


ORIGINAL ARTICLE

The effect of an educational program based on Roy's adaptation model on the quality of life of patients suffering from heart failure: A clinical trial study

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Abstract

Aim: Heart failure is a progressive, debilitating disease with exacerbated physical and psychological symptoms that reduces the quality of life of patients. Nursing intervention based on nursing theories could help in the adaptation of patients to the disease and improving quality of life. The aim of this study was to determine the effect of an educational program based on Roy's adaptation model on the quality of life of patients with heart failure.

Methods and Material: In this randomized controlled trial, 76 patients with heart failure were allocated to either the intervention or control group through a blocked randomization method. The data were collected between May and October 2017. The intervention group received oral and written educational programs for 4 weeks. Minnesota quality-of-life questionnaire and Roy's adaptation model-based evaluation form was completed at the beginning of the trial, and 1 month after the completion of the study.

Results: Intervention patients showed statistically significantly improved scores on the physiologic, role function, independence-interdependence dimensions and the total score of Roy's adaptation model over time compared with control patients ($p < .05$). The mean score of all of the three quality-of-life dimensions and total score of quality of life increased significantly ($p < .05$).

Conclusion: The study results help nursing staff detect the stimuli and the behaviors of patients with heart failure. Roy's adaptation model can be used as a standard practice to increase adaptation to the disease and improving quality of life.

KEYWORDS

adaptation, heart failure, quality of life, Roy's adaptation model

1 | INTRODUCTION

Heart failure (HF) is one of the most common cardiovascular diseases, which is considered a chronic, progressive, and debilitating disorder with significant physical and psychological symptoms (Keihani, Kargarfard, & Mokhtari, 2014).

Incidence and prevalence of HF across the world is increasing even in developed countries (Hjelm, Brostrom, Riegel, Arestedt & Stromberg, 2015; Riegel & Weaver, 2009). Among 6 million Americans suffering from chronic HF, the extent of hospitalization is 18 patients per every 1,000 patients above 64 years of age, causing 700,000 cases of

hospitalization per year (Mirkin, Enomoto, Caputo & Holenbeak, 2017). According to the WHO, in 2015, annually 17.5 million people die due to HF (Filipe, Meijers, Rogier van der Velde & de Boer, 2015). In Asia, prevalence of HF varies between 1.26 and 6.7%, and the mortality rate has been reported to be 3.9–6.7%. Prevalence of HF in Iran is twice as large as that of the Asia's mean, which is 8%. A total of 25% of patients hospitalized in Iran suffer from this disease (Samir & Nour 2011).

Chronic HF progresses following different conditions and diseases including hypertension, diabetes mellitus, metabolic syndrome, atherosclerotic disease, valvular defects, congenital HF, high cholesterol, smoking, and obesity (Li et al., 2014; Samir & Nour 2011). This disease has numerous symptoms including shortness of breath, edema, pain, depression, fatigue, nausea, constipation, sleep disorder and anxiety. These symptoms cause various complications in the life, body, and mind of the person, which can include development of stress, low self-confidence, diminished activity, lowered levels of power in the patient, re-hospitalization, increased financial burden for the family and healthcare providers and eventually death in the patients (Conley, Feder & Redeker, 2015; Hallas, Wray, Andreou & Banner, 2011; Riegel & Weaver, 2009). Thus, the complex and progressive nature of this chronic disease and the distress resulting from its complications result in poor adaptation with the disease and eventually negative effect on different dimensions of the quality of life (Graven & Grant, 2013). According to studies in Iran, HF patients show medium and poor adaptation and self-care abilities (Abootalebi, Vosooghi, Mohammad Nejad, Namadi & Akbari Kaji, 2012; Naeim Hassani, Tabiee, Saadatjoo & Kazemi, 2014). Adaptation is the ability and tool to cope with the variable internal and environmental conditions. Adaptation is a psychological process, in which the person deals with the desires and challenges of everyday life, or controls these (De Ridder, Geenen, Kuijer & van Middendorp, 2008). Patient adaptation with the disease and its consequences are inseparable parts of nursing care and training, and bring about numerous advantages. Adaptation causes preservation of balance and ability of the person in meeting his needs, alteration in their lifestyle in stressful situations, elevated satisfaction of the person, and eventually enhanced quality of life in different physiological, mental, and social aspects of the patients' lives. Therefore, it should be a priority in nursing and supportive care. To enhance adaptation with disease, patients should be helped to be active participants in their self-care activities. Further, they should be allowed to express their emotions and affections suitably and concentrate on positive aspects of the disease which cause facilitated adaptation with the consequences of the disease (Azarmi & Farsi, 2015).

