

# The impact of family support program on depression, anxiety, stress, and satisfaction in the family members of open-heart surgery patients

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## Abstract

**Context:** Because family members of cardiac surgery patients play a significant role in the patient's recovery, it is important to address their needs during hospitalization and after discharge.

**Aims:** We aimed to investigate the impact of family support program on depression, anxiety, stress, and satisfaction in the open-heart surgery patients' family members.

**Setting and Design:** This is a randomized clinical trial with two intervention and control groups. The study was conducted at the Teaching Hospital Heart Center in Sari, Iran.

**Materials and Methods:** Ninety family members participated in this randomized controlled study, who were divided into an intervention group receiving support program from a research team and a control group receiving routine care.

**Statistical Analysis:** In this study, Shapiro–Wilk, Mann–Whitney U, Friedman, and Chi-square test were used.

**Results:** The family members in both groups had significantly lower depression, stress, and anxiety at 24 h before and 14 days after discharge. The total score of depression, stress, and anxiety statistically significantly improved in the intervention group compared to the control group. However, their satisfaction of nursing care increased ( $P < 0.001$ ).

**Conclusions:** This study () revealed that significant effects with regard to reduced feelings of depression, stress, and anxiety also improved the family members' satisfaction in the intervention group.

**Keywords:** Anxiety, Depression, Patient family, Satisfaction, Stress

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## INTRODUCTION

It is obvious that open-heart surgery and hospitalization in the intensive care unit (ICU) lead to severe stress in

patients and in their family members. The intensity of stress is so high that this period is often referred to as a period

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of crisis.<sup>[1-3]</sup> Fear of death, doubts about prognosis and treatment, emotional conflicts, concern about economic conditions, and changes in the roles and disruption of daily activities could lead to shock, anger, frustration, anxiety, and depression in family members, particularly in the first 72 h of hospitalization.<sup>[4-6]</sup> The high stress of heart surgery is a threatening factor for the health condition of the patients, with negative impacts on relationships between family members.<sup>[7,8]</sup> Anxiety limits the efficiency of family members in helping the patient that may exacerbate patients' concerns.<sup>[9]</sup> Lack of support and increased levels of anxiety significantly affect the performance of the family and consequently the success of heart surgery.<sup>[10]</sup>

Askari *et al.* showed that 68%, 57.3%, and 46.7% of the patients' (hospitalized in ICU) family members experienced anxiety, depression, and stress, respectively.<sup>[11]</sup>

Studies indicate that the main causes of stress and anxiety in the patients' family members are the lack of support and information required to recover at home.<sup>[12-15]</sup> In-time identification and responding to the needs of the family members reduce the negative impact of the stress on them and the treatment team and direct their attention to the patient care.<sup>[16,17]</sup>

On the other hand, in recent years, research has inclined toward community-based care, and the attempts to improve the health-care quality and satisfaction of the patients and their families have increased.<sup>[18-20]</sup> Studies indicate that the level of families' satisfaction is an appropriate measure to evaluate the quality of care and effectiveness of information provided to the families of the patients hospitalized in ICUs. Therefore, we have suggested some interventions to reduce the stress of the family members and improve their satisfaction.<sup>[21-23]</sup>

It seems that supportive interventions, as compared to educational interventions, have been more evaluated in the reduction of depression and anxiety in family members.<sup>[24,25]</sup> Supportive interventions of the patients' family members could be as follows: family education about the disease process, treatment, and rehabilitation, more cope of family members with patient's postoperative condition; skills in the control of concerns; providing support; comfort; and appointment of a brief meeting with the patients.<sup>[26-29]</sup>

In the cultural, social, and religious context, the role of family members in the patients' care is good in Iran,<sup>[30]</sup> and there is a close communication between the patients and their family members.<sup>[31]</sup> Following hospitalization of the patient, the family members try to care for the patient.<sup>[32]</sup>

The health systems of Iran's family support programs are not well explained, and little attention is given to the positive role of the family as an important factor in the development of therapeutic objectives.<sup>[33]</sup> Whereas, due to increases workload in clinical setting, family member support program were ignored by Iranian nurses.<sup>[31,34]</sup>

Because post open-heart surgery hospitalization period is short, most of the recovery processes happen at home, without patients enjoying constant nursing and medical care. Therefore, it is necessary that the needs of patients and their families should be assessed during their hospital stay, which require training, and care should be provided during hospitalization and recovery period according to their needs, to reduce postoperative complications. This study was conducted to investigate the impact of family support program on depression, anxiety, stress, and satisfaction of open-heart surgery patients' family members.

