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Assessing the Impact of Family-Centered Empowerment Model on Self-Care of Patients With Prosthetic Heart Valves

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Abstract

Background: A heart valve disease is an important cardiovascular disease. Patients need long-term care after heart valve replacement, while promoting such patients' self-care is very important. In this study, the impacts of family-centered empowerment model on self-care of patients with prosthetic heart valves were assessed.

Methods: This clinical controlled study was done at Tehran armed forces hospitals in 2015. After transferring patients from the intensive care unit (ICU), samples of the study and active members of their family were selected through the convenient method. Family-centered empowerment model was performed for the experimental group in four steps: perceived threat, self-efficacy, self-esteem and evaluation through group discussion, group problem solving, educational participation (in three to five sessions) and providing educational cards and manual for the patients and the active members of their family. The control group received routine care. Patients' self-care was assessed before and after the intervention and also one and half month after the intervention. There was no intervention for the control group. Data analysis was done through descriptive and inferential statistical tests via the SPSS 23 software.

Results: Both groups were similar before the intervention in terms of demographic variables. The average self-care scores in the experimental and control groups in terms of knowledge was respectively 49.42 $\pm$ 5.77 and 50.58 $\pm$ 9.09, in the emotional aspect: 17.53 $\pm$ 3.43 and 17.26 $\pm$ 3.29 and in the functional aspect: 51.58 $\pm$ 6.03 and 53.84 $\pm$ 8.68; no significant difference was observed between the two groups, yet after the intervention, the average self-care scores in the experimental and control groups in terms of knowledge was, respectively, 60.11 $\pm$ 2.97 and 51.95 $\pm$ 7.38, in the emotional aspect, 22.32 $\pm$ 3.001 and 18.32 $\pm$ 5.513 and in the functional aspect, and 63.63 $\pm$ 5.11 and 53.11 $\pm$ 7.45 with a significant increase was observed for the self-care scores (P = 0.05). Self-care ability after one and half month was not only stable, yet had also increased.

Conclusions: Based on the findings of this study, performing family-centered empowerment model improves self-care in patients with prosthetic heart valve. It seems that performing this model has a positive impact on chronic diseases therefore it is recommended to use this model for these patients at a broader level.

Keywords: Family-Centered Empowerment Model, Self-Care, Prosthetic Heart Valve and Nursing

1. Background

The world health organization (WHO) predicts that deaths due to cardiovascular diseases from 17 million people in 2008 are going to increase to 25 million people in 2030. Cardiovascular diseases are the cause of one in three deaths in Canada, America and also Europe; in addition cardiovascular diseases are the cause of four million deaths in Europe annually (1, 2). Despite modern therapies, interventions and surgical techniques, nowadays, cardiovascular diseases are the main causes of death in both high and low-income countries.

The WHO predicts that in case of no improvement of cardiovascular health and current training by year 2020, people will lose 25% of their useful lifetime due to heart diseases. High mortality rate due to cardiovascular diseases is currently occurring in developing countries. Also in Iran, the highest mortality rate is related to cardiovascular diseases (3).

Heart valve diseases include ten to twenty percent of all heart surgical procedures in America (4). About one and a half million heart surgeries are performed in the world annually (5). After coronary artery disease, hypertension and heart failure, heart valve diseases are the most common causes of death due to heart diseases (6). Heart valve

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diseases are conservatively predicted for 42 million people in the world (7).

Above 290000 patients undergo heart valve replacement around the world annually and 850000 of such cases are predicted to occur 2050 (8). Despite great advances in treatment of cardiovascular diseases, patients are still experiencing several physical, mental and social problems after surgery (9). Overall, 7461 cases of heart valve replacement procedures were performed in Brazil in 2012 with 8% mortality rate; this is while mortality rate was 4.6% in most of the analysis of other studies (10).

