# Original paper

# Compliance of Hypertensive Patients to Medication in AL-Imam AL-Hussein medical City- Kerbala- 2018

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## Abstract

**B**ackground: High blood pressure (BP) is estimated to cause 7.5 million deaths worldwide, around 12.8% of the whole deaths . It is a major risk factor for coronary artery disease and its complications, heart failure, renal insufficiency, stroke and blindness in diabetic patients.

**Aim:** This study is designed to determine the compliance of hypertensive patients attending the consultation clinics of internal medicine in Al-Imam Al-Hussein  medical city with treatment regimen and the causes of noncompliance.

**Method:** A descriptive cross- sectional study conducted in the outpatient clinics of Al- Imam Al-Hussein medical city in Kerbala during the period from March till June 2018.Total study sample was 335 hypertensive patients ,their ages over 25 years were selected by convenience sampling procedure according to the inclusion criteria . They were interviewed and assessed using special questionnaire format based on sociodemographic data, Morisky 8- item medication adherence scale (MMAS-8) ,and measuring of blood pressure.

**Results:** the mean age of the patients was $58.69 \pm 11.87$ years. Good compliance with treatment was present in only 28.36% of the sample, 25.67% with partial compliance and 45.97% had poor compliance. Good control of blood pressure was present only in 23.3% of the patients .The absence of symptoms was the first isolated cause of non-compliance to medication 21.9%, followed by forgetfulness 18.8%, the cost of medication 16.3%, then negligence and carelessness of patients 9.4%, while 23.1% of the patients had more than one specific reason to their poor compliance.

**Conclusions:** the study revealed a low rate of medication compliance and low level of blood pressure control with strong association between them. Compliance increased with age, male gender, higher level of education and income, longer duration of the disease, presence of complications, using healthy diet and having positive believe about hypertension treatment and its consequences.

**Key words:** Compliance, Hypertension, Non-compliance, Kerbala.

## Introduction

Hypertension (HT) is a prevalent disease and remains one of the most significant causes of death worldwide. [1]  It is one of the most important risk factors for cardiovascular morbidity and mortality. [2] Globally, HT affects over one billion people, with an overall prevalence of around 40% in adults aged 25 years and over in 2008, with high prevalence in Africa, followed by Eastern Mediterranean, while Europe recorded higher prevalence of HT than USA.[3] However, only 57% of identified hypertensive patients receiving medical treatment in the United States have controlled blood pressure. [4]

It is estimated that 32% of total strokes and 15% of cases of acute myocardial infarction among patients treated for hypertension can be associated with poor controlled blood pressure. [4] Information from different

national and local surveys show that hypertension is common in developing countries, specifically in urban regions. [5]

The updated hypertension guideline alternates the definition of hypertension, which is currently considered to be any systolic BP measurement of 130 mm Hg or higher or any diastolic BP measurement of 80 mm Hg or higher.[6]

Previously hypertension was defined as systolic blood pressure (SBP) of 140 mmHg or higher, or diastolic blood pressure (DBP) of 90 mmHg or higher.[7]

Follow-up with treatment adjustment must remain until the goal of blood pressure (BP) less than 140/90 mmHg is attained. This level is essential to reduce the risk of cardiac diseases. The aim for patients with hypertension and co-morbidities such as diabetes or renal disease is to reach a blood pressure less than 130/80 mmHg. [8]

Successful control of blood pressure is necessary for the reduction of morbidity and mortality rates. Compliance with antihypertensive medication is one of the most important factors affecting hypertension management results in terms of quality of life and complications. [9]

The term compliance to medication is defined as "the extent to which the patient acts in accordance with the recommended interval and amount of the dosing regimen" reported as the percentage of the recommended doses taken at the recommended time interval. [10]

It is very important to determine the causes of the patients' non-adherence to their treatment regimen. Studies have established that the patients who are on continuing treatment are more liable to non-compliance than persons who take the drugs for short time. [11]

Lower adherence to antihypertensive drug therapy was detected in newly diagnosed hypertensive patients and new antihypertensive treatment users. [12]

