ORIGINAL RESEARCH ARTICLE

The Effect of Self-Care Education on the Quality of Life and Readmission of Patients with Heart Failure: A Quasi-Experimental Study

Akram Shariati[1], Vahid Alinejad[2], Nader Aghakhani[3], Maryam Eftekharnahli[4], Ali Shakibi[5]
Mohammad Rostamzadeh[1]

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Abstract

Background Heart failure is one of the most common chronic diseases and cardiac disorders, as well as a leading cause of death in adults. Therefore, patients with heart failure can improve their comfort, functional abilities, and disease management by acquiring training in self-care skills. This study aimed to determine the effect of self-care training on quality of life and re-admissions in patients with heart failure.

Methods In this quasi-experimental study, a comprehensive list of all patients diagnosed with heart failure in the Cardiology and CCU wards of Seyyed-al-Shohada Hospital in Urmia during 2023 was compiled. After random allocation of patients into control and intervention groups, the intervention was conducted. Finally, the collected data were analyzed using SPSS software.

Results The difference in the mean total score of the quality-of-life questionnaire between the control and intervention groups after the intervention was significant (P = 0.004). Additionally, the frequency distribution of re-hospitalization differed significantly between the control and intervention groups (P = 0.046).

Conclusion The mean quality of life in the intervention group improved compared to the control group following the intervention. Delivering education in plain language—using training booklets, face-to-face instruction, social support, and family involvement—appears to assist in managing the psychological consequences of heart failure and in preventing re-hospitalization. Accordingly, integrating this essential training into the initial education of medical personnel may enable health system managers to take a meaningful step toward more effective implementation of the program, ultimately enhancing patients' quality of life and reducing hospitalization rates among individuals with heart failure.

Keywords Heart Failure, Patient Readmission, Quality of Life, Self-Care Education, Social Support

✉ Vahid Alinejad
alinejad.v@umsu.ac.ir

1. Department of Cardiology, School of Medicine, Urmia University of Medical Sciences, Urmia, Iran
2. Department of Community Medicine, School of Medicine, Urmia University of Medical Sciences, Urmia, Iran
3. School of Nursing and Midwifery, Urmia University of Medical Sciences, Urmia, Iran
4. Student Research Committee, Urmia University of Medical Sciences, Urmia, Iran
5. Medical Education Studies and Development Center, Urmia University of Medical Sciences, Urmia, Iran

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1 Introduction

Heart failure is one of the most common chronic diseases and cardiac disorders, as well as a leading cause of mortality in adults.[1] It accounts for the highest proportion of medical services, with a readmission rate of approximately 44% within six months of discharge. Nearly 15 million people worldwide suffer from this condition.[2] In heart failure, the heart is unable to meet the physiological demands of the body's cells for oxygen and nutrients due to myocardial cell damage. [3] Ventricular dysfunction impairs the heart's ability to pump blood adequately to meet metabolic needs, often resulting from coronary artery disease, cardiomyopathy, hypertension, or valvular disorders.[4, 5] Heart failure is a significant social burden due to rising hospitalization costs and is projected to become a major public health challenge, driven by the growing population over 65 and increased life expectancy among cardiac patients. [6] Its progressive prevalence, high mortality, and unpredictable hospitalizations make it a leading cause of hospitalization in older people. Incidence correlates directly with age, doubling with each decade, and carries a 5-year mortality rate of 45% in women and 60% in men.[7, 8] Studies indicate that cardiovascular diseases account for the highest mortality rate in Iran compared to other diseases.[9]

Current treatment and care strategies focus on improving prognosis and preventing readmission.[10] cardiovascular of death.[11] In Iran, diseases remain the leading cause Hospital readmissions for heart failure patients are a critical healthcare issue, escalating despite medical advancements.[12, 13] Key factors contributing to readmission include disease complications, lack of awareness about symptoms, recurrence, clinical progression, and improper medication or dietary regimens.[14-16]

