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Assessment of Knowledge, Attitude and Practice Regarding Management of Hypertension among Saudi Population

Alhanouf Ali Alenezi and Humera Banu

Department of Clinical Nutrition, Collage of Applied Medical Science, University of Hail, Hail, KSA

ABSTRACT

Background: Hypertension, defined as a blood pressure of ≥130/80 mmHg in adults by the American Heart Association, remains a leading cause of global morbidity and mortality. It contributes significantly to coronary artery disease and cerebrovascular events. The global prevalence is estimated at 26% (972 million people) and is expected to rise to 29% by 2025, especially in developing countries. This study aimed to assess the knowledge, attitudes, and practices (KAP) related to hypertension management among the Saudi population in Hail City. **Materials and Methods:** A retrospective cross-sectional study was conducted using a structured questionnaire comprising three sections: knowledge (scored based on correct responses), attitude (assessed using a Likert scale), and practices (based on frequency of behaviors). **Results:** More than 80% of subjects expressed concern about long-term medication use, engaged in regular exercise, and preferred home-cooked meals with fruits and vegetables. About half of the hypertensive subjects reported daily blood pressure monitoring and adding lemon to salads. The study revealed an overall acceptable level of KAP. Significant fair positive correlations were found between KAP and age, income, and education level ($p < 0.05$). **Conclusion:** Most respondent's demonstrated good knowledge and positive attitudes toward hypertension management, with KAP significantly associated with demographic factors.

Key words: Hypertension, Knowledge, Attitudes, Practice, Health Behavior, Cross-Sectional Studies, Saudi Arabia

Introduction

Hypertension in adults is defined as blood pressure (BP) higher than 130 over 80 millimeters of mercury (mmHg), according to the American Heart Association[1]. Globally, an estimated 26% of the world's population (972 million people) has hypertension (HTN), and the prevalence is expected to increase to 29% by 2025, driven largely by increases in economically developing nations. In spite of a high prevalence, the ratio of taking blood pressure under control among hypertensive patients is still very low[2]. Most hypertensive people are not aware of their condition or have a low level of health literacy.

The knowledge, perceptions and attitude of people towards hypertension has a significant role in changing lifestyle including the modifiable risk factors of HTN. It has been shown that self-management behaviors such as taking prescribed medications, quit smoking, eating a healthy diet and increasing physical activity level are crucial for hypertensive patients. Therefore, it would be possible to reduce burden of hypertension by changing the modifiable risk factors through increasing the health literacy of hypertensive patients[3]. Although there has been significant progress in the management of hypertension, rates for control of this chronic disease in the Kingdom of Saudi Arabia (KSA) has been shown to be very low[4].

Despite this high prevalence, studies examining awareness of HTN and its dietary management in Saudi Arabia are limited from Hail region. Hence, present study was conducted to assess the knowledge attitude and practices

*Corresponding author.
E-mail address: Alh2nouf@hotmail.com (Alhanouf Ali Alenezi)
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(KAP) towards management of hypertension among Saudi population residing in Hail. The results of the study will help to develop suitable intervention programs aimed at increasing awareness about the risk factors of HTN and self-management strategies.

Material and Methods

A retrospective cross-section study was conducted on 400 subjects (male and female) aged over 18 years, residing in the Hail City of Saudi Arabia. The study was approved by Research Ethics Standing Committee (REC) of University of Hail (H-2022-122). Through random sampling, 400 subjects were enrolled for the study after obtaining informed consent. Through a well-designed pre- tested online questionnaire, demographic profile was collected. To assess (KAP), the designed questionnaire was divided into 3 sections. Section A focused on assessing the participants' knowledge and scores were awarded for each correct answer. In section B, subjects' attitude was assessed through Likert scale. In section C, practices were was assessed based on frequency of practice. For in-depth analysis, the KAP scores were further graded and classified as Good, Moderate and Poor score. Descriptive data was represented as percentage, mean and SD. Chi square test was used to analyze qualitative variables. Pearson correlation analysis was done to test statistical significance of KAP level of subjects using SPSS version 24.0. Significance was set at $p < 0.05$. Descriptive data were expressed as percentages, means, and standard deviations. The Chi-square test was used to examine significance of the subjects' (KAP) levels.

Results

General characteristics of the subjects

The study results in table 1 presented that it was conducted among 400 subjects: 200 males and 200 females. About half of the subjects (51%) in the study sample were was aged >40 years, more than half of them (53%) have a bachelor's degree and were working. Regarding the duration of HTN, more than half (59%) suffer from HTN for <1 to 5 years. Most of the subjects (71%) did not report chronic diseases such as diabetes, heart problems, or kidney problems. The mean ± SD for height, weight, and body mass index (BMI) of study subjects were 165.19±15.51, 78.57±15.16, and 28.80±4.98, respectively.

