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The Effect of Self-management-based Discharge Planning on Anxiety, Depression, and Re-admission in Patients with Chronic Heart Failure

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Abstract

Background: Heart failure (HF) is a chronic progressive syndrome. Patients with heart failure often experience poor self-management, anxiety, depression, poor quality of life, and frequent readmission.

Aim: The present study was performed with aim to explore the effect of self-management-based discharge planning on anxiety, depression, and readmission in patients with heart failure.

Method: This quasi-experimental study was performed on 80 patients with heart failure admitted to two teaching hospitals of Zahedan in 2019-2020. The participants were randomly assigned to two intervention and control groups. The self-management-based discharge planning was performed for the intervention group. The intervention group was followed-up by calling 2-3 days after discharge and then every week in the first month and every two weeks in the second and third months. Data were collected using the Hospital Anxiety and Depression Scale (HADS) and a readmission frequency and duration form. Data were analyzed using SPSS software (version 16). $P<0.05$ was considered statistically significant.

Results: The results showed a significant differences in the mean score of anxiety and depression over time ($p<0.001$) and in the intervention and control groups ($p<0.001$). There was no significant difference between the two groups in the readmission duration ($p=0.052$) and readmission frequency ($p=0.801$).

Implications for Practice: Self-management-based discharge planning reduces depression and anxiety of patients with heart failure. Given the ease of clinical implementation of self-management-based discharge planning, its low costs, and availability for clinical staff, it can be considered an effective method to reduce depression and anxiety in these patients.

Keywords: Anxiety, Depression, Heart failure, Patient Discharge, Patient Readmission, Self-management

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Introduction

Heart failure is the most common cause of hospitalization in people over 60 years old (1). About 64.3 million people worldwide live with heart failure. In developed countries, heart failure generally affects about 1 to 2% of the adult population (2). The increased rate of heart failure patients worldwide increases disease management costs, and these costs will reach almost $400 billion by 2030 (3). The prevalence of heart failure in Iran was reported as 0.4%-4.3% (4). Patients with heart failure experience various consequences, including fatigue (5), poor self-management (6), readmissions (7), low quality of life, anxiety, and depression (8). Nearly 66% of heart failure patients suffer from anxiety (9). Aggelopoulou et al. in a study reported that 28% of patients with heart failure showed anxiety (8). Moreover, the prevalence of depression in patients with heart failure is 5 times higher than in normal people (10). Yeh and Shao showed that 47.13% of patients with heart failure had symptoms of depression (11). Suzuki et al. (2014) found that the prevalence of anxiety and depression in hospitalized patients with heart failure was 20% (12). The association of anxiety and depression with a chronic disease such as heart failure causes a worse prognosis, improvement of the functional class of the disease, poor treatment compliance (13), increased mortality, poor quality of life (14), increased anxiety and depression, and frequent patient readmissions (13).

Heart failure accounts for the highest rate of readmissions with a rate of about 30% during 30-60 days after discharge (15). In Europe, 30% of readmissions of patients with heart failure occur in the first week after discharge and 60% in the first two years (16). In Iran, 29-47% of patients with heart failure are re-hospitalized within 3-6 months after initial discharge (17). The reasons for readmissions often include drug complications, lack of care follow-up, lack of social support, poor quality of care, and lack of patient's communication with healthcare staff and hospital after discharge (18). Patients experience many challenges at home after discharge (19). Discharge planning is an intervention to maintain and care for the achievements attained during hospitalization. It also aims to continue the process of treatment of patients after discharge and provide the necessary services and support to patients and their caregivers (20).

