

# The attitude and prevalence of patient noncompliance toward chronic disease medications in Saudi Arabia

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## ABSTRACT

**Background:** Failure of patients' adherence to medications has been a big issue for both physicians and patients; not only it does affect the patients' health but also it affects the financial status of the hospital and the patient. **Objective:** This investigation aims to explore the prevalence and the factors affecting the compliance of patients with chronic conditions to their medications. **Materials and Methods:** An online survey was distributed to patients who had chronic conditions and lived in the main cities of Saudi Arabia. The questionnaire included sections about the patients' general characters, type of chronic disease, the pattern of prescribed medications' usage, and factors affecting compliance of patients toward their medications. Data was collected in a predesigned excel sheet, and analysis was executed through SPSS program version 26. **Results:** 301 patients responded to this questionnaire. The lowest incidence of missing pills was among patients with heart failure, followed by chronic kidney disease, whereas the highest frequency of missing pills was among patients with vitamin D deficiency, followed by hyperlipidemia. 38.5% of the patients used mobile applications as reminders for the administration of their medications. 50% of the patients who use reminders take more than four pills a day. 48.2% of the patients stopped medications without consulting their doctors, where 20.9% stopped one medication for less than a month. 57.5% forgot to take drug doses in a year, with a mean of  $8.55 \pm 26.3$  forgotten doses. Females, patients aging between 31 and 45 years old, obese, married, illiterate, self-employed, those who follow with military hospitals, exercising regularly, and ex-smoker all showed a higher incidence of noncompliance to medications. The main reason for noncompliance was forgetfulness in 60% of patients. 63.2% of the patients did not have a GP to help them with medications compliance. **Conclusion:** The compliance of Saudi patients toward their chronic medications requires improvement. Similar studies in other areas in Saudi Arabia are recommended.

**Keywords:** Adherence, chronic disease, medication compliance, patient

## Introduction

Chronic conditions are considered the leading cause of morbidity globally.<sup>[1]</sup> They can cause a significant reduction in the patients' quality of life.<sup>[2]</sup> In addition, they can represent significant risk

factors for other conditions.<sup>[3]</sup> The incidence of chronic diseases is considered high not only in developing countries but also in developed countries.<sup>[4]</sup>

Common chronic conditions include diabetes, hypertension, asthma, thyroid disorders (hypo or hyperthyroidism), and other cardiac and endocrine conditions.<sup>[5]</sup> Patients with chronic diseases are more likely to have more than one condition.<sup>[6]</sup> Consequently, these patients usually have what is described as "poly pharmacy" due to the administration of multiple medications.<sup>[7]</sup>

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Received: 21-12-2020

Revised: 28-03-2021

Accepted: 04-04-2021

Published: 27-08-2021

### Access this article online

#### Quick Response Code:



Website:  
www.jfmpc.com

DOI:  
10.4103/jfmpc.jfmpc\_2512\_20

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**How to cite this article:** Altamimi AF, Alqahtani ZA, Almughaiseeb FA, Alshiha KA, Alaryni A, Alotaibi A. The attitude and prevalence of patient noncompliance toward chronic disease medications in Saudi Arabia. J Family Med Prim Care 2021;10:3064-70.

The compliance of patients with chronic conditions toward their medications can be affected by multiple factors.<sup>[8]</sup> Furthermore, these patients are at notably higher risk of toxicity from medication due to medication errors or noncompliance.<sup>[9]</sup> Another critical issue is that these patients are usually elderly, and they might not have someone to help them with their medications.<sup>[10]</sup>

In addition, patients' psychological condition and their perception of their disease can affect their compliance to medications.<sup>[10]</sup> Some patients might think that because their condition is incurable, their disease can not be controlled, and there is no benefit from administering medications.<sup>[11]</sup> Also, some patients might have financial problems that might affect the purchase of their medications.<sup>[12]</sup>

Therefore, this study's objective is to understand the factors that affect the attitude of chronic disease patients and the prevalence of compliance toward their medical treatment in Saudi Arabia.

## Materials and Methods

### Study design

This is a cross-sectional observational study conducted in the main cities of Saudi Arabia through an online questionnaire that was distributed online to patients with chronic conditions and lived in Saudi Arabia.

The validity of our questionnaire was established by experts and it was pilot tested on a subset of participants.

### Data collection

A self-administered online questionnaire was disseminated online to patients with chronic conditions. The survey mainly focused on the general characters of the patients, type of chronic condition, the pattern of the usage of prescribed medications, and the factors affecting patients' compliance toward their medications. All responses were then collected in a predesigned excel sheet.

