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DOI:
10.4103/jehp.jehp_1463_20

The of effect of partnership-based education on adherence to the treatment plans in open heart surgery

Fatemeh Bahramnezhad¹, Neda Sanaie², Alun C. Jackson^{3,4,5}, Esmail Shariati⁶, Foroozan Atashzadeh-Shoorideh⁷

¹Department of Critical Care Nursing, School of Nursing and Midwifery, Nursing and Midwifery Care Research Centre, Spiritual Health Group, Research Center of Quran, Hadith and Medicine, Tehran University of Medical Sciences, Tehran, Iran, ²Department of Medical-Surgical Nursing, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran, ³Australian Centre for Heart Health, Melbourne Australia, ⁴Faculty of Health, Deakin University, Geelong Australia, ⁵Honorary Professor, Centre on Behavioural Health, Hong Kong University, Hong Kong, ⁶Imam Hossein Hospital, Shahrood University of Medical Sciences, Shahrood, Iran, ⁷Department of Psychiatric Nursing and Management, School of Nursing and Midwifery, Shahid Labbafinezhad Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Address for correspondence:

Dr. Foroozan Atashzadeh-Shoorideh, Vali-Asr Avenue, Cross of Vali-Asr and Hashemi Rafsanjani Highway, Opposite to Rajaei Heart Hospital, Tehran 1996835119, Iran.
E-mail: f_atashzadeh@sbmu.ac.ir

Received: 31-10-2020
Accepted: 30-03-2021
Published: 30-09-2021

Abstract:

BACKGROUND: Adherence to the treatment plans is one of the most effective conducts to prevent and reduce postoperative side effects. Partnership-based education is one of the most efficient ways to shape health behaviors. The aim of the present study was to determine the effect of partnership-based education on adherence to the treatment plans in open heart surgery.

MATERIALS AND METHODS: This quasi-experimental study was conducted in 2019–2020 on the patients undergoing open heart surgery in Tehran (Capital of Iran). Sampling was done in one educational hospital. A total of 86 patients and their caregivers participated in the study. Sampling was done nonrandomly by tossing a coin, and patients were allocated into the odd week in the intervention group and the even week in the control group ($n = 43$ in each group), and data were collected before and after intervention using the Treatment Adherence Questionnaire concerning dietary, physical activity, and medication aspects. The educational intervention was carried out after the pretest analysis in five 20–45 min sessions (two individual and three group educations). Data were analyzed with Chi-square, independent t -test, and paired t -test using SPSS 19 at a significance level of $P < 0.05$.

RESULTS: Patients and caregivers in both groups did not have a significant difference in terms of demographic variables ($P > 0.05$). In addition, there was no significant difference in the mean of dietary, physical activity, and medication plans before the intervention in both groups; however, after the intervention, the mean of the three aspects in the intervention group was significantly higher than that of control ($P < 0.001$).

CONCLUSION: Implementing partnership-based education with participation of patients and caregivers is influential in improving patients' adherence to the treatment plans and it is recommended as a clinical dynamic educational strategy.

Keywords:

Adherence, cardiac surgery, caring, educational intervention, nursing, treatment plans

Introduction

Cardiovascular diseases (CVDs) are the most common and a major reason of mortality worldwide,^[1] and according to the World Health Organization's report, in 2019, 17.9 million cases of deaths around the world were due to CVDs, three-fourth of which occur in developing countries.^[2] There is evidence indicating that mortality rate due

to CVDs has remarkably been decreased during the past 5–10 years as a result of pharmaceutical developments and surgery methods such as thrombolytic therapy, coronary artery bypass graft (CABG), valve repair, or replacement surgeries.^[3]

The most important purpose of the surgical approach is to improve patients' life quality, and surgery is still considered as a standard treatment for CVDs.^[4] However, despite the

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How to cite this article: Bahramnezhad F, Sanaie N, Jackson AC, Shariati E, Atashzadeh-Shoorideh F. The of effect of partnership-based education on adherence to the treatment plans in open heart surgery. *J Edu Health Promot* 2021;10:353.

numerous advantages of this approach, there are some side effects. For instance, patients are put into risk due to nonadherence to an appropriate diet. Furthermore, patients might not adhere to the trained physical activities due to pain or concern about the part of the body where they had surgery. As not coughing or taking deep breaths and no walking or sporting activities would expose the individual to respiratory problems such as atelectasis or pneumonia.^[5] Consequently, secondary treatments and adherence to the treatment plans have a key role in prevention from further complications.^[6]

