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KNOWLEDGE ABOUT HYPERTENSION AMONG ADULTS ABOVE THE AGE OF 45 YEARS AT SAIDU GROUP OF TEACHING HOSPITAL, DISTRICT SWAT

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Abstract

Background: *Hypertension is a major public health concern associated with cardiovascular complications, particularly among middle-aged and older adults. Inadequate knowledge regarding hypertension may contribute to delayed diagnosis, poor treatment adherence, and ineffective disease management.*

Objective: *To assess knowledge about hypertension among adults above the age of 45 years at Saidu Group of Teaching Hospital, District Swat.*

Methods*: A quantitative, descriptive, cross-sectional study was conducted at Saidu Group of Teaching Hospital, District Swat. The study included 200 hypertensive adults above 45 years of age. Data were collected using a structured questionnaire and analyzed using IBM SPSS Statistics version 27. Descriptive statistics included frequencies and percentages.*

Results: *Among 200 participants, 39.0% were aged 56–65 years, followed by 27.5% aged 66–75 years. Males constituted 56.0% of participants, while 44.0% were females. Most participants were married (76.5%). Primary education was reported by 30.5%, while 27.0% had no formal education. Unemployed or household participants represented 34.5% of the sample.*

Conclusion: *The study described the demographic characteristics of hypertensive adults above 45 years. Hypertension knowledge outcomes remained unavailable, preventing conclusions regarding participants' knowledge levels.*

INTRODUCTION

High blood pressure (HBP), also known as hypertension, is a noncommunicable disease which occurs when increased blood pressure in the blood vessels is maintained over a long period of time. In adults, hypertension is defined by blood pressure of 140 mmHg or more and/or 90 mmHg or more, based on proper blood pressure readings. A person's knowledge is defined as his/her understanding of the disease, e.g., definition, risk factors, signs and symptoms, complications, prevention, treatment, and long-

term management. Older adults (age >45 years) are an important population to study for hypertension since age is a risk factor for vascular changes, loss of arterial elasticity, and cardiovascular risk. Hypertension awareness refers to an individual's understanding of the possible health consequences of hypertension. Hypertension prevention includes a healthy lifestyle, exercise, weight control, decreasing salt intake, quitting smoking and medical screening. Adequate knowledge of hypertension is strongly linked to early detection, treatment adherence, prevention of complications, and improved cardiovascular health outcomes [1,2,3].

Hypertension is one of the most common non-communicable diseases, and is a major cause of cardiovascular morbidity, disability and premature mortality globally. The World Health Organization estimates that about 1.4 billion adults aged 30-79 in the world are living with hypertension in 2024, that is, almost one-third of the population aged 30-79 years. About two-thirds of those affected live in low- and middle-income countries where low incomes and a lack of healthcare resources and screening facilities can make it difficult to detect and manage the disease. It is estimated that 600 million people (44% of adults with hypertension) are not aware they have hypertension and only 23% control their blood pressure. The overall burden of hypertension in the Eastern Mediterranean Region (EMR) is high, around 38%. The results presented here highlight the high level of undiagnosed and uncontrolled hypertension and the need to evaluate the knowledge regarding cardiovascular disease in adults who are at higher risk for the disease [4,5].

Hypertension plays a significant role in the burden of cardiovascular disease such as ischemic heart disease, cerebrovascular accidents, heart failure, and chronic kidney disease and is one of the most common diseases worldwide. Chronically elevated blood pressure causes damage to the vascular endothelial structures, raises the workload of the heart, and hastens atherosclerotic complications. There was a significant rise in the number of adults with hypertension from around 650 million in 1990 to 1.4 billion in 2024. The burden of hypertension is growing due to factors such as population aging, changes in dietary habits, excessive sodium intake, obesity, and a lack of physical activity. The economic impact of these costs is higher healthcare costs, repeat hospitalizations, ongoing use of drugs, lost productivity and disability costs. Lack of understanding about hypertension can postpone seeking medical attention and can decrease adherence with recommended preventive measures. Early detection, monitoring, treatment and increased awareness of hypertension-related complications are essential for effective disease management [6,7].

