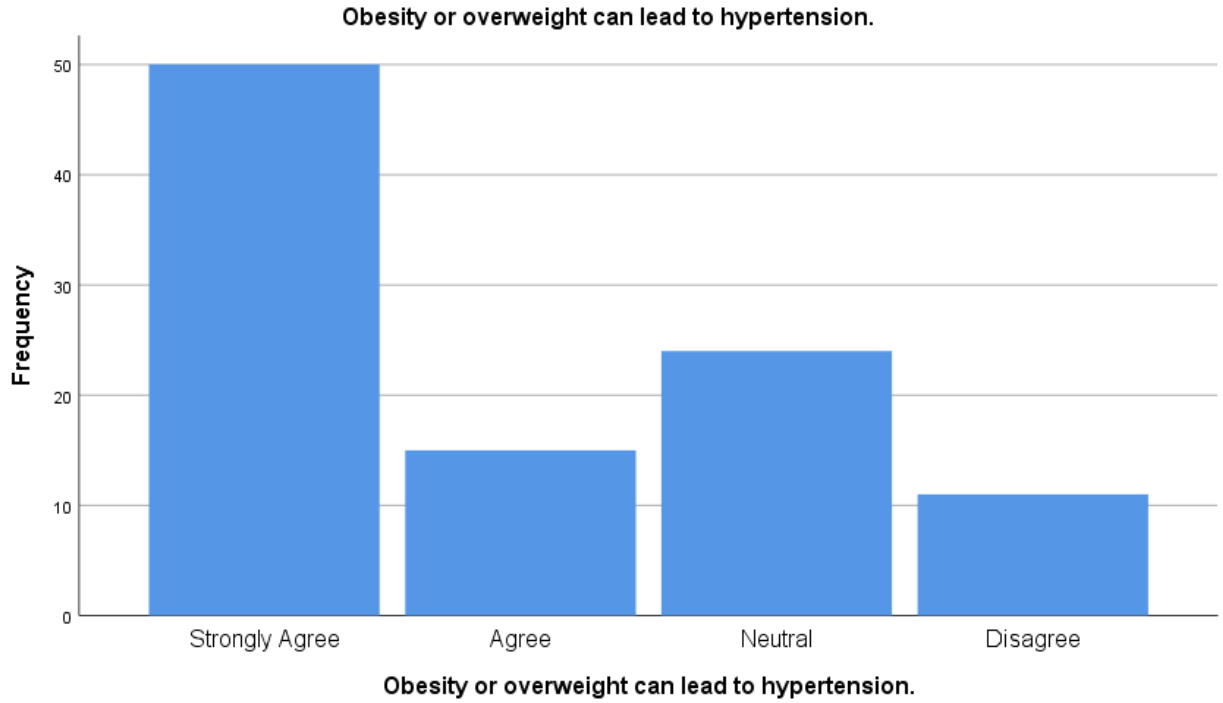

marital status
Frequency
50
40
30
20
10
0
single
married
widowed
divorced
marital status


Educational level
Frequency
50
40
30
20
10
0
no formal education
primary education
secondary education
college/university
5.00
Educational level


Occupation
Frequency
50
40
30
20
10
0
government employee
private employee
self employed
unemployed
Occupation


Have you ever heard about **Hypertension?
Frequency
60
40
20
0
yes
no
Have you ever heard about **Hypertension?


High salt intake can increase the risk of hypertension.
Frequency
60
40
20
0
Strongly Agree
Agree
Neutral
Disagree
High salt intake can increase the risk of hypertension.



