



## Effect of Discharge Education on Quality of Life and Hospital Readmission in Patients with Heart Failure: Is It Effective?

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### Abstract

**Background:** A relatively common disease, congestive heart failure has a significant effect on the quality of life. Given that hospital admission is an important problem in patients afflicted with congestive heart failure, we sought to evaluate the effect of discharge education on the quality of life and hospital readmission in this group of patients.

**Methods:** Eighty patients admitted with decompensated heart failure were selected and divided into 2 matched groups. The quality of life scores were measured for each patient. Upon discharge and during the first week after that, the intervention group received 3 sessions of education. Both groups were followed for 6 months. Data on the readmission rate and quality of life scores were collected.

**Results:** The baseline quality of life scores in the control and education subjects were similar ( $p$ -value: NS). The quality of life scores showed a significant improvement at 3 and 6 months' follow-up in the education group. The hospital readmission rate, however, was higher in the control group at 3 and 6 months' follow-up.

**Conclusion:** The present study showed that discharge education could enhance the quality of life and reduce the rate of hospital readmission in those suffering from congestive heart failure. It is, therefore, advisable that self-care training and discharge education be incorporated in the heart failure management strategy.

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**Keywords:** Education • Heart failure • Hospital readmission • Quality of life

### Introduction

Heart failure (HF) is a principal complication of virtually all forms of heart disease. HF has been described as a complex clinical syndrome that can result from any structural or functional cardiac disorder that impairs the ability of the ventricle to fill with or eject blood. The cardinal

manifestations of HF are dyspnea, fatigue, and edema, which can impair the quality of life.<sup>1</sup>

HF is a relatively common disease. The trend toward increasing morbidity secondary to HF may be due in part to the aging of the people and in part to the improved survival of

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patients with cardiovascular disease. HF is, therefore, a serious health care problem not only for patients and their family but also for society inasmuch as it contributes significantly to the enormous costs associated with the care of its sufferers. Overall, it appears that HF affects 1-3% of the general population and 10% of the elderly. Hospital admissions and costs for HF have increased over the past two decades to the extent where HF now accounts for approximately 2% of the total health care expenditure.<sup>2</sup>

The cost of hospitalizations for HF is twice that for all forms of cancer and myocardial infarctions combined.<sup>3</sup>

Rational care for chronic HF incorporates inpatient and outpatient health care delivery with the goal of maintaining improved clinical function and decreasing the need for hospital readmission.<sup>4</sup> Regularly administered cardiovascular medications may preserve the cardiac function, improve the quality of life, and reduce the risk for exacerbations. Researchers have estimated that approximately 50% of patients with chronic illnesses do not take their medications as prescribed.<sup>5</sup> The most frequent cause of reversible cardiac decompensation is non-compliance with a complex dietary and pharmacological treatment regimen.<sup>6</sup> Reasons for non-adherence include lack of patients' knowledge, skills, and support to appropriately self-manage complicated medication regimens.<sup>5</sup>

The aim of this study was to evaluate the effect of discharge education on the functional status, hospital readmission, and quality of life in patients admitted with HF and to demonstrate whether this simple and inexpensive task could significantly improve the quality of life and decrease hospitalization rates.

## Methods

This study was performed at Jondi Shapour University of Medical Sciences in Ahwaz.

The subjects were recruited from the inpatient service of Imam Khomeini Hospital between April 2005 and October 2006. Patients admitted with decompensated HF were eligible to participate in the study if they had left ventricular ejection fraction (LVEF)  $\leq 40\%$  (documented with transthoracic echocardiography) and a history of HF for at least one year.

The exclusion criteria included patients' refusal to participate, severe dementia or other serious psychiatric illnesses, anticipated survival of less than six months, valvular heart disease requiring surgical correction, concurrent non-cardiac illness likely to cause hospital admissions, serum creatinine more than 3.0 mg/dl, and cardiac surgery or myocardial infarction during the index admission.

After written informed consent had been obtained, a total of 80 patients were enrolled into the study. The patients were divided into two equivalent groups. Both groups were matched in terms of age, gender, functional class, level of

education, etiology of HF, duration of disease, and LVEF.

Baseline evaluations comprised taking history including the number of hospital admissions during the previous six months, physical examination, and transthoracic echocardiography performed by cardiologists.

The patients were interviewed, and the Minnesota Living with Heart Failure (MLHF) questionnaires were completed. The MLHF questionnaire consists of 21 brief questions, each of which is answered on a scale of 0 to 5. Eight questions have a strong relationship to the symptoms of dyspnea and fatigue and are referred to as physical dimension measures. Five other questions that are strongly related to emotional issues are referred to as emotional dimension measures. For each question, the patient selects a number from 0 to 5. Zero indicates that HF had no effect, and 5 denotes a very large effect.

Both groups were eligible to receive standard treatments. All the patients had beta blocker, spironolacton, and ACE inhibitor in their regimen.