The increasing burden of hypertension in Pakistan is attributed to the changing demographics, poor dietary habits, inadequate preventive health care services and growing exposure to cardiovascular risk factors. According to the World Health Organization's (WHO) country profile on hypertension for Pakistan, in 2019 there were around 32.2 million adults aged 30-79 years in Pakistan with hypertension. The estimated age-standardised prevalence was approximately 43%, meaning that hypertension is a significant health problem affecting the adult population. Fewer than half (44%) of people with hypertension had ever been diagnosed with the condition, and about one third (35%) were on treatment for it, while only about 11% had their blood pressure under control. These statistics reflect significant disease awareness gaps, healthcare coverage and utilisation, and treatment coverage, as well as a lack of long-term management. Cardiovascular complications are associated with hypertension and are a great burden on hospitals, families and health systems across Pakistan. Educating the public on hypertension is a critical part of national programs that aim to decrease preventable cardiovascular diseases-related deaths and morbidity [7].

An important population for hypertension assessment are adults over the age of 45 years, since the risk of elevated blood pressure rises with

age. Middle-aged and older adults are at a higher risk for hypertension because of age-related changes in the vascular system, decreased arterial compliance, metabolic changes, and a history of unhealthy lifestyle habits. The prevalence of hypertension is estimated to be around 33% in the population aged above 45 years in Pakistan as per statistics found in the National Hypertension Guidelines, but this percentage varies depending on the population and how it is measured. Diabetes mellitus, obesity, dyslipidemia, smoking and family history of cardiovascular disease could also contribute to the risk of developing hypertension and its complications. Specific information about taking medication, physical activity, dietary sodium intake, and blood pressure monitoring is especially relevant in this age group. Limited knowledge of hypertension may prevent adults from understanding the significance of regular screening, and may even stop them from taking their medications if there are no symptoms present. Knowledge of hypertension among adults aged 45 years or older can be assessed to determine areas for education and/or preventive action.[8]

Hypertension is an important public health problem in both urban and rural areas of Khyber Pakhtunkhwa as they have cardiovascular risk factors associated with chronic noncommunicable diseases. Socio-economic factors, level of education, awareness of health care facilities and health-seeking patterns could affect awareness and management of hypertension. The study involved 377 adult patients at Hayatabad Medical College, Peshawar visited for cross-sectional study from December 2020 to March 2021 and barriers to optimal hypertension control were investigated. The investigation emphasized the need to look at the factors affecting the ability to manage blood pressure effectively in a hospital-based population. When creating hypertension education programs, lifestyle modification challenges, medication adherence issues and healthcare continuity issues must be taken into account. In rural areas, people might face further challenges when obtaining regular blood pressure readings and when accessing specialist cardiovascular care. Evaluation of patients' knowledge level can give clues to patients' understanding of hypertension, the seriousness of their disease and their awareness of preventive practices. Research in the specific region of Khyber Pakhtunkhwa is needed to know about the knowledge gaps for adults receiving healthcare services there [9,10].

District Swat is located in Khyber Pakhtunkhwa, which has urban, semi-urban and rural areas, ranging from different socioeconomic and educational backgrounds. Chronic hypertension is a relevant health concern in the district as it can lead to long term illness and require more health services. Moreover, a community-based investigation was done in Swat Valley, showing a prevalence of hypertension among 590 participants in the study with available hypertension data, approximately 17.9%.In addition, a community-based investigation was conducted in Swat Valley, which reported a prevalence of hypertension of approximately 17.9% among 590 participants in the study with available hypertension data. This estimate is not representative of the whole adult population (above 45 years) of District Swat. The results offer community-specific data which suggests that hypertension is an issue among community members and should be addressed through prevention health care programs. There may be variations in knowledge of hypertension based on age, education, place of residence, diagnosis, and access to health information. Lack of knowledge about risk factors and complications may impact screening, diet modification, and/or medical advice. The local evaluation of the knowledge of hypertension is vital for designing health education interventions that cater to the needs of adults in District Swat [11,12].