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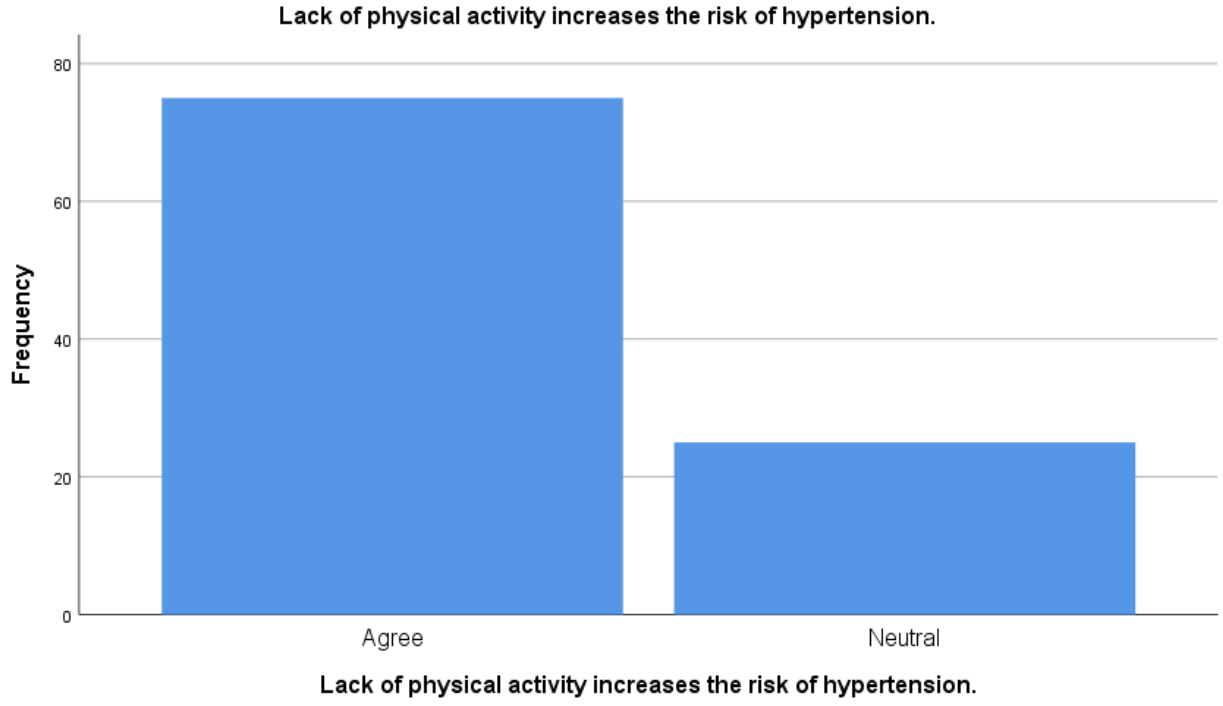
