Original Article

# The effect of educational program on self-care behaviors of candidates for coronary artery angiography

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## Abstract

**Context:** Cardiovascular disease is one of the leading causes of mortality and disability in the world and its prevalence is increasing.

**Aim:** The aim of the study was to determine the effect of educational program on self-care behaviors of candidates for coronary artery angiography.

**Setting and Design:** This study was a quasi-experimental interventional study conducted at Imam Hossein Hospital in Mehran/Ilam in 2018.

**Materials and Methods:** One hundred and twenty-six candidates for coronary artery angiography were randomly divided into two groups of intervention and control and completed the Cardiac Patients Learning Needs Inventory. The intervention group was trained with cardiovascular care educational program after angiography. After 2 weeks, the questionnaire was completed again by both groups.

**Statistical Analysis Used:** Data were analyzed using Kolmogorov–Smirnov test, *t*-test, and paired *t*-test using SPSS software version 18.

**Results:** The educational needs of the subjects were measured in eight areas of self-care (introduction to the cardiac intensive care unit, anatomy and physiology, psychological factors, risk factors, pharmaceutical information, nutritional information, physical activity, and other information). Most of the samples had moderate-to-high educational need (intervention group = 3.46) and (control group = 3.86), and the educational need in intervention group reached 1.62, which was significant ($P < 0.001$), but there was no significant change ($P = 0.871$) in the control group (3.31).

**Conclusion:** Promoting self-care behaviors in patients undergoing coronary angiography using educational interventions is important and necessary. The curriculum that is designed and used in this study is recommended as a sample.

**Keywords:** Behaviors, Coronary angiography, Nursing, Patient education, Self-care

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## INTRODUCTION

Cardiovascular disease is one of the leading causes of mortality and disability in the world and its prevalence is increasing.[1] Coronary artery disease is the most common cause of illness and imposes high levels of health-care costs.[2] In comparison with other cardiovascular diseases, myocardial infarction (MI) causes the highest level of mortality.[3] The leading cause of mortality in 2007 in Iran was cardiovascular disease with a prevalence of 39.3%, which raised to 46% in 2010, indicating an increase in the prevalence of the disease.[4]

With the advancement of technology in recent years, the length of diagnosis, treatment, and hospitalization has decreased.[5] One of these premier techniques is angiography.[6-8]

As a standard method for the diagnosis and evaluation of coronary artery disease, coronary angiography provides important data on coronary artery disease, congenital diseases, valvular heart disease, and cardiac function through catheterization. On the other hand, it is the best and most reliable method for diagnosing coronary artery disease, and its number is increasing day by day because of its reliability and accuracy.[9,10]

Research shows that more than 82% of patients experience stress and anxiety before this test, which significantly affects the diagnosis of the test,[11-13] because it is a considerable source of stress and anxiety for the patient. This may be due to the lack of awareness of the patient regarding the procedure and the unknown things in the environment of the procedure and its unfamiliar environment[14] or the lack of knowledge about the results of the diagnosis,[15] which directly affect satisfaction, anxiety,[16] acceptance, and selection of this test.[17] The results of the study of Kato *et al*.[18] showed that the main reason for readmission of chronic patients in the hospital was the lack of practice of self-care behaviors.

Self-care is a collection of activities during which the patients are required to contribute to improve their health and well-being. Self-care is an important part of disease management in cardiovascular diseases[19] and includes self-management, self-regulation, self-monitoring, and adherence and compliance with behaviors or activities that contribute to the patient's health and well-being.[20] Self-care outcomes include improvement in the quality of life, physical status, and mental status.[21]

Cardiac patients need to receive empathic, comprehensive, understandable, simple, and nonjudgmental information about the management of heart attack warning signs, lifestyle changes, and physical constraints, and given the fact that the nurse spends more time with the patient, he/she is the most appropriate option for this, providing appropriate training requires need assessment. If education is provided in accordance with the patients' needs, it will result in higher efficiency, and it will save money, time, and manpower.[22] According to various studies, the need for specialized information about the risk of recurrence, the level of heart muscle damage, drugs to be used, the level of physical activity, and diet,[21] the symptoms of disease, its progress and future care,[23] disease management,[24] pharmaceutical information,[25] and self-care[26] are listed as educational needs of patients.

