

# Barriers to Compliance of Hypertensive Patients in Abha City, Saudi Arabia

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## Abstract

**Aim of Study:** To measure non-compliance and to identify barriers to compliance among hypertensive patients.

**Patients and Methods:** A total of 200 hypertensive patients attending Al-Qabel Primary Health Care (PHC) Center since at least one year were included in this study. A structured data collection interview questionnaire was used. To assess non-compliance of hypertensive patients, the Hill-Bone Non-Compliance to High Blood Pressure Therapy Scale was used.

**Results:** Only 11% of hypertensive patients were highly compliant. The main barriers for full compliance were forgetfulness (39%) and being asymptomatic (30%). Some patients were non-compliant as a result of disliking the manner of medical service provided by the primary health care (PHC) team (16%), or they felt the need to take some rest from the daily antihypertensive medication (15.5%). Controlled blood pressure was achieved among 58% of patients. Saudis were significantly more non-compliant than non-Saudis ( $p < 0.001$ ). Married patients expressed significantly higher non-compliance than single patients ( $p = 0.015$ ). Non-compliance scores were significantly higher among smokers than non-smokers ( $p < 0.001$ ); and significantly higher among patients who were treated with multiple antihypertensive drugs ( $p = 0.019$ ). Patients with uncontrolled systolic or diastolic blood pressure had significantly higher non-compliance mean scores ( $p < 0.001$  for both).

**Conclusions:** Non-compliance of hypertensive patients attending PHC settings in Abha is high. Main barriers against full compliance of hypertensive patients are forgetfulness, absence of symptoms, dissatisfaction with provided health care and being tired of treatment side effects. Non-compliance is significantly higher among younger, newly diagnosed, Saudi, married and smoker patients. Non-compliance is also significantly higher among hypertensive patients on multiple antihypertensive medications.

**Recommendations:** Health education of hypertensive patients should cover information on the disease, medication, exercise, diet and follow up visits. Patients should be advised to include self-reminders to avoid missing intake of medication and follow up visits. Hypertensive patients should be advised to avoid smoking. PHC physicians should spend enough time with their hypertensive patients listening to their complaints and to meet patients' expectations of a consultation and to avoid any unnecessary over-prescription of multiple anti-hypertensive medications.

**Key words:** Hypertension, Barriers to compliance, Primary care, Saudi Arabia.

## Introduction

Hypertension is an important and prevalent public health problem worldwide, with almost one in three adults suffering from hypertension (1). It is a major risk factor for coronary artery disease and its complications, heart failure, stroke, renal insufficiency, and blindness in diabetic patients. The Global Burden of Disease study estimated that hypertension is the leading risk factor for disability-adjusted life years worldwide, and is considered one of the most significant causes of mortality worldwide (2).

The risk of developing high blood pressure can be reduced by effective medication therapy management and significant lifestyle modifications. Moreover, antihypertensive medication plays an important role in hypertension management. Nevertheless, compliance to hypertension management remains suboptimal (3).

Non-compliance is the main obstacle for controlling hypertension in the community, and a significant barrier to effective hypertension management (4). Therefore, good compliance is crucial to improve hypertension control rates and prevent complications (5). In a global study, the non-compliance rate was 45% and a significant number of hypertensive patients with comorbidities were non-adherent to treatment (6).

Maintaining compliance to multiple medications is a complex issue in patients with chronic diseases. The influence of non-adherence to antihypertensive medications is the most important cause of uncontrolled blood pressure. Consequently, because of non-compliance, nearly three-quarters of hypertensive patients do not achieve optimal blood pressure control (7).

Several approaches have been tried to investigate the medication-taking behavior and the traditional methods, such as pill counts, clinical reports, prescription refills and patient-reported measures are some of the cheap and acceptable methods to provide medication adherence information. However, self-reported questionnaires were often used to assess medication adherence in chronic disease patients (8).

Several self-reported validated questionnaires have been developed to monitor medication adherence in chronic disease patients including hypertension patients. Some of these scales suitable for measuring adherence in hypertension patients include the Hill-Bone Compliance scale (9), and the Morisky medication adherence scale-8 (10).

Several barriers have been associated with non-compliance, such as forgetfulness, lack of motivation due to the incurable nature of hypertension, absence of symptoms, use of herbal preparations, physical disability, presence of complications, low level of education, poor knowledge of the disease and ignorance on the need for long-term treatment (11).

