

The Effect of Self-Care Education on Adherence to Treatment in Elderly Patients with Heart Failure: A Randomized Clinical Trial

Abstract

Background: Noncompliance with treatment in the elderly with Heart Failure (HF) may result in a lack of recovery, a decrease in longevity, rehospitalization, and additional costs. Therefore, this study was conducted to determine the effect of self-care education on adherence to treatment among elderly patients with HF. **Materials and Methods:** This study was a parallel clinical trial on 90 elderly people over 60 years of age who were hospitalized in cardiac wards. Data were collected using a demographic characteristics form and the adherence to treatment questionnaire. Individuals who met the study inclusion criteria were randomly allocated to the intervention and control groups. The intervention group training was performed before and after discharge. The adherence to treatment questionnaire was completed again by both groups 2 months after discharge. Data were analyzed using Chi-squared test; ex. ($\chi^2 = 3.95$, $df = 1$, $p = 0.046$), paired and independent t -tests, and analysis of covariance. **Results:** The mean (standard deviation) total score of adherence to treatment in the intervention group was 39.71 (4.51) and 78.72 (10.47) before and after the self-care education, respectively. Paired t -test showed a significant difference in both groups after the intervention compared to before the intervention, and independent t -test showed a significant difference between the groups after the intervention ($p = 0.001$). **Conclusions:** Self-care education before discharge and home-based education were effective in promoting adherence to treatment among patients with HF. Therefore, self-care education before discharge may improve adherence to treatment among elderly patients with HF.

Keywords: Aging, education, heart failure, nursing, self-care, treatment adherence and compliance

Introduction

The elderly population is increasing worldwide and they are the primary victims of Heart Failure (HF).^[1] HF is a public health problem which results in hospitalization and death. HF patients have a mortality rate of 10–15% and a rehospitalization (within 6 months after discharge) rate of 30–40%.^[2] The lifetime risk of HF is 11.4% (95% CI: 9.6–13.2%) for men and 15.4% (95% CI: 13.5–17.3%) for women.^[3] The prevalence of HF is expected to increase from 2.42% to 2.97% in 2030.^[4] A study showed that the HF hospital readmission rate varies from 17.0% to 28.2%.^[5] One of the reasons for the readmission of patients is nonadherence to treatment.^[5] A study showed that although 100% of patients reported using prescription drugs, their direct monitoring showed that only 76% had complete adherence with the drug

regimen.^[6] Adherence to the treatment regimen in patients with HF includes adherence to the necessary pharmaceutical and nonpharmaceutical methods. However, when patients with HF leave the hospital and return to their community, their main problem is discontinuation or early withdrawal of medication.^[7]

Failure to follow a regimen, defined as noncompliance with health or therapeutic recommendations, is a complex behavioral process which is influenced by many factors such as individual characteristics of the patient, the physician–patient relationship, and the health-care system.^[8,9] Compliance with or adherence to therapeutic instructions refers to the degree to which the patient adheres to the recommendations of the health-care provider regarding medication intake, diet, or lifestyle changes.^[10] Pobrotyn *et al.* reported that the main cause of

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rehospitalization of patients with HF is their poor self-care behaviors.^[11] According to Orem, self-care is a learned and regulated function in humans.^[12] Self-care is defined as a strategy to adapt to the events and tensions of everyday life which results in independence and includes specific activities by which the symptoms of the disease are reduced and health is maintained and improved. Self-care is an important aspect of treatment in patients with HF.^[13] Daily weighing should be monitored by yourself; contacting a physician if you see edema in the legs, ankle, and abdomen, monitoring your daily urine output, taking medications regularly according to your doctor's orders, and avoiding excessive drinking of fluids are examples of self-care behaviors in patients with HF.^[14] Self-care management of HF is complex; it includes being committed to monitoring symptoms and compliance with drug regimens, recognizing and assessing changes in one's condition, and choosing the appropriate treatment option and evaluating its effectiveness.^[15]

A study showed adherence to the treatment of HF among patients to be poor and concluded that the training and follow-up of self-care behaviors with focus on diet and other aspects of chronic illnesses is necessary.^[16] There are several ways through which nurses can improve HF prognosis. One of them is patient education through providing self-care materials and responding to patients' telephone calls if necessary.^[1,10] Compliance with treatment in elderly patients with HF seems to require more attention. Therefore, the present study was conducted to determine the effect of self-care education on adherence to treatment among the elderly with HF.

