Original Article

EVALUATION OF MEDICATION COMPLIANCE IN PATIENTS WITH CONGESTIVE HEART FAILURE IN YEMEN

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ABSTRACT

Objective: Non-compliance with heart failure medication is related to the highest mortality, morbidity, and health-care costs. The objective of this study was to evaluate medication compliance with patients with congestive heart failure.

Methods: Inpatients of the cardiac care unit and medical ward of Republican Hospital, German Hospital, Revolutionary Hospital, and Chinese–Yemeni Friendship Hospital were recruited for this study. The study was conducted on patients that were diagnosed as having congestive heart failure and were receiving treatment. Questionnaires were distributed and personal interviews to evaluate the patients' compliance was conducted to determine the reasons for their non-compliance in taking drugs.

Results: Of 86 patients, 44% (n = 38) reported compliance and 56% (n = 48) reported non-compliance. The distribution of the patients in terms of sex was as follows: among men, 41% (n = 24) were compliant and 59% (n = 35) were non-compliant; among women, 52% (n = 14) were compliant and 48% (n = 13) were non-compliant. In addition, smoking status was too significantly linked with non-compliance ($P = 0.001$). Furthermore, the status of chewing of khat tree leaves was also significantly associated with non-compliance ($P = 0.007$).

Conclusion: This study indicates that the reasons for non-compliance with medications among patients can be attributed to lack of education, chewing of khat tree leaves, lack of health insurance, and cigarette smoking. Therefore, healthcare professionals should create strategies to address these reasons in order to increase medication compliance with patients in heart failure.

Keywords: Congestive heart failure, Medication, Compliance, Patients

INTRODUCTION

Heart failure (HF) is a clinical syndrome observed by breathing trouble, ankle enlargement, and weakness that can be accompanied by elevated jugular venous pressure, pulmonary crackles, and peripheral edema [1].

More than 5.7 million general public in the United States and at least 23 million persons worldwide live with HF, which is related to considerable illness, death, and healthcare costs [2].

By 2030, the prevalence of HF in the United States is estimated to rise by 46% to about 8.5 million persons [3]. Numerous countries in the Middle East have experiential rises in the prevalence of the risk factors of the increase in HF [4]. Permitting to the HF guidelines on the European Society of Cardiology and the American Heart Association/American College of Cardiology, multiple medications (e. g., angiotensin-converting enzyme inhibitors [ACEIs], diuretics, beta-blockers, spironolactone, digoxin) are useful for patients with HF and should, therefore, was prescribed. Non-pharmacological routine changes, such as fluid and sodium restriction, regular weighing, movement adjustment, vaccination against influenza, stop smoking, and limiting alcohol intake, have been recommended. Compliance has long been documented as a significant matter in health care [5]. A significant first step to successful medication compliance is defining the factors that influence compliance. Accordingly, the aims at this study were to evaluate the medication compliance with patients with congestive heart failure.

MATERIALS AND METHODS

A prospective observational study with the purposive random sample was conducted at the cardiac inpatient department of four government hospitals Revolutionary Hospital, German Hospital, Republican Hospital, and Chinese–Yemeni Friendship Hospital in Sana'a, Yemen. Patients were registered prospectively for a period of 5 mo (from March 2016 to July 2016). A validated standard questionnaire assessing medication adherence was used to survey the patients, after its translation to the Arabic language. A total of 86 patients with congestive heart failure (CHF) underwent personal interviews, and related data were collected after a medical chart review. The diagnosis of HF was documented based on patient history, physical investigation, and echocardiography. The patients were aged>20 y, were confirmed to have a diagnosis of HF, and were receiving HF medications. Appropriate ethical approval was obtained from the involved hospitals. The data collection form was used to assemble the patients' associated with data (age, sex, education status, the status of chewing khat tree leaves, cigarette smoking, medical insurance status, and prescribed drugs).

Their current medication was obtained through the questionnaire. This questionnaire was offered in Arabic. Data were entered and examined by means of Microsoft Excel 2007 for Windows. Continuous data were statistically examined using Student's t-test, and categorical data were analyzed using the chi-square test. Descriptive analysis was used to summarize the data. The level of significance was assigned to $P<0.05$.

RESULTS

A total of 86 patients were recorded in the present study. 69% (n = 59) of the subjects were men, and 31% (n = 27) were women. The mean patient age was 56.9 (±16) years.