Patients with heart failure can enhance their comfort, improve functional capacity, and better manage their disease by participating in self-care education.[17] Due to the consequences of disease and treatment, they require self-care behaviors to address these challenges. [2, 18, 19] As a chronic, progressive condition, heart failure leads to complications that reduce quality of life.[20] The experience of multiple symptoms in these patients leads to activity intolerance, which in turn affects their satisfaction and quality of life. The resulting limitations also complicate the patient's occupational, familial, and social life, leading to social isolation, the emergence of psychological issues, and depression.[21-23] Beyond poor prognosis, it restricts physical activity, social interactions, and mental well-being, imposing dependency, early retirement, and reduced vitality.[24] The World Health Organization (WHO) defines quality of life as an individual's perception of their life within cultural and societal contexts, aligned with personal goals, standards, expectations, and interests.[25] Quality of life is a fundamental concept, and by examining it, one can determine the needs of individuals under care. By evaluating it, patients can receive attention and care to improve their quality of life years after the illness. [26, 27] Impairment in quality of life not only negatively affects social life, family, work, and recreational activities but also increases the risk of hospitalization and death from this disease.[28, 29]

One of the primary therapeutic goals for heart failure is to reduce the likelihood of patient readmission. The need to improve healthcare personnel's understanding of the concept of patient readmission to hospitals has increased day by day.[30] Thus, one of the important components of heart failure control programs is education and helping patients perform appropriate behaviors, specifically selfcare education. One-on-one or face-to-face education is among the most powerful ways to influence learners, as in this method, healthcare personnel can provide active learning opportunities in real conditions for the client. [31] Research has shown that patient education has a significant impact on reducing behaviors related to risk factors and increasing healthy behaviors, and generally has a tangible economic justification.[32-36] Providing education to patients not only leads to significant improvements in behaviors such as smoking, improving the patient's level of physical activity tolerance, and adherence to medical recommendations but also results in cost savings in prevention and treatment.[32, 37-39]

Given the increasing prevalence of heart failure, its costliness, increased economic burden, and imposition of enormous costs on the country's healthcare system, the impact of this disease on quality of life, family functioning, and multiple hospital admissions, and considering that many reasons leading to non-compliance with treatment and exacerbation of heart failure can be prevented using educational interventions. Additionally, a literature review revealed no similar studies to the present study. This research was conducted to determine the effect of self-care education on quality of life and readmission of patients with heart failure at Seyyed-al-Shohada Hospital in Urmia."

2 Methods

This quasi-experimental study was conducted at Seyyed-al-Shohada Hospital in Urmia. Initial approval was obtained from the Deputy of Research and Technology and the Ethics Committee of Urmia University of Medical Sciences. Subsequently, a list of all patients admitted with a diagnosis of heart failure was prepared by referring to the Cardiology and CCU departments of Seyyed-al-Shohada Hospital. Patients were then randomly assigned to either the intervention or control group using a random number table. Before any intervention or training, both groups completed the Quality-of-Life Questionnaire.

Individuals in the control group received no training. In the intervention group, patient education was provided face-to-face in four two-hour sessions. If patients were geographically distant or unavailable, video call facilities were utilized. Finally, after the intervention, the Quality of Life Questionnaire was re-administered to both groups. Initially, 31 individuals were enrolled in each group. However, one participant in the control group withdrew, resulting in 30 participants in the control group and 31 in the intervention group. The sample size was determined to be 21 individuals. Accounting for a 35% attrition rate in each group (intervention and control), 31 individuals were enrolled in our study. This calculation was performed using information from the study by Goudarzvand et al.[40] as detailed below:

$$(\sigma_2 = 8.86, d=9, \alpha=0.05, 1-\beta=0.9)$$

$$n= (z_{1-\alpha/2}+z_{1-\beta})^2\sigma^2/d^2=21$$

Inclusion criteria for the study were: echocardiography results in the patient's medical record showing an ejection fraction below 45%; diagnosis of heart failure by cardiology specialists within the research team; full patient consent for follow-up at home to receive care and necessary ongoing education from the research team; minimum literacy (reading and writing); age over 18 years; absence of other chronic and progressive diseases besides heart failure and mental disorders; not working as healthcare personnel; and accessibility for the research team. Exclusion criteria included: moving outside the research area during the study; long-term travel between hospital discharge and three months later; and undergoing surgery during the study period. It should be noted that age and education characteristics were homogenized among patients as much as possible. The researcher visited the wards during different shifts and on various days of the week. Individuals who met the eligibility criteria for participating in the study were assigned to the intervention and control groups using a card-drawing method.