Materials and Methods

This study was a parallel clinical trial (IRCT ID: IRCT20160930030058N2) with an intervention and a control group that was conducted between July 2018 and February 2019.

The study setting was Khatam-al-ambia Hospital, Shohada Hospital, and Payambar Azam Hospital of Gonbad-e-Kavos, Iran, in 2019. These three hospitals are located in three areas of the city and are almost similar, and thus, the patients who refer to these hospitals are similar in terms of demographic characteristics and ethnicity. All three hospitals have cardiology wards and cardiology clinics. Based on the study by Kamrani *et al.*,^[17] and 95% confidence interval and a power of 90%, the sample size of the study was calculated to be 38 samples. Considering a possible dropout rate of 25%, the sample size was finally considered to be 45 patients in each group. Eligible patients were selected using the available sampling method. The research sample included 90 elderly patients. The study inclusion criteria included age of over 60 years, HF class 1 or 2, hospitalization in the cardiology ward, and self-care score of lower than 49.^[18] The study exclusion

criteria included having no psychiatric disorders (according to health records), the discontinuation of participation in the study, and severe illness and death of the patient. After receiving informed written consent from the patients, they were allocated to the two groups of intervention and control using permuted block randomization and random sequence generation method [Figure 1].

At first, the intervention and control group completed the adherence questionnaire before the training. The intervention group received training in the ward before discharge and at home during the 2 months after discharge through an educational package and an educational CD.

The intervention group could contact the research team via telephone calls. The control group only received routine training without the supervision of the researcher after discharge. The intervention and control group completed the adherence questionnaire again 2 months after the completion of the training. The training after discharge included the name of the disease, etiology of the disease, possible causes of recurrence, name of the medications used, how drugs are taken, the time of drug use, drug interactions, drug side effects, diet, food avoidance, blood pressure, using a sphygmomanometer, weight control, smoking cessation training, how to oxygenate at home if needed, appropriate posture, movement on the bed, urinary catheter care, if necessary, the symptoms of heart disease (sweating and chest pain, shortness of breath, chest pain, and restlessness), and the warning signs that show they need to go to a doctor. The patients were given a phone number to contact the researchers whenever they needed to guide or education. Data were gathered using a demographic checklist including items on age, gender, and marital status, and the adherence to treatment questionnaire designed by Seyed Fatemi *et al.*^[19] The questionnaires were completed by the elderly individuals in both groups before discharge and 2 months after discharge. The adherence to treatment questionnaire was designed and validated by Seyed Fatemi *et al.*^[19] and its validity and reliability were confirmed. This questionnaire has seven areas including Making Effort for Treatment (MEFT) (nine items), Intention to Take the Treatment (ITTTT) (seven items), the Adaptability (seven items), Integrating Treatment with Life (ITWL) (five items), Stick to the Treatment (four items), Commitment to Treatment (five items), and Indecisiveness for Applying Treatment (IFAT) (three items). The items of the questionnaire are scored based on a 6-item Likert scale ranging from 0 (never) to 5 (sure). Higher total scores demonstrate greater adherence to treatment and higher scores in each area illustrate greater adherence to treatment in that area [Table 1]. Therefore, the score of each subscale is calculated from the sum of its items and the total score of the questionnaire is achieved from the sum of the subscale scores. By converting the score obtained on the questionnaire to a percentage and

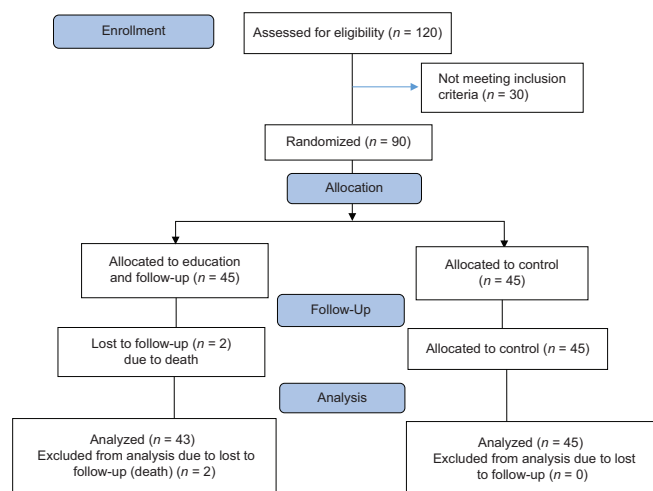


Figure 1: Flow chart of sample allocation in elderly patients with heart failure according to the CONSORT 2010 flow diagram

