

Alireza Shamsi¹, Hooria Yavarmanesh², Hani Harati³, Shiva Eiliaei¹, Majid Sadeghian¹

¹School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

²Faculty of Medicine, Zahedan University of Medical Sciences, Zahedan, Iran

³Department of Cardiology, Ali Ibn Abi Talib Hospital, Faculty of Medicine, Zahedan University of Medical Sciences, Zahedan, Iran

The relationship between medication adherence and affective temperaments in patients with congestive heart failure

Abstract

Introduction: Congestive heart failure (CHF) is a serious condition and lack of medication adherence is one of the most common problems in the treatment of patients with CHF. This study aimed to determine the relationship between medication adherence and affective temperaments in patients with CHF.

Material and methods: This cross-sectional study was performed on 150 patients, who were referred to the cardiology clinic of Ali Ibn Abi Talib Hospital of Zahedan, Iran in 2017–2018. Morisky Medication Adherence Scale (MMAS-8), Temperament Evaluation of Memphis, Pisa, Paris, and San Diego auto questionnaire (TEMPS-A), and Beck Depression Inventory-II (BDI-II) were used to collect data. For statistical analysis, SPSS-18 was used. Logistic regression was done for modeling the relationship between medication adherence.

Results: Generally, 54% of the patients were euthymic, while 16%, 23.33%, and 6.66% of them suffered from mild, moderate, and severe depression, respectively. The medication adherence was high, moderate, and low in 30.66%, 46%, and 23.33% of the patients, respectively. There was a significant relationship between medication adherence and depressive ($P = 0.049$), cyclothymic ($P = 0.01$), and irritable ($P = 0.01$) affective temperaments. Only BDI-II score ($P = 0.018$) was identified as predictors of drug adherence.

Conclusions: Despite the statistically significant relationship between depressive, cyclothymic, and irritable temperaments and adherence, affective temperaments cannot be considered as a predictor of adherence in patients with CHF.

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Key words: medication adherence, congestive heart failure, affective temperaments, depression

Introduction

Cardiovascular diseases are one of the most common chronic diseases worldwide, which are known as one of the main causes of morbidity and mortality [1, 2]. Congestive heart failure (CHF) is a chronic progressive condition, which is associated with the inefficiency of the heart in pumping and maintaining the blood flow [1]. According to the American Heart Association (AHA), about 5.8 million people in the USA and 22 million people worldwide suffer from heart failure. In addition,

550,000 people are annually diagnosed with CHF [3, 4]. As the rate of CHF increases, it imposes heavy costs on the health systems [4].

The treatment process of patients with heart failure is difficult because of the complex and diverse medication regimens used for these patients [5]. Previous studies showed that about half of CHF patients do not comply with the regimens prescribed by their physicians, which can lead to devastating consequences and their re-hospitalization [6].

Some factors such as hyperlipidemia, hypertension, high body mass index (BMI), diabetes mellitus, thyroid disorders, and health-related behaviors such as smoking and alcohol use play a major role in the incidence of cardiovascular diseases; these conditions may also affect the

Adres do korespondencji:

Alireza Shamsi
School of Medicine
Shahid Beheshti University
of Medical Sciences, Tehran, Iran
e-mail: ar.shamsi@sbmu.ac.ir

treatment process in CHF patients [7]. In some patients with asymptomatic cardiac dysfunction, medication non-adherence can lead to disease development and exacerbation [8]. After identification of the risk factors for heart failure, great attention has been focused on medication adherence and self-care behaviors in recent years [9, 10].

On the other hand, personality characteristics are a main important factor affecting the self-care behaviors of individuals [11]. Behavioral researchers have focused on the role of psychological factors and problems such as stress, tension, anxiety, depression, and type A behavior pattern on CHF [12]. Furthermore, they assessed other personality characteristics contributing to the incidence of CHF in addition to the classical elements [13]. Recent studies have highlighted the role of affective factors such as anger, hostility, depression, and anxiety in the development and progression of CHF [14]. As a result, personality characteristics are closely related to physical health [15].

