

Medication adherence & compliance among Saudi hypertensive patients

Essmat A. Mansour¹, Isabelita N Pandaan¹, Irene Roco

¹Medical Surgical Nursing Department. King Saud

University, College of Nursing, Saudi Arabia

DOI: <https://doi.org/10.5281/zenodo.7075037>

Published Date: 13-September-2022

Abstract: background: Chronic diseases are usually need to patient's adherence and compliance to be controlled especially if it needs long-life medication as well as life style modification. Hypertension is one of the chronic diseases and one of the most common among adult worldwide and it needs meticulous control and follow up to avoid or at least delay the occurrence of serious complications.

Aim of the study: The aim of the current study was to assess compliance to medication among Saudi hypertensive patients.

Material and methods: This study was cross-sectional study. The data were collected randomly using simple random sampling method from 514 participants from Saudi hypertensive patients. Two tools were be used to collect the data, first one is sociodemographic and disease related data, tool two is Hill-Bone Compliance to High Blood Pressure Therapy Scale (HB-HBP)

Results: Descriptive statistics displayed a compliance to hypertension medication total score among 86.4% and only 13.6% reported non-compliance. Highly educated males who are working and who have health insurance were more likely to adhere to hypertension medication. In addition, the results revealed that those who were married, educated, working and have health insurance were more likely to keep their medical appointments.

Conclusion: Majority of participants were adhere and comply to medication, keeping appointments and salt use, There are some demographic and disease related variables affect the participants compliance and adherence.

Keywords: adherence, compliance & hypertensive patients.

1. INTRODUCTION

Chronic diseases are of long duration and usually progresses slowly. The prevalence of it increases with age. The characteristic of chronic disease is that it requires a long period of supervision, observation or care. ^[1]. Hypertension is a chronic condition that contributes to a high proportion of morbidity and mortality worldwide ^[2]. The prevalence of hypertension is projected to rise up to 29% by 2025. In the Middle East, the prevalence of hypertension is high ^[3]. In the Kingdom of Saudi Arabia, most recent study revealed that the prevalence of hypertension among the Saudi population is about 31.4% ^[4].

One of the well-recognized factors contributing to the poor control of blood pressure in hypertension is failure to take medications as often as prescribed ^[5]. Among patients with chronic illness, approximately 50% do not take medications as prescribed ^[6]. In the management of patients with chronic diseases needing a long-term pharmacotherapy, medication adherence is a well-recognized problem. To maintain a high level of medication adherence over years is most difficult ^[7].

Medication adherence is measured by taking antihypertensive drugs in individuals and other therapies included. A previous study concluded that non-compliance in treating patients with hypertension is due to not feeling any complaints or the patient forgets to remember the control time, has other activities and is afraid of the dangers of the drug side effect [8].

Furthermore, other studies revealed that non-adherence was a result of perceptions that medications are not effective to manage the conditions. Patients with these perceptions turned to herbal medicines and spiritual healing as therapeutic alternatives. However, there are also other factors that were identified including polypharmacy practice; tight work schedules, social norms, poor prescription instruction by health providers and knowledge and experience of medication [9].

In the same vein, patient characteristics were found to be associated with adherence. Medication adherence has been linked to gender, age, race and the ability to pay as well as clinical factors related to the medication itself [10]. Similarly, results of study showed into light that higher number of female patients are compliant to treatment regimen as against the males and married participants were compliant against single participants. Unemployed patients however, were more compliant than the employed participants [11]. In a paper that determined drug adherence for patients with hypertension in Saudi Arabia, the patients were not sure of the benefits associated with the continuous use of medication, which leads to non-adherence to treatment regimens [12]

There are many researches [5-7] that support the issue of medication adherence in chronic illness like hypertension and the association of patient characteristics influencing medication adherence [10-11]. However, there is still limited evidences on why hypertensive patients miss or discontinue taking medications. The lack of information regarding medication adherence among hypertensive patients in Saudi Arabia necessitates the need to explore this health issue. Therefore, this study aims to assess the compliance to medication among Saudi hypertensive patients.

