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Treatment Adherence in Patients with Heart Failure at a Selected Hospital during COVID-19 Pandemic: A Cross-sectional Study

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Abstract

Background and Aim: Heart failure (HF) is a common and serious condition that affects millions of people worldwide. Treatment adherence (TA) is associated with clinical outcomes, quality of life, and the cost of health services for patients with HF. This study aimed to investigate TA and its related factors in patients with HF in a selected hospital affiliated to Iran University of Medical Sciences during COVID-19 Pandemic.

Materials and methods: In this descriptive cross-sectional study, 98 clients with HF were selected through convenience sampling based on inclusion criteria. A two-part questionnaire including a demographic section and a standard TA section was used for data collection. Data were analyzed with independent t-test and one-way analysis of variance (ANOVA).

Results: Sixty-four percent of the clients was between 61-75 years, 57% was men, and 72.4% had a previous history of hospitalization due to cardiovascular diseases. Mean score of TA was 3.24±0.3 (out of 5 points). Among the dimensions of TA, the highest (4.02) and lowest (2.66) mean scores were related to "combination of treatment with life" and "sticking to the treatment." A significant relationship was found between gender, marital status, educational level, economic status, living condition, as well as COVID-19 morbidity and mean of TA ($p<0.05$).

Conclusion: Generally, TA was satisfactory; however, considering its importance, healthcare workers are recommended to design and implement interventions regarding factors related to TA in patients with HF.

Keywords: Treatment adherence (TA), Heart failure (HF), COVID-19, Cross-sectional study.

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Introduction

Heart failure (HF) is a complicated clinical condition caused by either functional or structural problems in the ventricles, leading to symptoms of left ventricle dysfunction. These symptoms arise from an insufficient cardiac output which cannot meet the body's metabolic needs. Despite advancements in treatments and prevention, HF remains a major cause of cardiovascular illness and death globally [1]. Several factors can lead to HF, including systemic diseases, various cardiac conditions, and certain hereditary defects. The causes of HF can differ between high-income and developing countries, and patients may have a combination of causes. In high-income regions, ischemic heart disease and chronic obstructive pulmonary disease (COPD) are the most common underlying factors for HF. In contrast, hypertensive heart disease, rheumatic heart disease, cardiomyopathy, and myocarditis are the primary conditions for HF in low-income regions, as indicated by a systemic analysis for the Global Burden of Disease Study [1-3].

In recent decades, the prevalence of chronic diseases has increased significantly due to such factors as increased life expectancy and, consequently, an aging population; urbanization; and major changes in lifestyle, posing a challenge among societies [4]. The prevalence of HF as one of these chronic conditions has been steadily growing in recent decades. This condition can affect various age groups, but its prevalence is higher among adults and, particularly, the elderly, with the likelihood of contracting it with increasing age [5]. According to global statistics, the prevalence of HF was reported to be 64.34 million people in 2017 (8.52 cases per 1000 people), resulting in 9.91 million years lost due to disability (YLDs) and an equivalent cost of 346.17 billion dollars [6]. In Iran, cardiovascular diseases are considered as the second leading cause of death, accounting for more than one-third (39%) of all deaths. HF in Iran has a higher prevalence compared to regional countries and global estimates, with a reported rate of 8% [7].

The conditions resulting from HF are often chronic and stable, requiring individuals to adhere to long-term therapeutic regimens in order to survive, improve their health status, and enhance their quality of life. Furthermore, frequent hospitalizations are often necessary for these individuals [8]. The effectiveness of a therapeutic regimen is directly associated with proper treatment adherence (TA). However, evidence indicates significant challenges in this area,

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particularly among patients with chronic diseases, who often struggle with TA [9]. Adherence to treatment refers to the degree to which a patient's behavior aligns with the agreed-upon recommendations of a healthcare provider in various aspects [10]. The fundamental areas of treatment plan for individuals with HF are physical activity, adhering to prescribed medication, and adhering to the recommended diet and lifestyle [11]. TA is influenced by multiple factors. In a study on patients with HF, the most important influential factors included gender, educational level, number of hospitalizations during the past year, comorbidities, knowledge about the condition, and cognitive function, which were significantly related to treatment compliance [12]. TA is a behavior affected by mental state and is influenced by psychological components [13]. Under certain conditions, the resulting worry and anxiety may increase in a person. These conditions can intensify the fear of life threatening or uncertainty about the conditions. The COVID-19 pandemic caused such a situation. Worrying about the unstable situation as well as the financial and life threat to the person and the people around him causes anxiety which can affect a person's behavior in various areas, including adherence to treatment [14, 15].