### Statistical analyses

Data were expressed as frequencies and percentages for categorical variables and as means and standard deviations for continuous variables. IBM SPSS (Statistical Package for the Social Science; IBM Corp, Armonk, NY, USA) was used to carry out all statistical analyses, version 26 for Microsoft Windows.

### Ethical considerations

Informed consent was shown on the initial page of the questionnaire and all participants were provided with detailed information about the study, and only those who accepted to consent were recruited. Confidentiality was maintained. Ethical approval was obtained from Imam Mohammed Ibn Saud Islamic University IRB committee before the beginning of the study.

## Results

Three hundred and one patients responded to this questionnaire mainly from Riyadh. Only participants who finished all the

questions in the survey were included. The demographics of participants and analysis of the questionnaire are shown in Table 1.

### General characters of responders

Out of 301 patients, females represented 68.8% of the patients. Age was subcategorized into three age groups starting from 15 years old and 45 years old. The most prevalent age group was the one above 45 years old (43.9%). As for body mass index, 39.9% of the whole cohort were obese.

In addition, 68.1% were married, 47.5% had a bachelor's degree, and 34.6% were employed. Furthermore, 86% of the patients have never smoked, and 42.5% had health insurance from the ministry of health. All demographic data are shown in detail in Table 1.

### Medications compliance among patients

The frequency of missed pills was identified over different chronic conditions among the included patients. It has been shown that the lowest incidence of missing pills was among patients with heart failure, followed by chronic kidney disease, whereas the highest frequency of missing pills was among patients with vitamin D deficiency, followed by hyperlipidemia.

Moreover, the distribution of chronic conditions among patients has been examined. The most prevalent chronic condition was vitamin D deficiency, followed by hyperlipidemia, while the least common chronic condition was heart failure followed by chronic kidney disease as shown in Figure 1.

### Pills are taken daily

Participants were also asked about the number of pills administered on a daily basis. 41.9% of the patients administered pills once daily, while 0.7% of patients administered pills more than four times daily, as shown in Table 2.

### Use of reminders

Patients were asked about their use of reminders. Regarding the type of reminders use, 38.5% of the patients use mobile applications as reminders for the administration of their medications, while only 7.3% use phone alarms as shown in Table 3.

As for the relation between the number of pills administered and the use of reminders, patients taking more than four pills a day are the most common to use reminders (50%), while those taking four pills per day are the least common to use reminders as shown in Figure 2.

### Adherence level among participants

The adherence of patients was also assessed. 48.2% of the patients stopped medications without consulting their doctors, where 20.9% stopped one medication for less than a month. Furthermore, 55.8% of the patients were able to refill medication in a year regularly without problems.

**Table 1: Sociodemographic data of responders to the questionnaire**

Characteristics of the study group (n=301)	n (% of Total)
Gender	
Male	94 (31.2)
Female	207 (68.8)
Age	
15-30 years	86 (28.6)
31-45 years	83 (27.6)
Above 45 years	132 (43.9)
Body Mass Index (BMI)	
Underweight (< 18.50 kg/m <sup>2</sup> )	15 (5)
Normal (18.50-24.99 kg/m <sup>2</sup> )	75 (24.9)
Overweight (25-29.99 kg/m <sup>2</sup> )	91 (30.2)
Obese (>30 kg/m <sup>2</sup> )	120 (39.9)
Social Status	
Single	74 (24.6)
Married	205 (68.1)
Separated	14 (4.7)
Widowed	8 (2.7)
Education	
Illiterate	10 (3.3)
Literate	2 (0.7)
Primary-Preparatory degree	20 (6.6)
Secondary degree	45 (15)
Post-High school	28 (9.3)
Some college with no degree	22 (7.3)
Bachelor's degree	143 (47.5)
Master's degree	23 (7.6)
Doctorate or equivalent	8 (2.7)
City	
Riyadh	205 (68.1)
Qassim	17 (5.6)
Jeddah	15 (5)
Others	28 (9.3)
Employment status	
Student	52 (17.3)
Unemployed	32 (10.6)
Employed	104 (34.6)
Housewife	30 (10)
Self-employment	17 (5.6)
Retired	66 (21.9)
Smoking	
Never smoked	259 (86)
Ex-smoker	15 (5)
Current smoker	27 (9)
Exercise	
Not exercising regularly	134 (44.5)
Exercising occasionally	140 (46.5)
Exercising regularly	27 (9)
Health Insurance	
Ministry of health	128 (42.5)
Military health insurance	67 (22.3)
University Health insurance	26 (22.3)
Private healthcare sector through private insurance	91 (30.2)
Private healthcare sector through private cash	66 (21.9)

On the other hand, 57.5% forgot to take drug doses, with a mean of  $8.55 \pm 26.3$  forgotten doses in a year, as shown in Table 4.

