



Hypertensive patient's compliance and its consequence effect on the patient quality of life, Jeddah-KSA

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General Note



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ABSTRACT

Background: Hypertension is one of the global health problems and a major risk factor for stroke, coronary heart disease, and premature death. Different methods were used to measure the therapeutic compliance of hypertensive patients. **Objectives of the work:** to determine the compliance of hypertensive patients with their management plan. **Method:** This is an observational cross-sectional study that had been conducted in private hospitals in Jeddah city; the data was collected through an online published questionnaire to measure patient compliance towards medical therapy and their management plan in Saudi Arabia. All data were analyzed by SPSS program version 20 and p-value <0.05 will be considered significant. **Results:** The study included 340 hypertensive patients with (38.5%) of them were at the age group (45-60) and (67.2%) were females. The prevalence of poor compliance rate was (78.8%). There was a significant association between poor patient compliance and their educational level, the degree of information provided by their doctor, the follow-up visits, poor relationship with the doctor, less frequent doctor visits and investigations and also no blood pressure measuring follow up at home. The most common causes of low compliance were feeling better and forgetting to take their medication. **Conclusion:** It can be concluded that the level of compliance was low among the studied hypertensive patients. There were many factors associated with this. Counseling and health education about these factors can be done to those hypertensive patients to improve their compliance to the pharmacological and non-pharmacological aspects of their management plan which consequently affect the control of their blood pressure and their quality of life.

Keywords: Hypertension, Management, Healthy lifestyle, Compliance

1. INTRODUCTION

Hypertension is a common chronic disease worldwide, according to American Heart Association (AHA) 2018, it is defined as a condition in which the systolic BP that is equal to or more than 140 mmHg and the diastolic 90 (Saudi Hypertension Management Society, 2018). Hypertension is a disease that has a huge impact on the health of communities. It constitutes a public health challenge and contributes significantly to morbidity, financial burden to healthcare and mortality. It is widespread in the Arabian Gulf area, Middle East region, and the whole world. In the year 2025, it is expected that it may affect about 1.56 billion people worldwide (Iloh GU and Amadi AN, 2017). It is one of a public health challenge and a risk factor that result in developing of stroke and coronary heart disease which lead to increase morbidity and mortality rates (Chockalingam A et al., 2006). It was classified as the leading risk factor for death in 2010 in KSA (Memish ZA et al., 2014). Many epidemiological studies have been reported the prevalence of hypertension, it was reported to be 9.4 million worldwide (Al Wabel AH et al., 2018) and in Saudi Arabia, from 1995 to 2000 found to be 26.1% among the 30–70 years' age group and 25.5% in 2005 among the 15–64 years old age group (Al-Hamdan N et al., 2011).

Management of hypertension including both lifestyle modification and medication, lifestyle modifications as (weight loss, reduced sodium intake, physical activity, limiting alcohol consumption, and following the Dietary Approaches to Stop Hypertension (DASH) eating plan) are strongly recommended to prevent further complications, preferred to start early as it may decrease the need for drug therapy (Nguyen Q et al., 2010). However, it is not always sufficient and sometimes it is difficult to comply with, so most of the patients will require pharmacologic interventions to control their BP (Iloh GU and Amadi AN, 2017). Medication compliance is one of the determinants of treatment success for hypertension, while poor medication compliance and lack of knowledge and awareness on hypertension have been stated as some of the important reasons for poor hypertension control which directly impacts patients' quality of life (Iloh GU and Amadi AN, 2017). National Health Survey done by the Saudi Hypertension Management Society in 2013 had reported that 45% of patients diagnosed as hypertension were controlled after taking medication and 20.2% were treated and uncontrolled (El Bcheraoui C et al., 2014).

Therapeutic management compliance can be measured by many factors not only by a patient's behavior in terms of seeking care, attendance and following the physician's advice in diet and lifestyle changes (Jin J et al., 2008). Compliance can be viewed as a patient's behavior in terms of timeliness in seeking care, attendance at follow-up appointments or observance of the physician's advice. As compliance improves the outcome of hypertension, understanding its pattern is an important step in evaluating the effect of a hypertension management plan. Therefore, we need urgent methods and programs to prevent, early detect, evaluate, treat and increase patient compliance to hypertension medication management.

2. METHODS

Study Context

This is an observational cross-sectional study that had been conducted among private hospitals in Jeddah City; Saudi Arabia. The study duration was six months from July to December 2019.