Assessment level of knowledge regarding hypertension

The findings in table 2 showed that most of the subjects (75%) reported that the normal range of BP is recognized as 120/80 mmHg, while 15% don't have that knowledge. Moreover, nearly one third (29%) suggested that HTN is caused by family history, while 22% don't know. In terms of dietary risk factors, 41% reported that a high salt intake contributed to elevated BP, while 12% don't know the risk factors. Regarding symptoms of HTN, subjects identified dizziness, headache, shortness of breath, and chest pain, respectively, as symptoms of HTN, 71% reported that headache is the symptom, while 6% don't know. Additionally, 45% were aware that uncontrolled HTN can lead to damage in vital organs such as the heart, brain, kidneys, and eyes, while 21% don't know. Regarding treatment, 42% acknowledged that HTN can be controlled through medication, while 12% don't know. 45% reported that BP should be monitored daily and 37% of them reported BP should be monitored once a week, while 13% did not aware. 72% identified that the sitting position is the appropriate posture for BP measurement, while 12% were not aware. However, 19% reported low sodium in their diet while, 48% don't know DASH (Dietary Approaches to Stop HTN). Most of the subjects 77%, knew that a person with high BP should not eat salt, while 9% don't know. 46% reported that a person with high BP should eat greens, olive oil, garlic, and bananas.

Table 1 Demographic and medical characteristics of subjects (No. = 400)

Characteristic	Frequency	%
Age		
<40 years	199	49%
>40 years	201	51%
Total	400	100%
Gender		
Male	200	50%

Female	200	50%
Total	400	100%
Educational qualification		
Illiterate	4.0	1.0%
Primary	23.0	6.0%
Secondary	152	38%
Bachelor	201	50%
Master	20.0	5.0%
Total	400	100%
Employment		
Student	42.0	11.0%
Working	210	53%
Not working	77.0	19%
Retired	71.0	17%
Total	400	100%
Duration of hypertension		
Less 1 years	100	25%
1-5 years	134	34%
6-10 years	48.0	12%
10-15 years	20.0	5.0%
More than 15 years	36.0	9.0%
None	62.0	15%
Total	400	100%
Do you have any of the following disease:		
Diabetes	84.0	21%
Heart problem	23.0	6.0%
Kidney problem	9,0	2.0%
None	284	71%
Total	400	100%
Height, Weight, and BMI distribution		
Variables		**Mean ±SD**
Height (m^2)		165.19±15.51
Weight (kg)		78.57±15.16
BMI (kg/m^2)		28.80±4.98

Assessment level of attitude regarding hypertension

The current study results in table 3 showed that (80%) take blood pressure medication daily, while one fifth (20%) of the participants take it when they need it. 82% of subjects doing exercise daily to control their BP, while the others exercise thrice or once a week. As well, 52% of them preferred to add lemon to their salads, while 8% added salts. The majority of the subjects in the study (83% and 88%, respectively) preferred to eat home-cooked food and more fruits and vegetables in their meals, while 21% of them eat at restaurants and fast foods. More than half of HTN subjects (52%), monitored BP daily, while 39% of participants monitored it once a week.