**Table 2: The number of pills administered daily**

Number of pills taken daily	n	%
Once	126	41.9
Twice	107	35.5
Three	35	11.6
Four	12	4.0
More than 4	2	0.7
As needed	4	1.3
Others	15	5.0

### Risk factors for noncompliance

Different socio-demographic variables were examined to explore the factors influencing noncompliance in chronic patients. Females showed a higher incidence of noncompliance (52.2%), and patients aging between 31 and 45 years old, obese patients, married patients, illiterate, self-employed, patients with military health insurance, those who are exercising regularly, and ex-smoker all showed a higher incidence of noncompliance to medications as shown in Table 5.

### Reasons for noncompliance

Patients were also asked about the reasons behind their noncompliance to medications. The most common reason for noncompliance was forgetfulness in more than 60% of patients, as shown in Figure 3.

### Reasons for noncompliance in terms of the patient-physician relationship

It has been shown that 56.2% of noncompliant patients follow two physicians; also, 57.5% of the noncompliant patients had a clear education about their management plan, and 47.9% of them had an average relationship with their physicians. Furthermore, 63.2% of the patients did not have a GP to help them stick to the medication plan, as shown in Table 6.

In addition, the reasons for the inability to refill medications were explored, where the most common reason was forgetfulness in 30% of patients, followed by long waiting for appointments, as shown in Figure 4.

## Discussion

Patients with chronic conditions can have more than one type of medications.<sup>[13]</sup> This is known as polypharmacy and can increase the risk of confusion or noncompliance to medications' administration. Consequently, it can increase the risk of toxicity, especially in the elderly population.<sup>[14]</sup> Hence, it is crucial to understand the factors influencing noncompliance to medications in patients with comorbid conditions to reduce the incidence of complications and toxicity.<sup>[15]</sup>

The present study aimed to evaluate patients' attitudes and risk factors that affect the compliance with chronic disease medications in the main cities of Saudi Arabia. The study demonstrated that the lowest incidence of missing pills was