The results of the study of Niakan *et al*.[27] showed that patients with MI need to be trained in self-care behaviors at the time of hospitalization. Furthermore, the study of Imani[28] showed the difference between educational needs before and after training self-care behaviors. In such a way that, after training, the needs in various fields had decreased.

Although in different studies, various aspects have been introduced as the educational needs from the viewpoint of angiography candidates, nursing teachers, and cardiologists, they were not comprehensive enough. Therefore, the present study was conducted to determine the effect of educational program on self-care behaviors of patients undergoing cardiac angiography who referred to Imam Hossein Hospital in Mehran, Iran in 2018.

## MATERIALS AND METHODS

In this quasi-experimental interventional study, the effect of self-care education on candidates for coronary angiography who referred to Imam Hossein Hospital in Mehran was measured in 2018. The research population included candidates for coronary artery angiography who referred to the center. The samples consisted of 126 patients who referred to the angiography unit who were randomly divided into two groups of intervention and control. The ethical code of article is IR.MEDILAM.REC.1396.17.

### Inclusion criteria

Candidates for coronary artery angiography who were willing to participate in the study, did not have mental, auditory, or visual impairment, and had no history of coronary artery angiography.

### Exclusion criteria

Unwillingness to participate in the study, physical disability, acute disease, and old age in a way that negatively affects

the ability to learn and memorize, referring to other centers or discontinuing treatment, and occurrence of an acute problem during angiography and after that.

### Data collection scales

The data collection scale was a questionnaire consisting of two parts: the first part was a demographic information questionnaire including age, gender, occupation, level of education, income, marital status, history of underlying disease, history of smoking, and the phone number. The second part was the Cardiac Patients Learning Needs Inventory (CPLNI), which measured the needs of patients with cardiovascular disease in eight areas: introduction to the cardiac intensive care unit, anatomy and physiology, psychological factors, risk factors, pharmaceutical information, nutritional information, physical activity, and other information. The questionnaire includes 42 questions, with answers in a 5-point Likert scale (1 = unimportant to 5 = very important). Acquiring a mean score of 1 indicates that minimum education is required, while mean score of 5 indicates most educational need. The interpretation of this questionnaire is done according to the mean of the lowest and highest scores; score 3 indicates moderate self-care, the mean score of 1 to 3 indicates desirable self-care, and the mean score of 3 to 5 indicates weak self-care.[29-31]

After making arrangements with the designer of this scale (Peggy S. Gerard), the English version of the questionnaire was translated into Persian using free translation method. To determine the validity, the translated version of the scale was provided to five cardiologists and five faculty members of the Nursing and Midwifery Faculty, Ilam University of Medical Sciences. Modifications were made based on the views and suggestions of these experts. After the final revision, it was used as a 42-item questionnaire. The test–retest reliability of the CPLNI questionnaire was measured in patients who were candidates for coronary angiography and were not among the intervention or control samples. Test–retest reliability of the scale was assessed by two-way random effects model was used to calculate the intraclass correlation coefficient (2, 1) with 95% confidence interval. This model assumes that random error comes from both the raters and the participants.[32] Cronbach's alpha of 0.92 was obtained after entering the data into SPSS version 16 (SPSS Inc., Chicago, IL,USA), which is an acceptable score to confirm the reliability of the questionnaire. After the sampling was complete, Cronbach's alpha for 63 samples of the control group was 0.95, which again confirmed the reliability of the scale.