Studies report that patients do not adhere to the recommended treatment regimen during the first few months after surgery due to factors such as depression, not returning to preoperation activities and the restrictions.^[7,8] The patients believed that they achieved their complete health after CABG and their disease was completely cured; as a result, lack of or improper patient education may be accompanied by risky side effects or rehospitalization.^[9]

The effective way to improve patients' adherence to the treatment plans is choose an appropriate educational approach. Today, the hospitalization period has been condensed, and a noticeable part of the patients' recovery takes place at home; therefore, taking into account patient and family education is crucial.^[10] Patients and their families encounter a new condition after cardiac surgery that exposes their life to various changes.^[10] Since those changes are lifelong, it necessitates family presence by the patient. In order to comply with the new condition, caregivers and patients need to be provided with ongoing education and support through partnership commencing from preoperative teaching to discharge from the hospital and home care.^[11] Nurses with partnership-based education can alleviate the stress of caregivers and improve patients' compliance of treatment by establishing caring relationships, sharing knowledge and information, paying attention to support psychologically and physically, involving them in decision-making, and empowering them in care.^[12] Taking into account the simultaneous presence of the patient and his/her family has an influential impact on the improvement of the educational results.^[13] In the study by Kraenbring *et al.*, family presence during education was influential in improving adherence to the medication plan.^[14]

Partnership-based education allows the patient to learn self-care activities along with his/her caregiver and this interaction in education may help to consolidate obtained information. Partnership-based education, through recognizing and respecting the patient and family, can provide the facilities for enhancing trust and enabling the patient and family to improve adherence

to the treatment plan.^[15,16] Despite the studies on the patients' adherence to the treatment plans after cardiac surgery, few studies have been carried out on the effect of partnership-based education and family roles as caregivers on patients' adherence to the treatment plans. Given the importance of family presence during education, more studies are required to be conducted. The present study was carried out with the aim of identifying the effect partnership-based education on adherence to the treatment plans in open heart surgery.

Materials and Methods

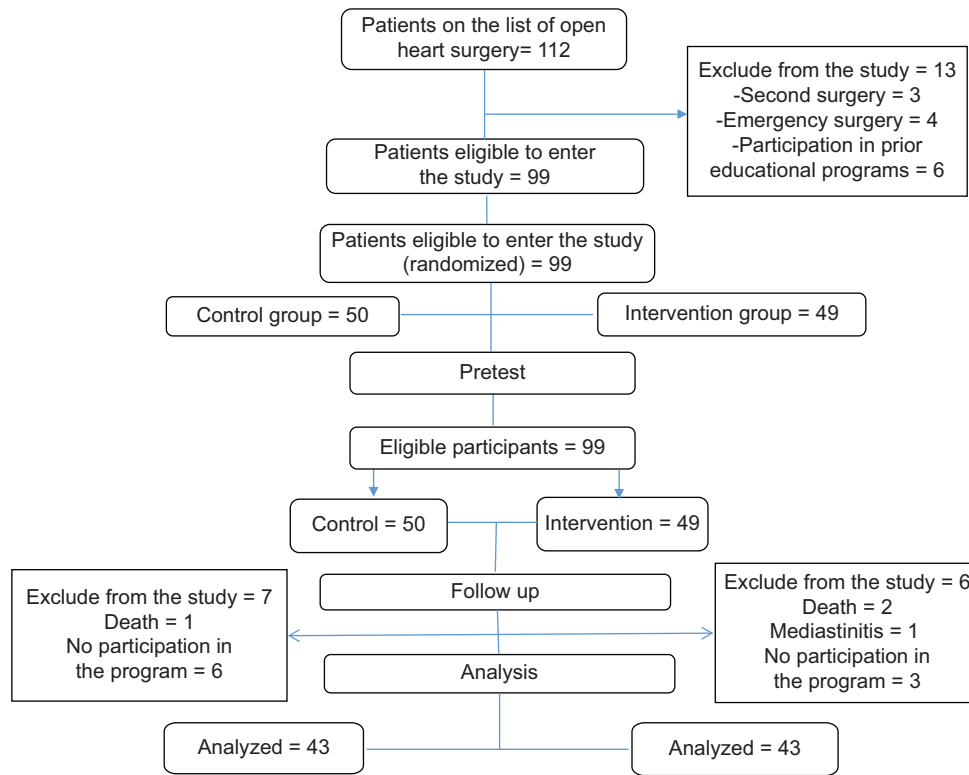
Study design and setting

This quasi-experimental study was conducted in 2019–2020. The study setting was one educational hospital affiliated Shahid Beheshti University of Medical Sciences, Tehran, Iran.

