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Comparing the effects of teach-back method, multimedia and blended training on self-care and social support in patients with heart failure: A randomized clinical trial

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Abstract:

BACKGROUND: The knowledge level of caregivers and their support for patients can affect the self-care of patients with heart failure (HF). The present study was conducted to compare the effects of teach-back, multimedia, and blended training methods on self-care and social support in patients with HF and on knowledge in their caregivers.

MATERIALS AND METHODS: In a randomized clinical trial, a total of 150 HF patient-caregiver dyads were randomly allocated into three equally sized training groups, using a simple number table ($n = 50$). The study was conducted between May to October 2018 in Sari, northern Iran. In the teach-back, multimedia and blended training groups, patient-caregiver dyads participated in 20–30-min training sessions held face-to-face, using digital video disc (DVD) and combination of teach-back and DVD on 4 consecutive days at the bedside of hospitalized patients in coronary care unit, respectively. Data were collected using the European Heart Failure Self-Care Behaviour Scale and the multidimensional scale of perceived social support for patients. Caregivers' level of knowledge was measured using the HF Knowledge Scale. Data were measured on the first day of hospitalization, 1 day before discharge and 4 and 8 weeks after patients' discharge. Data were analyzed using SPSS version 18 (SPSS Inc., Chicago, IL, USA).

RESULTS: All three educational methods improved self-care behaviors in patients. The comparison of self-care behavior scores in patients with HF among the three groups at different time points showed no statistically significant differences ($P > 0.05$), except 1 day before discharge ($P = 0.04$). There were no statistically-significant differences between the teach-back, multimedia and the blended training group in terms of perceived social support at any of the four-time points ($P > 0.05$). All three training methods improved the level of knowledge of caregivers. However, the score in the blended training groups was higher than the other groups ($P < 0.001$).

CONCLUSION: According to the results of the present study, it seems that all three educational interventions can improve self-care behaviors in HF patients and increase knowledge in their caregivers. However, using the blended training method was associated with better outcomes.

Keywords:

Health education, heart failure, patient education, self-care, teach-back communication

Introduction

Heart failure (HF) is a major problem for health care worldwide. Prevalence of HF is expected to reach 46% in adults by 2030.[1,2] Aging, diabetes, uncontrolled hypertension, and myocardial infraction increase the risk of this disease.[3,4] In

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patients with HF, physical symptoms and disease progression can lead to limitations in daily activities, loss of independence, and dependency on others and the increased family burden.[5] Self-care is a key component in the comprehensive management of patients with HF.[5,6] Poor self-care management is the most important determinant of poor prognosis in these patients[3] and contributes to exacerbation and hospitalization. However, effective self-care can maintain independence and reduces hospital readmission in patients with HF.[7]

It has been previously confirmed that family members play a crucial role in the care of patients with HF. Receiving tangible and massive informational, financial, emotional, and other necessary support from the family members can improve patients' self-care ability and their psychosocial, physical, and social outcomes and also reduce patients' readmission rate.[8,9] For this reason, caregivers of HF patients need to have adequate knowledge about the disease and its related self-care activities. Despite the importance of the aforementioned issues, evidence has shown that information, resources, and family support in patients with HF are limited.[9] Therefore, the need for patient-caregiver education is inevitable.[10-12]

The teaching methods range from conventional to modern approaches.[13] Conventional educational methods usually cannot improve patients' self-care skills ability, owing to ineffective educational skills of the training staff and their failure to pay adequate attention to the patients as well as inappropriate contents of the program and forgetting the contents by the patients.[13,14] Teach-back is a modern educational method that is conducted through face-to-face questions and answers. This method allowed patients to express in their own words what they have listened to and understood, while the educator corrects their mistakes by reminding them of the contents.[15] This method helps to maintain the optimum levels of self-care in patients and consolidate materials learned during discharge planning. Some previous studies suggest the efficacy of the teach-back method in improving the self-care ability of patients with HF. Needing to the physical presence of the trainer and the time and cost of training are the limitations of this approach.[16-19] Multimedia training (video, animation, and compact disc) is another modern teaching method that can be used for the education of self-care behaviors in patients with HF.[20,21] Previous published studies suggest the usefulness of multimedia training for improving patient self-care abilities.[20-22] Many patients can be trained using this method; learners can see the video repeatedly when it is needed. Furtermore, easy access to the contents, more effectively attracting the attention of the audience and lower educational costs are another advantages of this method.[23,24] Blended training is another modern educational technique that combines face-to-face training and electronic learning.[25,26] The advantages of this method, including easy access to the contents, more effectively attracting the attention of the audience, and lower educational costs, make it one of the potentially attractive teaching methods for improving patients' self-care.[25,27-29]

Due to the increasing prevalence of HF and paucity of information regarding the comparison of the efficacy of teach-back, multimedia and blended training methods on self-care and social support of patients with HF and their caregivers, the present study is aimed to compare the effect of the teach-back method, multimedia and blended training on self-care and social support in patients with HF and knowledge in their caregivers in 2018 in Sari, northern Iran.

