# The effect of educational program based on the clinical practice protocol on treatment adherence, self-efficacy and quality of life of patients undergoing coronary artery bypass graft surgery

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**Abstract:**

**BACKGROUND AND AIM:** Educating the patients undergoing coronary artery bypass graft (CABG) before and after surgery is one of the most important factors for success in this surgery, as it improves their treatment adherence, self-efficacy, and quality of life. The aim of this study was to determine the impact of the educational program based on clinical practice protocol upon treatment adherence, self-efficacy, and quality of life of patients undergoing CABG surgery in Tehran, Iran, during the period 2021–2022.

**MATERIALS AND METHODS:** This experimental study was conducted on 100 patients who were undergoing CABG and were hospitalized in a public hospital (Shahid Modarres Educational Hospital) in Tehran, Iran, in 2021–2022. Patients were randomly assigned to intervention ($n = 50$) and control ($n = 50$) groups. Four questionnaires (demographic–clinical questionnaire, Modanloo's adherence to treatment questionnaire, Sullivan's self-efficacy questionnaire, and McNew's quality of life questionnaire) were completed by both intervention and control groups before and 1 month after the educational intervention. The intervention group received an education program based on the clinical practice protocol. Data were analyzed using descriptive and inferential methods in Statistical Package for the Social Sciences (SPSS) 22 software.

**RESULTS:** The results of the study showed that the intervention and control groups were similar in terms of demographic and clinical characteristics. The average scores of treatment adherence, self-efficacy, and quality of life 1 month after the intervention were significantly higher in the intervention group compared to the control group. Also, the average scores of treatment adherence, self-efficacy, and quality of life were significantly higher 1 month after the intervention than before in the intervention group ($P < 0.001$).

**CONCLUSIONS:** The results of this study showed that education program based on the clinical practice protocol can be effective and useful for increasing the level of treatment adherence, self-efficacy, and quality of life of patients undergoing CABG.

**Keywords:**
Clinical protocols, coronary artery bypass, education, quality of life, self-efficacy, treatment adherence

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## Introduction

Coronary artery disease (CAD) is a significant cause of death and disability in the world and is associated with 17.8 million deaths per year.[1] In Iran, CAD accounts for nearly 50% of all deaths per year and is the first cause of mortality, morbidity, and disability with high health-care cost.[2] Coronary artery bypass graft (CABG) is

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one of the treatments for CAD.[3] Approximately 1.4% of all surgeries in the operating room are for CABG. In Iran, almost 25,000 CABGs are done per year.[4] CABG undoubtedly affects the quality of life in patients.[5,6] Follow-up and educational programs have positive effects on the health promotion in patients after CABG.[7] In total, educational factors are effective for changing the behaviors of people.[8,9]

One of the topics emphasized in educating patients undergoing CABG is adherence to treatment and medication, which includes all health-related behaviors that are recommended by health-care providers. In addition, the treatment result has a direct relationship with the patient's adherence to the treatment plan.[10] Adherence to treatment is one of the most important issues in regards to mental and physical illnesses, which has received little attention in Iran.[11] Self-efficacy is another basic issue in these patients, which affects their quality of life and is the focus of and emphasized by the treatment team. Self-efficacy refers to a person's self-confidence regarding success in doing certain tasks. The self-efficacy of people determines the quality of their goals and strategies to achieve those goals.[12] Tensions and stresses by CABG can affect people's self-efficacy in doing daily tasks. In addition, self-efficacy is related to the improvement of the disease and also the quality of life of people after the disease period. Studies have confirmed the relationship between the quality of life and self-efficacy of patients undergoing CABG.[13,14]

Educational programs have a positive effect on increasing the treatment regimen and the self-efficacy and quality of life of patients undergoing CABG, and these programs are increasingly recommended.[14] Also, the use of educational methods and strategies before and after heart surgery can have various positive effects such as reducing stress and financial burden and increasing the quality of care and level of knowledge in these patients.[15] The clinical practice protocol to reduce hospitalization after CABG includes education related to medication therapy, rehabilitation program, and psychological care of the individual and his/her family, which is given on various days before and after CABG. This protocol was followed in an experimental study conducted in 2016 with the aim of providing a description of the implementation of the clinical practice protocol in the USA, which included the redesign of processes that began before the patient was admitted and continued until 30 days after discharge from CABG.[16] So far, no study has been done regarding the effect of educational intervention based on this comprehensive and continuous clinical practice protocol upon treatment adherence, self-efficacy, and quality of life of patients undergoing CABG in in Iran and other countries. Therefore, the aim of this study was to determine the impact of the education program based on clinical practice protocol upon treatment adherence, self-efficacy, and quality of life of patients undergoing CABG in Tehran, Iran, during the period 2021–2022.