Table 2 Assessment level of knowledge regarding hypertension

Q1: How much is the normal blood pressure?	Issue	70/ 40 mm of Hg	120/ 80 mm of Hg	140/ 90 mm of Hg	I don' know		
	No. (%)	7 (1)	300 (75)	33 (9)	60 (15)		
Q2: High blood pressure is caused by…	Issue	Aging	Obesity	Stress	Family history	All	I do not know
	No. (%)	4 (1)	45 (11)	66 (17)	115 (29)	83 (20)	87 (22)
Q3:Dietary risk factors for High blood pressure are	Issue	High salt diet	Alcohol consumption	High fatty foods	All	Do not know.	
	No. (%)	159 (41)	7 (1)	38 (9)	147 (37)	49 (12)	
Q4:Which of the following are the symptoms of High Blood pressure	Issue	Dizziness	Headache	Shortness of Breath	Chest pain	All	Do not know
	No. (%)	61 (12)	131 (33)	14 (3)	31 (8)	138 (38)	25 (6)
Q5:Uncontrolled high blood pressure can damage	Issue	Heart	Brain	Kidney	Eyes	All	Don't Know
	No. (%)	47 (12)	10 (2)	25 (6)	58 (14)	175 (45)	85 (21)
Q6:High Blood pressure can be controlled by	Issue	Physical Activity	Medication	DASH Diet	All	Don't Know	
	No. (%)	44 (11)	166(42)	25 (6)	116(29)	49 (12)	
Q7: How often does a person with blood pressure get his blood pressure checked?	Issue	Daily	Once a week	Once In a Month	6- 12 months	Don't know	
	No. (%)	180 (45)	148 (37)	12 (3)	9 (2)	51 (13)	
Q8:Blood pressure is measured in	Issue	Lying position	Sitting position	Standing position	Different positions	Don't Know.	
	No. (%)	34 (8)	286 (72)	8 (2)	25 (6)	47 (12)	
Q9:A person with high blood pressure should eat Dash Diet which is	Issue	Low sodium	High potassium	High fiber	All	Don't know	
	No. (%)	76 (19)	19 (4)	23 (5)	92 (24)	190 (48)	
Q10:A person with high blood pressure should NOT eat	Issue	Salt	Red Meat	Canned Foods	Packed	All	Don't Know
	No. (%)	307 (77)	23 (5)	8 (2)	4 (1)	20 (6)	38 (9)
Q11:A person with high blood pressure should eat	Issue	Greens	Olive oil	Garlic	Bananas	All	Don't Know
	No. (%)	61 (15)	19 (4)	32 (8)	5 (1)	179 (46)	104 (26)

Table 3 Assessment level of attitude regarding hypertension N= (400)

Questions	**No. (%)**
Q1:Medication for blood pressure should be:	
Daily	320 (80)
Only when blood pressure increases	49 (12)
When one needs/wishes	31 (8)
Total	**400 (100)**
Q2:To control high blood pressure one should exercise:	
Daily	328 (82)
Thrice a week	39 (10)
Once a week	33 (8)
Total	**400 (100)**
Q3:I prefer to add _____ to my salads:	
Salt	29 (8)
Olive oil	162 (40)
Lemon	209 (52)
Total	**400 (100)**
Q4:I prefer to eat:	
Home-cooked food	333 (83)
Order online	12 (3)
Eat at restaurants	55 (14)
Total	**400 (100)**
Q5:I prefer to eat:	
More fruits and Vegetables	350 (88)
Packed foods	22 (5)
Fast foods	28 (7)
Total	**400 (100)**
Q6:For better control of high blood pressure, one should monitor blood pressure:	
Daily	208 (52)
Once a week	158 (39)
Once a month	24 (6)
6- 12 month	10 (2)
Total	**400 (100)**

Assessment level of practice regarding hypertension

Table 4 showed the assessment level of practice regarding HTN; about half of the subjects (46.5%) always monitored their blood pressure once a week, while 7.8% never monitored it. Moreover, more than half (58.3%) always made an effort to include potassium-rich fruits and vegetables in their diet, while 4% never made it. 33.8% most of the time have used lemon juice instead of salt, and 38.5% of the most of time avoid fast foods and packed foods to maintain BP, while 5.8% never used it. More than one third (37%) of subjects always avoided adding salt to their salads or using salt at the table, while 10.3% responded never, which we interpreted as using salts in their foods. Only 20% always avoided fast and packed foods, while 36.3% sometimes avoided fast and packed foods and 5.3% never avoided fast and packed foods. 34.8% of subjects never used home remedies or herbal medicines to maintain BP, while 19% only always used them. Most of the subjects in the study sample (69.5%) always took their medication regularly to maintain BP, while 10.5% and 6% took it sometimes and never used it respectively. 39.3% sometimes exercise for 60-120 minutes daily to maintain BP, while 14% never exercise.

Table 4 Assessment level of practice regarding hypertension N= (400)

Questions	Answers			
	Always (%)	Most time	Some-times (%)	Never (%)
Q1: I monitor my BP once a week.	185 (46.3)	117 (29.3)	67 (16.8)	31 (7.8)
Q2: Every day I make effort to add potassi-um-rich fruits / vegetables in my diet.	233 (58.3)	103 (25.8)	114 (28.5)	16 (4)
Q3:I use lemon juice instead of salt	116 (29)	135 (33.8)	126 (31.5)	23 (5.8)
Q4: I avoid adding salt to salads or using salt at table.	148 (37)	101 (25.3)	110 (27.5)	41 (10.3)
Q5: To maintain BP I avoid fast and packed foods.	80 (20)	154 (38.5)	145 (36.3)	21 (5.3)
Q6: To maintain BP, I use home remedies or herbal medicines.	76 (19)	73 (18.3)	112 (28)	139 (34.8)
Q7: To maintain BP I take medication regularly	278 (69.5)	56 (14)	42 (10.5)	24 (6)
Q8: To maintain BP I exercise for 60- 120 min-utes daily.	92 (23)	95 (23.8)	157 (39.3)	56 (14)

Correlations between KAP regarding hypertension

The results in table 5 showed the correlation between KAP regarding hypertension. Knowledge had a significant fair positive correlation with attitude (r= 0.63, p= 0.02) and practice (r=0.71, p=0.00), also attitudes had a significant fair positive correlation with practice (r=0.74, p= 0.01) regarding hypertension.

