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A comparison of the effects of multimedia and peer teaching methods on medication adherence in heart failure patients

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***Abstract*---**Objective: The present study investigated and compared the effects of peer and multimedia teaching methods on medication adherence of heart failure patients. Methods: This quasi-experimental study was done in Arak University of Medical Sciences hospitals, Arak, Iran. Samples were 44 patients with heart failure, studied in two groups. Twenty-two patients received medication adherence education through multimedia content developed by the researchers and a trained peer educated the other 22 patients. The patients' medication adherence was assessed with a medication adherence questionnaire designed by Girerd et al. (2001) before, immediately after, and 1 month after the intervention. Data was entered the SPSS 23 and analyzed through descriptive and inferential statistics (ANOVA). Results: The study of medication adherence indicated that medication adherence was different in each group before, immediately after, and one month after the intervention; however, there was no statistically significant difference between the two groups. Conclusion: Both peer and multimedia education methods improved medication adherence in patients with heart failure. However, the improvement rate in medication adherence was higher in the multimedia group. Practice Implication: It is suggested to use an appropriate method for teaching patients in different situations based on the available facilities and conditions.

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Keywords---*Heart failure; Peer teaching; Multimedia teaching; Medication adherence.*

Introduction

Heart diseases are the leading causes of death worldwide compared to cancers, lung diseases, kidney diseases, stroke, diabetes, and other diseases. Heart failure is highly prevalent and the final stage of numerous heart diseases among heart diseases. According to statistics published by the American Heart Association in 2018, about 5.7 million people had heart failure in the United States. This figure has been estimated to reach more than 8 million people over 18 years by 2030 (1). The prevalence of this disease has been investigated in various studies and countries. Research has shown that its prevalence is 1.44% in Italy, 1.6% in Germany, and 1.8% in Sweden. The disease also has a large incidence in Asia. For example, 4.2 million patients in China were diagnosed with heart failure (2). Heart failure is an essential cause of disability and death in Iran, and its current prevalence will increase due to changes in the age pyramid of the society and the aging population of Iran (3).

There is a poor prognosis in patients with chronic heart failure despite disease prevention and treatment advances over the past 25 years (4). Frequent hospitalization for the exacerbated symptoms of this disease is the most common problem in patients with heart failure. In this respect, the lack of self-care behaviors, including medication adherence, is the main reason behind this challenge (5). Heart failure management needs to change health behaviors such as attention to diet, physical activity, and medication (6). Medication adherence is necessary to control heart failure symptoms, prevent their aggravation, decrease mortality, and reduce hospitalization rates and treatment costs (7). The interventions designed to improve the patients' medication adherence are important strategies to reduce the complications and mortality due to heart failure (8). However, accepting the medication is a serious challenge for patients and healthcare providers (9). According to the literature, many patients intentionally or unintentionally do not follow the prescribed medication (10). However, not accepting medication worsens symptoms and reduces the quality of life (11). Some factors leading to non-adherence to medication include the lack of patients' knowledge and low health literacy, the severity of heart failure, sensory impairment, depression and anxiety, other illnesses, fatigue, previous hospitalizations, cognitive impairment, old age, low socioeconomic status (12, 13). Self-care behaviors help reduce readmission for heart failure. In this respect, medication adherence is the most important self-care behavior that can prevent the aggravation of heart failure and the other issues mentioned above (15).

Despite many studies in this field, medication adherence remains low in these patients, and non-adherence to medication is a major problem in patients with heart failure (8). Many studies have considered the importance of medication adherence in patients with heart failure. It is assumed that the improvement in these patients' outcomes largely depends on their prescribed drugs. Some papers have indicated that many patients do not consume their medications as prescribed. This non-adherence is a serious obstacle to the effectiveness of the

existing treatments (14). Medication non-adherence has become an epidemic, especially in the elderly (17). Forgetfulness and insufficient education are the reasons behind non-adherence to medication (18). Also, the complexity of treatment and the diversity of drugs reduce medication adherence (19).

Evidence indicates that education reduces readmission and mortality in patients with heart failure and improves their quality of life. Developing educational programs and purposive support are essential to increase self-care in heart failure patients (20).