Several studies have addressed the effect of implementing discharge planning on reducing patient readmissions (17) and improving the quality of life and decreasing the mortality of patients with heart failure (21). Patients as the main participants should have an active role in disease management (22). A self-management-based discharge planning is recommended for patients with heart failure (23). Self-management is defined as the ability to reduce or manage symptoms, solve physical and mental problems, change lifestyles, and finally leads to a good life with a chronic disease (24). Patients with heart failure often have poor self-management (6). Given the progressive and complex nature of heart failure, it is important to identify the interventions which lead to effective self-management in patients with heart failure (25). There are few studies in Iran which have addressed self-management in patients with heart failure. Aghamohammadi et al. (2016) showed that the self-efficacy of older people with heart failure improved after self-management-based discharge planning (24). Laal et al. also indicated that post-discharge education and follow-up reduced the frequency of readmissions in cardiac patients (17). Moreover, there is no sufficient evidence about the effect of self-management-based discharge planning on the psychological health and readmission of patients with heart failure in Iran. Thus, the present study was performed with aim to evaluate the effect of self-management-based discharge planning on anxiety, depression, and readmission of patients with heart failure admitted to the teaching hospitals in southeastern of Iran.

Methods

This two-group quasi-experimental study was performed on 80 patients admitted to the cardiovascular intensive care units in two teaching hospitals of Zahedan, southeastern of Iran from September 2019 to April 2020.

The participants were selected using convenience sampling among the patients who met the inclusion criteria and then randomly assigned to the intervention and control groups. Each patient was assigned either to the intervention or control group by selecting one of the cards with two different colors. A total of 80 cards, including 40 bold blue cards for the intervention group and 40 pale blue cards for the control group, were prepared and were selected by the patient during hospitalization, and the type of assigned group was determined based on the color of the selected card. According to a study by Khajavi et al. (2019) (26), and considering the confidence coefficient 0.95 and the test power of 95% and using the

mean formula of two independent populations, the minimum sample size was determined as 3.4 per group that considering the probability of dropout, a total of 80 samples was considered (40 samples in each group with a 15% attrition rate).

The inclusion criteria were: age of ≥18 years, hospitalization due to heart failure confirmed by a cardiologist, being literate, suffering from class II or III heart failure (with an ejection fraction (EF) below 40%) according to the prepared checklist and the New York Heart Association (NYHA) Functional Classification, no history of training on self-management-based discharge planning, access to the telephone, no drug or alcohol abuse, no cognitive or psychiatric disorders, and no use of psychotic drugs. Moreover, patients who had recovered due to medical interventions such as treatment procedures for heart valve problems were excluded from the study. The other exclusion criteria were deterioration of the patient's condition or a serious life-threatening illness with less than 6 months of life expectancy (diagnosed by the attending physician), receiving post-discharge special care for heart failure or follow-up by a specialist, patient's death or withdrawal from the study, and heart attack during the last 3 months (during the intervention from admission to the end of the follow-up period).

Data was collected through a demographic and clinical information questionnaire (age, sex, disease duration, education level, smoking, disease class, main caregiver, caregiver's age), the Hospital Anxiety and Depression Scale (HADS), and a readmission frequency and duration form. The Hospital Anxiety and Depression Scale (HADS) is a 14-item tool with two anxiety and depression subscales, developed by Zigmond and Snaith (27) to screen the presence and severity of depression and anxiety (each with 7 items) experienced during the last week in hospitalized patients. Other than physically ill individuals, the HADS is also used for community samples/populations. The items in the scale can be completed in less than 5 minutes. The scale has been developed for adolescents aged 16 years and older. Each item is scored on a scale of 0-3. Thus, the total scores on the subscales of depression and anxiety range from 0 to 21. A score of 0-7 on both subscales shows normal symptoms, a score of 8-10 indicates mild symptoms, a score of 11-14 shows moderate symptoms, and a score of 15-21 indicates severe symptoms. The validity between this questionnaire and the Beck depression questionnaire was reported as 0.62-0.73. Regarding reliability, Cronbach's alpha coefficient was reported as 0.81-0.90 and test-retest was r>0.80 (27). The Hospital Anxiety and Depression Scale (HADS) has been extensively used in previous studies. Montazeri et al. confirmed the validity and reliability of this tool. The internal consistency was 0.78 for the anxiety subscale and 0.86 for the depression subscale (28). Sadeghzadeh et al. also confirmed the reliability of the tool with a Cronbach's alpha of 0.79 (29). In the present study, the reliability of the tool was determined with a Cronbach's alpha of 0.93.

