



Randomized Controlled Trial of a Peer Based Intervention on Cardiac Self-Efficacy in Patients Undergoing Coronary Artery Bypass Graft Surgery: A 3-Year Follow-up Results

Shokoh Varaei¹, Morteza Shamsizadeh², Sakineh Kolahezan³, Khodayar Oshvandi⁴, Ali Dehghani⁴, Ali Mohammad Parviniannasab⁵, Hamid Reza Koohestani⁶, Arash Khalili², Mehdi Molavi², Mitra Talebi^{7*}

¹ School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran.

² Dept. of Medical Surgical Nursing, School of Nursing and Midwifery, Hamadan University of Medical Sciences, Hamadan, Iran.

³ School of Medicine, Shahroud University of Medical Sciences, Shahroud, Iran.

⁴ School of Nursing and Midwifery, Jahrom University of Medical Sciences, Jahrom, Iran.

⁵ Dept. of Nursing, Larestan School of Medical Sciences, Larestan, Iran.

⁶ Dept. of Nursing, School of Nursing and Midwifery, Saveh University of Medical Sciences, Saveh, Iran.

⁷ School of Nursing and Midwifery, Shahroud University of Medical Sciences, Shahroud, Iran.

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Abstract

Background: Self-efficacy is one's belief in ability to succeed in specific situations and considerable factor to maintaining healthy behaviors. It has an important role in person-centred care and significantly improves after effects of heart attacks. This study aimed to investigate the effects of a peer based intervention on cardiac self-efficacy of the patients after bypass surgery.

Methods: In this clinical trial study, 60 patients undergoing bypass surgery were chosen and assigned equally into the control and intervention groups. The patients were assigned into two groups by block randomization. While routine education was presented to the patients in the control group, intervention group were taught using the peer education in two sessions. Cardiac self-efficacy of all the selected patients was assessed orderly in 36-month (3 years) follow-up after surgery. Inclusion criteria used to choose the suitable patients were as the following: no record of CABG surgery, understanding and talking Persian language, willingness to participate in the research, age between 40 and 70 years, no dementia, confusion, mental and psychological problems which might hinder their participation. In addition, exclusion criteria in this study were patient's death, serious physical problems after CABG surgery, emergency and unexpected surgeries, or cancellation the CABG surgery due to patient's situation. Data was collected using cardiac self-efficacy scale and analyzed using chi-square, independent t-test and Kolmogorov-Smirnov tests.

Results: The patients in both groups were homogenous in terms of demographic data. The mean score of cardiac self-efficacy in the intervention group was significantly different from control group in 3-year follow-up after surgery ($P < 0.038$).

Conclusions: Based on this study, accomplishment of peer based intervention can be a beneficial educative-supportive approach in cardiac surgery fields.

Keywords: Coronary artery bypass graft, Education, Peer, Self-efficacy.

*Corresponding to: M. Talebi, Email: talebi.m90@gmail.com

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Introduction

In the past two decades, coronary artery disease (CAD) has been the most prevalent heart disorder sweeping developing

countries.¹ Among cardiovascular diseases (CVD), CAD is the most common cause of morbidity and mortality worldwide.² In Iran, there has been rapid growth in the prevalence of CAD and in its resulting morbidity and mortality. CAD has been the cause of 46% of mortality cases and its incidence rate is 181.4 in every 100,000 individuals.³

Although medications have been helpful in controlling CAD, coronary artery bypass graft surgery (CABG) is a necessary option for many of these patients.⁴ In all of the heart surgeries, CABG is very common. Among patients who have had CABG surgery, fear, anxiety, and tension may appear, which can result in the loss of faith in their ability, and therefore in their self-efficacy.