Patient education allows patients and families to learn about diseases, treatment, adaptation mechanisms, and skill development. Teaching people with heart failure is a primary component of self-care (21). Interventions such as telephone follow-up, home visits, online and computer training, group and individual training, and peer teaching can improve medication adherence in patients with heart failure (22). In this regard, it is suggested to use the best method according to circumstances (23).

There are two famous teaching methods, namely multimedia and peer education. Peer education promotes health and has a great effect on learning. Jahanshahi et al. concluded that peer education improves the quality of life in patients with heart failure (24). It is an educational model based on empathy principles that benefit patients. In this approach, the peer establishes a friendly relationship with the patient, and the two parties share their information. The peer acts as a mediator between the patient and the medical staff (25). In this approach, informed patients (as a peer group) perform education and transfer the necessary knowledge about the disease, care, and ways to control it. In this way, a safe, secure, and calm learning environment is created according to the similar characteristics of the members (26). Successful peers can share their strengths, weaknesses, and experiences with healthcare providers with patients and encourage them to choose suitable health behaviors by creating practical, emotional, informational, and motivational readiness and discussing the disease (27).

Advances in information and communication technology have provided opportunities to solve problems, create new learning environments and flexibility, and improve patient education services. Multimedia teaching methods have been used based on these advances. The advantages of multimedia methods include the vast activation, flexibility, repeatability, and using text, audio, and video combinations. Reducing the interactions between the nurse and the patient during education is a disadvantage of this type of education. Studies that used computers for teaching patients, such as heart patients, people with diabetes, pregnant women, and adolescents, reported positive results, including higher awareness, medication adherence, and self-care (28).

Given the importance of medication in patients with heart failure and their adherence, we sought to design an appropriate method to improve their medication adherence. In addition, the present study compares the effects of a multimedia teaching program to successful peers' experiences on medication adherence in patients with congestive heart failure (CHF).

Methods

Study design and samples

The present quasi-experimental study aimed to compare the effects of peer and multimedia teaching on medication adherence in heart failure patients. The statistical population consisted of subjects with grade 2 or 3 heart failure admitted to the cardiac wards and CCUs of Arak University of Medical Sciences hospitals, Arak, Iran. The sample size was estimated to be 22 per group based on a similar study (29) and the following equation.

$$\frac{(z_{1-\frac{\alpha}{2}} + z_{1-\beta})^2 \, ({s_1}^2 + {s_2}^2)}{d^2}$$

α = 0.05, β = 0.2, S1 = 1.23, S2 = 1.27, μ1 = 6.81, μ2 = 5.75

N1 = N2 = 22

Inclusion criteria were as follows: Grade 2 or 3 heart failure, consent to participating in the study and the ability to participate in education, being in the age range of 35 to 65 years, and time and place orientation. Moreover, the familiarity with the Persian language, literacy, stability of the patient, being able to see and hear, no mental illness, and no other physical illnesses such as epilepsy and cancer, other than diabetes and hypertension. Exclusion criteria were patient withdrawal, worsening of clinical conditions (increased disease class), and patient death.

According to the sample size, 44 patients with heart failure were classified into two 22 individual groups. The samples in the multimedia group were selected in two weeks, and those in the peer group were chosen two weeks later. This process was continued until the sample size was completed. It was done to prevent the two groups from communicating with each other.

Data gathering

Data were collected using a questionnaire: 1) demographic and disease information and 2) medication adherence. The medication adherence scale was designed by Girerd et al. (2001) and used by Thio et al. (2012). It includes six specific questions with “Yes” and “No” options. Patients who chose “No” for all their medication adherence questions (score = 0) were categorized as the good medication adherence group. Those who chose “Yes” for up to two questions (score = 1 to 2) were in the moderate medication adherence group. Finally, those who answered “Yes” to more than two questions (score = 3 to 6) were assigned to the poor medication adherence group (30, 31). Gholamaliei et al. (2015) used this scale in their research and calculated CVI = 90% and Cronbach’s alpha o= 0.84 for the scale (32). In the present study, the professors confirmed the face validity of the tool, and the reliability of the scale was calculated using Cronbach’s alpha of 0.9.