Facilitators and barriers to TA among patients with cardiovascular diseases were extracted through a review by Rashidi et al. (2020). They introduced engaging in exercise, having support and mentorship, lifestyle modification, and the perceived value of taking medication as facilitators. Also, perceived lack of support, concerns about taking medication, and lack of engagement in exercise and lifestyle changes were identified as barriers [8]. Several studies have investigated on TA among patients with HF. A study on medication adherence among 100 patients with HF in Brazil showed that 41.1% of individuals had low adherence [16]. In a study conducted in Vietnam, among 112 patients with HF, 54.5% demonstrated treatment compliance [12]. Gheiasi et al. (2023) identified facilitators and barriers to TA among HF patients in Iran. They found that the most important facilitators included supportive family, positive personality characteristics, and health literacy. In contrast, negligence; psychological problems; cultural, social, and economic problems; physical limitations; and lack of knowledge in self-care management were identified as barriers to optimal TA [17]. The study on 400 patients with HF in Kermanshah

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City (Center of Kermanshah province, Iran) demonstrated that the majority of clients (94%) had poor medication adherence [18]. This is in contrast to a study on 60 patients with HF in Kashan City (Located in Isfahan province, Iran), where the pretest phase showed high levels of TA in both intervention and control groups [19]. Evidence indicates significant differences in reported outcomes. Given the importance of TA in terms of treatment efficacy, quality of life, and socio-economic performance of patients, this study was conducted to investigate TA and its related factors in patients with HF at a selected hospital of Iran University of Medical Sciences during COVID-19 pandemic.

Methods

This descriptive cross-sectional study was conducted at Firoozgar Hospital affiliated to Iran University of Medical Sciences. Its protocol was confirmed by Ethics Committee of Tehran Islamic Azad University of Medical Sciences (Code: IR.IAU.TMU.REC.1399.258). The study population included all patients with HF hospitalized in the hospital from January to August 2022. The sample size was calculated to be 85 clients with the following formula. Confidence interval (z) was considered 95%. Parameters α and β represent type I and type II errors at the desired confidence interval, and r indicates the expected correlation coefficient [20]. Due to lack of similar studies, a value of 0.30 was considered in an attempt to achieve a larger sample size.

Total sample size = $n = [(Z_\alpha+Z_\beta)/C]^2 + 3$, $C = 0.5 * \ln[(1+r)/(1-r)]$

Total sample size = $n = [(1.96+0.8416)/0.3095]^2 + 3 = 85$

Because of possible attrition up to 15% for different reasons, more subjects (98 patients) were selected. Inclusion criteria were willingness to participate in the study, ability to read and write in Persian, diagnosis of HF by a cardiologist, absence of psychiatric disorders with no consumption of related medications, and absence of consumption of tranquilizers and anti-anxiety medications. Incomplete questionnaire to items related to the main variable (TA) was considered an exclusion criterion. First author referred to the hospital on different days of the week and selected clients with convenience sampling method based on the inclusion criteria.

A two-part questionnaire consisting of demographic and TA parts was used to collect data. The TA part developed by Modanloo (2013) in Iran comprises 40 items covering seven dimensions: making effort for treatment (9 items), willingness to participate

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in treatment (7 items), adaptability (7 items), integration of treatment into life (5 items), attachment to treatment (4 items), commitment to treatment (5 items), and management in treatment implementation (3 items). It is scored with a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). According to its scoring, obtaining 76-100% indicates very good TA, 51-75% good TA, 26-50% moderate TA, and 0-25% poor TA [21]. Validity and reliability of the TA questionnaire were confirmed by Seyed Fatemi et al. (2018), with content validity index (CVI) of 91.4% and Cronbach's alpha coefficient of 0.921. Additionally, its internal consistency was calculated with test-retest method and its correlation coefficient was 0.875 [22]. In our study, its Cronbach's alpha coefficient was calculated 0.836.

Kolmogorov-Smirnov test was used to examine the normality of the data and approved normal distribution of the main variable (TA). Therefore, independent t-test and One-way ANOVA were used to find the relationship between demographic variables and TA. In cases where the result of one-way ANOVA indicated a significant relationship between two variables, Tukey's post hoc test was used to identify subgroups with significant differences [23, 24].

