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Impact of patients' knowledge of hypertension on adherence to antihypertensive drugs in Qassim region, Saudi Arabia

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ABSTRACT

Background: Hypertension is a common disease in Saudi Arabia. Non adherence to hypertension treatment is a common reason for failure to reach the target blood pressure. Multiple studies have shown a direct relationship between patients' knowledge of hypertension and their adherence level to antihypertensive drugs. *Aim:* The study's aim is to identify the association between hypertension knowledge and adherence to antihypertensive drugs among hypertensive patients in Qassim region. *Methods:* A cross sectional study performed in the Family Medicine clinics of Qassim University Medical City. A self-administered questionnaire was distributed among hypertensive patients. The questionnaire includes socio-demographic characteristics, General Medication Adherence Scale (GMAS) and Hypertension Knowledge Test (HKT). *Results:* Of the 452 hypertensive patients, 56.4% were females and 36.1% were aged between 31 to 50 years old. The overall mean GMAS score was 28.1 (SD 5.15), with 51.3% categorized as having high adherence. The overall mean HKT score was 12.6 (SD 3.75), wherein 58.4% was considered to have average hypertension knowledge. There was a notable positive correlation between the GMAS score and the HKT score. *Conclusion:* Patients with hypertension in Qassim region showed a high level of adherence to their antihypertensive drugs and only moderate knowledge of their disease. Greater drug adherence is more common in patients who are aware of their disease than in other hypertension patients. More investigations are required to determine the level of knowledge and adherence among hypertension patients in our region.

Keywords: Hypertension, antihypertensive drugs, medication adherence, hypertension knowledge, Qassim region, Saudi Arabia

1. INTRODUCTION

Hypertension is one of the most prevalent diseases in Saudi Arabia, which affects 26.1% of the country's middle-aged population (Alharbi et al., 2010).

Hypertension is a considerable risk factor for heart failure, myocardial infarction, cerebrovascular disease and renal failure (Chobanian et al., 2003). Antihypertensive drugs are now commonly used worldwide. Despite that, only one-third of patients reach the recommended blood pressure target (Chow et al., 2013). Non adherence to hypertension treatment, including pharmacological and non pharmacological treatment, is a common reason for failure to reach the treatment goal (Lynch et al., 2009). The lack of symptoms is the most prevalent reason for non adherence among hypertensive patients (Ashoorkhani et al., 2018). Non adherence has been linked to an increase in cardiovascular events and the cost of healthcare (Dragomir et al., 2010). Knowledge is a crucial component in controlling hypertension, as it is linked to reduced rates of stopping treatments, adhering to intervention behavior and improved disease control by patients (Jankowska-Polańska et al., 2016).

Multiple studies have been conducted worldwide regarding the adherence level to antihypertensive drugs and the association between patients' knowledge of hypertension and their level of adherence to antihypertensive drugs (Jankowska-Polańska et al., 2016; Algabbani and Algabbani, 2020; Ghembaza et al., 2014). A study conducted in Poland revealed that approximately 85% of participants had a moderate high adherence score (15% had a low adherence score). The same study demonstrated a direct relationship between knowledge of hypertension and the adherence level; only 8% of participants with high knowledge were non adherents, while 20% of participants with low knowledge were non adherent patients (Jankowska-Polańska et al. 2016). Another study conducted on a more local level among 306 hypertensive outpatients in the Riyadh region. It showed low adherence to antihypertensive drugs (only 42.2% of the participants were adherents). Regarding the association between patients' knowledge of hypertension and antihypertensive drugs adherence, it was positively noticed in their study as 57.4% of the knowledgeable patients about the disease were adherents to the treatment. In contrast, those patients with poor knowledge levels were less adherent to the treatment (Algabbani and Algabbani, 2020). No studies in Qassim region have investigated the association between hypertension knowledge and adherence level to antihypertensive drugs.

Thus, our aim is to identify the association between patients' knowledge of hypertension and their adherence level to antihypertensive drugs in Qassim region.

2. METHODOLOGY

It was an observational cross-sectional study conducted to identify the association between patients' knowledge of hypertension and their level of adherence to antihypertensive drugs in Qassim region. We started collecting the data from the 1st of July 2022 until the 22nd of July 2022. Our sample size was 400 with a 95% confidence level and a 5% margin of error; fortunately, we got 452 participants. We informed the participants about the study's goals and they agreed to participate. All the study participants gave informed consent. First author's email was attached to answer any inquiries. The inclusion criteria are the following: I) clinically confirmed hypertension diagnosis and II) the participant is from Qassim region.