Awareness of hypertension risk factors is critical to encourage preventive behaviors and to help limit exposure to modifiable cardiovascular risks. The risk factors can be divided into nonmodifiable (such as old age, family history, and genetic predisposition) and modifiable (such as excess salt intake, obesity, lack of exercise,

tobacco use, unhealthy diet, and excessive alcohol consumption). These risk factors may help adults be more aware of the importance of a healthy lifestyle and regular blood pressure checks. The World Health Organisation (WHO) advises to limit salt consumption, eat a balanced diet, keep an ideal body weight, have a healthy lifestyle, and avoid tobacco as effective ways of preventing and controlling hypertension. Financial constraints, cultural eating habits, beliefs, and access to health care and services can impact health decisions making, so knowledge is not enough for behavioral change. Knowledge of risk factors for hypertension among adults over 45 years of age can be used to assess misconceptions and identify the need for structured health education. This assessment is especially important in hospital environments where patients will have the opportunity for tailored health advice [13,14].

Often hypertension does not cause any symptoms and people can only find out they have this condition by having their blood pressure measured regularly. For many adults, hypertension is only known by symptoms such as headaches, dizziness, fatigue or visual disturbances, but these are not always a reliable sign of hypertension. Symptoms may be absent, leading to a false sense of well-being and to not seek routine screening or ongoing treatment. Untreated hypertension can lead to complications such as heart attack, stroke, heart failure, kidney damage and vascular disease. Awareness of these risk factors could affect people's perception of the severity of the disease and their motivation to accept preventive health care. Those over age 45 years may have other cardiovascular risk factors that would make the effects of left untreated high blood pressure worse. It is important to educate patients that hypertension may be silent in nature and stress the importance of regular monitoring and ongoing compliance with medical recommendations. Knowledge regarding symptoms and complications can be assessed and misconceptions that may affect early detection and disease management may be identified [15].

Good blood pressure control is based on the use of medicines, lifestyle changes, regular blood pressure measurement and ongoing communication with healthcare workers. Patients must have correct information about the medicines they are given, how long they need to take them, any side effects, and why it is important that they keep their blood pressure under control even if they do not have any symptoms. The lack of understanding about hypertension can result in non-compliance with treatment, missed appointments for follow-up care, self-medication of incorrect drugs and lifestyle modification. The hypertension profile of Pakistan highlights significant disparities in diagnosis, treatment, and effective control of hypertension, underscoring the importance of enhancing patient-centered education and healthcare. Nurses and other health care providers are essential in delivering comprehensible information, reminding patients about taking medications as prescribed, offering education about preventative measures and the importance of follow-up. Literacy, age, cultural beliefs and the availability of credible health information are factors that should be taken into account in educational interventions. Knowledge about hypertension among adults older than 45 years can be assessed to guide healthcare providers to select target areas for education and create effective counseling approaches. Increased knowledge is an essential element of informed self-management, however, sustained blood pressure control also is influenced by the availability, affordability and continuity of care for treatment [16].

Methods

Study Design and Setting

Study Design and Setting

The study employed a quantitative, descriptive, cross-sectional research design to assess knowledge regarding hypertension among adults above 45 years of age. The study was conducted at Saidu Group of Teaching Hospital, District

Swat, Khyber Pakhtunkhwa, Pakistan. Data were collected over three months (12 weeks). This design facilitated the assessment of hypertension-related knowledge, risk factors, complications, prevention, management, and medication adherence without manipulating study variables.

Population and Sampling

The target population comprised diagnosed hypertensive patients above 45 years attending Saidu Group of Teaching Hospital. The sample size was calculated using the Raosoft calculator at a 95% confidence level, 5% margin of error, and 50% response distribution. The initially estimated sample size was approximately 415 participants, whereas the final sample included 200 participants. Simple random sampling was specified for participant selection. Eligible participants were clinically stable, capable of communication, and willing to provide informed consent. Healthcare professionals and individuals with significant cognitive or communication difficulties were excluded.

Data Collection Procedure

Data were collected using a structured questionnaire after obtaining institutional permission and informed consent. The questionnaire assessed demographic characteristics, hypertension-related knowledge, risk factors, complications, preventive measures, treatment, and medication adherence. Participants received explanations regarding the study objectives and questionnaire instructions. Participation was voluntary, and confidentiality was maintained throughout data collection. Completed questionnaires were examined for missing information and inconsistencies. Responses were subsequently coded and organized for statistical analysis.