Sampling

The Sample was a consecutive non-probability sampling technique, selection of sample done when sample size had been completed. The minimum sample size was determined using Fisher's formula, with a standard normal deviation at 95% confidence interval (CI) (1.96), a prevalence rate of 0.789 (proportion of medication adherence among hypertensive patients according to National Health Survey done by Saudi Hypertension Management Society at 2013) (Saudi Hypertension Management Society, 2018), and the error of precision at $\pm 5\%$ (0.05). The minimum sample size was 690; to adjust for non-response using an expected response rate of 70% (0.7), a sample size of 483 was calculated.

The sample was 340 individuals, adult hypertensive patients who lived in Jeddah city, aged $\geq 15 - 65$ years who were registered and gave informed consent and had been placed on antihypertensive medications for at least 6 months before the study. Patients with other diseases apart from hypertension and pregnant women were excluded from the study.

Data Collection Methods

Data was collected through an online published standardized self-administrated questionnaire obtained from M.I.H. Mahmoud, 2012 about therapeutic compliance of hypertensive patients and with their management plan in different hospitals in Jeddah city, Saudi Arabia applied in a Google form and uploaded on the internet (M.I.H. Mahmoud, 2012). The questionnaire was undertaken from patients who were attending different hospitals in Jeddah.

Questionnaire had been evaluated for validity and reliability through the pilot sample which is taken from 10 % of the sample (calculated 34 patients) and they were not included in the results of the study, through pilot results some modification was done and to avoid language barrier the questionnaire was translated through an expert from English to Arabic and then back-translated again, both copies were reviewed to give the same meaning.

Statistical Analysis

The collected data will be coded and analyzed by computer using a database software program, Statistical Package for Social Science (version 20, SPSS Inc., Chicago, IL). Qualitative variables will be expressed as a number and percentage. A chi-square test was used to compare the level of compliance regarding different factors. The results will be considered statistically significant when the significant probability (P-value $< 0.05^*$).

Sample size was calculated using Fisher's formula, with a standard normal deviation at 95% confidence interval (CI) (1.96), a prevalence rate of 0.789 which is the proportion of medication adherence among hypertensive patients according to National Health Survey done by SHMS (Saudi Hypertension Management Society, 2018) and the error of precision at $\pm 5\%$ (0.05).

Ethical Considerations

Ethical clearance for the study was obtained from the ISNC Research and Ethics Committee (IEC Ref No.: H-03-11072019). During the online survey, the participants were all informed about the purpose of the study and their right to refuse participation. Ethical conduct was maintained during data collection and throughout the research process. Participation in the study was voluntary and the confidentiality of the participants was maintained as the questionnaire was provided anonymously.

3. RESULTS

The present study is a cross-sectional study that included 340 hypertensive patients to assess the degree of compliance to the management plan and the factors affecting their compliance. Most of the participants (38.5%) were at the age group (45-60) and the majority of them (67.2%) were females. Most of the participants were secondary school in their education level (68.5%) (Figure 1& 2).

By assessing the level of compliance, it was found that about (78.8%) reported poor compliance and (21.2%) of participants reported good compliance. By assessing the relationship between socio-demographic characteristics and the level of compliance there was no statistically significant difference between compliance and different age groups or sex but there was a significant difference regarding the education with patients with fair to good compliance were collectors or higher than collectors (Table 1).