1.1 | Theoretical framework

The current study has been designed according to Roy's adaptation model (RAM). One of the most valuable practical points of this model is that it allows researchers to outline the structural or conceptual framework of their studies. Based on this model, behavioral responses can be related to three types of stimuli: focal, contextual, and residual stimuli. Control processes or adaptation mechanisms can be examined through regulatory and cognitive systems and through stabilizing and innovative subsystems for groups. Adaptive individual/group responses, which emerge to keep adaptation with individual and environmental transformations and eventually promotion of health are examined in four modes of physiological adaptation, self-concept, role function, and interdependence (Akyil & Erguney, 2013; Roy, 2009). In the physiological dimension, the person responds to the environmental stimuli as a living organism. Indeed, the person shows adaptation based on their physiological needs. The dimension of self-concept includes the emotions and perceptions. The dimension of role function is associated with expectations of the society from different roles on the part of the person. The dimension of independence and interdependence involves the interactive behaviors between social and individual systems. This model is a suitable framework for collecting information from patients and application of this model causes concentration, organization, conduction of thoughts and actions of nurses toward the targets of interest more effectively and suitably (Akyil & Erguney, 2013; Azarmi & Farsi, 2015). Based on this model, the nurse investigates the patient through interview, observation, and measurement in a methodical and precise manner. They then determine maladaptive behaviors, which are indeed the patients' problems across four dimensions along with the behavior stimuli (reasons). Subsequently, they design precise educational and care programs to solve the patients' problems (maladaptive behaviors) (Akyil & Erguney, 2013; Riegel & Weaver, 2009). Researchers have described RAM as a potentially useful model for researchers and healthcare trainers. This model can be extensively used across all nursing fields concurrently. Implementation of nursing activities in the form of this model causes increased patient adaptation (Akyil & Erguney, 2013; Alligood, 2014). The results of the studies conducted on chronic obstructive pulmonary disease (Akyil & Erguney, 2013), hemodialysis (Kacaroglu Vicdan & Gulseven Karabacak, 2016), HF (Bakan & Akyol, 2008), cancer (Zeigler, Smith & Fawcett, 2004) and asthma (Buckner et al., 2007) have shown positive effects of RAM.

A review of studies has shown that few studies have investigated the effect of RAM on quality of life of HF patients. Therefore, the purpose of this study was to determine the effect of educational programs based on RAM on the quality of life of patients with HF.

2 | METHODS

2.1 | Design

This research was a randomized clinical trial study.

2.2 | Participants

The data were collected between May 1 and October 30, 2017 in the cardiac units in two major general hospitals affiliated with the Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

According to the statistical formula $n = \frac{(s_1^2 + s_2^2)}{(\bar{x}_1 - \bar{x}_2)^2} \left(z_{1-\frac{\alpha}{2}} + z_\beta \right)^2$, considering the significance level of 0.05 and power of 80% and by considering 10% dropout, 76 persons were determined.

The patients with HF were selected according to inclusion criteria and then assigned into intervention and control groups (38 persons to each group) based on a blocked randomization method.

The inclusion criteria were: (a) having HF Classes I, II, and III (at least for 6 months) according to the criteria of the American Heart Association; (b) percentage of heart ejection fraction of equal to and less than 40%; (c) absence of any psychological disorder; (d) ability to develop verbal communication; (e) age between 18 and 65 years; (f) no participation in similar educational programs.

The exclusion criteria included: (a) migration of the samples throughout the research; (b) patients leaving the training sessions after two sessions; (c) having kidney failure, liver failure, chronic obstructive pulmonary diseases, neuromuscular disorders, and walking disorders. The stages of the research are shown in Figure 1.

2.3 | Randomization and blinding

This study was performed as a single-blind random allocation sampling method. For this purpose, after determination of the participants, they were categorized into groups A and B, and the names of the samples were taken from a container as a lottery. For blinding of the study, the trainer nurse training the treatment group was not aware of the objectives and details of the treatment.