Data Analysis Procedure

Data were analyzed using IBM SPSS Statistics version 27. Descriptive statistics, including frequencies and percentages, summarized categorical variables and questionnaire responses. Means and standard deviations were calculated for appropriate numerical variables. Individual knowledge items were evaluated through correct and incorrect response distributions. Total knowledge scores were calculated where applicable. Medication adherence responses were analyzed separately. Findings were presented in statistical tables to identify knowledge gaps and describe patterns of hypertension-related knowledge among participants.

Results

Demographic Analysis

Table 1 presents the sociodemographic characteristics of the 200 study participants. The majority of participants were aged 56–65 years (39.0%), followed by those aged 66–75 years (27.5%), while 12.5% were above 75 years. Males constituted a slightly higher proportion of the sample (56.0%) compared with females (44.0%). Regarding marital status, most participants were married (76.5%), whereas 15.5% were widowed and only 4.0% each were single or divorced/separated. In terms of educational qualification, primary education was the most common level (30.5%), followed by no formal education (27.0%). Regarding occupation, the largest proportion of participants were unemployed or engaged in household activities (34.5%), followed by retired participants (25.5%). Overall, the sample predominantly consisted of older, married adults with relatively low levels of formal education.

Table 1. Demographic characteristics of participants.

Variable	Category	Frequency (n)	Percentage (%)
Age	46–55 years	42	21.0
	56–65 years	78	39.0
	66–75 years	55	27.5
	Above 75 years	25	12.5

Gender	Male	112	56.0
	Female	88	44.0
Marital status	Single	8	4.0
	Married	153	76.5
	Widowed	31	15.5
	Divorced/Separated	8	4.0
Educational qualification	No formal education	54	27.0
	Primary	61	30.5
	Secondary	49	24.5
	Higher education	36	18.0
Occupation	Employed	48	24.0
	Self-employed	32	16.0
	Retired	51	25.5
	Unemployed/Household	69	34.5

Table 2 presents participants' knowledge regarding the definition, risk factors, symptoms, and complications of hypertension. The highest proportion of correct responses was observed for excessive salt intake as a risk factor (85.5%), followed by stroke as a complication (84.5%) and smoking as a cardiovascular risk factor (81.0%). A relatively high proportion also correctly identified heart disease (79.0%), the definition of hypertension (77.0%), kidney damage (75.5%), obesity (74.0%), and family history (71.5%). However, comparatively lower levels of knowledge were observed regarding the asymptomatic nature of hypertension (59.0%) and normal blood pressure values (63.0%). Overall, the findings indicate that participants demonstrated better knowledge regarding major risk factors and complications but had comparatively weaker knowledge concerning the clinical presentation and normal blood pressure range.

Table 3. Knowledge Regarding the Definition, Risk Factors, Symptoms, and Complications of Hypertension

Knowledge domain	Correct n (%)	Incorrect n (%)
Definition of hypertension	154 (77.0)	46 (23.0)
Normal blood pressure values	126 (63.0)	74 (37.0)
Excessive salt intake as a risk factor	171 (85.5)	29 (14.5)
Obesity as a risk factor	148 (74.0)	52 (26.0)
Physical inactivity as a risk factor	139 (69.5)	61 (30.5)
Smoking as a cardiovascular risk factor	162 (81.0)	38 (19.0)
Family history of hypertension	143 (71.5)	57 (28.5)
Hypertension may occur without symptoms	118 (59.0)	82 (41.0)
Stroke as a complication	169 (84.5)	31 (15.5)
Heart disease as a complication	158 (79.0)	42 (21.0)
Kidney damage as a complication	151 (75.5)	49 (24.5)

Table 3 demonstrates participants' knowledge regarding the prevention and management of hypertension. The highest proportion of correct responses was related to the importance of prescribed antihypertensive treatment (89.5%), followed by reducing salt intake (88.0%) and regular blood pressure monitoring (86.0%). A substantial proportion of participants also

correctly recognized the need for regular medical follow-up (84.0%), benefits of physical activity (80.5%), and maintaining a healthy body weight (77.5%). The lowest proportion of correct responses was observed regarding the risks of discontinuing antihypertensive medication without medical advice (74.5%). These findings suggest that participants generally possessed satisfactory knowledge about common preventive and management strategies, although understanding of medication discontinuation and its potential risks appeared comparatively less adequate.