## MATERIALS AND METHODS

### Aims

This study aimed to examine the impact of family support program on depression, anxiety, stress, and satisfaction on the family members of open-heart surgery patients during the 1 day before surgery until 14 days after discharge.

### Ethical approval

After approval of the Ethics Committee of Mazandaran University of Medical Sciences (No. 95-2118), registration at the Iranian Registry of Clinical Trials (IRCT: 2016051624342N2), and receiving a letter of introduction, the list of patients supposed to undergo coronary artery bypass graft surgery and heart valve replacement was received from the heart surgery nursing ward, and the patients were visited before surgery. The purpose of the study was explained to the family members of the patients. Confidentiality of information, freedom of exclusion, and receive routine care in spite of leaving the study were emphasized, and a written informed consent was obtained from the participants.

### Study setting

This is a randomized clinical trial with two intervention and control groups. The study was conducted at the teaching hospital heart center in Sari, Iran.

### Participants

Of 108 family members of the patients hospitalized for coronary artery bypass surgery and heart valve replacement in these wards, only 90 family members were selected.

We used a convenient sampling method. Eligible individuals were randomly assigned to an intervention ( $n = 45$ ) and a

control ( $n = 45$ ) groups [Figure 1]. A computer-generated random list was used to allocate the study participants into control and intervention groups.

In order to prevent the exchange of information between the two groups, the groups were not studied in the same week. Participants of the two groups allocated in 1,2,3,4 in intervention group and 2,5,6,8 in control group.

### Inclusion criteria

Age  $\geq 18$  years; education status; those who play a major role in patient care; those who are not a recipient of open-heart surgery emergency; those who were not being affected by major psychiatric disorders; and those with no addiction to drugs and alcohol or psychoactive drugs.

### Exclusion criteria

Family members who were absence from 1 to 2 training sessions; those who had bleeding of the surgical site and

undergone re-operation; those not removing endotracheal tube after 24 h; and death of patient during the study.

### Data collection

Data were collected for 4 months from April to July 2016. The study questionnaires comprised information on demographic data; Depression, Anxiety, and Stress scale (DASS-21); and the Persian version of the Family Satisfaction in the Intensive Care Unit (FS-ICU). Demographics and DASS-21 data were collected at 1 day before surgery in the two groups. FS-ICU questionnaires were completed at 24 h before discharge, and DASS-21 was completed at 14 days after discharge.

### Measures

Demographic data of the family members comprised seven items (gender, age, relationship with patient, marital status, education, occupation, and living place). In order to measure depression, anxiety, and stress, DASS-21 was used.

