



# Effect of Self-Care Education on Patients' Quality of Life after Coronary Artery Bypass Graft Based on Pender's Health Promotion Model

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### Authors

Majlessi F.<sup>1</sup> MD,  
Ghaffari R.<sup>2</sup> MD,  
Mohsenipouya H.<sup>\*3</sup> PhD,  
Nesarhosseini V.<sup>4</sup> MD,  
Yazdani-Charati J.<sup>5</sup> PhD,  
Naghbi S.<sup>6</sup> PhD

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<sup>1</sup>Health Education & Promotion Department, Public Health Faculty, Tehran University of Medical Sciences, Tehran, Iran

<sup>2</sup>Cardiac Surgery Department, Medicine Faculty, Mazandaran University of Medical Sciences, Sari, Iran

<sup>3</sup>Health Education & Promotion Department, Nursing Faculty, Mazandaran University of Medical Sciences, Behshahr, Sari, Iran

<sup>4</sup>Cardiology Department, Cardiovascular Research Center, Mazandaran University of Medical Sciences, Sari, Iran

<sup>5</sup>"Health Science Research Center" and "Epidemiology & Biostatistics Department, Health Faculty", Mazandaran University of Medical Science, Sari, Iran

<sup>6</sup>"Health Sciences Research Center" and "Public Health Department, Health Faculty", Mazandaran University of Medical Sciences, Sari, Iran

### \*Correspondence

Address: Health Education & Promotion Department, Nursing Faculty, Mazandaran University of Medical Sciences, Behshahr, Iran. Postal Code: 4851839661

Phone: +98 (11) 33245631

Fax: +98 (11) 33245631

hosseinmohsenipouya@gmail.com

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## ABSTRACT

**Aims** Coronary artery bypass graft (CABG) is often associated with social isolation, treatment rejection, and negative perception of the health status of patients. One of the methods to detect these problems is evaluating the quality of life. This study aimed at determining the effect of self-care behavior education on quality of life of patients after CABG based on Pender's health promotion model.

**Materials & Methods** This semi-experimental was conducted on cardiac surgery candidates, who underwent CABG in the cardiac center hospital of Mazandaran, Iran in 2017. Subjects were selected and divided into two intervention and control groups, using block randomization. Sample size was estimated at 220 individuals (110 cases per group), and data were collected, using interviews with subjects, the self-care questionnaire based on Pender's health promotion model in cardiac surgery candidates, and SF-36 quality of life questionnaire. Moreover, the patients were followed-up and trained for 3 and 6 months after the intervention.

**Findings** In this research, ANOVA results demonstrated that the different structures of quality of life significantly changed at 3 periods, including before, 3, and 6 months after the intervention ( $p < 0.001$ ). Furthermore, the mean total score of quality of life was higher in the intervention group ( $56.244 \pm 1.474$ ), compared to the control group ( $48.120 \pm 1.508$ ) in all 3 periods.

**Conclusion** According to the results of the study, it is recommended that the model designed and used in the current research be applied to perform healthcare behaviors, so that the quality of life of patients can be improved after cardiac surgery.

**Keywords** Self-Care; Quality of Life; Coronary Artery Bypass; Health Promotion

## CITATION LINKS

[1] Coronary artery bypass graft surgery versus percutaneous coronary intervention in patients with three-vessel disease and left main coronary disease ... [2] Lifestyle practices, health problems, and quality of life after coronary ... [3] Brunner & Suddarth's textbook of medical-surgical ... [4] Adherence to practice guidelines for coronary ... [5] Comparison of the social status of men and women after ... [6] Attachment anxiety predicts depression and anxiety symptoms following ... [7] Examining the effects of remote monitoring systems on ... [8] Physical activity instruction of ... [9] Validation of the United States' version of the world health organization ... [10] Health, health-related quality of life, and quality ... [11] Health-related quality of life in patients with coronary ... [12] The effect of a supportive educational intervention ... [13] Predictive ability of pender's health promotion ... [14] Diabetes empowerment related to Pender's Health ... [15] Factors associated with future commitment and ... [16] Effect of a health education program on quality ... [17] Managing heart failure patients with multivessel disease-coronary ... [18] Quality of life in elderly patients following coronary artery ... [19] Quality of life can both influence and be an outcome of general health perceptions after heart ... [20] Development and psychometrics of self-care assessment scale in heart surgery patients based on health ... [21] Quality of life 12 months after coronary artery bypass ... [22] Experience of cardiac rehabilitation after coronary artery surgery: Effects on health and risk ... [23] Quality of life and factors related to it among cardiac patients after heart ... [24] The effect of self-care education on quality of life in unstable angina patients in Kashan Shahid Behashti ... [25] Self-care and quality of life in patients with advanced heart failure: The effect of a supportive educational ... [26] Depressive symptoms and health-related quality of life: The Heart and soul ... [27] Relation of angina pectoris to outcomes, quality of life, and response to exercise training in patients with chronic ... [28] Effect of a comprehensive rehabilitation nursing program on patients undergoing ... [29] Mechanisms of change within motivational interviewing in relation to health behaviors outcomes ...

