Adherence to Treatment and Its Relationship with Anxiety and Depression in Patients with Cardiovascular Disease

Seyed Mojtaba Alavi[1] iD , Seyed Mohammad Hashem Montazeri[1] iD , Zahra Taheri Kharameh[2*] iD

[1] Student Research Committee, School of Medicine, Qom University of Medical Sciences, Qom, Iran
[2] Assistant Professor, Department of Health Education and Promotion, School of Paramedical Sciences, Qom University of Medical Sciences, Qom, Iran

Corresponding author: Zahra Taheri Kharameh, School of Paramedical Sciences, Qom University of Medical Sciences, Qom, Iran. Tel: 02531971094; Email: ztaheri@muq.ac.ir

Article Info	A B S T R A C T
Article type: Original article	**Background and Aim:** Adherence to treatment is of utmost importance for the management of patients with cardiovascular disease. The present study aimed to determine the degree of adherence to treatment and its relationship with anxiety and depression in patients with cardiovascular diseases.
	Materials and Methods: A cross-sectional study was conducted among patients with cardiovascular disease admitted to teaching hospitals in Qom, Iran in 2016. One hundred sixteen patients who met the inclusion criteria were selected via the convenience sampling method. Data collection instruments included demographic information form, Adherence to Refills and Medications Scale, as well as Hospital Anxiety and Depression Scale. The data were analyzed in SPSS software using descriptive tests and linear regression analysis.
	Results: Based on the obtained results, about half of the patients (49.1%) scored lower than average in adherence to treatment. The results of multiple linear regression analysis showed that among the variables included in the univariate model (P<0.15), depression (P=-0.26; β = 0.047) and body mass index (BMI) (P=0.22; β = 0.26) were significantly correlated with treatment adherence. **Conclusion:** As evidenced by the results of the current study, patients' adherence to a medication regimen was associated with depression and BMI. Psychological problems, especially depression, deserve assiduous attention as important determinants of treatment adherence.

Introduction

Cardiovascular diseases are so prevalent that challenge all the boundaries across the globe. According to the World Health Organization (WHO), in the past few decades, cardiovascular diseases have been the leading cause of death in different age groups around the world, especially in developing countries. These diseases are also common in Iran and impose huge costs on the health care systems of the country (1). Despite their high prevalence and importance, cardiovascular diseases are among the most preventable non-communicable diseases in humans.

Patients' adherence to recommended treatment regimens is one of the important factors in the prevention and control of the disease (2). Adherence to treatment regimens refers to a range of behaviors in accordance with health care providers' recommendations regarding the prescribed treatment regimen. Adherence to a therapeutic regimen in cardiovascular diseases implies such factors as the food and medication regimen, sodium and fluid restriction, as well as lifestyle changes (3).

Treatment compliance is based on patients' participation and acceptance of responsibility so that many complications of the disease can be controlled by correct performance of the related behaviors. Adherence to treatment regimens and prescribed medications is a critical challenge for patients with chronic diseases. Patient nonadherence results in serious consequences, such as relapse and progression of disability;

consequently, they will need immediate treatment and hospitalization.

Non-adherence to pharmacological and non-pharmacological regimens (e.g., use of cardiac medications, sodium and fat restrictions, weight loss, exercise program) is associated with morbidity and mortality complications (4). The findings of related studies pointed out the low adherence to non-pharmacological recommendations and even prescription medications. Non-compliance limits the effectiveness of prevention strategies, leading to a significant increase in associated cardiovascular complications (5).

Numerous barriers, such as self-care, age-related limitations, other chronic diseases, prolonged medication use, inability to purchase medication, side effects of drug use, and psychological disorders, have been mentioned as contributors to medication nonadherence. Based on statistics, only 40% of patients poorly follow their prescribed regimen for disease control (5-8).

Anxiety and depression which are present in various stages of human life are aggravated in special conditions, including hospitalization. The hospital environment acts as a stressor that increases the incidence of psychological reactions and leads to anxiety as a negative consequence during the course of the disease (9). Poor treatment adherence in patients with chronic diseases leads to increased morbidity and mortality, imposing huge costs on the health system (10). Therefore, due to the complex nature of non-adherence to treatment and the importance of follow-up care in patients with cardiovascular disease, the present study aimed to assess treatment adherence and its related factors in patients with cardiovascular diseases.

Materials and Methods

This descriptive-analytical cross-sectional study was conducted in Qom in 2016. The study population included all patients with cardiovascular diseases, including acute coronary syndrome, admitted to the Department of Cardiology at Shahid Beheshti and Kamkar hospitals in Qom. A total of 116 patients in the mentioned hospitals were selected via the convenience sampling method.