Table 1: Dimensions of the adherence to treatment questionnaire

Dimensions	Minimum and maximum score
MEFT*	0-45
ITTTT**	0-35
Adaptability	0-35
ITWL***	0-25
Stick to the treatment	0-20
Commitment to treatment	0-25
IFAT****	0-15
Total score of treatment	0-200

*MEFT: Making effort for treatment; **ITTTT: Intention to take the treatment; ***ITWL: Integrating treatment with life; ****IFAT: Indecisiveness for applying treatment

comparing it with the maximum and minimum scores of the questionnaire, the patient's degree of adherence to treatment is calculated and interpreted as high (75–100%), good (50–74%), average (26–49%), or low (0–25%). The average content validity index of the questionnaire was 0.914. The reliability of the questionnaire was calculated using Cronbach's alpha ($\alpha = 0.92$), and the stability of the questionnaire was $r = 0.88$ (19, 24).

Data were analyzed in SPSS software (version 16; SPSS Inc., Chicago, IL, USA). The Chi-squared test was used to determine the relationship between qualitative variables; independent and paired t -test were used to compare the two groups; and Mann-Whitney U was used to compare non-normally distributed variables. The level of significance was considered to be $p < 0.05$.

Ethical considerations

The study was approved by the Research Ethics Committee of Golestan University of Medical Sciences, Iran (IR.GOUMS.REC.1397.027), and was registered in the Iranian Registry of Clinical Trials. The researchers obtained written informed consent from patients for participation in

the study. Numerical codes were used for participants to maintain the confidentiality of data. Nurses were free to withdraw from the study at any time.

Results

This study was conducted on 90 patients, 45 patients in the intervention group and 45 in the control group. However, two participants in the intervention group died at home after being trained and were excluded from the study. There were an equal number of women and men in the intervention and control groups. There were no significant differences between the study groups in terms of demographic variables [Table 2]. The mean \pm standard deviation of age of the subjects in the intervention and control groups was 67.96 (7.13) and 68.58 (7.46) years, respectively [Table 3].

There was no significant difference in the mean duration of admission between the two groups. The mean systolic and diastolic blood pressures in the intervention and control groups were within the same range. There were no significant differences between demographic characteristics and clinical characteristics of the patients in the intervention and control groups [Tables 2 and 3].

The mean total score of adherence to treatment in the intervention group before the self-care training was 39.71 (4.91) and after the self-care education was 78.32 (10.47); this difference was significant ($p = 0.001$) [Table 4]. The total score of adherence to treatment in the control group before discharge was 36.85 (3.48) and 2 months later was 55.63 (14.25). Paired t -test showed a significant difference between the pre-intervention scores and postintervention scores in both groups ($p = 0.001$) [Table 4]. All dimensions of treatment adherence in both the intervention and control groups differed significantly after the intervention compared to before the intervention ($p = 0.001$) [Table 4].

Independent t -test results showed a significant difference in the total score of adherence to treatment between intervention and control groups before the intervention ($p = 0.002$). Moreover, independent t -test results showed a significant difference between intervention and control groups in terms of the MEFT subscale scores before the intervention ($p = 0.002$). Independent t -test showed that the score of the ITWL subscale differed significantly between the intervention and control groups before the intervention ($p = 0.004$) [Table 5].

As the treatment scores in the two groups were not equal before the intervention, analysis of covariance was used to compare the mean scores of the two groups after the intervention. Before the intervention, the results showed that the mean score of adherence to treatment, as an intervening variable, was statistically significant between the two groups ($p = 0.001$).

This means that the lack of equality of the treatment scores in the two groups before the intervention was statistically adjusted. Therefore, it can be concluded that the intervention caused a significant change in the mean score of adherence to treatment in the subjects examined.

Regarding the fact that the total self-care scores in and between the two groups were statistically significant, this variable was also introduced as an intervener in the analysis of covariance. Thus, in the presence of this variable, the adherence to treatment of the two groups in the postintervention phase was again compared. The results showed that the intervention has had a major impact on the increase in the mean score of adherence to treatment.