The patients' age and socio-economic condition is directly connected with the incidence of non-compliance. Geriatric patients are well-known to have higher incidence of non-compliance in contrast to the rest of the population. [11]

Low socioeconomic status and low monthly income, lack of family support, awareness, knowledge and belief concerning hypertension and its management, forgetfulness, absence of symptoms, distance from health services, irregular follow-up were significantly associated with poor adherence to antihypertensive medication. [10]

The aim of this study was to determine the compliance rate of hypertensive patients with their medications, the factors related with it and the causes of non-compliance.

## Methods

### Study design, setting and time
A descriptive cross sectional study conducted in the medical consultation clinics of Al-Imam Al- Hussein medical city in Kerbala in 2018 to assess the compliance of hypertensive patients to medication

### Ethical considerations
Ethical approvals were obtained from the research committee in the College of Medicine in Kerbala University and from the research ethical committee in Karbala health directorate

Verbal consent was taken from each patient prior to the interview, after a brief explanation on the study and its objectives.

### Study population
The study included a sample of 335 hypertensive patients their ages above 25 years attended the consultation clinics of internal medicine of Al-Imam Al- Hussein medical city.

### Inclusion and exclusion criteria
Inclusion criteria of the patients were diagnosed with essential HT for not less than 6 months, age of 25 years and more, taking antihypertensive treatment for not less than 6 months. Pregnant women, severely ill, untreated hypertensive patients and those with psychiatric diseases were all excluded.

### Sampling procedure

Convenience sampling procedure done to select the study participants that fit research criteria by approaching all patients who attended the consultation clinics of the internal medicine.

**Pilot study**

The pilot study was carried out two weeks prior to the data collection on 12 patients and was revealed good acceptance, minor modifications on the questionnaire were done.

**Data collection and sampling technique**

Data collection was done during the period from the mid of March through June, 2018. A specially designed questionnaire including the socio-demographic part include age, gender, occupation, marital status, educational level, residence, income and family history and compliance to medication part was based on Morisky 8 Item Medication Adherence Scale (MMAS-8). The MMAS-8 was designed to evaluate the patients adherence to their medical treatment. It consists of 8 questions. From questions 1 to 7, the answer choices are "yes" or "no". The eighth question is answered according to a scale of five options: never, almost never, sometimes, frequently, and always. The total score of this scale is from 0 to 8.

The classification of patients according to their scores is as follows: less than 6 (low adherence), 6 or 7 (moderate adherence), and 8 (high adherence). [13]

The time needed for each interview was nearly 15 minutes, and the number of forms that can be completed was 12-15 forms / day. Measurement of BP for each patient was done using a mercury sphygmomanometer at the end of the interview .The measurement was done on both arms and the highest reading taken.[6]

**Statistical analysis**

Data entered and analyzed by statistical package for social science program (SPSS software version 20). It presented in figures, tables, frequencies and percentages. The chi-square ($\chi 2$) and Fisher- exact tests were used to find the associations between the variables with compliance score. The association considered statistically significant when the P-value is $\leq 0.05$.

## Results

The ages of respondents ranged between 26 to 94 years with a mean age $58.69 \pm 11.87$ years. The sociodemographic characteristics of the study population are shown in (Table 1) which showed that 49.6 % were in age group of $\geq 60$ years, 56.7 % of the patients were females, 72.8 % were married and 81.2 % lived in urban area. Of the total population of the study 47.5 % were housewives, 33.1 % were illiterate while those with higher education were 11.3% and 72.8% were with low monthly income.

Concerning measurement of blood pressure the highest percentage 43% of patients had hypertension stage 2 (>140/>90 mmHg) while 23.3% of the patients had normal blood pressure (<120/<80 mmHg) and 20.9% were with stage 1 hypertension (BP130─139/80─89 mmHg) as shown in (figure 1). [6]

Good compliance with treatment was present in only 28.36 % of the sample, 25.67 % had partial compliance and 45.97% had poor compliance to treatment, as shown in (Fig. 2).