The inclusion criteria entailed: absence of cognitive problems and known chronic diseases, ability to communicate in Persian, and willingness to participate in the study. Verbal informed consent was obtained from all selected patients. After obtaining the approval of the Vice-Chancellor for Research of Qom University of Medical Sciences and presenting it to the officials of educational and medical centers, the required permits were obtained to conduct the study.

To collect the needed data, the Department of Cardiology was referred to every day, the aims of the study were clarified to the patient, and the questions were asked by a trained person after obtaining the participants' consent. Medical information was also retrieved from patients' records. The data were collected using interviews to complete a three-part questionnaire. The first part was related to demographic characteristics, including age, gender, education level, marital status, residence status, employment status, body mass index (BMI), a history of smoking, duration of diagnosis, number of hospitalizations, and presence of symptoms.

The second part was the Adherence to Refills and Medications Scale (ARMS) developed by Kripalani et al. in 2009. It assesses medication refill adherence in patients with chronic conditions. This 12-item questionnaire consists of two subscales: adherence to taking medications (eight items) and adherence to refilling prescriptions (four items). The items were rated on a four-point Likert scale ranging from never=1 to always=4. Item scores are summed to produce an overall adherence score of 12-48, with lower scores indicating better adherence (10). The validity and reliability of the original and Persian versions of this questionnaire have been confirmed (11).

In the third part, patients' anxiety and depression were measured by the Hospital Anxiety and Depression Scale (HADS). This 14-item questionnaire comprises seven questions for anxiety and seven questions for depression. Each item is scored on a four-option Likert scale (almost never=0, sometimes=1, most of the time=2, and almost always=3). Finally, out of the total score of 21 in each part, a score higher than eight is regarded as the presence of anxiety and depression (12). The validity and reliability of the Persian version have been also confirmed (13).

Data were analyzed in SPS software (version 22) using descriptive and analytical tests (single and multiple linear regression to control demographic, clinical, and psychological variables). A p-value less than 0.05 was considered statistically significant.

Results

Based on the results of the present study, the mean age of the subjects was 60.62±10.55 years. In terms of gender, the majority of cases (n=63 of cases were women. More than half of the patients (n=85) were illiterate or had primary education, and most of them were married (n=82). In terms of residence status, 99 cases lived in their own houses. Only 30 subjects were employed, and 15.5% of cases had a history of smoking.

The mean duration of the disease was reported as 8.58± 8.02 years. Table 1 displays the demographic

Table 1. Demographic characteristic of the study sample

		Percentage	Frequency
Gender	Male	45.7	53
	Female	54.3	63
Marital status	Married	70.7	82
	Single	1.7	2
	Divorced	2.6	3
	Widow	25	29
Employment status	Housewife	52.6	61
	Unemployed or retired	20.7	24
	Employee	8.6	10
	Freelancer	17.2	20
Education level	illiterate	45.7	53
	Primary	27.6	32
	Junior high school	5.2	6
	High school	3.4	4
	Diploma	10.3	12
	Academic	7.8	9
Economic status	Good	5.2	6
	Moderate	26.7	31
	Poor	68.1	79
Smoking	Yes	15.5	18
	Quit	17.2	20
	No	67.2	78
Duration of the disease (year) Standard deviation ± Mean		8.58±8.02	
Age (years) Standard deviation ± mean		60.62±10.55	

characteristics of the subjects. The mean and standard deviation of the treatment adherence was obtained at 11.72±3.4. About half (49.1%) of the patients scored below the average, signifying poor treatment adherence. Among the demographic variables, BMI (r=0.22; P= 0.02) had a significant inverse relationship with treatment adherence.

Pearson correlation coefficient between treatment adherence and depression was calculated at -0.195. The sub-scales of adherence to taking medications and refilling prescriptions had a significant negative correlation with depression; nonetheless, the relationship between treatment adherence and anxiety was not significant (Table 2).

The results of multiple linear regression analysis demonstrated that among the variables included in the univariate model with (P<0.01), the variables of depression (P= 0.047; β=0.26) and BMI (P=0.026; β=0.22) had a significant positive relationship with treatment adherence (Table 3).

Table 2. Correlation between treatment adherence components and depression and anxiety in patients with cardiovascular disease

Subscale	Anxiety	Depression
Adherence to taking medications	-.106	-.195*
Refilling prescriptions	-.087	-.201*
Total treatment adherence	-.070	-.155

*Significant at the 0.05 level.
**Significant at the 0.01 level.