Albert Bandura's (1977) theory of self-efficacy was developed within the framework of social cognitive theory.⁵ Self-efficacy beliefs are not judgments about one's skills, objectively speaking, but rather about one's judgments of what one can do with those skills.⁶ Self-efficacy refers to the individual's confidence in fulfilling specific health behaviors to accomplish a desired goal.⁷ Good self-efficacy is a critical concept in dealing with tensions and stressful situations resulting from the CAD. Self-efficacy thus has an important psychological role in diminishing negative effects caused by the CABG.⁸ Cardiac self-efficacy (CSE) is a cardiac-specific measure of one's belief regarding his/her ability to perform activities related to the symptoms and challenges of CVD.⁹ Low CSE is related to poor health and depression in patients and they are very vulnerable to complications of the disease.¹⁰ Previous studies to increase CSE in CABG surgery patients are limited. However, some studies have been conducted among patients with acute myocardial infarction¹¹⁻¹³ and coronary syndrome.¹⁴

Patients undergoing CABG surgery should be educated regularly to be prepared for unanticipated situations postoperatively.¹⁵ Peer education is defined as a tool applied by people who share the same experiences.¹⁶ Peer-based interventions have become a common method to effect important health-related behavior changes.¹⁷ Peer-based intervention is a strategy in which individuals from a target group provide information, training, or resources to their peers.¹⁸

Based on the literature, peer-based interventions in CVD have caused lifestyle changes regarding improvements in physical activity and eating behavior,¹⁹ higher baseline health status, functioning, social support,²⁰ improved heart health,²¹ significant

improvement in knowledge,²² and reduced risk of coronary heart disease.²³

Considering the great importance of peer education, there has not been any study to investigate and follow up the effects of peer-based intervention on self-efficacy in patients undergoing CABG surgery. Therefore, this study aims to investigate a peer-based intervention on CSE in patients undergoing CABG surgery; a 3-year follow-up is the result.

Materials and Methods

The present study is a randomized controlled trial (Figure 1). This study was conducted on 60 patients who were undergoing CABG surgery. The patients were selected from Imam Khomeini and Shariati Hospitals in Tehran, Iran. The patients in the control and intervention groups were selected from the two hospitals equally. Participants were selected on the basis of a simple sampling strategy. Next, random allocation [block randomization (block size: 6)] was conducted. The inclusion criteria were as follows: patients who did not have any record of CABG surgery, understand, and talk the Persian language; willingness to participate in the research; aged between 40 and 70 years; and did not have dementia, confusion, mental, and psychological problems, which might hinder their participation.

In addition, exclusion criteria in this study were as follows: patient's death; serious physical problems after CABG surgery such as severe pain from chest and leg incisions, wound infection, loss of appetite, fatigue, emergency and unexpected surgeries, or cancelation of the CABG surgery due to patient's situation. The selected patients were randomly assigned into two groups, control and intervention, using the block randomization method.²⁴

A demographic questionnaire and CSE scale were used for collecting the data. The validity of the demographic questionnaire was checked using the content validity method; therefore, 10 faculty members approved it. The CSE scale was used to assess CSE.²⁵ This instrument was developed to measure self-efficacy related to heart diseases. This scale consists of 16 items divided into two main sections: symptom control items and functioning maintenance items consisting of, respectively, eight and five items. There are three additional items associated with obesity, smoking, and dietary habits, which were applied to subjects requiring modification of risk factors. Each item was scored on a 5-point Likert scale, ranging from 0 (i.e., strongly disagree) to 4 (i.e., strongly agree).^{13,26} The CSE scale is a valid and reliable measure when evaluating self-efficacy in patients with Acute Coronary Syndrome (ACS).^{9,14,25-27}

Sample size (in each group, 30 participants), based on the Parent and Fortin (2000) study, was calculated based on the requirement to achieve 80% power at a significance level of 5%.²⁸ The peers were selected from the patients who had already undergone CABG surgery and could be accessed for participation in the study. The factors upon which the authors tried to select the peers were as follows:²⁹⁻³¹ diploma graduate; 1 year from their last CABG surgery; showed a high level of self-efficacy using the CSE scale. According to the aforementioned criteria, two peers were selected. The peers were educated by related experts through lectures and interactive discussions during three sessions (Table

1). Furthermore, the peers discussed the educated topics at the end of each session and also their educational experiences.