## Introduction

Coronary artery bypass graft (CABG) is performed to restore blood flow to the heart. This surgery improves chest pain and ischemia and, in many cases, prolongs the life of patients. Another goal of this method is reducing the risk of heart attack and enabling patients to adopt a healthy lifestyle [1].

A large number of patients with coronary artery disease undergo CABG due to the lack of response to drug therapies [2]. This conventional surgery has been performed by the medical population for 35 years [3]. More than 8 million CABGs are carried out in the world every year, 40,000 of which occur in Iran [4].

Most studies on the effectiveness of CABG are mainly in the form of mortality and using criteria, such as survival rates, laboratory results, and clinical observations. While these techniques provide important information on the physical dimension of these patients, they fail to assess other aspects of health, such as individuals' characteristics and social status. Therefore, independent use of the mentioned criteria cannot lead to an efficient assessment of all health dimensions in chronic and progressive diseases, such as coronary artery diseases, where the disease cannot be separated from the social and personal structure of individuals [5].

Studies have shown that 27% to 61% of patients deal with problems in psychosocial compatibility after CABG, in a way that social isolation, treatment rejection, and negative perception of health status could be observed in these individuals. Moreover, these patients fail to restart their job and perform leisure and physical activities [6]. One of the methods to detect these specific aspects is measurement of quality of life. The concept of quality of life is regarded as an important feature in clinical examinations and care of patients, demonstrating the current emotional status of patients and their level of quality of life [7]. In other words, quality of life is defined as the ability of an individual to satisfactorily perform life affairs [8].

According to world health organization (WHO), quality of life is the perception of a person about his life status in terms of culture, the value system he lives in, goals, expectations, standards, and priorities. Therefore, this is obviously a mental concept and cannot be observed by others [9, 10].

In cardiovascular studies, the concept of optimal quality of life is interpreted as an improvement of physical function, reduction of complications, mortality, symptoms, re-admission and drug use, and restore of daily activities [7]. In this group of patients, poor quality of life is associated with a greater number of diseases, lower survival rate, increased period of hospitalization, and decreased daily activities [11].

Over the past 2 decades, there has been a significant increase in evaluation and improvement of the quality of life of chronic patients. Moreover,

improvement of daily functioning and the quality of life of patients with chronic diseases have become a medical target for healthcare systems [12]. While various studies have assessed the effect of intervention and implementation of rehabilitation programs on the quality of life of cardiac patients [13-15], there is little research on theory-based interventions and their role in the quality of life of cardiac surgery candidates [16].

The value of educational programs depends on their effectiveness on the correct use of theories and models. One of the evaluated models is recognition of behaviors and creation of new behaviors in patients, using the Pender's health promotion model [17]. This model can act as a guide to describe the physical, psychological, and social processes of individuals to adopt and perform health-promoting behaviors. The health promotion model is designed based on Bandura's social recognition theory, health belief model, and Pender's studies on health-promoting behaviors and self-care. In addition, the efficiency of this model has been confirmed by various studies [18, 19]. However, no research has been carried out on the efficiency of this model to promote the quality of life of cardiac patients.

Therefore, with regard to low number of theory-based educational interventions and evaluation of changes in the quality of life of patients within an appropriate time interval, this study aimed at determining the effect of education of self-care behaviors based on Pender's promotion model on quality of life in patients, who underwent CABG in the heart center hospital of Mazandaran, Iran in 2017.

## Materials and Methods

This semi-experimental research was conducted on cardiac surgery candidates, who were referred to the heart center hospital of Mazandaran to undergo CABG in 2016. Inclusion criteria were willingness to participate in the research, full consciousness, undergoing CABG for the first time, and passing a minimum of 1 month from the surgery.

On the other hand, exclusion criteria included diagnosis of psychological diseases, having an urgent condition, and lack of passing 1 month from the surgery. These criteria were extracted according to the medical records of patients and in-person interviews with these individuals. Subjects were selected through simple sampling and divided into intervention and control groups, using block randomization. In addition, sample size was estimated at 110 cases per group, using the sample size formula with confidence level of 0.95 and test power of 0.84.