2.4 | Intervention

The demographic information questionnaire, Roy's adaptation questionnaire, and Minnesota quality-of-life questionnaire were completed by all samples before the intervention. According to RAM, behaviors and stimuli assessment for four physiological, self-concept, role function and interdependence modes was conducted and the maladaptive

behaviors of patients were identified. Nursing diagnosis and the goal setting was identified based on ineffective behaviors and their related stimuli. For the intervention group, based on nursing diagnosis, an educational program was designed in cooperation with a cardiologist, nutritionist, psychologist, nurse psychiatrist, and specialist nurse in heart care. The educational plan is shown in Table 1. The intervention group patients were divided into two 19-person groups. Next, the educational program was held for each group during four 70 min sessions (55 min: training, 15 min: questions and answers) during 1 month (one session per week). To accurately implement the educational points in each session by the patients, a checklist was provided to patients which was indeed the designed questions of Roy's questionnaire related to the educational dimension which had been given to them in that session. They were requested to check their adaptive behaviors in that trained dimension on a weekly basis. Meanwhile, all of the patients in the intervention group were followed up, such that the researcher contacted them during the week by telephone and controlled the given trainings based on the checklist prepared for each session. He also responded to the patients' questions, and positive behaviors in patients were reinforced by encouraging them and citing the advantages of those behaviors. On the other hand, negative behaviors were attenuated through stating the complications and disadvantages of the behavior. A booklet called "How can I learn to live with heart failure" was prepared by the researcher and provided to the treatment group. The content of this pamphlet included all trainings across the four dimensions of RAM.

The control group received only normal and routine training by the care team.

One month after the training, the research instruments were completed for the second time by another researcher who was not aware of the manner of the patients' assignments (blinding), and the quality of life of both groups was measured. For ethical considerations, by the end of the treatment and completion of questionnaires, the pamphlets were also provided to the control group and one group training session was also held for this group, and they also received telephone and in-person consultation.

2.5 | Measurement

The data collection tools included a demographic information questionnaire, Minnesota HF quality of life questionnaire and RAM-based evaluation form (self-made). The demographic information included age, marital status, level of education, place of residence, occupation, number of household members, monthly income of the entire family, and duration of living with HF.