The intervention and control groups were given routine information about surgery and recovery during the hospitalization by health professionals. After the peers were prepared with three educational sessions, the patients in the intervention group also went through two educating sessions on 2 consecutive days before CABG surgery; it is noteworthy that each session lasted for 1 h with peers. However, the control group only received the routine education provided by the hospitals. Patients in the intervention group underwent peer education preoperatively and the education was presented 1 day preoperatively. Educational sessions were held in the open-heart surgery ward of the hospital; also, the researcher had a supervisory role during the sessions. Then, the intervention groups were evaluated two times to complete the CSE scale (5 days and 36 months postoperatively).

The Research Ethics Committee (No: 90/D/130/2329) affiliated to the Tehran University of Medical Sciences, Tehran, Iran, approved the study and the consent form. Moreover, the Iranian Registry of Clinical Trials registered the study with the number IRCT201205029623N1. In this study, the selected participants were thoroughly informed about both the purpose and the process of the study. Moreover, they were assured that participation in and withdrawal from, the project were voluntary, and the permission to use the CSE scale was granted by Professor Mark Daniel Sullivan.

Data were analyzed using Statistical Package for the Social Sciences (SPSS) (version 16.0, for Windows). We used the chi-square test, Fisher's exact test, independent-samples, and Kolmogorov-Smirnov tests.

Results

The Kolmogorov-Smirnov test shows that the data had a normal distribution in each group (sig=0.8). The patients in both groups were homogenous in terms of demographic data. All information about the demographic data of both groups is given in Table 2. The CSE of the patients was checked in the order of 5 days and 3 years postoperatively (Table 3). The CSE of the patients in the intervention group was higher, compared with that of patients in the control group (P<0.001).

Table 1. The content of each session

	a. The concepts, importance, benefits of peer education
The first session	b. Communication skills (i.e. non-verbal behaviors, active listening, and ability to receive and send the clear communication messages) were taught.
The second session	a. The required level of practice, control of dyspnea, fatigue, chest pain, weight, diet, regular level of activity, and social interactions were taught to the peers.
The third session	a. Medication and following the treatment regime b. Sexual relationships

Table 2. Demographic information of the population in the intervention and control groups

Characteristics	Intervention		Control		P.V
	n (%)		n (%)		
Age	40 – 55	11 (36.7)	7 (23.3)		0.393* t=0.871
	55 - 70	19 (63.3)	23 (76.7)		
	Mean(SD)	58.90(8.33)	60.73(7.96)		
Gender	Male	23 (76.7)	23 (76.7)		1.000**
	Female	7 (23.3)	7 (23.3)		
Marital status	Married	27 (90)	26 (86.7)		0.500***
	lone	3 (10)	4 (13.3)		
Job	Employee	7 (23.3)	8 (26.7)		0.874**
	Free jobs	17 (56.7)	15 (50)		
	homemaker	6 (20)	7 (23.3)		
Educational level	Illiterate	14 (46.7)	11 (36.7)		0.279***
	Elementary	15 (50)	14 (46.7)		
	Diploma	1 (3.3)	5 (16.7)		
Smoking	Yes	12 (40)	12 (40)		1.000**
	No	18 (60)	18 (60)		
Insurance	Yes	22 (73.3)	24 (80)		0.542**
	No	8 (26.7)	6 (20)		
Body Mass Index	Normal	8 (26.7)	7 (23.3)		0.502**
	Overweight	16 (53.3)	13 (43.3)		
	Obese	6 (20)	10 (33.3)		
Information about surgery	Yes	3 (10)	8 (26.7)		0.095**
	No	27 (90)	22 (73.3)		
Hyperglycemia	Yes	9 (30)	9 (30)		1.000**
	No	21 (70)	21 (70)		
Hyperlipidemia	Yes	10 (33.3)	12 (40)		0.592**
	No	20 (66.7)	18 (60)		
Hypertension	Yes	10 (33.3)	17 (56.7)		0.069**
	No	20 (66.7)	13 (43.3)		

Table 3. Cardiac self-efficacy of the population in the intervention and control groups

Cardiac self-efficacy	5 days		3 years follow up	
	Intervention	Control	Intervention	Control
Mean(SD)	37.93(9.5)	15.37(5.74)	63.18(1.46)	56.23(6.16)
P.V	<0.001*		<0.038*	