The questionnaires were first completed by the patients before starting the intervention. Then, the intervention started when the general condition of the patients stabilized after hospitalization. The self-management-based discharge planning was implemented in the hospital in 4 training sessions each lasting 30-60 minutes. Face-to-face (individual) training was provided with a teach-back approach for the patient and the family caregiver. The content of the self-management-based discharge planning was prepared from the reliable sources (21, 23, 30). The training sessions focused on self-management barriers, implementing the problem-solving process involving the active participation of the patient and the main caregiver in the discussion, providing examples, and engaging to find solutions to solve problems based on individual need analysis)by asking questions and assessing the patient's condition). In the first session, the characteristics of the disease (diagnosis, treatment, and side effects), the importance of self-management, and the consequences of the disease in the lack of self-management skills were discussed. The second and third sessions were related to the depression and anxiety of patients and the importance of their management and the effects of the poor psychological condition of patients in the control and management of the disease. The fourth session was related to the challenges and obstacles of self-management as well as focusing on the individual needs of each patient. Patient's education based on learning needs assessment could improve self-care behaviors in patients with heart failure (31). At the end of each session, the patient and the caregiver were surveyed regarding the efficacy of the instructions. An educational pamphlet was also given to each patient at the end of the intervention. The intervention group was followed-up by calling the patient and the caregiver 2-3 days after discharge followed by phone calls every week in the first month and every two weeks in the second and third months. The follow-up procedure focused on reinforcing the instructional content before discharge, examining the patient's problems and needs and solving them, examining the patient in terms of the exclusion criteria, checking the possibility of patient's

readmission to the hospital, and the length of hospital stay. The caregiver answered the phone calls if the patient could not talk for any reason. Each phone call averagely lasted 15-20 minutes.

The patients in the control group received routine education in the cardiovascular intensive care units (CICUs) which includes the minimum learning needs of patients hospitalized in the ward, and assessment of individual needs as well as the ability of patients to self-management is not a priority. The control group was followed-up through phone calls to check the discharge criteria, the patient's readmission to the hospital, and the length of hospitalization at the end of each month up to 3 months.

If the patients had a history of readmissions during the study period, they were not excluded from the intervention and were followed-up as other patients. At the end of the first and third months after the intervention, the questionnaire was again completed by phone for the patients in both groups. To comply with the ethical principles, the training pamphlet was given to the patients in the control group at the end of the study.

The researcher explained the research objectives to the participants and the written informed consent was obtained from the patients. They were told that their participation was voluntary and they could leave the study if they wished. They were also reassured that their information would remain confidential.

The collected data was analyzed using SPSS software (version 16). The Kolmogorov-Smirnov test was used to confirm the normality of the data. Thus, the assumptions for using parametric tests were established. The data were summarized using descriptive statistics including frequency, percentage, mean, and standard deviation. Moreover, the paired samples t-test was used to compare the pre- and post-intervention scores in each group. Also, independent samples t-test was used to compare the pre- and post-intervention scores between the two intervention and control groups. The frequency of the qualitative variables was also compared in the two groups using the chi-square and Fisher's exact tests. Furthermore, repeated measures analysis of variance (ANOVA) determined the group effects on the outcomes after removing the effect of confounding variables (age, gender, marital status, income level, education, employment status, and smoking). $P<0.05$ was considered statistically significant.

Results

A total of 80 patients were included in this study. However, 5 patients left the study (due to unwillingness to continue participation) and the research was performed on 75 patients (38 patients in the intervention group and 37 patients in the control group) (Figure 1).