Results

Demographic variables of 98 clients are shown in Table 1. Mean age of them was 63.36 (SD = ±9.35), 57% was men and 72.4% had a previous history of hospitalization due to cardiovascular diseases. Approximately, half of the subjects reported COVID-19 affliction and 82.6% received at least 2 doses of COVID-19 vaccine.

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Table 1: Demographic characteristics of clients

Demographics (n=98)		F(%)	Demographics (n=98)		F(%)
Age (year)	30-45	5 (5.1)	Marital status	Single	5 (5.1)
	46-60	24 (24.5)		Married	61 (62.2)
	61-75	63 (64.3)		Divorced	2 (2.1)
	>75	6 (6.1)		Widow	30 (30.6)
Gender	Male	56 (57.1)	Previous hospitalization	Yes	71 (72.4)
	Female	42 (42.9)		No	27 (27.6)
Educational level	Diploma and less	65 (66.3)	Economic condition	Poor	37 (37.7)
	Higher diploma	14 (14.3)		Moderate	57 (58.2)
	Bachelor and higher	19 (19.4)		Good	4 (4.1)
Occupational status	Unemployed	25 (25.5)	Living condition	With spouse	34 (34.7)
	Retired	27 (27.6)		With child/children	28 (28.6)
	Home keeper	29 (29.6)		With family	27 (27.6)
	Clerk	5 (5.1)		Alone	7 (7.1)
	Self-employed	12 (12.2)		Other	2 (2.0)
COVID-19 vaccination	Not vaccinated	12 (12.2)	COVID-19 affliction	Yes	47 (48.0)
	First dose	5 (5.1)		No	51 (52.0)
	Second dose	40 (40.8)	COVID-19 treatment	Outpatient	21 (44.7)
	Third dose	41 (41.8)		Inpatient	26 (55.3)

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Table 2 shows mean score of TA and its dimensions.

Table 2: Mean and standard deviation of TA and its dimensions

TA and its dimensions	Mean ± SD
Making effort for treatment	3.53 ± 0.60
Willingness to participate in treatment	3.45 ± 0.56
Adaptability	3.10 ± 0.76
Integration of treatment into life	4.02 ± 0.55
Attachment to treatment	2.66 ± 0.81
Commitment to treatment	3.01 ± 0.53
Management in treatment implementation	2.94 ± 0.74
Total TA	3.24 ± 0.30

Mean score of TA was 3.24±0.3 (out of 5 points). Among the dimensions of TA, the highest and lowest mean scores were 4.02 for "Integration of treatment into life" and 2.66 for "Attachment to treatment."

The significance level of Kolmogorov-Smirnov test for TA variable (p=0.159) was greater than 0.05 and, thus, showed a normal distribution to allow parametric tests. The results of independent t-test showed a significant relationship between gender as well as COVID-19 affliction and TA; consequently, mean score of TA among men and people with no history of COVID-19 affliction was more than others ($p<0.05$). Such a relationship was not found between history of previous hospitalization as well as the way of treating COVID-19 and TA ($p>0.05$).

The results of one-way ANOVA to find a relationship between qualitative demographic variables and TA are shown in Table 3.

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Table 3: Relationship between qualitative demographic variable and TA

Demographics		Treatment Adherence		
		Mean	F	Sig.
Age (year)	30-45	3.36	2.679	0.051
	46-60	3.37		
	61-75	3.18		
	>75	3.30		
Marital status	Single	3.63	9.055	<0.001
	Married	3.31		
	Divorced	3.11		
	Widow	3.06		
Educational level	Diploma and less	3.16	10.416	<0.001
	Higher diploma	3.28		
	Bachelor and higher	3.50		
occupational status	Unemployed	3.05	3.818	0.006
	Retired	3.28		
	Home keeper	3.32		
	Clerk	3.42		
	Self-employed	3.30		
Economic condition	Poor	3.22	11.395	<0.001
	Moderate	3.21		
	Good	3.90		
Living condition	With spouse	3.30	13.593	<0.001
	With child/children	3.02		
	With family	3.31		
	Alone	3.33		
	Other	3.34		

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The results of one-way ANOVA showed a significant relationship of all qualitative demographic variables with TA ($p<0.05$) except for age ($p>0.05$). Besides, findings of Tukey's post hoc test showed a significantly higher scores of TA in single clients than others ($p<0.001$). In terms of educational level, mean score of TA in clients with bachelor degree or higher was significantly more than lower levels ($p<0.001$). Regarding the relationship between TA and occupational status, findings showed significantly higher scores of TA in clerks than unemployed clients ($p=0.006$). Additionally, mean score of TA in clients with good economic condition was significantly higher than others ($p<0.001$). Finally, the results of Tukey's post hoc test showed lower mean score of TA in clients who lived with their child/children than others ($p<0.001$).