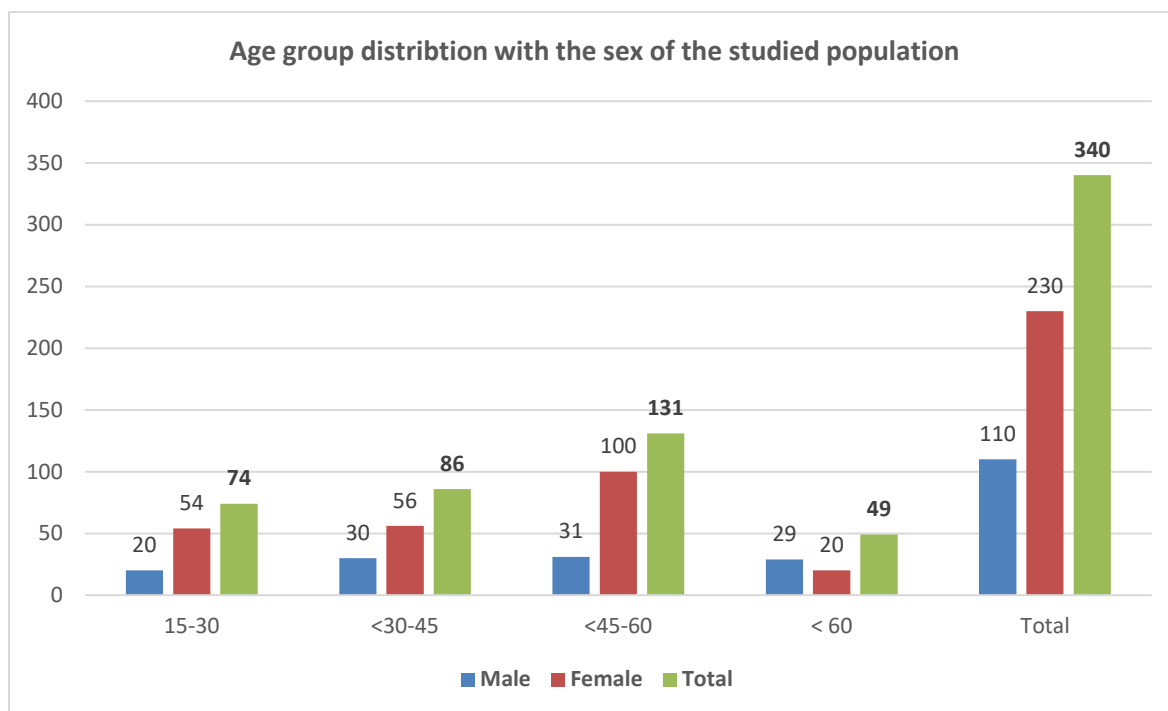


Figure 1 Age distribution in relation to the sex of the studied population (n=340)

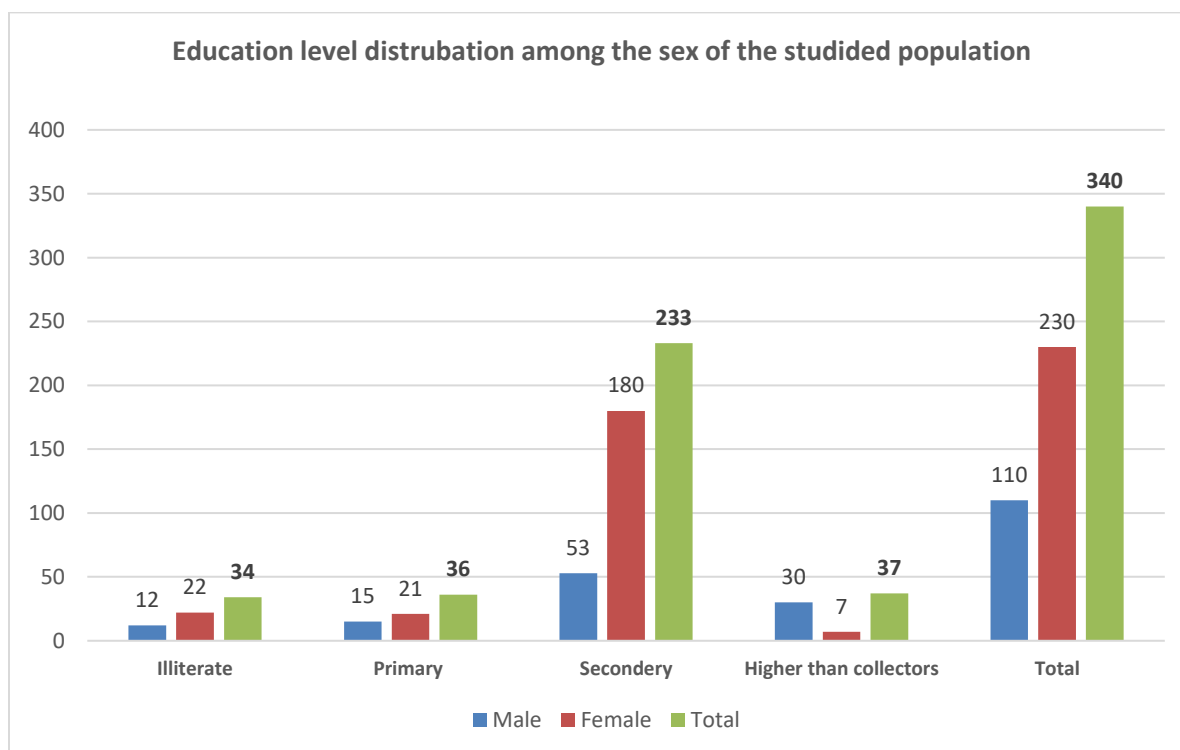


Figure 2 Education level distribution in relation to the sex of the studied population (n=340)

Table 1 Relation between socio-demographic characteristics and level of compliance to hypertension management (n=340)