Therefore, a better understanding of these barriers to compliance could help to tailor effective interventions and strategies to improve blood pressure control of hypertensive patients (12).

## Study Rationale

Hypertension is a common health problem among adults in Saudi Arabia. Although there has been significant progress in management of hypertension, rates for control of this chronic disease have proved to be very low. An important cause for failure to control hypertension is low compliance with treatment, which remains a universal problem. The identification and characterization of barriers to compliance can potentially lead to better management of hypertension.

## Aim of Study

To measure prevalence and extent of non-compliance and to identify barriers to compliance among hypertensive patients in Abha City, Saudi Arabia.

## Patients and Methods

This research followed a cross sectional study design and was conducted in Abha City, Saudi Arabia. Following a simple random sample, Al-Qabel primary health care (PHC) center was chosen to conduct this study. It serves a population of about 15,000, most of whom are Saudi. The study population comprised all hypertensive patients registered at the study setting.

A total of 200 hypertensive patients were interviewed by the researchers. Their blood pressure (BP) was measured using a mercury sphygmomanometer. Patients were seated for at least 5 minutes and BP was measured with the patient lying on a couch. A cuff of suitable size was applied evenly and firmly around the right exposed upper arm and was rapidly inflated until the reading is 30 mmHg above the level at which the pulse disappears, then slowly deflated at a rate of 2 mmHg per second. Systolic blood pressure (SBP) was taken at Phase I of Kortokoff's sound disappearance. Diastolic blood pressure (DBP) was taken at Phase V (13). BP control was judged according to the Eighth Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure (JNC VIII) (14).

The researchers designed and used a structured data collection interview questionnaire that included the following items:

- 1- Patients' characteristics: age, sex, marital status, smoking status, employment and level of education.
- 2- Data about hypertension: duration of treatment, BP measures, family history of hypertension, type and number of drugs taken for hypertension (1, 2 or > 2 drugs) and the source of drugs (free, subsidized or not).

To assess non-compliance of hypertensive patients, the "Hill-Bone Compliance to High Blood Pressure Therapy Scale" (9) was used. It assesses patients' behaviors for 3 important behavioral domains of high BP treatment: 1) diet (i.e., reduced sodium intake); 2) appointment keeping;

and 3) medication taking. This scale is composed of 14 items in 3 subscales. Each item is a 4-point Likert type scale. Each item is given a score that ranges from "1" for never to "4" for always. Accordingly, the highest total score is 56 while the lowest is 14. Patients were classified as "highly compliant" if their total score is less than 29; "moderately non-compliant" if their total score is 29-42; or "highly non-compliant", if their total score is higher than 42.

Data were collected by direct interview of hypertensive patients. The Statistical Package for Social Sciences (IBM, SPSS ver. 25.0) was used for that purpose. Descriptive statistics were calculated and the appropriate tests of significance (i.e., t-test, F-test) were applied accordingly.

## Results

Table (1) shows that more than half of patients were aged 40-60 years (56.5%) and more than one third were aged above 60 years. Male patients were more than female patients (56% and 44%, respectively). Most patients were Saudis (88.5%) and married (94.5%). More than one third of patients were illiterate (37%); almost one quarter attained primary level of education (24.5%), while those who were university graduates constituted 8%. More than half of patients were unemployed or retired (55.5%). In addition, 17% of patients were smokers. Almost one quarter of patients (23%) had a positive family history for hypertension.

Table (2) shows that 52.5% of patients had been treated for more than 5 years. More than half of patients showed controlled BP (58%). Almost one quarter of patients had high systolic and diastolic blood pressures (22%), while 18.5% had isolated systolic hypertension and 1.5% had diastolic hypertension. Beta blockers were administered to more than half of patients (52%), followed by ACE inhibitors (35.5%), diuretics (32%), and calcium channel blockers (15%). More than half of patients received one anti-hypertensive drug (56%), 28% received two different drugs, while 16% of hypertensive patients received three drugs or more. Anti-hypertensive treatment was fully subsidized for most patients (71%). It was partially subsidized for 17.5% of patients while it was covered for 11.5% of patients.