## Materials and Methods

### Study design and setting
This study used pre- and post-test experimental design in both an intervention and a control group and was conducted as part of a master's degree thesis in community health nursing. After obtaining the necessary permissions, data collection and sampling were done from Shahid Modarres Educational Hospital, Tehran, Iran.

### Study participants and sampling
After obtaining the necessary permissions from the university and hospital, the first author went to the heart departments of the mentioned hospital for data collection and then selected 114 patients during 2021–2022 who were candidates for CABG (14 patients were excluded from the study because of dying during the study, declining to participate, and for other reasons). After obtaining oral and written consent form and by coordinating with the patients, for the first time, the patients were randomly assigned to one of the intervention or control group based on luck and lottery. The first group was assigned to the control group and after 2 weeks, sampling was done for the intervention group. This process was done in order to prevent sharing the information between the intervention and control groups, and it continued until the end of sampling [Figure 1].

### Data collection tool and technique
Four questionnaires were completed by both intervention and control groups before and 1 month after the educational intervention. The date and time for the educational intervention were decided by coordinating with the CABG patients. The Patients and one of their active family members for caring in the intervention group received the educational intervention based on the clinical practice protocol,[16] which consisted of six face-to-face sessions (each session was for 10–20 min). The days of the educational intervention were as follows: 1. after angiography, 2. before surgery, 3. after surgery and with full consciousness of the patient, 4. before discharge, 5. the day of discharge, and 6. a week after discharge. It should be mentioned that the educational intervention was administered using various educating methods such as lectures with questions and answers and slides, demonstration, presentation of written media such as pamphlets, educational videos, and follow-up by telephone (after the sixth session, patients were followed and educated by phone on a weekly basis). The control group received only routine hospital education, which included physician and nurse explanations during
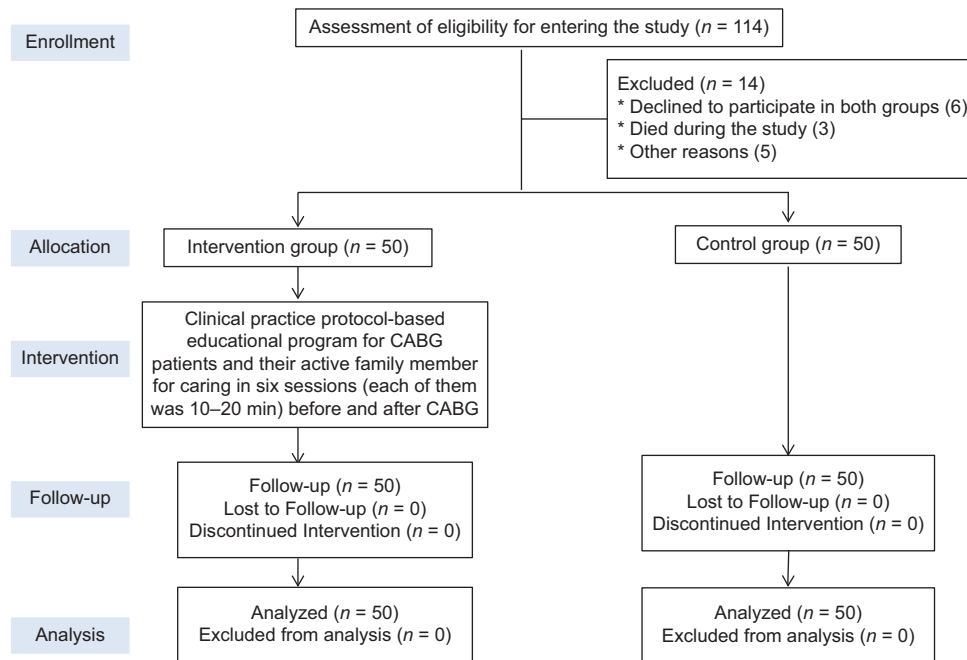
**Figure 1:** CONSORT flowchart of the study. CABG = coronary artery bypass graft. CONSORT = Consolidated Standards of Reporting Trials

the treatment period and delivering pamphlets at the discharge time. At the end of sampling, 100 CABG patients participated in this study (50 CABG patients in each group).

For preparing the educational content, the scientific literatures and texts of heart surgery and nursing and also the experiences of five cardiac surgeons of hospital were used, and it was reviewed and confirmed by them and by the supervisor of the study. Then, the content was validated by three experts (two cardiac surgeons and one nurse in the Open-Heart Intensive Care Units [OH-ICU]).

