

Research Article

# Non-adherence to Antihypertensive Medication and Its Associated Factors Among Cardiac Patients at Alshaab Referred Clinic, November 2017

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## Abstract

**Background:** Non-adherence to antihypertensive drugs is identified to have negative impact on cardiovascular outcome. Various studies have been conducted on this issue worldwide but data about medications adherence and its associated factors in Sudan are limited.

**Objectives:** The objectives of this study are to identify the prevalence and factors associated with non-adherence to antihypertensive medications among cardiac patients in Sudan.

**Methods:** A descriptive cross-sectional study was conducted on 202 patients by total coverage of all diagnosed hypertensive patients with cardiac disease who attended the referred clinic at Alshaab teaching hospital during the study period from November 5th to December 7th, 2017.

Data were collected by direct interview of the patients using structured questionnaire, clinical characteristics of the patients were obtained from the medical records, WISEWOMAN medications adherence questionnaire for hypertension was used to assess the level of medication adherence. Descriptive and multivariate logistic regression was used for data analysis, using SPSS version 20.

**Results:** Out of 202 participants, 140 (69.3%) were female, the mean age of the participants was  $60.74 \pm 13.6$ . The study revealed that 41.6% of the patients were non-adherent to their antihypertensive medications, the level of non-adherence was found to be significantly associated with young age ( $p$ -value  $< 0.012$ ), high level of education ( $p$ -value  $< 0.05$ ), and using more than one pharmacy to get the medications ( $p$ -value  $< 0.00$ ); after logistic regression analysis, non-adherence was found to be significantly associated with using more than one pharmacy to get the medications ( $p$ -value  $< 0.00$ ). The level of non-adherence in our study is found to be corresponding to the findings of other similar local, regional, and international studies, which have reported that non-adherence of medication ranged between 39.5% and 55.9%. Other factors in different studies were found to be significantly associated with non-adherence such as gender, duration of hypertension, duration between follow-up visits to physician and number of drugs.

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**Conclusion:** The study results show high prevalence of non-adherence; this is associated more with using more than one pharmacy to get the medications, young age, and higher level of education. In order to improve the adherence to antihypertensive medications in our country, we recommend the use of medications adherence scale as routine tool in the outpatient clinic to identify the non-adherent patients. Doctors must make sure that the drugs are available in the pharmacies around their area before prescription, and to conduct more studies to identify the barriers to adherence specially in young and educated patients.

**Keywords:** non-adherence, antihypertensive medications, cardiac patients, associated factors

## 1. Introduction

Hypertension is defined as “a systolic blood pressure equal to or above 140 mm Hg and/or diastolic blood pressure equal to or above 90 mm Hg” [19].

The practical definition of hypertension is “the level of BP at which the benefit of treatment out-weights the cost and hazards [1].

Hypertension has adverse effect on many organs including blood vessels, heart, kidney, CNS, and retina [1]. And it contributes to the premature mortality and disability. The main objective of antihypertensive therapy is to reduce the incidence of cardiovascular complications [1].

Randomized controlled trials have demonstrated that antihypertensive therapy can reduce the incidence of stroke and to lesser extent coronary artery diseases [1].

Options of treatment include:

Non-drug therapy: lifestyle modification

Antihypertensive drugs

The adherence to medications is defined as “the extent to which a patient behavior with respect to taking medications corresponds with agreed recommendations from healthcare provider [2, 5].”

Only 29% of hypertensive patients in the USA have good control, and overall adherence rate of medication were about 50% [2]. In the USA, 33.69% of avoidable cases of hospital admissions were due to poor adherence [2].

There is limited published literature about adherence to antihypertensive medications in Sudan, a hospital-based study was conducted during 1997 in Kassala; compliance was measured using the pill count method, and it was found to be about 59.6%.

Many factors contribute to the medication non-adherence, and WHO categorized those factors into five groups including: patients, therapy, conditions, socioeconomic and health-system-related factors [2, 4]. As seen in sub-Saharan Africa countries, there are many social and economic barriers, inequalities in the distribution of services, staff shortage in healthcare facilities, limited supply of medications, and limited capacity to conduct clinical investigations [2].”