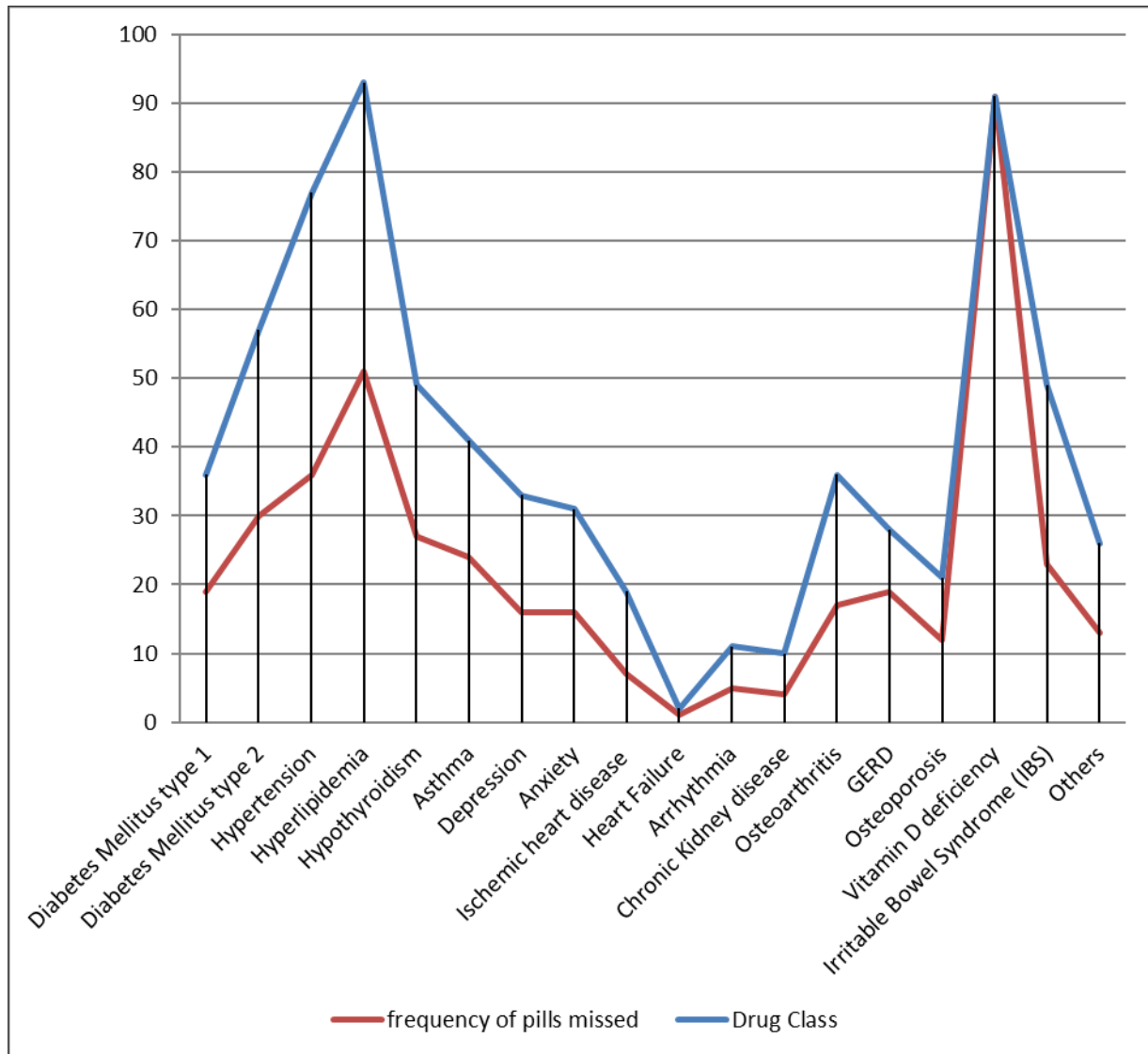


Figure 1: Spread of chronic diseases among participants and frequency of missing pills in relation to each disease

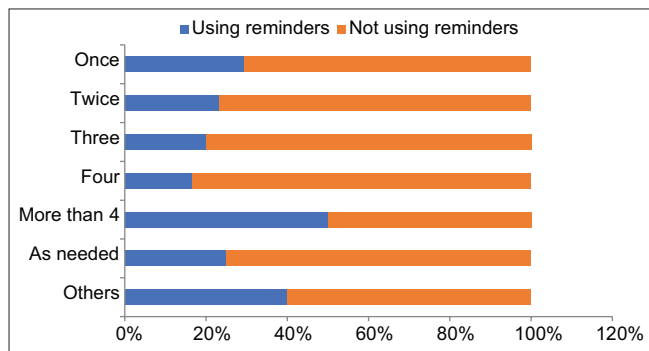


Figure 2: Correlation between the numbers of pills used daily and the need to use a reminder

among patients with heart failure, followed by chronic kidney disease. The highest frequency of missing pills was among patients with vitamin D deficiency, followed by hyperlipidemia.

Some patients also used reminders for their medications; 38.5% used mobile applications as reminders for the administration of their medications, and those taking over four pills a day were the most common to use reminders (50%). 48.2% of the patients stopped medications without consulting their doctors, where 20.9% stopped one medication for less than a month. 57.5% forgot to take drug doses in a year, with a mean of  $8.55 \pm 26.3$  forgotten doses.

As for the risk factors to noncompliance to medications, females, patients aging between 31 and 45 years old, obese, married, illiterate, self-employed, patients with military health insurance, those who are exercising regularly, and ex-smoker all showed a higher incidence of noncompliance to medications. The main reason for noncompliance was forgetfulness in 60% of patients. 63.2% of the patients did not have a GP to help them stick to the medication plan.

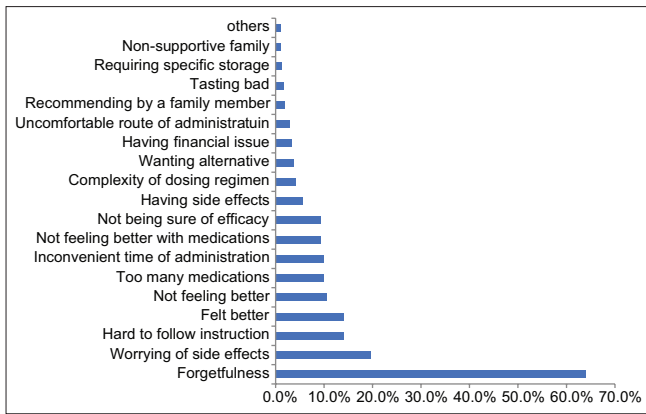


Figure 3: Reasons for noncompliance to medications

Compliance with chronic disease medications has been investigated in different care settings. Shamkuwar *et al.*<sup>[16]</sup> evaluated the attitude toward medication compliance in Indian patients. Through interviewing patients presenting to a tertiary hospital, Shamkuwar *et al.*<sup>[16]</sup> demonstrated that the knowledge of patients toward their disease was low, which resulted in a low level of adherence to their medical treatment.