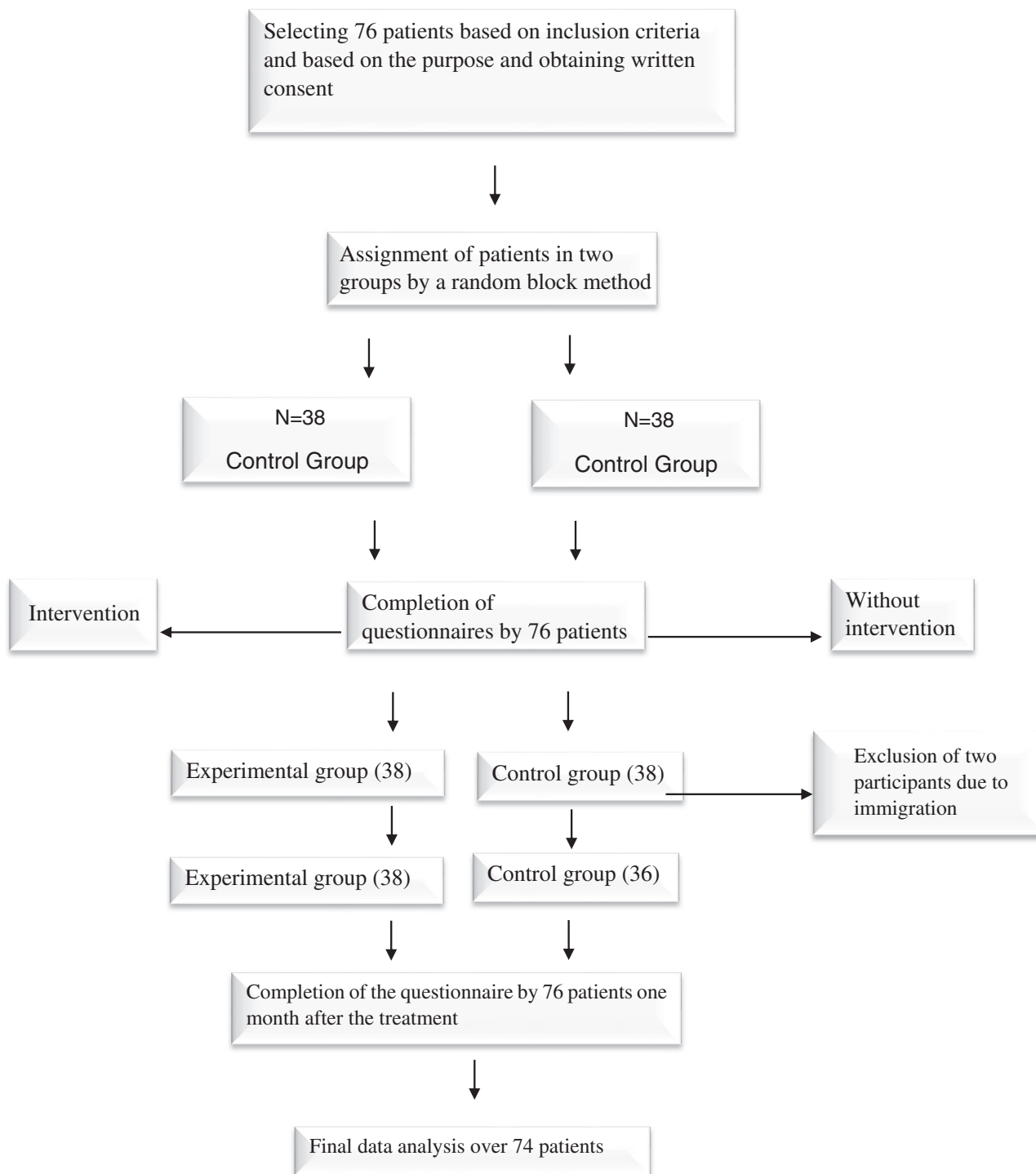


FIGURE 1 The diagram representing the procedure of the research

2.6 | Minnesota Living with HF questionnaire

Minnesota Living with HF questionnaire represents the perception of patients regarding the effects of HF on the physical, mental, and socioeconomic aspects of their lives. This questionnaire contained 21 questions, categorized into physical, mental, and socioeconomic dimensions. Each question was scored based on a Likert scale from 0 to 5 (never = 0, very few times = 1, few times = 2, sometimes = 4, many

times = 4, often = 5). Zero represents the best state, while 5 suggests the worst state. In this questionnaire, the minimum score was 0 (suggesting no effect by the disease on different dimensions of quality of life), while the maximum was 105 (representing a considerable effect on the different dimensions of quality of life). Lower scores indicate better quality of life.

In Iran, the reliability of the Minnesota Living with HF questionnaire was reported using Cronbach's α for the total

TABLE 1 The content of the educational sessions

Content of educational program	Dimensions of Roy's adaptation model	Session
Training based on maladaptive behaviors and stimuli of each behavior in the physiologic dimension including understanding the nature of heart failure disease, etiology, diagnosis, treatment and complications of heart failure pharmaceutical understanding and consultation, introducing food groups and cardiovascular diet, consumption of liquids, tobacco, and alcohol, daily weighing and interpreting daily weight in heart failure, the type of physical activity, exercise and its effect on heart failure, and managing the disease symptoms. Conductor: cardiologist and nutritionist	Physiologic	First session
Training based on maladaptive behaviors and stimuli of each behavior in the self-concept dimension including stress management and mitigation methods, anger control, regular sleep, methods to enhance self-confidence, and self-perception Conductor: psychologist, nurse psychiatrist	Self-concept	Second session
Training based on maladaptive behaviors and stimuli of each behavior in the role function dimension including training spousal, social, parental roles as well as sexual problems, the stresses they had, and the way they adapted with them. Conductor: nurse psychiatrist, specialist nurse in heart care	Role function	Third session
Training was based on maladaptive behaviors and stimuli of each behavior in the dimension of independence and interdependence including encouraging the patients to do their daily and personal tasks independently, being independent in remembering the date of their visit by the physician, encouraging the patient to go for examination by the physician independently; they know the time, dose and method of medications used independently; they independently know what type of nutrition is useful to them and what kind of foods is harmful to them. Conductor: specialist nurse in heart care, nurse psychiatrist	Independence and interdependence	Fourth session

score, physical scale and emotional scale as 0.87, 0.81, and 0.84, respectively. Further, it has been constantly above 0.70 (Rajati et al., 2016). In the present study, the reliability of the tool was measured as 0.84 (Cronbach's α coefficient).

2.7 | RAM-based evaluation form

To measure the extent of adaptation of the four dimensions of Roy's model, a 55-item self-made questionnaire was employed, including 24, 13, 10, and eight items for physiology, self-concept, role function, and independence and interdependence dimensions, respectively. The physiological mode was assessed by 24 questions, using a five-item scale (never, rarely, sometimes, often and always) related to respiration, nutrition, defecation, activity, excretion, rest, sleep, and liquids and electrolytes. Minimum and maximum scores of physiological adaptation were 24 and 120, respectively. Self-concept dimension involves 13 question with a five-item scale (never, rarely, sometimes, often and always) which was used to assess emotions and perceptions of the person, well-being of self, acknowledging the disease, sense of despair, guilt, and helplessness. For this mode, the scores ranged between 13 and 65. Regarding role function dimension, 10 questions with a five-item scale (never, rarely, sometimes, often and always) were used to assess spousal, social, parental roles as well as sexual

