



Full Length Research Article

THE EFFECT OF CARDIAC REHABILITATION ON PERFORMING SELF-CARE ACTIVITIES BASED ON OREM'S SELF-CARE MODEL AMONG ELDERLY PEOPLE SUFFERING FROM CONGESTIVE HEART FAILURE; A RANDOMIZED DOUBLE-BLIND CONTROLLED CLINICAL TRIAL

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ABSTRACT

Introduction: Congestive heart failure (CHF) is one of the most common diseases among elderly people in which lack of knowledge about self-care can lead to negative consequences. Cardiac rehabilitation is one of the most important methods of therapy. Using Orem's self-care model can also help the patient perform self-care activities.

Objectives: Investigating the effect of the cardiac rehabilitation on performing self-care based on Orem's self-care model in elderly people suffering from CHF.

Methods and Materials: In this randomized double-blind controlled clinical trial, 90 patients with CHF were enrolled in the study. Block randomization method was used to randomize the participants, into case and control groups. Data were collected from both groups before and immediately after interventions using questionnaires. Patients in the case group participated in the cardiac rehabilitation programs consisted of three one-hour sessions per week for eight consecutive weeks. They also simultaneously received face-to-face required trainings based on Orem's model. Participants in the control group only received routine instructions of the hospitals.

Results: The mean (\pm SD) age of the patients were (65.42 \pm 5.73) and (65.46 \pm 6.73) in the case and control groups respectively ($p=0.973$). In the case group, mean change scores for self-care were statistically significant before and after intervention ($p<0.001$) and increases in the mean change scores were observed in responses to all self-care items after intervention.

Conclusion: Our findings showed that using cardiac rehabilitation and Orem's model could improve self-care ability in elderly suffering from CHF.

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INTRODUCTION

The rapidly expanding elderly population in the most of developed countries has diverted attentions towards the health of such age group (Wu, 2000). Elderly population in United States who are aged 65 and over will increase from 12% in 2010 to 17% by 2020 (Eliopoulos, 2010); it is predicted that the number of such people increases to 89 million by 2050 in

United States which is more than twice their number in 2010 (Frieden, 2013). Likewise, the number of elderly people in Iran which increased from 7.2% in 2006 to 8.3% in 2011 (Reeisi et al., 2012) is anticipated to reach one third of whole population by 2050 (Spengler, 2005). The reason behind the overall considerations towards such people is that they have numerous health problems. Furthermore, the increase in aging population is followed by multiple cost increases especially healthcare and treatment costs (Hashemloo et al., 2013). Besides, the increased risk of cardiovascular diseases especially congestive heart failure (CHF) is significant in elderly people (Paul, 2007). CHF describes the inability of

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heart to provide adequate pump action to meet the needs of body's tissues for oxygen and nutrient (Smeltzer *et al.*, 2010). It is also a probable disorder occurring among elderly suffering from different types of coronary artery and atherosclerotic cardiovascular diseases (Eliopoulos, 2010). It is also considered as a chronic, progressive and debilitating disorder. In United States, approximately 1% of the people aged 50 years and over and 10% of those aged 80 years and over are suffering from heart failure (HF) (Shojaee, 2008) and each year, more than 550,000 new cases of HF are diagnosed. It is most common in people over age 75, the most frequent cause of hospitalization in those over age 65 and the second common cause of referring to physicians' clinics (Smeltzer, 2010). HF is one of the most common causes of mortality and morbidity in Iran and the incidence rate of the disease will increase to 3500 per 100,000 in near future (Hekmatpour, 2009).