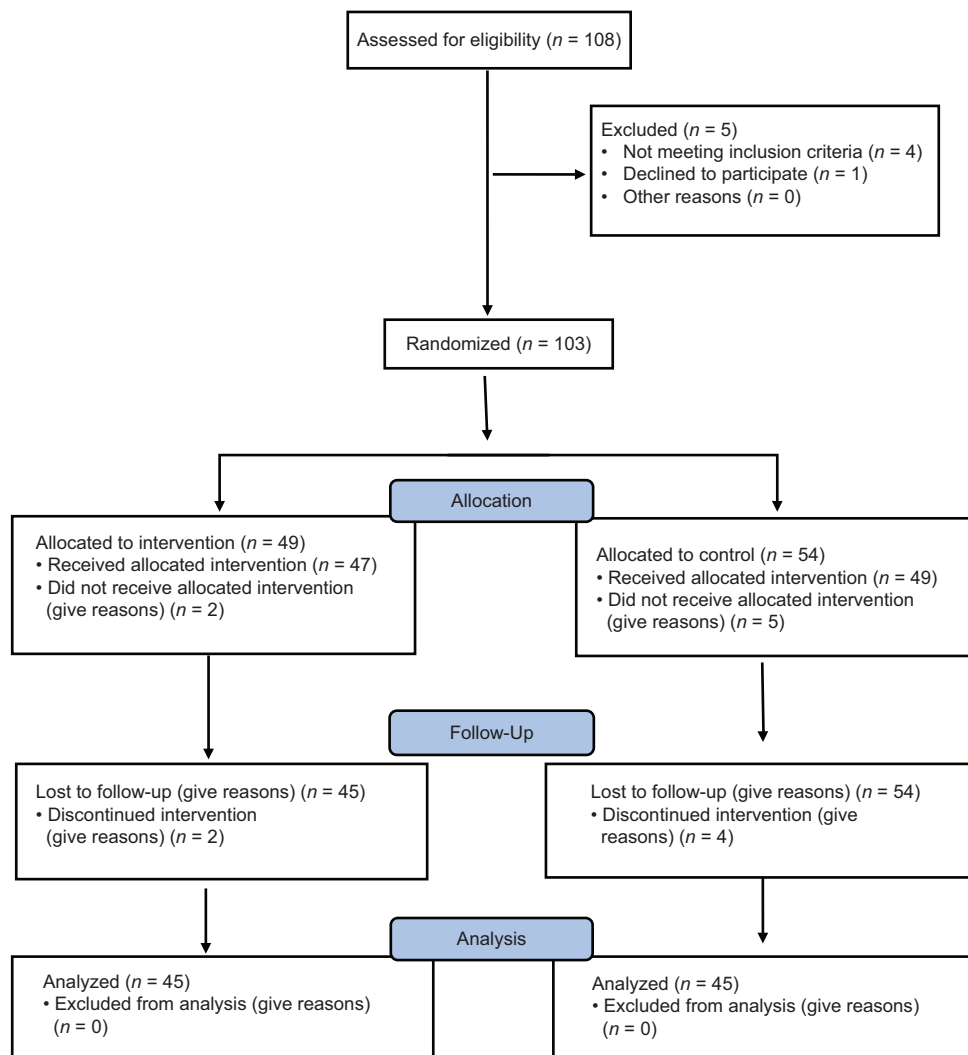
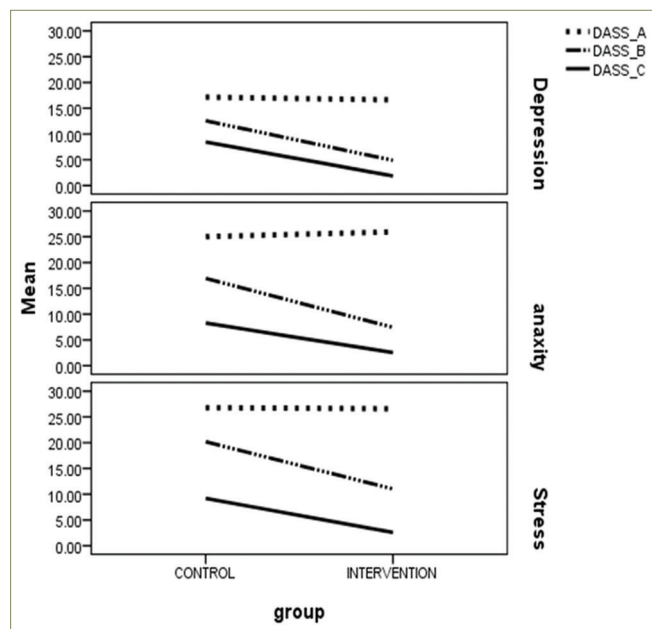


Figure 1: The flow diagram of the participants through each stage of the study



**Figure 2:** Depression, Anxiety, and Stress scale-21 changes in the two groups (A = 1 day before surgery, B = 24 h before discharge, and C = 14 days after discharge)