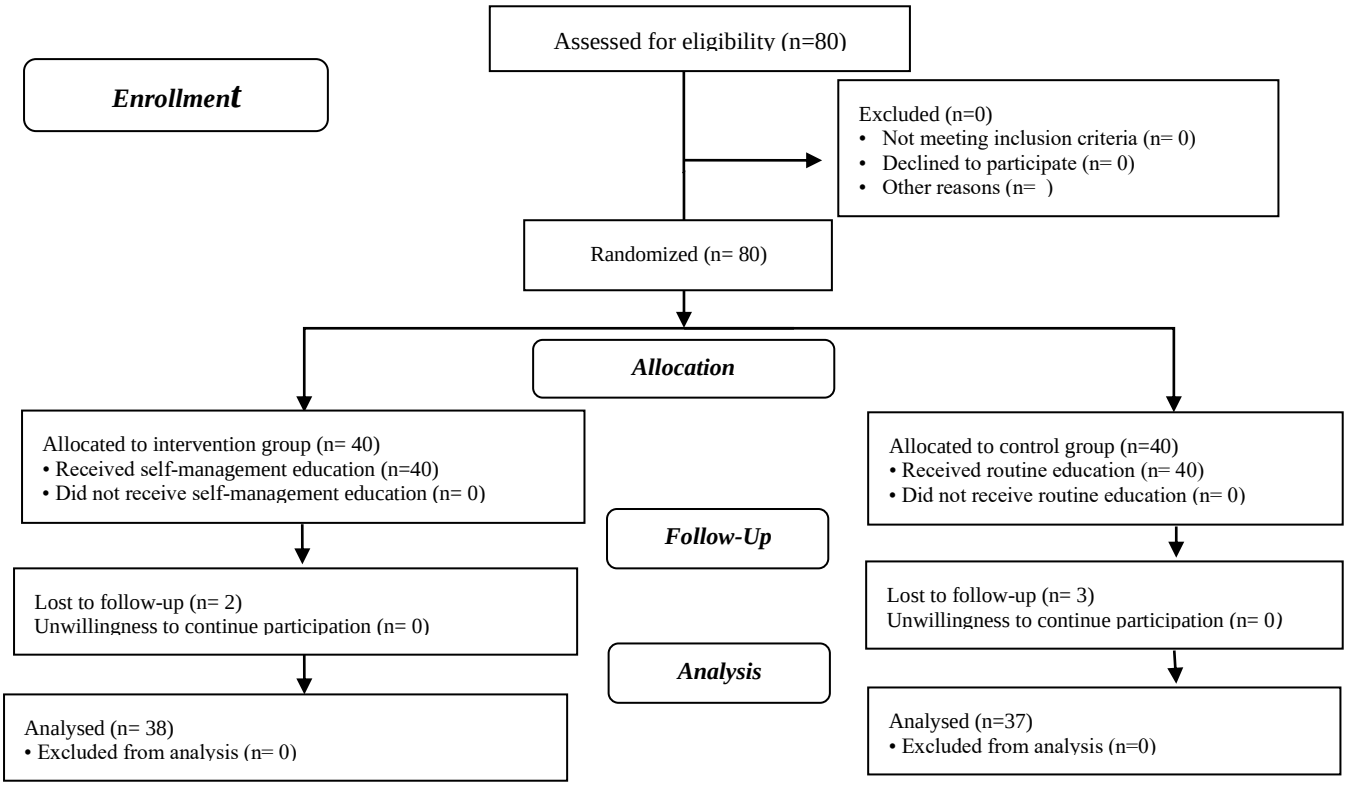

Figure 1. CONSORT flow diagram of the study

Analysis of the participants' demographic characteristics showed that 55.3% of the patients in the intervention group and 45.9% in the control group were male. The mean age of the patients in the intervention group was 50.97±11.68 years and in the control group was 45.21±11.85 years; the difference between the two groups was significant (p=0.042). Other demographic characteristics of the patients and caregivers in the two groups were presented in Table 1. As can be seen in this table, except for the patient's age, other variables had no statistically significant differences in the intervention and control groups.