Study participants and sampling

The study population consisted of all patients undergoing open heart surgery and their family caregivers. Inclusion criteria for the patients included patients undergoing nonemergency surgery, open heart surgery for the first time, literacy to study the educational booklet, able to physically attend in educational sessions, and no recognized physical or mental disease (such as dialysis need or severe mental illness) that seriously affects the patient's self-care ability. Inclusion criteria for the caregivers included literacy to read and write, the ability to participate in educational sessions, having access to the phone for checking follow-up programs, and no prior experience about giving care to a patient undergoing open heart surgery. Exclusion criteria included the patient and caregiver's inactive and irregular participation in training programs as intervention sessions, the disorder in the process of patient recovery, and patient's physical deterioration during the study.

A total of 13 patients were excluded from the study based on exclusion criteria, and finally, 86 patients (43 in the intervention and control group) were evaluated. The patients were assigned to the intervention and control groups. The study phases are shown in Flow Chart 1. Sampling was done as follows: patients admitted to the cardiac surgery were purposefully selected and allocated to control and intervention groups. Regarding that all patients undergoing cardiac surgery were generally transmitted from open heart intensive care unit (ICU) to the ward and the average stay duration was 5–7 days after discharge from the ICU, to avoid and reduce the exchange of information between the two groups, at the beginning of the study, weeks were divided into even and odd and by tossing a coin, patients were allocated into the odd week in the intervention group and the even week in the control group. Consequently, there was no



Flow Chart 1: Stage of the study

contact between the patients in the two groups during the hospital stay.

In order to collect the data during the 1st week, all participants were allocated in the intervention group and the questionnaires were completed by the patients and caregivers before intervention. Following that, the intervention, including education with partnership-based method during 5 sessions (two individual and three group educations), was implemented. The sample size was calculated as 41 individuals considering the total score of adherence to dietary plan in patients undergoing open heart surgery as the initial outcome in the study by Sanaie *et al.*^[17] with significance level lower than 0.01 and the power of 85% in each group using the following formula. Afterward, given 10% attrition, the final number of 86 individuals.

$$n = \frac{(z_{1-\alpha/2} + z_{1-\beta})^2 (p_1(1-p_1) + p_2(1-p_2))}{(p_1 - p_2)^2}$$

$$= \frac{(1/96 + 0/84)^2 (0/733 \times 0/267 + 0/467 \times 0/553)}{(0/733 - 0/467)^2}$$

$$= 40/7 \sim 41$$

Data collection tool and technique

The instrument in this study included three questionnaires: (1) patients' personal information questionnaire; (2) caregivers' personal information

questionnaire, (3) the treatment adherence questionnaire including three aspects: 3-1: assessing the rate of patients' adherence to a dietary plan whose preliminary questions were adapted from the questionnaire of adherence to dietary plan in patients undergoing a coronary bypass in the study by Sanaie *et al.*^[17] Following that, the qualitative face validity of the questions was investigated in terms of difficulty, inconsistency, ambiguity, and failure in conveying the meaning by ten specialists and their ideas were applied.

In order to identify face validity in the quantitative phase, the impact score was measured for each question. First, for each item of the questionnaire, the score range (0–4) was allocated concerning the consumption amount of protein, oils, carbohydrates, and cereals.

In order to assess content validity in the quantitative phase, the content validity ratio (CVR) and the content validity index (CVI) were utilized. After CVR calculation and according to 10 experts' opinions and adaptation of the numbers to the Lawshe table,^[18] the numbers above 0.59 were agreed upon. Later, an investigation of CVI was conducted based on Waltz and Basel CVI,^[19] and accordingly, those items obtaining the score above 0.79 were accepted. After the validity assessment terminated, the final questionnaire consisted of thirty questions, each of which had 0–4 scores and the total score range was 0–120. Following validity assessment, in order to