Aim of the study

The aim of this study is to assess the compliance of Saudi hypertensive patients to the treatment regimen

2. METHODOLOGY

This study was designed as cross-sectional study. The data were collected randomly using simple random sampling method from 514 participants from Saudi hypertensive patients aged 20 years and above, the inclusion criteria were, Saudi hypertensive patients, both sexes, in the age group of 20 years old and above, there is no exclusion criteria that prevent the participants from sharing this study if they met all inclusion criteria.

Research questions: Four research questions were asked to assess the aim of the study.

1. To what extent do Saudi hypertensive patients comply with hypertension medication?
2. Does compliance of hypertensive Saudi patient differ by their demographic characteristics?
3. Does compliance of hypertensive Saudi patient differ by their disease-related data?
4. Which variable among demographics characteristics and disease-related data predicts compliance among hypertensive patients?

Two tools were used in this study;

First tool is sociodemographic and disease related data it was developed by the researchers: it includes, age, sex, education, occupation and presence of health insurance, meanwhile disease related data includes, age when diagnosis of hypertension takes place, family history and presence of chronic diseases.

Second tool: is Hill-Bone Compliance to High Blood Pressure Therapy Scale (HB-HBP) [13] the scales were developed with National Institutes of Health (NIH) funds; therefore, they are available for use at no cost; the scales are free after taking an official use permission. It was developed in English and other 9 languages. This brief instrument provides a simple method for clinicians in various settings to assess patients' self-reported compliance and to plan appropriate interventions. According to the author, this tool is valid for any chronic disease.

The Hill – Bone Compliance scale is 14 items on a 4-points Likert scale that range from 14 to 56. The scale includes 3 subscales: medication compliance (8-items), compliance to salt use (3-items) and compliance to appointment keeping (3 items). Compliance was calculated as summing the scores of none of the time and some of the times and noncompliance was calculated by summing the scores of most of the times and all the time.

International Journal of Novel Research in Healthcare and Nursing

Vol. 9, Issue 3, pp: (9-18), Month: September - December 2022, Available at: www.noveltyjournals.com

Pilot study was carried out on 10 participants to test the clarity and relevance of the tool. These 10 participants were not added to the actual sample size.

Data were collected through direct individualized interview in different public places such as; hypermarkets, health clubs & universities, the reason for selection of these different places is to meet the participants away from the health care settings to avoid the environmental effect of the health care settings on the participant’s answers.

Data were collected within 7 months from November 2021 until May 2022.

Consent was taken from the participant either written or verbal. The purpose of the study was explained to each participant before starting the interview to gain his confidence, cooperation and to alleviate any doubts. The pertinent research and ethical committees and all the legal guardians of the participants approved the study protocol. No hazards were present. Participants were assured of confidentiality. Data were only available to the researchers and all participants were informed that they have the right to withdraw from the study at any time.

Data analysis

Data was collected and entered into an excel spreadsheet where it was cleaned for errors and checked for discrepancies. The entire database in excel spreadsheet was categorized, coded and analyzed using Statistical Package for Social Sciences version 20 (SPSS Inc, Chicago, Illinois, USA). Descriptive statistics mainly frequency distribution and percentages were used to present the data. Chi-square test was used to determine associations between compliance to hypertension medication and participants’ demographics and disease-related data. Regression analysis was used to predict which variable among demographics and disease-related data mostly predicted compliance to hypertension medication among Saudi patients. A p-value of 0.05 and less was considered as statistically significant.

3. RESULTS

The aim of the current study was to assess compliance to medication among Saudi hypertensive patients. Four research questions were asked to assess the aim of the study. Descriptive statistics of the study participants showed that 55.8% were males and 44.2% were females, 48% were in the age group of 60 years and above, 37.9% in the age group of 41 to 60 years while 14% were in the younger age group. Regarding marital status, 52.5% were married and 47.5% were not married. Similar percentages were either holding secondary school education (29.8%), university graduates (26.5%) and primary school degree (25%). About one third was working in governmental sectors (32%), while 27.2% were working in non-governmental sectors and 24.7% were housewives. The majority (88.9%) reported having a health insurance.

Regarding disease related data, 62% diagnosed with hypertension in the age group of 41 to 60 years old and 36.2% diagnosed while they were in the age group of 20 to 40 years old. Forty-two percent reported having DM, 15.4% reported having asthma and 6.8% reported having other cardiac diseases while 35.8% reported having no chronic illnesses. As for family history of chronic disease, 38.9% reported having a family history of hypertension and DM, 13.2% reported having a family history of hypertension only, 10.3% reported a family history of DM only, 6.2% asthma, in addition to 24.9% reported having no family history of chronic diseases. Demographic characteristics and disease-related data of the study participants are presented in table 1.