As shown in (Table 2), there was a significant association between compliance with antihypertensive medication and different sociodemographic characteristics of the patients, where compliance with medication was higher among age group $\geq$ 60 years, male gender, those who were working, higher levels of education and higher income.

There was a significant association between compliance with antihypertensive medication and the presence of complications, using healthy diet and positive belief of the patients regarding regular treatment. Smoking and the presence of other diseases had no significant effect on compliance rate in our study, as shown in (Table 4).

The absence of symptoms was the first isolated cause of non-compliance to medication 21.9%, followed by forgetfulness 18.8%, the cost of medication 16.3% then negligence and carelessness of patients 9.4%, while 23.1% of the patients had more than one specific reason to their poor compliance, as shown in (Figure 3).

**Table 1.** The distribution of the patients according to the socio-demographic characteristics.

| Socio-demographic Characteristics | N | % |
|---|---|---|
| **Age** | | |
| < 40 | 12 | 3.6% |
| 40-59 | 157 | 46.8% |
| ≥ 60 | 166 | 49.6% |
| Total | 335 | 100.0% |
| **Gender** | | |
| Male | 145 | 43.3% |
| Female | 190 | 56.7% |
| Total | 335 | 100.0% |
| **Residence** | | |
| Urban | 272 | 81.2% |
| Rural | 63 | 18.8% |
| Total | 335 | 100.0% |
| **Occupation** | | |
| Employee | 41 | 12.2% |
| Free work | 56 | 16.7% |
| Retired | 33 | 9.9% |
| Not working | 46 | 13.7% |
| House wife | 159 | 47.5% |
| Total | 335 | 100.0% |
| **Marital status** | | |
| Single | 3 | 0.9% |
| Married | 244 | 72.8% |
| Divorce | 8 | 2.4% |
| Widow | 80 | 23.9% |
| Total | 335 | 100.0% |
| **Monthly income** | | |
| < 500000  I.Q.D | 244 | 72.8% |
| 500000-1000000  I.Q.D | 85 | 25.4% |
| More than 1000000  I.Q.D | 6 | 1.8% |
| Total | 335 | 100.0% |
| **Education** | | |
| Illiterate | 111 | 33.1% |
| Read and write | 71 | 21.3% |
| Primary | 74 | 22.1% |
| Secondary | 41 | 12.2% |
| Higher education | 38 | 11.3% |
| Total | 335 | 100.0% |

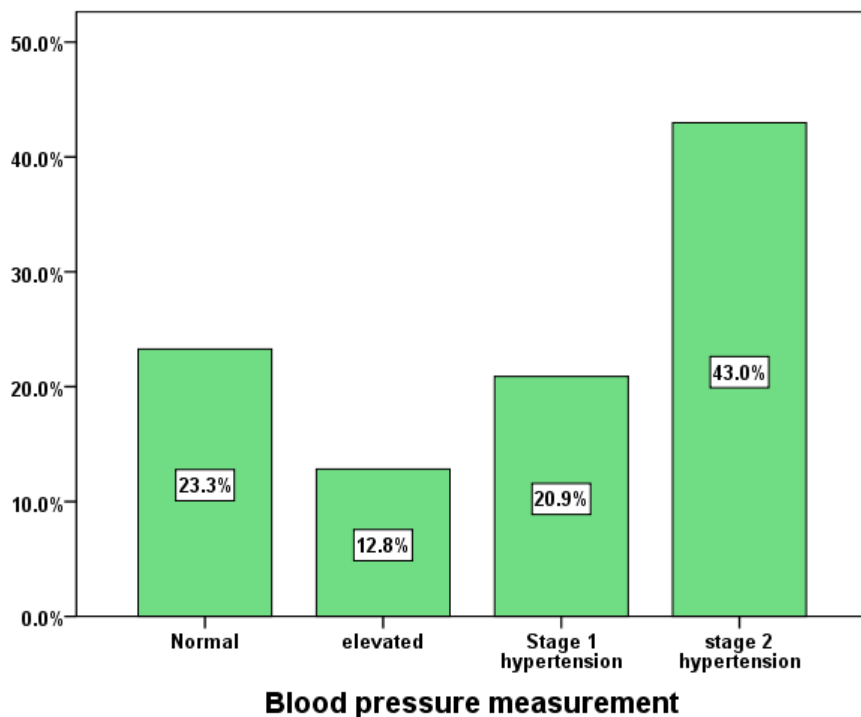*Mean age of patients was (58.69 ± 11.87).