problems along with emotional and affective behaviors. For this mode, the scores ranged between 10 and 50. For the independence and interdependence dimension, eight questions with a five-item scale (entirely disagree, disagree, no opinion, partly agree and entirely agree) about daily and personal tasks independently, social support and keeping relations with others and friends and relatives were investigated. The score ranged between eight and 40. A high score for all sub-dimensions was evaluated as positive adaptation. Using Roy's questionnaire and response of the patients to the items, the number of maladaptive behaviors and their stimuli were determined in the four dimensions. For validity, this questionnaire was provided to 10 professors at the faculty of nursing and midwifery at the authors' institution, and their modifying ideas were applied in the questionnaire. In the present study, the reliability of the tool was measured as 0.85 (Cronbach's α coefficient).

2.8 | Ethical considerations

This study was approved by the ethics review board at the authors' institution (IR.AJUMS.REC.1394.504). In this study, once the patients were informed about the research procedure, they participated in the research with complete awareness after filling a consent form. At any time, if they were unwilling to continue, they were able to quit the study. At the end of the study, training was also provided to the control group in addition to the treatment group. This study

was registered in the website of Registry of Clinical Trials with the following code: IRCT2016010625880N1.

2.9 | Statistical analysis

By the end of the study, the obtained data were analyzed by parametric statistical tests of Chi-square, covariance analysis, and independent *t*-test using SPSS 18.0 (SPSS Inc., Chicago, IL, USA). The significance level in this study was considered at $p < .05$.

3 | RESULTS

The results in Table 2, using independent *t*-test and Chi-square, indicated that there were no significant differences between the control and intervention groups in terms of gender, marital status, level of education, occupation, insurance support, monthly income, place of residence, disease history (years), and age ($p > .05$).

Out of 76 HF patients, 38 were in the control group and 38 patients were in the intervention group. Two patients from the control group were excluded from the study due to migration. The mean age of the participants in the control and treatment groups were 54.14 ± 68.10 and 56.45 ± 78.11 , respectively.

The results in Table 3 indicated there were no inter-group differences in baseline in terms of score of physiologic, role function, and independence-interdependence aspects and the total score of RAM ($p > .05$). Intervention patients showed statistically significantly improved scores on the physiologic, role function, independence-interdependence dimensions and the total score of RAM over time compared with control patients ($p < .05$). In the dimension of self-concept, which was performed by covariance analysis, it was also significant ($p < .05$).

The results indicated that before the treatment in the control and intervention groups, the mean score of each dimension of quality of life (physical, mental, and socioeconomic dimensions) and the total score of quality of life did not differ significantly ($p > .05$). The results of independent *t*-test showed that after the intervention, the mean score of all of the three quality-of-life dimensions (physical, mental, and socioeconomic), and total score of quality of life increased significantly between the control and intervention groups ($p < 0.05$) (Table 4).

4 | DISCUSSION

The results of present study indicated that adaptation and quality-of-life increased in the intervention group after the training based on RAM. According to RAM, coping processes consist of two regulator and cognator subsystems. Proper response

TABLE 2 Distribution of the intervention and control groups' individual characteristics (baseline)

Variables	Intervention group	Control group	<i>p</i> value
Gender	Male	27 (71.1)	.88
	Female	11 (28.9)	
Marital status	Married	38 (100)	.486
	Single	0	
Level of education	Sub-diploma	37 (97.3)	.108
	Diploma and above	1 (2.7)	
Occupation	Employed	11 (28.9)	.383
	Unemployed	1 (2.6)	
	Retired	16 (42.2)	
	Housewife	10 (26.3)	
Insurance support	Yes	35 (92.1)	.474
	no	3 (7.9)	
Disease history, years	1>	2 (5.3)	.494
	1<	36 (94.7)	

of these subsystems to external and internal stimuli results in adaptive behaviors (Afrasiabifar, Karimi & Hassani 2013).

4.1 | Physiological mode

Our results indicated that training based on RAM caused a significant improvement in the physiological mode. Exercise training may improve quality of life by ameliorating dyspnea, edema, fatigue, and other uncomfortable symptoms in patients with HF. Our results are consistent with other studies. The results of the study by Akyil and Erguney (2013) indicated that training breath control and relaxation techniques based on Roy's model is effective on physiological dimensions of patients with chronic obstructive pulmonary disease. The results of another study showed that an intervention based on self-efficacy theory reduced smoking and alcohol consumption and improved daily activity in patients with HF (Pozehl, Duncan, Hertzog & Norman, 2010). The results from Afrasiabifar, Karimi and Hassani (2013), showed that RAM-based education improved patients' adaptation in physiologic mode in hemodialysis patients.