Table 1: Demographic characteristics and Disease-Related data of the study sample

Demographic Variable	# (%)
Gender	
Male	287 (55.8)
Female	227 (44.2)
Age	
20-40-year-old	72 (14)
41-60-year-old	195 (37.9)
> 60 years old	247 (48.1)
Marital Status	
Married	270 (52.5)
Not married	244 (47.5)

Education	
Illiterate	29 (5.6)
Read and write	42 (8.2)
Primary	128 (24.9)
Secondary	153 (29.8)
University	136 (26.5)
Postgraduate	28 (5.1)
Occupation	
Housewives	127 (24.7)
Retired	82 (16)
Governmental	165 (32.1)
Non-governmental	140 (27.2)
Health Insurance	
Yes	457 (88.9)
No	57 (11.1)
Disease-related data	
Age of diagnosis	
20-40 year- old	186 (36.2)
41-60 year- old	319 (62.1)
> 60 years old	9 (1.8)
Presence of chronic disease	
None	184 (35.8)
DM	216 (42)
Asthma	79 (15.4)
Other cardiac disease	35 (6.8)
Family history of chronic disease	
None	
HTN	128 (24.9)
DM	68 (13.2)
Asthma	53 (10.3)
Cardiac diseases	32 (6.2)
HIT+DM	33 (6.4)
	200 (38.9)

Research question 1: To what extent do Saudi hypertensive patients comply with hypertension medication?

As shown in table 2, descriptive statistics displayed a compliance to hypertension medication total score among 86.4% and only 13.6% reported non-compliance. Results on the compliance subscales showed that, 87.7% of the participants reported compliance to medication, 81.7% comply to salt use and 88.7% comply to appointment keeping. A considerable percentage of the participants reported either none of the time and some of the time to all the subscales items.

Table 2: Level of hypertensive patients' compliance to medication

Subscales Question	Compliance score: Number (%)				Mean score
	None of the time (4)	Some of the time (3)	Most of the time (2)	All the time (1)	
Medication Compliance					
1- How often do you forget to take your hypertensive medicine?	190 (37)	280 (54.5)	35 (6.8)	9 (1.8)	3.27
2- How often do you decide NOT to take your hypertensive medicine?	313 (60.9)	163 (31.7)	33 (6.4)	5 (1)	3.53
3- How often do you run out of hypertensive pills?	166 (32.3)	302 (58.8)	39 (7.6)	7 (1.4)	3.22
4- How often do you skip your hypertensive medicine before you go to the doctor	171 (33.3)	299 (58.2)	35 (6.8)	9 (1.8)	3.23
5- How often do you miss taking your hypertensive pills when you feel better?	184 (35.8)	295 (57.4)	30 (5.8)	5 (1)	3.28

6- How often do you miss taking your hypertensive pills when you feel sick?	195 (37.9)	282 (54.9)	33 (6.4)	4 (0.8)	3.29
7- How often do you take someone else's hypertensive pills?	347 (67.5)	133 (25.9)	25 (4.9)	9 (1.8)	3.59
8- How often do you miss taking your hypertensive pills when you are careless?	186 (36.2)	292 (56.8)	33 (6.4)	3 (0.6)	3.28
Total score on compliance to medication	Compliance # (%)		Non-compliance # (%)		
	451 (87.7)		63 (12.3)		
Sodium Use					
1- How often do you eat salty food?	127 (24.7)	311 (60.5)	65 (12.6)	11 (2.1)	3.08
2- How often do you shake salt on your food before you eat it?	137 (26.7)	304 (59.1)	65 (12.6)	8 (1.6)	3.11
3- How often do you eat fast food?	216 (42)	251 (48.8)	38 (7.4)	9 (1.8)	3.31
Total score on compliance to sodium use	Compliance # (%)		Non-compliance # (%)		
	420 (81.7)		94 (18.3)		
Appointment Keeping					
1- How often do you make the next appointment before you leave the doctor's office? *	185 (36)	291 (56.6)	31 (6)	7 (1.4)	3.27
2- How often do you miss scheduled appointments?	161 (31.3)	303 (58.9)	45 (8.8)	5 (1)	3.21
3- How often do you forget to get prescriptions filled?	135 (26.3)	341 (66.3)	28 (5.4)	10 (1.9)	3.17
Total score on compliance to appointment keeping	Compliance # (%)		Non-compliance # (%)		
	456 (88.7)		58 (11.3)		
Total compliance	444 (86.4)		70 (13.6)		

Research question 2: Does compliance of hypertensive Saudi patient differ by their demographic characteristics?