Table 5 Correlations between KAP regarding hypertension using Pearson Correlation Test

Variables	R-value	p-value	Interpretation
Knowledge and Attitude	0.63	0.02	Fair Positive Correlation
Knowledge and Practice	0.71	0.00	
Attitude and Practice	0.74	0.01	

Correlation between ages, income and educational levels with a total score of KAP regarding hypertension

The results in table 6 showed the correlation between subjects' ages and a total score of KAP regarding hypertension. The study results found that the ages of subjects had a significant fair positive correlation with their knowledge (r=0.69, p=0.01), their attitudes (r=0.74, p= 0.00), and their practice (r=0.77, p= 0.02) regarding hypertension. The present study showed that there was a fair positive correlation between a total score of KAP and participants' income at (r=0.72, p= 0.00), (r=0.61, p= 0.00); and (r=0.69, p= 0.01) respectively. This study also showed that there was a fair positive correlation between a total score of KAP and participants' educational qualification at (r=0.59, p =0.01), (r=0.66, p= 0.02); and (r=0.57, p =0.03) respectively.

Table 6 correlation between ages, income and educational levels with a total score of KAP regarding hypertension using Pearson Correlation Test

Study axes	Info.	Pearson C.	p-value	Interp.
Knowledge-Based Questions	Ages	0.69	0.01	Fair Positive Correlation
Attitude Based Questions		0.74	0.00	
Practice-Based Questions		0.77	0.02	
Knowledge-Based Questions	Income	0.72	0.00	Fair Positive Correlation
Attitude Based questions		0.61	0.00	
Practice-Based questions		0.69	0.01	
Knowledge-Based Questions	Educational qualifications	0.59	0.01	Fair Positive Correlation
Attitude Based questions		0.66	0.02	
Practice-Based questions		0.57	0.03	

Info. = information Pearson c. = Pearson Correlation
Interp. = interpretation

Discussion

HTN contributes significantly to several burdens worldwide[5]. Good knowledge of HTN management and its

risk factors is vital for early prevention of complications[6]. Therefore, this study sought to assess KAP regarding hypertensive subjects in Hail City (KSA). In general, HTN in KSA is at high risk in males and those at younger ages[7]. HTN sharply increases with age and other combinations of cardiometabolic risk factors[8]. More attention should be paid to all community members, with specific consideration to those at higher risk.

The current study results in (Table 2) that found knowledge was the lowest and limited with regard to diet, definition, and the risk factors & causes, while the best with regard to complications and treatment. This finding is in agreement with the previous study by [9] who found that all patients had been diagnosed with HTN at least 1 year before, and more than half of them (57.1%) showed only an average knowledge and 29.4% showed a poor knowledge on the dimension of definition, lifestyle, treatment and complications of HTN. The knowledge was the poorest with regard to diet and treatment, and the best with regard to complications. However, various studies found that knowledge on HTN among patients was very poor [10-11]. This study's results are also similar to most previous international studies that indicated the level of knowledge and the basic understanding of risk factors and warning signs of stroke as a complication were inadequate among people with high BP [12]. This reflected a significant knowledge gap identified regarding disease definition, risk factors, and diet restrictions and allowances that could contribute to suboptimal health outcomes. Similarly, the study of [13] also reported that the participants have poor knowledge in the domains "definition and diet" which is similar to research conducted in Lebanon[14] and Sri Lanka [15], Indonesia [16], Pakistan [17] and India [18] However, specific knowledge domains revealed notable disparities. This finding is similar to the research findings of[7-19].

Regarding to attitude and practices among hypertensive patients, although, most of the subjects responded positively in attitude assessment toward antihypertensive medication adherence, diet, exercise daily (Table 3) while only less than half of subjects with appropriate practices toward BP monitoring, medication adherence and diet with responding sometimes or never for almost practice assessment (Table 4).