After providing necessary explanations regarding the study's objectives and how to complete the questionnaire, and obtaining written informed consent from participants, interviews were conducted and questionnaires were completed until the target number of participants was reached.

In this study, two questionnaires were used to collect data. One questionnaire was used to gather demographic and socioeconomic data from patients, and the other was the standard SF-36 questionnaire, which was employed to measure quality of life. First-phase data were collected before the intervention, and second-phase data were collected six months after the educational intervention in both groups. Additionally, a checklist was used to monitor re-hospitalization up to three months after patients in this study were discharged. Three esteemed faculty members confirmed the content validity of the demographic section of the questionnaire, and their comments and suggestions were applied. To assess the face validity of the second part of the questionnaire, a pilot study was conducted before sampling. The questionnaire was administered to 10 individuals with heart failure who met the study's eligibility criteria.

Subsequently, after obtaining consent to participate in the study from selected individuals, and if they agreed, their quality of life was measured using the standard SF-36 questionnaire. This is a standard instrument that has been used and validated in various studies in Iran.[31, 32] The questionnaire demonstrated an 85% reliability in the UK in 1992, according to the Cronbach's alpha test.[41] This questionnaire assesses physical functioning, role physical, bodily pain, general health, vitality, role emotional, and overall perception of health. Scoring was based on the specific standard measurement criteria for SF-36. Three-option questions were scored 0, 50, and 100; five-option questions were scored 0, 25, 50, 75, and 100; and six-option questions were scored 0, 20, 40, 60, 80, and 100. A higher score indicates better quality of life.[41]

Finally, after data collection, the normality of the data was initially examined. Then, the results were analyzed using independent and paired t-tests to compare means before and after the intervention between the two study groups, and the chi-square test was used to examine the relationship between the two qualitative variables. SPSS software version 22 was used for the analysis in this study.

3 Results

The mean age of patients in the control group was 54.13±9.60 years, and for the intervention group, it was 57.35±11 years. The difference in mean age between the two groups was not statistically significant (P = 0.256).

Based on the results in Table 1, the frequency distributions of the gender, marital status, education, and occupation variables were similar between the control and intervention groups, showing no statistically significant differences (P>0.05).

Based on the results in Table 2, the mean scores of the dimensions of physical functioning, role limitations due to physical health, role limitations due to emotional problems, energy/vitality, emotional health, social functioning, pain, and general health before the intervention were not statistically significant between the control and intervention groups (P > 0.05). The mean scores of physical functioning, role limitations due to emotional problems, energy/vitality, emotional health, social functioning, and pain dimensions were statistically significant between the control and intervention groups after the intervention

Table 1 Joint Frequency Distribution of Qualitative Demographic Variables Between Intervention and Control Groups

Variable		Group		Significance
		Control	Intervention	
		Frequency (%)	**Frequency (%)**	
Gender	Male	18 (60)	18 (58.1)	*X^2=0.024
	Female	12 (40)	13 (41.9)	**P=0.878
Marital status	Single	8 (26.7)	5 (16.1)	*X^2=1.01
	Married	22 (73.3)	26 (83.9)	**P=0.315
Education	Under a high school Diploma	17 (56.7)	15 (48.8)	*F=1.935
	Highschool Diploma	9 (30)	8 (25.8)	**P=0.672
	Above a high school Diploma	4 (13.3)	8 (25.5)	
Occupation	Homemaker	8 (26.7)	9 (29)	*X^2=3.874
	Employee	6 (20)	10 (32.3)	**P=0.275
	Self-employed	9 (30)	10 (32.3)	
	Unemployed	7 (23.3)	2 (6.4)	

* Chi-square test ** Fisher's exact test

(P < 0.05). This indicates the effectiveness of the intervention in these dimensions of the quality-of-life questionnaire. However, the differences in the mean scores of role limitations due to physical health and general health dimensions were not statistically significant after the intervention (P > 0.05).