Table 1: Content of partnership-based education

Session	Content	Duration (min)	Purpose	Method
1	Individual session (patient and caregiver) Introducing and familiarizing the researcher with the patient and caregiver and explaining the outline of educational program, content and number of sessions as well as the importance of the study for the patient and family Educating on surgery type, preoperation preparations, reason of transfer to ICU and the lengths of stay, explaining postoperation, the reason for using chest tube and a pacemaker, and stay duration physical conditions and duration of hospitalization	20-35	Preliminary familiarization and making relationship to introduce the program Reducing the anxiety associated with the surgery by providing information for the patient and family	Speech (face-to-face education), asking and answering
2	Group session (groups of 4-6 individuals for patients undergoing CABG and valve replacement including patients and caregivers) The importance of adherence to postoperative drug regimen, introducing drugs, the effect of drugs on patient's physical condition Dealing with side effects of the drugs	30-45	Recognizing drugs, necessity of drug consumption and knowing the side effects	Speech, using educational slides, asking and answering, group discussion, providing medical pamphlets
3	Group sessions (groups of 4-6 individuals including patients and caregivers) The role of proper dietary regimen after surgery Knowing variety of beneficial and harmful foodstuff Introducing the foodstuff interacting with medication regimen particularly in patients undergoing valve replacement or consuming warfarin, and the patients treated with digoxin	30-45	Knowing the right dietary regimen, the best way of preparing food	Speech, using educational slides, asking and answering, group discussion
4	Group session (groups of 4-6 individuals including patients and caregivers) Start time of respiratory physiotherapy Start time and techniques of doing sporting activities and stretches in a practical display Required actions before starting movement program Important points during doing sporting activities Appropriate time for sexual intercourse How to and the necessity of participating in a cardiac rehabilitation program Appropriate time for returning to work	30-45	Awareness of the necessity of respiratory physiotherapy and early discharge Knowing various allowed and prohibited sporting activities, regarding risky signs during physical activities	Speech, asking and answering, practical display, educational booklet
5	Individual session (patient and a caregiver) Explanation of the follow up schedule after discharge Regarding warning symptoms and side effects after surgery and the way of referring for necessary periodic tests Answering questions and ambiguities	20-25	Answering patient's or caregiver's exclusive questions or leading	Asking and answering

ICU=Intensive care unit, CABG=Coronary artery bypass graft

evaluate the reliability of the questionnaire, test-retest, which indicates repeatability of an index, was used. To this end, the questionnaire was given to 20 patients undergoing open heart surgery, and 2 weeks later, they were required to recomplete the questionnaire. The Cronbach's alpha was obtained as 0.84.

3-2: Second aspect was assessing the patients' adherence to physical activity plan. First, the preliminary questions were adapted from the questionnaire of adherence to physical activity plan in patients undergoing coronary bypass in the study by Sanaie *et al.*^[17] The process of face and content validity was performed as a dietary adherence questionnaire.

First, for each item score, range (0-4) was identified. The scores were related to warming up before exercise,

checking pulse before and during exercise, doing light exercise after a physical activity, quitting exercise in case of side effects, taking heart drugs with oneself during exercise, observing suitable time distance between food and physical activity plan, choosing appropriate workout clothing, doing stretches and checking feet after exercise, avoiding hard activities, considering the weather for doing outdoor activities, and the amount of activity in hot and cold weather. The scores were as follows: never = 0, rarely = 1, sometimes = 2, often = 3, and always = 4. The process of identifying the content validity was identical to dietary plan aspect and the final version of the questionnaire consisted of 14 questions, scoring 0-4, with a total range of 0-56. In order to identify the questionnaire reliability, test-retest was

Table 2: Demographic variables of the patients undergoing open heart surgery in two groups

Variable	Intervention group, n (%)	Control group, n (%)	P
Sex			
Male	27 (62.81)	31 (72.11)	0.490
Female	16 (37.19)	12 (27.89)	
Marital status			
Single	11 (25.58)	9 (20.91)	0.799
Married	32 (74.42)	34 (79.09)	
Education			
Elementary	14 (32.56)	15 (34.89)	0.678
Diploma	9 (20.94)	11 (25.58)	
Higher education	20 (46.5)	17 (39.53)	
Occupation			
Employee	22 (51.15)	18 (41.91)	0.635
Self-employed	12 (27.91)	11 (25.57)	
House keeper	9 (20.94)	14 (32.52)	
Surgery type			
Coronary bypass	29 (67.39)	32 (74.42)	0.635
Valve replacement	14 (32.61)	11 (25.58)	
Age, mean (SD)	52.11 (4.32)	49.07 (2.61)	0.659

SD=Standard deviation

Table 3: Demographic variables of the caregivers of the patients undergoing open heart surgery in two groups