Although the present study did not investigate patients' knowledge toward their disease, the compliance toward chronic medications was considered low. The highest incidence of missing pills was among patients with vitamin D deficiency, followed by hyperlipidemia. Also, 48.2% of the patients stopped medications without consulting their doctors.

Furthermore, Pages-Puigdemont *et al.*<sup>[17]</sup> examined patients' perceptions of compliance with chronic disease medications in 36 patients and showed that there are multiple factors affecting patients' compliance, the most important of which is the patient-physician relationship.

Similarly, the present study showed that 63.2% of the patients did not have a GP to help them stick to the medication plan. Also, only 47.9% of them had an average relationship with their physicians. This should encourage the improvement of the relationship between patients and physicians.

In addition, Abebaw *et al.*<sup>[18]</sup> evaluated the adherence of diabetic patients toward their medications in Ethiopia. They revealed a low level of adherence to diabetes medications in 20% of patients and showed that knowledge about the disease is the most significant factor affecting medication adherence.

And as for hypertension, a recent study by Roka *et al.*<sup>[19]</sup> in 2020 has shown that 72% of the patients had decreased adherence to anti-hypertensive medications, mostly among females (77%); factors that aided in this were having multiple comorbidities, getting the medication for free, and no follow up or check ups with their regular family physician or GP.<sup>[19]</sup>

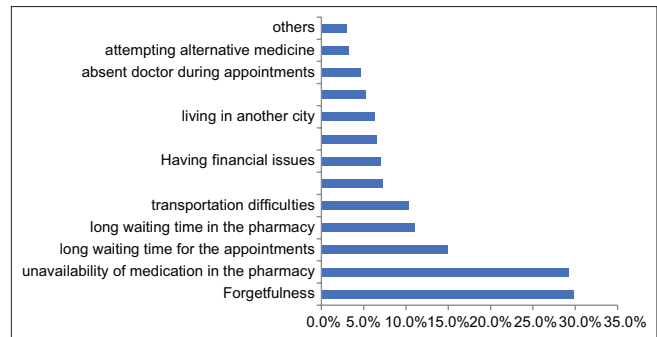


Figure 4: Reasons for inability to refill medications in a year

Table 3: Types of reminder used for medication adherence

	n	%
Not using reminders	222	73.8
Among reminders	79	26.2
Family member	29	26.6
Apps	42	38.5
Pill divider	30	27.5
Phone Alarm	8	7.3

Table 4: Adherence level among participants

Stopping pills without consultation	n	%
No	156	51.8
Stopped	145	48.2
one medication stopped for less than a month	63	20.9
one medication stopped for more than a month	51	16.9
multiple medications for less than a month	20	6.6
multiple medications for more than a month	9	3.0
other	2	0.7
The ability to refill medications in a year		
Regular with no problems	168	55.8
Regular with problems	72	23.9
Not needed	57	18.9
Forgetting taking doses in a year		
No	128	42.5%
Yes	173	57.5%
<b>Proximal number of forgotten doses in a year</b>	<b>Mean±SD (Min-Max)</b>	
	8.55±26.394 (0-300)	

The present study also showed an unsatisfactory level of compliance toward chronic medications. The most common factors affecting adherence are gender (females), middle-age (31 to 45 years old), obesity, marriage, illiteracy, and ex-smoking.

The limitation of the present study: the participants' responses depend only on their honesty and subjective opinions, which might affect the reliability of the results. This is the first study to assess medication compliance behaviors in Saudi Arabia.