The difference in the mean scores of physical functioning, role limitations due to physical health, energy/vitality, emotional health, social functioning, pain, and general health before and after the intervention in the control group was not significant, indicating relative stability in these dimensions before and after the intervention in the control group (P>0.05). However, the difference in the mean score of role limitations due to emotional problems before and after the intervention in the control group was significant, showing a statistically significant decrease in score level in this dimension within the control group after the intervention (P=0.006). Furthermore, the differences in the mean scores of physical functioning, role limitations due to physical health, energy/vitality, emotional health, social functioning, pain, and general health before and after the intervention in the intervention

Table 2 Comparison of Mean Quality of Life Dimensions Between Intervention and Control Groups, Before and After Intervention

Variable		Time Point		Significance
		Before Intervention	After Intervention	---------
Physical Functioning	Control	52.17 ± 25.59	48.5 ± 24.25	*t = -0.891
				**P = 0.38
	Intervention	50.97 ± 23.4	60.48 ± 23.11	*t = 4.522
				**P < 0.0001
Significance		*t = 0.191	t = -2, P = 0.05	---------
		**P = 0.849		
Role Limitations due to Physical Health	Control	52.5 ± 44.7	42.5 ± 41.08	*t = -1.197
				**P = 0.241
	Intervention	43.55 ± 42.8	63.71 ± 46.92	*t = 2.206
				**P = 0.003
Significance		*t = 0.799	t = -1.88, P = 0.066	---------
		**P = 0.427		
Role Limitations due to Emotional Problems	Control	77.78 ± 34.28	56.67 ± 30.51	*t = -2.993
				**P = 0.006
	Intervention	65.59 ± 34.94	74.19 ± 34.11	*t = 1.438
				**P = 0.161
Significance		*t = 1.375	t = -2.11, P = 0.039	---------
		**P = 0.174		

Table 2 (continued)

Energy and Vitality	Control	48 ± 9.61	42.67 ± 14.37	*t = -1.881 **P = 0.07
	Intervention	44.78 ± 10.56	53.39 ± 10.91	*t = 3.484 **P = 0.002
Significance		*t = 1.243 **P = 0.219	t = -3.29, P = 0.002	---
Emotional Well-being	Control	40.27 ± 10.29	39.33 ± 10.67	*t = -0.383 **P = 0.705
	Intervention	37.42 ± 8.61	51.23 ± 18.43	*t = 3.765 **P = 0.001
Significance		*t = 1.174 **P = 0.245	t = -3.07, P = 0.003	---
Social Functioning	Control	56.92 ± 18.88	56.83 ± 17.66	*t = -0.026 **P = 0.98
	Intervention	54.27 ± 20.33	68.06 ± 17.21	*t = 3.02 **P = 0.005
Significance		*t = 0.526 **P = 0.610	t = -2.52, P = 0.015	---
Pain	Control	55.1 ± 25.54	50.52 ± 21.91	*t = -1.009 **P = 0.321
	Intervention	55.34 ± 19.55	67.63 ± 20.86	*t = 3.566 **P = 0.001
Significance		*t = -0.041 **P = 0.967	*t = -3.13 **P = 0.003	---
General Health	Control	38.33 ± 15.11	40.83 ± 11.82	*t = 0.974 **P = 0.338
	Intervention	42.42 ± 14.66	45.97 ± 14.91	*t = 2.935 **P = 0.006
Significance		*t = -1.072 **P = 0.288	*t = -1.49 **P = 0.142	---

*Independent t-test, **Paired t-test

group were significant, demonstrating the intervention's effectiveness in increasing the score levels in these dimensions after the intervention in the intervention group (P<0.05). In contrast, the difference in the mean score of role limitations due to emotional problems before and after the intervention in the intervention group was not significant (P = 0.161).