We gave a modified electronic questionnaire for the participants presented in the Family Medicine clinics of Qassim University Medical City. The questionnaire consisted of 39 questions divided into three sections. Section 1 is the socio demographic characteristics, which consists of 8 questions. Section 2 is the General Medication Adherence Scale (GMAS), which assesses the adherence level and consists of 11 questions (Naqvi et al., 2019). Section 3 is the Hypertension Knowledge Test (HKT), which assesses knowledge about hypertension and consists of 20 questions (Han et al., 2011). Regarding section 1, we asked them about: 1) gender, 2) age, 3) nationality, 4) where do youlive? 5) Educational level, 6) do you have hypertension? 7) Is it controlled? and 8) what was your last measurement? In section 2, the questions divided into 3 parts. The first part consisted of 5 questions to assess patient non adherence due to his behavior; the second part consisted of 4 questions to assess patient non adherence due to additional diseases and pill burden; and the third part consisted of 2 questions to assess patient non adherence due to financial constraints. The answers are fixed: Never, Sometimes, Mostly and Always. The "Never" answer has the most points, 4 points and the "Always" answer has the least points, 1 point. To say the patient has high adherence, he must get 30–33 points, good adherence 27–29 points, partial adherence 17–26 points, low adherence 11–16 points and poor adherence 0–10 points. Section 3 consists of true-false questions and multiple-choice questions. The questions were assessing the patient's knowledge of hypertension with regard to general information about the disease, complications, how to be diagnosed, what lifestyle and diet habits could decrease the blood pressure and others. There is only one correct answer. The participant must correctly answer >75% of the questions to be considered as having high knowledge; 50-75% is considered average knowledge; <50% is considered low knowledge.

The developers of GMAS and HKT permitted us to use both the English and Arabic versions (Naqvi et al., 2019; Han et al., 2011). Regarding HKT, we translated the English version to an Arabic version by following published guidelines for translating questionnaires in PubMed (Tsang et al., 2017). We obtained the ethical approval from the Committee of Research Ethics, Deanship of Scientific Research, Qassim University (No. 21-21-06).

Statistical analysis

All categorical variables were presented as numbers and percentages (%) while all continuous variables were summarized as mean and standard deviation. The GMAS and HKT scores were compared with the socio demographic characteristics by using Mann Whitney Z test. Statistical collinearity has been measured by the Shapiro Wilk test. Both GMAS and HKT scores follow the non normal distribution. Thus, non parametric tests were applied. Pearson correlation coefficient has been conducted to determine the correlation between the GMAS score and HKT score. A P-value of 0.05 was considered statistically significant. The data were analyzed using Statistical Packages for Social Sciences (SPSS) version 26 (Armonk, NY: IBM Corp, USA).

3. RESULTS

This study involved 452 hypertensive patients. Table 1 presents the socio demographic characteristics of the patients. 36.1% were aged between 31 to 50 years, with more than half (56.4%) being females and nearly all (97.3%) were of Saudi nationality. Patients who had bachelor's degrees constitute 52%. The prevalence of patients with controlled hypertension was 83.6%, while those with high blood pressure during the last measurement constituted 59.1%.

Table 1 Socio-demographic characteristics of the hypertensive patient (n=452)

Study variables	N (%)
Age group	
15 – 30 years	31 (06.9%)
31 – 50 years	163 (36.1%)
51 – 60 years	154 (34.1%)
>60 years	104 (23.0%)
Gender	
Male	197 (43.6%)
Female	255 (56.4%)
Nationality	
Saudi	440 (97.3%)
Non-Saudi	12 (02.7%)
Educational level	
Below High school	94 (20.8%)
High school	93 (20.6%)
Bachelor's degree	235 (52.0%)
Master's degree	21 (04.6%)
PhD	09 (02.0%)
Having controlled hypertension	
Yes	378 (83.6%)
No	74 (16.4%)
What was your last measurement?	
Controlled	110 (24.3%)
Uncontrolled	330 (73.0%)
I don't know	12 (02.7%)

Table 2 Descriptive statistics for the general medication adherence scale (GMAS) and Hypertension knowledge test (HKT) (n=452)

Variables	N (%)
GMAS score (mean ± SD)	28.1 ± 5.15
Level of adherence	
Poorly adherence (score 0-10)	07 (01.5%)
Low adherence (score 11-16)	11 (02.4%)
Partial adherence (score 17-26)	101 (22.3%)

Good adherence (score 27-29)	101 (22.3%)
High adherence (score 30-33)	232 (51.3%)
HKT score (mean ± SD)12.6 ± 3.75	
Low (score <50%)	87 (19.2%)
Average (score 50% - 75%)	264 (58.4%)
High (score >75%)	101 (22.3%)

The descriptive statistics of medication adherence and hypertension knowledge are given in Table 2. It can be observed that the mean GMAS score was 28.1 (SD 5.15), with poor, low, partial good and high adherence detected in 1.5%, 2.4%, 22.3%, 22.3% and 51.3%, respectively. Regarding hypertension knowledge, the mean score was 12.6 (SD 3.75), with low, average and high hypertension knowledge found in 19.2%, 58.4%, and 22.3% respectively.