Moreover, the annual cost of hospitalization of such patients in Iran is estimated 400 billion Rials that should be considered as a warning sign to find preventive solutions to create more efficacies by lowering costs (Hekmatpour, 2009). The conducted studies indicate low levels of self-care abilities in the patients with HF in most countries which urges performing some interventions in this regards (Abootalebi *et al.*, 2012; Jaarsma *et al.*, 2013; Riegel *et al.*, 2009). One of the treatment methods for the patients with cardiovascular diseases is cardiac rehabilitation program which includes a series of exercises that helps the patients to return to normal life and work (Homayoni and Khosropanah, 2005). Cardiac rehabilitation and supportive cares could play important role in reducing hospitalization period and improving quality of life in elderly people. Not only the rehabilitation has positive effects on underlying heart diseases, but it could also reduce the rate of HF and ischemic disease progression by intervening on risk factors for cardiovascular diseases such as hypertension, hypercholesterolemia, obesity, smoking and diabetes mellitus (Najafian and Rabieei, 2001). Self-care activities in the patients with HF includes making the patients committed to the responsibilities, regulating the activities which are related to their health such as the method of drink consumption, diet and medication as well as taking therapeutic actions during symptoms aggravation. These are considered as the most important strategies of controlling the disease and the key to successful treatment (Jaarsma *et al.*, 2000).

One of the models which could involve the patients in their self-care activities is Orem's self-care model. This nursing theory which was initially developed by Dorothea Orem discusses mostly about the aspects of self-care. Self-care actions are performed individually by people to recover or maintain their health and life and to have constantly the feeling of well-being (Rostami *et al.*, 2009). According to this model, nurses regulate self-care capabilities for persons by doing nursing caresso that they can meet their self-care therapeutic needs (Peggy, 2004; Tomey and Aligood, 2006). Hashemloo and colleagues conducted a study on 50 elderly people in nursing homes of Urmia in 2012 to investigate the effect of performing Orem's self-care programs on self-care capabilities of elderly people. They found low levels of self-care capabilities among the participants of both case and control groups. They concluded that performing Orem's self-care program could positively affect increasing such

capabilities (Hashemloo *et al.*, 2013). Despite the importance of self-care activities in the management of HF, limited studies in Iran have addressed the self-care status of the patients (Jaarsma *et al.*, 2000). Although the obvious benefit of cardiac rehabilitation for several groups of the patients with cardiovascular diseases is known, referral rate of patients with cardiovascular diseases especially elderly to rehabilitation centers was low due to the lack of referral from the physicians, medical insurance, financial affordability and sufficient knowledge (Dunlay, 2009). The evidence shows that physical training is helpful for those suffering from HF; however, the optimum exercise 'prescription' is unspecified due to the fact that typical elderly patients were not enrolled in many studies (McMurray, 2012). Our study could also be an emphasis on considering cardiac rehabilitation in the referral and treatment system for the patients suffering from cardiovascular diseases especially elderly patients with CHF. With respect to the benefits and evidences indicating the effectiveness of the cardiac rehabilitation program in the health-related fields on the mentioned patients and using Orem's self-care model for the treatment of chronic diseases in the aged people, we aimed to evaluate the effects of such methods on self-care abilities in elderly with CHF.

MATERIALS AND METHODS

This study was approved by the Ethics Committee of Shiraz University of Medical Sciences (Ethics Committee Approval Number: 92.56660). In this randomized double-blind controlled clinical trial, we enrolled 90 elderly patients with CHF referred to the hospitals affiliated to Shiraz University of Medical Sciences, Shiraz, southwest Iran during April to August 2013. After obtaining written informed consent, balanced block randomization method was used to randomize the participants into case and control groups (figure 1). The patients were blind to the assigned groups and the research assistant was responsible for data collection. The sample size was calculated as 45 in each group based on the data of similar studies and using Med Calc statistical software (power: 80%, α : 0.05, mean difference: 13 and SD: 23 [case group] and 16.5 [control group]).