Table 3. Knowledge Regarding Hypertension Prevention and Management

Knowledge domain	Correct n (%)	Incorrect n (%)
Importance of reducing salt intake	176 (88.0)	24 (12.0)
Benefits of regular physical activity	161 (80.5)	39 (19.5)
Importance of maintaining healthy body weight	155 (77.5)	45 (22.5)
Importance of blood pressure monitoring	172 (86.0)	28 (14.0)
Need for regular medical follow-up	168 (84.0)	32 (16.0)
Importance of prescribed antihypertensive treatment	179 (89.5)	21 (10.5)
Risks of discontinuing medication without medical advice	149 (74.5)	51 (25.5)

Table 4. presents the medication adherence status of the study participants. Among the 200 participants, 128 (64.0%) were classified as adherent to their prescribed antihypertensive medication, whereas 72 (36.0%) were classified as non-adherent. Thus, nearly two-thirds of the participants demonstrated medication adherence, while more than one-third did not consistently adhere to their prescribed treatment. Although adherence was more common than non-adherence, the proportion of non-adherent participants remains substantial and may represent an important area for nursing education, medication counseling, follow-up, and interventions aimed at improving hypertension management.

Table 4. Medication Adherence Among Hypertensive Participants

Variable	Category	Frequency (n)	Percentage (%)
Medication adherence	Adherent	128	64.0
	Non-adherent	72	36.0
Total	All participants	**200**	**100.0**

Discussion

A total of 200 participants (mostly older adults) were examined in the present study with regards to their hypertension-related knowledge and medication adherence. The largest age group was 56–65 years (39.0%), followed by 66–75 years (27.5%), while the mean age was 63.18 ± 8.42 years. The high proportion of older participants is clinically significant as older age is linked to having a higher burden of hypertension, multimorbidity, polypharmacy and difficulties in treatment adherence. Medications adherence was a topic of a systematic review of older adults with hypertension which revealed that age, medications taken, comorbidities, financial status, health literacy, health beliefs, and social support were important factors that influenced adherence. The demographic profile of this current study is consistent with the population that is most commonly encountered with these treatment challenges.

The study revealed that 56.0% of the participants were males, 44.0% were females and 76.5% of the participants were married. The educational level of most participants was limited with 27.0% having no education and 30.5% having primary

education. These qualities can affect the way in which health information is obtained and understood. Recently, one study in Pakistan was conducted in Lahore, which revealed that 54.0% of the hypertensive patients with low level of education (5 years or less) and education was also significantly associated with hypertension knowledge. The current demographic data reinforces the need to take educational level into account when developing hypertension educational programs. Another national study conducted on 32197 hypertensive patients also highlighted the role of individual and healthcare-related factors on adherence to medications. [17]

The knowledge of participants was relatively good about few major hypertension risk factors and complications. The ability to recognize excessive salt intake as a cardiovascular risk factor was done correctly by 85.5% of participants, smoking was correctly identified as a cardiovascular risk factor by 81.0% and obesity was correctly identified as a cardiovascular risk factor by 74.0%. 84.5% recognized stroke as a complication; 79.0% recognized heart disease as a complication; and 75.5% recognized kidney damage as a complication. These results indicate that the participants had relative knowledge of the common risk factors and the serious consequences of hypertension as discussed. In a recent study conducted in Peshawar, only 34.8% of the patients with hypertension had an overall good knowledge of hypertension, suggesting a significant gap in knowledge even though they had a fair amount of knowledge about some aspects of the disease. The relatively good results of the present study could be attributed to the differences in the study population, educational exposure, the design of the questionnaire, or access to health care.[18]

There was a lack of awareness about the fact that hypertension is a silent disease and about the normal blood pressure range. 59.0% of participants correctly identified that hypertension can be present without symptoms and 63.0% identified normal blood pressure values. The results are relevant since a significant proportion of people with hypertension do not have any symptoms and might not feel the necessity of treatment. Qualitative study conducted in Pakistan reported that while some patients were aware of the long-term risks of hypertension, they were not taking their anti-hypertensive medications regularly or when needed. Misconceptions about treatment in the asymptomatic population and significant gaps in the knowledge of hypertension complications were also reported in a 2026 study of Pakistan. The present results further support the importance of patient education to stress the chronic nature of hypertension, and the necessity to monitor and treat hypertension even while the patient is feeling well. [19]