This study aims to measure the prevalence of medication non-adherence among hypertensive patients with cardiovascular diseases and identify the factors that are associated with non- adherence.

## 2. Methodology

This study was an observational descriptive hospital-based cross-sectional study that was conducted between November 5 and December 7, 2017, at Al-shaab referred clinic, Khartoum, Sudan. Al-shaab teaching hospital is the largest public cardiac center in Sudan, patients with cardiac or chest diseases from all parts of Sudan are referred to Al-shaab hospital, and they get a monthly follow-up care at the referred clinic after discharge; there are six cardiac clinics in the week.

All diagnosed hypertensive patients with cardiac disease who attend the referred clinic during the study period were included, while patients with cardiac problem not known to be hypertensive were excluded.

Data were collected through direct interview of the patients using structured questionnaire; clinical characteristics of the patients were obtained from the medical records; WISEWOMEN medications adherence questionnaire for hypertension which is adapted from Morisky medication adherence scale was used to assess the level of medication adherence. Five medical students participated in data collection and interviewing the patients.

The data obtained through the questionnaire include: socio-demographic information, duration of hypertension, duration of treatment, classes and doses of antihypertensive medications, co-morbidities, and level of medication adherence.

The dependent variable of this study was the level of adherence to antihypertensive medication and the independent variables were age, gender, level of education, residence, occupation, age at diagnosis, regular follow-up, duration of treatment, number

of medication classes and doses, health insurance, side effects of the antihypertensive drugs, availability of the medications in pharmacies, and the presence of other chronic illnesses.

The adherence was measured using three items scale from medication adherence questionnaire for hypertension by WISEWOMAN which is adapted from Morisky Medication adherence Scale (Figure 2). The items were: “Do you sometimes forget to take your high blood pressure pills?;” “Do you ever cut back or stop taking your BP medicine?” Taking medication every day can be inconvenient for some people. Do you ever feel hassled about sticking to your blood pressure treatment plan?; each item had two responses (yes = 1, no = 0) and the items were summed, patients were considered as adherent to their medications when they have score < 2 and non-adherent when score  $\geq 2$ .

Ethical approval was obtained from the University of Khartoum, Faculty of Medicine, Department of Community Medicine, State Ministry of Health, Research Committee at Al-shaab teaching hospital, and the head nurse at the referred clinic, the permission to use the medication adherence scale was obtained from the authors, and verbal consent was taken from the patients.

Data was entered and analyzed using SPSS software version 20, chi-square was used to determine the association between each independent variable and the level of adherence, then multiple logistic regression was used to identify the factors that significantly affected non-adherence to medications, *p*-value of  $\leq 0.05$  was considered as statistically significant.

### 3. Results

A sample of 211 patients were selected for the study, 202 of them participated in the study, 9 patients were excluded because some were very ill and could not complete the interview, and others denied that they had hypertension.

Table 1 shows the socio-demographic characteristics of the participants, 69.3% of the participants were female, 48.5% were above 60 years of age, and 43.6% belonged to the age group 41–60 years with mean age 60.7 (SD 13.6) , 67.8 % were married , 63.4% lived in urban areas, 40.6% were not educated (illiterate), 60.4% were unemployed, and 76.7% had health insurance.

Table 2 shows diseases and treatments-related factors, 69.8% were above 40 years of age when diagnosed with hypertension, 76.7% were visiting doctors for regular follow-up and measurement of blood pressure, 43.6% were using antihypertensive medications

for < 5 years, 65.8% were using only one class of antihypertensive medications, 65.8% had only one dose of antihypertensive drug per day, 80.2% did not have side effects from their antihypertensive medications, 61.4% were using more than one pharmacy to get their medications, and 96.5% were taking medications for another chronic illnesses.

Regarding the medication adherence scale, the responses of the participants were as follow: 63.9% reported that they never forget taking their high blood pressure medications, 58.9% do not ever cut back or stop taking their medications, and 61.4% do not feel hassled sticking to their medications and treatment plan, as shown in Table 3. A total of 84 participants (41.6%) out of 202 were found to be non-adherent to their antihypertensive medications (with score  $\geq 2$ ; Figure 1).