Personality bridging inborn temperamental and learned characterological features associated with psychological and behavioral traits. Temperament is closer to "humoral theory" and represents the biological core of personality with the genetic and constitutional endowment. Character is more linked to nurturing, comprising acquired competencies during development, namely interpersonal development [16]. Some of the previous studies have revealed that medication adherence is been influenced by personality characteristics such as affective temperaments [17].

Considering the high importance of CHF and the limited number of studies examining the relationship between affective temperaments and medication adherence, this study aimed to determine the relationship between affective temperaments and medication adherence in patients with CHF.

Material and methods

This cross-sectional study was performed on patients referred to the cardiology clinic of Ali Ibn Abi Talib Hospital of Zahedan, Iran in 2017 and 2018 with the diagnosis of CHF. By using the available sampling method, 156 patients were included in the study. First, the patients who met the inclusion criteria were selected. Of 156 participants, 6 patients with incomplete questionnaires were excluded from the study. At the end, 150 subjects were enrolled in the study.

Inclusion and exclusion criteria

The inclusion criteria were as follows: 1) age \geq 18 years; 2) diagnosis of CHD based on patient's clinical record;

3) at least three months elapsed from the diagnosis of CHF; 4) presence of New York Heart Association (NYHA) class II or III symptoms based on patient's clinical record; 5) left ventricular ejection fraction (LVEF) \leq 45%; 6) the number of medications taken daily for the treatment of CHF \leq 5; 7) proficiency in reading and writing Persian; and 8) providing informed consents.

Patients with severe cognitive problems, LVEF greater than 45%, and NYHA class I or IV symptoms were excluded from the study. Lack of patient's consent to participate in the study was another exclusion criterion.

Data collection tools

Morisky Medication Adherence Scale (MMAS-8)

Morisky Medication Adherence Scale (MMAS-8) is a structured, self-reported medication adherence measure [18]. This scale had been used to evaluate medication adherence in patients with heart failure [19]. The MMAS-8 has 8 items. Response choices for items 1 to 7 are "Yes" or "No". The 8th item is a Likert-type question. The total score ranges from 0 to 8. Scores of less than 6 indicate low adherence, scores of 6 to $<$ 8 indicate moderate adherence and score = 8 indicates high adherence. To perform logistic regression, patients with scores less than 6 were considered as patients with non-adherence, and patients with scores of 6 and higher were considered as patients with adherence. The Persian version of MMAS-8, that has been used in the present study, validated by Moharamzad et al. in 2015 [20].

TEMPS-A

To assess the patients' affective temperaments, we used the Temperament Evaluation of Memphis, Pisa, Paris, and San Diego Auto questionnaire (TEMPS-A).

This questionnaire was designed by Akiskal et al. [21] to assess five affective temperaments including depressive, cyclothymic, hyperthymic, irritable, and anxious temperaments.

In the present study, we used a brief Persian version of TEMPS-A which is validated in Persian language [22]. This version of TEMPS-A consists of 35 yes/no items and the score ranges from 0 to 1 for each temperament.

Beck Depression Inventory-II (BDI-II)

Beck Depression Inventory was designed by Aaron T. Beck. This instrument is a 21-item, multiple-choice, self-report inventory, which is used for measuring the severity of depression among patients. It consists of items related to depression symptoms (hopelessness and irritability), cognition (guilt or feelings of being punished), and physical symptoms (fatigue, weight loss, and lack of interest in

sex). BDI-II is a revision of BDI, designed in 1996. BDI-II is validated in Persian language [23].

Ethical considerations

The present study was approved by the Ethics Committee of Zahedan University of Medical Sciences. All the participants were assured in terms of data confidentiality and informed consent were obtained from all subjects.

Data analysis

All participants in this study completed the questionnaire related to medication adherence, affective temperaments, and depression. Afterward, the obtained data were recorded on the prepared sheets. The collected data were entered into SPSS version 18. The distribution of samples and comparison of quantitative variables were evaluated by the Kolmogorov-Smirnov test, t-test, and Man-Whitney test. The comparison of qualitative variables was performed by the Chi-square test. Also, logistic regression was used for modeling the relationship between medication adherence and the associated variables.

Results

In general, 54.66% of the patients were female, and the mean age of the patients was 48.48 ± 12.25 years.