Characteristic	Level of Compliance						P value
	Poor (n=268)		Fair to good (n= 72)		Total		
	N	%	N	%	N	%	
Age							
15-30	60	17.6	14	4.1	74	21.8	0.58
30-45	64	18.8	22	6.5	86	25.3	
45-60	103	30.3	28	8.2	131	38.5	
> 60	41	12.1	8	2.4	49	14.4	
Sex							
Female	175	52.2	50	14.9	225	67.2	0.606
Male	89	26.6	21	6.3	110	32.8	
Educational status							
Illiterate	20	5.9	1	0.3	21	6.2	0.024*
Write & Read	12	3.5	1	0.3	13	3.8	
Primary	11	3.2	6	1.8	17	5	
Preparatory	11	3.2	8	2.4	19	5.6	
Secondary	59	17.4	12	3.5	71	29.9	
Collectors	129	38.1	33	9.7	162	47.8	
Higher than collectors	25	7.4	11	3.2	36	10.6	

Chi square test *statistically significance

There was a statistically significant difference between the level of compliance and the degree of information provided by the doctor and the follow-up visits and the relation with the doctor ($p < 0.05$) with the majority of patients with good compliance had information provided by the doctor, follow up visits and good relation with the doctor (Table 2). There was a statistically significant difference regarding the level of compliance between the different management plans with more compliance in the medication and medication strategy (Table 3).

There was a statistically significant difference between patients with good compliance and those with poor compliance regarding the frequency of doctor visits and frequency of different investigations with most of those with good compliance visit the doctor monthly ($p 0.04$) and had investigations every 6 months ($p < 0.0001$) (Table 4).

There was statistically significant difference regarding blood pressure measuring at home and stopping treatment when blood pressure becomes normal and level of compliance with most of the patients with good compliance had devices for measuring blood pressure at home and use it for measuring blood pressure and did not stop treatment when their pressure becomes normal ($p < 0.05$) (Table 5).

There was no statistically significant difference regarding the perception of the seriousness of the disease and the importance of follow up and support from the contacts and level of compliance ($p > 0.05$) (Table 6). It was found most of the causes of non-adherence in both groups were feeling better and forgetting to take medication and the reasons for not committing sports were that it was difficult for them to change their habits and there was no enough time to do so (Table 7).

Table 2 Relation between the provided information by the doctor and his relation with the hypertensive patients and the level of compliance (n=340)

Characteristic	Level of Compliance						P value
	Poor		Fair to good		Total		
	N	%	N	%	N	%	
Did the doctor provide you with different methods of treatment?							
Yes	192	57.1	58	17.3	250	74.4	0.152
No	73	21.7	13	3.9	86	25.6	
Did the doctor explain to you the appropriate use of different methods of treatment?							
Yes	175	52.4	61	18.3	236	70.7	0.001*
No	88	26.3	10	3	98	29.3	
Does the doctor explain to you the expected side effects of HTN?							
Yes	165	49.5	52	15.6	217	65.2	0.142
No	97	29.1	19	5.7	116	34.8	
Did the doctor tell you about the follow-up dates?							
Yes	171	51.4	60	18	231	69.4	0.006*
No	90	27	12	3.6	102	30.6	
Have you been provided with a printed leaflet for the treatment plan?							
Yes	87	26.6	33	10.1	120	36.7	0.092
No	168	51.4	39	11.9	207	63.3	
Was your relationship with the doctor good?							
Yes	214	64.7	69	20.8	283	85.5	0.009*
No	45	13.6	3	0.9	48	14.5	
Chi square test.							

*Statistically significance

Table 3 Relation between different aspects of the management plan, drug availability, number of drugs and tablets taken per day and level of compliance (n=340)

Characteristic	Level of Compliance						P value
	Poor		Fair to good		Total		
	N	%	N	%	N	%	
What type of management plan aspect you followed?							
Medication	123	37.3	30	9.1	153	46.4	0.026*
Medicine and diet	40	12.1	20	6.1	60	18.2	
Medicine, diet and sports	48	14.5	5	1.5	53	16.1	
Diet	20	6.1	6	1.8	26	7.9	
Diet and sports	27	8.2	11	3.3	38	11.5	
Is the drug available?							
Yes	193	60.3	58	18.1	251	78.4	0.445
No	17	5.3	6	1.9	23	7.2	
Sometimes not available	39	12.2	7	2.2	46	14.4	
How many drugs did you use?							
No take	6	2.8	0	0	6	2.8	0.006*
1	63	29.6	19	8.9	82	38.5	
2	64	30	19	8.9	83	39	
3 or more	22	10.3	20	9.4	42	19.7	
How many tablets do you take per day?							
No take	3	1.4	0	0	3	1.4	0.127
1	63	29.2	14	6.5	77	35.6	
2	50	23.1	15	6.9	65	30.1	
3	12	5.6	6	2.8	18	8.3	
4	13	6	8	3.7	21	9.7	
5	4	1.9	4	1.9	8	3.7	
6	9	4.2	6	2.8	15	6.9	
7 or more	5	2.3	4	1.9	9	4.2	