Based on the results in Table 3, the difference in the mean total quality of life score before the intervention was not statistically significant between the control and intervention groups (P = 0.443). The difference in the mean quality of life score after the intervention was statistically significant between the control and intervention groups (P = 0.004). The difference in the mean total quality of

Table 3 Comparison of Mean Total Quality of Life Score Between Intervention and Control Groups, Before and After Intervention

Variable		Time Point		Significance
		Before Intervention	After Intervention	
Quality of Life	Control	50.6 ± 14.49	46.14±15	*t=−1.674 **P=0.105
	Intervention	47.85 ± 13.3	58.4±16.7	*t=6.856 **P=0.0001
Significance		*t = 0.772 **P = 0.443	t=−3.01 *P=0.004	---

life score before and after the intervention in the control group was not significant, indicating approximate stability in the control group's total quality of life score before and after the intervention (P = 0.105). Additionally, the difference in the mean total quality of life score between the intervention group before and after the intervention was significant, demonstrating the effectiveness of the intervention in this group (P < 0.001).The frequency distribution of quality-of-life levels in the study patients, both in the control and intervention groups, before and after the study, is shown in Table 4. When comparing quality of life levels before and after the intervention, most patients had a moderate and stable quality of life level, with only a small portion of patients with a good quality of life level decreasing to a poor or moderate level after the intervention. In contrast, at the beginning of the study, the intervention group had the same quality of life level as the control group, with most patients having a moderate quality of life level. However, after receiving intervention from nurses and physicians, most patients experienced a good quality of life, demonstrating the effectiveness of the intervention in improving the quality of life in heart patients.

Table 4 Comparison of Mean Quality of Life Dimensions Between Intervention and Control Groups, Before and After Intervention

Group		Time Point					
		Before Intervention			After Intervention		
		Poor	Moderate	Good	Poor	Moderate	Good
Control	Frequency	5	21	4	7	21	2
	Percentage	16.7%	70%	13.3%	23.3%	70%	6.7%
Intervention	Frequency	4	26	1	3	14	14
	Percentage	12.9%	83.9%	3.2%	9.7%	45.2%	45.2%

Table 5 Joint Distribution of Readmission Frequency in Intervention and Control Groups Over Six-Month Follow-Up

Variable		Group				Significance
		Control		Intervention		
		Frequency	Percentage	Frequency	Percentage	
Readmission	No	21	70%	28	90.3%	*χ^2 = 3.985
	Yes	9	30%	3	9.7%	**P = 0.046

*Independent t-test, **Paired t-test

Based on the results of the chi-square test, the joint frequency distribution of re-hospitalization was not similar between the control and intervention groups, and this difference was statistically significant (P = 0.046) (Table 5).

4 Discussion

This study aimed to determine the impact of self-care education on the quality of life and re-hospitalization of patients with heart failure at Seyyed-al-Shohada Hospital in Urmia.

The current study's results showed that the differences in the mean scores of physical functioning, role limitations due to emotional problems, energy/vitality, emotional health, social functioning, and pain, as well as the total quality of life score, were significant between the control and intervention groups after the intervention. This indicates the intervention's effectiveness on these dimensions and its positive impact on increasing the quality of life in cardiac patients. At the beginning of the study, the intervention group had a similar quality of life level to the control group, with most patients having a moderate quality of life. However, after receiving the intervention from nurses and physicians, most patients in the intervention group reported a good quality of life, which demonstrates the intervention's effectiveness in improving the quality of life for cardiac patients.

A study by Naderi et al.[38] in 2018 similarly conducted a face-to-face educational intervention in control and intervention groups. Their results showed a significant increase in the total quality of life score for cardiac patients in the intervention group's families, which aligns with our study. Jahanshahi et al.'s 2016 quasi-experimental study[42] on heart failure patients, conducted with a single group before and after the intervention, also found a significant increase in the mean quality of life score after the intervention, demonstrating the intervention's effective impact on patients' quality of life, consistent with our study. Similarly, Baghaei et al.'s 2015 study[43] found that education and follow-up improved the quality of life in patients with heart failure, also aligning with our findings. Furthermore, a 2020 study by Mesbahi et al.[44] demonstrated the effect of education on the quality of life of hospitalized cardiac patients, which is consistent with our study.