Chi square test was performed and results showed that there was a significance relationship between compliance to medication subscale and gender (p = .001), education (p = .04), occupation (p = .004), and insurance (p = .01). Age did not report significance relationship (p = .35) and marital status was approaching significance (p = .06). Highly educated males who are working and who have health insurance were more likely to adhere to hypertension medication.

Compliance to salt use subscale reported significant relationship with age (p= .000), occupation (p=.000) and insurance (p=.003), indicating that older patients who were working and who have health insurance were more likely to comply with salt use in their diets. Similarly, compliance to appointment keeping subscale reported significant relationship with marital status (p=.02), education (.001), occupation (.004) and insurance (p=.001) respectively. Those who were married, educated, working and have health insurance were more likely to keep their medical appointments. Results of research question 2 are presented in table 3.

Table 3: Demographic characteristics of the study sample and compliance

variable	Medication compliance			Compliance to salt use			Compliance to appointment keeping		
	Chi-square value	df	P value	Chi-square value	df	P value	Chi-square value	df	P value
Gender	10.255	1	.001	1.07	1	.17	.448	1	.29
Age	2.04	2	.35	16.81	2	.000	2.97	2	.22
Marital status	2.69	1	.06	1.51	1	.13	4.34	1	.02
Education	12.86	5	.04	10.04	5	.09	21.31	5	.001
Occupation	15.07	3	.004	23.58	3	.000	13.51	3	.004
Insurance	6.63	1	.01	9.71	1	.003	14.47	1	.001

Research question 3: Does compliance of hypertensive Saudi patient differ by their disease-related data?

As shown in table 4, Chi square test results showed that there was a statistical significance relationship between compliance to medication and age on diagnosis ($p = .000$), presence of chronic disease ($p = .002$), and family history ($p = .000$). This indicating that more compliance was reported when patients were older at first diagnosed with hypertension, those who have other chronic diseases, and those who have a family history. Compliance to salt use reported a relationship with age on diagnosis ($p = .03$), presence of chronic disease ($p = .01$) and family history ($p = .003$). Further, there was also a relationship between compliance to appointment keeping and presence of chronic disease ($p = .001$), and family history ($p = .000$).

Table 4: Compliance and disease related data

variable	Medication compliance			Salt use			Appointment keeping		
	Chi-square value	df	P value	Chi-square value	df	P value	Chi-square value	df	P value
Age on diagnosis	16.18	2	.000	4.59	2	.03	4.88	2	.08
Presence of chronic disease	19.05	5	.002	15.49	5	.01	19.64	5	.001
Family history	53.37	5	.000	18.04	5	.003	30.96	5	.000

Research question 4: Which variable among demographics characteristics and disease-related data predicts compliance among hypertensive patients?

Regression analysis was performed; demographic variables and disease-related-data variables were regressed to the total score on compliance. The model explained 28% of variance on compliance and the model was statistically significant ($F = 4.57$, $p = .000$) indicating that some demographics and disease-related variables would predict compliance among hypertensive patients. When the test performed for the subscales, results showed that demographics and disease-related data explained 30% of variance on compliance to medication and the model was statistically significant ($F = 5.74$, $p = .000$). Age ($\beta = -.21$, $t = -4.05$, $p = .000$), gender ($\beta = -.22$, $t = -3.9$, $p = .0000$), education ($\beta = -.14$, $t = -2.6$, $p = .01$), insurance ($\beta = .14$, $t = 2.85$, $p = .004$) and age on admission ($\beta = .13$, $t = 2.45$, $p = .01$) respectively reported statistical significant.