*Statistically significance

Table 4 Relation between the frequency of doctor visit and frequency of different investigations and level of compliance (n=340)

Characteristic	Level of Compliance						P value
	Poor		Fair to good		Total		
	N	%	N	%	N	%	
Are there other diseases besides pressure?							
Yes	121	36.6	44	13.3	165	49.8	0.04*
No	138	41.7	28	8.5	166	50.2	
Adjusted frequency of the doctor to continue							
Monthly	33	10	31	9.4	64	19.5	0.000*
Every two months	48	14.6	27	8.2	75	22.8	
More than two months	176	53.5	14	4.3	190	57.8	
ECG and Doppler rate							
Monthly	2	0.6	9	2.8	11	3.4	0.000*
Every 6 months	10	3.1	46	14.2	56	17.3	
Annually	70	21.6	7	2.2	77	23.8	
Other	170	52.5	10	3.1	180	55.6	
kidney function and lipid profile							
Monthly	5	1.5	17	5.2	22	6.8	0.000*
Every 6 months	30	9.2	46	14.2	76	23.4	
Annually	76	23.4	7	2.2	83	25.5	
>year	142	43.7	2	0.6	144	44.3	
Last visit to the doctor (for the nearest month)							
No Visit	94	28.1	8	2.4	102	30.4	0.000*
Since -1 Month	21	6.3	16	4.8	37	11	
Since 1-6 Month	48	14.3	32	9.6	80	23.9	
Since 6-12 Month	47	14	10	3	57	17	
Since 12-18 Month	25	7.5	0	0	25	7.5	
Since 18-24 Month	17	5.1	6	1.8	17	6.9	
Since +24 Month	11	3.3	0	0	11	3.3	

*Statistically significance

Table 5 Relation between some factors and level of compliance (n=340)

Characteristic	Level of Compliance						P-value
	Poor		Fair to good		Total		
	N	%	N	%	N	%	
Do you have a device at home to measure pressure?							
Yes	130	40.2	57	17.6	187	57.9	0.000*
No	122	37.8	14	4.3	136	42.1	
Usage measure pressure rate							
Don't use it	77	27.3	5	1.8	82	29.1	0.000*
Sometimes you use it	102	36.2	48	17	150	53.2	
You use it regularly	32	11.3	18	6.4	50	17.7	
During the past two weeks did you forget to take the treatment							
Yes	89	27.9	25	7.8	114	35.7	1.000
No	160	50.2	45	14.1	205	64.3	
How many days did you forget to take treatment?							
Didn't forget	3	3.1	2	2.1	5	5.2	0.139
1	18	18.6	8	8.2	26	26.8	
2	22	22.7	8	8.2	30	30.9	
3	9	9.3	3	3.1	12	12.4	
4	1	1	1	1	2	2.1	
5	3	3.1	0	0	3	3.1	
6	2	2.1	6	6.2	8	8.2	
7	1	1	0	0	1	1	
9 or more	9	9.3	1	1	10	10.3	
When did you feel that your pressure at the normal level do you stop taking treatment?							
Yes	101	31.4	18	5.6	119	37	0.04*
No	152	47.2	51	15.8	203	63	

*Statistically significance

Table 6 Relation between the importance of follow up and level of compliance (n=340)

Characteristic	Level of Compliance						P value
	Poor		Fair to good		Total		
	N	%	N	%	N	%	
Your belief in the seriousness of the disease							
Danger	203	62.7	58	17.9	261	80.6	1.00
No danger	49	15.1	14	4.3	63	19.4	
The extent of control of this risk treatment							
Controllable	211	65.7	66	20.6	277	86.3	0.098
Uncontrollable	39	12.1	5	1.6	44	13.7	
Importance of periodic follow-up at the doctor							
Important	207	64.1	63	19.5	270	83.6	0.146
Not important	46	14.2	7	2.2	53	16.4	
There is encouragement from the contacts of the patient to abide by the treatment system?							
Yes	214	65.6	62	19	276	84.7	0.403
No	42	12.9	8	2.5	50	15.3	