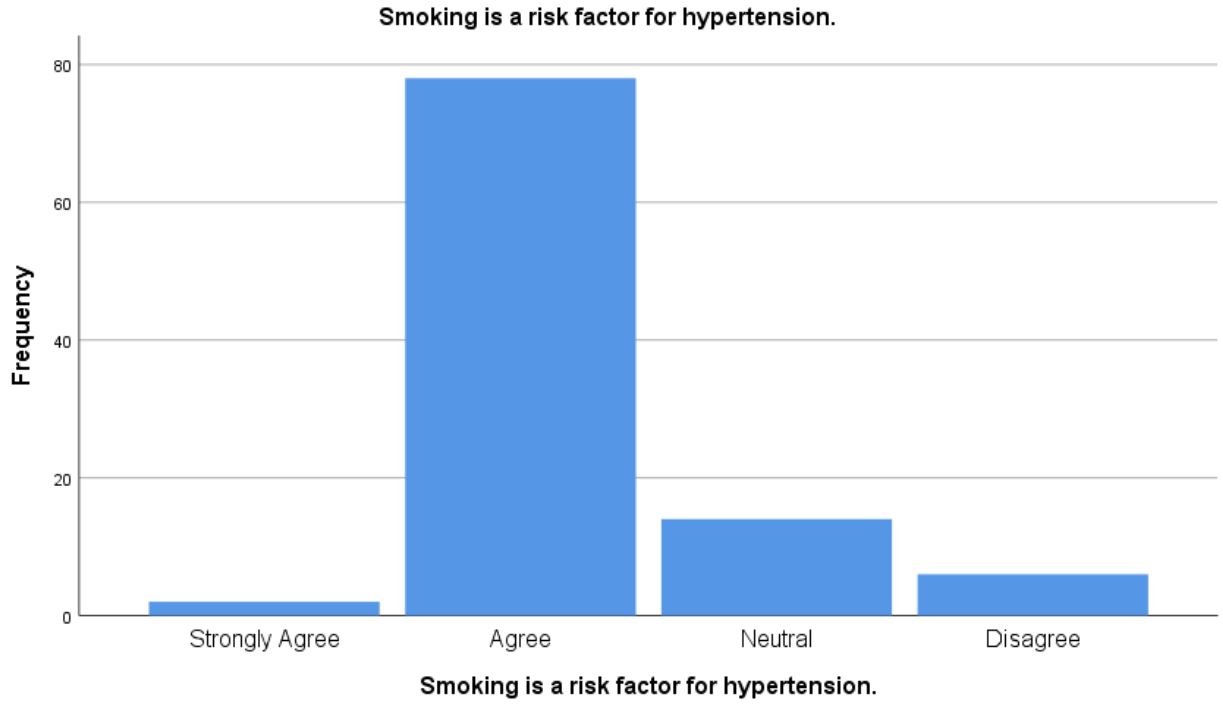
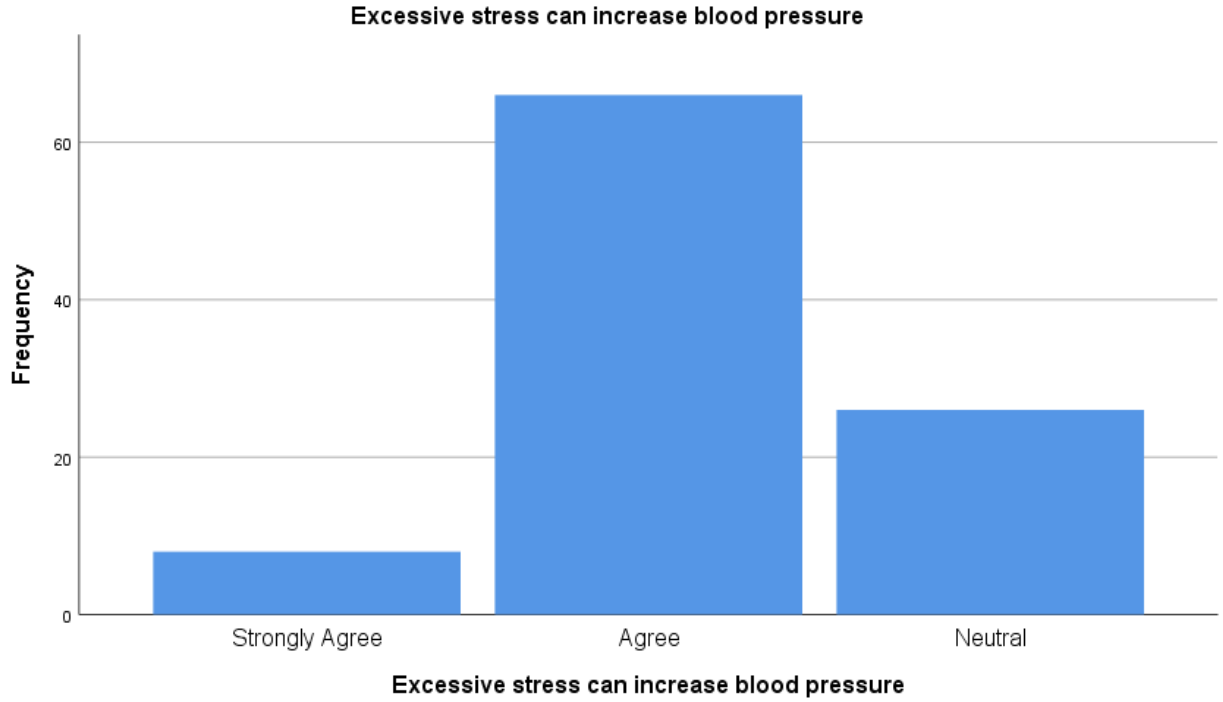
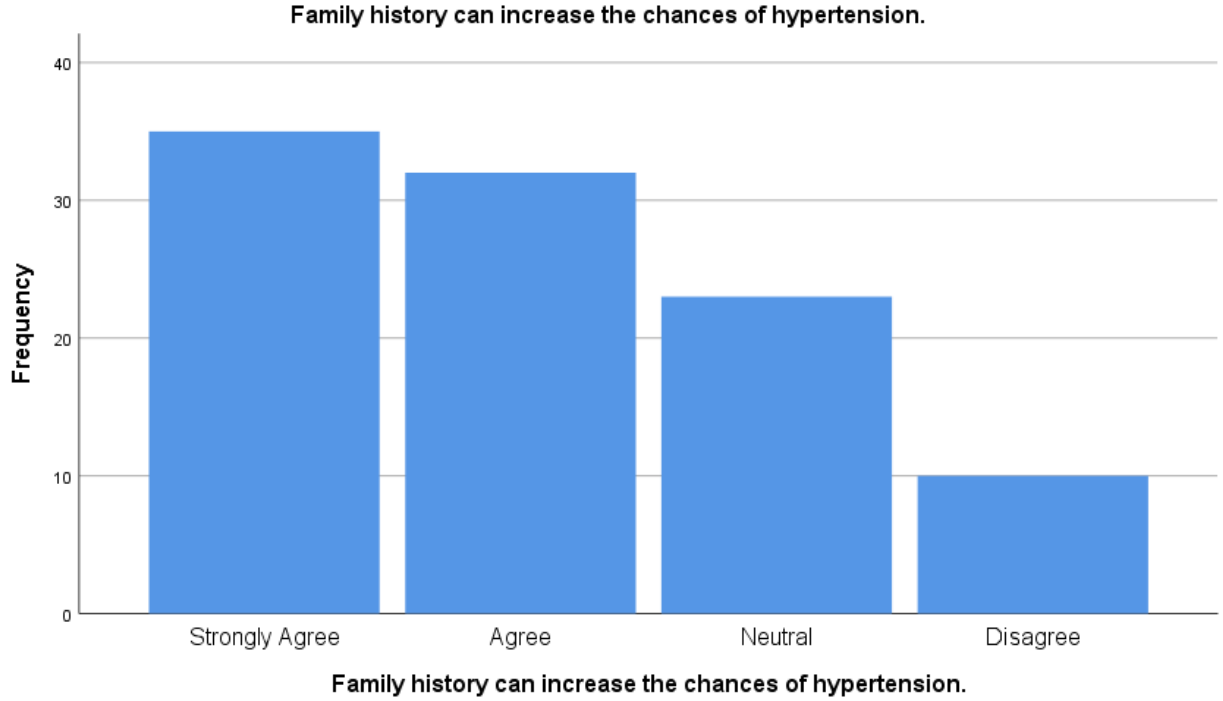