Regarding compliance to salt use, the demographic variables and disease-related data explained 25% of variance on compliance to salt use and was statistically significant ($F = 3.87$, $p = .000$). Age ($\beta = -.13$, $t = -2.43$, $p = .01$), gender ($\beta = .13$, $t = 2.38$, $p = .01$), insurance ($\beta = .14$, $t = 2.97$, $p = .003$) and family history ($\beta = -.10$, $t = -2.04$, $p = .04$) reported statistical significance. According to compliance to appointment keeping, the demographic variables and disease-related data explained 25% of variance on compliance to appointment keeping and the model was statistically significant ($F = 3.87$, $p = .000$). Insurance ($\beta = .15$, $t = 3.18$, $p = .002$), presence of chronic disease ($\beta = .14$, $t = 2.96$, $p = .003$) and family history ($\beta = -.11$, $t = -.225$, $p = .02$) reported statistical significance. Results of regression analysis are presented in table 5.

Table 5: Regression analysis of demographic variables and disease-related data and total compliance

Variable	Medication compliance			Compliance to salt use			Compliance to appointment keeping		
	β	t	p-value	β	t	p-value	β	t	p-value
Age	-.21	-4.05	.000	-.13	-2.43	.01	-.03	-.545	.58
Gender	-.22	-3.90	.000	.13	2.38	.01	-.04	-.749	.45
Marital status	.024	.511	.61	.03	.65	.51	.05	1.13	.25
Education	-.14	-2.60	.01	.05	1.01	.31	-.06	-1.07	.28
Occupation	-.055	-.985	.32	-.09	-1.73	.08	-.03	-.538	.59
Insurance	.14	2.858	.004	.14	2.97	.003	.15	3.18	.002
Age on diagnosis	.13	2.453	.01	.02	.33	.73	.04	.836	.41

Presence of chronic disease	.088	1.877	.06	.06	1.42	.15	.14	2.96	.003
Family history	-.085	-1.834	.06	-.10	-2.04	.04	-.11	-2.25	.02

4. DISCUSSION

Our study aims to assess the compliance and adherence of Saudi hypertensive patients to the treatment regimen and the demographic characteristics and disease-related data that predicts compliance among hypertensive patients. Medication compliance is significant to the successful control of hypertension for many patients. Non-adherence to pharmacotherapeutics is one of the most common causes of uncontrolled hypertension.

The Extent of compliance with Antihypertensive medication

In this study, a high percentage (86.4%) of compliance with hypertension medication was shown, 81.7% to salt use and 88.7% compliance to appointment keeping. The results of this study are similar to the studies reported in Korea, 2018 (81.7%) and other advanced countries, low and middle-income countries, and China which ranges between 53.4 – 91%. However, a low compliance rate of 14.6 – 15.4% was reported in the studies done in Kenya and Egypt with a compliance rate of (46.12%) replicating a poor health environment and culture in their societies. ^(14,15). In Saudi Arabia, there are varying degrees of adherence rates to hypertension treatment from 34.7% - 47 %. ^(15, 16) In other studies conducted in different countries, adherence rates ranged from 15 to 88%. This discrepancy in adherence rate is potentially due to the differences in population characteristics, medication adherence assessment tools, and healthcare systems. ⁽¹⁶⁾

High compliance to appointment keeping was reported in this study with similar results in the study done in Kenya, which could probably be due to variation in sociodemographic characteristics, sample size differences, and challenges in the health sector in Africa ⁽¹⁴⁾. According to Choi et al 2018, ⁽¹⁸⁾, a lesser number of medications may have fewer side effects and can be easily remembered leading to more adherence than multiple medications. On the other hand, some previous descriptive studies explained that patients with multiple pills may be more motivated to take medications due to the perception of the severity of the disease ⁽¹⁵⁾.