**Formula 1:** Sample size formula

$$N = \frac{(z_{1-\frac{\alpha}{2}} + z_{1-\beta})^2}{d^2} = \frac{(1.96 + 0.84)^2}{(0.27)^2} = 107.5 \cong 110$$

**Instrument:** The data were collected, using a questionnaire by referring the researcher to the

houses of patients and performing interviews with these individuals. The first section of the questionnaire included items on demographic characteristics of the subjects, including age, gender, marital status, level of education, occupational status, level of income, number of hospitalizations, ejection fraction (EF), and body mass index (BMI). The second section was the self-care questionnaire based on Pender's health promotion model for cardiac surgery candidates. This 97-item questionnaire has 8 structures:

1. Prior-related behavior: frequency of performing similar behaviors in the past (40 items in 9 sections).
2. Perceived self-efficacy: including self-judgment about the abilities to manage and perform health-promoting behaviors (20 items in 9 sections).
3. Behavioral feelings: mental feelings occurring before, during, or after an activity (5 items).
4. Perceived benefits: including the prediction of positive results obtained from performing a behavior (4 items).
5. Perceived barriers: including the prediction of imagined or actual barriers and personal costs due to performing recommended behaviors (9 items).
6. Interpersonal influences: recognition of factors related to a behavior, belief, or attitude in other people (13 items in 2 sections of normality's [5 items] and social support [8 items]).
7. Situational influences: including the perception of a specific situation by an individual that can facilitate or prevent the performing of a behavior (4 items).
8. Commitment to a plan of action: a commitment to perform a particular action at a specific time and place and identification of strategies to stimulate, enforce, and strengthen the behavior (2 items).

Items were scored on a 5-point Likert scale. In addition, the content validity index (CVI) and content validity ratio (CVR) of the questionnaire were estimated at 0.90 and 0.84, respectively. Moreover, reliability of the questionnaire was calculated at the Cronbach's alpha of 0.77. On the other hand, Kisser sample size sufficiency index was estimated 0.76. Moreover, Chi value of two Bartlett tests was  $p < 0.001$ , and  $\chi^2$ , root mean square error of approximation (RMSEA), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), normed fit index (NFI), and comparative fit index (CFI) were estimated 0.003, 0.001, 0.98, 0.93, 0.97, and 0.99, respectively [20].

The third section was related to the SF-36 quality of life questionnaire, reliability, and validity of which have been confirmed in domestic and international studies [16, 17]. This 36-item questionnaire contains 8 components, including general (6 items), physical (10 items), and mental (6 items) health, social function (2 items), body pain (2 items), role-physical (4 items), role-emotional (3 items), and vital-energy (3 items). The total score of the questionnaire is obtained in the range of 0-100, where the highest score is indicative of a better quality of life.

Health Education and Health Promotion

**Educational Intervention:** Subjects of the intervention group received an education based on the results of the self-care questionnaire. In this research, training was carried out, using question/answer, verbally persuading the patients, providing a practicing condition, and demonstrating favorable behaviors by some of the patients.

The educational intervention was performed in the form of 60-90-minutes sessions per week for 6 weeks. These sessions involved lectures, question/answer, practical demonstration, displaying educational clips, and providing educational booklets for cardiac surgery candidates, which were prepared for patients of the intervention group free of charge. In addition, sustainable education and follow-up of progress of patients were carried out 3 and 6 months after the intervention, respectively. Participants of the intervention group were guided by receiving counseling through separate contacts about their self-care behaviors and follow-up of their problems and barriers. After 3 and 6 months, questionnaires were completed by the intervention group one more time, followed by comparison of results between the two groups (Table 1).

**Table 1) Educational Intervention**

Session	Titles	Time (min)
1	Anatomy and heart surgery	75
2	Self-care behaviors in cardiac surgery	90
3	Behavioral feelings and perceived self-efficacy in patients heart surgery	75
4	Benefits and perceived barriers the result of self-care behaviors	60
5	Social support and its role in improving self-care behaviors and patient quality of life	70
6	Lifestyle and its role in improving patient heart surgery	70

**Ethical Considerations:** This research was carried out with the codes of 28217 and IRCT 2015001248742N6. At first, objectives of the research were explained to the participants and written informed consents were obtained prior to the research. Next, the questionnaire was filled by the researcher through interviews with subjects. Subjects of the intervention group were informed about the educational sessions and transportation accommodations were provided for those with financial problems.