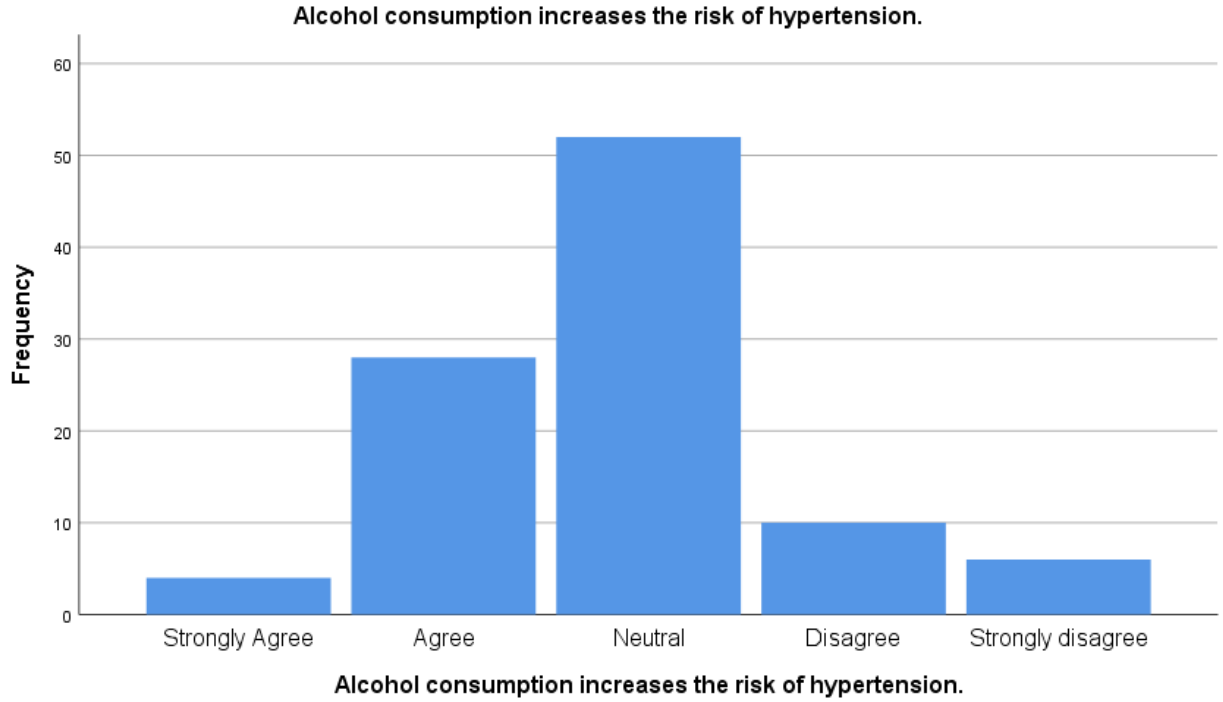
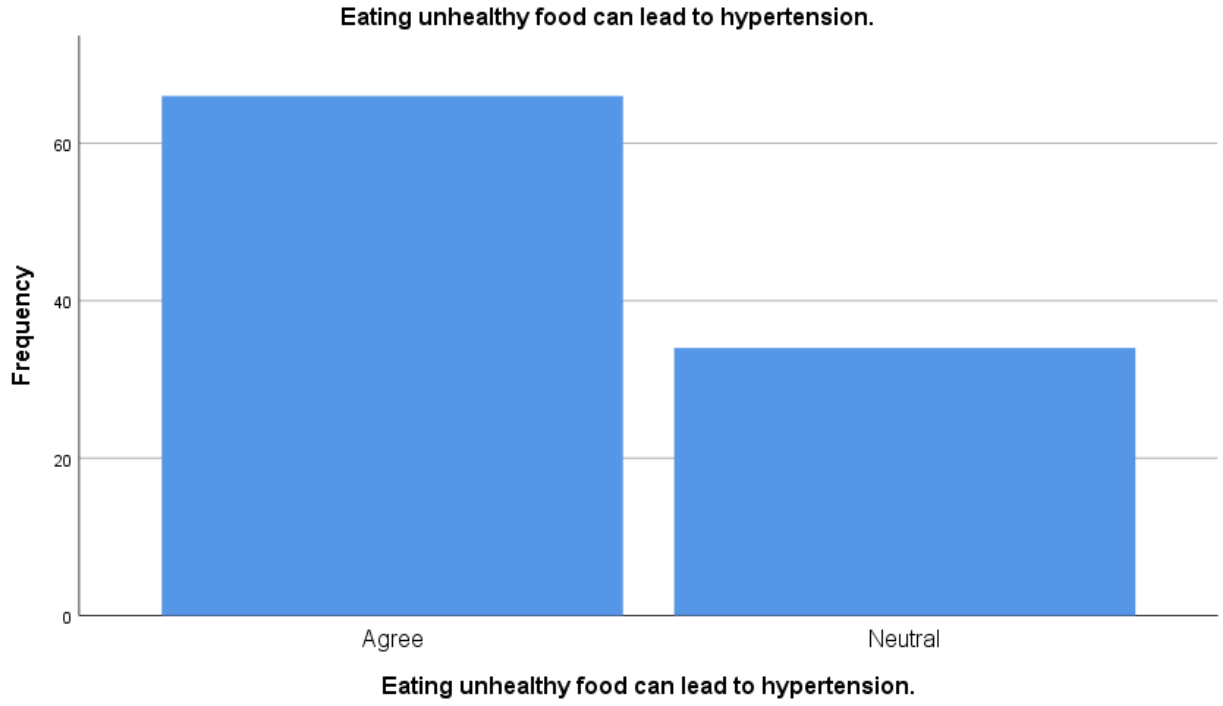