4.2 | Self-concept mode

The present study showed that RAM-based educational intervention had a positive effect on the patients' self-concept. The concept of self is expressed in two sub-categories

TABLE 3 Comparison of the mean scores of Roy's adaptation model before and after the training

Dimensions of Roy's adaptation model	Intervention	Control	<i>p</i> value
Physiologic	Pre-test	13.26 ± 85.63	.287
	Post-test	4.63 ± 113.58	.001*
Self-concept	Pre-test	7.10 ± 47.57	.006
	Post-test	7.10 ± 59.29	.001*
Role function	Pre-test	7.02 ± 40.34	0.320
	Post-test	3.21 ± 46.52	.001*
Independence-interdependence	Pre-test	5.49 ± 28.68	.967
	Post-test	2.94 ± 36.26	.001*
Total score of Roy's adaptation model	Pre-test	24.77 ± 202.23	.095
	Post-test	11.90 ± 255.65	.001*

Note: Independent *t*-test was used.

*Statistically significant (*p* < .05).

TABLE 4 Mean of quality of life in patents before and after training, based on a standardized Minnesota quality-of-life questionnaire in Iranian population

Dimensions of quality of life	Intervention	Control	<i>p</i> value
Physical	Pre-test	8.70 ± 16.39	.477
	Post-test	4.10 ± 5.97	.001*
Mental-spiritual	Pre-test	6.14 ± 7.05	.181
	Post-test	2.54 ± 2.21	.001*
Socioeconomic	Pre-test	5.94 ± 14.89	.110
	Post-test	2.21 ± 3.81	.001*
Total score of quality of life	Pre-test	16.45 ± 38.07	.139
	Post-test	7.03 ± 11.97	.001*

Note: Independent *t*-test was used.

*Statistically significant (*p* < .05).

(the physical self and personal self) in Roy's model. The physical self consists of sense of self and body image, whereas personal self includes feeling of guilt, anxiety, depression and impotence (Alligood, 2014). Anxiety and depressive disorder, often seen in HF, have a negative effect on adaptation (Ratcliff et al., 2017).

Patients with chronic illness usually need knowledge to interpret the disease in an objective fashion and cope with it effectively. In such conditions, changing the image of self can facilitate adaptation to disease (Akyil & Erguney, 2013). The results of the study by Akyil and Erguney (2013), showed that training how to control stress, have peace, and mental support based on Roy's model had a positive and significant effect on the self-concept mode of patients with chronic obstructive pulmonary disease. The results of another study indicated that educational intervention based on Roy's model had a significant effect on self-concept of hemodialysis patients (Afrasiabifar, Karimi & Hassani, 2013). In this regard, family structure, socioeconomic status, personality type, and

individual beliefs and perception of well-being are the facilitators of or barriers of psychological adjustment to illness.

4.3 | Role function mode

Our results also indicated that role function scores increased in the intervention group. In a study by Afrasiabifar, Karimi and Hassani (2013) on patients receiving dialysis, eight 1 hr sessions of patient education based on Roy's model significantly improved the role function mode in the intervention group. Akyil and Erguney (2013) studied chronic obstructive pulmonary disease patients and showed that oral and written education based on RAM increased knowledge about the disease, symptom control, sense of well-being and ultimately adaptation to disease in the role function mode.

4.4 | Interdependence mode

Our results also showed a positive effect on the mean score of independence and interdependence mode. The

interdependence mode of RAM underlines the presence of social support, social relationship with other patients, satisfactory relationships and support from healthcare professionals (Roy, 2009). We can interpret this result as a sign that intervention patients shared their feelings with other friends and patients in teaching sessions. In this regard, Larsen and Pedersen (2016) studied HF patients and showed that performing an individual empowerment program and following up patients for 12 weeks significantly increased mean scores of social performance and interdependence mode. The results of the study conducted by Afrasiabifar, Karimi and Hassani (2013), showed that nursing education based on RAM could not promote the interdependence mode. This may be due to the majority of patients (81.35%) being single. Also 57.63% of the patients live in rural regions in which the structures of family are nuclear and the parents live with children. But in our study, the majority of patients were married and lived in urban areas.