Table (3) shows that only 11% were highly compliant. More than two thirds of patients were partially compliant (68.5%) while one fifth of patients were non-compliant (20.5%). The main reasons for not achieving full compliance were forgetfulness (39%) and feeling normal (30%). Moreover, some patients were non-compliant as they did not like the manner of provided medical service by the health team (16%), or they felt the need to take some rest from the daily antihypertensive medications (15.5%).

Table (4) shows that mean non-compliance scores were almost similar among male and female patients. Saudis showed significantly higher non-compliance scores than non-Saudis (36.2+7.5 vs. 30.9+4.2,  $p<0.001$ ). Married patients expressed significantly higher non-compliance than single patients (35.9+7.3 vs. 30.3+7.1,  $p=0.015$ ). Patients with higher educational status (e.g., university graduates) expressed lower non-compliance scores compared with patients with low educational status (e.g., illiterate or primary level). However, differences were not statistically significant. Mean non-compliance scores were almost similar among employed and non-employed patients. Non-compliance scores were significantly higher among smokers than non-smokers (43.4+6.2 vs. 34.0+6.6, respectively,  $p<0.001$ ). Mean non-compliance scores were almost similar among those with positive family history of hypertension and those with no family history of hypertension. Non-compliance mean scores of hypertensive patients did not differ significantly if ACE inhibitors, calcium channel blockers or beta-blockers were administered. However, patients on diuretics expressed significantly lower mean non-compliance scores, (i.e., higher compliance) ( $p<0.001$ ). Non-compliance was significantly higher among patients treated with multiple antihypertensive drugs ( $p=0.019$ ). Patients who fully paid for their medications expressed the highest non-compliance mean scores (38.1+6.4) compared with those who had partially or fully subsidized treatment. Differences were not statistically significant. Patients with uncontrolled systolic or diastolic BP had significantly higher non-compliance mean scores ( $p<0.001$  for both).

Table 1: Characteristics of hypertensive patients

Characteristics (n=200)	No.	%
Age group (in years)		
– <40	15	7.5
– 40-60	113	56.5
– >60	72	36.0
Sex		
– Males	112	56.0
– Females	88	44.0
Nationality		
– Saudi	177	88.5
– Non-Saudi	23	11.5
Marital status		
– Single	11	5.5
– Married	189	94.5
Educational level		
– Illiterate	74	37.0
– Primary	49	24.5
– Intermediate	32	16.0
– Secondary	29	14.5
– University	16	8.0
Smoking status		
– Smoker	34	17.0
– Non-smoker	166	83.0
Positive family history of hypertension		
– No	154	67.0
– Yes	46	23.0

Table 2: Characteristics of treatment received by hypertensive patients

Variables (n=200)	No.	%
Duration of treatment		
– ≤5 years	95	47.5
– > 5 years	105	52.5
Blood pressure control		
– Controlled	116	58.0
– Systolic-Diastolic Hypertension (SDH)	44	22.0
– Isolated Systolic Hypertension (ISH)	37	18.5
– Isolated Diastolic Hypertension (IDH)	3	1.5
Prescribed antihypertensive medications		
– Beta blockers	104	52.0
– ACE Inhibitors	71	35.5
– Diuretics	64	32.0
– Calcium channel blockers	30	15.0
– Other medications	47	23.5
Number of prescribed antihypertensive medications		
– One	112	56.0
– Two	56	28.0
– Three or more	32	16.0
Payment for antihypertensive medications		
– Totally by patient	23	11.5
– Partially subsidized	35	17.5
– Fully subsidized	142	71.0

Table 3: Degrees of non-compliance and reasons for non-compliance among hypertensive patients

Patterns of non-compliance	No.	%
Levels of non-compliance among hypertensive patients (n=200)		
– Highly compliant ( <i>non-compliance scores &lt;29</i> )	22	11.0
– Moderately compliant ( <i>non-compliance scores 29-42</i> )	137	68.5
– Non-compliant ( <i>non-compliance scores &gt;42</i> )	41	20.5
Main reasons for non-compliance <sup>†</sup>		
– Forgetfulness	78	39.0
– Feeling normal (asymptomatic) without taking medication	60	30.0
– Dissatisfaction with offered health care	32	16.0
– Getting some rest from anti-hypertensive treatment side effects	31	15.5