* independent sample T test

Discussion

This study evaluated the role of a peer-based intervention (peer education) on cardiac self-efficacy of patients undergoing CABG surgery. Cardiac self-efficacy is a person’s belief in his/her ability to manage the challenges posed by a coronary disease, and its role has been evaluated in several coronary populations using the CSE scale. Based on the results, peer education could be considered as a practical, clinical, effective, and suitable tool to be applied for increasing the CSE, which can contribute to an increase in patients’ self-confidence to develop physical activity. CSE is in fact due to a direct relationship between self-efficacy, self-confidence, and physical activity in patients with CVD.³² The levels of CSE determine the degree of confidence and that reflects the own functional abilities of patients. Thus, if patients have not shown even improvement in CSE, we must perform an educational program to develop that.

We found low levels of CSE among control group patients who participated in this study. Similar to reports by Cajanding (2015), those 143 patients perceived a structured discharge planning program among patients with cardiac problems.¹³ The average score of CSE in the patients of the intervention group at 5 days (P<0.001) and 3 years follow up (P<0.038) is significantly

higher, compared with the control group. In a study conducted by Fors et al. (2014), Boroumand et al. (2016), and Cajanding (2015), a similar relationship between the CSE and receiving education in the control and intervention groups was found. Wu et al. (2012), in their research project entitled “Peer supporters for cardiac patients with diabetes: a randomized controlled trial,” found that significant improvement in knowledge was achieved for the intervention group. But significant improvements in self-efficacy and self-care behavior were not observed.²²The result of Wu et al. (2012) was in opposition to our study. Design of peer base intervention is an essential component to the accomplishment of the project.³³ Walker and Avis (1999) mentioned in their article why peer education fails and explained common reasons for that.³⁴The top reasons are as follows:

- 1- A lack of clear aims and objectives for the project.
- 2- An inconsistency between the project design and the external environment/constraints which should dictate the project.
- 3- A lack of investment in peer education.
- 4- A lack of appreciation that peer education is a complex process to manage and requires highly skilled personnel.
- 5- Inadequate training and support for peer educators.

- 6- A lack of clarity around boundary issues and control.
- 7- A failure to secure multi-agency support.

In our study, we tried to comply with these topics.

