

## Original Article

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# The Effects of the Family-centered Empowerment Model on Self-efficacy and Self-esteem among the Family Caregivers of Patients with Prosthetic Heart Valve: A Controlled Clinical Trial

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#### ABSTRACT

**Background:** Patients with heart valve disease need to receive long-term care from their family members after surgical valve replacement. Thus, family caregivers should have adequate self-efficacy for patient care. **Objectives:** This study examined the effects of the family-centered empowerment model (FCEM) on self-efficacy and self-esteem among the family caregivers of patients with prosthetic heart valve. **Methods:** In this quasi-experimental study, forty patients together with one of their family caregivers were consecutively recruited and allocated to an intervention or a control group. The FCEM was used in three to five sessions for patients in the intervention group. Besides, we sent their family caregivers educational cards containing the same educations provided to their patients. Finally, an educational session was held for family caregivers in which their questions were answered and each of them was provided with an educational booklet containing the same materials as the educational cards. Patients and their family members in the control group received routine care. Self-efficacy and self-esteem of family caregivers were assessed before, 1 week, and 1.5 months after the intervention. Data analysis was performed through the independent-samples *t*-test and the repeated measures analysis of variance. **Results:** Before the intervention, the mean scores of self-efficacy in the control and the intervention groups were  $26.68 \pm 4.79$  and  $26.79 \pm 5.49$ , whereas the mean scores of self-esteem in these groups were  $33.74 \pm 4.55$  and  $33.84 \pm 4.72$ , respectively. None of the between-group differences were significant. After the intervention, the mean scores of self-efficacy and self-esteem in the intervention group were significantly greater than the control group ( $37.32 \pm 2.68$  versus  $29.89 \pm 2.20$  and  $36.26 \pm 3.66$  versus  $29.26 \pm 5.84$ ;  $P < 0.05$ ). **Conclusion:** The use of the FCEM promotes self-efficacy and self-esteem among the family caregivers of patients with prosthetic heart valve.

**KEYWORDS:** Caregiver, Family-centered empowerment model, Nurse, Prosthetic heart valve, Self-efficacy, Self-esteem

## INTRODUCTION

In the 21<sup>st</sup> century, valvular heart disease (VHD) has increasingly become known as a mark of degenerative processes related to aging.<sup>[1]</sup> The underlying causes of VHD may be congenital conditions or more frequently, acquired heart problems. The most common treatment for VHD is surgical valve replacement. However, the surgery can significantly affect the quality of life and various physical, psychological, and social aspects of life.<sup>[2]</sup>

Patients with chronic disorders, such as VHD, need medical, nursing, and social services and support. However, these services are costly. Caregiving by family members and friends is a good and cost-effective


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substitute for costly professional services.<sup>[3]</sup> It has been shown that family caregivers can monitor illness-related signs and symptoms and help patients perform their activities of daily living, manage their medications and lives, and modify their lifestyles.<sup>[4]</sup> Adult patients with chronic illnesses who have stronger family support have closer adherence to their dietary and treatment regimens, have greater control over their illnesses, are at lower risk for disease progression, and feel greater satisfaction with health-care services.<sup>[5]</sup> However, the heavy burden of caregiving threatens caregivers' health, causes them emotional strain and depression, and puts them at risk for chronic conditions. Thus, their empowerment may help them prevent such problems and effectively cope with caregiving and its related problems and burden.<sup>[6]</sup>

Nurses are responsible to empower the patients and their family caregivers to be able to care for themselves as much as possible. The Family-Centered Empowerment Model (FCEM) was designed and first reported in 2003 by Fatemah Alhani at Tarbiat Modarres University, Tehran, Iran, and then was tested on different groups of patients and their families. FCEM greatly values the motivational, psychological, and functioning roles of patients and their family members in health promotion. Its main goal is to strengthen the family system to promote patient and family health.<sup>[7]</sup> FCEM has four major steps, namely perception of threat, self-efficacy, self-esteem, and evaluation. This model has been used so far to promote quality of life among patients with chronic conditions such as iron-deficiency anemia,<sup>[8]</sup> coronary artery disease,<sup>[9,10]</sup> Type II diabetes mellitus,<sup>[11]</sup> myocardial infarction,<sup>[12]</sup> hypertension,<sup>[13]</sup> multiple sclerosis,<sup>[14]</sup> and adolescent asthma.<sup>[15]</sup> However, there is limited information about the effectiveness of FCEM in improving self-efficacy and self-esteem among patients with VHD and their family caregivers.