Data were gathered using four questionnaires (demographic–clinical questionnaire [14 items], Modanloo's adherence to treatment questionnaire [40 items], Sullivan's self-efficacy questionnaire [16 items], and McNew's quality of life questionnaire [27 items]). All questionnaires were valid and reliable. These questionnaires were completed by both intervention and control groups before and 1 month after the educational intervention. Data were analyzed using descriptive (such as mean, standard deviation, frequency, and frequency percentage) and inferential (such as *t*-test) methods in Statistical Package for the Social Sciences (SPSS) software (version 22; IBM Corp., Armonk, NY, USA).

### Ethical considerations

The proposal of this study was approved by the community health nursing group and the School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran. The ethical code was approved by the research ethics committees of the

School of Pharmacy and Nursing and Midwifery, Shahid Beheshti University of Medical Sciences (Approval ID: IR.SBMU.PHARMECY.REC.1400.072). Then, necessary permissions for data gathering and sampling were obtained from Shahid Modarres Educational Hospital authorities. Consent forms were obtained from all participants, and the principles of voluntary participation, anonymity, and confidentiality for the participants and accuracy and bailment for the texts were respected throughout the study.

## Results

The results of the study showed that the demographic and clinical characteristics of the intervention and control groups were similar. The majority of the participants in this study were men (*n* = 66, 66%), married (*n* = 67, 67%), and in the age group of 55–65 years (*n* = 33, 33%). Majority of the patients had middle school education (*n* = 45, 45%), an underlying disease (*n* = 71, 71%), health insurance (*n* = 76, 76%), and insufficient income (*n* = 57, 57%).

The results of the independent-samples *t*-test showed that the mean scores of treatment adherence between the intervention and control groups were not statistically significant before the intervention, while after the educational intervention, the mean scores of treatment adherence between the intervention and control groups were statistically significant and the score of intervention group was higher. Also, the results of the paired-samples *t*-test showed that for both the intervention and control groups, the mean scores of treatment adherence before

and after the intervention were statistically significant, and the scores were higher after the intervention in both groups [Table 1].

The results of the independent-samples *t*-test showed that the mean score of self-efficacy between the intervention and control groups was statistically significant before the intervention and the score of the control group was higher, while after the educational intervention, the mean score of self-efficacy between the intervention and control groups was statistically significant and the score of the intervention group was higher. Also, the results of the paired-samples *t*-test showed that in the intervention group, the mean scores of self-efficacy were statistically significant before and after the intervention and they were higher after the intervention, while the mean score of self-efficacy after the intervention and CABG was lesser than before in the control group [Table 2].

The results of the independent-samples *t*-test showed that the mean score of the quality of life between the intervention and control groups was statistically significant before the intervention and the score of the control group was higher, while after the educational intervention, the mean score of the quality of life between the intervention and control groups was statistically significant and the score of the intervention group was higher. Also, the results of the paired-samples *t*-test showed that in the intervention group, the mean score of the quality of life before and after the intervention was statistically significant and was higher after the intervention, while the mean score of the quality of life after the intervention and CABG was lesser than before in the control group [Table 3].

## Discussion

The results of the study showed that patients in the intervention and control groups were similar with regard to the demographic and clinical characteristics. Majority of the participants in this study were men, married, middle-aged, had a middle school education, had a history of underlying disease, had health insurance, and had insufficient income. Other results of the study showed that the mean scores of treatment adherence, self-efficacy, and quality of life in the intervention group were statistically significant and higher compared to the control group after the intervention and CABG. Also, the results showed that the mean scores of treatment adherence, self-efficacy, and quality of life were statistically significant and higher in the intervention group after the intervention compared to the scores before.

The results of the study showed that the mean scores of treatment adherence between the intervention

**Table 1: Mean score of treatment adherence of the intervention and control groups before and after the educational intervention**

| Groups/stages of measure | Intervention group | | Control group | | *P* |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | |
| Before intervention | 115.62 | 9.24 | 112.50 | 6.07 | 0.05 |
| After intervention | 136.34 | 7.55 | 122.66 | 7.54 | <0.001** |
| | <0.001** | | <0.001** | | |

SD=Standard deviation. *Significant at 0.05 level; **significant at 0.01 level

**Table 2: Mean score of self-efficacy of the intervention and control groups before and after the educational intervention**

| Groups/stages of measure | Intervention group | | Control group | | *P* |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | |
| Before intervention | 20.14 | 4.66 | 28.58 | 4.58 | <0.001** |
| After intervention | 41.96 | 4.88 | 27.82 | 4.73 | <0.001** |
| | <0.001** | | 0.38 | | |