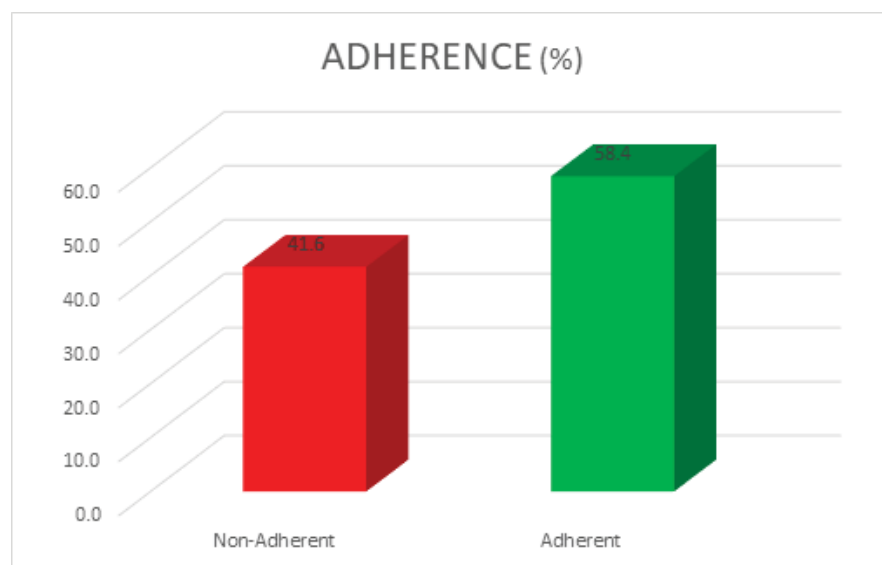


Figure 1: Adherence %.

Table 4 shows the association between socio-demographic characteristics and the level of adherence to antihypertensive medications, patients who were above 60 years of age were found to be more adherent, illiterate patients also show high level of adherence, other factors including gender, marital status, residence, occupation, and having health insurance don't show significance difference.

Regarding the medications and diseases-related factors and its relation to the level of adherence, those who use more than one pharmacy to get the medications were more non-adherent than those who got their medications from one pharmacy; other factors showed no significant difference (Table 5).

TABLE 1: Socio-demographic characteristics of the participants.

Characteristic	Number(n)	Frequency(%)
<b>1. Age</b>		
20–40 years	16	7.6%
41–60 years	88	43.6%
Above 60 years	98	48.5%
<b>2. Gender</b>		
Male	62	30.7%
Female	140	69.3%
<b>3. Marital status</b>		
Single	6	3.0%
Married	137	67.8%
Divorced	6	3.0%
Widow	53	26.2%
<b>4. Educational level</b>		
Illiterate	82	40.6%
Khalwa	31	15.3%
Primary school	45	22.3%
Secondary school	34	16.8%
University	8	4.0%
Above university	2	1.0%
<b>5. Residence</b>		
Rural	74	36.6%
Urban	128	63.4%
<b>6. Occupation</b>		
Unemployed	122	60.4%
Employee	32	15.8%
Trader	8	4.0%
Farmer	6	3.0%
Others	34	16.8%
<b>7. Health insurance</b>		
Yes	155	76.7%
No	47	23.3%

TABLE 2: Diseases and medications related factors.

Characteristic	Number(n)	Frequency(%)
<b>1. The patients age when diagnosed with HTN</b>		
< 20 years	3	1.5%
20–40 years	57	28.2%
≥ 40 years	141	69.8%
<b>2. Visiting doctors regularly for follow-up</b>		
Yes	155	76.7%
No	47	23.3%
<b>3. Duration of antihypertensive treatment</b>		
< 5 years	88	43.6%
5–9 years	44	21.8%
≥ 10 years	70	34.7%
<b>4. Number of antihypertensive classes</b>		
One class	133	65.8%
Two or more classes	69	34.2%
<b>5. Number of doses</b>		
Once per day	133	65.8%
Twice or more	69	34.2%
<b>6. Side effects from medications</b>		
Yes	39	19.3%
No	162	80.2%
Missed	1	0.5%
<b>7. Use more than one pharmacy to get medications</b>		
Yes	124	61.4%
No	77	38.1%
Missed	1	0.5%
<b>8. Presence of other chronic diseases</b>		
Yes	195	96.5%
No	7	3.5%
<b>9. Types of chronic diseases</b>		
Cardiac Diseases	185	66.8%
Hyperlipidemia	12	4.3%
Diabetes Mellitus	64	23.1%
Other comorbidities	16	5.8%

Multiple logistic regression analysis revealed that the only variable that has significant effect on non-adherence is using more than one pharmacy to get the medications ( $p$ -value 0.000), other factors were excluded (Table 6).