### Sampling method

Random convenience sampling was used in this study. To perform random sampling, all patients who referred to the center during 1 week were assigned to the intervention group and all patients who referred next week were assigned to the control group. In the intervention group, patients received the educational text as a training booklet after completing the questionnaire. After preparing this educational text, it was provided to five cardiologists and five faculty members of the Nursing and Midwifery School of Ilam University of Medical Sciences, and the final revision was made based on their comments. Literate patients, while reading the educational text, also received information in simple language face to face through the researcher. In patients with low literacy, the educational text was read once in full and the second time it was explained in simple language to the patient and her companion. Finally, the educational pamphlet was given to the patient to use it at home. Both groups completed the questionnaire again after 2 weeks.

### Data analysis method

After collecting the questionnaires, the data were entered into SPSS version 16 and were analyzed by descriptive statistics including frequency distribution tables, central and dispersion indicators, and inferential statistics including paired *t*-test (for measuring self-care before and after intervention), independent *t*-test (for comparison between intervention and control groups), covariance analysis (to measure the effect of training in each area), Kolmogorov–Smirnov test (for measuring the normality of variables), and Kruskal–Wallis test (significance of the effect of education) were used. The significance level was considered to be $<0.05$.

## RESULTS

This study was conducted among 126 candidates for coronary angiography who referred to Imam Hossein Hospital in Mehran. Table 1 shows the absolute and relative frequency distribution of the research units according to personal characteristics (gender, occupation, education, income, marital status, underlying disease, and smoking). The mean age of the participants in the study was 54.70 years with a standard deviation of 12.2 in intervention group and 60.06 years with a standard deviation of 10.9 in control group. Kolmogorov–Smirnov test was used to measure the normality of the demographic variables, and the results showed that the variables had a normal distribution. For analysis, first independent *t*-test was used to compare the mean of self-care score in the two groups considering the test conditions (normality, independence of groups). The paired *t*-test was used to evaluate the results before and after the educational intervention. The result of average scores in different

**Table 1: Absolute and relative frequency of personal characteristics of participants in both intervention and control groups**

| Personal characteristics | Intervention group, *n* (%) | Control group, *n* (%) | Total, *n* (%) |
|---|---|---|---|
| Gender | | | |
| Male | 42 (66.7) | 30 (47.6) | 72 (57.1) |
| Female | 21 (33.3) | 33 (52.4) | 54 (42.9) |
| Marital status | | | |
| Married | 46 (73) | 41 (65.1) | 87 (69) |
| Single | 6 (9.5) | 5 (7.9) | 11 (8.7) |
| Wife's death | 9 (14.3) | 15 (23.8) | 24 (19) |
| Divorced | 2 (3.2) | 2 (3.2) | 4 (3.2) |
| Job | | | |
| Employee | 16 (25.4) | 12 (19) | 28 (22.2) |
| Free job | 18 (28.6) | 12 (19) | 30 (23.8) |
| Idle | 19 (30.2) | 23 (36.5) | 30 (23.8) |
| disabled | 2 (3.2) | 6 (9.5) | 8 (6.3) |
| Retired | 8 (12.7) | 10 (15.9) | 18 (14.3) |
| Education | | | |
| Illiterate | 16 (25.4) | 18 (28.6) | 34 (27) |
| Under the diploma | 19 (30.2) | 19 (30.2) | 38 (30.2) |
| Diploma | 13 (20.6) | 19 (30.2) | 32 (25.4) |
| Graduate | 15 (23.8) | 7 (11.1) | 22 (17.5) |
| Underlying disease | | | |
| Cardiovascular | 24 (38.1) | 24 (38.1) | 48 (38.1) |
| Diabetes | 10 (15.9) | 12 (19) | 22 (17.4) |
| Digestive | 7 (11.1) | 20 (31.7) | 27 (21.4) |
| Neurological | 4 (6.3) | 3 (4.8) | 7 (5.6) |
| No disease | 18 (28.6) | 4 (6.3) | 22 (17.5) |
| Smoking | | | |
| Yes | 25 (39.7) | 18 (28.6) | 43 (34.1) |
| No | 38 (60.3) | 45 (71.4) | 83 (65.9) |

areas based on cardiac patients learning needs inventory questionnaire in intervention and control groups before and after intervention are persented in Table 2.