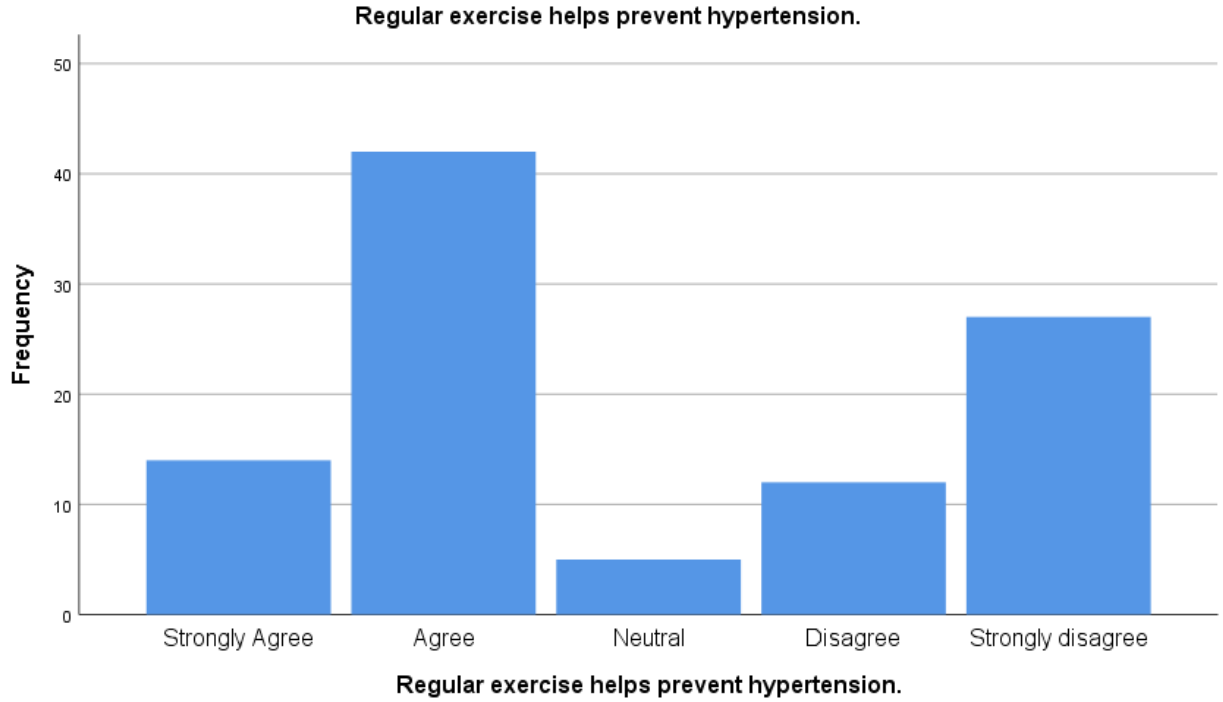

Smoking is a risk factor for hypertension.
Frequency
80
60
40
20
0
Strongly Agree
Agree
Neutral
Disagree
Smoking is a risk factor for hypertension.