2, Compliance of hypertensive Saudi patient differ by their demographic characteristics (gender, age, Marital status, Educ)

Sociodemographic and their association with adherence rate have been explored in several studies. In this study, a significant relationship was found between compliance to medication subscale and gender, education, occupation, and insurance. Age did not report significant relationship and marital status was approaching significance. Highly educated males who are working and who have health insurance were more likely to adhere to hypertension medication. In a couple of studies conducted locally, differences in results shows that female patients were less adherent to hypertension medication compared to male patients ⁽¹⁷⁾ however, a contradicting result of the study indicated that female patients were more adherent than male patients ⁽¹⁶⁾. Our study showed that there was no significant relationship between gender, marital status, and educational level with adherence, which is similar to findings utilized in the other studies ⁽¹⁶⁾. In terms of age, this study indicates that more compliance was reported when patients were older at first diagnosed with hypertension, those who have other chronic diseases, and those who have a family history similar to the findings of the local study ⁽¹⁷⁾. However, in a study conducted in both Kenya and Egypt ^(14,15), it is noted that young patients (18-28 years old) (< 40 years) demonstrated optimal compliance to therapy to their counterparts. In another previous study, age was not associated with adherence ⁽¹⁶⁾. Older adults with hypertension, often have multiple chronic conditions and polypharmacy, which may adversely affect medication adherence ⁽¹⁹⁾. Older patients may devote more time adhering to pharmaceutical treatment and are more likely to use devices such as pillboxes or calendars to assist in regular medication-taking ⁽²⁰⁾.

Regarding the level of education current study revealed that Patients with higher education levels showed a higher adherence rate, more so with its complications were seven times more likely to have good adherence to medication ^(14,15,16&21). This is because formal education promotes patient awareness and understanding of hypertension instructions ⁽²²⁾. Contrary, in a study utilized in Kenya, showed that noncompliance was higher for the educated patients ⁽¹⁵⁾. The main patient-associated problems are poor knowledge of hypertension condition, insufficient knowledge or low awareness, and the symptomless nature of hypertension ⁽²³⁾.

3. Does compliance of hypertensive Saudi patients differ by their disease-related data?

Compliance with salt use reported a relationship with age on diagnosis, presence of chronic disease, and family history. Further, there was also a relationship between compliance to appointment keeping and the presence of chronic disease and family history. The results of this study are supported by the studies ⁽²⁴⁾ which showed a significant association between the presence of comorbid conditions in hypertensive patients and good adherence to antihypertensive medications. Patients with comorbidities such as those related to cardiovascular risk factors are more likely aware of being at a higher risk and, therefore, may adhere more to a therapeutic regimen.

However, in previous studies utilized, hypertensive patients without other comorbidities have a simple treatment regimen that makes adherence easier ⁽¹⁴⁾. This is supported by different studies which reveal that participants without other cardiovascular comorbidities such as stroke, myocardial infarct, diabetes, or dyslipidemia were twice more likely to have good adherence than those with these co-morbidities ⁽¹⁶⁵⁾. With more comorbidities, taking multiple medications to adhere to may affect patients psychosocially, leading to less adherence ⁽¹⁴⁾.

4. Which variable among demographic characteristics and disease-related data predicts compliance among hypertensive patients?

The results of this study indicate that some demographics and disease-related variables would predict compliance among hypertensive patients. Results showed that demographics and disease-related data such as gender, education, insurance, and age on admission were statistically significant in terms of compliance to medication, however, age and marital status did not report a significant relationship which indicates that highly educated males who are working and who have health insurance were more likely to adhere to hypertension medication. Those who were married, educated, working, and had health insurance were more likely to keep their medical appointments. Adherence to multiple medications may also be affected by poorer health literacy ⁽¹⁵⁾. Knowledge increases antihypertensive therapy compliance by 2.715 times, and knowledgeable hypertensive patients have a better understanding of the significance of controlling high BP, hence would be more compliant with the therapy, which is similar to studies utilized ⁽¹⁴⁾ which were done in Ethiopia, Debre Tabor, Gondar, China, and Malaysia that patients with sufficient knowledge of their diseases and management had improved compliance compared to those who didn't.

Poor adherence was significantly associated with lower mean age (59 years old vs. 63 years old), higher mean clinic diastolic blood pressure (76 mmHg vs. 73 mmHg), and higher mean weight (70.4 kg vs. 67.4 kg) ⁽¹⁵⁾. Elderly patients affected by polypharmacy are more likely to experience adverse effects and drug interactions, which may affect their concerns about medication ⁽²⁵⁾. As stated, the pill burden did not seem to influence MA. Patients with good MA had a median of two AHM compared to one among those with poor MA which indicates that almost one in two patients are not fully adherent to their AHM. Poor AHM adherence increases the risk of cardiovascular complications such as stroke and ischaemic heart disease 6,7 and contributes to socio-economic burden ⁽¹⁵⁾.