Material and Methods

This study was a randomized controlled trial with follow-up assessment after 4 and 8 weeks that was conducted in two teaching hospitals affiliated to Mazandaran University of Medical Sciences in northern Iran from May to October 2018. One hundred fifty patient-caregiver dyads who meet the inclusion criteria were randomly assigned to one of three intervention groups as teach-back method, multimedia, and blended training groups, using random number table.

Sample size calculation

The total sample size was determined as 150 (50 in each group) using the following formula, according to the study by Dalir *et al.*[18] with $\alpha = 0.05$, $\beta = 0.2$ and a dropout rate of 20%.

$$n = \frac{(z_{1-\alpha/2} + z_{1-\beta/2})^2 * (\sigma_1^2 + \sigma_2^2)}{(\overline{x}_1 - \overline{x}_2)^2}$$

Inclusion criteria

Age of 18 years, diagnosing HF with echocardiography, with New York Heart Association functional class I to IV, having a digital video disc (DVD) player at home, no history of participation in self-care programs, the ability to speak and understand Persian, having literacy and having a cell phone were the patients related inclusion criteria. Being an adult, living with the patients, literacy, patient care ability and having cell phone were inclusion criteria for caregivers.

Exclusion criteria

For patients, being a member of the medical team, speech, and auditory problems, having cognitive and psychological disorders, unwillingness to continue participation at any stage of the study, death, and

experiencing stressful events were the exclusion criteria. The exclusion criteria for caregiver were being member of the medical team and having known psychiatric disorders and life-threatening comorbidities.

Patient-caregiver education program: Teach-back method

The patient-caregiver dyads participated in 20–30-min training sessions held face-to-face on 4 consecutive days by using questions and answers at the bedside of hospitalized patients in the coronary care unit (CCU). At the end of each session, the educational content of that session was given to the patients. During the 8 weeks after patients discharge, once every 2 weeks a 10–15-min telephone follow-ups were performed. Questions were asked by patients or their caregivers and the responses to the patient-caregiver's questions were provided over the phone using the teach-back method.

Patient-caregiver education program: The multimedia

The patient-caregiver dyads participated in 20–30-min electronic training sessions held on 4 consecutive days using multimedia, i.e., a DVD player, at the patients' bedside. At the end of each training session, the patient-caregiver was provided with the educational content of that session. All the educational materials were also delivered to the patient-caregiver via a cell phone. In addition, once every 2 weeks a 10–15-min telephone follow-ups were performed after discharge for 8 weeks. All questions were asked and the responses to the patient-caregiver's questions were provided using a cell phone and via text messaging or electronic files.

Patient-caregiver education program: Blended training method (teach-back/multimedia)

The patient-caregiver dyads participated in four 20–30-min training sessions held face-to-face on consecutive days at the patients' bedside. At the end of each session, the patient-caregiver were given an educational booklet and DVD. The educational content of that session was then delivered to the patient-caregiver through a cell phone. In addition, once every 2 weeks a 10–15-min telephone follow-ups were performed for after discharge for 8 weeks. Questions were asked and the responses to the patient-caregiver's questions were provided on a cell phone using teach-back method, text messaging or sending electronic files.

The educational contents for all training methods were based on the guidelines for self-care management in patients with HF,[30,31] which were approved by cardiologists, nursing faculty members, CCU nurses, a number of patients with HF and their caregivers before the study initiation. Educational content was included: nature of illness, sign and symptoms of the disease, medication, nutrition, salt and fluid restriction, physical activity, sexual activity, and follow-up after discharge.

Data collection

Demographic and clinical characteristics of patients were obtained at baseline using interviews and patients' medical records. Patients' self-care behavior was measured by the European Heart Failure Self-care Behavior scale (EHFScB). Perceived social support was evaluated using multi-dimensional scale of perceived social support (MSPSS) questionnaire. Caregivers' level of knowledge was measured using the HF Knowledge Scale. Patients' self-care behavior, perceived social support and caregivers' level of knowledge were measured on the 1st day of hospitalization, 1 day before discharge and 4 and 8 weeks after patients' discharge.