### Objectives

This study was carried out to examine the effects of FCEM on self-efficacy and self-esteem among the family caregivers of patients with prosthetic heart valve.

### METHODS

#### Design and participants

This quasi-experimental, nonblind study was conducted in 2015. The population of the study consisted of patients with prosthetic heart valve in Jamaran and Baqiyatallah hospitals in Tehran, Iran, who had undergone a valve replacement surgery and had been transferred from postoperative intensive care units to

general cardiology units. Inclusion criteria of patients were the age of 30–80 years, at least one prosthetic heart valve in place, surgery for valve replacement for the first time at least 48 h before the study, and no employment in health-care settings. Exclusion criteria were voluntary discontinuation of participation in the study, inaccessibility after hospital discharge, and death during the study. These patients together with their active family caregivers were consecutively recruited for the study.

The sample size was estimated to be twenty per group, relying on the findings of an earlier study,<sup>[16]</sup> in which the mean and standard deviation of quality of life scores in the intervention has been changed from  $45.86 \pm 10.62$  (before the intervention) to  $27.38 \pm 8.29$  (after the intervention). Then, with an  $\alpha$  of 0.01, a  $\beta$  of 0.10, an  $S_1$  of 10.62, an  $S_2$  of 8.29, a  $\mu_1$  of 45.86, and a  $\mu_2$  of 27.38, the sample size was estimated to be eight for each group. However, considering the possible attrition, twenty people were recruited to each group.

### Instruments

In this study, we collected patients' demographic data such as age, body mass index (BMI), gender, occupation, residence, education level, marital status and type of insurance, and patient and family caregivers' empowerment data.

A three-part thirty-item empowerment questionnaire was developed by the research team. The first section included ten items on family caregivers' perceived threats about the risk factors of VHD such as dental and invasive procedures, hypertension, heavy physical exercise, bleeding signs and symptoms, over-the-counter medications, taking warfarin or digoxin tablets, unhealthy diet, and working with sharp devices. These items were scored on a Likert-type scale as the following: "0: Indifferent," "1: Completely disagree," "2: Disagree," "3: Agree," "4: Completely agree." Thus, the total score of this part could be 0–40. The second part was related to self-efficacy and included ten items on practical skills, namely correct drug administration, ability to accurately report laboratory test results to physicians, patients' ability to perform physical activities, accepting the responsibility of patient care, ability to report bleeding signs and symptoms, ability to check and report pulse rate, correct application of incentive spirometer, the use of relaxation techniques, ability to undertake the responsibility of patient care, and dietary modifications. Scoring the items of this part was the same as the first part, with a possible total score of 0–40. The third part was the Rosenberg Self-Esteem Scale for family members. This scale was used to evaluate family caregivers' general feelings and

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their positive or negative self-evaluation. Its ten items were scored on a four-point scale from one ("completely disagree") to four ("completely agree"), resulting in a possible total score of 10–40. The possible total score of the whole study instrument was 10–120 and showed participants' level of empowerment. The content validity of the study questionnaire was qualitatively assessed by ten experts, while its reliability was assessed through the internal consistency assessment method which yielded a Cronbach's  $\alpha$  of 0.82. In both groups, family caregivers personally completed the study questionnaires at the presence of the first author both before and after the study intervention.

### Intervention

The study intervention was the empowerment of family caregivers based on the four steps of FCEM both through educations provided to their patients and educational materials provided to the family members. Due to the limitations in the study setting, first, the intervention group was selected, and the study intervention was done. Then, the patients and caregivers in the control group were consecutively recruited.