## 4. Discussion

In this study, we found that about 41.6% of the participants were non-adherent to their antihypertensive medications, which corresponds to the findings of other similar local, regional, and international studies that have reported medication non-adherence ranging between 39.5% and 55.9%, despite the difference in the social and economic status of the patients in these countries, and the difference in health system, the prevalence of non-adherence to medications is still high, more studies need to be conducted to identify the barriers to adherence in order to develop the strategies to overcome these barriers [10, 13, 15, 17, 20, 21].

Regarding the socio-demographic factors and its relation to non-adherence, our study revealed that age has significant association with the level of adherence and this contradicts the finding of two other studies that reported that age has no significant effect on non-adherence [15, 17]; regarding the gender, we found that there is no difference between male and female patients in the adherence level, while a study in UAE found that male are more non-adherent than females [15]. Other two studies in Almadina Almunawara and Pakistan found the opposite, which may be due to the difference in the social and cultural beliefs regarding the gender in these areas [14, 16]. In our study, we found that non-adherence is less prevalent among patients with no formal education (illiterate), while a study which was conducted in Finland showed that non-adherence was less prevalent among highly educated patients [7], and these findings may be explained by the difference in the literacy rates between Sudan and Finland; in developed countries, the literacy is about 99.2%, while in sub-Saharan Africa, it is about 64.0% as reported by UNESCO in 2015; and another study in Saudi Arabia found that highly educated patients were more non-adherent to their medications, other socio-demographic factors including marital status, residence, occupation; having health insurance showed no significant difference and this is in agreement with the two similar studies in the UAE and Iran [15, 17].

Diseases- and medications-related factors that include age at diagnosis with hypertension, regular follow-up, duration of treatment, number of medication's classes and doses, side effects of medications, using more than one pharmacy to get the medications and the presence of other comorbidities, all were found to be not significantly



associated with non-adherence except for using more than one pharmacy to get the medications, which is similar to the findings of a study that is conducted in three cardiac centers in Khartoum and found that one of the major reasons for poor medication adherence among the study participants to be poly-pharmacy; on the other hand, a study conducted in the UAE found that patients who use  $\geq$  two medications were more non-adherent than those who use only one drug [15], and another study in Finland showed that patients who experienced side effects of the drugs were significantly more likely to be non-adherent [7].

The literature about medication adherence in Sudan is limited and this makes direct comparison with local studies to be not feasible.

TABLE 3: Responses to medication adherence questionnaire.

Items	Number (n)	Frequency (%)
<b>1. Do you sometimes forget to take your high BP medications?</b>		
Yes	71	35.1%
No	129	63.9%
Missed	2	1%
<b>2. Do you ever cut back or stop taking your medications?</b>		
Yes	83	41.1%
No	119	58.9%
<b>3. Do you ever feel hassled sticking to your treatment plan?</b>		
Yes	78	38.6%
No	124	61.4%

## 5. Conclusion

The study showed that 41.6% of cardiac patients were non-adherent to their antihypertensive medications, using more than one pharmacy to get the medications was the factor that is significantly associated with non-adherence.

In order to improve the adherence to antihypertensive medications in our country, we recommend the use of medications-adherence scale as routine tool in the out-patient clinic to identify the non-adherent patients. Doctors must make sure that the drugs are available in the pharmacies around their area before prescription and to conduct more studies to identify the barriers to adherence specially in young and literate patients.

TABLE 4: Association between socio-demographic characteristics and level of adherence to antihypertensive medications.

