**RESEARCH NOTE**                                                          **Open Access**

# The impact of an educational discharge program based on Orem's self-care model on lifestyle, hope, and treatment adherence in coronary angioplasty patients: a randomized controlled clinical trial

Zahra Mohebi[1], Mostafa Bijani[2*], Abdulhakim Alkamel[3], Azizallah Dehghan[3] and Shahnaz Karimi[4]

## Abstract

**Objective**  Patient education at the time of discharge using models which aim to improve self-care behaviors can significantly contribute to patients' adoption of a healthy lifestyle and treatment adherence. This is a randomized controlled clinical trial with no blinding in which we tested two groups of intervention control. 90 patients having undergone coronary angioplasty were allocated to an intervention ($N=45$) and a control group randomly ($N=45$). Data were collected from January to October 2022. The data collection instruments comprised angioplasty patients' treatment adherence questionnaire, Walker's health-promoting lifestyle profile questionnaire, and Snyder's Hope Scale. Data analysis was performed using SPSS version 23. To analyze the data, we used descriptive statistics. Accordingly, inferential statistics applied included chi-square, independent-samples t-test, and repeated measures (ANOVA). Significance level was considered as $p < 0.05$.

**Results**  The mean scores of lifestyle, hope, and treatment adherence in the intervention group were significantly higher than those of the control group as measured immediately and three months after the intervention ($p < 0.05$). The study results revealed that using discharge program based on Orem's self-care model positively impacted the lifestyle, hope, and treatment adherence of patients having experienced coronary angioplasty.

**Iranian registry of clinical trials**  IRCT registration number: IRCT20190917044802N5.

**Registration date**  17/7/2022.

**Keywords**  Self care, Education, Patient, Lifestyle, Treatment adherence, Discharge program

*Correspondence:
Mostafa Bijani
bizhani_mostafa@yahoo.com
[1]Student Research Committee, School of Nursing, Fasa University of Medical Sciences, Fasa, Iran
[2]Department of Medical Surgical Nursing, School of Nursing, Fasa University of Medical Sciences, Fasa 81936-13119, Iran
[3]Noncommunicable Diseases Research Center (NCDRC), Fasa University of Medical Sciences, Fasa, Iran
[4]Department of Medical Education, Medical Education Research Center, Fasa University of Medical Sciences, Fasa, Iran

## Introduction

As one of the major issues in healthcare systems in many societies, cardiovascular diseases are a main cause of death and disability which imposes great costs on the healthcare systems [1]. In Iran, cardiovascular diseases, especially cardiac arrest, account for more than 40% of deaths [2]. Artery coronary angioplasty is a modern treatment for many patients with blockage of coronary arteries [3]; more than 85% of heart disease patients can be cured by coronary angioplasty [4]. Compared to surgery, this treatment is considered a low-risk, less invasive, and economical method that reduces the length of treatment and hospital stays [5]. At the time of discharge, following coronary angioplasty, most patients are concerned about their lifestyle, limitations in their daily activities, regimen, and medication and their side effects, emphasizing the need to raise the patients' awareness [6–7]. Effective discharge planning is associated with continuation of treatment, greater patient satisfaction, improved well-being of patients, and shorter hospital stays [8]. Although the discharge plan and its record in Europe and the US has benefits, there is still a controversy in this regard [9]. In Iran few studies have investigated the discharge plan, and the impacts of its usage have not been clarified yet [10]. Studies report that at least 50% of patients with a cardiac disorder, especially those who are treated by coronary angioplasty, do not exercise satisfactory medication adherence or discontinue their medication. Discontinuation of antiplatelet therapy may result in the recurrence of cardiac arrest, blockage in a stent due to a clot, re-hospitalization, prolongation of the treatment process, and higher medical expenses for the healthcare system [11–12].

Self-care, a strategy to adapt to the realities and distresses of life, can contribute to the well-being of patients and their families through conscious, learned, and purposeful activities [13]. Orem's self-care model aims to improve care using the individuals' conditions and needs while they experience a deviation from normal health [14]. A study conducted by Nasiri et al. (2022) revealed that the Orem's self-care model helped the nurses in different fields to assess the patients' self-care ability dynamically and carefully and take appropriate nursing measures based on their individual needs, challenges, and interests. Given the lack of consistent evidence which confirms the empirical efficacy of this model, it is recommended that high-quality reviews should be done [15]. In a previous study, telephone consultation was performed using orem self-care model in patients with coronary angioplasty [16]. In another study, the interdisciplinary discharge program was evaluated in this patients without using the Orem self-care model [17]. Also, other studies have evaluated the application of Orem's self-care model on some variables such as treatment adherence, resilience [16], quality of life and re-hospitalization in patients with coronary angioplasty separately [18].

The increasing prevalence of cardiovascular diseases has led to a rise in medical interventions, especially coronary angioplasty. Most of the studies in this field have been conducted descriptively, and the few available experimental studies have not used a discharge plan according to Orem's self-care model. Thus, due to the importance of the subject and since few studies have been carried out in this area, it is recommended that the present study should be carried out in different countries to develop knowledge translation in patient education. Accordingly, the present study was designed to find out the impact of an educational discharge program using Orem's self-care model on the lifestyle, hope, and treatment adherence of cardiac disease patients for whom coronary angioplasty had been done in the south of Iran in 2022.

## Main text

### Study design

This is a randomized controlled clinical trial with no blinding in which an intervention and a control group were investigated. The study was conducted between June and October 2022. To measure the effectiveness of a discharge plan using Orem's self-care model in promoting the lifestyle, hope, and treatment adherence of patients having experienced coronary angioplasty, the researchers performed three tests on the participants: before, immediately after, and three months after the intervention.