Figure 1 shows that the mean educational needs before intervention in the intervention group was 3.463 and in the control group was 3.861. After intervention, the educational needs of the intervention group decreased from 1.840 to 1.623, while this decrease in control group was 0.549, and the educational need was changed to 3.312, and there was no significant difference in the control group before and after the intervention. Overall, the difference between the intervention and control groups was significant ($P < 0.001$).

ANOVA test was used to measure the relationship between demographic variables and the effect of education on reducing educational needs and also improving self-care behaviors. There was no statistically significant relationship between variables and the effect of education.

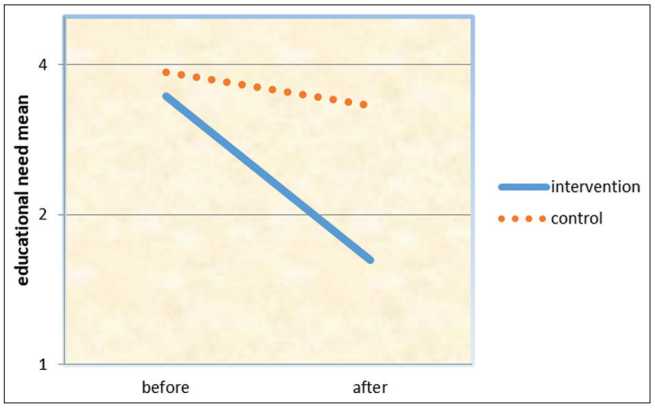


**Figure 1:** General comparison of educational needs in intervention and control groups before and after intervention

## DISCUSSION

The aim of this study was to determine the effect of educational program on self-care behaviors in candidates for coronary angiography. Most of the participants in the study had a high educational need before the intervention; in other words, they had poor or undesirable self-care, and the educational needs in intervention group decreased after this educational program. In the study of Nasiri *et al.*, most samples also had high educational needs in terms of pharmaceutical information, activity, and nutritional information.[17]

Based on the results of this study, the self-care behaviors of patients were mostly in the weak-to-moderate range (receiving an educational need score of 3 and above in most cases), which is similar to the results of Shojaei *et al.*[33]

The educational need of patients was high in terms of pharmaceutical information (3.563), which was consistent with the results of Nasiri *et al.*[17] In the study of Imani,[28]

**Table 2: Average scores in different areas based on cardiac patients learning needs inventory questionnaire in intervention and control groups before and after intervention**

| Educational need | Group | Intervention group | | | Control group | | |
|---|---|---|---|---|---|---|---|
| | | Mean score | SD | Mean score change | Mean score | SD | Mean score change |
| Introduction to the CCU ward | Before | 3.06 | 2.2 | 1.73 | 3.67 | 2.4 | 0.45 |
| | After | 1.33 | 0.8 | | 3.22 | 1.8 | |
| Anatomy and physiology | Before | 3.49 | 2.3 | 1.8 | 3.91 | 2.3 | 0.59 |
| | After | 1.60 | 0.9 | | 3.31 | 2.3 | |
| Psychological factors | Before | 3.56 | 2.1 | 1.95 | 3.81 | 2.5 | 0.47 |
| | After | 1.61 | 1.3 | | 3.34 | 2.3 | |
| Risk factors | Before | 3.46 | 2.4 | 1.79 | 3.91 | 2.8 | 0.60 |
| | After | 1.66 | 1.3 | | 3.30 | 2.7 | |
| Medication information | Before | 3.56 | 2.4 | 1.70 | 3.93 | 2.9 | 0.51 |
| | After | 1.85 | 0.8 | | 3.42 | 2.1 | |
| Diet information | Before | 3.56 | 2.1 | 1.86 | 3.99 | 2.3 | 0.75 |
| | After | 1.69 | 1.3 | | 3.23 | 2.2 | |
| Physical activity | Before | 3.51 | 2.6 | 1.86 | 3.72 | 2.1 | 0.51 |
| | After | 1.65 | 1.2 | | 3.21 | 2.1 | |
| Other pertinent information | Before | 3.47 | 2.3 | 1.91 | 3.92 | 2.8 | 0.48 |
| | After | 1.56 | 1.2 | | 3.43 | 2.7 | |

SD: Standard deviation, CCU: Coronary Care Unit

most of the samples had moderate-to-high educational needs before education, and most of the samples had a moderate-to-low education educational needs after the education, which is consistent with the results of this study.