**Figure 1.** shows the distribution of the patients according to blood pressure measurement.
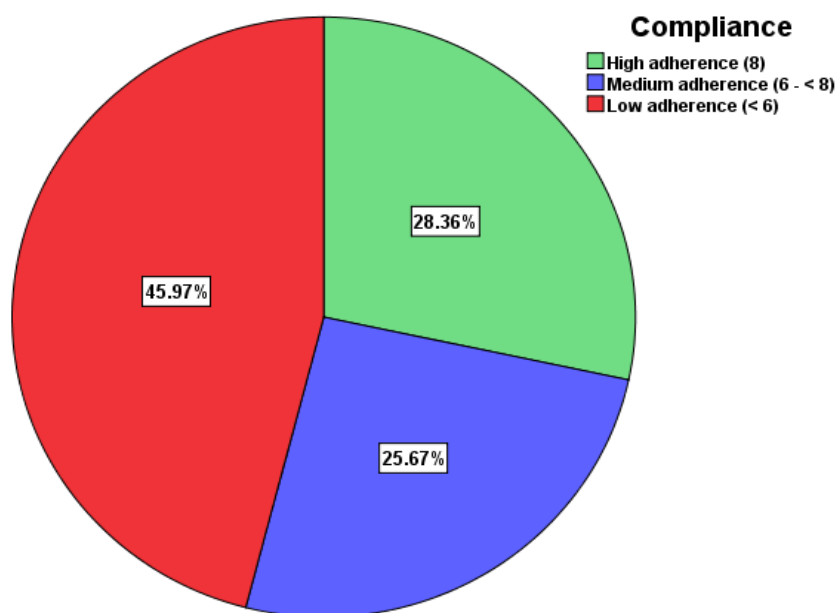


**Figure 2**. Compliance to medication according to Morisky 8-item medication adherence scale among hypertensive patients.
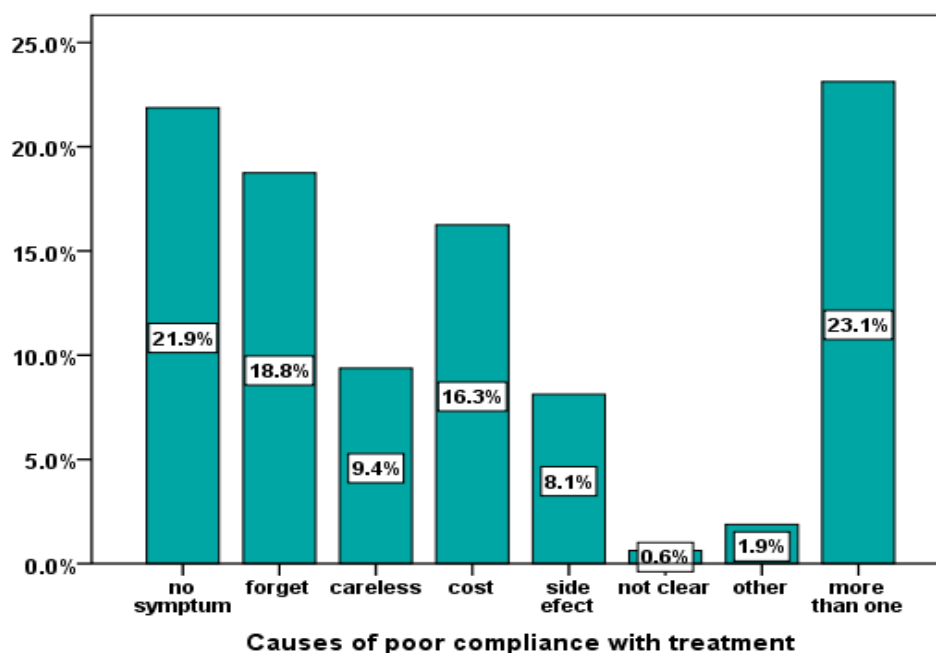
**Figure 3.** shows the distribution of the patients according to the causes of poor compliance with antihypertensive drugs.