The results of this study also are consistent with the study by Sekarsari and Santoso (2013), which showed that training and consultation based on the self-care model of HF resulted in diminished rates of re-hospitalization and mortality in these patients. Bakan and Akyol (2008) conducted a study on patients with HF and concluded that theory-based interventions increased functional capacity, social support and adaptation to the disease and improved quality of life of patients. The results of the studies by Peters-Klimm *et al.* (2010) and Baraz, Zarea and Shahbazian (2017), indicated that self-care behaviors significantly improved adaptation to disease in HF and diabetes respectively.

4.5 | Quality of life

A significant improvement in quality of life was found following nursing interventions based on RAM. The results were consistent with previous studies. The results of a study by Naeim Hassani, Tabiee, Saadatjoo and Kazemi, (2014) showed that using an educational program based on RAM can be effective on the psychological adaptation and reduction of maladaptive behaviors in patients with HF. The results of study by Bakan and Akyol (2008), indicated that quality of life of patients with HF, functional capacities and social support within the interdependence dimension improved. Monitoring and improving quality of life can reduce disease burden and may help improve clinical outcomes in these patients.

5 | LIMITATIONS OF THE STUDY

As limitations of this study, the limited number of the sample size and conducting the intervention in two hospital may

impact the generalizability of our findings. A multi-center sampling study with greater sample size is recommended. Another limitation was the short follow-up period. More studies are needed to examine the long-term follow-up effects of RAM.

6 | CONCLUSION

Overall, based on the obtained results and data interpretation, it is inferred that application of a specific nursing model in the working environment causes each of the four dimensions of Roy mentioned in this research to have significant effects on planning and presenting nursing services. In their operational scope, nurses need theories and models which have the maximum benefit in their working situations. The results of most research conducted regarding RAM suggest that this model can be a suitable framework in investigating the stimuli and the behaviors of patients, care, interventions, and eventually controlling chronic diseases. RAM can be used as a standard practice to increase adaptation to the disease and improving the quality of life.

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DISCLOSURE AND CONFLICT OF INTERESTS

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AUTHORS' CONTRIBUTION

Study concept and design: A.M., S.B., N.E., B.S.; acquisition of data: A.M., S.B., B.S.; analysis and interpretation of data: A.S.M.; drafting of the manuscript: S.B., A.M., N.E., B.S.; critical revision of the manuscript for important intellectual content: S.B., N.E., A.S.M. Statistical analysis: A.S.M.; study supervision: S.B., N.E., A.S.M.

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REFERENCES

- Abootelebi, G., Vosooghi, N., Mohammad Nejad, E., Namadi, M. & Akbari Kaji, M. (2012). Study of the self-care agency in patients with heart failure. *Journal of Critical Care Nursing*, 4, 203–208.