**Analysis:** After sampling, scores of each questionnaire were summarized, using a software. Data analysis was performed in SPSS version 22, using Chi-square and analysis of variance with repeated measures to evaluate the effect of educational intervention based on health promotion model on quality of life of patients in the control and intervention groups.

## Findings

Demographic characteristics of the participants are shown in Table 2. In this research, mean age of the

subjects in the intervention and control groups were 60±9.25 and 60.32±8.94 years, respectively. In total, 143 (65.45%) of the subjects were male and 77 (34.54%) were female. In addition, 203 (92.27%) of the subjects were married, and 103 (46.8%) of the participants had income level of 10-15 million IRR. On the other hand, 188 (83.2%) of the patients had EF>40%, and 120 (54.5%) individuals had BMI: 25-29.9. According to the results of Chi-square and Mann-Whitney U, no significant difference was observed between the study groups in terms of gender, marital status, level of income, occupational status, level of education, BMI, and EF (p<0.05; Table 2).

ANOVA with repeated measures was used to evaluate changes in various structures of quality of life at 3 periods, including before, and 3 6 six months after the intervention and control of demographic

variables, results of which are presented in Table 3. According to the results, a significant change was observed in different structures of the quality of life over time (p<0.001).

In addition, Diagram 1 was drawn to graphically assess the changes in the total quality of life during 3 periods and type of changes based on intervention and control groups. According to Diagram 1, mean total score of quality of life was higher in the intervention group (56.244±1.474) compared to the control group (48.120±1.508) in all 3 periods. In addition, the changes in total quality of life of patients in the intervention group had an upward trend compared to the changes observed in the control group, which demonstrated the interaction between intervention and changes in mean total quality of life (Table 4).

**Table2)** Demographic and health status of the participants in control (N=110) and intervention (N=110) groups

Characteristics	Control		Intervention		P-value
	F	%	F	%	
<b>Sex</b>					
Male	71	64.54	72	65.45	0.888 <sup>a</sup>
Female	39	35.45	38	34.54	
<b>Marital status</b>					
Single	1	0.9	1	0.9	0.454 <sup>b</sup>
Married	100	90.9	103	93.6	
Spouse deceased	9	8.2	6	5.5	
<b>Educational Level</b>					
Illiterate	21	19.1	15	13.6	0.837 <sup>a</sup>
Elementary	40	36.4	44	40	
High school diploma	40	36.4	40	36.4	
Collegiate	9	8.2	11	10	
<b>Occupation</b>					
Employee	4	3.6	5	4.5	0.380 <sup>a</sup>
Worker	14	12.7	14	12.7	
Homemaker	39	35.5	33	30	
Retired	26	23.6	39	35.5	
Freed	1	0.9	19	17.3	
<b>Lodging</b>					
City	60	54.54	64	58.18	0.587 <sup>a</sup>
Village	50	45.45	46	41.81	
<b>Income(Dollar)</b>					
Not income	16	14.54	10	9.09	0.758 <sup>a</sup>
<200	35	31.81	36	32.72	
200-500	50	45.45	53	48.18	
>500	9	8.18	11	10	
<b>EF</b>					
≤40%	18	16.36	19	17.27	0.857 <sup>a</sup>
>40%	92	83.63	91	82.72	
<b>BMI (kg/m<sup>2</sup>)</b>					
18.5-24.9	24	21.81	28	25.45	0.645 <sup>b</sup>
25-29.9	63	57.27	57	51.81	
30 and more	22	20	25	22.72	
<b>Hypertension</b>					
Yes	41	37.27	36	32.72	0.480 <sup>a</sup>
No	69	62.72	74	67.27	
<b>Diabetes</b>					
Yes	42	38.18	47	42.72	0.492 <sup>a</sup>
No	68	61.81	63	57.27	
<b>Dyslipidaemias</b>					
Yes	30	27.27	24	21.81	0.347 <sup>a</sup>
No	80	72.72	86	78.18	
<b>Smoking</b>					
Yes	22	20	18	16.36	0.484 <sup>a</sup>
No	88	80	92	83.63	
<b>Age (year)</b>					
Mean ± SD	60.32±8.94		60.00±9.25		0.796 <sup>c</sup>

<sup>a</sup>Chi-square test, <sup>b</sup>Mann-whitney test, <sup>c</sup>independent sample t-test, SD=Standard deviation