## Discussion

Compliance with antihypertensive treatment is an important factor in preventing critical complications in patients with high blood pressure. Non-compliance is a serious problem, and must be assumed as one of the major barriers to successful treatment of hypertension. Our study carried out to examine the prevalence of compliance to antihypertensive medication and the causes of non-compliance in Al- Imam Al-Hussein medical city in Karbala. This study revealed that only 28.36 % of the patients with good compliance to antihypertensive medication, while 45.97% of the patients had poor compliance to medication according to the 8-Item Morisky Medication Adherence Scale (MMAS-8).

This low compliance rate is less than that reported by different researchers which were 88.6% , 85.5%, 85% , 66.3% , 62.4%, 53□4%, 45 %, 39.6% and 36.3% among total studied patients. [7,14-21]

While it was higher than 24.8% compliance rate reported by Alsallami S. in Babylon city 2015, and higher than 26 % reported by Polska S. in 2013.[3, 2]

Also, it was higher than the compliance rate 23.3% reported by Shameena A.U. in 2017, the compliance rate 25.19% reported by Campbell P.C. in 2014 and the compliance rate 24%, 16.4% that found in Iranian studies measured medication adherence in patients with hypertension reported by Kamran A. and Saadat Z. [22, 23, 24, 13]

The low blood pressure (BP) control rate of 23.3% was lower than that found in other studies carried out by several authors which were 36% reported by Al-Mehza A.M. , 48.3% reported by Kimuyu B.M., 26.7% reported by Campbell P.C. and it was higher than the BP control rates 22.3% reported by Alsallami S. ,11.1% reported by Polska S. and 2% reported from a study conducted in Erbil city by Ismael D.H. [14, 17, 23, 3, 2, 19]

This difference in results from variant societies may be related to the difference in educational values, cultures, beliefs about the disease and its treatment, in addition to the health services providing.