Multimedia education: The resources were examined to prepare multimedia content, and the researchers prepared the educational scenario. The scenario was reviewed for multimedia preparation with the cooperation of the Arak University of Medical Sciences` virtual education unit. In the first part, animated content, which was voiced, was used to introduce the disease. In the second part, a cardiologist introduced the drugs and their application. In the third part, the researchers about the drugs, the necessity of their consumption, and other useful information, simultaneously showing common medications, presented more information. In the end, the researchers also used voiced images to teach about diet and mobility. The multimedia content was prepared after combining these parts, and a nursing professor and a cardiologist did the final revision. The final revision was introduced to the patients as a compact disk.

Peer education: Peers must have a good adherence based on the medication compliance questionnaire, at least a high school education, the age range of 45-55 years, 2nd and 3rd class heart failure, balanced clinical status, and no history of hospitalization in the past year. In addition, the ability to present the desired content, the ability to conduct meetings, and the willingness to cooperate. The researchers educated the two selected peers in three sessions, and for each of them, a pilot educational session was done with a patient to examine their ability to educate the patient. During the intervention session, the peer was introduced to the patients by one of the researchers who were present in the session. The teaching program was held in small groups of 2 to 5 patients in one session lasting from 20 to 30 minutes, near their discharge time. The peer taught the patients the same educational content designed in multimedia content.

The questionnaire was completed three times, before, immediately after, and one month following the intervention.

Data analysis

Data was entered SPSS software version 23, and descriptive statistics were expressed for quantitative variables with centrality and dispersion indices and qualitative variables with frequency and percentage indices. In inferential statistics, repeated measures analysis of variance and Bonferroni pairwise comparison test were used.

Results

The data analysis indicated that the two groups were not significantly different regarding the demographic variables, except for the education level (Table 1).

Table 1. Distribution of demographic variables in the two groups

group / variable	multimedia	peer	test	p-value
quantitative variables	mean ± S.D.			
Age (year)	54.17±7.99	57.72±6.15	Mann-Whitney	0.599
hospitalization duration (day)	2.9±2.50	2.68±1.46	Mann-Whitney	0.599

duration of the disease (year)		5.26±2.56	5.95±2.03	Mann-Whitney	0.393
Number of drugs used		5.91±1.37	6±1.51	Mann-Whitney	0.824
qualitative variables		number (percent)			
gender	female	10 (43.5)	7 (30.4)	Chi^2	0.420
	male	13 (56.5)	15 (68.2)		
marital status	married	13 (56.5)	17 (77.3)	Chi^2	0.140
	single	10 (43.5)	5 (22.7)		
education	illiterate	7 (30.4)	19 (42.2)	Fisher exact test	0.029
	elementary	2 (8.7)	8 (17.8)		
	secondary	3 (13)	5 (11.1)		
	diploma	6 (26.1)	8 (17.8)		
	University	5 (21.7)	5 (11.1)		
diabetes	yes	14 (60.9)	13 (59.1)	Chi^2	0.999
	no	9 (39.1)	9 (40.9)		
HLP	yes	11 (47.8)	13 (59.1)	Chi^2	0.449
	no	12 (52.2)	9 (40.9)		
HTN	yes	7 (30.4)	6 (27.3)	Chi^2	0.815
	no	16 (69.6)	16 (69.6)		

Regarding medication adherence, the results of inter-group repeated measures analysis of variance (ANOVA) for the mean medication adherence score revealed that the mean changes were statistically significant (P=0.0001). The between-group repeated measures ANOVA results indicated that the mean medication adherence score was not statistically significant (P = 0.203) (Table 2).

Table 2. Comparison of the trend of changes in the mean and standard deviation of the total score in two groups

drug / adherence score / group	Mean ±SD (0)	Mean ±SD (1)	Mean ±SD (2)	Estimated Marginal Means ± SD	Repeated measure test (Between group)	Time* group
peer	3.40±1.56	2.84±1.32	1.95±1.29	2.742±0.242	F=1.671 p=0.203	F=1.398 p=0.253
multimedia	3.13±1.32	2.56±1.30	1.21±0.79	2.304±0.237		
p-value	0.472	0.404	0.073			

Bonferroni pairwise comparison test results showed that the changes in medication adherence scores were better in both groups. However, the adherence rate was higher in the multimedia group (Table 3).