† More than one reason is possible

Table 4: Association between non-compliance scores (Mean±SD) and patients' personal characteristics

Personal Characteristics		No.	Mean	SD	p-value
Age group	<40 years	15	33.1	2.0	<0.001
	40-60 years	113	38.0	8.2	
	>60 years	72	32.2	4.9	
Sex	Males	112	36.0	7.2	0.369
	Females	88	35.0	7.7	
Nationality	Saudi	177	36.2	7.5	0.001
	Non-Saudi	23	30.9	4.2	
Marital status	Single	11	30.3	7.1	0.015
	Married	189	35.9	7.3	
Educational level	Illiterate	74	36.0	8.3	0.415
	Primary	49	36.6	7.3	
	Intermediate	32	35.5	5.7	
	Secondary	29	34.3	8.0	
	University	16	32.9	4.3	
Duration of treatment	≤5 years	95	36.6	7.4	0.048
	>5 years	105	34.6	7.4	
Smoking	Non-smoker	166	34.0	6.6	<0.001
	Smoker	34	43.4	6.2	
Family history of hypertension	Negative	154	35.8	7.8	0.449
	Positive	46	34.8	5.7	
Prescribed medications	ACE Inhibitors	71	36.1	6.7	0.408
	Calcium channel blockers	30	36.7	6.4	0.360
	Diuretics	64	32.2	5.4	<0.001
	Beta blockers	104	36.4	8.1	0.096
No. of prescribed antihypertensive drugs	One	112	34.3	7.3	0.019
	Two	56	36.8	6.5	
	Three or more	32	37.8	8.4	
Payment for treatment	Totally by patient	23	38.1	6.4	0.106
	Partially subsidized	35	33.9	5.4	
	Fully subsidized	142	35.5	7.9	
Systolic blood pressure	Controlled	119	32.1	4.1	<0.001
	Uncontrolled	81	40.7	8.2	
Diastolic blood pressure	Controlled	153	32.7	4.8	<0.001
	Uncontrolled	47	44.9	6.6	

## Discussion

The present study indicated that non-compliance of hypertensive patients was highly prevalent. Only 11% were highly compliant. More than two thirds of patients were partially compliant (68.5%) while one fifth of patients were non-compliant (20.5%). The main reasons for failure to achieve full compliance were forgetfulness (39%) and being asymptomatic (30%). Moreover, some patients were non-compliant as they did not like the manner of provided medical service by the health team (16%), or they felt the need to take some rest from the daily antihypertensive medication (15.5%).

High non-compliance rates for hypertensive patients were reported by several studies all over the world. Al-Sowielem and Elzubier (15) reported that 34.2% of their hypertensive patients in Al-Khobar, KSA were compliant. Hadi and Rostami-Gooran (16), in Iran, reported that only 39.6% of their hypertensive patients were compliant. Youssef and Moubarak (17), in Egypt, noted that half of their patients were compliant, while nearly half of their hypertensive patients were either non-compliant (25.9%) or partially compliant (22.2%). Thrall et al. (18) added that figures from the United States suggest that non-compliance with medication may reach as high as 50-80%, with compliance decreasing rapidly over time.

Miller et al. (19) stated that barriers to compliance encountered by patients include practical and logistical issues such as lack of transportation and health insurance, inability to take time off from work to keep medical appointments, and lack of a continuing health care provider.

Youssef and Moubarak (17) noted that the most frequently stated barriers to full compliance were feeling that BP was normal (36.2%), followed by forgetfulness (34.8%), wanting a 'drug holiday' (11.8%) and wanting to avoid side-effects (10.5%).

Several studies concluded that the main barriers against compliance among hypertensive are having their antihypertensive medications prescribed more than once a day. Patients' concerns mainly relate to the lifelong need for medication and the possible side effects or risks that may be unacceptable in a largely asymptomatic disease (20-21). Mamaghani (22) added that barriers to effective compliance among hypertensive patients include poor doctor-patient communication, cost of antihypertensive therapy, and side effects of the drugs.

Efforts to control hypertension through the use of antihypertensive medications are considered to be the most effective strategy. Since HBP is mostly asymptomatic, poor patient compliance with anti-hypertensive medication has consistently limited the effectiveness of these interventions (23). Moreover, patient forgetfulness, the number of daily doses, side effects, and/or class of agent, may impair patients' compliance (24-25).