This study shows statistical significance between demographic variables and compliance to salt use as well as appointment keeping. As cited in a previous study, patients on a healthy diet with a low salt intake had good adherence to medication ⁽¹⁵⁾, which is supported by (Choi et al, 2018) ⁽¹⁸⁾, who showed that patients with high salt intake had poor adherence to antihypertensive medication. These results suggest that a patient's lifestyle modification enhances good adherence to medications. In a previous study, a substantial relationship was found between compliance to antihypertensive therapy and health care follow-up on the consistency of therapy. Healthcare follow-up on the consistency of therapy may increase antihypertensive therapy compliance by 0.45 times. ⁽¹⁴⁾. Effective two-way communication can ensure compliance with medications and other health management related to the control and treatment of hypertension.

5. CONCLUSION

The present study provides evidence for a high percentage of compliance with hypertension medication. A significant relationship was found between compliance to medication subscale and gender, education, occupation, and insurance. Age did not report significant relationship and marital status was approaching significance. A significant association between the presence of comorbid conditions in hypertensive patients and good adherence to antihypertensive medications was found.

6. RECOMMENDATIONS

Based on the results of the current study recommendation will be as the following:

- 1- Conduct the study on a large sample and on more than one city to ensure generalization.
- 2- Provide an access to health care provider for hypertensive patients to ensure follow up based care.
- 3- Stress the understanding of the treatment regimen and its benefits in relation to control and prevent complications of hypertension.

REFERENCES

- [1] Reynolds R, Dennis, S, Hasan I, Slewa J, Chen W, Tian D, Bobba S, Zwar N. (2018). A systematic review of chronic disease management interventions in primary care. *BMC Family Practice* (2018) 19:11 DOI 10.1186/s12875-017-0692-3.
- [2] Mekonne, C K, Mekonnen B Y, Mekonnen H S (2019). Knowledge and Associated Factors of Blood Pressure Control Among Hypertensive Patients Attending Chronic Illness Follow-Up Clinic at University of Gondar, Comprehensive Specialized Hospital, Northwest, Ethiopia. *Vasc Health Risk Management*. Dec 13:15:551-558. doi. 10.2147/VHRM.S225910.eCollection 2019.
- [3] Habibzadeh, F (2012). Hypertension in the Middle East. *The Lancet Middle East Edition*, NIOC Medical Education and Research Centre, Shiraz, Iran. www.lancet.com vol 380. October 2012.
- [4] Alshammari S A, Alajmi A N, Albarrak R A, et al. (May 06, 2021) Quality of Life and Awareness of Hypertension Among Hypertensive Patients in Saudi Arabia. *Cureus* 13(5): e14879. doi:10.7759/cureus.14879.
- [5] Burnier M, Egan B M (2019). Adherence in Hypertension. *Circulation Research*. 124:1124-1140. <https://doi.org/10.1161/CIRCRESAHA.118.313220>.
- [6] Brown M T, and Bussel J K (2011). Medication Adherence: WHO Cares? *Mayo Clinic Proc*. 2011 Apr; 86(4): 304-314. doi: 10.4065/mcp.2010.0575.
- [7] Burnier M (2019). Is There a Threshold for Medication Adherence? Lessons Learnt from Electronic Monitoring of Drug Adherence. *Front Pharmacol., Sec. Drugs Outcomes Research and Policies*. <https://doi.org/10.3389/fphar.2018.01450>.
- [8] Soesanto E, Ramadlan I, Setyawati D, Aisah S, Pawestri (2021). Factors affecting medication adherence in hypertension patients: A literature review. *Bali Medical Journal (Bali MedJ)* 2021, Volume 10, Number 3 Specia Issue ICONURS: 1364-1370. P-ISSN.2089-1180, E-ISSN: 2302-2914.
- [9] Atinga, R A, Yarney L, Gavu, N M (2018). Factors influencing long-term medication non-adherence among diabetes and hypertensive patients in Ghana: A qualitative investigation. *PLoS One*. 2018; 13(3): e0193995. doi: 10.1371/journal.pone.0193995.
- [10] Whittle J, Yamal J M, Williamson J D, Ford C E, Probstfield J L, Bread B L, Marginean H, Hamilton B P, Suhan P S, Davis B R (2016). Clinical and demographic correlates of medication and visit adherence in a large randomized controlled trial. *BMC Health Serv Res*. 2016; 16: 236. doi: 10.1186/s12913-016-1471-x.
- [11] Abdelhalim H N, Zahrani A I, Shuaibi A M (2019). Factors affecting treatment compliance of patients on antihypertensive therapy at National Guard Health Affairs (NGHA) Dammam Primary Health Care Clinics (PHCC). *J Family Community Med*. 2019 Sep-Dec; 26(3): 168–172. doi: 10.4103/jfcm.JFCM_43_19.
- [12] Alzahrani, S., Eid Alosaimi, M., Abdullah Alamrim, A., Alotaibi, M., Ahmed Almatar, E., Abdullah Almana, B. and et al. Association between Knowledge and Drug Adherence in Patients with Hypertension in Saudi Arabia. *Arch Pharma Pract* 2019;10(3):71-6.