Table 1. Comparison of demographic and clinical data of the participants in the intervention and control groups

Variable		Control group Mean±SD/ Frequency (%)	Intervention group Mean±SD/ Frequency (%)		statistical test result
Patient's age		45.11±21.85	50.97±11.68	t=2.119	0.042*
Disease duration		5.21±4.09	5.4±23.33	t=-0.021	0.983*
Caregiver's age		34.10±08.20	38.50±13.15	t=1.622	0.115*
Gender	Male	17 (45.9%)	21 (55.3%)	χ^2=0.65	0.423**
	Female	20 (54.1%)	17 (44.7%)		
Education	Lower than diploma	29 (78.4%)	33 (86.8%)	χ^2=0.94	0.337**
	Diploma and higher	8 (21.6%)	5 (13.2%)		
Smoking	Yes	0 (0.00%)	3 (7.9%)	F=3.04	0.244***
	No	25 (67.6%)	29 (76.3%)		
	Quitted	12 (32.4%)	6 (15.8%)		
Disease class	Class II	33 (89.2%)	30 (78.9%)	χ^2=1.46	0.238**
	Class III	4 (10.8%)	8 (36.85)		
Main caregiver	Spouse	24 (64.9%)	24 (63.2%)	χ^2=0.2	0.882**
	Child	13 (35.1%)	14 (36.8%)		

* Independent samples t-test, ** Chi-square test, *** Fisher's exact test

As shown in Table 2, the results of repeated measures ANOVA indicated a statistically significant difference between the mean anxiety scores in the intervention and control groups over time (p<0.001). Moreover, the repeated measures ANOVA showed significant differences between the mean scores of depression in the intervention and control groups (p<0.001). There was an interactive effect between the self-management-based discharge program intervention and time (before, one month and three months after the intervention) regarding anxiety and depression of patients in the intervention and control groups based on the Bonferroni approach. This means that over time, the level of anxiety decreased in the patients of the intervention group and increased in the patients of the control group (Table 3,4).

Table 2. Comparison of the participants' clinical data in the two groups before and after the intervention

Variable	Stage	Intervention group	Control group	Time	Group	Time × group
Anxiety	Pre-intervention	11.44±0.82	10.50±0.84	F = 2.013	F = 5.744	F = 43.512
	One month after the intervention	8.62±0.68	10.69±0.47	df = 1	df = 1	df = 1
	Three months after the intervention	6.20±0.58	11.58±0.59	P = 0.161	P = 0.023	P < 0.001
Depression	Pre-intervention	7.36±0.83	8.74±0.84	F = 3.012	F =10.143	F = 38.735
	One month after the intervention	5.38±0.76	8.90±0.77	df = 1	df = 1	df = 1
	Three months after the intervention	3.84±0.66	9.30±0.68	P = 0.874	P = 0.002	P < 0.001
Readmission frequency	Pre-intervention	3.16±0.25	2.89±0.25	F = 0.074	F = 0.159	F = 1.069
	One month after the intervention	0.04±0.065	0.31±0.066	df = 1	df = 1	df = 1
	Three months after the intervention	0.11±0.074	0.26±0.0.075	P = 0.787	P = 0.692	P < 0.305
Readmission duration	Pre-intervention	4.02±0.202	3.82±0.21	F = 0.308	F = 3.365	F = 1.123
	One month after the intervention	012±0.20	0.91±0.20	df = 1	df = 1	df = 1
	Three months after the intervention	0.36±0.204	0.66±0.21	P = 0.581	P = 0.071	P < 0.293

Table 3: Interaction effect between anxiety and time and groups point by point with Bonferroni correction

Anxiety	mean difference	SD	P_{Value}
Comparing the time before the intervention with one month later	1.44	2.88	P < 0.001
Comparing the time before the intervention with three months later	2.12	4.50	P < 0.001
Comparing the time one month after the intervention with 3 months later	0.68	3.23	0.07

Table 4. Interaction effect between depression and time and groups point by point with Bonferroni correction

Depression	mean difference	SD	P_{Value}
Comparing the time before the intervention with one month later	0.92	17.9	P < 0.001
Comparing the time before the intervention with three months later	1.51	30.34	P < 0.001
Comparing the time one month after the intervention with 3 months later	0.68	17.07	0.07

The results of repeated measures ANOVA showed no significant changes in the readmission frequency (p=0.305) and readmission duration (p=0.293) of the patients in the two groups over time.