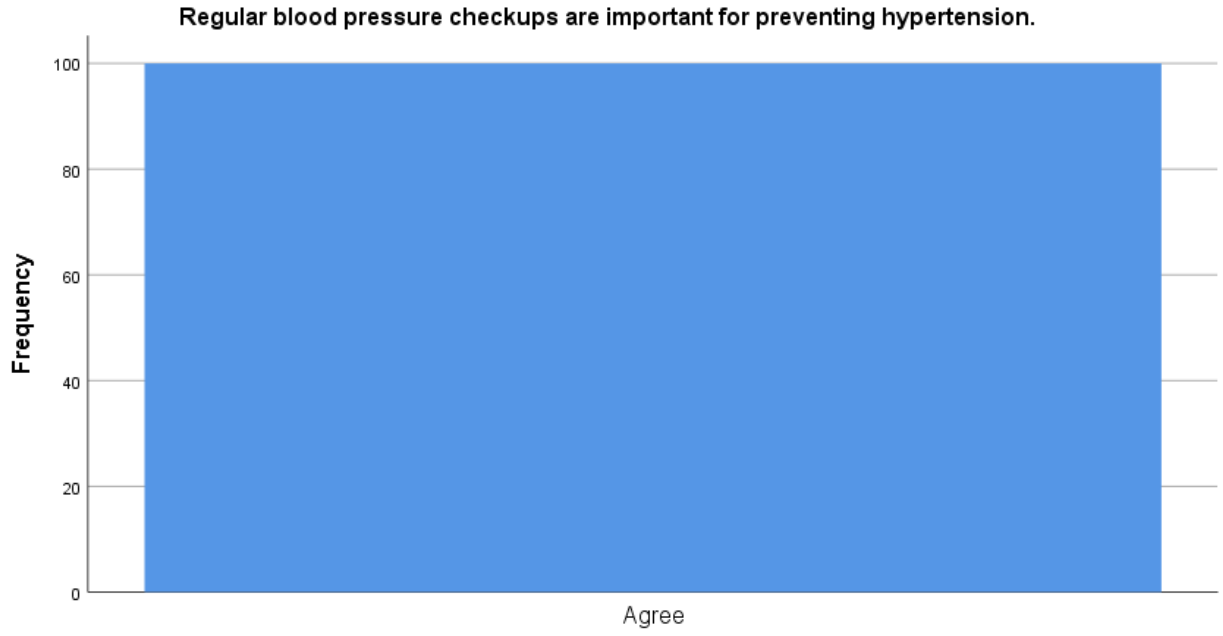

Excessive stress can increase blood pressure
Frequency
60
40
20
0
Strongly Agree
Agree
Neutral
Excessive stress can increase blood pressure


Family history can increase the chances of hypertension.
Frequency
40
30
20
10
0
Strongly Agree
Agree
Neutral
Disagree
Family history can increase the chances of hypertension.