*Statistically significance

Table 7 Comparing reasons for not adhering to the drug and sports and level of compliance (n=340)

Characteristic	Level of Compliance						P value
	Poor		Fair to good		Total		
	N	%	N	%	N	%	
Reasons for not adhering to the drug							
Economic reasons	2	1.5	0	0	2	1.5	0.085
Feeling better	27	20	9	6.7	36	26.7	
Forgetting	37	27.4	12	8.9	49	36.3	
frequent urination	5	3.7	0	0	5	3.7	
Lack of encouragement from those around me	1	0.7	0	0	1	0.7	
Others reasons	40	29.6	2	1.5	42	31.1	
Reasons for Not Committing Sports							
I work hard	22	8	4	1.4	26	8	0.183
Difficulty changing habits acquired	78	28.3	18	6.5	96	34.8	
I don't know how to do proper exercise	31	11.2	7	2.5	38	13.8	
I have no time	65	23.6	28	10.1	93	33.7	

I have a disability that prevents me	20	7.2	3	1.1	23	8.3	
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*Statistically significance

There was no statistically significant difference regarding acceptance, satisfaction, and confidence with treatment plans and health services and level of compliance ($p > 0.05$) (Table 8).

Table 8 Comparing acceptance, satisfaction, and confidence with treatment plans and health services and level of compliance (n=340)

Characteristic	Level of Compliance						P value
	Poor		Fair to good		Total		
	N	%	N	%	N	%	
Your acceptance of the treatment plan							
Acceptable	232	71.4	69	21.2	301	92.6	0.159
Unacceptable	22	6.8	2	0.6	24	7.4	
Your satisfaction with the health service provided to you							
Satisfied	212	65.4	59	18.2	271	83.6	0.773
Unsatisfied	43	13.3	10	3.1	53	16.6	
How confident are you that following this treatment plan?							
Trust	192	72.5	52	19.6	244	92.1	1.00
Not trust	17	6.4	4	1.5	21	7.9	
The good effect of the drug on health when used outweighs the negative effects it causes							
Agree	177	66	45	16.8	222	82.8	0.497
Not agree	34	12.7	12	4.5	46	17.2	

*Statistically significance

4. DISCUSSION

Management of hypertension remains a major challenge for both the patient and the community due to the significant complications that may occur to the patients and consequently causes a great financial load on the health services. Medication compliance is the key point in the success of treatment as poor medication compliance results in poor control of blood pressure and affects the patients' quality of life adversely (Iloh GU and Amadi AN, 2017).

The present study is a cross-sectional study that included 340 hypertensive patients (38.5%) was at the age group (45-60) and the majority of them (67.2%) were females. By assessing the level of compliance, it was found that about (78.8%) reported poor compliance and (21.2%) of participants reported good compliance. By assessing the relationship between socio-demographic characteristics and the level of compliance there was no statistically significant difference between compliance and different age groups or sex but there was a significant difference regarding the education with patients with fair to good compliance were of higher education. The study of Shaik S et al., 2016 which was conducted in Saudi Arabia to assess the level of medication adherence among hypertensive patients revealed that poor adherence rate to medications was about 55% (Shaik S. et al., 2016). But this study reported that older patient's age, lower educational status, and lower monthly income were significantly associated with poor adherence. The study of Rao et al., 2014 reported higher compliance with hypertension treatment which was found to be 82.2% (Rao et al., 2014). This study reported that education and socio-economic status were not found to be associated with treatment compliance but found statistically significant more compliance with female patients.

A cross-sectional study done by Tibebe A et al., (2017) was conducted on 404 respondents with a 97% response rate. 210 (52%) were male and the mean age was 54 ± 10.77 years. The respondents' adherence to antihypertensive medications was 66.8% (Tibebe A et al., 2017). But inconsistent with our study results, better adherence was reported in females and middle and old aged adults. A higher compliance rate (88.6%) was reported by Al-Mehza AM et al., 2009 study among hypertensive patients attending a hypertension clinic in Kuwait (Al-Mehza AM et al., 2009). On the other hand, the study of M.I.H. Mahmoud, 2012 revealed that compliance was affected by the level of education, work status, smoking habits and self-reported response to medications (M.I.H. Mahmoud, 2012). The study of Osamor PE and Owumi BE, 2011 revealed that most of the respondents (65.2%) were females and (51.1%) of them had no education. The majority belonged to the age group (46-55 years) and (56-65 years) comprising (58.4%) (Osamor PE and Owumi BE, 2011). The study reported that only 51% of the study patients reported high compliance rate with their treatment. These variations regarding the level of compliance in different studies may be attributed to the different methods used in assessing the compliance of patients.