In the study of Taghadosi (2014) regarding patients with metal heart valve and their experiences, there were two main issues including: fear and concern about the International Normalization ratio (INR) fluctuation, effort for correct use of Warfarin and setting INR. The results indicated that heart valve replacement patients were suffering from a frequent fear and concern of consuming Warfarin and they tried to reduce this concern through correct consumption of Warfarin and setting INR. It is necessary to help patients overcome their concern through assessment of the patients, providing post-discharge care, organizing a valve disease association and family support (11).

Another study was done by Toixeira Rocha (12) regarding knowledge of patients with prosthetic valves about anticoagulant including 110 patients; results indicated that 61% of the patients had moderate knowledge, 40.9% could not even name a factor influencing INR and 73.3% could not report INR treatment level.

Also a study by Taghadosi et al. (2014) (5) regarding assessment of educational needs of patients with heart valve replacement was done considering four items including: nature of the disease, different types of prosthetic valves, activity level, drug and nutrition. The findings indicated that the lowest score was related to the nature of the disease and the highest score was related to drugs. All the patients acquired scores less than 50, which indicated weak knowledge.

The main approach of the health system has changed towards providing knowledge and necessary training for patients in the recent decades. Planned and systematic training increases patients' knowledge, self-care and satisfaction, and decreases their anxiety level. It is expected from health system staff to provide enough knowledge for the patients and their families regarding diseases, their complications, treatment and self-care methods. Also patients have to be able to play an active and dependent role in taking decisions related to themselves (13).

By self-care, we mean an individual's decisions and actions for coping with the disease and improving health status. In order to promote self-care, patients should be able to recognize their problems and consider logical aims and appropriate strategies for achieving them (14). Self-care is achieved through different methods used by the patients, families or other health care providers as a group, in a clinical situation or at home by the health services providers. It is believed that self-care increases a patient's ability in perceiving his/her condition and accepting his/her health responsibility (15). People perform self-care for improving their health, preventing disease, limiting illness and maintaining health; all these actions are performed without professional staffs' help, but people should be trained for this purpose. Originally self-care meant patients' participation and responsibility for preventing complications and risks through correct performance of self-care behaviors (16). For the purpose of performing self-care, patients should be able to recognize their own problems, to take informed decisions for managing their own disease; they have to have logical aims and appropriate strategies for achieving their aims and more importantly they have to believe in their abilities in this regard; all these issues are related to efficacy in empowerment, and efficacy is considered as an important part of self-care (14). Considering the increasing number of chronic patients and shortage of physical space in the health sector, paying attention to family-centered empowerment model is an essential component in the area of medical and nursing education. Supporting and increasing family members' knowledge regarding chronic patients' self-care requirements is the best strategy for supporting patients and strengthening their compliance with the available conditions and maintaining their quality of life. Therefore, nurses should seriously consider this strategy in the process of care and education and they have to have an appropriate plan for improving family members' knowledge and empowerment (17).

Nowadays, empowerment is an excellent part of the health care system for moving from unilateral decision making to fair and participatory model in health services. Empowerment has been achieved with lower cost especially for people with special conditions (18). In this regard, the term 'patient's empowerment' has had an important place in nursing and medical studies in the recent decades and it has been considered as a necessity of nursing profession (17).

Family-centered empowerment model has been designed by emphasizing on the efficiency of a person and other relatives' role in three motivational, psychological (self-esteem, self-control and self-efficiency) and problem-based dimensions (knowledge, attitude and perceived threat). This model is the results of a qualitative study on the "fundamental theory", which passed stages of developing a practical model after content-forming stages, developing stages, specifying psycho-social stages of the prob-

lem and deriving the central variable of "family-centered empowerment", and so far it has been performed for promoting life quality of chronic patients (anemia, iron deficiency, thalassemia, hemophilia, diabetes, asthma, epilepsy and multiple sclerosis) (18).

2. Objectives

The main aim of this study was to assess the impact of family-centered empowerment model on self-care of patients with prosthetic heart valve.