The European Heart Failure Self‐care Behaviour scale

EHFScB contains 12-items and are rated on a five-point Likert scale ranging from 1 (completely agree) to 5 (completely disagree) with a total score range of 12–60. Overall, higher scores indicate poorer self-care, while a score of 12–28 suggests good self-care, 29–44 moderate self-care and 45–60 poor self-care.[32] EHFScB is a frequently validated tool for assessing self-care behavior in HF patients. The reliability and validity of this scale have been demonstrated in different studies.[32-33] In this study, the internal consistency of this scale which was measured by Cronbach alpha, was 0.75.

Multi-dimensional Scale of Perceived Social Support

MSPSS is a 12 items self-reported questionnaire which is rated on a seven-point Likert scale ranging from 1 (very strongly disagree) to 7 (very strongly agree) with a total score of 12-84. Higher scores indicate higher levels of perceived social support. This questionnaire measures social support in three subscales of friends (items 6–7, 9 and 12), family (items 3–4, 8 and 11) and significant others (items 1, 2, 5 and 10). Previous studies reported the Cronbach's alpha reliability coefficient of this scale in the range of 0.85–0.91.[34] In this study, Cronbach's alpha reliability coefficient was 0.85.

Dutch Heart Failure Knowledge Scale

Knowledge of caregivers was measured with the Dutch Heart Failure Knowledge Scale. This self-report 15-item scale can evaluate knowledge about HF related to HF knowledge in general (4 items), HF symptoms and symptom recognition (5 items), and knowledge on HF treatment (including activity and fluid and diet restriction) (6 items). The total score was the range of 0-15, and the caregivers were divided into three

groups by their level of knowledge, i.e., low (score: 0–9), moderate (score: 10–13), and high (score: 14–15). The validity and reliability of this scale have been previously demonstrated.[35] In this study, Cronbach's alpha reliability coefficient was 0.71.

Ethical considerations

The present study was approved by the Ethics Committee of Mazandaran University of Medical Sciences (Code: IR.MAZUMS.REC.1397.115) and registered in the Iranian Registry of Clinical Trials (IRCT20151004024342N5). All the participants were ensured of the confidentiality of their information, and written informed consent was obtained from all subjects.

Statistical analysis

The data were analyzed using Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA). Shapiro–Wilk test was used to determine the normality of the data. The Friedman test was used to assess the trend of variations in within groups. The groups were compared with one another at the four stages cited using the Kruskal–Wallis test. $P < 0.05$ was considered as statistical significance.

Results

During the study period, a total of 223 HF patients and their caregivers were screened. Eighty-three of them did not meet the inclusion criteria or declined to participate in the study. The remaining 150 participants were randomly allocated into three groups (50 in each group). A total of 145 participants completed the present study [Figure 1].

Participants' characteristics

The mean age of the patients was 65.340 ± 12.450 years in the teach-back group, 67.190 ± 9.979 in the multimedia group and 65.710 ± 12.690 in the blended group. Most patients were male, married, and have primary education. The mean age of the caregivers was 45.920 ± 11.150 years in the teach-back group, 46.480 ± 9.623 in the multimedia group, and 42.330 ± 9.613 in the blended group. The majority of the caregivers were female and married and held primary and secondary school education [Table 1].

Changes in patients' self-care behaviors

The results showed an improvement in patients' self-care behaviors, 1 day before discharge. This change maintained at 4 and 8 week- follow-up. Evaluating the trend of variations in the teach-back, multimedia, and blended training groups at the different time points using the Friedman test showed that all the three educational methods had improved the patients' self-care behaviors ($P < 0.001$). The comparison of self-care behavior scores in patients with HF among the three groups at different time points showed no statistically significant differences ($P > 0.05$), except 1 day before discharge ($P = 0.04$) [Table 2].

Changes in perceived social support in patients

Comparing the perceived social support in each groups before the intervention, 1 day before and 4 and 8 weeks after discharge showed significant statistical differences only in the blended training group ($P = 0.01$). The Kruskal–Wallis test showed no statistically-significant differences between the teach-back, multimedia and the blended training groups in terms of perceived social support at any of the four-time points [Table 3].