Inclusion criteria included confirmed diagnosis of CHF by cardiologists, being in the stages I to III of heart failure based on the New York Heart Association (NYHA) functional classification system, a left ventricular ejection fraction (LVEF) $\geq 40\%$, age of 60 or more, ability to speak and understand the Persian language, being permitted to participate in the cardiac rehabilitation programs by a cardiologist and a physical medicine and rehabilitation specialist, lack of any other chronic diseases such as orthopedic problems as well as physical, cognitive and psychological disabilities which could interfere with the rehabilitation programs. After obtaining informed consent, the researcher explained the aims and method of the research to the patients who were willing to participate in the study and asked them to complete the questionnaires. The questionnaires were completed twice by participants, once before the intervention, and once immediately after the intervention. Data were collected using demographic questionnaire and European Heart Failure Self-care Behavior Scale (EHFScBS) which is a twelve items presented on a 5 point Likert scale anchored at 1 = completely agree and 5 = completely disagree. Its reliability and validity

was estimated in many studies such as the one conducted by Jaarsma and colleagues (28) and in Iran was estimated by Shojafard and colleagues in 2008. The patients in the case group participated in cardiac rehabilitation programs consisted of three one-hour sessions per week for eight consecutive weeks individually based on a predetermined program. Each session consisted of three phases: the warm up phase lasted 5-10 minutes, aerobic exercise for 20-45 minutes, and the cool down phase lasted at least 5 minutes. They also simultaneously received face-to-face required trainings based on Orem's model and individual's need assessment. Moreover, they received a training booklet comprising the definition of HF, symptoms and causes, risk factors and methods of controlling them; general principles of treatment, pharmaceutical treatment and non-pharmaceutical management of the disease, method of controlling daily body weight and obesity, diet, avoiding smoking, methods of stress management and preventing depression, resting and doing activities, exercising, principles of medicine consumption, time of making contact with physicians and nurses or referring to them, symptoms of severity of the disease and necessity of visiting a physician as well as management of pain. Immediately after the end of intervention, the questionnaires were completed by the patients or research assistant in the case group. Participants in the control group only received routine instructions of the inpatient or outpatient wards without the intervention of the researcher and were discharged. The collected data were analyzed using SPSS software, version 19. Statistical qualitative tests, Chi-square, independent and paired t-test were used as appropriated. The significance level was set at $<0/05$.

RESULTS

The age range of the patients was 60-85 years. The mean (\pm SD) age of the patients were (65.42 \pm 5.73) and (65.46 \pm 6.73) in the case and control groups respectively and there was no significant difference between the case and control groups with respect to their age ($p=0.973$). The mean (\pm SD) Left ventricular ejection fractions (LVEFs) were 35.44 \pm 6.76 and 32.31 \pm 8.78 in the case and control group respectively, the independent t-test showed no significant difference between two groups ($p=0.061$). The baseline characteristics of the samples (qualitative variables) have been examined by chi-square test. The numbers of men and women in the case group were 64.4% ($n=29$) and 35.6% ($n=16$) respectively, while in the control group 68.9% ($n=31$) were men and 31.1% (14) were women. Therefore, there was no significant difference regarding the sex between two groups ($p=0.412$). 91.1% of patients in the case group and 93.3% of those in the control group were married ($p=0.5$). 33.3% of the patients in the case group and 46.7% in the control group didn't have secondary education. Similarly, no significant difference had been observed between the two groups regarding their job types ($p=0.239$); most of the women were housewives, while most of the men were unemployed or retired. Atherosclerosis was the most common underlying cause of the disease which was reported 57.8% and 48.9% in the case and control groups respectively. There was no significant difference between the two groups with respect to cigarette smoking ($p=0.079$) and alcohol consumption ($p=0.5$). Table 1 shows the mean (\pm SD) scores and mean change scores for self-care between the case and control groups compared by paired t-test and independent

t-test respectively before and after intervention. The results of table 1 indicates that there were significant difference between mean change scores for self-care before and after intervention in the case group ($p<0.001$); while, no significant difference was observed in the control group in this regard ($p=0.433$). The mean change scores for self-care were assessed before and after intervention in both groups (14.78 units in the case and 1.29 units in the control group). Therefore, the difference between the two groups was statistically significant at the level of 0.001 ($p<0.001$). In the case group, there was an increase in the mean change scores in responses to all self-care items after intervention.