This agreed with recent findings by [17-20], who reported high prevalence of non-adherence to antihypertensive medication globally, with non-Western countries showing even higher rates, which is a persistent challenge in chronic disease management, particularly in hypertension, which affects over 1.3 billion people globally, as highlighted by the World Health Organization in 2023 [21] . The current results might be affected by the younger ages of half of the subjects (<40 years) and the highly educated and working subjects; all factors enhance their awareness and attitude with antihypertensive drug adherence and diet management [22]. These also could include unclear communication from healthcare providers, insufficient awareness of the significance of medication adherence, or cultural beliefs influencing medication use. Exploring these contributing factors can guide the development of targeted interventions. Tailored interventions like communication training for health care providers and behavioral change communication to the community will address these root causes and empower individuals and communities for improved health outcomes. Additionally, addressing patients' concerns, preferences, and values is crucial in developing a personalized treatment plan that patients are more likely to follow [23].

The results in (Table 5) revealed a significant positive fair correlation between KAP regarding hypertension, which is consistent with the study of [24], who revealed a significant positive weak correlation between knowledge and attitude (r=.296, p=.000), and knowledge and practice (r=.248, p=.000). However, a significant negative weak correlation was observed between attitude and practice (r=−.249, p=.000). This correlation indicated that subjects who knew more about high blood pressure consequences had a better attitude towards complication prevention for hypertension. Accordingly, any increment in knowledge among hypertensive patients will motivate them to change their attitude positively. The study of [24] also found a significant positive weak correlation between knowledge and practices. This finding means that good knowledge leads to better performance in some circumstances. Accordingly, someone who knew that HTN could cause stroke would perform certain strategies for preventing complications, including lifestyle modifications like regular physical exercise, avoiding tobacco use, regulating salt intake, and controlling major risk factors of HTN, diabetes, and heart disease. Therefore, the training program is vital to improve their practical behaviors towards stroke prevention. Knowledge is key for changing behaviors, so people must have sufficient and accurate information about stroke and its risk factors that would enhance both public preventive attitudes and practices. Thus, a regular healthy educational program, specifically for underserved population, is crucial to increase understanding towards stroke prevention and enhance respondents' preventative attitudes and practices. This finding contrasts with a study that showed most participants over 60 years old had good practices for complication prevention for hypertension [8].

The current study results found that the knowledge level of the subjects about hypertension was influenced by factors such as education, income, and age groups (Table 6). Individuals who are married, have chronic illnesses, have

lower incomes, and are less educated are more likely to have a lack of knowledge about hypertension. These results are also consistent with a study conducted in Poland [25]. These warrants targeted intervention, especially for people of lower socio-economic status, to effectively manage this significant global health problem. Hence, it could decrease the associated complications and healthcare expenditure [26]. Similarly, higher education levels were significantly associated with higher knowledge between patients, which was in agreement with current results [27].

Conclusion

The study findings concluded that the majority of hypertensive subjects in the study who were female and male, working, without other chronic illnesses, demonstrated an acceptable level of knowledge and attitude related to hypertension, expressed their concerns about daily medication intake and emphasized the importance of regular exercise, home-cooked meals, and increased consumption of fruits and vegetables—behaviors However, the study concluded fair practice for monitoring their BP and adopted dietary modifications suggesting the need for improvement in consistent well practice regarding hypertension.

A fair positive associations between knowledge and both attitude and practice, highlighting the interconnected nature of KAP in managing chronic conditions like hypertension. Additionally, demographic factors such as age, income, and educational attainment were positively associated with higher KAP scores. These findings underscore the influence of socio-demographic variables on health-related behaviors and support the need for tailored health education interventions.

Overall, the study suggested that while awareness is relatively high, enhancing practical implementation through targeted educational programs and public health initiatives could further improve hypertension management outcomes in the region. In order to prevent further complications of this disease, appropriate health education and follow up programs must be conducted in order to raise community awareness and knowledge about this disease. As well as encourage routine blood pressure monitoring and healthy lifestyle choices through community-based interventions.

Limitations of the Study

As a cross-sectional design, it captures data at a single point in time, limiting the ability to assess causal relationships. The use of self-reported questionnaires may introduce response bias, as participants might provide socially desirable answers. Additionally, the study was conducted in a single city (Hail), which may limit the generalizability of the findings to other regions of Saudi Arabia or broader populations.

Future studies

Conduct longitudinal and multi-regional studies to enhance generalizability and establish causal relationships. Future prospective studies be conducted to examine the factors influencing drug adherence, lifestyle modifications, and healthcare expenditure within a variety of cultural contexts.

Declaration by Authors/ Author's contribution:

ALHANOUF ALI ALENEZI[1.] Designed the work, collected data, drafted initial manuscript, analyzed, interpreted the data and drafted the final article.

HUMERA BANU[2.] Designed the work, revised and approved the final draft of the published version

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Conflict of interest

The authors declare that they have no conflicts of interest with respect to the research, authorship, and/or publication of this article.

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