The study conducted by Pashaei et al.[45] in 2020, which was quasi-experimental research with control and intervention groups, also reported a significant effect of the intervention on increasing the quality of life in heart failure patients, a result consistent with our study. A clinical trial by Lakdizaji et al.[46] in 2013 also howed a positive and significant impact on increasing the quality of life in patients within the intervention group, aligning with the results of the present study.

The results of the current study demonstrated that the educational intervention was effective in improving quality-of-life dimensions, including physical functioning, role limitations due to emotional problems, energy/vitality, emotional health, social functioning, and pain. However, the intervention was not effective on the dimensions of role limitations due to physical health and general health.

The findings of Naderi et al.[38], Jahanshahi et al.[42], Baghaei et al.[43], Mesbahi et al.[44], Pashaei et al.[45], and Lakdizaji[46] are consistent with our study's findings across all quality-of-life dimensions, except for the two dimensions of role limitations due to physical health and general health. The inconsistency in these two dimensions might be attributed to the prevalence of the COVID-19 pandemic, which was widespread during the study period. Given the high-risk nature of cardiac patients regarding the coronavirus, enhancing physical and overall health through the provided education and interventions was limited to a certain extent. If better conditions were available for this study, the results for these two dimensions would likely have shown greater significance, similar to those in other studies.

Based on the results of this study, patients in the intervention group experienced fewer rehospitalizations compared to those in the control group. This implies that if patients adhere to the education provided by nurses and physicians, they are likely to face a lower probability of re-hospitalization, indicating the effective impact of education on reducing re-hospitalizations in cardiac patients. The results of Lal et al.'s 2017 clinical trial, which found a significant effect of the intervention on reducing re-hospitalization, are consistent with our study.[46] Similarly, Eghtedar et al.'s 2023 quasi-experimental study also demonstrated a significant and effective impact of the intervention on reducing the frequency of re-hospitalization in the intervention group, which aligns with our study.[48]

5 Conclusion

Given the importance of heart failure as a significant health threat, developing effective solutions to enhance self-care in affected individuals is a priority for health and treatment organizations worldwide. Implementing patient education programs during hospitalization and after discharge, utilizing experienced nursing staff and physicians, is crucial for increasing awareness and enhancing the quality of life in cardiac patients. Therefore, this type of educational intervention can be used to improve patients' quality of life.

The main motivation for conducting this research was its clinical application to improve patients' quality of life. Quality of life is about managing life; thus, healthcare system managers can take a new step towards better implementation of this plan to improve quality of life and reduce hospitalization rates by incorporating this essential training course into the initial orientation of healthcare personnel.

The limitations of this study include a lack of patient cooperation and early withdrawal from the study by some participants. It is recommended that future research be conducted with a larger sample size and employ a randomized clinical trial design. Moreover, future studies should consider including patients with other chronic conditions and those hospitalized in various wards, rather than limiting the sample to cardiac patients. An additional limitation was the overlap of the study period with the COVID-19 pandemic, which posed significant challenges for the research team.

Declarations

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Authors' Contributions

In this study, all authors contributed to the initial conceptualization, study design, data collection, and manuscript drafting. They have reviewed and approved the final version in its entirety and declare no conflicts or disagreements regarding any of its sections.

Availability of Data and Materials

The datasets generated and/or analyzed during the current study are not publicly available due to privacy and confidentiality agreements with the participants but are available from the corresponding author on reasonable request.

Conflict of Interest

The authors declare that this study is the product of independent research and that there are no conflicts of interest with any organizations or individuals.

Consent for Publication

All authors have read and approved the final manuscript and provided their consent for publication.

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Ethical Considerations

This article is extracted from the medical student's thesis at Urmia University of Medical Sciences, with ethics code IR.UMSU.REC.1400.456.

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