The intervention was implemented, while the patients were hospitalized at general cardiology units. As the researchers did not interfere in the patients' length of stay, the duration of intervention for each patient was modified according to their length of stay, and the results of the pretest. Accordingly, the patients in the intervention group were assigned in subgroups of three to five, and patients in each subgroup along with their main family caregivers were invited to attend in a briefing session in which the researcher introduced the study objectives and process. Afterward, according to their length of stay and the results of the pretest, the FCEM model was implemented in the intervention group at three to five sessions. Each session lasted 30–40 min, depending on participants' inclination and tolerance. All the sessions were held in a special room at the general cardiology unit.

The first group discussion sessions were held to promote patients' perception of threat through verbally providing them with educations about VHD, its prognosis, its associated problems and complications, the signs and symptoms of complications, strategies to prevent and manage them, treatment regimens, and medical follow-ups. Besides verbal educations, educational cards with written materials and pictures were used to facilitate participants' learning.

In the second step, i.e., self-efficacy promotion through problem-solving, patients were actively engaged in the process of care through understanding their underlying

condition and its associated problems and complications. Accordingly, problem-solving sessions were held to discuss and find solutions to patients' problems. Then, solutions were taught to all patients and they were asked to exercise them through demonstration. For instance, they were taught to perform deep breathing exercises and use an incentive spirometer to prevent postoperative respiratory complications. The main goals of these sessions were to identify patients' problems, find proper solutions to them, and adopt solutions to promote their self-efficacy.

In the third step, i.e., self-esteem promotion through educational partnership, participating patients were asked to train their family caregivers and provide them with the educational materials which had been provided to them in the first two steps. Besides, we sent their family caregivers educational cards containing the same written materials and pictures which had been provided to patients. Each card had two questions on its back about its content. Family caregivers were required to answer the questions and send their answers to us through their patients. These questions helped us to evaluate the quality of our educations for patients and the quality of patients' educations for their family caregivers. In total, three to five sets of cards were sent to each family caregiver, depending on the number of sessions held for patients. Besides education of family caregivers through their patients, we held an educational session for family caregivers. In that session, family caregivers were asked to discuss what they had learned from educations they had received from their patients. Moreover, their questions were answered and an educational booklet was given to them, which contained the same materials as the educational cards. Patients and family caregivers in the control group received the services routinely provided to all patients in the study setting.

The fourth step, i.e., evaluation, was taken through asking all family caregivers to attend the clinic and re-complete the three-part study empowerment questionnaire both 1 week and 1.5 months after the intervention. At the end of the study, the control group also received the educational booklet, and their questions were answered by the researcher.

### Ethical considerations

This study was approved by the Institutional Review Board and the Ethics Committee of AJA University of Medical Sciences, Tehran, Iran (approval codes: 594256.28.8.2015 and IR.AJAUMS.REC1394.40, respectively). In addition, it was registered in the Iranian Registry of Clinical Trials (with the registration code of IRCT201508312004IN2). Necessary permissions

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were obtained from the Research Administration of the affiliated university and from the authorities of the study setting. We explained the goals and the procedures of the study and the voluntariness of participation to the patients and their family caregivers. Moreover, we ensured them that they could discontinue participation at personal will that the withdrawal did not affect their medical and caring services. They also were assured that their information would be confidentially used only for the purposes of the present study. Oral informed consent was obtained from each participant. All the patients and their family caregivers rights were observed according to the Helsinki ethical declaration.

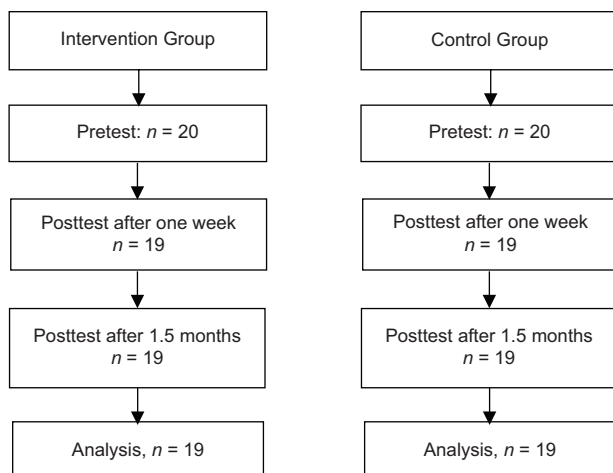
**Data analysis**

The data were analyzed using the SPSS software version 16.0 (SPSS Inc., Chicago, IL, USA) at a significance level of  $<0.05$ . The measures of descriptive statistics (such as mean and standard deviation) were used for data presentation and continuous variables such as self-efficacy and self-esteem.