Variable	Intervention group, n (%)	Control group, n (%)	P
Sex			
Male	11 (25.58)	13 (30.2)	0.635
Female	32 (74.42)	30 (9.8)	
Marital status			
Single	17 (39.53)	20 (46.49)	0.663
Married	26 (60.47)	23 (53.51)	
Education			
Elementary	3 (6.95)	5 (11.72)	0.752
Diploma	10 (23.24)	9 (20.89)	
Higher education	30 (69.81)	29 (67.39)	
Occupation			
Employee	11 (25.58)	15 (34.89)	0.239
Self-employed	8 (18.57)	10 (23.25)	
House keeper	10 (23.25)	12 (27.91)	
University student	14 (32.60)	6 (13.95)	
Relationship with the patient			
Spouse	19 (44.18)	16 (37.21)	0.661
Child	24 (55.82)	27 (62.79)	
Age, mean (SD)	32.6 (2.11)	37.36 (4.03)	0.204

SD=Standard deviation

used, as the questionnaire was handed into 20 patients undergoing open heart surgery, and 2 weeks later, they were requested to recomplete the questionnaire. The Cronbach's alpha was obtained as 0.92.

3-3: The third aspect of the questionnaire was assessing the rate of the patients' adherence to medication plan. To this end, the standard 8-item Morisky Medication

Adherence scale-8 was used. This scale consists of seven Yes/No questions (Yes = 0 and No = 1) and one 5-point Likert scale question (never = 0, rarely = 1, sometime = 2, often = 3, and always = 4).^[20] The score above 6 indicates optimal adherence. The reliability of the questionnaire in this study was confirmed with Cronbach's alpha = 0.81.

The intervention was likewise implemented during odd weeks until the required sample size was completed, and 8 weeks after discharge, the questionnaires were recompleted. During the study, all patients, including the intervention and the control groups utilized the routine face-to-face educational program on how to take medications, allowed and not allowed physical activities, cardiac rehabilitation follow-ups, and periodical tests. During this period, the telephone follow-up program was done as 1 weekly call the intervention group and two calls in the control group until the second completion of the questionnaires was performed. In order to observe ethics in research, the control group participants received a booklet and educational pamphlet. Table 1 summarizes the content of educational sessions.

Data were analyzed using SPSS 19 (SPSS Inc., Chicago, Illinois, United States), using independent *t*-test and paired *t*-test at the significance level of 0.05.

Ethical consideration

The study was approved by the National Research Ethics Committee of Shahid Beheshti University of Medical Sciences (IR.SBMU.RETECH.REC.1399.112). In order to consider ethical issues and after providing the patients and caregivers with the explanations about study purposes and methods, written informed consent was obtained from them. The right to freely enter the study, no harm or loss to the patients, right to withdraw from the study, and confidentiality of information were among the observed statements.

Results

Chi-square test and independent *t*-test showed that patients of both groups were not significantly different in personal variables, and similarly, there was no significant difference in caregivers in both groups in terms of their age, sex, marital status, education, occupation, and relationship with the patient ($P > 0.05$). Patients and caregivers in both groups were similar [Tables 2 and 3].

Results from data analysis showed that mean of adherence to dietary plan before intervention were not significantly different in both groups ($P = 0.092$). Yet, independent *t*-test showed that mean of adherence to dietary plan after intervention in both groups was significantly different ($P < 0.001$). The mean of adherence to dietary plan before and after implementing

Table 4: Comparison of the mean and standard deviation of adherence to treatment plans in patients before and after intervention between two groups

Adherence dimensions	Before intervention, mean (SD)		Independent, <i>t</i> -test (<i>P</i>)	After intervention, mean (SD)		Independent <i>t</i> -test (<i>P</i>)
	Intervention	Control		Intervention	Control	
Dietary	58.62 (9.6)	61.04 (6.21)	0.092	99.84 (8.7)	64.02 (5.71)	<0.001
Physical activity	31.67 (2.86)	30.51 (2.66)	0.54	47.51 (4.45)	31.41 (2.73)	<0.001
Medication plan	5.05 (1.78)	5.77 (1.84)	0.068	9.63 (1.23)	7.58 (1.5)	<0.001

SD=Standard deviation

Table 5: Comparison of the mean and standard deviation of adherence to treatment plans in patients before and after intervention in each group