This questionnaire includes 21 items related to depression (seven items), anxiety (seven items), and stress (seven items), with a 4-point Likert scale ranging from “at all” to “very much.” The following scores have been developed for defining normal, mild, moderate, severe, and very severe scores for each component of DASS scale: for depression: 0–4: normal; 5–6: mild; 7–10: moderate; 11–13: severe; and over 14: very severe; for anxiety: 0–3: normal; 4–5: mild; 6–7: moderate; 8–9: severe; and over 10: very severe; for stress: 0–7: normal; 8–9: mild; 10–12: moderate; 13–16: severe; and over 17: very severe. Crawford and Henry obtained the reliability of DASS-21 through calculating Cronbach’s alpha coefficient. On this basis, the reliability of depression was found to be 0.95, for anxiety to be 0.90, for stress to be 0.93, and for total scores to be 0.97.<sup>[35]</sup> A study conducted in Iran indicated Cronbach’s alpha coefficients of 0.97, 0.71, 0.74, and 0.91 for depression, anxiety, stress, and total reliability, respectively.<sup>[36]</sup>

To measure perceived satisfaction, the FS-ICU<sup>[34]</sup> developed by Dolatyari *et al.*, was used. The Persian version of the FS-ICU with three subscales, including satisfaction with the performance of medical staff (12 items), convenience (12 items), and decision-making (6 items), was used. The scoring method in this measure, which is based on the Canadian Coding Standard (FS-ICU-34) developed by Heyland *et al.*,<sup>[37]</sup> is as follows: in the first and second subscales of the 5-point Likert scale with scoring system of 0, 25, 50, 75, and 100, the option weak is assigned for point 0 and the option excellent is assigned for point 100 (items

1–24); In the third subscale, the items 25, 29, and 30 were answered by 5 descriptive choices in which the score 0 was allocated to choices 1 and 5, score 50 to choices 2 and 4, and score 100 to choice 3. In this subscale, the answer for item 27 has three options and scoring is as follows: options 1 and 3 receive score zero and option 2 receives score 100. The scoring system for item 28 of the third subscale has three options, where option 1 is assigned for score zero and options 2 and 3 are assigned for score 100.<sup>[38]</sup> The reliability and validity (face, content, and construct) of this questionnaire were approved in Iran.<sup>[38]</sup> The total reliability of the measure in the present study using Cronbach’s alpha was obtained at 0.95, and the reliability of satisfaction with the performance of medical staff, convenience, and decision-making subscales was obtained at 0.93, 0.92, and 0.84, respectively. In the present study, the total reliability of the measure was obtained at 0.82%.

*Control condition*

The control group did not receive any intervention and routine hospital care. Using DASS-21, the anxiety, depression, and stress were measured for both groups 24 h before and 14 h after discharge. In addition, using the Persian version of the FS-ICU questionnaire, satisfaction of the participants was measured 24 h before discharge.

*Routine care*

Family members in the control group received care as usual during the intervention period. In general, the intervention of care included low-frequent sessions with nurse’s verbal education to patient at admission time about preparation for surgery and a leaflet about after-discharge care and the patient following treatment.

*Experimental condition*

In addition to routine care, the family members in the intervention group received psycho-education support from 1 day before surgery to 14 days after discharge through face-to-face sessions and follow-up calls. An individual training session was held the day before surgery where a booklet including preoperative care (familiarizing of the family members with the equipment and accessories of ICU, such as ventilator, and providing some information about the process and the approximate time of surgery, and hospital stay period) was handed over to the patients’ family members. From the 1<sup>st</sup> day after the surgery to 3 days after the surgery, three face-to-face training sessions, each lasting about 30–45 min, were held for the patients according to their needs, and a booklet including some information was provided to make them acquainted with medicine and nutritional regimen and the procedures conducted after the surgery. Coinciding with the face-to-face sessions,



some approaches, such as giving family members an opportunity to discuss their concerns and fears, assuring them that adequate care will be provided at the hospital, and advising them to be hopeful and have trust in God, were emphasized. From day 4 after surgery until the 14<sup>th</sup> day after discharge, daily telephone calls were made with the family members of the patients, and their questions about patient care were answered. In addition, the telephone number of the researcher was given to the patients' family members to contact in case necessary. Scientific resources and books were used in designing the educational content of the intervention.<sup>[39-42]</sup> Validity of the content was also verified by three cardiac surgery specialists, three cardiologists, two anesthesiologists, and four nurses working in the ICU of open-heart surgery.