Discussion

The current study examined the effect of self-management-based discharge planning on anxiety, depression, and duration and frequency of readmissions in patients with heart failure. The results showed that self-management-based discharge planning reduces anxiety and depression, however, no significant effect was shown on the frequency and duration of re-hospitalization of patients. Similarly, Shojaei et al. (2014) found that patient education and 3-month telephone nursing follow-up significantly reduced the anxiety experienced by patients with heart failure (32). Also, Tsuchihashi-Makaya et al. (2013) showed that the home-based heart failure management program significantly reduced depression and anxiety of patients (33). Moreover, Khoshab and colleagues (2011) showed that applying the collaborative model significantly reduces anxiety and depression in patients with heart failure (14). The findings of the above mentioned studies were in line with the results of the present study because an educational program such as self-management-based discharge planning and post-discharge follow-up of heart failure patients can significantly control the disease and reduce its symptoms and complications such as depression and anxiety.

However, in the present study, the frequency and duration of re-hospitalization of patients did not reduce after the intervention. However, Cui et al. (2019) found that the structured education program was associated with a significant reduction in hospital admissions of patients with chronic heart failure (34). Lambrinou et al. (2012) conducted a systematic review on the effectiveness of heart failure management programs with a nursing-directed discharge plan to reduce readmissions. Their results showed that these programs can significantly reduce the readmission rate of patients (35). Laal and colleagues (2017) reported that post-discharge education and follow-up led to a significant reduction in the readmissions of patients with heart failure (17). Moreover, Ghahramani et al. (2010) found that educational programs lead to improving awareness, self-care behaviors, and reduced readmissions of patients with heart failure (36). Also, Shahbaz et al. (2016) found that the self-care behaviors of most patients with heart failure had not very good quality, and there was a negative relationship between self-care behaviors and readmission in these patients (15). The reason for the difference between the results of these studies and the present study can be due to the difference in the method of the research. On the other hand, the coincidence of the follow-ups in the present study with the spread of the corona virus can affect the willingness of patients to be again hospitalized and distort the results of the present study. Therefore, this finding should be interpreted with caution and more studies will be needed after the end of the corona epidemic.

Young et al. (2016) carried out a home-based intervention to strengthen patients' activities and improve their self-management. Their results showed that the intervention improved patients' compliance and self-management behavior, but the frequency of re-hospitalization did not decrease (37). Leavitt and (2020) in their study to investigate the effect of heart failure nursing intervention at home on the readmission of patients, there was no significant improvement in the rate of re-hospitalization (38). Hsing-Mei et al. (2020) found that the effects of pre-discharge patient education program with one-year post-discharge follow-up was not significant on hospital readmission, which indicates the need to design more effective and powerful interventions (39). The results of the above mentioned studies were consistent with the present study. Further studies are needed to be performed in order to investigate the effect of the self-management program on reducing the duration and

frequency of hospitalization of patients.
Since this study was conducted on a small sample and in only two hospitals, its findings might have limited generalizability for other populations. In addition, the data were collected using self-report tools, which could affect the participants' responses. It is suggested that future studies use longitudinal data with long follow-up periods to evaluate the effectiveness of self-management-based discharge planning. Furthermore, considering the need for education and increasing the awareness of patients about heart failure and controlling and managing its symptoms, similar studies can be carried out on patients with any level of literacy and education.

Implications for practice
As the results of the present study indicated, self-management-based discharge planning in patients with heart failure can improve the outcomes of the disease. Considering the effectiveness and ease of implementation, it is suggested that the discharge process of these patients be designed, implemented and evaluated based on the self-management principles.

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Conflicts of interest
The authors declared no conflicts of interest

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