Table 3. Multiple regression analysis of individual, clinical, and psychological components in explaining treatment adherence in patients with cardiovascular disease

Variable	B	Standard error	Beta coefficient	T	P-value	Correlation coefficient, R	Coefficient of determination, R2	Adjusted Coefficient of Determination
Constant	9.426	2.311	---	4.079	.000		.129	.09
Anxiety	.121	.112	.144	1.078	.284			
Depression	-.204	.102	-.266	-2.003	.048	.359		
Body mass index	.120	.053	.227	2.258	.026			
Existence of diseases symptoms	-.062	.121	-.053	-.514	.609			

Discussion

The present study aimed to assess treatment adherence in patients with cardiovascular diseases. Treatment adherence was not satisfactory in the studied patients, and about half (49.1%) of them scored lower than the average, signifying poor treatment adherence. The results of the study conducted by Gholamaliei et al. pointed to poor treatment adherence in diabetic patients (14). Based on the findings of the present study, depression was an important determinant of treatment adherence after controlling clinical and psychological demographic variables. That is to say, patients with depression were less likely to follow their treatment regimen. This finding was consistent with the results of other studies (15, 16).

The results of similar studies indicated that treatment adherence was lower among physically ill hospitalized patients who also suffered from depression and they impose more costs on the health care system. This can be ascribed to their depression since non-cooperation of depressed patients in treatment aggravates their medical problems and endangers their health (17).

As people age, they usually become lonely, isolated, and predisposed to depression; therefore, they are required to be screened for depression (18). Regarding physiopathology, depression increases the function of the sympathetic nervous system by increasing adrenocortical hormones, which in turn, raise blood pressure (19). Moreover, hypertension increases the risk of cardiovascular disease, stroke, and death (20).

In several studies (21-23), 17%-44% of patients with cardiovascular diseases also had depression. According to other studies, patients with myocardial ischemia who were depressed had more urgent hospitalizations and longer hospital stays, as compared to non-depressed patients (24, 25). Post-myocardial infarction depression has also been associated with increased mortality and emergence of cardiovascular diseases (21).

The effect of depression is not limited to the reduction of treatment adherence, rather it is directly related to cardiovascular diseases and an independent risk factor for cardiovascular disease and its complications. Depression changes the lifestyle and increases sudden cardiac death. Treatment non-adherence takes the heaviest toll on the patients themselves and will make the disease progress and chronic all over the world (26).

Although this problem is posed to all countries, treatment adherence has been a neglected issue in the field of health in Iran. Therefore, it is necessary for health professionals to localize these patterns based on the cultural and social characteristics of Iranian using the existing models and patterns in the field of treatment compliance (27).

Among the notable limitations of the present study, one can refer to the cross-sectional nature of the study which did not allow understanding the cause-and-effect relationship among the variables. In addition, self-reported data collection might not have reflected the actual performance of individuals. Furthermore, the non-random sampling and limited sample size in this study reduce the generalizability of the findings. The performance of this study with a larger sample size can eliminate this limitation. Moreover, many variables that may affect treatment adherence were not assessed in the current study. Therefore, it is recommended that more variables be controlled in future studies.

Conclusion

The results of the present study pointed to low treatment adherence in patients with cardiovascular disease. Moreover, the variables of BMI and depression were among the factors affecting treatment adherence in these patients. Psychological problems, especially depression, deserve assiduous attention as important determinants of treatment adherence.

Acknowledgments

Conflicts of interest

The authors declare that there is no conflict of interest regarding the publication of this study.

References

1. Shahsavari S, Nazari F, Karimyar Jahromi M, Sadeghi M. Epidemiologic study of hospitalized cardiovascular patients in Jahrom hospitals in 2012-2013. Iran J Cardiovasc Nurs 2013;2(2):14-21. Link
2. Gast A, Mathes T. Medication adherence influencing factors-an (updated) overview of systematic reviews. Syst Rev 2019;8(1):112. DOI: 10.1186/s13643-019-1014-8
3. William TO, Levensky ER. Promoting treatment adherence: a practical handbook for health care providers. New York: Sage Publications; 2006. Link
4. Abbasi M, Salemi S, Fatemi NS, Hosseini F. Hypertensive patients, their compliance level and its 'relation to their health beliefs. Iran J Nurs 2005;18(41):61-8. Link
5. Baune BT, Aljeesh Y, Bender R. Factors of non-compliance with the therapeutic regimen among hypertensive men and women: a case-control study to investigate risk factors of stroke. Eur J Epidemiol 2005;20(5):411-9. DOI: 10.1007/s10654-005-0675-x
6. Tong X, Chu EK, Fang J, Wall HK, Ayala C. Nonadherence to antihypertensive medication among hypertensive adults in the United States-HealthStyles, 2010. J Clin Hypertens 2016;18(9):892-900. DOI: 10.1111/jch.12786
7. Lo SH, Chau JP, Woo J, Thompson DR, Choi KC. Adherence to antihypertensive medication in older adults with hypertension. J Cardiovasc Nurs 2016;31(4):296-303. DOI:

10.1097/JCN.0000000000000251

8. Hadi N, Rostami GN. Determinant factors of medication compliance in hypertensive patients of Shiraz, Iran. Arch Iran Med 2004;7(4):292-6. Link