### Statistical analysis

First, data homogenization in terms of demographic characteristics (age, gender, relationship with patient, marital status, occupation, education level, distance from health center, and type of surgery) was performed. Normality of the data was examined through Shapiro–Wilk test. To describe the data, mean and standard deviation were used. Comparison between the groups in the DASS-21 and FS-ICU questionnaires was conducted by Mann–Whitney U-test, and in order to compare the trend of changes in one group, Friedman test was used. For dichotomous variables, Chi-square test was used.  $P < 0.05$  was considered statistically significant level for all comparisons. The collected data were analyzed using SPSS 16 (version 16-SPSS 16.0 Studentv Version for Windows Inc. SPSS©2009).

### RESULTS

In this study, ninety family members in intervention and control groups were surveyed. Most of the study participants in both groups were female, were married, and were homemakers. The mean age of the family members in the intervention and control groups was  $42.82 \pm 12.96$  and  $39.80 \pm 11.65$  years, respectively. There was a statistically insignificant difference in demographic data ( $t = 63.1$ ,  $P = 0.283$ ) [Table 1]. The mean age of the patients in the control and intervention groups was  $61.76 \pm 9.48$  and  $61.89 \pm 11.52$  years, respectively. In addition, 65.6% and 34.4% of the participants were male and female, respectively.

Normality was evaluated using Shapiro–Wilk test, and the results showed that it does not follow a normal distribution ( $P > 0.05$ ). Mann–Whitney U-test showed a statistically insignificant difference between depression ( $P = 0.671$ ), anxiety ( $P = 0.987$ ),

stress ( $P = 0.774$ ), and satisfaction. Therefore, the participants were similar in terms of these factors before the intervention. The prevalence of depression, anxiety, and stress was very severe in the two groups. The mean scores of depression, anxiety, and stress in the intervention and control groups were compared 24 h before discharge and 14 days after discharge, using Mann–Whitney U-test. The data showed a decrease in the mean scores of depression, anxiety, and stress in both groups. The level of depression in the intervention group decreased from very severe to normal in 24 h before and 14 days after discharge. The level of anxiety and stress in the intervention group decreased from very severe to moderate and normal in 24 h and 14 days after discharge, respectively. However, in the control group, the level of depression, anxiety, and stress decreased from very severe before the intervention to moderate 24 h before discharge [Figure 2]. This reduction was statistically significant in the intervention group ( $P < 0.001$ ) [Table 2].

Friedman test revealed that the average scores of depression and stress in all the three stages, i.e., before surgery, 24 h before discharge, and 14 days after discharge, significantly decreased in both groups ( $P < 0.001$ ), but the intervention group showed a greater decrease compared with the control group in terms of the mean scores of anxiety, depression, and stress.

**Table 1: Demographic characteristics of the family members in the two groups (n=90)**

Variables	Intervention, n (%)	Control, n (%)	P-value	$\chi^2$
Gender				
Male	21 (46.7)	18 (40)	0.523	0.407
Female	24 (53.3)	27 (60)		
Marital status				
Single	3 (6.7)	8 (17.8)	0.176	4.060
Married	41 (91.1)	37 (82.2)		
Divorced	1 (2.2)	0		
Relationship to patient				
Spouse	16 (35.6)	8 (17.8)	0.270	2.615
Offspring	27 (60)	34 (75.6)		
Sister/brother	2 (4.4)	3 (6.6)		
Level of education				
Primary	20 (44.5)	19 (42.2)	0.701	2.990
Diploma	15 (33.3)	18 (40)		
University	10 (22.2)	8 (17.8)		
Job				
Homemaker	25 (55.6)	26 (57.8)	0.668	=3.206
Employed	10 (22.2)	9 (20)		
Other	10 (22.2)	10 (22.2)		
Distance to health center				
Far	17 (37.8)	15 (33.3)	0.660	0.194
Near	28 (62.2)	30 (66.7)		
Surgery				
CABG	39 (86.7)	34 (75.6)	0.215	4.470
Replace heart valve	3 (6.7)	3 (6.7)		
Both	3 (6.7)	8 (17.8)		

CABG: Coronary artery bypass graft

Mann–Whitney U-test also showed a statistically significant difference regarding satisfaction between the two groups 24 h before discharge ( $P < 0.001$ ). Therefore, satisfaction was noticed more in the intervention group ( $82.02 \pm 6.44$ ) ( $P < 0.001$ ).