3. Methods

This was a controlled clinical trial study. Samples of the study were patients that had referred to the armed forces hospitals of Tehran. The inclusion criteria included: having at least one artificial heart valve, embedding prosthetic heart valve for the first time, being 30 to 80 years old, at least 48 hours should have passed since the heart surgery, lack of patient or a participant's presence in the medical team as a nurse or physician. Sample size determined by using the related article (14) and the following Formula 1(19):

Sample size was 40 through the Formula 1 (20 are in the experimental group and 20 are in the control group).

$$n = \frac{2}{d^2} \times C_{P,Power} \quad (1)$$

Collecting samples was done through the convenient method and a researcher-made tool was used for data collection. This tool includes two parts; the first part is related to demographic data, which included 15 questions. The second part included a self-care questionnaire, which consisted of three areas;

The area of knowledge included 16 questions about physiology, anatomy, follow-up of important cases, nutrition, risk factors, and the time of returning to daily living activities, which were scored through a Likert scale; the scoring was done as follows: completely agree (4), agree (3), disagree (2), completely disagree (1), I have no idea (0).

The emotional item included seven questions consisting of issues such as; expression of emotions, communications, stress reduction techniques, sleep and the importance of exercise. Scoring was done through the Likert scale.

The functional item included 18 questions consisting of issues such as; using incentive spirometry, closing chest support, coming down from the bed, walking and hiking, exercise and permitted body movements, taking a shower, counting pulse, taking medications, testing and informing the doctor and warning signs.

The questionnaire validity was confirmed by ten lecturers of Aja Medical Sciences University, Tarbiat Modares Universtiy and Baqyatallah University, and reliability was calculated through the internal consistency method (Cronbach's alpha coefficient was 86%).

The researcher explained the cases' authority in participating in the study before the intervention and achieved their consent orally. Then, the pre-test was filled in the form of asking every single question from the patients face to face. The empowerment questionnaire of the active members of the families was filled out by themselves with the presence of the researcher in the same session, and all the questions of the participants were answered by the researcher. After analyzing data related to the pre-test, the intervention was held for the experimental group in three stages.

In the first stage (the perceived threat) some meetings were held in the form of group discussions with the aim of increasing perceived threat through increasing patients' knowledge in terms of problems associated with the disease that are threatening for the patients. In the first and second sessions, the researcher explained about the nature and the process of disease and prognosis, symptoms and the possibility of complications and their outcomes; the researcher also explained about prevention and treatment strategies, drug regimen and following the treatment plan. To increase cooperation in the debate, patients had the chance of participating in the discussion, so that they continued the discussion themselves. Some educational cards were used by patients to continue the work even outside of these meetings. Time for every session was 30 to 40 minutes based on patients' willingness and tolerance.

In the second stage, self-efficacy was done through individual or group problem-solving tasks. In addition to having deep knowledge and understanding of the disease process and its complications, patients were confidently and actively participating in the care plan and understanding that they could have an important role in improving their condition. Therefore group problem-solving meetings were held and it was tried to solve problems related to the disease through group problem solving. For example, deep breathing through the correct method, correct usage of incentive spirometry and appropriate activities and movements were practically performed. The aim was the recognition of the problem by the samples of the study and providing solutions by themselves, along with promotion of self-efficacy level through discussions.

In the third stage (self-esteem), patients were asked to participate in training active members of their family; they were supposed to convey the discussed issues of every session to the active member of their family as the represen-

tative of their family, in addition educational cards of every session were sent for the active member of the family and one educational manual containing all the discussed issues were given to the samples of the study after the end of the meetings.

Data analysis was done with the SPSS 23 software using descriptive (number, percentage, average and deviation) and analytical tests (independent t-test, Fisher's exact test, Pearson test, Chi-square RMANOVA test).

This study was approved by the ethical committee of Aja Medical Sciences University with the ethics code of IR.AJAUMS.REC.1394.40. In addition, this project was documented in the clinical trials registry central system with the following registration number IRCT201508312004IN2.