- [13] Kim, M.T., Hill, M.N., Bone, L.R., Levine, D.M. Development and testing of the Hill- Bone compliance to high blood pressure therapy scale. *Progress in Cardiovascular Nursing* Summer 2000, 90-96. <https://www.ncbi.nlm.nih.gov/pubmed/10951950>
- [14] Moss JT, Kimani H, Mwanzo I. Compliance to antihypertensive therapy and associated factors among adults' hypertensive patients attending medical clinics in Kilifi County Kenya. *Int J Community Med Public Health* 2021;8:4655-65.
- [15] Hussein A, Awad MS, Mahmoud HEM. Patient adherence to antihypertensive medications in upper Egypt: a cross-sectional study. *Egypt Heart J.* 2020 May 25;72(1):29. doi: 10.1186/s43044-020-00066-0. PMID: 32451726; PMCID: PMC7248145.
- [16] Algabbani, F.M., Algabbani, A.M. Treatment adherence among patients with hypertension: findings from a cross-sectional study. *Clin Hypertens* 26, 18 (2020). <https://doi.org/10.1186/s40885-020-00151-1>
- [17] Khayyat M, Khayyat S, Alhazmi R. Predictors of medication adherence and blood pressure control among Saudi hypertensive patients attending primary care clinics: a cross-sectional study. *PloS One.* 2017;12.
- [18] Choi HY, Im Jung O, Lee JA, et al (2018) Factors affecting adherence to antihypertensive medication. *Korean J Fam Med* 39(6):325–332
- [19] Burnier M, Egan BM. Adherence in hypertension: a review of prevalence, risk factors, impact, and management. *Circulation research.* 2019 Mar 29;124(7):1124-40.
- [20] Świątoniowska-Lonc N, Polański J, Mazur G, Jankowska-Polańska B. Impact of Beliefs about Medicines on the Level of Intentional Non-Adherence to the Recommendations of Elderly Patients with Hypertension. *International Journal of Environmental Research and Public Health.* 2021; 18(6):2825. <https://doi.org/10.3390/ijerph18062825>
- [21] Nielsen J, Shrestha D, Neupane D, Kallestrup, P. Non-adherence to antihypertensive medication in low-and middle-income countries: a systematic review and meta-analysis of 92443 subjects. *Journal of human hypertension.* 2017;31(1):14-21)
- [22] Boima V, Ademola AD, Odusola AO, Agyekum F, Nwafor CE, Cole H, et al. Factors Associated with Medication Nonadherence among Hypertensives in Ghana and Nigeria. *International Journal of Hypertension.* 2015.
- [23] Akoko BM, Fon PN, Ngu RC, Ngu KB. Knowledge of Hypertension and compliance with therapy among Hypertensive patients in the Bamenda Health District of Cameroon. *Across-sectional Study. Cardiol Ther.* 2017;6:53-67.
- [24] Mallya SD, Kumar A, Kamath A, et al (2017) Assessment of treatment adherence among hypertensive patients in a coastal area of Karnataka, India. *Int J Comm Med Public Health* 3:1998–2003
- [25] Vrijens, B.; Antoniou, S.; Burnier, M.; de la Sierra, A.; Volpe, M. Current situation of medication adherence in hypertension. *Front. Pharmacol.* 2017, 8, 100. [CrossRef] [PubMed]