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## Applied Nursing Research

journal homepage: [www.elsevier.com/locate/apnr](http://www.elsevier.com/locate/apnr)

# The effect of family training and support on the quality of life and cost of hospital readmissions in congestive heart failure patients in Iran



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## ARTICLE INFO

### Article history:

Received 22 April 2015

Revised 16 November 2015

Accepted 18 March 2016

### Keywords:

Family training

Quality of life

Caring intervention

Heart failure

Iranian nurses

## ABSTRACT

**Background:** This study was conducted to investigate the effects of family training and support on quality of life and cost of hospital readmissions in congestive heart failure patients.

**Methods:** In this single-blinded, randomized, controlled trial, the participants were heart failure patients hospitalized in an Iranian hospital. Data were collected from available hospitalized patients. The participants were enrolled through randomized sampling and were divided randomly into two groups, an intervention group and a control group. The intervention group received extra training package for the disease. Training was provided at discharge and three months after. A standard questionnaire to assess the QoL was filled out by both groups at discharge and six months after.

**Results:** Mean scores of QoL domains at the beginning of the study decreased in control group and increased in intervention in comparison with six months after ( $p < 0.01$ ).

**Conclusion:** Nursing care follow-up according to heart failure patients' needs promoted their QoL.

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## 1. Introduction

Today, cardiac diseases are the most common chronic diseases among the middle-aged (Hasanpour Dehkordi & Khaledi Far, 2015) and the elderly, and the most important reason for the elderly hospitalization. Cardiac patients have to deal with some problems in many aspects of life (Dehkordi & Heydarnejad, 2009; Shepperd et al., 2013) and the most prevalent cardiac disease is congestive heart failure (CHF) (Pelle et al., 2010). With the advent of new medical and surgical treatments and longer life expectancy in cardiac patients, the number of CHF patients has increased (Gasirowski & Dutkiewicz, 2013). About 15 million patients all over the world and more than six million in the United States are affected by heart failure (HF) (Gaddam, Jarreau, & Ventura, 2011). In Iran, the number of CHF patients in 18 provinces was 3.3/100 individuals per year, of whom 2.8 were older than 50 years and 0.5 were 15 to 49 years (Willette, Surrells, Davis, & Bush, 2007). Management of CHF is based on eliminating the underlying factors, pharmacotherapy and modifying lifestyle. Lifestyle modification can alleviate the symptoms of the disease, slow down disease progression, promote quality of life (QoL) and decrease hospital readmissions

(Ditewig, Blok, Havers, & van Veenendaal, 2010). Lifestyle modification in cardiac patients requires care, training, and follow-up by health care professionals especially nurses (Heydarnejad & Hassanpour Dehkordi, 2010). QoL is defined as optimum levels of physical, mental, and social functioning involving occupational and life roles, relationships, and personal perceptions of health, fitness, life satisfaction, and well-being (Dehkordi, Heydarnejad, & Fatehi, 2009; Hassanpour-Dehkordi & Jivad, 2014; Heydarnejad, Hassanpour, & Solati, 2011). QoL is increasingly being used as a primary outcome measure to evaluate the effectiveness of treatment (Hassanpour-Dehkordi & Jivad, 2014). In addition, HF leads to an extremely high rate of readmission after hospitalization, with up to 44% of patients rehospitalized within six months after discharge (Shah, Rahim, & Boxer, 2013). Recent studies have demonstrated that multidisciplinary disease management programs can substantially reduce the risk of readmission, by 56% for readmissions due to HF and 44% for all-cause readmissions (Shah et al., 2013).

## 2. Background

Studies have shown that follow-up care such as home visit has a significant effect in reducing mortality and new admissions among cardiac patients (Krumholz et al., 2002). There is also growing evidence of potential effectiveness of home visit interventions for patients (Ditewig et al., 2010). Family training interventions increase patients'

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ability to manage symptoms, treatment, physical and psychosocial consequences, and lifestyle changes, and also affect the cognitive, behavioral and emotional responses necessary to maintain a satisfactory QoL, so that a dynamic and continuous process of self-regulation is established (Ditewig et al., 2010; Gaddam et al., 2011). A study of patients with CHF showed the beneficial effects of a post discharge family training for at least 18 months with a significant reduction in unplanned readmissions, total hospital stay, hospital-based costs and mortality (Krumholz et al., 2002). Moreover, the QoL promotion in CHF patients has recently decreased mortality considerably (Flather et al., 2005). The results of clinical trials have shown that the QoL can be considered as an index of health care quality and a part of disease management in cardiac patients; measuring QoL in chronic diseases patients can provide useful information for health care professionals to assess patients' health (Howlett et al., 2010).