- Afrasiabifar, A., Karimi, Z. & Hassani, P. (2013). Roy's adaptation model-based patient education for promoting the adaptation of hemodialysis patients. *Iranian Red Crescent Medical Journal*, 15, 566–572.
- Akyil, R. C. & Erguney, S. (2013). Roy's adaptation model-guided education for adaptation to chronic obstructive pulmonary disease. *Journal of Advanced Nursing*, 69, 1063–1075.
- Alligood, M. R. (2014). *Nursing Theorists, Utilization and Application*. Philadelphia, PA: Mosby/Elsevier.
- Azarmi, S. & Farsi, Z. (2015). Roy's adaptation model-guided education and promoting the adaptation of veterans with lower extremities amputation. *Iranian Red Crescent Medical Journal*, 17, 1–7.
- Bakan, G. & Akyol, A. D. (2008). Theory-guided interventions for adaptation to heart failure. *Journal of Advanced Nursing*, 61, 596–608.
- Baraz, S., Zarea, K. & Shahbazian, H. B. (2017). Impact of the self-care education program on quality of life in patients with type II diabetes. *Diabetes Metabolic Syndrom*, 11((Suppl 2)), s1065–s1068.
- Buckner, E. B., Simmons, S., Brakefield, J. A., Hawkins, A. K., Feeley, C., Kilgore, L. A. *et al.* (2007). Maturing responsibility in young teens participating in an asthma camp: Adaptive mechanisms and outcomes. *Journal for Specialists in Pediatric Nursing*, 12, 24–36.
- Conley, S., Feder, S. & Redeker, N. S. (2015). The relationship between pain, fatigue, depression and functional performance in stable heart failure. *Heart & Lung*, 44, 107–112.
- De Ridder, D., Geenen, R., Kuijer, R. & van Middendorp, H. (2008). Psychological adjustment to chronic disease. *The Lancet*, 372, 246–255.
- Filipe, M. D., Meijers, W. C., Rogier van der Velde, A. & de Boer, R. A. (2015). Galectin-3 and heart failure: Prognosis, prediction & clinical utility. *Clinica Chimica Acta*, 443, 48–56.
- Graven, L. J. & Grant, J. S. (2013). Coping and health-related quality of life in individuals with heart failure: An integrative review. *Heart & Lung*, 42, 183–194.
- Hallas, C. N., Wray, J., Andreou, P. & Banner, N. R. (2011). Depression and perceptions about heart failure predict quality of life in patients with advanced heart failure. *Heart & Lung*, 40, 111–121.
- Hjelm, C. M., Brostrom, A., Riegel, B., Arestedt, K. & Stromberg, A. (2015). The association between cognitive function and self-care in patients with chronic heart failure. *Heart & Lung*, 44, 113–119.
- Kacaroglu Vicdan, A. & Gulseven Karabacak, B. (2016). Effect of treatment education based on the Roy adaptation model on adjustment of hemodialysis patients. *Clinical Nurse Specialist*, 30, E1–E13.
- Keihani, D., Kargarfard, M. & Mokhtari, M. (2014). Cardiac effects of exercise rehabilitation on quality of life, depression and anxiety in patients with heart failure patients. *Journal of Fundamentals of Mental Health*, 17, 13–19.
- Larsen, P. & Pedersen, P. U. (2016). The effectiveness of individual rehabilitation on health status in patients with heart failure: A quasi-experimental study. *International Journal of Nursing Practice*, 22, 15–21.
- Li, Y. L., Ju, J. Q., Yang, C. H., Jiang, H. Q., Xu, J. W. & Zhang, S. J. (2014). Oral Chinese herbal medicine for improvement of quality of life in patients with chronic heart failure: A systematic review and meta-analysis. *Quality of Life Research*, 23, 1177–1192.
- Mirkin, K. A., Enomoto, L. M., Caputo, G. M. & Hollenbeak, C. S. (2017). Risk factors for 30-day readmission in patients with congestive heart failure. *Heart & Lung*, 46, 357–362.
- Naeim Hassani, S., Tabiee, S., Saadatjoo, S. & Kazemi, T. (2014). The effect of an educational program based on Roy adaptation model on the psychological adaptation of patients with heart failure. *Modern Care Journal*, 10, 231–240.
- Peters-Klimm, F., Campbell, S., Hermann, K., Kunz, C. U., Muller-Tasch, T. & Szecsenyi, J. (2010). Case management for patients with chronic systolic heart failure in primary care: The HICMan exploratory randomised controlled trial. *Trials*, 11, 56.
- Pozehl, B., Duncan, K., Hertzog, M. & Norman, J. F. (2010). Heart failure exercise and training camp: Effects of a multicomponent exercise training intervention in patients with heart failure. *Heart & Lung*, 39, S1–S13.
- Rajati, F., Feizi, A., Tavakol, K., Mostafavi, F., Sadeghi, M. & Sharifirad, G. (2016). Comparative evaluation of health-related quality of life questionnaires in patients with heart failure undergoing cardiac rehabilitation: A psychometric study. *Archives of Physical Medicine Rehabilitation*, 97, 1953–1962.
- Ratcliff, C. G., Barrera, T. L., Petersen, N. J., Sansgiry, S., Kauth, M. R., Kunik, M. E. *et al.* (2017). Recognition of anxiety, depression, and PTSD in patients with COPD and CHF: Who gets missed? *General Hospital Psychiatry*, 47, 61–67.
- Riegel, B. & Weaver, T. E. (2009). Poor sleep and impaired self-care: Towards a comprehensive model linking sleep, cognition, and heart failure outcomes. *European Journal of Cardiovascular Nursing*, 8, 337–344.
- Roy, S. C. (2009). *The Roy Adaptation Model* (3rd edn). Upper Saddle River, NJ: Prentice Hall.
- Samir, A. & Nour, W. (2011). Self-management among Egyptian heart failure patients. *International Journal of Nursing Practice*, 17, 221–230.
- Sekarsari, R. E. R. & Santoso, a. (2013). Trained Nurse-led education and counseling of heart failure selfcare model “PrOMiSe” decrease clinical outcome on re-admission and/or mortality in heart failure patients in hospital, Indonesia. *IOSR Journal of Nursing and Health Science*, 2, 34–40.
- Zeigler, L., Smith, P. A. & Fawcett, J. (2004). Breast cancer: Evaluation of the common journey breast cancer support group. *Journal of Clinical Nursing*, 13, 467–478.

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