Discussion

The results of the present study indicate that self-care education was effective on adherence to treatment in the intervention group. Ogungbe *et al.*^[20] indicated that self-management interventions were effective on adherence to the medication regimen in cardiovascular patients, which is consistent with the present study. Moreover, the results of the present study are consistent with the results of the study by Zorina *et al.*,^[21] who showed that telephone education and follow-up was a significantly promoted adherence to treatment in cardiac patients.

In the present study, the mean total adherence to treatment in the intervention group was 39.71 before the

intervention and 78.32 after the intervention, which shows that self-care education has been effective in promoting adherence to treatment. In the present study, however, the highest and lowest scores in the adherence to treatment were related to MEFT and IFAT, respectively. Zakeri Moghadam *et al.*^[22] found that the highest scores of adherence to treatment after the intervention were related to the combination of treatment with life, and the lowest scores to the area of IFAT. Nevertheless, there was no significant relationship between the intervention and the MEFT, IFAT, ITTTT, and commitment to treatment subscales. In the present study, there were significant differences in all areas of adherence to treatment after the intervention in the control group.

In this study, there was no significant difference between the intervention and control groups in terms of the demographic characteristics, clinical characteristics, and the level of literacy of the patients.

The results of this study are not consistent with that of the study of Fabbri *et al.*,^[23] which showed that people with adequate health literacy were better treated. Sedri *et al.*^[24] compared the effect of two short message methods (interactive and noninteractive) on adherence to treatment regimen in patients with artificial heart valve. They found no significant difference between the three groups before the intervention in terms of adherence to the treatment regimen, but after 3 months of training, they observed a significant difference between the 3 groups in terms of adherence to the treatment regimen which is consistent with the current study.^[24]

RafieeVardanjani *et al.*^[25] found no significant difference in the different dimensions of adherence to treatment between the two groups at the end of the study; however, the treatment status was better in the intervention group than the control group which is inconsistent with the present study.

In the present study, the MEFT subscale and total score of treatment in the two groups were significantly different; that in intervention group was effective in enhancing adherence to treatment.

Poshtchaman *et al.*^[26] investigated the effect of telecommunication and telephone follow-up procedures on treatment compliance before discharge.^[27] They found that telephone follow-up leads to improved adherence to treatment after coronary artery bypass surgery,^[27] which is consistent with the present study.

In the present study, before and 2 months after the intervention, there were significant differences between the study groups in terms of the subscales and total score of treatment, but the level of statistical significance of this difference was higher in the intervention group than the control group. Navidian *et al.*,^[28] in a study on HF patients, found that education affected adherence to

Table 2: Demographic characteristics of the elderly with Heart Failure (HF) in the intervention and control groups

Variables	Intervention [number (%)]	Control [number (%)]	<i>p</i>
Male	26 (50)	26 (50)	>0.99
Female	19 (50)	19 (50)	
Illiterate	26 (56.50)	20 (43.50)	0.11
Elementary	8 (32)	17 (68)	
Literate	11 (57.90)	8 (42.10)	
High blood pressure	38 (46.30)	44 (53.70)	0.06
Normal blood pressure	7 (87.50)	1 (12.50)	
Class 1	31 (44.30)	39 (55.70)	0.07
Class 2	14 (70)	6 (30)	

Table 3: Clinical features of elderly patients with heart failure in the intervention and control groups

	Intervention group Mean (SD)	Control group Mean (SD)	<i>p</i>
Age	67.96 (7.13)	68.58 (7.46)	0.68
Ejection fraction	46.44 (10.47)	50 (9.29)	0.09
Duration of admission	4.46 (1.42)	4.35 (1.15)	0.68
Systolic blood pressure	134.11 (16.59)	134.13 (8.83)	0.99
Diastolic blood pressure	76.78 (11.23)	77.27 (7.07)	0.81
Heart rate	79.84 (11.79)	80.71 (6.27)	0.66

SD: Standard deviation

Table 4: Comparison of adherence to treatment scores of elderly patients with heart failure in the intervention and control groups