The patients' demographic characteristics are presented in table 1. In this study, 53(n = 46) patients were non-educated and 47% (n = 40) were educated. In addition, 45% (n = 39) patients were non-smokers and 55% (n = 47) patients were smokers. On the other hand, 44% (n = 38) patients did not chew khat tree leaves and 56% (n = 48) patients were chewers of khat tree leaves. Among the

patients, 83% (n = 71) did not have medical insurance and 17% (n = 15) had medical insurance. The results of this study showed that the patients' age had an influence on their compliance behavior (*P*<0.0001), as shown in table 2.

In the present study, educational status was significantly linked with non-compliance. In group 1, the percentage of non-educated patients was 33% (n = 15) and the percentage of educated patients was 57% (n = 23). On the other hand, in group 2, the percentage of non-educated patients was 67% (n = 31) and the percentage of educated patients was 43% (n = 17). In addition, smokers were more than non-smokers likely to belong to the compliance group, consequently, smoking status was too significantly linked with non-compliance (*P* = 0.001). Furthermore, the status of chewing of khat tree leaves was also significantly associated with non-compliance (*P* = 0.007) (table 3).

In group 1, there were 61% (n = 23) patients that did not chew khat tree leaves and 31% (n = 15) patients who did chew khat tree leaves. In comparison, in group 2, 39% (n = 15) patients did not chew khat tree leaves and 69% (n = 33) patients did chew khat tree leaves (*P* = 0.007). Moreover, health insurance status was also significantly associated with non-compliance (*P* = 0.002).

In group 1, 37% (n = 26) patients had no medical insurance and 80% (n = 12) patients were medically insured. In comparison, in group 2, 63% (n = 45) patients had no medical insurance and 20% (n = 3) patients were medically insured.

According to the results of the present study (table 4), diuretics were the most prescribed medications (about 89.3% of all prescribed medications), followed by angiotensin-converting enzyme inhibitors (ACEIs), digoxin, aspirin, anticoagulants, nitrates, beta-blockers, and calcium channel blockers (CCBs) (76.5%, 63.5%, 61.6%, 57%, 30.3%, 28%, and 21%, respectively). On the other hand, angiotensin receptor blockers (ARBs) had a prescribed rate of about 13%, whereas anti-arrhythmic drugs were rarely prescribed (9.3%).

In general, using the Morisky Medication Adherence Scale [6] and the questionnaires used during the personal interviews for the patients in this study, it was determined that the percentage of patients with medication compliance was 44% (n = 38) and that of non-compliant patients was 56% (n = 48) (table 5).

The distribution of drug class according to compliance status is presented in fig. 1. It was found that patients had the highest percentages of compliance with diuretics, ACEIs, nitrates, ARBs, beta-blockers, and anti-arrhythmic drugs (92%, 82%, 37%, 15.8%, 32%, and 13%, respectively). On the other hand, it was shown that patients had the highest rates of non-compliance to digoxin (69%), anticoagulants (67%), CCBs (23%), and aspirin (63%).

Table 1: The demographic forms of the patients in the existing study

Characteristic		Frequency	(%)
Age, mean (±SD), 56.9±16 y			
Sex	Men	59	69
	Women	27	31
Education status	Educated	40	47
	Non-educated	46	53
Smoking status	Smoker	47	55
	Non-smoker	39	45
Chewing of khat tree leaves	Chewer	48	56
	Non-chewer	38	44
Health insurance status	With insurance	15	17
	Without insurance	71	83

SD: Standard deviation; CHF: Congestive heart failure

Table 2: Distribution and influence of age among study groups

Age*	n	Minimum	Maximum	Mean	SD	P-value
Non-compliance group	48	20.00	90.00	58.8	14.9	0.0001
Compliance group	38	20.00	85.00	54.5	16.8	

P<0.05 was considered statistically significant. SD: Standard deviation.

Table 3: Compliance rate among patient groups according to study variables

Study variable		Compliance group 1		Non-compliance group 2		P-value*
		Freq	%	Freq	%	
Sex	Men	24	41	35	59	0.333
	Women	14	52	13	48	
	Non-educated	15	33	31	67	
Education status	Educated	23	57	17	43	0.011
	Non-smoker	25	64	14	36	
Smoking status	Smoker	13	28	34	72	0.001
	Non-chewer	23	61	15	39	
Chewing of khat tree leaves	Chewer	15	31	33	69	0.007
	Without insurance	26	37	45	63	
Health insurance status	With insurance	12	80	3	20	0.002

P<0.05 was considered statistically significant. Group 1: Compliant; Group 2: Non-compliant. Freq: Frequency.