4. Results

One sample from each group was excluded from the study due to inaccessibility and finally the study included 38 samples, 19 for the experimental group and 19 for the control group. The average age of samples of the study was 58 $\pm$ 12.74; most of the samples of the study were female, housewife, married and they had under diploma education.

Self-care according to Table 2 in both groups before and after intervention was as follows;

Table 3 indicates the self-care total score in the experimental group at three different time points: before intervention, one week after the intervention and one and a half month after the intervention.

5. Discussion

Results of this study indicated that patients with prosthetic heart valve did not have an appropriate score for knowledge, emotional and performance items, and performing family-centered empowerment model improves self-care in the control group rather than the experimental group; performing this model leads to stable improvement of self-care in patients with prosthetic valve.

In the study of de Meneses et al. (2015) (10) with the aim of determining self-care of the patients with mechanical valve, a questionnaire was used based on the Orem self-care theory; this questionnaire assessed issues such as; body health, mouth health, fluid intakes, consuming food, fruit and vegetables, bowel function, avoiding the use of drugs and alcohol, proper use of medicine, treatment, follow up and controlling INR (international normalization ratio). Results indicated that patients did not fully perform all the self-care-related issues, and other strategies are required to eliminate self-care defects.

Another study was done by Rocha et al. (2010) (12) on patients with prosthetic valve in Brazil. Results indicated that 61.8% of the patients had moderate knowledge and 40.9% did not even know about one factor influencing Warfarin and 37.3% were not able to report about treatment of INR level; knowledge and performance defects could be observed from this study, which is consistent with the results of the present study.

Results of a descriptive study by Khodadadi et al. (20) (2009) with the aim of awareness of self-care in heart patients showed that in the areas of drug regimen, diet and physical activities, most of the patients had moderate knowledge and a remarkable percentage had weak knowledge of self-care principles specially in the area of drug regimen. Self-care weakness was also observed in all three areas of this study. This is while a study was done in this regard by Yaman et al. (2010) (21) with the aim of determining the impact of planned education on patients after heart valve replacement regarding knowledge, self-care and post-discharge problems. This semi-experimental study included 80 patients. Discharge training test was performed for the experimental group through a specific plan and distribution of a training manual provided by the researcher, and the control group had routine training. Results indicated that the average scores of the experimental group regarding information and self-care was higher than the control group; they also showed that patients of the control group had a greater degree of problems such as fatigue, weakness or bleeding gums ($P < 0.05$). Also problems such as nausea and vomiting, heartbeat, insomnia and nose bleeding were more common in patients of the control group; however, the difference was not significant. Therefore it has been shown that planned education during discharge enables the patients to have higher level of awareness and self-care and suffer from fewer problems after discharge. In this study performing planned education and distribution of training manual improved self-care and decreased complications, which are consistent with the results of the present study.

Results of the study of Mr. Babaei et al. (2011) (22) regarding the impact of performing discharge plan on anxiety level of patients with myocardial infarction indicated that there was no significant difference between the average situational anxiety score of all the experimental group compared with the control group before performing the discharge plan ($P < 0.05$), but after performing the discharge plan, there was a significant difference in situational anxiety score average and anxiety of all the experimental group compared with the control group ($P < 0.05$). This study indicated the impact of pre-discharge appropriate actions on improvement of the emotional item; in the present study, the model was also performed before