Adherence dimensions	Intervention group, mean (SD)		Pair <i>t</i> -test (<i>P</i>)	Control group, mean (SD)		Pair <i>t</i> -test (<i>P</i>)
	Before	After		Before	After	
Dietary	58.62 (9.6)	99.84 (8.7)	<0.001	61.04 (6.21)	64.02 (5.71)	0.425
Physical activity	31.67 (2.86)	47.51 (4.45)	<0.001	30.51 (2.66)	31.41 (2.73)	0.18
Medication plan	5.05 (1.78)	9.63 (1.23)	<0.001	5.77 (1.84)	7.58 (1.5)	<0.001

SD=Standard deviation

partnership-based education in intervention group changed from 58.62 (9.6) to 99.84 (8.7) that indicates a statistically significant change ($P < 0.001$). However, although the scores in control group changed from 61.04 (6.21) to 64.02 (5.71), this change was not statistically significant ($P = 0.425$) [Tables 4 and 5].

According to the independent *t*-test, mean of adherence to physical activity plan before intervention was not significantly different in both groups ($P = 0.54$). However, mean of this aspect after intervention was significantly different in the two groups ($P < 0.001$) as it was higher in the intervention group than that of control. In addition, mean of adherence to physical activity plan before and after implementing partnership-based education in the intervention group changed from 31.67 (2.86) to 47.51 (4.45) that was statistically significant ($P < 0.001$). Yet, mean in the control group changed from 30.51 (2.66) to 31.41 (2.73) that was not statistically significant ($P = 0.18$) [Tables 4 and 5].

The results of data analysis indicated that mean of adherence to medication plan before intervention in both groups was not significantly different ($P = 0.068$) and the two groups were similar regarding this aspect before intervention. Yet, independent *t*-test showed that mean of adherence to medication plan after intervention in both groups was significantly different ($P < 0.001$). Mean of adherence to medication plan before and after implementing partnership-based education in the intervention group changed from 5.05 (1.87) to 9.63 (1.23) and in the control group from 5.77 (1.84) to 7.58 (1.5) that were both statistically significant ($P < 0.001$). However, the difference between means in two phases in intervention and control groups was 4.58 (1.85) and 1.81 (1.6), respectively [Tables 4 and 5]. Therefore, mean of adherence to medication plan in the intervention group had improved more compared to the control group.

Discussion

The present study was carried out with the aim of identifying the effect of partnership-based education on adherence to the treatment plans of patients undergoing open heart surgery. The results showed that implementing partnership-based education had a significant effect on improvement and enhancement of adherence to the treatment plans in patients after open heart surgery. In this educational approach, the possibility of following and adherence to the treatment plans is facilitated through emphasizing the presence of families who actively provide care for the patients. In the study by Posluszny *et al.*, partnership-based education was utilized in the patients undergoing bone marrow transplant surgery, their family caregivers, and treatment team members and the effect of the educational program in the presence of patients and families on adherence to the medication plan, physical activities, and diet was investigated.^[21]

The results of the study showed that using above-mentioned approach provided the possibility of observing the treatment plans through increasing the sense of responsibility in the patients and families and led to the enhanced adherence to the treatment plans. However, in the above study, individual training sessions for the patient and family were used. On the contrary, in the present study, both patients and their families were educated simultaneously during a single session. Moreover, considering the educational content, individual educational sessions for each patient and caregiver as well as group education sessions were implemented.

In the study by Brieger *et al.*, the results showed that failure to discharge patients on indicated therapies is the most important modifiable predictor of adherence failure

6 months after coronary disease. Implementing protocols such as participatory education, active communication between patient and family-treatment group, follow-up after discharge has the potential to reduce nonadherence dramatically in the 6 months following discharge.^[22]

In the study by Lee *et al.*, the results showed that there was a direct relationship between social support provided by the family and adherence to the treatment plans.^[23] Similarly, in the present study, implementation of partnership-based educational program was effective for improvement of adherence to the treatment plans by facilitating the active contribution of the family. In the study by Srisuk *et al.*, which was a systematic review, the results showed that utilizing educational approaches that pivot around family contribution was effective in improving adherence to the treatment plans, enhancing life quality, decreasing caregiving burden, improving adherence to medication plan, and increasing self-care ability in the patients with heart diseases.^[24] Numerous studies have emphasized that the effective communication between patient and family with treatment team as well as the reduction of any maladaptive belief that patients have about health or illness is of large importance in patient adherence.^[25-27]