**Table 2.** The Association between compliance with antihypertensive drugs and sociodemographic characteristics.

| Study variables | Compliance | | | $\chi^2$ | P-value |
|---|---|---|---|---|---|
| | High (8) | Medium (6- < 8) | Low (<6) | | |
| **Age** <br> < 40 <br> 40-59 <br> $\geq$ 60 <br> Total | 0 (0.0) <br> 45 (47.4) <br> 50 (52.6) <br> 95 (100.0) | 1 (42.2) <br> 44 (42.2) <br> 41 (57.8) <br> 86 (100.0) | 11 (7.1) <br> 68 (44.2) <br> 75 (48.7) <br> 154 (100.0) | | **0.027* f** |
| **Gender** <br> Male <br> Female <br> Total | 52 (54.7) <br> 43 (45.3) <br> 95 (100.0) | 34 (39.5) <br> 52 (60.5) <br> 86 (100.0) | 59 (38.3) <br> 95 (61.7) <br> 154 (100.0) | **7.11** | **0.028*** |
| **Residence** <br> Urban <br> Rural <br> Total | 77 (81.1) <br> 18 (18.9) <br> 95 (100.0) | 70 (81.4) <br> 16 (18.6) <br> 86 (100.0) | 125 (81.2) <br> 29 (18.8) <br> 154 (100.0) | 0.004 | 0.998 |
| **Occupation** <br> Employee <br> Free work <br> Retired <br> Not working or house wife <br> Total | 20 (21.1) <br> 16 (16.8) <br> 14 (14.7) <br> 45 (47.4) <br> 95 (100.0) | 10 (11.6) <br> 12 (14.0) <br> 11 (12.8) <br> 53 (61.6) <br> 86 (100.0) | 11 (7.1) <br> 28 (18.2) <br> 8 (5.2) <br> 107 (69.5) <br> 154 (100.0) | **21.05** | **0.002*** |
| **Marital status** <br> Single <br> Married <br> Divorce <br> Widow <br> Total | 1 (1.1) <br> 70 (73.7) <br> 2 (2.1) <br> 22 (23.1) <br> 95 (100.0) | 1 (1.2) <br> 61 (70.9) <br> 1 (1.2) <br> 23 (26.7) <br> 86 (100.0) | 1 (0.6) <br> 113 (73.5) <br> 5 (3.2) <br> 35 (22.7) <br> 154 (100.0) | | 0.949 f |
| **Monthly Income** <br> < 500000 I.Q.D <br> 500000-1000000 I.Q.D <br> More than 1000000 I.Q.D <br> Total | 67 (70.5) <br> 26 (27.4) <br> 2 (2.1) <br> 95 (100.0) | 54 (62.8) <br> 30 (34.9) <br> 2 (2.3) <br> 86 (100.0) | 123 (79.9) <br> 29 (18.8) <br> 2 (1.3)  154 (100.0) | | **0.047* f** |
| **Education** <br> Illiterate, read and write, primary and secondary <br> Higher education <br> Total | 81 (85.3) <br><br> 14 (14.7) <br> 95 (100.0) | 71 (82.6) <br><br> 15 (17.4) <br> 86 (100.0) | 145 (94.2) <br><br> 9 (5.8) <br> 154 (100.0) | **8.899** | **0.012*** |

*p value $\leq$ 0.05 was significant. f: Fisher- exact test.

**Table 3.** association between compliance with antihypertensive drugs and study variables including (smoking habit, use of healthy diet, regular exercise, history of other diseases, history of complications and belief of patients regarding regular treatment).

| Study variables | Compliance | | | $\chi^2$ | P-value |
|---|---|---|---|---|---|
| | High (8) | Medium (6- < 8) | Low (<6) | | |
| **Smoking habit** Smokers, passive smokers and X-smokers Non smokers  Total | 42 (44.2) 53 (55.8)  95 (100.0) | 42 (48.8) 44 (51.2)  86(100.0) | 88 (57.1) 66 (42.9)  154 (100.0) | 4.224 | 0.121 |
| **Use of healthy diet** Always Sometimes Never use healthy  diet Total | 34 (35.8) 58 (61.1) 3 (3.2) 95 (100.0) | 24 (27.9) 52 (60.5) 10 (11.6) 86(100.0) | 24 (15.6) 95 (61.7) 35 (22.7) 154 (100.0) | **26.66** | **<0.001\*** |
| **Regular exercise** Yes No Total | 17 (17.9) 78 (82.1) 95 (100.0) | 12 (14.0) 74 (86.0) 86(100.0) | 16 (10.4) 138 (89.6) 154 (100.0) | 2.87 | 0.238 |
| **History of other disease** Yes No Total | 55 (57.9) 40 (42.1) 95 (100.0) | 50 (58.1) 36 (41.9) 86(100.0) | 83 (53.9) 71 (46.1) 154 (100.0) | 0.573 | 0.751 |
| **History of complication** Yes No Total | 48 (50.5) 47 (49.5) 95 (100.0) | 46 (53.5) 40 (46.5) 86(100.0) | 58 (37.7) 96 (62.3) 154 (100.0) | **6.619** | **0.037\*** |
| **Belief of patient regarding regular treatment** Yes No Total | 94 (98.9) 1 (1.1) 95 (100.0) | 79 (91.9) 7 (8.1) 86(100.0) | 104 (67.5) 50 (32.5) 154 (100.0) | **47.30** | **<0.001\*** |

\*p value ≤ 0.05 was significant. f: Fisher- exact test.