Table 3. Bonferroni pairwise comparison to compare changes in the average score of medication adherence at different times in two groups

		multimedia			peer		
Factor (1)	Factor (2)	Mean difference	S.D.	p-value	Mean difference (1-2)	S.D.	p-value

		(1-2)					
Before intervention	Immediately after intervention	0.565	0.138	0.001	0.545	0.194	0.032
	1 month after intervention	1.913	0.226	0.0001	1.455	0.244	0.0001
Immediately after intervention	1 month after intervention	1.348	0.264	0.0001	0.909	0.227	0.002

Discussion

The present quasi-experimental study aimed to compare the effects of multimedia and peer teaching methods on medication adherence of patients with heart failure. Forty-four individuals were classified into two 22-individual groups. One group was taught by peers, and the other by multimedia content prepared by the researchers. The medication adherence of both groups was evaluated before, immediately after, and one month after teaching using the medication adherence questionnaire.

Data analysis indicated no significant difference between the two groups regarding age, sex, marital status, history of diabetes, high blood lipid, hypertension, mean duration of hospitalization, and the mean number of drugs. Meanwhile, there was a statistically significant relationship between the multimedia and peer groups in terms of education levels, and the multimedia group had a higher education level than the peer group.

The study of medication adherence in the two groups exhibited a significant difference in medication adherence in the three mentioned periods. Nevertheless, there was not any significant difference between the two groups. Accordingly, both interventions improved medication adherence in patients. The Bonferroni test results indicated that the medication adherence score changes were descending in both groups, although the reduction was higher in the multimedia group.

Varvani-Farahani et al. (2016) compared multimedia teaching with the successful live experiences (peer experiences) method on the quality of life of type 2 diabetic patients. They reported that the mean quality of life score was significantly different in both groups before and after the intervention. Even though the multimedia method's average quality of life was slightly higher, the difference was not statistically significant (28). These results were consistent with ours, showing no significant difference between the peer and multimedia groups, whereas the increase rate in medication adherence score was higher in the multimedia group.

The results of studies conducted on using peers in patient education are generally consistent with those of the present study, indicating the effect of peer education

on different variables in different patients. Harris et al. (2014) found that peer education resulted in higher self-care behaviors, proper use of medications, and lower insulin requirements in diabetics (33). Salavati et al. also concluded that the individual and peer teaching methods were equally effective in the quality of life of heart failure patients; however, the effect of peer teaching was greater in the long run (34). Jahanshahi et al. also reported that peer teaching affected the quality of life of heart failure patients and improved it (24). Furthermore, Haidar-Bani et al. concluded that peer teaching improved the self-efficacy of heart failure patients (35).

Several studies have examined the use of multimedia content in patient education. Khanjari et al. examined myocardial infarction patients and found that family-based teaching via multimedia software improved medication, food, and diet adherence (37). Their results were consistent with our findings. Bijani et al. stated that teaching medication adherence in patients with hypertension through multimedia significantly improved their medication adherence immediately and one month after the intervention (38). Abbasi et al. studied the effect of a self-management teaching program using a multimedia method on the quality of life of patients with congestive heart failure. According to their results, this method significantly affected dimensions of self-efficacy and knowledge in patients; however, other dimensions did not change significantly (39). The results of a study by Davoudi et al. demonstrated that the multimedia teaching method was effective in reducing hemodialysis patients' weights (40). Gholamizadeh et al. examined the effect of a multimedia teaching program on the anxiety of patients admitted to chemotherapy wards and found that multimedia teaching did not affect the anxiety of patients admitted to chemotherapy wards (41).

Conclusion

The results of the present study revealed that medication adherence increased in peer and multimedia teaching groups after the intervention. Even though both peer and multimedia teaching methods effectively improved medication adherence in heart failure patients, the improvement in medication adherence scores was better in the multimedia group than in the peer group. In most similar works, peer and multimedia teaching methods greatly improved the quality of life, medication adherence, and knowledge level. According to the conducted studies, using different training methods based on needs assessment will improve patients' self-care quality. Overall, it is suggested to use the best method considering the circumstances.

Practice implications

It is suggested that patients who want to participate in the education of other patients should be identified and organized, and in the necessary cases, education should be used by peers. On the other hand, due to the improvement of information technology and the availability of media, multimedia contents can be used well. In this regard, it is suggested that clinical nurses, in cooperation with university professors, prepare quality, attractive and scientific educational content related to self-care.

To improve the quality of self-care training, medical centers should provide nurses with various patient training ways, including the presence of peers for training, multimedia content, etc. for educating patients according to the patient's condition and the department's situation.

Declarations of interest

None.

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