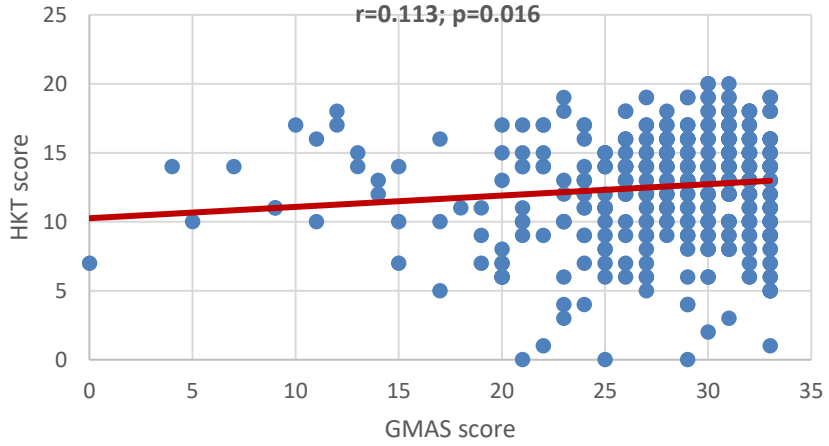

Figure 1 Correlation between GMAS score and HKT score

Figure 1 shows a significant positive correlation between the GMAS score and the HKT score (r=0.113; p=0.016). Indicating that theincrease in the score of GMAS is correlated with the increase in the score of HKT.

Table 3 Differences in GMAS score in relation to the Socio-demographic characteristics of the hypertensive patients (n=452)

Factor	GMAS Score (33) Mean ± SD	Z-test	P-value §
Age group			
≤50 years	27.2 ± 5.55	3.089	0.002 **
>50 years	28.8 ± 4.72		
Gender			
Male	28.6 ± 5.09	2.248	0.025 **
Female	27.8 ± 5.16		
Educational level			
High school or below	28.0 ± 5.17	0.747	0.455
Bachelor's degree or higher	28.2 ± 5.14		
Having controlled hypertension			
Yes	28.8 ± 4.58	5.852	<0.001 **
No	24.8 ± 6.49		
Last measurement BP level			
Normal or low	28.7 ± 4.38	0.858	0.391
Elevated or high	28.1 ± 5.14		

§ P-value has been calculated using Mann Whitney Z-test.
*** Significant p<0.05 level.*

When measuring the differences in the score of GMAS in relation to the socio-demographics of the patients (Table 3), it was found that a higher GMAS score was more associated among the older age group (Z=2.089; p=0.002), gender male (Z=2.248; p=0.025) and having controlled hypertension (Z=5.852; p<0.001) while the differences in GMAS score according to educational level and last measurement of BP did not reach statistical significance (p>0.05).

Table 4 Differences in HKT score in relation to the Socio-demographic characteristics of the hypertensive patients (n=452)

Factor	HKT Score (20) Mean ± SD	Z-test	P-value §
Age group			
≤50 years	12.4 ± 3.98	0.470	0.638
>50 years	12.7 ± 3.57		
Gender			
Male	12.5 ± 3.87	0.317	0.751
Female	12.7 ± 3.65		
Educational level			
High school or below	11.7 ± 3.79	3.787	<0.001 **
Bachelor's degree or higher	13.2 ± 3.61		
Having controlled hypertension			
Yes	12.6 ± 3.69	0.557	0.577
No	12.3 ± 4.02		
Last measurement BP level			
Normal or low	13.4 ± 3.68	2.817	0.005 **
Elevated or high	12.4 ± 3.72		

§ P-value has been calculated using Mann Whitney Z-test.

*** Significant p<0.05 level.*

Regarding the differences in the score of HKT in terms of socio-demographic characteristics (Table 4), it was found that a higher HKT score was more associated with being more educated (Z=3.787; p<0.001) and having normal or low BP measurement (Z=2.817; p=0.005). Other variables such as age group, gender and having controlled hypertension were not statistically significant when compared with HKT score (p>0.05).