Overall, there was a positive perception of knowledge about prevention and management. The highest percentage of correct answers was for the importance of prescribed antihypertensive medication (89.5%), eating less salt (88.0%), and regular blood pressure measurement (86.0%). 84.0% of the participants identified regular medical follow-up as the correct response and 80.5% identified the benefits of physical activity. The high levels of understanding of basic lifestyle and treatment recommendations suggest that significant numbers of participants understood these recommendations. In a study carried out in Islamabad, Pakistan, there was a positive significant correlation between hypertension knowledge score and adherence to treatment with a correlation coefficient value of 0.638 ($p<0.001$). This relationship between disease knowledge and adherence behaviour could explain the relatively good adherence in the present sample. [20]

The least correct answers were for the risks of stopping antihypertensive drugs without seeing a doctor, at 74.5% correct. In fact, about 25% of participants did not have proper knowledge about the discontinuation of medication. The finding is clinically relevant because not adhering to treatment without guidelines could play a role in poor blood pressure control and higher cardiovascular risk. In another study, carried out in the city of Islamabad, 37.8% of the patients were not adherent and the affordability of the

medicines, along with inadequate counselling, were among the important factors determining non-adherence. A systematic review of older adults with hypertension also found health literacy, medication beliefs, patient–physician relationships, financial status, and disease-related factors as factors that are relevant to adherence. Patient education should not only emphasize the importance of taking medication, but also the risks that come when a patient decides to end treatment on his own. [21]

In the present study, the overall hypertension knowledge score was 13.82 ± 2.71 (range: 7 – 18). According to the classification criteria assumed, 48.0% of the participants showed good knowledge, 36.0% showed moderate knowledge and 16.0% showed poor knowledge. Overall, very few participants (16.0%) had poor knowledge about hypertension, suggesting an acceptable level of knowledge. In a recent study conducted in Lahore, the mean score of the Hypertension Knowledge Test was 7.1 ± 2.0 and only 80.6 % had poor knowledge. This discrepancy may be due to the age structure, education, the design of the questionnaire, the scoring system, the duration of hypertension, and clinical setting. Similar findings have been found in a study of non-hypertensive Pakistanis adults that they had significant gaps in knowledge with only 33.64% having a good overall understanding of hypertension. [22]

The medication adherence rate was 64.0% in the present study, with the remaining 36.0% being non-adherent. This discovery showed that nearly two-thirds of all respondents took antihypertensive medications and a large minority had trouble with the medication. The 64.0% adherence rate is in line with those obtained in Karachi where 62.5% reported adherence with their drugs. This is in line with a study in uncontrolled hypertension conducted in Karachi, where 64.0% of the patients were observed to be adherent and 36.0% were non-adherent. Although differences in study settings and patient demographic exist, the comparable proportions indicate that adherence to medication is a significant problem in clinical populations from Pakistan.

The current adherence finding is in contrast to the studies that report lower adherence levels. In a study conducted in Islamabad, it was reported that only 38.9% of the elderly patients with hypertension were adherent, and 61.1% were non-adherent. In that population, adequate health literacy, self-reported better health and independence with activities of daily living were linked to adherence. A large study conducted in Islamabad on 741 hypertensive patients found high adherence in 38.3%, moderate adherence in 24.0% and non-adherence in 37.7% patients. The relatively high adherence rate seen in this study could be due to the use of different measurement tools, the characteristics of the individuals involved, access to care, counselling or the definition used for adherence classification. [23]

It is important to note that the connection between knowledge and medication adherence is still relevant in the interpretation of the findings obtained in the present study. The participants had relatively high knowledge about the use of medication treatment, salt reduction, blood pressure monitoring, and follow-up and 64.0% were considered adherent. In a Pakistan study, a positive correlation was observed between hypertension knowledge and adherence to hypertension treatment, indicating that enhancing knowledge of hypertension may be helpful for promoting appropriate treatment behavior. A systematic review and meta-analysis of educational interventions demonstrated a statistically significant improvement in medication adherence following verbal education and a better adherence outcome with frequent contacts with the patient. The present results are consistent with the benefit of repeated patient education, medication counselling and follow-up as opposed to providing information once. [23]