9. Sharma Dhital P, Sharma K, Poudel P, Dhital PR. Anxiety and depression among patients with coronary artery disease attending at a cardiac center, Kathmandu, Nepal. Nurs Res Pract 2018;2018:4181952. Link

10. Kripalani S, Risser J, Gatti ME, Jacobson TA. Development and evaluation of the Adherence to Refills and Medications Scale (ARMS) among low-literacy patients with chronic disease. Value Health 2009;12(1):118-23. DOI: 10.1111/j.1524-4733.2008.00400.x

11. Barati M, Taheri-Kharameh Z, Bandehelahi K, Yeh VM, Kripalani S. Validation of the short form of the adherence to refills and medications scale (ARMS-SF) in Iranian elders with chronic disease. J Clin Diagn Res 2018;12(11):5-8. Link

12. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand 1983;67(6):361-70. DOI: 10.1111/j.1600-0447.1983.tb09716.x

13. Montazeri A, Vahdaninia M, Ebrahimi M, Jarvandi S. The hospital anxiety and depression scale (HADS): translation and validation study of the Iranian version. Health Qual Life Outcomes 2003;1(1):14. DOI: 10.1186/1477-7525-1-14

14. Gholamaliei B, Karimi-Shahanjarini A, Roshanaei G, Rezapour-Shahkolaei F. Medication adherence and its related factors in patients with type II diabetes. J Educ Community Health 2016;2(4):3-12. DOI: 10.21859/jech-02042

15. Taskapan H, Ates F, Kaya B, Emul M, Kaya M, Taskapan C, et al. Psychiatric disorders and large interdialytic weight gain in patients on chronic haemodialysis. Nephrology 2005;10(1):15-20. DOI: 10.1111/j.1440-1797.2005.00321.x

16. Akman B, Uyar M, Afsar B, Sezer S, Nurhan Ozdemir F, Haberal M. Adherence, depression and quality of life in patients on a renal transplantation waiting list. Transpl Int 2007;20(8):682-7. DOI: 10.1111/j.1432-2277.2007.00495.x

17. Mahmoudi S, Salehnezhad G, Nazaarian S, Yaghoubi M. A comparison study of depression between hemodialysis patients and renal transplant recipients. Iran J Nurs Res 2010;5(18):73-80. Link

18. Son YJ, Won MH. Depression and medication adherence among older Korean patients with hypertension: Mediating role of self-efficacy. Int J Nurs Pract 2017;23(3):e12525. DOI: 10.1111/ijn.12525

19. Long J, Duan G, Tian W, Wang L, Su P, Zhang W, et al. Hypertension and risk of depression in the elderly: a meta-analysis of prospective cohort studies. J Hum Hypertens 2015;29(8):478-82. DOI: 10.1038/jhh.2014.112

20. Wolf-Maier K, Cooper RS, Banegas JR, Giampaoli S, Hense HW, Joffres M, et al. Hypertension prevalence and blood pressure levels in 6 European countries, Canada, and the United States. JAMA 2003;289(18):2363-9. DOI: 10.1001/jama.289.18.2363

21. Belialov FI. Depression, anxiety, and stress in patients with coronary heart disease. Ter Arkh 2017;89(8):104-9. DOI: 10.17116/terarkh2017898104-109

22. Carney RM, Freedland KE. Depression and coronary heart disease. Nat Rev Cardiol 2017;14(3):145-55. DOI: 10.1038/nrcardio.2016.181

23. Hance M, Carney RM, Freedland KE, Skala J. Depression in patients with coronary heart disease: a 12-month follow-up. Gen Hosp Psychiatry 1996;18(1):61-5. DOI: 10.1016/0163-8343(95)00100-x

24. Reese RL, Freedland KE, Steinmeyer BC, Rich MW, Rackley JW, Carney RM. Depression and rehospitalization following acute myocardial infarction. Circ Cardiovasc Qual Outcomes 2011;4(6):626-33. DOI: 10.1161/CIRCOUTCOMES.111.961896

25. Van Melle JP, De Jonge P, Spijkerman TA, Tijssen JG, Ormel J, Van Veldhuisen DJ, et al. Prognostic association of depression following myocardial infarction with mortality and cardiovascular events: a meta-analysis. Psychosom Med 2004;66(6):814-22. DOI: 10.1097/01.psy.0000146294.82810.9c

26. Sabaté E, Sabaté E. Adherence to long-term therapies: evidence for action. Geneva: World Health Organization; 2003. Link

27. Mikaili N, Ghasemi MA, Salari S, Sakeni Z. Theoretical and practical dimensions of adherence to treatment in patients: a review study. Med J Mashhad Univ Med Sci 2019; 62(2):1403-19. Link