Table 1. Demographic Information of the Samples of the Study

Group	Experimental			Control			Statistic
Index Variable	Average	Deviation	No. (%)	Average	Deviation	No. (%)	
Age	58.58	10.80		11.58	74.12		independent t-test: P = 0.261
Body mass index (BMI)	27.27	4.79		4.26	83.3		independent t-test: P = 0.466
Gender							
Male			6 (31.57)			11 (57.89)	independent t-test: P = 0.096
Female			13 (68.42)			8 (42.1)	
Occupation							
Military			1 (5.26)			2 (10.52)	
Civilian			1 (52.26)			4 (21.05)	Pearson Chi-square test: P = 0.369
Housewife			12 (63.15)			7 (36.84)	
Retired military			3 (15.78)			5 (26.31)	
Retired civilian			2 (10.52)			1 (5.26)	
Residence							
City			18 (94.73)			17 (89.47)	Fisher's exact test: P > 0.500
Village			1 (5.26)			2 (10.52)	
Education level							
Illiterate			2 (10.52)			3 (15.78)	
Under diploma			11 (54.89)			7 (36.84)	Pearson Chi-square test: P = 0.630
Diploma			3 (15.78)			5 (26.31)	
University education			3 (15.78)			4 (21.05)	
Marital status							
Married			17 (89.47)			17 (89.47)	Fisher's exact test: P = 0.698
Death of spouse			2 (10.52)			2 (10.52)	
Type of insurance							
Armed forces			13 (68.42)			12 (63.15)	
Social security			3 (15.78)			6 (31.57)	Pearson Chi-square test: P = 0.499
Free			1 (5.26)			0	
Other insurances			2 (10.52)			1 (5.26)	

Table 2. Self-Care in Both Groups Before and After the Intervention

Area	Knowledge				Emotion				Performance			
Index	Before Intervention		After Intervention		Before Intervention		After Intervention		Before Intervention		After Intervention	
Group	Average	Deviation	Average	Deviation	Average	Deviation	Average	Deviation	Average	Deviation	Average	Deviation
Experimental	49.42	5.77	11.60	2.97	17.53	3.43	22.32	3.001	51.58	6.03	63.63	5.11
Control	50.58	9.09	51.95	7.38	17.26	3.29	18.32	5.513	53.84	8.68	53.11	7.45
Statistic	Independent t-test: P = 0.643	Independent t-test: P = 0.643	Independent t-test: P = 0.001	Independent t-test: P = 0.001	Independent t-test: P = 0.678	Independent t-test: P = 0.678	Independent t-test: P = 0.001	Independent t-test: P = 0.001	Independent t-test: P = 0.357	Independent t-test: P = 0.357	Independent t-test: P = 0	Independent t-test: P = 0

discharge and resulted in improvement of the emotional item.

According to the study of Seyam et al. (2011) (16), regarding the impact of self-care education on coping mechanisms in patients after heart surgery, it was shown that self-care education after heart surgery increases using the difficult-centered method. Difficult-centered method includes; attempt to have better control of the situation, gaining information about the problem, breaking the problem into smaller dimensions, determining specific targets for solving the problems, talking to people who have the same problem; self-care education also decreases the use of emotion-centered techniques is in contrast which are including hope of improvement, worship and prayer, daydreaming, submitting to fate, aggression, crying etc.. This study indicated that improvement of self-care led to self-efficacy and self-esteem in patients after heart surgery, as performing family-centered empowerment model, and increased self-efficacy and self-esteem are the main steps, and therefore they can have a mutual rela-

Table 3. Central Indexes and Self-Care Distribution in the Experimental Group

Indexes Group	Average	Standard Deviation	Statistic
Self-care before the intervention (1)	118.53	11.55	Test: MANOVA; P = 0.01
Self-care one week after the intervention (2)	144.07	074.12	
Self-care one and a half month after intervention (3)	146.05	9.82	

tionship.

The study of Vahedian-Azimi et al. (2016) (23) was done regarding "Cardiac rehabilitation using the family-centered empowerment Model versus home-based cardiac rehabilitation in patients with myocardial infarction: a randomized controlled trial", which was done on 70 patients. This study was done in four stages; perceived threat, efficacy, self-esteem and ultimately evaluation. Results were indicating that performing model in cardiac rehabilitation improves life quality, perceived stress and anxiety level both in the experimental group itself and in compare with the control group. In other words, it improves physical and psychological health in patients after myocardial infarction.