Independent samples *t*-test was used to compare the two groups regarding patients' age, BMI, self-efficacy, and self-esteem. The Chi-square test was used to compare the groups in terms of patients' gender, occupation, education level, and type of insurance. Fisher's exact test was used to compare the two groups regarding patients' residence and marital status. Repeated measures analysis of variance (RM ANOVA) and Wilks' Lambda test were used to compare the variations of the mean family caregivers' empowerment scores across the three measurement time points and Bonferroni test for pairwise comparisons.

**RESULTS**

One patient from each group was excluded due to inaccessibility at posttests, and hence, the study was finished with 19 patients in each group [Figure 1].



**Figure 1:** The study flow diagram

The average age of samples was  $58 \pm 12.74$ ; most of them were females, housewife, married, and under diploma education. The intervention group did not significantly differ from their counterparts in the control group [Table 1].

Independent *t*-test showed that the intervention group was not significantly differ from their counterparts in the control group regarding the pretest mean scores of self-efficacy ( $P = 0.298$ ) and self-esteem ( $P = 0.974$ ). However, after the intervention, self-efficacy and self-esteem mean scores in the intervention group were significantly greater than the control group [Table 2].

In RM ANOVA, the Muchly's test illustrated that sphericity was assumed ( $\chi^2 = 0.878$ ;  $df = 2$   $P > 0.05$ ). Thus, the Wilks' Lambda test was used and the results showed that the intervention significantly affected the mean family caregivers' empowerment scores ( $F = 13.52$ ,  $df = 2$ ;  $P < 0.001$ ) [Table 3]. Furthermore, a significant interaction was found between time and group ( $F = 4.45$ ,  $df = 2.2$ ,  $P = 0.022$ ). Then, pairwise comparison using the Bonferroni test illustrated the significant difference between the mean scores of the

**Table 1: Demographic characteristics of the study participants**

| Variable             | Groups            |                   | P                  |
|----------------------|-------------------|-------------------|--------------------|
|                      | Intervention      | Control           |                    |
| Age                  | 58.58 $\pm$ 10.80 | 58.11 $\pm$ 12.74 | 0.261 <sup>a</sup> |
| BMI                  | 27.27 $\pm$ 4.79  | 26.4 $\pm$ 3.83   | 0.466 <sup>a</sup> |
| Gender               |                   |                   |                    |
| Male                 | 6 (31.57)         | 11 (57.89)        | 0.096 <sup>b</sup> |
| Female               | 13 (68.42)        | 8 (42.1)          |                    |
| Occupation           |                   |                   |                    |
| Military             | 1 (5.26)          | 2 (10.52)         | 0.369 <sup>b</sup> |
| Civilian             | 1 (5.26)          | 4 (21.05)         |                    |
| Housewife            | 12 (63.15)        | 7 (36.84)         |                    |
| Retired              | 5 (26.03)         | 6 (31.29)         |                    |
| Residence            |                   |                   |                    |
| City                 | 18 (94.73)        | 17 (89.47)        | 0.500 <sup>c</sup> |
| Village              | 1 (5.26)          | 2 (10.52)         |                    |
| Education level      |                   |                   |                    |
| Illiterate           | 2 (10.52)         | 3 (15.78)         | 0.630 <sup>b</sup> |
| Under diploma        | 11 (54.89)        | 7 (36.84)         |                    |
| Diploma              | 3 (15.78)         | 5 (26.31)         |                    |
| University education | 3 (15.78)         | 4 (21.05)         |                    |
| Marital status       |                   |                   |                    |
| Married              | 17 (89.47)        | 17 (89.47)        | 0.698 <sup>c</sup> |
| Widowed              | 2 (10.52)         | 2 (10.52)         |                    |
| Type of insurance    |                   |                   |                    |
| Armed forces         | 13 (68.42)        | 12 (63.15)        | 0.499 <sup>b</sup> |
| Social security      | 3 (15.78)         | 6 (31.57)         |                    |
| Free                 | 1 (5.26)          | 0                 |                    |
| Other insurances     | 2 (10.52)         | 1 (5.26)          |                    |