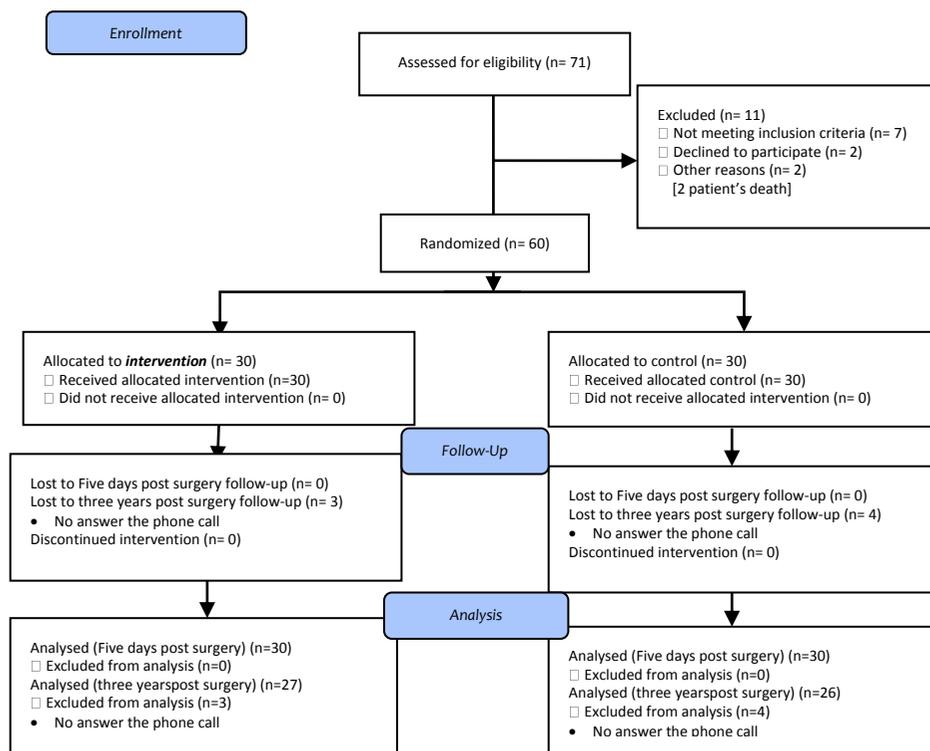


Figure 1. The process of study design

In this study, the CSE of the intervention group, compared with the control group, was significantly higher after 5 days and 3 years postoperatively. There are few studies examining long term follow up (3 years) of these patients. A study by Hildingh and Fridlund (2004) contributes to increased knowledge among healthcare professionals, politicians and decision makers about peer support groups as a support strategy after a cardiac event. They assess a 3-year follow-up of participation in peer support groups after a cardiac event. The results show that persons who participated in The Heart & Lung School exercised more regularly, smoked less, and had a denser network as well as more social support from nonfamily members than the comparison groups.³⁵ Results of a study by Fors et al. (2015) entitled “Person-centered care improves self-efficacy to control symptoms after acute coronary syndrome: a randomized controlled trial,” indicate that person-centered care added to usual care promotes and hastens the development of patients’ confidence in their ability to manage symptoms during recovery after ACS. This underlines the importance of initiating and establishing partnerships between patients and health-care professionals as early as possible after ACS.²⁶ Another study by Cajanding (2015) entitled “Effects of a Structured Discharge Planning Program on Perceived Functional Status, Cardiac Self-efficacy, Patient Satisfaction, and Unexpected Hospital Revisits Among Filipino Cardiac Patients: A Randomized Controlled Study,” demonstrated that a nurse-led structured discharge planning program is an effective intervention

in improving perceived functional health status, CSE, and patient satisfaction, while reducing the number of unexpected hospital revisits among Filipino patients with acute myocardial infarction.¹³ Both of the abovementioned research studies focused on nurses’ intervention, but in our study, peer education was highlighted.

Vicarious experience provided through dyadic support is effective in helping patients undergoing cardiac surgery to cope with surgical anxiety and improve self-efficacy expectations and self-reported activity postoperatively.²⁸ In addition, Lien et al. (2012) reported that the promotion of self-efficacy beneficially increases the chances of diabetic patients who are undergoing coronary artery disease, of CABG surgery and also boosts the tolerance of the patients postoperatively, which contributes to increased activity.³⁶ Kang and Yang (2013) mentioned in their paper that “Cardiac self-efficacy is an important factor in initiating and maintaining health behaviors, which leads to a decreased recurrence of cardiac events and improved cardiac functions such as left ventricular EF in patients with CADs”.⁷ In a study conducted by O’Neil et al. (2013), it was indicated that higher CSE significantly predicted better cardiac functioning and self-rated mental and physical health.⁹

All people in a stressful situation try to find someone who has a similar experience. If this attempt does not work in the right direction, the patient’s ability to perform will normally be affected

and the patient's self-efficacy will be decreased. It would appear to be important to improve CSE among patients with ACS. The CSE scale can provide greater insight into a person's self-efficacy and belief about the illness. Therefore, in health-care practice, the CSE scale combined with an in-depth dialogue can be used to take into account the patient's perspective of the illness in relation to self-efficacy and to formulate a personal health plan. Overall, the implementation of peer-based interventions can increase the CSE, cardiac functions, and promote patients' recovery postoperatively. Therefore, health-care professionals (particularly nurses) can use peer experiences and skills in a patient's educational program to improve cardiac self-efficacy and outcomes in patients who undergo CABG surgery. The limitation of this study is the small number of samples in intervention and control groups. Further studies including larger sample sizes are recommended.

This study showed that a peer education program could improve CSE and decrease hospital readmission among patient candidates for CABG surgery. The findings of this study could serve as a basis for further development of peer education programs in CABG patients. Therefore, implementation of peer education has positive effects on CSE in patients undergoing bypass surgery, and reduces their hospital readmission. It can be beneficial to apply this as an educative-supportive approach in cardiac surgery fields.

This present work was a two-group study with a rather small sample size. Further studies included with larger sample sizes are recommended.

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Conflict of Interest

The authors declare that they have no conflict of interests.

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