### 2.1. Purpose

Since QoL promotion is one of the main objectives of HF management, health care professionals, especially nurses, can act as effective agents in health promotion and public training to modify health-related behaviors and identify risk factors, educate clients and support them (Howlett et al., 2010; Lawrenson et al., 2013). Family training and QoL promotion are two roles of the nurses (Lawrenson et al., 2013; Lupon et al., 2008). This study was conducted to evaluate the effect of family training and support on the QoL and cost of hospital readmissions among CHF patients.

### 3. Materials and methods

This study was a single-blinded, randomized, controlled trial that was conducted in Shahrekord, southwest Iran from March 1st, 2012 to September 1st, 2013. Ninety CHF hospitalized patients (aged between 50 and 65 years) were enrolled by randomized sampling and were randomly assigned into two groups, one intervention and one control. Considering  $\alpha = 0.05$ , confidence interval 95% with variance 10 and  $d = 2$ , the sample size was estimated to be 90 people.

Inclusion criteria consisted of the presence of echocardiography in medical records and ejection fraction less than 45%, diagnosis of HF by cardiologist of the research team, consent to participate in family training to provide follow-up care and necessary training by research team, literacy (ability to read and write), and accessibility for research team during the study. Exclusion criteria comprised leaving the province of study or prolonged traveling after discharge up to six months later, undergoing surgery, suffering from chronic and progressive diseases alongside cardiac disease, diagnosis of mental disorder(s) and being a member of health care team. The response rate was 90%.

The researchers provided training materials about drugs, diet, signs, symptoms, complications of disease, behavior and lifestyle modification. The required training was identified using the focus group interview; i.e., a form of interview for data collection in which a group of people are asked about their perception, opinions, beliefs and attitudes towards a product, service, concept, advertisement, idea or packaging in order to reveal detailed information and deep insight as well as to create an accepting environment that puts participants at ease (Kitzinger, 2007). A checklist of home care in cardiac patients, recurrence of disease and referring to physician was used. The checklist was a modified version of a needs assessment tool, *Checklist of Successful Health Plan Approaches to Heart Disease and Stroke Prevention* (Pearson et al., 2002). The checklist was completed during hospitalization and also in family training sessions. The section related to patients was filled within about 40–50 min. Also, a training booklet about all the relevant matters was provided for the intervention group. Family training program was arranged in three turns: one month after discharge, two months after the first family training session, and three months after the first family training session. In family training sessions, necessary trainings were provided, lifestyle modifications were confirmed and the questions of the patients and their family were

answered. If necessary, the patient was taken to specialized health care centers and the physician of research team.

The study participants were firstly contacted by the main researcher. He explained the level of their involvement to them and answered their questions. In addition, the risks and benefits of the study, the confidentiality of data, the voluntary nature of participation and withdrawal from the study without penalty were discussed before they were asked to provide informed consent. Moreover, the study was approved by the Ethics Committee of the Shahrekord University of Medical Sciences and the code IRCT2013012512279N1 was issued by the *Iranian Registry of Clinical Trials* for this study. The participants also filled out a written consent letter.

The data collection tool was a two-part questionnaire: The first part was concerned with the demographic characteristics, the clinical condition of the patient, prescribed treatments and cost of hospital readmissions filled out with reference to the data collected through interview with the patient and his/her medical record. The second part was the standard questionnaire of the QoL SF-36 (second edition). It is a standard questionnaire frequently used in similar studies. This questionnaire has already been adapted to the Iranian context and its reliability and validity have been established. According to Cronbach's alpha, its reliability has been estimated to be 0.73 to 0.887 and by test-retest (internal consistency coefficient) within a two-week interval, higher than 0.90 in all domains (Rejeh, Heravi, Montazeri, & Taheri, 2015; Taghipour et al., 2011). This standard questionnaire has 36 items in eight domains, including physical performance, limitation in activity following emotional (psychological) problem, limitation in activity following physical problem, energy and fatigue, mental health, social performance and public health, with the score of each domain ranging from 0 to 100 (Flather et al., 2005). The questionnaire was completed in two turns in each group: during discharge and after family training sessions in the intervention group, and during discharge and six months after discharge in the control group.