Table 3 shows a statistically significant difference between the two groups regarding satisfaction with medical staff performance and comfort subscales ( $P < 0.001$ ); moreover, there was a statistically insignificant difference in terms of decision-making between the two groups ( $P = 0.282$ ).

## DISCUSSION

This study aimed to examine the impact of family support program on depression, anxiety, stress, and satisfaction on the family members of open-heart surgery patients during the 1 day before surgery until 14 days after discharge. Before the family support program was applied in the present research, the two groups were assessed in terms of age; gender; marital status; educational level; family caregiver’s relationship to patient; distance to health center; job; kind of surgery; and depression, anxiety, and stress scores before intervention, while statistical test revealed no significance difference between the control and intervention groups. However, there was a decrease in both groups 24 h before and 14 days after discharge. Therefore, this decrease was statistically significant in the intervention group ( $P < 0.001$ ). Satisfaction of nursing care 24 h before discharge indicated a greater increase in the intervention

group ( $P < 0.001$ ). All surgeries threaten the physical and mental health of the patients’ family members, but in heart surgeries, where the life of the patient is threatened, the problem is more evident,<sup>[43,44]</sup> which was also observed in this study.

Chien *et al.* found that information provided by the nurses on the patient’s condition, prognosis, paying attention to their family members’ feelings, and training them on how to care for their patients could reduce their anxiety.<sup>[12]</sup> Implementing a nursing care plan including information and emotional support during surgery could reduce depression, anxiety, and stress among the family members.<sup>[45]</sup> However, another study showed that implementing the support program until the day of discharge from the ICU could not reduce the family members’ anxiety.<sup>[46]</sup> However, in the present study, the systematic program implied that family support could reduce these indicators. This difference can be due to that, in spite of our study that systematic program implied family support could reduce these indicators, in Imanipour *et al.*’s study information support were used and according to the provision of information in the control group by the hospital the level of anxiety did not decrease compared with the intervention group. However, in the present study, the coherent family support program was used. Bailey *et al.* found that though there is an insignificant relationship between information support and anxiety of the families, when their patients are hospitalized in the ICU, satisfaction of the family members increased due to information support.<sup>[13]</sup> Ågren *et al.* reported that psychoeducational support has no impact on the depressive symptoms in patients and their partners.<sup>[27]</sup> In the present study, a positive relationship was found between family support and depression, anxiety, and stress. The difference between the present research and Mehdipour-Rabori *et al.* study could have been emerged due to the fact that the present study provided an opportunity for families to talk about their concerns and encouraged them to hope and trust in God and other studies indicated that trust in God heals psychological symptoms in family members, thus this improvement seen in the present study.<sup>[47,48]</sup>

Some studies show that depression and anxiety are not associated with satisfaction.<sup>[49,50]</sup> Rusinova *et al.* found a relationship between the symptoms of depression and anxiety that are associated with the satisfaction of family members of patients in the ICU and reported that reduction in depression and anxiety led to increase in their satisfaction with nursing care.<sup>[51]</sup> This difference can be due to that the present study used a 14-day follow-up program after surgery because family members are responsible for caring of the patients, and this follow-up program could increase satisfaction.

**Table 2: Comparing the mean standard deviation of depression, anxiety, and stress of family members during the study**

Day of intervention	Variables	Mean±SD		Z	P
		Control (45)	Intervention (45)		
1 day before surgery	Depression	17.15±9.20	16.62±8.84	-0.425	0.671
	Anxiety	25.02±10.98	25.95±8.76	-0.16	0.987
	Stress	26.80±8.34	26.57±8.26	-0.288	0.774
1 day before discharge	Depression	12.57±4.89	4.88±4.23	-6.47	0.001
	Anxiety	16.93±5.77	7.42±4.62	-6.4	0.001
	Stress	20.17±5.40	11.02±6.76	-5.98	0.001
14 days after surgery	Depression	8.44±3.97	1.86±1.72	-7.54	0.001
	Anxiety	8.26±5.28	2.53±1.43	-6.7	0.001
	Stress	9.02±5.07	2.57±2.11	-6.59	0.001