Adherence to dietary plan in patients with heart disorders is of great importance and modifying unhealthy eating behaviors will improve success of the heart surgery. In the present study, adherence to dietary plan after operation in intervention group enhanced noticeably after implementing partnership-based education. In the study by Rosland *et al.*, an educational method called Caring Others Increasing Engagement in Patient Aligned Care Teams was used for the patients with Type 2 diabetes that investigated the effect of partnership-based education on adherence to dietary plan.^[28] In this approach, patients, their families, and professional educator attended the training sessions simultaneously. Concomitant contribution of patients and families to the treatment plans led to the creation of enthusiasm, formation of the opportunity for behavior alteration, and active relationship with treatment team, thus means of adherence to dietary plan in intervention group increased significantly. Similarly, in the present study, partnership-based education provided the opposite condition to form active learning through emphasizing concomitant and active attendance of families by the patients, thus leading to significant effect on adherence to dietary plan.

One of the deterrents to prevention from CVD and proper treatment of the patients with such disorders as well as reducing treatment costs is medication nonadherence and no modifications in lifestyle.^[29] In the present study, despite the fact that both partnership-based and

routine educational approaches helped improve mean of adherence to medication, the mean of partnership-based education was higher than that of control group. In the study by Turan *et al.*, the effect of social support on adherence to the treatment plans focusing on medication was investigated, the results of the study showed that social support and families' contribution to the treatment plans of the patients with hypertension led to the patients' enhanced self-efficacy in adherence to medication plan. In the mentioned study, the medication adherence self-efficacy scale was used as an instrument and the mean of the group receiving social support increased significantly.^[30] Similarly, in the study carried out by Ribé *et al.*, the results indicated that the patients receiving appropriate social support including families and friends' presence and contribution observed better adherence to their medication plan.^[31] In the study by Rampamba *et al.*, empowering the patients with hypertension along with their families helped improve their knowledge and adherence to medication plan.^[32] The results of the study showed that utilizing educational models at the presence of patients and families as caregivers would help adhere to medication plan. Adherence to physical activity plan after operation is critically important in enhancing patients' life quality and prepares them for rapid return to society and apt social activities. In the present study, utilizing partnership-based education had significant effect on improving the score of patients' adherence to physical activity plan.

The partnership-based education and family involvement in care could help patients modify their eating behavior and increase adherence to dietary plan through creating motivation. Increased adherence to dietary plan could have a boundless role in recovery and success of cardiac surgeries.^[33] Concerning adherence to medication regimen, partnership-based education in various diseases implemented through numerous methods could improve adherence to medication regimen.^[34] Utilizing this method, especially in chronic diseases such as cardiac disorders and their risk factors and cardiac surgeries, might be influential in controlling and improvement of such diseases. Furthermore, improved physical activities in cardiac patients after surgery through doing sporting activities with the help of a physiotherapist and based on families' partnership might have the key role in enhancing life quality of such patients and their quick return to society and social activities.^[35]

Limitation and recommendation

One of the limitations of this study was the level of adherence to treatment plans including all three aspects were investigated only by the patients' self-reports. It is suggested that, in further studies, long-term effects of partnership-based education are investigated, and the variables are measured more than once after terminating

the intervention. In addition, more concrete indices such as counting the number of consumed tablets and investigating and comparing body mass index will be used for identification of the actual impact of partnership-based education.

Conclusion

The results of the present study showed that utilizing partnership-based education would help patients undergoing open heart surgery improve their adherence to the treatment plans. Taking into account the role of the family in the process of educating patients in this study facilitated shaping a dynamic and functional education and it led to the improvement of the patients' adherence to treatment plans including medication, physical activity, and dietary plans after heart surgery. Considering the chronic nature of CVDs, families, as health-care providers, have a conspicuous role in improving and controlling the disease. Therefore, the simultaneous presence of both patients and families in educational programs has a discernible effect on the improvement of educational results. Evidently, in the present study, results indicated the positive effect of such education. Accordingly, it is suggested that further studies focus on patients' improvement and control after surgery through emphasizing partnership-based educational programs.

Acknowledgment

The authors thank all those who cooperated in this study, especially the Vice-Chancellor in Research Affairs of Shahid Beheshti University of Medical Sciences, the patients and families who volunteered and participated in this study.

Financial support and sponsorship

The authors appreciate toward Shahid Beheshti University of Medical Sciences for their support to conduct this research.

Conflicts of interest

There are no conflicts of interest.

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