The HF patients education is aimed to help patients and their caregiver(s) to acquire the necessary knowledge, skills, strategies, problem solving abilities and motivation for adherence to the treatment plan and effective participation in self-care. After discharge, patients and caregiver(s) should be informed about and supported in self-care follow-up plans, management of self-care follow-up plans and perception of the importance of adherence to the health-related QoL. At least 60 min of patient education (which could be divided into multiple sessions by the educator) was assigned to ensure that the patients and/or their caregiver(s) understand what actions must be taken in the post-discharge period. Teaching sessions were delivered by an expert (RN) educator of HF management at discharge and at home for patients with HF. In addition, the RN educator provided the bulk of education and counseling, supplemented by physician and, if possible and necessary, by dietitians, pharmacists and other health care providers. Furthermore, the 60-min patient education included discussions on any of the following domains: recognition of escalating symptoms and making plans to respond to particular symptoms. Thus, the patient/caregiver(s) should be able to identify specific signs and symptoms of HF, and explain measures to take when symptoms occur. Measures may include a flexible diuretic regimen or fluid restriction for volume overload. Examples of signs and symptoms include: shortness of breath (dyspnea), persistent coughing or wheezing, buildup of excess fluid in body tissues (edema), tiredness, fatigue, decrease in exercise and activity, lack of appetite, nausea and increased heart rate.

The data were analyzed by SPSS (version 19) using descriptive statistics (such as frequency, mean, and standard deviation) and independent and paired t-test.

### 4. Results

The mean age of participants in the intervention and control groups was 60.78 and 59.13 years, respectively. 58% of the participants in the

intervention group and 59% of the control group were living in urban areas. 60% of the intervention group and 62% of the control group were male. Also, 65% of the intervention group and 66% of the control group were hospitalized less than three turns. 72% of the intervention group and 76% of the control group had HF of class III. 75% of the intervention group and 77% of the control group had ejection fraction of 35%–45%. About 75% of individuals in the intervention group and 70% of the control group had elementary education. In addition, 80% of individuals in the intervention group and 77% of individuals in the control group reported low income. There were no significant differences in age, gender, education level, living place, previous admissions, class of HF and ejection fraction between the two groups. Results showed that the factors of income, cultural factors, gender and level of education were quite interrelated, such that people with higher education and income had higher QoL, causing reduction in their readmission and mortality rate. There were no salient differences in the mean scores of eight domains of QoL before the intervention between the two groups. However, by independent t-test, there was a statistically significant difference in the scores of the intervention group six months after follow-up and in the scores of the control group after discharge in physical activity limitation following physical problems, energy and fatigue, social performance, physical pain and general health ( $p < 0.05$ ) (Table 1).

These results showed the increase in mean score of QoL in the intervention group. Paired t-test indicated a significant difference in mean scores of different domains of the QoL before intervention and six months after in both groups. The mean score of the QoL decreased in the control group and increased in the intervention group ( $p < 0.001$ ) (Table 2).

Also, results demonstrated that the rates of readmissions and referring to physicians were lower in the intervention group compared to the control group ( $1.65 \pm 1.01$  vs.  $2.74 \pm 1.07$  and  $2.73 \pm 1.24$  vs.  $3.32 \pm 0.94$ , respectively) ( $p < 0.05$ ) after the intervention. The mean health care cost in the intervention group ( $246,375 \pm 16,756$  Rials) was significantly different from that of the control group ( $2,736,800 \pm 167,360$  Rials) ( $p > 0.05$ ) (Table 3).

## 5. Discussion

According to the results, training, caring and consultative nursing interventions, which were provided during family training sessions for CHF patients, can improve QoL. In contrast, the mean scores of QoL domains in the control group, who received routine care and training, decreased six months after discharge in comparison to the beginning of the study. The results of the study of Ekman et al. (2011) showed that follow-up training and caring interventions could enhance physical performance (such as activity toleration, relief of physical pain and hospital admission turns). Other studies have demonstrated that nursing interventions in cardiac patients by nursing students under the supervision of a cardiac care nurse (home care with telephone follow-up within 14 to 16 weeks after discharge) can promote the QoL and the physical conditions of patients and alleviate the symptoms (Vavouranakis

**Table 2**

Comparison of scores of quality of life domains in congestive heart failure patients in intervention and control groups.