Changes in the caregivers' knowledge of heart failure

The findings show that increases in the scores of caregivers' knowledge from baseline to end of follow-ups were statistically significant among all groups, but the increases in the blended training group were higher than the other two groups. The Friedman test showed significant differences in the scores of knowledge in the caregivers over time among the three groups ($P < 0.001$). Comparing the teach-back, multimedia and the blended training groups over the four-time points showed that the score in the blended training group was higher than in at least two of the other groups [Table 4].

Discussion

According to the findings of this study, any type of the trainings methods including teach-back method, multimedia and blended training method can improve the self-care in patients with HF. The self-care scores in all groups were increased during the educational period and 8 weeks after discharge. However, the effect was grater in blended training method. Dalir *et al*. found that the teach-back sessions at the bedside can effectively improve self-care in patients with HF.[18] Another study showed that one session of teach-back training increased the self-care knowledge in patients with HF.[16] Dinh *et al*. indicated that the teach-back method, coupled with booklets and phone calls, improved self-care in HF patients.[19] Despite the difference in the number of training sessions and their implementation methods compared to our study, the superiority of the teach-back method over routine care is obvious. In addition, teach-back method, along with patient-caregiver's phone calls follow-up, causes a higher improvement in self-care. Previously it has been revealed that times.

The present study results showed an increase in the mean score of self-care 1 day before and 4 and 8 weeks after discharge compared to the baseline multimedia group. Multimedia training, along with patient-caregiver phone follow-ups and delivery of educational contents

Table 1: Sociodemographic and clinical characteristics of heart failure patients and their caregiver

Variable	Teach-back (*n*=50), *n* (%)	Multimedia (*n*=50), *n* (%)	Blended (*n*=50), *n* (%)	*P*
Patients' charachteristics				
Gender				
Female	24 (48)	17 (34)	20 (40)	0.36
Male	26 (52)	33 (66)	30 (60)	
Matrial status				
Married	37 (74)	36 (72)	36 (72)	0.95
Single	0 (0)	1 (2)	1 (2)	
Divorced	13 (26)	13 (26)	13 (26)	
Education				
Primary	34 (68)	33 (66)	40 (80)	0.31
School	14 (28)	12 (24)	9 (18)	
Secondary school	0 (0)	0 (0)	0 (0)	
Diploma BSc or grater	2 (4)	5 (10)	1 (2)	
Job				
Business	9 (18)	9 (18)	12 (24)	0.68
Unbusiness	41 (82)	41 (82)	38 (76)	
NYHA				
I	0 (0)	0 (0)	0 (0)	0.07
II	9 (18)	4 (8)	8 (16)	
III	12 (24)	31 (62)	37 (74)	
IV	29 (58)	15 (30)	5 (10)	
Income				
Poor	11 (22)	11 (22)	17 (34)	<0.001
Fair	20 (40)	14 (28)	19 (38)	
Good	19 (38)	25 (50)	14 (28)	
Type of HF				
Systolic	48 (96)	47 (94)	48 (96)	0.98
Dyastolic	2 (4)	3 (6)	2 (4)	
Comorbidity				
HTN	50 (100)	50 (100)	49 (98)	0.93
DM	34 (68)	35 (70)	32 (64)	0.80
HDLP	41 (82)	38 (76)	45 (90)	0.17
CRF	28 (56)	23 (46)	25 (50)	0.60
Addiction				
Smoker	6 (12)	2 (4)	5 (10)	0.37
Morphin	10 (20)	9 (18)	11 (22)	
Smoker, morphin	5 (10)	6 (12)	1 (2)	
No addiction	35 (70)	35 (70)	38 (76)	
Caregivers' characteristics				
Gender				
Female	36 (72)	40 (80)	41 (82)	0.44
Male	14 (28)	10 (20)	9 (18)	
Matrial status				
Married	37 (74)	44 (88)	38 (76)	0.33
Single	11 (22)	4 (8)	9 (18)	
Divorce	2 (4)	2 (4)	3 (6)	
Education				
Primary school	20 (40)	20 (40)	22 (44)	0.12
Secondary school	18 (36)	20 (40)	22 (44)	
Diploma	2 (4)	4 (8)	2 (4)	
Bachelor's degree and above	10 (20)	6 (12)	4 (8)	
Job				
Business	16 (32)	10 (20)	16 (32)	0.30
Unbusiness	34 (68)	40 (80)	34 (68)	
Carers location				

Contd...

Table 1: Contd...