Z=Mann-Whitney U-test. SD: Standard deviation

**Table 3: Comparison of the level of satisfaction in the two groups**

Subscale	Groups, mean±SD		Z	P
	Control	Intervention		
Medical staff performance	64.81±13.02	90.18±7.70	-7.37	0.001
Comfort	49.12±15.49	84.49±8.63	-7.98	0.001
Decision-making	62.68±11.16	61.11±12.57	-1.07	0.282
Total	58.11±12.10	82.02±6.44	-7.75	0.001

Z=Mann-Whitney U-test. SD: Standard deviation

In this study, we found that supporting family members of the patients reduces their depression, anxiety, and stress and increases their satisfaction. Carlson *et al.* reported a negative relationship between emotional distresses in the family members of patients hospitalized in the ICU and their satisfaction, so that an improved care and especially an improved communication between staff and patients' family members, as well as provision of the required information, could reduce their emotional distress and increase their satisfaction.<sup>[52]</sup>

In the present study, determining satisfaction level in patient's family members showed that implementing a supportive program increases their satisfaction with medical staff performance and comfort subscales, but has no impact on the decision-making subscale. Lack of partial score less than the decision-making scale score could indicate low attention to the importance of health caregivers.<sup>[38,53,54]</sup> In this study, importance to the needs of family members, such as on-time obtaining data, confidence, and convenience, was considered.<sup>[18]</sup> This result may be due to that caring for patients undergoing cardiac surgery is based on the patient's need and protocol. The independence and decision-making of the families are less and they could not change patient's care plan.

While another study investigating the relationship between provided information and family members' satisfaction showed a negative relationship.<sup>[52]</sup> The differences in the satisfaction levels of patient's family members in several studies attributed to the cultural and social differences of the participants.

Family-centered care in Iran had been less intentioned due to lack of benefit education and professional caregivers emphasized on patient's health, while forgot that family members are under tension same as the patients.<sup>[55]</sup> If the family members play role in supporting the patients physically and mentally, they improve soon and better.<sup>[56]</sup>

The findings of this study showed that follow-up of patients' family members and communication with them and presence of a professional nurse after patient discharge could reduce depression, anxiety, and stress until 14 days after discharge. Ågren *et al.* reported that communication between family members and a professional person after discharge improves their health condition and reduces their concerns,<sup>[27]</sup> which confirms with the findings of this study.

Fumis and Deheinzelin found that women are more susceptible to anxiety and depression,<sup>[2]</sup> whereas in

the present study, there was a statistically insignificant relationship between the levels of anxiety, depression, and stress in men and women. On the other hands, in Fumis and Deheinzelin 's study participants were cancerous patient but in present study they were dialysis patients and people face with this challenge in difference way.

Limitations of this study that may influence the results are as follows: its implementation at a training center, which limits generalization of the results to all hospitals. The individual differences and psychological status of the participants when responding to the questionnaires could affect their answers, which was out of the researcher's control.

## CONCLUSIONS

The findings of the study indicate that the level of depression, anxiety, and stress in the intervention group 24 h before and 14 days after discharge significantly reduced, compared with the day before surgery. Furthermore, satisfaction of the family members on health-care quality (24 h before discharge) increased. Family members of the patients undergoing open-heart surgery experienced much depression, anxiety, and stress. Therefore, paying attention and caring about family members of these patients is a necessity. Based on this study, nurses can effectively reduce these problems through implementing programs supporting patient's family members. Because the appropriate mental condition of the family members has a significant impact on the quality of the health care provided, implementing supportive programs to the family members of the patients is suggested.

## Conflicts of interest

There are no conflicts of interest.

## Authors' contribution

VSH designed the study, provided the important suggestions for the improvement of the first draft, revised the paper, and supervised the study process. FSH collected the data and wrote the paper. YJ supervised the study intervention. NMS performed the statistical analysis and contributed to the study design. MK collaborated on the article process. All the authors read and approved the manuscript and each author believes that the manuscript represents honest work.

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