SD=Standard deviation. *Significant at 0.05 level; **significant at 0.01 level

**Table 3: Mean score of the quality of life of the intervention and control groups before and after the educational intervention**

| Groups/stages of measure | Intervention group | | Control group | | *P* |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | |
| Before intervention | 3.15 | 0.31 | 3.57 | 0.24 | <0.001** |
| After intervention | 3.97 | 0.34 | 3.27 | 0.28 | <0.001** |
| | <0.001** | | <0.001* | | |

SD=Standard deviation. *Significant at 0.05 level; **significant at 0.01 level

and control groups were not statistically significant before the intervention, while after the educational intervention and CABG, the mean scores of treatment adherence between the intervention and control groups were statistically significant and the score of intervention group was higher. Also, the mean score of treatment adherence before and after the intervention were statistically significant in both groups and the scores were higher after the intervention. The results of this study in regards to treatment adherence between the intervention and control groups after the intervention are similar to those of a study reported from Iran about the effect of an educational intervention based on Beliefs, Attitudes, Subjective Norms and Enabling Factors (BASNEF) model on treatment adherence after CABG.[17] The results of Bikmoradi *et al*.'s[10] study in Iran showed that tele-nursing has an effect on the level of treatment adherence in patients discharged after CABG. Also, the result of an experimental study in USA showed that a professional leadership team is necessary to create the best results during the care period, and educational interventions are effective on treatment adherence in different populations with different characteristics by controlling the intervention variables that have been reported in previous studies.[16] The results of this study are in line with the mentioned studies, so there

is no doubt that education to patients and their families via various methods can be effective on patients' level of adherence to treatment.

The results of the study also showed that the mean score of self-efficacy between the intervention and control groups was statistically significant before the intervention and the score of control group was higher, while after the educational intervention and CABG, the mean score of self-efficacy between the intervention and control groups was statistically significant and the score of intervention group was higher. Also, the results of the study showed that in the intervention group, the mean scores of self-efficacy before and after the intervention were statistically significant and were higher after the intervention, while the mean score of self-efficacy after the intervention and CABG was lesser than before in the control group. The results of this study with regard to self-efficacy between the intervention and control groups after the intervention are similar to those of a study conducted in Iran about the effect of continuous care model on self-efficacy of patients undergoing CABG.[14] In another study, the results showed that by theoretical education and using pamphlets and educational booklets, the self-efficacy of patients after CABG increased significantly compared to before the educational intervention.[18] The results of another study showed that the educational intervention based on the health promotion model had a positive effect on the self-care behaviors and self-efficacy of patients undergoing CABG.[19] The results of this study in relation to the intervention group are in line with the mentioned studies; therefore, without any doubt, regular and appropriate education to patients and their families can be effective on patients' self-efficacy. In the control group, the level of self-efficacy was lower after performing CABG; the reason for this result could be ineffective education or education having a low impact.

The results of the study showed that the mean score of the quality of life between the intervention and control groups was statistically significant before the intervention and the score of the control group was higher, while after the educational intervention, the mean score of the quality of life between the intervention and control groups was statistically significant and the score of the intervention group was higher. Also, the results of the study showed that in the intervention group, the mean scores of the quality of life before and after the intervention were statistically significant and were higher after the intervention, while the mean score of the quality of life after the intervention and CABG was lesser than before in the control group. The results of this study with regard to quality of life between the intervention and control groups after the intervention are similar to those of a study conducted in Iran about the effect of continuous care model on the quality of life of patients undergoing CABG.[14] Another prospective study showed that 1 month after CABG, the quality of life of patients was improved, but was still inadequate and 1 year after surgery, appropriate results were achieved in the quality of life of these patients.[20] The results of this study in relation to the intervention group are in line with the mentioned studies, therefore showing that regular and appropriate education to patients and their families can be effective on the quality of life of patients. In the control group, after CABG, the quality of life was lower than before; the reason for this result can be CABG and ineffective or low-impact education or time shortness of measuring.

### Limitation and recommendation

Limitations of this study were possible carelessness in completing the self-reporting questionnaires by patients and selecting one hospital for conducting the study. The intervention in this study was started based on the clinical practice protocol before CABG and continued in several sessions with different educational methods after surgery. This method can be useful for increasing other healthy life aspects of patients undergoing CABG or for other people with different health status.

## Conclusion

The results of this study showed that performing the educational program based on clinical practice protocol can be effective and useful for increasing the level of treatment adherence, self-efficacy, and quality of life of patients undergoing CABG. These results can be used to design regular and appropriate educational programs for improvement of treatment adherence, self-efficacy, and quality of life of patients undergoing CABG and other surgeries.

### Abbreviations
CABG: coronary artery bypass graft, CAD: coronary artery disease, OH-ICU: Open-Heart Intensive Care Units

### Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have

given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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## Conflicts of interest
There are no conflicts of interest.

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