Discussion

With respect to the aim of the study, TA was satisfactory. However, studies inside and outside the country with diversity of locations and tools have had different findings. In a study on clients with cardiovascular diseases at a teaching hospital in Qom City (Center of Qom Province, Iran), findings showed lower TA score than moderate score in 49.1% of the subjects [25], which is inconsistent with our findings. This may be due to the diversity of location and resultant differences in social, economic and cultural conditions of clients as well as health service quality, which, according to WHO, is one of the influential factors in the degree of TA [26]. In a study by Alavi et al., a different tool was used to assess TA (25). Contrary to our findings, a study in Kermanshah City showed that the majority of clients (94%) had poor medication adherence [18].

Studies in other countries also show different findings. For example, in Colombia, a study on patient with myocardial infarction (MI) indicated satisfactory TA [27], which is consistent with our findings. However, a study regarding medication adherence on patients with HF in Brazil showed low adherence in 41.1% of clients [16], which is different from our findings. A study in China on patients with cardiovascular diseases showed complete TA at only 27.46% of the clients [28], which is much worse than our findings.

In addition, significant relationships were found between different demographic variables and the degree of TA. Similar to our findings regarding significant relationships between such demographic variables as gender (men) as well as protection against

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Covid-19 and TA, Sen et al. (2020) showed this relationship between gender and TA in Vietnam [12]. In contrast, Zare et al. (2017) found no significant relationship between gender and the degree of TA in patients with cardiovascular diseases ($p<0.05$) [29]. Similarly, the study in China showed higher scores of TA in women than men [28]. These differences can be attributed to multifactorial nature of TA [26], which makes discussion challenging based on one variable.

Our findings also showed no significant relationship between history of previous hospitalizations and TA ($p>0.05$) while, in another study, this was found to be influential [30]. It seems that history of hospitalization because of its difficulties (special condition, isolation from family and community, abandonment of work and responsibilities, etc.) acts as a stimulus for better TA. However, it is also important to note that frequent hospitalizations can result from poor TA.

One-way ANOVA showed no significant relationship between the age of clients and TA ($p>0.05$). This finding is consistent with the results Ghias et. al (30) and Pan et. al [28]; however, Zare et. al showed that with the increasing age of the subjects, the rate of TA decreased [29]. It seems that with increasing age and resultant memory loss and cognitive problems, TA would decrease. Additionally, changes in living condition and dependence on others can affect it. However, the impact of each of these factors should be examined in relation to other ones.

In our study, mean score of TA in singles was significantly higher than others ($p<0.001$). In contrast, Pietrzykowski et al. in their study on patients with MI showed that mean score of TA was higher in married people than others [31]. It is obvious that multifactorial nature of TA makes it impossible to determine individual effect of each variable and because of numerous interactions among them, only collective effects can be explained. In terms of educational level, mean score of TA in the clients with bachelor degree or higher was significantly more than those with lower degrees ($p<0.001$) since it is a health-oriented behavior and is influenced by person's knowledge and awareness. Similarly, a review study indicated the relationship between TA and educational level [12].

A significant relationship was also found between TA and occupational status in such a way that clerks had higher mean scores than unemployed people ($p=0.006$). Employed people are socially more active, which makes them feel usefulness and facilitates health-

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oriented behaviors. In the study by Pietrzykowski et al., the number of employed people with satisfactory TA was more [31]. Additionally, mean score of TA was significantly higher in clients with good economic condition than others ($p<0.001$) because the dimensions of TA can be facilitated by financial factors. Abdul-Sattar and Abou El Magd also showed unsatisfactory TA in poor clients [32].

This study has provided many findings regarding TA in patients with HF and its related factors. However, it has its own limitations, one of which is the selection of clients from only one hospital in Tehran. Since the location is in the capital of the country, the environmental conditions and the type of clients may not represent the whole situation of the country and generalizations should be stated with caution.

Conclusion

It can be concluded in general that TA was satisfactory. Considering the importance of TA in obtaining recovery, preventing disease complications, and increasing life expectancy as well as quality of life, it is necessary to provide a basis for maintaining and improving TA by knowing its related factors. Therefore, it is recommended to design and implement interventions regarding them in patients with HF.

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Conflict of Interest

The authors declared no conflict of interest in conducting and publishing the research.

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