<sup>a</sup>*t*-test, <sup>b</sup> $\chi^2$ , <sup>c</sup>Fisher's exact test. BMI: Body mass index



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pretest, 1 week and 1.5 months after the intervention, but it did not show any significant difference between 1 week and 1.5 months after the intervention [Table 4].

Figure 2 also shows that the mean caregivers' empowerment score in the intervention group has

**Table 2: Comparison of the groups with regard to family caregivers' self-efficacy and self-esteem**

| Group                     | Self-efficacy |               | Self-esteem  |              |
|---------------------------|---------------|---------------|--------------|--------------|
|                           | Before        | After         | Before       | After        |
| Intervention <sup>a</sup> | 26.79 ± 5.49  | 37.32 ± 2.68  | 33.84 ± 4.72 | 36.26 ± 3.66 |
| Control <sup>a</sup>      | 26.68 ± 4.79  | 29.89 ± 2.202 | 33.74 ± 4.55 | 29.26 ± 5.84 |
| P <sup>b</sup>            | 0.298         | < 0.001       | 0.974        | 0.011        |

<sup>a</sup>Data are presented as mean±SD, <sup>b</sup>The results of the independent-sample *t*-test. SD: Standard deviation

**Table 3: Variations of the mean scores of the overall family caregivers' empowerment in both groups across the three measurement time points**

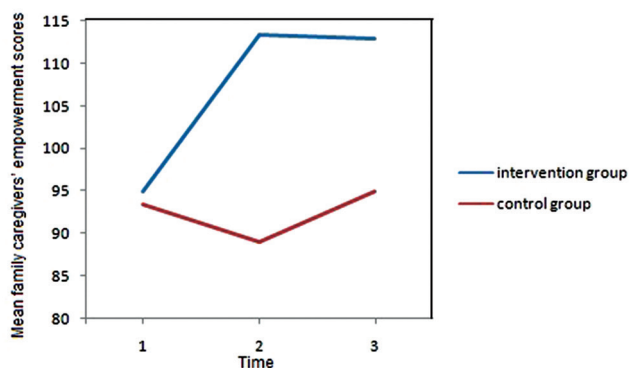
| Group                     | Time        |               |                  | P <sup>b</sup> |
|---------------------------|-------------|---------------|------------------|----------------|
|                           | Before      | 1 week after  | 1.5 months after |                |
| Intervention <sup>a</sup> | 95.00±8.80  | 113.32 ± 4.42 | 112.95 ± 5.14    | <0.001         |
| Control <sup>a</sup>      | 93.42±8.181 | 89.00±14.395  | 95.16 ± 13.334   |                |

<sup>a</sup>Data are presented as mean±SD, <sup>b</sup>The results of the repeated measure ANOVA. ANOVA: Analysis of variance, SD: Standard deviation

**Table 4: Pairwise comparisons**

| Time (I)   | Time (J)   | Mean difference (I-J) | SE    | P     | 95% CI for difference <sup>b</sup> |             |
|------------|------------|-----------------------|-------|-------|------------------------------------|-------------|
|            |            |                       |       |       | Lower bound                        | Upper bound |
| Pretest    | 1 week     | -6.947 <sup>a</sup>   | 2.062 | 0.005 | -12.124                            | -1.770      |
|            | 1.5 months | -9.842 <sup>a</sup>   | 1.797 | 0.000 | -14.355                            | -5.329      |
| 1 week     | Pretest    | 6.947 <sup>a</sup>    | 2.062 | 0.005 | 1.770                              | 12.124      |
|            | 1.5 months | -2.895                | 1.966 | 0.449 | -7.832                             | 2.043       |
| 1.5 months | Pretest    | 9.842 <sup>a</sup>    | 1.797 | 0.000 | 5.329                              | 14.355      |
|            | 1 week     | 2.895                 | 1.966 | 0.449 | -2.043                             | 7.832       |

<sup>a</sup>The mean difference is significant at the 0.05 level, <sup>b</sup>Adjustment for multiple comparisons: Bonferroni. CI: Confidence interval, SE: Standard error



**Figure 2: Variations of the mean family caregivers' empowerment scores in both groups**

significantly increased at the second measurement and remained relatively unchanged afterward. However, the mean scores of the control group did not change considerably during the study.