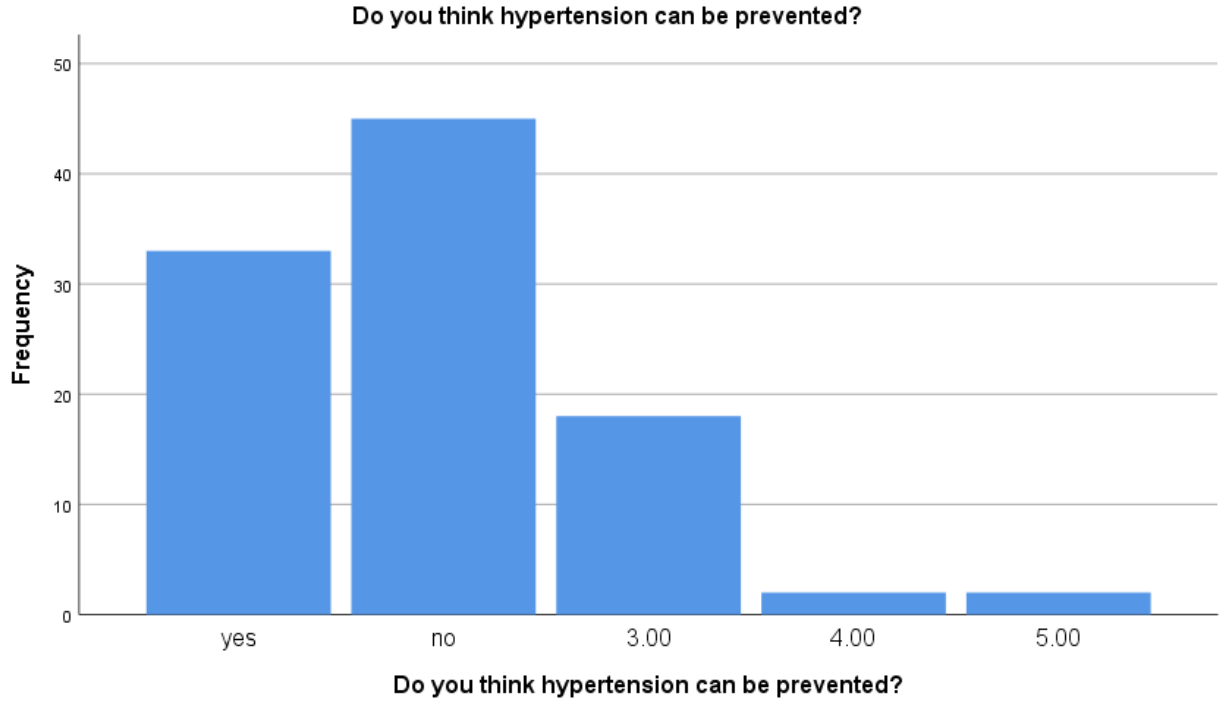

Alcohol consumption increases the risk of hypertension.
Frequency
60
50
40
30
20
10
0
Strongly Agree
Agree
Neutral
Disagree
Strongly disagree
Alcohol consumption increases the risk of hypertension.


Eating unhealthy food can lead to hypertension.
Frequency
60
40
20
0
Agree
Neutral
Eating unhealthy food can lead to hypertension.

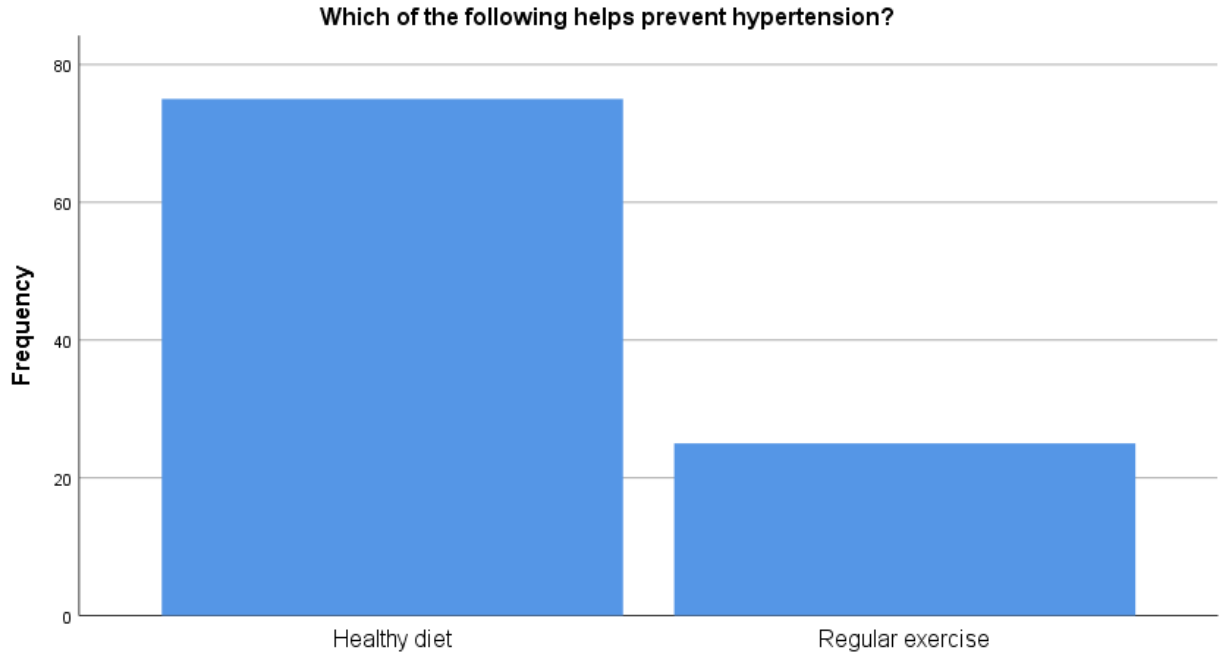

Regular exercise helps prevent hypertension.
Frequency
50
40
30
20
10
0
Strongly Agree
Agree
Neutral
Disagree
Strongly disagree
Regular exercise helps prevent hypertension.



Regular blood pressure checkups are important for preventing hypertension.



Do you think hypertension can be prevented?



Which of the following helps prevent hypertension?

A total of 100 participants from the general population of Peshawar participated in this study. The demographic findings showed that the majority of participants were 18–25 years old (34%), followed by 26–35 years (26%), 36–45 years (18%), 46–55 years (13%), and 56 years and above (9%). Regarding gender distribution, 58% were male and 42% were female. Most participants were married (55%), while 38% were single, 5% widowed, and 2% divorced.

In terms of education level, 32% had college or university education, 29% had secondary education, 21% had primary education, and 18% had no formal education. With respect to occupation, 27% were private employees, 23% were government employees, 21% were self-employed, 18% were students, and 11% were unemployed. Regarding monthly income, 31% earned less than 20,000 PKR, 29% earned 20,000–40,000 PKR, 24% earned 40,000–60,000 PKR, and 16% earned more than 60,000 PKR.