The current study revealed a significant relationship between the level of compliance and their relation with the doctor; the majority of patients with good compliance had good relations with their doctor. In the same manner, the study of Al-Nozha et al., 2007 revealed that a satisfactory patient-physician relationship was found by 14.4% of patients who have good compliance behavior with their management plan (Al-Nozha et al., 2007). A significant relation between patients with good compliance and those with poor compliance regarding the frequency of doctor visits and frequency of different investigations; most of those with good compliance visit the doctor monthly and had regular investigations every 6 months ($p < 0.0001$). These results agreed with M.I.H. Mahmoud, 2012 study which revealed that the total mean compliance was 35.1% in this study conducted in Saudi Arabia with the best compliance in that study was with ECG and Doppler then laboratory investigations. In the same manner, there was poor compliance with exercise and dietary regimes (M.I.H. Mahmoud, 2012).

The present study revealed significant difference regarding blood pressure measuring at home and stopping treatment when blood pressure becomes normal and level of compliance with most of the patients with good compliance had devices for measuring blood pressure at home and use it for measuring blood pressure and did not stop treatment when their pressure becomes normal ($p < 0.05$). The same results were concluded by a large cohort study done by Spirk D et al., 2018 which included hypertensive patients trained on blood pressure self-measurement at home and this led to the improvement of their blood pressure control and management (Spirk D et al., 2018). On the other hand, a randomized controlled trial was conducted on 196 hypertensive patients in which the intervention groups received self-monitoring devices and were educated to measure their blood pressure daily during study time and the investigator-assessed adherence to medications after each visit. The study could not confirm that self-monitoring can improve blood pressure control in those patients (Hosseininasab M et al., 2014).

The present study revealed a significant difference regarding stopping treatment when blood pressure becomes normal with most of the patients with good compliance did not stop treatment when their pressure becomes normal ($p < 0.05$). These results concurrent with a study revealed that 46% of patients treated with an anti-hypertensive drug stopped their treatment because they thought they had been cured. This can be explained by that most hypertensive patients have no symptoms and consequently, it becomes difficult for them to accept different treatment plans and any lifestyle changes. Also it reported that only one hypertensive patient from two followed their treatment correctly after one year follow up and between 54 and 83% after five years (Mallion JM and Schmitt D, 2001).

The current study reported that causes of non-adherence to the drug were mostly that the patients reported that they feeling better and forgetting to take medication and the reasons for not committing sports were that it was difficult for them to change their habits and there was no enough time to do so. There was no significant relationship between the perception of the seriousness of the disease, the importance of follow up, and support from the patient's family members with the level of compliance ($p > 0.05$).

These results were consistent with the study of Osamor PE and Owumi BE, 2011 which revealed that reasons for non-compliance to treatment were nearly the reasons for our study as about (11%) of the participants who were non-compliant to medication felt better and therefore, stopped to take their medication (Osamor PE and Owumi BE, 2011). Other factors were included as forgetfulness (8.4%), lack of funds to purchase drugs (6.8%), side-effects of drugs (6.1%), and having no time (3.6%). There was no association between believing that anxiety or stress is a cause of hypertension and high self-reported compliance. Beliefs about the cause of hypertension were not associated with compliance. Forgetfulness as a factor of non-compliance was also reported by many studies and is common contributors to multi-method interventions which improve adherence to hypertension treatment usually report this as an important barrier (Burnier M and Egan BM, 2019).

Limitations of this Study

Some limitations should be acknowledged that if overcome could lead to better findings: first, the small sample size hindered the generalizability of the results. So, the repetition of similar research work on national and international levels is recommended by the research team.

5. CONCLUSION

This study concluded that the level of compliance was low among the studied hypertensive patients in Jeddah City. There were due to many factors that associated with this low compliance. Counseling of those hypertensive patients and their families about these factors were highly suggested to improve their compliance with the pharmacological or non-pharmacological aspects of the management plan of their hypertension disease, which consequently will affect the control of the disease and improve the quality of life.