Group	Control (n = 45)	Intervention (n = 45)	p value
	Mean $\pm$ SD	Mean $\pm$ SD	
Before the intervention	62.34 $\pm$ 11.25	61.01 $\pm$ 14.9	$p > 0.05$
At the end of the intervention in the intervention group and three months after the intervention in the control group	58.43 $\pm$ 8.67	63.34 $\pm$ 12.69	$p < 0.05$

et al., 2003; Wheeler & Waterhouse, 2006). There is evidence that training, caring, and consultative nursing interventions are associated with better outcomes for cardiovascular diseases. Social isolation and living alone are associated with a rise in mortality and morbidity due to HF (Dunbar, Clark, Quinn, Gary, & Kaslow, 2008).

Holland et al. (2007) conducted a randomized, controlled clinical trial on HF patients. Eight weeks after discharge, results were indicative of a decrease in hospital admission and mortality rate in the intervention group in comparison to the control group as well as improvement of the QoL score in the intervention group in contrast to the control group (Holland et al., 2007). However, the increase in mean score of QoL was plausible for physical performance, activity limitation following physical problem, energy and fatigue, social performance, physical pain and general health. The mean score of the QoL in activity limitation following emotional problems and mental health in the intervention group was not considerable in comparison to that of the control group.

Measures of emotional distress such as depression and anxiety are important outcomes in the wider context of caretaking and most studies have shown that caretaking is associated with emotional distress level (Molloy, Johnston, & Witham, 2005). The results of a study showed a significant decrease in the QoL scores in emotional and psychological domains in patients with HF one year after the study (Ditewig et al., 2010). Thus, it can be concluded that follow-up care interventions can prevent the decrease in the scores of psychological and emotional domains of the QoL in the intervention group, but they cannot improve them. Therefore, psychological and physical problems can jeopardize health in HF patients, which should be considered by health care teams. Inglis et al. (2004) studied men with chronic arterial fibrillation for three years and found that the mortality rate in the intervention group was 51% in comparison to 66% in the control group, new admissions to hospital were 2.9 turns in the intervention group and 3.4 in the control group, and the number of hospitalization days was 22.7 in the intervention group and 30.5 in the control group. So, a reduction in hospitalization days and new admissions can be a sign of improvement of physical functioning in the intervention group, but anxiety and depression levels did not change significantly in comparison to the beginning of the study (Inglis et al., 2004). It can be inferred that in order to improve the emotional and psychological conditions of

**Table 1**

Mean scores of quality of life in patients with congestive heart failure in the two groups before and after the study.

Group	Before intervention			After intervention		
	Control (n = 45)	Intervention (n = 45)	p value	Control (n = 45)	Intervention (n = 45)	p value
Quality of life (8 domains)	Mean $\pm$ SD	Mean $\pm$ SD		Mean $\pm$ SD	Mean $\pm$ SD	
Physical Performance	52.22 $\pm$ 7.85	53.22 $\pm$ 8.87	$p > 0.05$	49.92 $\pm$ 7.24	56.12 $\pm$ 10.19	$p < 0.05$
Activity Limitation following emotional Problem	68.84 $\pm$ 10.33	66.9 $\pm$ 12.39	$p > 0.05$	75.26 $\pm$ 9.26	57.12 $\pm$ 10.14	$p < 0.05$
Activity limitation following physical problem	54.9 $\pm$ 7.71	56.32 $\pm$ 10.23	$p > 0.05$	62.32 $\pm$ 6.2	52.1 $\pm$ 10.25	$p < 0.05$
Fatigue	55.43 $\pm$ 11.67	54.98 $\pm$ 12.62	$p > 0.05$	60.76 $\pm$ 10.28	51.78 $\pm$ 16.29	$p < 0.05$
Mental health	62.9 $\pm$ 13.76	61.12 $\pm$ 16.83	$p > 0.05$	61.9 $\pm$ 12.2	66.56 $\pm$ 15.12	$p < 0.05$
Social performance	67.82 $\pm$ 15.68	65.92 $\pm$ 15.71	$p > 0.05$	67.13 $\pm$ 12.28	71.89 $\pm$ 16.96	$p < 0.05$
Physical pain	71.28 $\pm$ 13.55	70.1 $\pm$ 18.47	$p > 0.05$	78.12 $\pm$ 15.5	66.12 $\pm$ 16.13	$p < 0.05$
General health	72.33 $\pm$ 15.5	74.62 $\pm$ 16.24	$p > 0.05$	68.12 $\pm$ 15.5	76.12 $\pm$ 16.13	$p < 0.05$