The findings related to knowledge about hypertension revealed that 72% of participants had heard about hypertension, while 28% had no prior knowledge. When asked about the meaning of hypertension, 64% correctly identified it as high blood pressure, while 36% either selected incorrect options or did not know. Additionally, 69% of participants recognized that hypertension can lead to stroke, heart disease, and kidney disease.

Regarding knowledge of risk factors, the majority of participants demonstrated moderate to good awareness. 71% agreed that high salt intake increases the risk of hypertension, 68% recognized obesity as a risk factor, and 65% believed that lack of physical activity contributes to hypertension. Similarly, 62% agreed that smoking increases the risk of hypertension, while 66% reported that stress can raise blood pressure. About 60% of participants acknowledged family history as an important risk factor, and 57% believed that alcohol consumption increases the risk of hypertension. Furthermore, 70% agreed that unhealthy diet contributes to hypertension.

Preventive knowledge showed encouraging results. 74% of participants agreed that regular exercise helps prevent hypertension, and 79% agreed that regular blood pressure checkups are important. Overall, 76% of respondents believed that hypertension can be prevented, while 16% were not sure, and 8% believed it cannot be prevented. Additionally, 73% correctly identified that a healthy diet, regular exercise, and avoiding smoking are effective preventive measures.

Overall, the results indicate that the general population of Peshawar has a moderate level of knowledge regarding hypertension and its risk factors, although some gaps remain, particularly regarding lifestyle-related risk factors and preventive practices.

Discussion

The present study assessed the level of knowledge regarding risk factors of hypertension among the general population of Peshawar. The findings of the study indicate that the overall knowledge about hypertension among participants was moderate, with several participants demonstrating awareness of the disease and its associated risk factors. However, certain gaps in knowledge were also identified.

In the present study, 72% of participants reported that they had heard about hypertension, while 28% had no prior knowledge of the condition. This finding suggests that although a majority of the population is aware of hypertension, a significant proportion still lacks basic awareness. Similar findings were reported in a study conducted by Kearney PM and colleagues, which highlighted that awareness of hypertension remains inadequate in many developing countries due to limited health education and screening programs (Kearney et al., 2005). Public awareness is important because hypertension is often referred to as a "silent killer" due to its asymptomatic nature.

Regarding knowledge about the definition of hypertension, 64% of participants correctly identified hypertension as high blood pressure, while the remaining respondents either selected incorrect options or reported that they did not know. This finding indicates that although many individuals have heard about hypertension, their understanding of the disease may still be incomplete. Similar results were observed in the study by Mohammad K. Ibrahim, which reported that limited knowledge about the nature and consequences of hypertension remains common in many populations (Ibrahim & Damasceno, 2012).

The results of this study also showed that a majority of participants recognized major risk factors of hypertension. For instance, 71% of participants agreed that high salt intake increases the risk of hypertension, while 68% identified obesity as an important risk factor. In addition, 65% of respondents believed that lack of physical activity contributes to hypertension. These findings are consistent with previous research which highlights that lifestyle factors such as high sodium intake, physical inactivity, and obesity significantly increase the risk of developing hypertension (World Health Organization, 2021). Furthermore, 62% of participants recognized smoking as a risk factor, while 66% believed that stress can increase blood pressure. These findings are supported by research conducted by Paul K. Whelton, which reported that behavioral and lifestyle factors such as smoking, unhealthy diet, and chronic stress are strongly associated with increased blood pressure and cardiovascular diseases (Whelton et al., 2018).

Family history was also identified as an important risk factor by 60% of participants, indicating moderate awareness regarding genetic predisposition to hypertension. Previous studies have also emphasized that individuals with a family history of hypertension are more likely to develop the condition due to genetic and environmental influences (WHO, 2021).

The findings related to preventive knowledge were encouraging. In this study, 74% of participants agreed that regular exercise helps prevent hypertension, while 79% acknowledged the importance of regular blood pressure checkups. Additionally, 76% of respondents believed that hypertension can be prevented. These results are consistent with the recommendations of the World Health Organization, which emphasizes lifestyle modification, including healthy diet, regular physical activity, and routine health screening, as key strategies for preventing hypertension (WHO, 2021).

Despite these positive findings, some gaps in knowledge were observed, particularly regarding certain lifestyle risk factors such as alcohol consumption and family history. This indicates the need for improved health education programs and community awareness campaigns

to enhance public understanding of hypertension and its prevention.

Overall, the findings of this study suggest that while the general population of Peshawar demonstrates moderate awareness of hypertension and its risk factors, further efforts are required to improve knowledge and promote preventive practices. Increasing public health education through media campaigns, community health programs, and healthcare professionals could play a significant role in reducing the burden of hypertension in the population.

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