	Intervention		<i>p</i>	Control		<i>p</i>
	Before training Mean (SD)	After training Mean (SD)		Before discharge Mean (SD)	After discharge Mean (SD)	
MEFT*	20.93 (3.74)	35.83 (4.39)	0.001	19.42 (3.07)	26.66 (6.94)	0.001
ITTTT**	16.16 (4.23)	28.61 (4.16)	0.001	15.33 (3.35)	20.44 (5.58)	0.001
Adaptability	12.13 (3.55)	28.27 (11.54)	0.001	11.22 (3.11)	17.46 (5.33)	0.001
ITWL***	12.32 (3.32)	19.95 (2.97)	0.001	10.51 (2.46)	16.82 (3.41)	0.001
Stick to the treatment	7.32 (2.63)	14.69 (2.97)	0.001	7.28 (2.28)	9.80 (4.02)	0.001
Commitment to treatment	7.25 (3.31)	17.58 (6.02)	0.001	6.60 (3.22)	12.95 (5.42)	0.001
IFAT****	3.27 (2.45)	11.69 (3.51)	0.001	3.333 (1.96)	7.10 (4.82)	0.001
Total score of treatment	39.71 (4.51)	78.32 (10.47)	0.001	36.85 (3.48)	55.63 (14.27)	0.001

*MEFT: Making effort for treatment; **ITTTT: Intention to take the treatment; ***ITWL: Integrating treatment with life;****IFAT: Indecisiveness for applying treatment

Table 5: Comparison of the adherence to treatment scores of the elderly patients with heart failure in the intervention and control groups

	Intervention	Control	<i>p</i>	Intervention	Control	<i>p</i>
	Before training Mean (SD)	Before discharge Mean (SD)		After training Mean (SD)	After discharge Mean (SD)	
MEFT*	20.93 (3.74)	19.42 (3.07)	0.02	35.83 (4.39)	26.66 (6.94)	0.001
ITTTT**	16.16 (4.23)	15.33 (3.35)	0.31	28.61 (4.16)	20.44 (5.58)	0.001
Adaptability	12.13 (3.55)	11.22 (3.11)	0.25	28.27 (11.54)	17.46 (5.33)	0.001
ITWL***	12.32 (3.32)	10.51 (2.46)	0.004	19.95 (2.71)	16.82 (3.41)	0.001
Stick to the treatment	7.32 (2.63)	7.28 (2.28)	0.83	14.69 (2.97)	9.80 (4.02)	0.001
Commitment to treatment	7.25 (3.31)	6.6 (3.22)	0.46	17.58 (6.02)	12.95 (5.42)	0.001
IFAT****	3.27 (2.45)	3.33 (1.96)	0.74	11.69 (3.51)	7.10 (4.82)	0.001
Total score of treatment	39.71 (4.51)	36.85 (3.48)	0.002	78.32 (10.47)	55.63 (14.27)	0.001

*MEFT: Making effort for treatment; **ITTTT: Intention to take the treatment; ***ITWL: Integrating treatment with life;****IFAT: Indecisiveness for applying treatment

self-care behaviors in the intervention group participants and low adherence to self-care behaviors was associated with lower adherence to medication and higher rates of rehospitalization and death.^[29] The study had some limitations. One of the limitations of the study was the inaccuracy in filling out the questionnaire due to lack of patience and illness and old age of the subjects. The researcher attempted to be present at the time of completing the questionnaire and consider the most appropriate time to complete the questionnaire to minimize this limitation. Another limitation of the study was the illiteracy of the majority of subjects, which reduces the likelihood of understanding. Therefore, to minimize this limitation, the researcher read the questionnaire for all samples. Another limitation was ensuring the implementation of the intervention. To reduce this limitation, the researcher in the intervention period, in addition to contacting patients, was also in contact with a person who lived with the patient and had a higher education.

Conclusion

In this study, self-care education was effective on adherence to treatment in patients with HF and this demonstrates the importance and effectiveness of self-care

education and the importance of adherence to treatment. The results of this study also showed that pre-discharge and home-based education using an educational package and educational CD are effective in promoting adherence to treatment among elderly patients with HF. For this reason, self-care education programs can be suggested as an appropriate strategy for improving adherence to treatment in the elderly with HF. Therefore, based on the findings of this study, it can be concluded that self-care education has a positive effect on adherence to treatment in elderly patients. Furthermore, educating the basic health needs of elderly patients with HF after discharge by a geriatric nurse is recommended, as it will facilitate adherence to treatment and promote the quality of life of the elderly.

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Conflict of interest

Nothing to declare.

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