**Table 3**  
Comparison of the two groups for readmission, referring to physicians and health care costs.

Group Variable	Intervention	control	p value
	Mean ± SD	Mean ± SD	
Referring physician	2.43 ± .27	3.96 ± .67	$p < .003$
Readmission	1.87 ± .8	2.81 ± .9	$p < .001$
Costs	246,375 ± 16,756	306,524 ± 20,230	$p < .004$

cardiac patients, it is necessary to provide more meticulous interventions and care, and emotional and psychological interventions ought to be provided by mental health specialists. Patients training and caring intervention were two main components of family training sessions for CHF patients, because they may lead to gaining awareness of signs and symptoms, changes in lifestyle, physical performance, mental health, public health and social performance as well as adherence to therapeutic regimens. A training and support intervention was highly effective in reducing readmissions and hospital costs among patients with CHF. This finding is consistent with those of previous studies (Ditewig et al., 2010; Krumholz et al., 2002). Results of other studies have shown that a home-based intervention has the potential to lower the rate of unplanned readmissions and associated health care costs, prolong event-free and total survival, and improve QoL among patients with CHF (Krumholz et al., 2002). In addition, the training of HF patients may increase their knowledge, change their mind-set, health beliefs, and reduce readmission and mortality (Seraji, Tabatabaie, Rakhshani, & Shahrakipour, 2013).

A multidisciplinary CHF program coordinating inpatient and outpatient care through comprehensive discharge planning can considerably decline costs and readmissions.

Stressing patients education and self empowerment, while providing patient support and immediate feedback, remarkably enhanced patients' outcomes with no change in any medical management components. A decrease by nearly 75% in six-month CHF readmissions is in line with reductions obtained by more intense case management programs (Anderson, Deepak, Amoateng-Adjepong, & Zarich, 2005). The observed noticeable association of income, cultural factors, gender and level of education on the one hand, with higher QoL and reducing readmission and mortality among more educated people, on the other hand, could be explained by the effects of other socioeconomic factors which may influence the whole family either directly or indirectly (Govender & Penn-Kekana, 2008). Most of the above studies (Anderson et al., 2005; Ditewig et al., 2010; Krumholz et al., 2002) have not considered the cultural, economic and social beliefs and attitudes of CHF patients. This study, however, has sought to explore the impact of these factors on patients and their families.

There is evidence that low literacy is associated with poorer QoL. Almost 50% of all American adults have difficulty learning and using health information, which leads to a higher rate of hospitalization among patients with limited health literacy. Findings have proposed strategic communication training, where health care providers are taught based on the literacy level of their patients and develop adaptive and culturally-sensitive communication skills (Parker & Kreps, 2005).

A comprehensive education program in the outpatient setting is essential for improving outcomes in CHF patients. Patients education enables them to assume responsibility for disease management by increasing their knowledge base, promoting independent decision making, reinforcing adherence to treatment and adopting strategies of relapse prevention. Lack of knowledge of symptoms and poor compliance with treatment, particularly diet, drug use and weight control, are the major contributing factors to the exacerbation of HF, necessitating admission (Anderson et al., 2005). So, patients, if provided with information, are able to gain knowledge of self-care. In addition, increased knowledge leads to improved QoL and decreased rate of readmissions and medical referring.

Further longitudinal studies on the relationship between CHF illness severity and caregivers' distress are recommended considering the two contradictory hypotheses which can be generated from previous literature.

## 6. Conclusion

Nursing care follow-up and caring interventions based on patient and family collaboration, which are designed according to the patients' needs, and lifestyle modification can improve physical conditions, promote QoL and be effective in lowering readmissions and referring to physicians among cardiac patients. Given the growing number of cardiac patients, this, alongside health promotion, will reduce the need for referring to hospitals and paying for costly medical services. The findings of this study can be applied to promote the education of nursing students, nursing personnel, surveillance team and clients. In addition, these results can be the baseline of health care programs for CHF patients, their families and caregivers.

## 7. Limitations

First, the small sample size enrolled in this study may limit the generalizations of the findings. Secondly, the follow-up period was six months and longer follow-up is needed to evaluate the effects of any interventions on patients with HF more comprehensively.

## Conflict of interest

The authors of the present work declare no conflict of interest.

## Acknowledgments

We thank the Research and Technology Deputy of Shahrekord University of Medical Sciences for funding this study.

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