Variable	Teach-back (*n*=50), *n* (%)	Multimedia (*n*=50), *n* (%)	Blended (*n*=50), *n* (%)	*P*
Patients' charachteristics				
Town	23 (46)	28 (56)	23 (46)	0.51
Village	27 (54)	22 (44)	27 (54)	
Relationship withthe patients				
Daughter or son	27 (54)	21 (42)	28 (56)	0.53
Spouse	19 (38)	23 (46)	17 (34)	
Sibling	0 (0)	2 (4)	0 (0)	
Grandchild	4 (8)	4 (8)	5 (10)	

NYHA=New Yourk heart association, HTN=Hypertension, DM=Diabetes mellitus, HDLP=Hyperlipidemia, CRF=Chronic renal failure, HF=Heart failure

Table 2: Within and between group comparisons of self-care in patients with heart failure during the study period

Variables	Mean±SD				*P**	Effect size
	Baseline	Once day before discharge	4 weeks after discharge	8 weeks after discharge		
Teach-back	36.1±3.437	27.17±2.935	26.98±2.927	26.83±2.955	<0.001	0.70
Multimedia	35.13±4.097	26.74±3.383	26.93±3.454	26.09±3.488	<0.001	0.63
Blended	34.98±4.286	25.85±2.774	26.57±2.455	26.09±4.042	<0.001	0.59
*P***	0.15	0.04	0.20	0.10		
Effect size	0.01	0.02	0.03	0.01		

*Comparsion within groups by the Friedman test, **Comparsion between group by the Kruskal-Wallis test. SD=Standard deviation

Table 3: Within and between group comparisons of social support in patients with heart failure during the study period

Variables	Mean±SD				*P**	Effect size
	Baseline	1 day before discharge	4 weeks after discharge	8 weeks after discharge		
Teach-back	65.15±10.24	66.50±8.58	67.40±8.27	66.38±8.55	0.06	0.01
Multimedia	66.02±8.09	65.98±8.62	63.30±8.35	65.92±8.54	0.58	0.02
Blended	66.49±11.93	66.60±11.85	68.31±9.76	66.47±11.64	0.01	0.08
*P***	0.579	0.601	0.167	0.114		
Effect size	0.006	0.01	0.08	0.006		

*Comparsion within groups by the Friedman test, **Comparsion between group by the Kruskal-Wallis-test. SD=Standard deviation

Table 4: Within and between group comparisons of caregivers' heart failure knowledge during the study period

Variables	Mean±SD				*P**	Effect size
	Baseline	1 day before discharge	4 weeks after discharge	8 weeks after discharge		
Teach-back	5.35±2.47	3.75±1.64	11.19±2.33	12.21±2.45	<0.001	0.87
Multimedia	5.26±1.83	3.07±1.48	10.74±2.44	10.48±2.54	<0.001	0.77
Blended	5.98±2.10	4.34±1.41	12.36±2.55	12.87±2.52	<0.001	0.89
*P***	0.64	0.002	0.007	<0.001		
Effect size	0.02	0.06	0.09	0.17		

*Comparsion within groups by the Friedman test, **Comparsion between group by the Kruskal-Wallis test. SD: Standard deviation

through cell phones, improves better the self-care scores of patients. Srisuk *et al*. showed the superiority of face-to-face training using DVDs along with patient-caregiver follow-up phone calls over routine care in improving the self-care behaviors in HF patients.[10] Another study confirmed the efficacy of media-based training over routine care for improving the self-care of patients with HF.[36]

In our study, the blended training method showed a more significant efficacy in increasing the self-care score during the study period. Stamp *et al*. demonstrated that family-oriented educational interventions using DVDs and follow-up phone calls supported by information and communication to be more effective in improving self-care behaviors in patients compared to media-based training or follow-up phone calls.[23] Boyde *et al*., in their study, demonstrated that although DVD learning and verbal discussion, supported by written manual with tech-back, improved self-care in both groups compared to routine care in HF patients presenting to a heart clinic, the difference was not statistically significant.[30] This discrepancy of results can be explained by teaching a short booklet, as default in the routine care of patients. Given the differences in the number of training sessions and the intervention setting, blended training along with