The present study showed that achieving BP control is not easily obtainable. About half of patients showed controlled BP (58%). Almost one quarter of patients had high systolic and diastolic BPs (22%), while 18.5% had isolated systolic hypertension and 1.5% had diastolic hypertension. A similar finding has been described by Youssef and Moubarak (17), who reported that just over half (53.2%) of the participants achieved controlled BP.

The present study showed that non-compliance of hypertensive patients differed significantly according to some of their personal characteristics. Non-compliance correlated positively and significantly with age and education of patients. This study also showed that patients with uncontrolled systolic or diastolic BP had significantly lower compliance. Nevertheless, compliance did not differ between male and female patients or between employed and unemployed patients. However, Saudis showed significantly less compliance than non-Saudis. In addition, married patients expressed significantly less compliance than single patients.

These findings were controversial and sometimes contradicting in different studies. Al-Sowielem and Elzubier (15) reported that the compliance of hypertensive patients was significantly higher among illiterate patients than educated ones and among patients over 55 years of age than those who were younger. There was no significant difference in compliance rates between males and females, or between Saudis and non-Saudis. Hadi and Rostami-Gooran (16) reported that older patients were more compliant. Compliance score was higher in those patients who had taken antihypertensive drugs for longer than 5 years ( $p < 0.05$ ).

Wang et al. (26) stated that several studies indicated an association between compliance and BP control (27-29). Some other studies have shown a positive association between compliance and male gender (30) and level of education (31).

Similar findings were reported by Al-Sowielem and Elzubier (15) and Al-Mustafa and Abulrahi (33) in the KSA, who reported lower compliance among cigarette smokers and those with positive family history of hypertension.

This study showed that patients on diuretics expressed significantly higher compliance, while non-compliance was significantly higher among patients who were treated with more than one antihypertensive drug. Variations in patients' compliance may reflect the extent of affordable side effects of anti-hypertensive medications. With increased number of prescribed antihypertensive drugs, it is expected that side effects would also increase, hence discouraging the patient to comply. Moreover, hypertensive patients in the present study who fully paid for their medications expressed the least compliance compared with those who had partially or fully subsidized treatment. However, differences were not statistically significant. This finding can be explained by that hypertensive patients who pay for their treatment would not be able to pay any time they face financial problems.

Miller et al. (19) noted that compliance with recommendations for entering and remaining in care, modifying lifestyle, and taking medications vary according to incentive versus therapeutic intent or goal and ability to pay for care. They added that hypertensive patients need to use self-reminders into their daily routine. Patients also need advice on how to adapt to changes in their schedules and environment. Travel and vacations, for example, may lead to delays or omissions in taking medications and dietary errors such as increased intake of foods high in fat and sodium. Hadi and Rostami-Gooran (16) reported that compliance score was significantly higher among patients with 75% insurance than those who had not been insured ( $p < 0.05$ ).

Thrall et al. (18) emphasized that one of the main reasons that hypertensive patients give for complying with their medication regimen is the confidence they feel toward their physician or the health-care system. Moreover, the interaction between the patient and his/her physician significantly affects compliance with medical advice and medication. Factors such as empathy on the part of the physician, adequate time spent with the patient, providing clear information about the diagnosis and medication, and meeting patient's expectations of a consultation, all provide strong positive influences which subsequently potentiate compliance.

The present study concluded that non-compliance of hypertensive patients attending Al-Qabel PHC Center in Abha is high. Non-compliance is significantly more among younger, newly diagnosed, Saudi, married, smoker, and those on multiple antihypertensive medications. Compliance is significantly better among hypertensive patients on diuretics. Main barriers against full compliance of hypertensive patients are forgetfulness, absence of symptoms, dissatisfaction with offered health care and being tired of treatment side effects.

This study recommends that health education of hypertensive patients should cover information on the disease, medication, exercise, diet and follow up visits. Patients should be advised to include self-reminders to avoid missing intake of medication and follow up visits. Hypertensive patients should be advised to avoid smoking. PHC physicians should spend enough time with their hypertensive patients listening to their complaints and to meet patient's expectations of a consultation and to avoid any unnecessary over-prescription of multiple anti-hypertensive medications.

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