Upon discharge and during the first subsequent week, the intervention group received three 30-minute sessions of education. The education program included one-on-one teaching sessions with a nurse educator about the nature of the disease and precipitating factors, how to exercise, and the proper use of medications. Specific instruction was given to reduce daily dietary sodium intake to 2000 mg or less and daily fluid intake to 2000 mL or less. Additionally, the education sessions contained the rationale for self-care behaviors, daily weight monitoring, smoking cessation, avoidance of heavy alcohol intake, non-steroidal anti-inflammatory drugs, and what to do if the symptoms worsened.

Written discharge information was delivered in a folder by the assigned ward nurse at the time of discharge. This information, apart from follow-up appointment information, included a list of medications, dosages, and instructions on medication, diet, daily weight monitoring, and daily activities. The folder also included a description of common HF symptoms and instructions on when to call the physician if the symptoms worsened.

All the patients were followed for at least six months after discharge. Patient data were obtained at 3 and then 6 months after discharge, and the MLHF questionnaires were completed once again in the two groups.

All the analyses were performed with SPSS version 10.0 statistical software. Changes in the clinical variables within the two groups of patients were assessed using the Student's t-test. A P-value of less than 0.05 was considered statistically significant in the major comparisons between the two groups.

## Results

The present study enrolled 80 patients, 40 of whom received



education intervention. Follow-up data were collected on every patient. No patient withdrew from the study. No patient died during the follow-up period. The baseline characteristics demonstrated that the two study groups were matched with respect to age, gender, functional class, risk factors, etiology of HF, duration of disease, and LVEF (Table 1). The difference between the levels of education in both groups was not significant (Table 2).

Table 1. Clinical characteristics of patients\*

value	Intervention	Control
Age (yr)	56±9	57±8
Male gender	31 (78)	32 (80)
Etiology		
Ischemic	26 (65)	27 (67)
Idiopathic	12 (30)	11 (28)
Hypertension	29 (73)	29(73)
Diabetes mellitus	18 (45)	19 (47)
Functional capacity		
NYHA-FC III	29 (72)	28 (70)
NYHA-FC IV	11 (28)	12 (30)
LVEF(%)	30±8	30±10
Duration of disease (m)	16±13	17±14

\*Data are presented as mean±SD. Numbers in parenthesis show the related percentage.

All P values were non-significant

NYHA-FC, New York heart association functional Class; LVEF, Left ventricular ejection fraction

Table 2. Level of education in control and intervention groups\*

	Intervention	Control
Uneducated	10 (25%)	12 (30%)
Primary school	10 (25%)	9 (22.5%)
Secondary school	1 (2%)	-
High school	19 (48%)	18 (45%)
University	-	1 (2.5%)

\*All P values were non-significant

The baseline total MLHF scores for the control (53.62±5.054) and education (50.17±4.178) subjects were similar (p-value: NS). The baseline dyspnea, fatigue, and emotional MLHF scores for the control and education subjects did not have significant differences (Table 3). The total MLHF scores, measured at 3 and 6 months' follow-up, improved in the education group comparing with the baseline score (45.77±4.16, 45.67±4.14 vs. 50.17±4.18). Improvement was also seen in the dyspnea and fatigue MLHF scores.

The emotional MLHF scores did not change significantly at 3 months' follow-up, but it improved in the education subjects at 6 months' follow-up (Tables 3).

Table 3. Quality of life scores in education and control groups\*

	Control Group	Education Group	P Value
Basal			
Total MLHF	53.62±5.05	50.17±6.17	0.08
Fatigue MLHF	15.32±1.69	15.62±1.53	0.97
Dyspnea MLHF	4.47±0.59	3.55±0.53	0.26
Emotional MLHF	14.10±1.98	12.60±1.45	0.23
Three months Follow-up			
Total MLHF	54.60±5.17	45.77±4.15	0.02
Fatigue MLHF	16.77±1.89	14.22±1.54	0.04
Dyspnea MLHF	4.57±0.56	3.57±0.54	0.01
Emotional MLHF	14.30±1.91	12.05±1.41	0.06
Six months Follow-up			
Total MLHF	55.10±4.99	45.67±4.15	0.01
Fatigue MLHF	16.90±1.88	13.97±1.60	0.02
Dyspnea MLHF	4.65±0.57	3.60±0.55	0.01
Emotional MLHF	14.45±1.87	11.95±1.37	0.03

\* Data are presented as mean±SD

MLHF, Minnesota living with heart failure

Table 4. Rate of hospital admission in control and education groups during a six-month period before index admission and at 3 and 6 months' follow-up\*

	Education group	Control Group	P Value
Before Admission	3.10±1.01	3.00±0.93	<0.05
3 Months' follow-up	0.97±0.86	1.50±1.03	<0.05
6 Months' follow-up	1.98±0.98	2.95±0.99	<0.05

\* Data are presented as mean±SD

All P values were non-significant

The number of hospital admissions for chronic HF decompensation during the six-month period before index admission for the control (3±0.93) and education (3.1±1.01) subjects was similar (p value: NS). The hospital readmission rate was higher in the control group at 3 and 6 months' follow-up (Table 4). The results showed an improved quality of life and reduced number of hospital readmission in the education group. The results also demonstrated an increase in the quality of life scores in the control group at 6 months' follow-up.