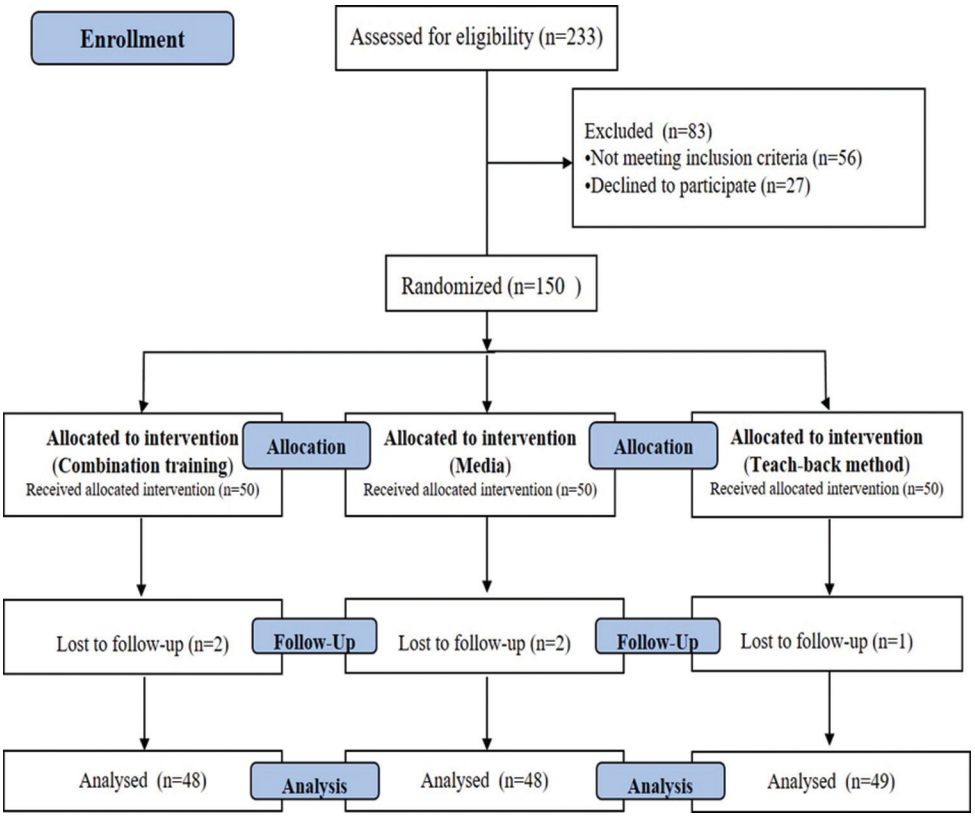

Figure 1: Flow diagram of the study

patient-caregiver phone follow-ups appear to cause higher improvements in self-care.

The results of the present study showed that only in patients with blended training method, a statistically significant difference were observed in terms of perceived social support. It seems that this difference may not translate into a clinically significant difference. This outcome implies that more effective interventions are needed to improve perceived social support in patients with HF. Because support provided by caregivers is very important for improving the self-care in patients with HF. Khaledi *et al*. demonstrated that face-to-face and group training can improve social support in HF patients, compared to routine education.[37] Furthermore, Shahriari *et al*. showed that teaching need-based social support to patients' families is more effective than routine education for improving social support in patients with HF.[38]

The results of the present study showed that all the three educational methods can significantly improve the knowledge levels in the caregivers, 1 day before and 4 and 8 weeks after discharge. Comparing the groups with one another also found that blended training can lead to a higher improvement in caregivers' knowledge. Increasing the level of knowledge led to the improvement of self-care behaviors, diet and medication, and patient-caregiver self-reporting.[15,24,39,40] The results of this study are in line with the results of the study by Srisuk *et al*.,[10] which found multimedia training along with patient-caregiver collaboration can significantly improve the knowledge levels in the caregivers and also self-care behaviors in patients with HF.

One of the limitations of this study was related to the conditions and problems in the patients' living environment. This condition can potentially affect the performance of patients and caregivers, which was beyond the control of the researchers. The novelty of this study lays mainly in two distinctive elements. First, to the best of our knowledge, for the first time, we compared the efficacy of three different educational intervention, including the teach-back method, multimedia, and blended training method for improving self-care behaviors in HF patients. Second, in this study, both patients and their main caregivers, as "invisible patients," were included to create a possible positive and synergistic effect to enhance the intervention effects.

Conclusion

According to the results of the present study, it seems that all three intervention, including the teach-back method, multimedia, and blended trainings method, can improve self-care behaviors in HF patients and increase knowledge in their caregivers. Maintaining improvements in self-care and knowledge over time is one of the major highlights of the findings of this study.

However, the interventions were not very effective in the improvement of patients' perceived social support.

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Conflicts of interest

There are no conflicts of interest.

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