In terms of marital status, 7.33%, 74.66%, 8%, and 10% of the patients were single, married, divorced, and widowed, respectively. Moreover, 20%, 23.33%, 18%, and 1.33% of the patients had a high school, associate degree, bachelor's degree, and master's degree, respectively; The remainder of the subjects had basic education. The level of medication adherence was high, moderate, and low in 30.66%, 46%, and 23.33% of the patients, respectively.

BDI-II showed that 54% of the patients were euthymic, whereas 16%, 23.33%, and 6.66% of them suffered from mild, moderate, and severe depression, respectively. The mean depressive temperament score was 0.562 ± 0.16 . Moreover, the mean temperament scores were 0.447 ± 0.298 , 0.508 ± 0.19 , 0.305 ± 0.194 , and 0.56 ± 0.228 in cyclothymic, hyperthymic, irritable, and anxious temperaments, respectively.

The comparison of medication adherence in CHF patients based on gender, marriage statues educational level, and severity of depression are shown in Table 1.

For evaluating the relationships between affective temperaments, BDI-II score, and medication adherence were examined by t-test and Mann-Whitney test. According to the obtained results, BDI-II score, depressive, cyclothymic, and irritable temperaments were inversely related to medication adherence. However, there was no significant

Table 1. The comparison of demographic characteristics and depression of patients with high, moderate, and low medication adherence

		Total	Medication adherence			P-value
			High	Moderate	Low	
			30.66%	46%	23.33%	
Gender	Male	45.33%	28.4%	44.8%	26.9%	0.519
	Female	54.66%	33.7%	47%	19.3%	
Marriage statues	Single	7.33%	22.2%	22.2%	55.6%	0.029
	Married	74.66%	32.7%	49.6%	17.7%	
	Divorced	8%	23.1%	23.1%	53.8%	
	Widow	10%	33.3%	53.3%	13.3%	
Education	Basic	37.33%	31%	55.2%	13.8%	0.001
	High school	20%	30%	46.7%	23.3%	
	Associate diploma	23.33%	47.1%	44.1%	8.8%	
	Bachelor	18%	14.8%	29.6%	55.6%	
	Master's degree	1.33%	0	0	100%	
Depres-sion	Normal	54%	49%	40.8%	10.2%	0.001
	Mild	16%	10%	50%	40%	
	Moderate	23.33	27.3%	33.3%	39.4%	
	Severe	6.66%	25%	58.3%	16.7%	

Table 2. The comparison between affective temperaments and BDI-II scores based on low, moderate, and high medication adherence

	Medication Adherence			P-value
	High	Moderate	Low	
Depressive Temperament	0.521 ± 0.185	0.597 ± 0.137	0.552 ± 0.155	0.049
Cyclothymic Temperament	0.339 ± 0.22	0.503 ± 0.183	0.483 ± 0.188	0.01
Hyperthymic Temperament	0.574 ± 0.194	0.459 ± 0.189	0.521 ± 0.163	0.11
Irritable Temperament	0.225 ± 0.185	0.313 ± 0.195	0.384 ± 0.169	0.01
Anxious Temperament	0.453 ± 0.266	0.599 ± 0.215	0.533 ± 0.198	0.218
BDI-II Score	11.3 ± 8.2	15.1 ± 7.9	18.5 ± 9.9	0.001

relationship between medication adherence and anxious and hyperthymic temperaments (Table 2).

For modeling the relationships between medication adherence and the related variables, logistic regression analysis was used. To determine the association between drug adherence and gender, age, depression, and temperaments, multiple correlation coefficient ($R = 0.358$), coefficient of determination ($R^2 = 0.128$), pure determination coefficient ($R^2 = 0.104$), and standard error of estimate ($SEE = 1.529$) were calculated. According to the obtained results, about 12% of the medication adherence variance score was explained by effective predictor variables; therefore, the regression was linear ($F = 5.342$; $P > 0.005$).

Simultaneous regression analysis showed that only BDI-II scores ($P = 0.018$) were identified as predictors of drug adherence. Age, gender, and temperament variables could not predict medication adherence (Table 3).