## Discussion

The three main goals of treatment for HF are to reduce symptoms, prolong survival, and improve the quality of life. A good quality of life implies the ability to live free of physical, social, emotional, and economic limitations. HF can have an enormous deleterious impact on the quality of life.

The most common cause of decompensation in a previously compensated patient with HF is an inappropriate reduction in the intensity of treatment. As a result, patient education to help patients respond appropriately to signs



and symptoms of worsening HF and to improve adherence to advice on pharmacological treatment, diet, and lifestyle is very important. Physicians treating patients with HF must prescribe a complex treatment plan involving multiple medications and rigorous self-care practices to achieve optimal care.

Previous studies evaluating the effect of HF patient discharge education combined with various post-discharge support programs have demonstrated benefits with respect to reductions in hospitalizations and costs and improvements in the quality of life.

Rich et al. described the benefits of the first multidisciplinary HF program in 282 patients, which included a nurse-led discharge education session, a geriatrician cardiologist medication review, intensive follow-up with hospital home care services, HF nurse telephone management, a session with a dietitian, pharmacist medication education, and social services evaluation. This intervention resulted in a 44% reduction in the risk of rehospitalization compared with the control group.<sup>7</sup>

Krumholz et al. published the results of a randomized, controlled patient education that included an hour-long, face-to-face session with a nurse educator within 2 weeks of hospital discharge, followed by telephone contacts for a 1-year period. Among the 88 patients randomized into this study, significantly fewer patients in the intervention group experienced a hospital admission or died during the 1-year follow-up period.<sup>8</sup>

Koelling et al. demonstrated that the addition of a 1-hour, nurse-educator delivered teaching session at the time of hospital discharge resulted in improved clinical outcomes, increased self-care measure adherence, and reduced cost of care in patients with systolic HF.<sup>9</sup>

In this study, while we observed a worsening of the quality of life in the control group, which was related to the natural history of HF and worsening of functional status, we witnessed a significant improvement in the quality of life of the education group.

The emotional MLHF scores did not change in the education group at 3 months, but they enjoyed a significant improvement at 6 months' follow-up. It may be related to the delayed response of psychological problems to any intervention.

The number of rehospitalization was decreased in the education group. As was mentioned before, rehospitalization costs in HF patients are an important problem for the community health system. So, discharge education can be cost-effective. We recommend that a randomized study be designed to evaluate the cost-effectiveness of this intervention.

Our study had some important limitations. First, the fact that the study was not a randomized clinical trial means that we had selection bias. Second, our sample size of patients was small. Third, our nurse coordinator was not blind to the treatment assignment of the patients. Fourth, the follow-up period was limited to six months and longer follow-up is

needed to evaluate the effect of any intervention on patients with HF.

## Conclusion

In conclusion, our results demonstrated that discharge education could improve the quality of life and reduce the number of hospital readmission. We, therefore, recommend that self-care training and discharge education be integrated into the HF management strategy.

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## References

1. Bristow MR, Lowes BD. Management of heart failure. In: Zipes DP, Libby P, Bonow RO, Braunwald E, eds. Braunwald's heart disease. 7th edition. Philadelphia: W.B. Saunders; 2005. p. 603-614.
2. van der Wal MH, Jaarsma T, Moser DK, Veeger NJ, van Gilst WH, van Veldhuisen DJ. Compliance in heart failure patients: the importance of knowledge and beliefs. *Eur Heart J* 2006;27:434-440.
3. Givertz MM, Colucci WS, Braunwald E. Clinical aspects of heart failure. In: Zipes DP, Libby P, Bonow R.O, Braunwald E, eds. Braunwald's heart disease. 7th edition. Philadelphia: W.B. Saunders; 2005. p. 539-568.
4. Fonarow GC, Stevenson LW, Walden JA, Livingston NA, Steimle AE, Hamilton MA, Moriguchi J, Tillisch JH, Woo MA. Impact of a comprehensive heart failure management program on hospital readmission and functional status of patients with advanced heart failure. *J Am Coll Cardiol* 1997;30:725-732.
5. Murray MD, Young J, Hoke S, Tu W, Weiner M, Morrow D, Stroupe KT, Wu J, Clark D, Smith F, Gradus-Pizlo I, Weinberger M, Brater DC. Pharmacist intervention to improve medication adherence in heart failure: a randomized trial. *Ann Intern Med* 2007;146:714-725.
6. Dec GW. Management of Acute Decompensated Heart Failure. *Curr Probl Cardiol* 2007;32:321-366.
7. Rich MW, Beckham V, Wittenberg C, Leven CL, Freedland KE, Carney RM. A multidisciplinary intervention to prevent the readmission of elderly patients with congestive heart failure. *N Engl J Med* 1995;333:1190-1195.
8. Krumholz HM, Amatruda J, Smith GL, Mattera JA, Roumanis SA, Radford MJ, Crombie P, Vaccarino V. Randomized trial of an education and support intervention to prevent readmission of patients with heart failure. *J Am Coll Cardiol* 2002;39:83-89.
9. Koelling TM, Johnson ML, Cody RJ, Aaronson KD. Discharge education improves clinical outcomes in patients with chronic heart failure. *Circulation* 2005;111:179-185.