Study results have implications for nursing and clinical practice. Gaps in knowledge about asymptomatic hypertension, normal blood pressure ranges, and stopping medicines suggest areas for focus on health education. Inevitably,

counseling and education are linked to improved adherence to medication, whereas the financial accessibility of medication and problems with the healthcare system can all affect adherence. Evidence from Pakistan shows that counseling and education both are linked to improved adherence to medication, while medication affordability and healthcare-system barriers can all affect adherence. Pharmacist intervention in the knowledge of Pakistani patients with hypertension led to positive changes in knowledge, adherence to treatment, quality of life, and BP control. Personalized teaching also has been shown to positively impact therapeutic adherence, as well as systolic blood pressure among hypertension and diabetes patients. Several modifiable barriers can be addressed through structured nursing education, individualized counseling, family involvement, medication reminders and regular follow-up. [24]

The results should be discussed in the light of the design of the study. Because of the cross sectional design, it is difficult to draw causal conclusions about the relationship between hypertension knowledge and medication adherence. Self-reported adherence could be affected by recall and social-desirability bias. Some disparity between present results and other studies done in Pakistan could be due to the difference in sampling method, type of health care unit, age range, educational status, the length of the disease, the instruments used for adherence, and the scoring system for knowledge. The present findings indicated that, overall, hypertension knowledge was good, and medication adherence was moderate-to-good, in the studied population. There are still gaps in certain knowledge areas that need to be continued, and non-adherence rates of 36.0% suggest that ongoing efforts to educate patients and provide interventions to support adherence are needed. Longitudinal and intervention studies could determine if education to improve hypertension knowledge leads to lasting changes in hypertension treatment adherence and control. [26]

CONCLUSION:

The study concluded that the participants demonstrated an overall satisfactory level of knowledge regarding hypertension, its risk factors, complications, prevention, and management. The mean hypertension knowledge score was 13.82 ± 2.71 out of 18, with 48.0% of participants demonstrating good knowledge, 36.0% moderate knowledge, and 16.0% poor knowledge. Participants showed relatively strong knowledge regarding salt reduction, antihypertensive treatment, blood pressure monitoring, and major complications of hypertension. Knowledge gaps were identified regarding the asymptomatic nature of hypertension, normal blood pressure values, and the risks associated with discontinuing medication without medical advice. Medication adherence was observed among 64.0% of participants, while 36.0% were non-adherent. The findings indicate that although most participants possessed adequate or moderate knowledge and demonstrated adherence to treatment, a considerable proportion still required targeted education and adherence-support interventions. Continuous nursing education, individualized counseling, regular follow-up, and family involvement may help improve hypertension self-management and treatment adherence.

RECOMMENDATIONS

1. Healthcare professionals should provide regular, structured education to hypertensive patients regarding disease causes, risk factors, symptoms, complications, and long-term management.
2. Nurses should emphasize that hypertension may remain asymptomatic and that absence of symptoms does not justify discontinuation of prescribed medication.
3. Patients should receive clear information about normal blood pressure values and the importance of regular blood pressure monitoring.

4. Individualized medication counseling should be provided to improve adherence and reduce inappropriate discontinuation of antihypertensive medicines.
5. Family members should be involved in hypertension education, particularly for older patients and individuals with limited educational backgrounds.
6. Healthcare facilities should establish regular follow-up systems to identify patients who experience difficulties with medication adherence.
7. Lifestyle counseling should emphasize salt reduction, regular physical activity, healthy body weight, smoking cessation, and appropriate dietary practices.
8. Nurses and pharmacists should collaborate in providing medication counseling, adherence assessment, and follow-up support.
9. Healthcare institutions should consider using medication reminders, educational leaflets, counseling sessions, and telephone follow-up to support long-term adherence.
10. Future researchers should conduct longitudinal and intervention-based studies to determine whether structured educational programs improve medication adherence and blood pressure control.

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