Discussion

According to the results of the present study, high medication adherence was observed in less than one-third of the cases. About half of the patients showed moderate medication adherence, and low medication adherence was observed in more than one-fifth of cases.

This study reflected a significant linear relationship between depression, depressive temperament, cyclothymic temperament, and irritable temperament with drug adherence. Our results demonstrated a lack of predictive power of different temperaments on medication adherence in CHF patients.

Non-adherence is a common problem among CHF patients [24–26]. Previous studies have been conducted about the causes of non-adherence with treatments. Some of these studies have examined the relationship between psychological factors and medication adherence. For the first time, lack of response to treatment due to non-adherence with drug and dietary regimens

was introduced as the main risk factor in patients with heart failure by Ghali et al. [27]. Based on the study by Lennie et al., non-adherence with dietary regimen was observed in three-quarters of CHF patients [26]. This finding is like the results of the present study in which only 31.3% of patients had high medication adherence. Additionally, our results are in accordance with those of Parsa-Yekta et al. [28] study, in which the rate of drug adherence was estimated at 28% in CHF patients and poor drug adherence was observed in the majority of patients with CHF.

However, the rate of medication adherence was higher in the study by Jahanpour et al. [29]. This discrepancy might be due to different study designs, different demographic characteristics, and different methods for evaluating drug adherence. On the other hand, the bias in the selection of patients in our study might have affected drug adherence rate, as our study was performed on the patients presented to the cardiology clinic and moderate symptoms (NYHA class II or III); therefore, it cannot be an accurate reflection of the CHF patients' population.

Ghali et al. found that low adherence to treatment was higher in males than the females [27], which is inconsistent with our result. However, like our study, Hadian and Mokhbary did not show any significant difference in medication adherence between the two genders [30], which was confirmed by the other similar studies [29, 31]. According to our findings, there was no statistically significant relationship between age and drug adherence. Some studies have shown that elderly patients may lack self-care and medication adherence behaviors due to disabilities of aging and problems such as cognitive problems [32]. Medication adherence was better in married patients than the single subjects, which was confirmed by other studies [5, 28]. One reason may be a higher prevalence of psychiatric disorders in single or divorced patients compared to married ones and these disorders can decrease medication adherence.

Table 3. The relationship between demographic data, depression, and affective temperaments with medication adherence

Model	Unstandardized coefficients		Standardized coefficients	T-test	P-value
	Beta	SEm*	Beta		
Fixed amount	1.534	0.837		1.834	0.069
Gender	0.376	0.257	0.116	1.462	0.146
Age	-0.03	0.01	-0.225	-2.894	0.059
Depression	0.031	0.013	0.232	0.387	0.018
Affective temperament (total)	0.007	0.011	0.062	0.629	0.531

*Standard error of measurement

Our study demonstrated that medication adherence is low in depressed patients, which can be justified considering low motivation of patients for treatment. According to the obtained results, logistic regression did not reflect any predictive association between affective temperaments and medication adherence. Hall et al. [33] showed that the anxious temperament can facilitate the diagnosis of diabetes in the early stages of the disease; however, similar to our findings, there was no significant relationship between the anxious temperament and self-care in diabetic patients at 6-month follow-up. These findings were inconsistent with the obtained results of Shamsi et al. [17]. They showed that the irritable temperament was a predictor of drug adherence. This may be as a result of the differences in sample characteristics or sample size. Also, the patients in our study suffered from CHF, while the study of Shamsi et al. was performed on the patients with diabetes.

Conclusion

Very few studies have been conducted about the relationship affective temperaments and medication adherence in patients with CHF. This may reflect the lack of attention to the relationship between medication adherence and personality characteristics and further studies in this area in the future can help clarify different aspects of this relationship and are therefore suggested. According to the findings of the present study, affective temperaments cannot be considered as a predictor of adherence in patients with CHF.

Limitations and strengths

In this study, the relationship between medication adherence and affective temperaments was assessed. In fact, no similar studies have been conducted in the Iranian population.

We used available sampling methods for subject selection, thus, future studies in other centers and with larger sample sizes are recommended.

Given this study was carried out on patients referred to cardiology clinic, it cannot be an accurate reflection of the CHF patients' population, therefore, future studies are recommended in this regard.

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