DISCUSSION

Findings showed that performing cardiac rehabilitation program on elderly with CHF based on Orem's self-care model could improve self-care capability in such patients. Wise and Andersen could prove the efficacy and safety of such program based on the ability and personal needs of the patients suffering from the disease (Wise, 2007; Andersen, 2006). However, it seems that still many physicians cautiously advise their patients to use such method of rehabilitation (Dunlay *et al.*, 2009). Maintaining and increasing the level of physical activities is one the most important aspect of self-care in cardiac rehabilitation (Barlow, 2010). Using such method of rehabilitation which increases acting capacity and decreases the symptoms of the disease could definitely enhance the patient's self-care ability. In the studies conducted by Tung and Jaarsma, the findings showed that training self-care skills to the patients suffering from CHF improved the self-care score in such patients (Jaarsma *et al.*, 2000; Tung *et al.*, 2013). The study done by Hashemloo and colleagues confirmed that Orem's self-care program could have positive effect on increasing the self-care ability of the elderly people (2013). Similarly, Naji and colleagues concluded that such model could affect both the recovery of patients with CHF and obtaining higher self-care score (2009).

The result of our study shows that using educational interventions that are based on individual's need were more effective than the trainings the elderly received in the hospitals or physicians' clinics. According to the study conducted by Shojafard and colleagues, it seems that self-care behaviors have not been advised or even done practically in the physicians' clinics or during hospitalization (2008). Therefore, regarding the efficacy of self-care training program on the awareness and performance of the patients with CHF, our findings emphasizes on using more effective methods such as the Orem's model by nurses for training the patients (Mangolian *et al.*, 2012). In accordance with the studies of Jaarsma and colleagues (2000), our findings show that preparing comprehensive training pamphlets about the disease and the methods of self-care for the patients could improve their awareness. We found no significant difference between two groups comparing mean change scores for self-care and baseline characteristics including age, sex, and educational level and occupation, and our findings were similar to that of Hassani and colleagues (2010). Orem believes that self-care capabilities and requirements in a healthy person differs depends on age development of that person; however, we observed no significant correlation between age and self-care abilities since all of our participants were the elderly.

Coyle states that sex, as a basic factor, could affect self-care capabilities and requirements (2000). Whereas, Lee and colleagues suggests that there is no significant correlation between sex and self-care capabilities in the patients suffering from HF (2009). The results of our study were consistent with Lee's findings and contrary to those of Coyle. Akyol and colleagues suggest that higher education could affect self-care capabilities (2007). However, we observed no significant correlation between the educational levels and mean change scores for self-care in the present study because most of our participants did not even have secondary education. We also found no statistically significant correlation between different groups regarding occupational status. Oksel and colleagues also reported a significant correlation between self-care ability and occupational status (2009). However, our findings were similar to those of Akyol and colleagues and we found no significant correlation in this regards (2007). Our findings showed an increase in the mean changes of the responses in the case group to all self-care items after the intervention compared with the responses before the intervention that was consistent with the findings of Shojafard and colleagues (2008). The highest mean score changes in our study were related to daily weighing, monitoring urination and observing fluid restriction respectively.

Jaarsma and colleagues indicate that supportive educational interventions improve self-care behaviors especially in the field of diet, recognizing the warning signs of the disease for receiving assistance and management of the activities in the patients with HF (2000). However, in a study conducted by Shafipour and colleagues, the mean change scores were increased significantly in the patients who participated in cardiac rehabilitation by following a proper diet and taking medications as directed (2011). Our experience and findings showed that the participants had not clearly perceived the importance of daily weighing, monitoring urination and observing fluid restriction clearly. Therefore, the most changes had been observed in these three items after that the participants received the required trainings.

Conclusions

The results of our study indicates that using such a non-pharmaceutical and exercise- based therapy method (cardiac rehabilitation) and individual's need-based trainings (Orem's model) could improve self-care ability in the elderly suffering from CHF. Therefore, their active participation in the rehabilitation programs and receiving the required trainings could increase their self-care ability and motivate other similar patients to participate in such programs.

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