Table 4: Distribution of medication classes in the middle of patients

Drug class	Frequency of prescribed class	(%)
Diuretics	77	89.3
ACEIs	66	76.5
Nitrates	26	30.3
ARBs	12	13
Digoxin	55	63.5
B-blockers	24	28
Anticoagulants	49	57
Antiarrhythmic drugs	8	9.3
CCBs	18	21
Aspirin	53	61.6

ACEIs: Angiotensin-converting enzyme inhibitors; ARBs: Angiotensin receptor blockers; CCBs: Calcium channel blockers.

Table 5: Morisky scale

| Factor loadings of the four-item medication adherence scale	Yes (n)	No (n)
Are you uncaring at times with taking medication?	48	38
Do you from time to time forget to take your medications?	48	38
When you transportable or leave home, do you on occasion forget to take along your medications?	44	42
When you feel similar your symptoms are under control, do you sometimes discontinue taking your drug?	36	50
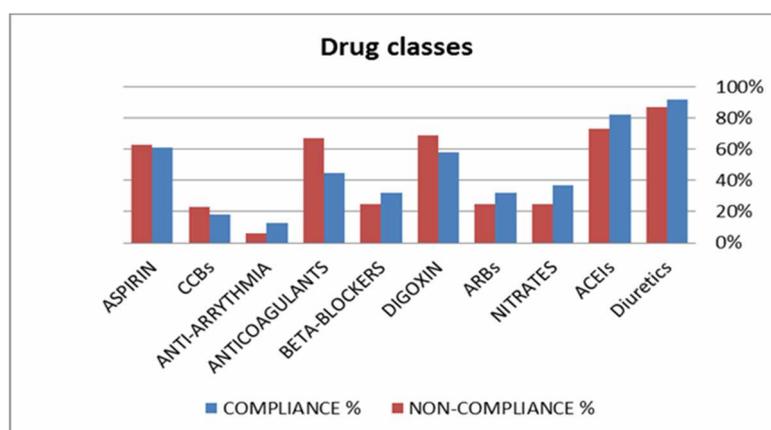
Fig.1: Distribution of medication classes according to compliance status. CCBs: Calcium channel blockers; ARBs: Angiotensin receptor blockers; ACEIs: Angiotensin-converting enzyme inhibitors

DISCUSSION

In patients with HF, medication non-compliance adversely affects their qualities of life, increases mortality and morbidity, which is one of the major causes of recurrent hospitalizations [7]. Some studies indicated that up to 60% of all medications prescribed were taken incorrectly, or not at all [8,9]. The present study showed that the non-compliance rates were 56%. The study by Ni *et al.* found a non-compliance rate of 23% [10]. On the other hand, Evangelista *et al.* reported a non-compliance rate of only 4% [11]. In contrast, data on the Asian population reported by Sayed *et al.*[12] showed a non-compliance rate of 72.7%, which is high when compared with that was found in our study. There are different methods of assessing compliance with medications, and various studies have used different compliance assessment methods that involve different procedures in different patient populations, which make comparisons between them inaccurate. This could be a partial reason for the variation in compliance rates. In this study, education status was significantly linked with non-compliance. In group 1 in this study, the percentage of non-educated patients was 33% (n = 15) and the percentage of educated patients was 57% (n = 23). On the other hand, in group 2, the percentage of non-educated patients was 67% (n = 31) and the percentage of educated patients was 43% (n = 17). The study by Chui *et al.* showed a highly significant association with education status with non-compliance[13].Another study by Berkman *et al.* reported that to non-educated patients, only 43 (23.5%) werecompliant and 140 (76.5%) were non-compliant, whereas among educated patients, 30 (35.7%) were compliant and 54(64.3%) were non-compliant[14]. Our results confirmed those of the above-mentioned studies, showing that lack of education was the main reason for non-compliance. Additionally, the present study showed a strong significant relationship to cigarette smoking with non-compliance. The results confirm the findings of two previous studies suggesting that current smokers were more likely to be non-compliant than current non-smokers [15, 16]. Several studies have reported that increases to HF rate and blood pressure were associated with chewing of khat tree leaves [17,18]. This study showed that 56% (n = 48) patients were chewers of khat tree leaves, and most of them were non-compliant in taking medications. The present study found that patients that did not have health insurance comprise 83% of the total population, indicating that most of the population did not have health insurance coverage. Furthermore, this study showed that the compliance rates were higher in patients with health insurance coverage than in those without. This indicated that a health insurance scheme can improve medication compliance with patients. The study by Chi-Kwon *et al.* showed that patients who had no insurance coverage or who had a low salary were more likely to be non-compliant with medication [19]. The results of the present study confirmed the findings of Chi-Kwon *et al.* However, it is difficult to compare various studies because of differences in the study population, measurement instruments, and in interventions that were used to improve compliance. Evaluating these differences might explain the different outcomes. In this study, diuretics were the most prescribed medication (about 89.3%), followed by ACEIs,