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Conflict of Interest & Financial resource

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REFERENCE

1. Al-Hamdan N, Saeed A, Kutbi A, Choudhry A, and Nooh R. Characteristics, risk factors, and treatment practices of known adult hypertensive patients in Saudi Arabia. *Int J Hypertens*. 2011; 2010:168739.
2. Al-Mehza AM, Al-Muhailije FA, Khalfan MM, and Al-Yahya AA. Drug compliance among hypertensive patients; an area-based study. *Eur J Genet Med*. 2009; 6:6–10.
3. Al-Nozha et al. Prevalence of Hypertension in KSA. *Saudi Med J* 2007; Vol. 28 (1): 77-84.
4. AlWabel AH, Almufadhi MA, Alayed FM, Aloraini AY, Alobaysi HM, and Alalwi RM. Assessment of hypertension and its associated risk factors among medical students in Qassim University. *Saudi J Kidney Dis Transpl*; 2018;29(5):1100-8.
5. Burnier M and Egan BM. Adherence in Hypertension a Review of arterial hypertension Prevalence, Risk Factors, Impact, and Management *Circ Res*. 2019;124:1124-40.
6. Chockalingam A, Campbell NR, J Fodor G. Worldwide epidemic of hypertension. *Can J Cardiol*. 2006; Vol 22: No 7.
7. El Bcheraoui C, Memish ZA, Tuffaha M, Daoud F, Robinson M, Jaber S, Mikhitarian S, Al Saeedi M, AlMazroa MA, Mokdad AHand Al Rabeeah AA. Hypertension and its associated risk factors in the kingdom of Saudi Arabia, 2013. *International Journal of Hypertension*; 2014, 8 pages.
8. Hosseininasab M, Jahangard-Rafsanjani Z, Mohagheghi A, Sarayani A, Rashidian A, Javadi M, Ahmadvand A, Hadjibabae M and Gholami K. Self-Monitoring of Blood Pressure for Improving Adherence to Antihypertensive Medicines and Blood Pressure Control: A Randomized Controlled Trial, *American Journal of Hypertension*, Volume 27, Issue 11, November 2014, Pages 1339–45.
9. Iloh GU and Amadi AN. Treatment satisfaction, medication adherence, and blood pressure control among adult Nigerians with essential hypertension. *Int J Health Allied Sci* 2017; 6:7581.
10. Jin J, Sklar GE, Oh VM, and Li SC. Factors affecting therapeutic compliance: A review from the patient's perspective. *Ther Clin Risk Manag*. 2008; 4(1): 269–86.
11. Mallion JM and Schmitt D. Patient compliance in the treatment, *J Hypertens*. 2001;19(12):2281-3.
12. Manal I.H. Mahmoud: Compliance with the treatment of patients with hypertension in Almadinah Almunawwarah: A community-based study. *Journal of Taibah University Medical Sciences*, 2012; 7 (2); 92–8.
13. Memish ZA, Jaber S, Mokdad AH, AlMazroa MA, Murray CJ, and Al Rabeeah AA. The burden of disease, injuries, and risk factors in the Kingdom of Saudi Arabia, 1990–2010. *Prev Chronic Dis*. 2014;11: E169.
14. Nguyen Q, Dominguez J, Nguyen L, and Gullapalli N. Hypertension Management: An Update 2010; 3(1): 47–56.
15. Osamor PE and Owumi BE. Factors associated with treatment compliance in hypertension in southwest Nigeria. *J Health Popul Nutr*. 2011;29(6):619–28. doi:10.3329/jhpn.v29i6.9899
16. Rao CR, Kamath VG, Shetty A, and Kamath A. Treatment Compliance among Patients with Hypertension and Type 2

- Diabetes Mellitus in a Coastal Population of Southern India. *Int J Prev Med*. 2014; 5(8):992–8.
17. Saudi Hypertension Management Society; Saudi Hypertension Guidelines 2018: Synopsis/Saudi Arabia, Saudi Hypertension Management Society - Riyadh, KSA, 2018.
 18. Shaik S, Alsuwailem A, Alhargan A, Alsuwailem A, Alshiha D, AlGhalib H, Alamri, R and Al-Hazmi A. Medications adherence level and its associated factors among hypertensive patients at a major referral hospital, in Riyadh, KSA. *Asian Journal of Medical Sciences*, 2016; 7(4), 24-30.
 19. Spirk D, Noll S, Burnier M, Rimoldi S, Noll G and Sudano I. Effect of Home Blood Pressure Monitoring on Patient's Awareness and Goal Attainment under Antihypertensive Therapy: The Factors Influencing Results in Anti-Hypertensive Treatment (FIRST) Study. *Kidney Blood Press Res* 2018; 43:979-86.
 20. Tibebe A, Mengistu D and Bulto LN. Adherence to prescribed antihypertensive medications and associated factors for hypertensive patients attending chronic follow-up units of selected public hospitals in Addis Ababa, Ethiopia. *Int J Health Sci (Qassim)*. 2017;11(4):47–52.