Compliance to prescribed treatment leads to well control of BP, and this association was evident in our study as 40% of the patients with high medication compliance had normal BP, while 79% of the patients with low compliance had stage 1 and stage 2 HT with high significant statistical association. This result was logically acceptable and supported by many studies reported by Alsallami S., Alhaddad I.A., Hawrami O.H. [3, 25, 26]

About 49.6% of the sample was in age group of ≥ 60 years, this agrees with  other study in Iraq reported by Ismael D.H. [19] In addition, this age group was significantly more compliant with treatment than other age groups in our study and this agrees with other studies reported by AUS B., Kamran A., Shameena, A.U. and Alhaddad I.A. [22, 24, 25, 27] this may reveal the traditional importance on family care for the elderly in the community and the extreme care which provide for them, when the disease is more often associated with severe symptoms and complications.

Males in our study appeared significantly better compliant  to medication than females, this result is sustained in previous studies in Iraq  reported by Alsallami S., Ismael D.H. , Alhaddad I.A., Hawrami O. and also this result is consistent with study reported from Egypt by Awad E. [3, 19, 25, 26, 20]

There was a significant association between longer duration of the disease and better compliance, 32.6% of the participants

presented with HT for more than 10 years and they were more compliant to antihypertensive treatment than those with shorter duration of the disease. Our result is consistent with studies conducted in Babylon city by Alsallami S. and in Sulaimani city reported by Hawrami O. which found that patients with longer duration of antihypertensive drugs used more than 10 years reported good adherence than patients with short duration of 5 years or less,also this result agrees with other studies reported by Abbas H., Polska S. and Kimuyu B. [2, 3, 7, 17, 26], This can be explained that these patients may possible have more information about the disease and established strong patient-physician relationship and follow up more than those with short duration of HT.

Education was significantly associated with patients' compliance in our study and the result agrees with other studies conducted by Alsallami S. and Alsolami F. [3, 8] While disagree with studies found that compliance rate was higher among patients with a low level of learning reported by Awad E., Esmaeili R., Hawrami O. and Polska S. [2, 19-21, 26]

This explains that educated patients may have more knowledge about hypertension, benefits from using anti-hypertensive drugs to control their blood pressure, and avoiding the future complications.

Occupational status has well recognized relation with compliance to drugs and inversely related with non-compliance. This finding was statistically important in our study, the rate of non-compliance was highest among those not working and housewives (69.5 %) compared with employed (7.1%). This may be related to economical factors, which make the employed person more careful about his/her health in addition to the ability to afford the cost of antihypertensive medications and this agrees with other study conducted in Iraq by Hawrami O.H. and disagrees with study reported by Lötsch F. [26, 16]

Positive beliefs regarding the importance of antihypertensive medications contribute significantly to positive medication adherence as found in our study with strong statistical significant association and this was also reported by Kamran A., Al-Mehza A.M. and Kimuyu B.M. [24, 14, 17]

There was a significant association between compliance to antihypertensive medications and following healthy diet in our study which was consistent with study reported from Iran by Kamran A. in 2014. [24]

Our study shows no significant association between compliance and marital status, the number and frequency of antihypertensive drugs used, this result is consistent with other studies from Iraq reported by Hawrami O.H. and from Iran reported by Esmaeili R. , but inconsistent with studies reported by Kamran A. , AUS B.S. and Shameena A.U. [21, 22, 24, 26, 27]

When the causes of non-compliance were explored in the current study, 23.1% of the patients had more than one cause for their non-compliance to treatment. The first isolated cause for poor compliance to medication as the patients shown was the absence of symptoms that forms 21.9%, for example taking the treatment only when they develop symptoms such as headache and not take medication when they feel well. Forgetfulness appeared as the second cause of noncompliance reported by 18.8 % of the subjects. The third reason for noncompliance was the cost of medication, followed by negligence or carelessness of the patient, and side effects of the drugs. From this, it appears that reasons for noncompliance were different in proportions from region to another and from culture to another although the presence of some similarity.

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