**Table 5: Factors affecting medication compliance**

Characteristics of the study group	Compliant n=145	Noncompliant n=156
Gender		
Male	46 (48.9%)	48 (51.1%)
Female	99 (47.8)	108 (52.2%)
Age		
15-30 years	45 (52.3%)	41 (47.7%)
31-45 years	38 (45.8%)	45 (54.2%)
Above 45 years	62 (47)	70 (53.0%)
Body Mass Index (BMI)		
Underweight (<18.50 kg/m <sup>2</sup> )	7 (46.7%)	8 (53.3%)
Normal (18.50-24.99 kg/m <sup>2</sup> )	35 (46.7%)	40 (53.3%)
Overweight (25-29.99 kg/m <sup>2</sup> )	40 (44.0%)	51 (56.0%)
Obese (>30 kg/m <sup>2</sup> )	63 (52.5%)	57 (47.5%)
Social Status		
Single	36 (48.6%)	38 (51.4%)
Married	97 (47.3%)	108 (52.7%)
Separated	8 (57.1%)	6 (42.9%)
Widowed	4 (50%)	4 (50%)
Education		
Illiterate	3 (30.0%)	7 (70.0%)
Literate	1 (50.0%)	1 (50.0%)
Primary-Preparatory degree	11 (55.0%)	9 (45%)
Secondary degree	21 (46.7%)	24 (53.3%)
Post-High school	16 (57.1%)	12 (42.9%)
Some college with no degree	13 (59.1%)	9 (40.9%)
Bachelor degree	70 (49%)	73 (51%)
Master degree	7 (30.4%)	16 (69.6%)
Doctorate degree or equivalent	3 (37.5%)	5 (62.5%)
City		
Riyadh	96 (%)	109 (%)
Qassim	8 (47.1%)	9 (52.9%)
Jeddah	8 (53.3%)	7 (46.7%)
Others	33 (51.6%)	31 (48.4%)
Employment status		
Student	24 (46.2%)	28 (53.8%)
Unemployed	51 (49.0%)	53 (51.0%)
Employed	19 (59.4%)	13 (40.6%)
Housewife	17 (56.7%)	13 (43.3%)
Self-employment	6 (35.3%)	11 (64.7%)
Retired	39 (59.1%)	27 (40.9%)
Smoking		
Never smoked	123 (47.5%)	136 (52.5%)
Ex-smoker	7 (46.7%)	8 (53.3%)
Current smoker	15 (55.6%)	12 (44.4%)
Exercise		
Not exercising regularly	63 (47.0%)	71 (53.0%)
Exercising occasionally	70 (50.0%)	70 (50.0%)
Exercising regularly	12 (44.4%)	15 (55.6%)
Health Insurance		
Ministry of health	61 (47.7%)	67 (52.3%)
Military health insurance	28 (41.8%)	39 (58.2%)
University Health insurance	11 (42.3%)	15 (57.7%)
Private healthcare sector through private insurance	45 (49.5%)	46 (50.5%)
Private healthcare sector through private cash	37 56.1 (%)	29 (43.9%)

## Conclusion

The practices and behaviors of Saudi patients in main cities

of Saudi Arabia toward chronic disease medications are unsatisfactory and require improvement. The awareness of patients toward their medications and their diseases also need

**Table 6: Factors of noncompliance among participants in terms of the patient-physician relationship**

Characteristics of the study group	Compliant n=145	Noncompliant n=156
Number of physicians followed		
No physicians	4 (44.4%)	5 (55.6%)
One	84 (46.4%)	97 (53.6%)
Two	28 (43.8%)	36 (56.2%)
Three	21 (63.6%)	12 (36.4%)
Four	2 (50.0%)	2 (50.0%)
More than four	6 (60.0%)	4 (40.0%)
Education about the management plan		
No	20 (57.1%)	15 (42.9%)
Unclear	11 (91.7%)	1 (8.3%)
Bad-poor	23 (59.0%)	16 (41.0%)
Not applicable	0 (0%)	1 (100.0%)
Clear	91 (42.5%)	123 (57.5%)
Relationship with physicians		
Good	82 (44.1%)	104 (44.9%)
Average	49 (52.1%)	45 (47.9%)
Bad	14 (66.7%)	7 (33.3%)
Having GP		
Yes	115 (49.1%)	119 (50.9%)
No	7 (36.8%)	12 (63.2%)
I don't know	23 (47.9%)	25 (52.1%)
GP helped in sticking to the plan		
Yes	115 (49.1%)	119 (50.9%)
No	7 (36.8%)	12 (63.2%)

to be improved by awareness campaigns in public areas and social events and strong physicians-patients relationship through clarifying the role of the physician to guide patients through their treatment. In addition, similar studies are also required in other areas in Saudi Arabia to explore compliance toward chronic disease medications all over the kingdom.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

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