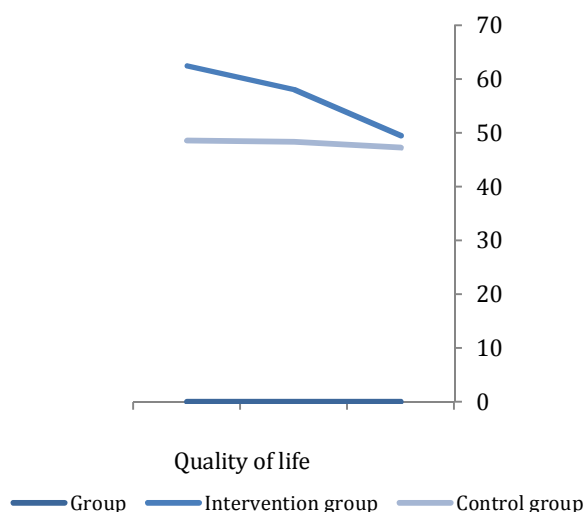
**Table3)** Results of ANOVA test to explore changes in various constructs of the quality of life before, 3, and 6 months after the intervention

Sub-score	sum of squares	F	P-value
GH	786.4	4.2	0.024
PH	13474.5	0.7	<0.001
MH	1556.4	6.3	0.007
SF	2222.9	9.4	<0.001
BP	5818.0	4.1	0.028
RP	9141.1	7.7	<0.001
RE	2195.9	7.7	<0.001
VT	2993.2	8.4	0.001
QOL	2993.2	31.5	<0.001

GH- general health, PH- physical health, MH- mental health, SF- social functioning, BP- bodily pain, RP- role physical, RE-role emotional, VT- vitality, QOL- quality of life

**Table4)** Estimated mean quality of life of for intervention (N=110) and control (N=110) groups

Group	Mean ± SD	95% Confidence Interval	
		Lower Bound	Upper Bound
Intervention	56.2±1.4	53.3	59.1
Control	48.1±1.5	45.1	51.0
Total	52.1±1.2	49.7	54.6



**Diagram 1)** Changes in the total quality of life at 3 periods including before and 3 and 6 months after the intervention and changes based on intervention and control groups; A= Intervention group, B= Control group (1= Before intervention, 2= 3 months after intervention, 3= 6 months after intervention)

### Discussion

According to the results, educational intervention based on health promotion model increased the quality of life of patients. In other words, results indicated that the quality of life and its emotional, physical, and social aspects were improved in the patients of the intervention group after theory-based educational intervention, which was statistically significant ( $p < 0.05$ ). In this regard, our findings are in line with the results obtained by Bak [18], Mathisen *et al.* [19], and Hunt *et al.* [21].

In a research by Lindsay *et al.* [22], all aspects of

quality of life were improved in patients after the implementation of rehabilitation programs, where education played a significant role. On the other hand, results obtained by Seyam *et al.* demonstrated the importance of education of self-care behaviors in the improvement of the quality of life of patients after cardiac surgery [23]. In a research conducted by Mirbagher Ajorpaz, education was able to enhance all aspects of quality of life, with the exception of body pain [24].

In another study carried out by Jaarsma *et al.*, while focused training improved self-care behaviors, it had a low impact on the quality of life of patients [25], which might be due to the time limit for patient evaluation and number of patients under study. In this respect, Ruo *et al.* reported that the quality of life of patients with the experience of CABG was affected by post-operative depression [26]. In other words, the quality of life of patients is often at a low level due to the complications of the disease and surgery, anxiety caused by surgery results, duration of hospitalization, and costs of surgery [27].

Despite the increased level of quality of life of patients in the control group of the present study after the intervention, this difference was not significant. In this regard, Xue *et al.* marked that patients generally forget the trained treatment recommendations after being discharged, which required strengthening [28]. On the other hand, the number of improper health behaviors of these patients increases in home in case of lack of follow-up [29]. In the present study, inadequate information on in-home self-care behaviors was provided for subjects of the control group after CABG, which led to the reduction of activities of some of the patients. With regard to the results of the current research and applicability of the self-care education program, it is suggested that this model be applied to perform self-care behaviors, which leads to the enhancement of quality of life of patients after cardiac surgeries.

### Conclusion

Teaching self-care behaviors correctly to the patients after cardiac surgeries can improve their quality of life and survival rate.

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**Ethical Permissions:** This research was carried out with the codes of 28217 and IRCT 2015001248742N6.

**Conflicts of Interests:** None declared by authors.

**Authors' Contribution:** Majlessi F. (First author), Introduction author and Original researcher (20%); Ghaffari R. (Second author) Methodologist (10%); Mohsenipouya H. (Third author) Introduction

author and Original researcher (50%); Nesarhosseini V. (Fourth author) Assistant (10%); Yazdani-Charati J. (Fifth author) Statistical analyst (5%); Naghibi S.A.H. (Sixth author) Discussion author (5%).

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