The factor	Non-adherence N %	Adherence N %	X <sup>2</sup>	P-value
<b>1. Age</b>			8.796	0.012
20–40 years	10 5%	6 3%		
41–60 years	43 21.3%	45 22.3%		
Above 60 years	31 15.3%	67 33.2%		
<b>2. Gender</b>			0.304	0.0581
Male	24 11.9%	38 18.8%		
Female	60 29.7%	80 39.6%		
<b>3. Marital status</b>			0.857	0.355
Single	24 11.9%	41 20.3%		
Married	60 29.7%	77 38.1%		
<b>4. Educational level</b>			11.05	0.050
Illiterate	26 12.9%	56 27.7%		
Khalwa	12 5.9%	19 9.4%		
Primary school	22 10.9%	23 11.4%		
Secondary school	21 10.4%	13 6.4%		
University	2 1%	6 3%		
Above university	1 0.5%	1 0.5%		
<b>5. Residence</b>			0.915	0.339
Rural	34 16.8%	40 19.8%		
Urban	50 24.8%	78 38.6%		
<b>6. Occupation</b>			1.187	0.276
Unemployed	47 23.3%	75 37.1%		
Employed	37 18.3%	43 21.3%		
<b>7. Health insurance</b>			1.363	0.243
Yes	61 30.2%	94 46.5%		
No	23 11.4%	24 11.9%		

TABLE 5: The association between medications- and diseases-related factors and the level of adherence.

The factor	Non-adherence N %	Adherence N %	X <sup>2</sup>	P-value
<b>1. The patient's age when diagnosed with HTN</b>			7.469	0.058
< 20 years	1 0.5%	2 1%		
20–40 years	32 15.8%	25 12.4%		
≥ 40 years	51 25.2%	90 44.6%		
<b>2. Visiting doctors regularly for follow-up</b>			0.024	0.878
Yes	64 31.7%	91 45%		
No	20 9.9%	27 13.4%		
<b>3. Duration of antihypertensive treatment</b>			1.260	0.533
< 5 years	37 18.3%	51 25.2%		
5–9 years	21 10.4%	23 11.4%		
≥ 10 years	26 12.9%	44 21.8%		
<b>4. Number of classes</b>			0.991	0.320
One class	52 25.7%	81 40.1%		
Two or more classes	32 15.8%	37 18.7%		
<b>5. Number of doses</b>			0.482	0.487
Once per day	53 26.2%	80 39.6%		
Twice or more	31 15.3%	38 18.8%		
<b>6. Side effects of medications</b>			1.992	0.369
Yes	14 6.9%	25 12.4%		
No	69 34.2%	93 46%		
Missed	1 0.5%	0 0.0%		
<b>7. Use more than one pharmacy to get medications</b>			15.767	0.000
Yes	65 32.2%	59 29.2%		
No	19 9.4%	58 28.7%		
Missed	0 0.0%	1 0.5%		
<b>8. Presence of another chronic disease</b>			0.723	0.395
Yes	80 39.6%	115 56.9%		
No	4 2%	3 1.5%		

TABLE 6: Factors associated with non-adherence, logistic regression analysis.

The factor	Significance	Exp(B)	95% CI
1. Using more than one pharmacy to get the medications	0.000	0.183	(0.083–0.401)

Date \_\_\_\_\_

Adapted from Morisky Medication-Taking Adherence Scale

4/2014

Last Name First Name Middle Initial MBCIS ID (Office Use Only)

1. Do you sometimes forget to take your high blood pressure pills?

Yes  No

1a. If yes, how often?

Rarely  Once in a while  Sometimes  Usually  All the Time

1b. If yes, explain why?

2. Do you ever cut back or stop taking your BP medicine?

Yes  No

If yes, do you cut back or stop taking your BP medicine because you (check all that apply):

2a.  Feel better?

2b.  Feel like your blood pressure is under control?

2c.  Feel worse when you take it?

2d.  Are having trouble paying for it?

2e.  Are having trouble getting to the pharmacy?

2f.  Are not sure why it is important?

3. Are you having any side effects from your medication?

Yes  No

4. Do you use more than one pharmacy to get your medications?

Yes  No

5. Taking medication every day can be inconvenient for some people. Do you ever feel hassled about sticking to your blood pressure treatment plan?

Yes  No

Figure 2: Medication adherence questionnaire for hypertension.

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