4. DISCUSSION

This study identified the level of hypertension knowledge and adherence to antihypertensivedrugs among hypertensive patients in Qassim Region, Saudi Arabia. This study showed a modest knowledge level among hypertensive patients toward their disease. Approximately 58.4% were categorized as average level, 22.3% as high and only 19.2% were categorized as low knowledge level (mean score: 12.6; SD 3.75). These results are congruent with Saleem et al., (2011) paper the study showed that 61.3% of the patients had average hypertension knowledge. This has been concurred by the study of Pirasath et al., (2017), wherein 69.9% had adequate knowledge levels, but 40.5% were oblivious to disease progression. In a study by Amado Guirado et al., (2011) however, increased knowledge was shown in patients after 12-month follow-up. According to reports, comparing the level of knowledge between the intervention group (IG) and the control group (CG) yielded an increase in knowledge level by at least 27.8% in the IG and 18.5% in the CG. The authors concluded that educational intervention had no significant effect on patients' compliance with medication (Guirado et al., 2011).

Data in this study indicate that the increased knowledge was significantly predicted in patients with better education and those with normal or low blood pressure levels. This is almost consistent with that of Pirasath and Sundaresan (2021). Based on their accounts, patients' knowledge and awareness were significantly related to educational levels (Pirasath and Sundaresan, 2021). Non adherence is a common reason for failure to reach the treatment goal (Lynch et al., 2009). In our study, more than half (51.3%) of the participants were having high adherence to medication, 22.3% were having good adherence, 22.3% were having partial adherence, 2.4% were having low adherence and only 1.5% were considered as having poor adherence level (mean score: 28.1; SD 3.75). This

was also observed among the participants in Sri Lanka, noting that taking medication has a critical role in blood pressure control (92.1%); authors then documented good medication adherence in 58.8% of the patients (Pirasath and Sundaresan, 2021). In Dammam, most patients (66.7%) were considered to have a moderate adherence level; however, only 7.6% were classified as good (Al Zahrani et al., 2019). Contradicting these reports, a study in Pakistan and Algeria reported that the adherence of hypertensive patients was poor. Suggesting that most patients were doubtful of the advantages of continuous medication use, which led to non adherence to antihypertensive regimens (Saleem et al., 2011; Ghembaza et al., 2014).

Increased adherence was significantly dependent on the older age group, gender male and having reasonable hypertension control. A study conducted in Iran documented several reasons for non-adherence to medication informed by hypertensive patients. For instance, the predisposing factors for non adherence to medication treatment were knowledge, belief and attitude, mental-personality traits and culture and lifestyle, while the most enabling factorswere access to health services and facilities in the home, workplace and society (Ashoorkhani et al., 2018). In Riyadh, patients with underlying diseases, as well as taking multiple medications, were highly adherent to the medications (Algabbani and Algabbani, 2020). However, in USA, adherence to antihypertensive drugs was seen to have a direct link with occupational status. According to reports, a short-term improvement was significantly seen in high-prior-cost employees in taking antihypertensive medication, but low-prior-cost employees contradicted this scenario (Lynch et al., 2009). Hence, more investigations are needed to prove these accounts.

One of the highlights of our study was the positive correlation between knowledge of hypertension and adherence level to antihypertensive drugs. This indicates that having a high knowledge level was correlated with an increase in adherence to medication. Consistent with our findings, several published studies documented a positive direct relationship between hypertension knowledge and level of adherence to its medication (Jankowska-Polańska et al., 2016; Guirado et al., 2011; Ghembaza et al., 2014). Contrary to this scenario, studies carried out in Dammam and Pakistan found an inverse relationship between hypertension knowledge and adherence (Al Zahrani et al., 2019; Saleem et al., 2011). A multi center approach, probably at national levels involving a more significant sample, may determine the true relationship between hypertension knowledgeand the adherence level. Educating patients regarding the importance and benefits of continuous taking of hypertension drugs and eradicating doubts about the use of drugs may result in better management of hypertension.

5. CONCLUSION

Hypertensive patients in Qassim region had moderate knowledge about their disease and high adherence level to antihypertensive drugs. Patients with increased knowledge tend to exhibit better medication adherence than other hypertensive patients. Further, patients' increased knowledge was dependent on educational level and blood pressure levels while adherence to medication was dependent on age, gender and controlled hypertension. Although most patients were having good medication adherence, their knowledge about their disease still has room for improvement. Therefore, health education is necessary to narrow the gaps in knowledge and the role of healthcare providers is imperative. More investigations are required to establish the knowledge and adherence level among patients with hypertension in our region.

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Author contributions

All authors contributed to the research. Abdulrhman Aldukhayel & Sulaiman Almarshoud have participated in reviewing the literature and writing the introduction, methods, discussion and conclusion. Mohammad Aldekhail & Mohammad AlKhattaf have participated in reviewing the literature and writing the introduction, abstract and references. Abdullah Alowais & Abdulmalik Aldawsari has participated in reviewing the literature and writing the introduction, data analysis and results.

Ethical approval

The study was approved by the Medical Ethics Committee of Qassim University (Ethical approval code: 21-21-06).

Informed consent statement

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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