Another study was done by Sanaie et al. (2013) (24) about the impact of family-centered empowerment on self-efficacy and self-esteem of patients undergoing coronary artery bypass surgery. Overall, 102 patients and 102 active members of the family hospitalized at the cardiac surgery ward of Imam Khomeini hospital were selected. Initially, self-efficacy and self-esteem of the two groups were measured and then family-centered empowerment plan was performed for the experimental group through individual training, group discussion, show and practical cooperation. The experimental group only received current care of the ward; self-efficacy and self-esteem were measured again after the intervention. After data analysis, there was a significant difference in the results of the findings through independent t-test in terms of average scores of self-efficacy and self-esteem level of the patients. Also after the intervention in the experimental group, average scores were significantly increased, along with increased self-efficacy and self-esteem of the patients. This study indicated that the model is applicable and has a positive effect on patients after heart surgery, which is consistent with the results of the present study.

Furthermore, another study was done by Wong (2014) with the aim of assessing the impacts of a patient's empowerment program, in a big group, on clinical results and health services usage by type 2 diabetes patients. Overall, 1141 samples were selected randomly; experimental and control groups were similar. Key aims of this study included; 1) providing knowledge, skills and increased awareness about the disease to be able to take useful informed decisions and perform appropriate actions 2) facilitating self-regulation to maximize patient's capacity and ability, and 3) improving public-private partnership for service delivery in patients with chronic disease. Clinical results of HBA1C, SBP, DBP, low density lipoprotein-cholesterol (LDL-C) and the level of using care services, public clinics, specialized clinics, emergency and hospitalization department were followed up during 12 months. Results indicated that there was a significant positive change in the level of HbA1C and LDL-C in the group, in which the empowerment plan had been performed; they also had less usage of general clinics compared to the group without the empowerment plan. Therefore, performing empowerment plan was effective in improving clinical results and led to less use of public clinics during 12 months in this group of patients (25). The findings of this study are consistent with the findings of the present study in terms of increase of knowledge, skill, self-efficacy and decrease of complications.

A study was done by Borimenjad et al. (2012) (26) to compare the impact of group and individual education on treatment follow-up and the incidence of complications in 76 patients consuming Warfarin after replacement. Three group education sessions were held for the intervention group with three-week intervals, and routine education was performed for the control group on the discharge day. Results of partial thromboplastin time (PTT), prothrombin time (PT) and INR tests, the number of the tests, tests intervals, complications incidence were compared in the two groups. Results indicated that there's a significant difference between the two groups in terms of follow-up level. Overall, 88.2% of the patients in the experimental group and 61.3% in the control group carried out their tests regularly. Only two cases (5.9%) of the experimental group had irregular test results and 51.9% of the patients in the control group had irregular test results once or more. Three deaths (9.7%), two hospitalizations (6.5%) and two blood transfusions were observed in the control group; this is while none of them were observed in the experimental group. Therefore, it can be said that group education improves treatment follow-up and decreases complications and deaths of patients consuming Warfarin after valve replacement.

The study of Kim et al. (27) with the aim of evaluating self-management efficacy was done in adults with chronic disease either with high or low level of literacy. Participants were educated by the researcher during six

2.5-hour sessions, the groups consisted of 10 - 12 people, and the discussions were about self-management theory, applying planning strategy and weekly action and feedback, modeling and problem-solving behaviors, interpretation of symptoms, symptoms management methods and techniques, and individual decision-making. Educational content included issues such as symptoms management, problem solving and managing emotions associated with chronic disease, exercise, nutrition, medicine and communications skills. Results indicated that these interventions were very useful for adults with chronic disease and their efficacy level and physical activity were significantly increased. In addition, participants with low level of health literacy benefited more than the participants with high level of health literacy.

Generally, the above studies indicated that self-care in patients with prosthetic valve is not performed appropriately. Performing family-centered empowerment model and planned education improves self-care, quality of life, self-efficacy, accountability and patients' clinical results and also decrease post-surgery problems and complications, and costs for patients after cardiac surgery, as well as costs of other chronic conditions; these results are consistent with the results of the present study.

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Footnotes

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