## DISCUSSION

Findings indicated that the use of FCEM significantly improved self-efficacy, self-esteem, and thereby, empowerment among family caregivers of patients with prosthetic heart valve.

Studies have shown the impact of training on coping mechanisms in caregivers of patients after heart surgery, and the importance of empowerment of patient's family caregivers through the problem-solving method. The problem-solving method includes gaining knowledge about problems, attempt to have better control of the situation, determining a specific target for solving the problems and talking to people about the same problem.<sup>[17,18]</sup> The increase of self-efficacy and self-esteem are the main steps to empowerment.

The present study also showed that FCEM has led to sustain improvement in the family caregivers' empowerment scores of the intervention group. The sustained effect of the FCEM can be attributed to the improved problem-solving skills of the family caregivers.

Other studies show that performing the FCEM improves self-efficacy, self-esteem, quality of life, self-care, accountability, and patients' clinical results. Furthermore, it led to decrease postsurgery problems, complications, and costs in patients after cardiac surgery and costs of other chronic conditions,<sup>[19,20]</sup> which are consistent with the results of the present study.

In line with our findings, a former study into the interrelationships of self-efficacy, social support, problem-solving ability, stress, and depressions found the significant role of self-efficacy in minimizing daily problems, and depression among caregivers, while social support and problem-solving ability had no significant effects on stress and depression. That study also reported a significant correlation between social support and self-efficacy.<sup>[21]</sup> Another study on the informal caregivers of patients with bone marrow transplantation reported the positive effects of three 1-h educational sessions, which were based on the problem-solving method, on their self-efficacy, anxiety, health status, and fatigue.<sup>[22]</sup> Moreover, another study on informal caregivers of cancer patients has reported that education of informal caregivers was effective in improving caregivers' self-efficacy in managing cancer symptoms, stress management ability, and readiness for

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patient care. However, the protocol had no significant effects on their psychological well-being, anxiety, and depression probably due to the changes in caregivers' needs after their patients' discharge from the hospital.<sup>[23]</sup> A randomized clinical trial also showed that an online counseling program based on problem-solving for five or more sessions significantly improved self-efficacy among the caregivers of adolescents with brain injuries and significantly reduced depression.<sup>[24]</sup> Moreover, two former studies reported that the application of FCEM had significant positive effects on chronically ill patients' stress, anxiety, and treatment outcomes as well as their caregivers' perceived satisfaction and self-esteem.<sup>[14,25]</sup> It seems that family caregivers of patients with prosthetic heart valves are not generally ready for taking care of their patients, and need support to appropriately do their caregiving roles. However, suitable supporting programs such as planned education and implementation of FCEM to prepare them for their caregiving roles will improve their self-esteem and self-efficacy and also decrease post-surgical problems and complications in patients.

Study limitations were individual differences among participants regarding their physical and mental status and abilities, their information-seeking skills, and the limited number of heart valve replacement surgeries in the study setting leads for sample size limitation. The study was not blind. We suggest apply FCEM in a wider range of patients and their families to enable them in taking care of their patients and to make informed decisions in the process of caring for their patients. Due to the limited number of participants, in this study, the control group was selected after the intervention was ended. This might negatively affect the internal validity of the study. Future studies with the parallel design are suggested.

## CONCLUSION

FCEM based on problem-solving significantly improves self-efficacy, self-esteem, and empowerment and reduces care-giving problems among family caregivers of patients with prosthetic heart valve.

We suggest that nursing service managers, with the application of patient and family caregiver empowerment patterns, draw partnerships, and responsibilities for patients into care and develop nursing services.

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## Conflicts of interest

There are no conflicts of interest.

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