digoxin, aspirin, anticoagulants, nitrates, and beta-blockers(76.5%, 63.5%, 61.6%, 57%, 30.3%, and 28%, respectively).

A similar study by Sayed *et al.* showed treatment rates of 60.2% for diuretics, 56.1% for ACEIs, and 38.2% for digoxin, which were lower than the ratios reported in this study [20]; however, their rates for beta-blockers (45.3%) and aspirin (78.6%) were higher than those of our study. According to European, American, and Canadian studies, 28–75% of patients with HF are prescribed with ACEIs and only 11.8–41% are prescribed with beta-blockers [21,22]. These were confirmed in our study, in which the prescription rate of beta-blockers was 28% and that for ACEIs was 76.5%. Current guidelines recommend the routine use of ACEIs or ARBs, and beta-blockers in patients with HF, owing to their proven effectiveness in improving morbidity, mortality, and hospitalization rates [23]. In the present study, the compliance rate of ACEIs was 82%, which is low when compared to another study that showed a compliance rate of 92.9% to ACEIs[24]. Another study by Parameswaran *et al.* reveals that the rates of continued therapy with beta-blockers at 6, 12, and 24 mo were 69%, 70%, and 74%, respectively [25]. The outcomes of the present study found a compliance rate of 32% for beta-blockers, which is low compared to that in the previous study. The present study showed that the compliance rates for digoxin among patients with HF were 58%, which is higher than the 10% rate reported by Monane*et al.*[26].

CONCLUSION

This study indicates that the reasons for non-compliance with medications among patients can be attributed to lack of education, chewing of khat tree leaves, lack of health insurance, and cigarette smoking. Therefore, healthcare professionals should create strategies to address these reasons, and learn to recognize the risk and of lack of education, cigarette smoking, and chewing of khat leaves to increase medication compliance with patients in CHF. Increasing the patients' knowledge about their disease is extremely useful and advisable, and might ultimately lead to a reduction in the incidence and prevalence of HF, which, in turn, would contribute to the overall improvement in the population's health status.

RECOMMENDATIONS

Following is a list of recommendations specified to a medical doctor in a work to improve compliance: Create it clear to patients that they themselves take in the drug as being significant. Make available clear guidelines. Style the medication programs to the patient's individual timetable. Review the significance of compliance with patients. Give a basic knowledge to patients in self-monitor. Begin regular communication with patients. Provide cognitive to assist in the patients. recommend patients to stop chewing khat tree leaves. Approving to the heart failure (HF) guidelines on the European Society of Cardiology (ESC) and the American Heart Association/American College of Cardiology (AHA/ACC) multiple drugs (ACE-inhibitors, diuretics, beta-blockers, spironolactone, digoxin) are advantageous to heart failure (HF) patients and should, therefore, be prescribed (Martj*et al.*, 2005)[27]. The Governmental and Private Hospitals in Yemen required clinical pharmacist for the reason that the clinical pharmacist can donate to confident result by teaching and recommend patients to prepare and encourage them to monitor their beneficial course of therapy and specialist care plans. The clinical pharmacist can make available best medication therapy to increase a patient's quality of natural life by treatment of disease. The community-founded pharmacist is one that has a direct contribution to a patient's treatment strategy, has direct and repeated communication with the medical doctor. The community-founded pharmacist can develop compliance and shares this evidence of the medical doctor to develop patient's carefulness and medication compliance (Dunbar-Jacob*et al.*, 2001)[28].

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LIST OF ABBREVIATIONS

ACEI, an angiotensin-converting enzyme inhibitor, ARB, angiotensin receptor blocker, CCB, calcium channel blocker, CHF, congestive heart failure, HF, heart failure

AUTHORS CONTRIBUTIONS

All the author have contributed equally

CONFLICT OF INTERESTS

The authors approve that they have no conflicts of interest in the declaration

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