The results of this study showed that the educational needs of patients regarding their self-care behaviors decreased after education and the educational program was successful. Self-care was in an unfavorable condition in the majority of participants. Given the fact that the research environment was a public center and most of the clients were the elderly, low educational level and low socioeconomic status were expected, which is consistent with the results of other studies.[17,18] in which the health indicators were poorly described. In addition, the results of the study by Jaarsma *et al.* showed that self-care behaviors in these patients are less than desirable, and this situation requires global planning and improvement.[34] In the present study, the "other information" area included diagnosing the symptoms of heart disease, pulse control, and the time of referral to a physician, which was a high educational requirement for most participants, indicating the need for planning to raise public awareness about common diseases such as cardiovascular diseases in the community, which has been emphasized in the study of Jaarsma. However, Peters-Klimm *et al.* showed that the overall self-care score was good in the research units;[35] this contradiction may be due to the use of different scales in self-care surveys or different levels of social welfare and benefiting from higher-quality treatment in a country like Germany, because the score was directly related to the quality of life of people.

In the study of Bassampoor *et al.*,[29] the effect of education on self-care was measured, and it was effective in the areas of drug use, nutrition, other needs, activity, and rest, which is consistent with the results of the present study.

According to the results of this study, literate individuals gained better score, but there was no significant relationship ($P = 0.535$), which is not consistent with Rockwell *et al.*[30] In terms of gender, although women received better self-care score after education, the difference between genders was not significant, which is not consistent with the results of Kabirian *et al.*, in which men showed better self-care than women.[36] In this study, married people had better self-care behaviors, but divorcees and singles had the highest level of change in the score of educational needs. However, this relationship was not significant. In the study of Ovayolu in Turkey, the singles had better self-care capabilities, which is consistent with the results of this research.[37] In this study, singles were often more educated than other groups, which could affect the level of knowledge and observance of self-care behaviors. On the other hand, divorcees and unmarried people have more opportunities to perform self-care behaviors, because they have less family responsibilities than married people.

In this study, the employees got better score, but this relationship was not significant. According to the results by Oksel *et al.*, the employees got better self-care scores than other research units, and there was a significant relationship between self-care capacity and occupation,[38] which contradicts the results of the present study.

## Limitation

Study environment, Imam Hossein Mehran Hospital, was the only center in the Ilam province for angiography; and patients were admitted on the morning of surgery

or in special cases the night before surgery. Given that performing educational intervention requires the right opportunity and time, patients who were candidates for emergency angiography were not included in the study and they did not receive education, while these patients also have high stress. However, after the study, educational content was provided to the ward for patient's education.

## CONCLUSION

Considering that self-care behaviors are very important in candidates for coronary artery angiography, interventional efforts are necessary to improve such behaviors in these patients to control and prevent complications, admission and readmission, and ultimately early-age mortality. The use of a curriculum such as the one designed and used in this study is recommended to promote self-care behaviors in these patients. It should be noted that, using health education experts in health centers or in educational programs of mass media and the provision of books and educational pamphlets for these patients and their families are likely to promote self-care in candidates for coronary artery angiography, because the first step to take any action is to obtain information and gain the necessary knowledge in this area.

Considering the different aspects of self-care, it is suggested that future studies evaluate various areas of self-care and the impact of education on each area. They can also use other educational methods such as educational videos. Conducting comparative studies using different educational methods and conducting studies using other quantitative and qualitative research methods are also recommended.

### Conflicts of interest

There are no conflicts of interest.

### Authors' contributors

All authors participated in all stages of the article.

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