### Inclusion and exclusion criteria

The inclusion criteria consisted of willingness to participate in the study; being literate; lack of an acute or chronic psychological or cognitive disorder; lack of a chronic disease, e.g. a liver, kidney, or lung disease, cancer, etc.; and lack of a speech, hearing, or sight impairment. The exclusion criteria included deterioration of the patient's condition, lack of attendance in more than two sessions of the educational intervention, unwillingness to continue participation in the study, withdrawal from the study for any reason, and death of the patient.

### Sample size and study population

To investigate the quality of randomized controlled trials performed, in the present study we used the CONSORT checklist [19]. The study population consisted of patients hospitalized in the CCU (Coronary care units) or post-CCU of two hospitals in the south of Iran after coronary angioplasty. According to a study by Rahpeima et al. [17] and using the formula for comparison of the means of two dependent groups, $\beta = 0.1$, $\alpha = 0.05$, $\sigma = 3.7$, and $\mu = 21.51$, the minimum sample size was estimated

26 patients. However, due to attrition and increase in the study power, we decided to study 45 patients in each group. Figure 1 displays the participants' consort flow diagramthroughout the study (Fig. 1).

## Data collection and the questionnaires
### The data collection tool consisted of three questionnaires

1. **Treatment adherence questionnaire**: As defined by the World Health Organization (WHO), adherence is defined as the extent to which the patient follows medical instructions [20]. The treatment adherence questionnaire for coronary angioplasty patients is a researcher-made instrument developed by Rahpeima et al. [17]. It contains 10 items scored using a 5-point Likert scale, ranging from always = 5 to never = 0. Thus, the maximum score is 50. The respondents' scores are divided into poor, average, and satisfactory. The scores 1–25 indicate- poor adherence,26–40 indicate- average adherence, and 41–50 indicates- satisfactory adherence. The reliability of the questionnaire was shown to be 0.89. In the present study, it was 0.90, which shows that the internal consistency of this questionnaire is at a good level. (Supplementary file: Questionnaire)

2. **Snyder's Hope Scale**: Snyder's Hope Scale contains 12 items with two subscales: agency and pathways. Respondents specify the degree of agreement or disagreement with each item on an 8-point Likert scale, ranging from completely agree to completely disagree. The scores range from 8 to 64; the score 8 indicates the lowest level and 64 the highest level of hope [21]. Researchers in Iran have approved the validity and reliability of this scalen. A study by Matinfar (2020) found that the internal consistency of the total scale was between 0.74 and 0.84, and its reliability was 0.80 [22]. The Cronbach's α value in the present study was 0.89.

3. **The Health Promoting Lifestyle Profile-II (HPLP-II )**: The Health Promoting Lifestyle Profile-II (HPLP-II) developed by Walker et al. [23]. It measures health promoting lifestyles as health promoting behaviors (HPB) by focusing on self-initiated actions and perceptions that serve to maintain or enhance the level of wellness, self-actualization, and fulfillment of the individual [23]. The scale consists of 52 items which are scored using a 4-point Likert scale: never = 1, sometimes = 2, often = 3, and always = 4. The scores of the health-promoting lifestyle profile range between 52 and 208, and the score for each dimension is calculated separately. This instrument was translated and validated in Iran by Zeidi et al.( 2012). Cronbach's alpha was used to estimate the reliability of the

instrument, which was shown to be 0.82 for the whole instrument [24]. A study by Rakhshan et al. (2015) found Cronbach's alpha of the scale to be 0.89 [25]. The Cronbach's α value in the present study was 0.88.

## Intervention and follow-up
The study was conducted between June and October 2022. The educational program based on Orem's self-care model was designed to be implemented in six sessions. The first four sessions were face-to-face meetings, which lasted one hour and provided education through group discussions, lectures, and educational pamphlets. Because of the spread of the seventh wave of COVID-19 in Iran, the other two sessions were held online using telenursing. In the present study, the experiences and expertise of different groups, including cardiologist, psychologist, as well as experienced nursing professors ( fifth author (SK) and corresponding authors (MB), who were an associate professors of nursing), were used in the development and implementation of the educational program. Face-to-face training sessions were conducted in the conference hall of theVali-asr hospital in Fars Province, south of Iran. The education content was presented via videos, photos, and PowerPoint. In each session, in addition to educating the patients, the researchers checked the patients' drugs, assessed their treatment adherence, and encouraged them to be more cooperative. Also, the barriers to the patients' treatment adherence were identified, and measures were taken to eliminate them. In the first session, the sessions' structure and the educational program's objectives were explained, and the concept of hope, based on Snyder's theory, was defined [21]. In the second session, the ways to have more hope and the impact of having hope on health were discussed. The patients were advised to have a healthy diet, consume less salt and fat, and replace fast food with vegetables and fruits for a better lifestyle. In session three, each patient was asked to tell their life story using the three dimensions of Snyder's theory, i.e., goal, agency, and pathways, in their own words to the group. Also, the researchers informed the patients about their drugs, how to use them, and their possible side effects to help them improve their lifestyle. In the fourth session, the patients were asked to list the ongoing events and important aspects of their lives and determiner significance. Moreover, the patients were encouraged to improve their lifestyle by playing sports and doing exercise that suited them. In session five, the qualities of proper goals were discussed and then the patients were encouraged to set themselves goals in one of the domains of their lives. The patients were also introduced to cardiac disease risk factors, including being overweight, smoking, inactivity, stress, anxiety, tension, and any other factors that could
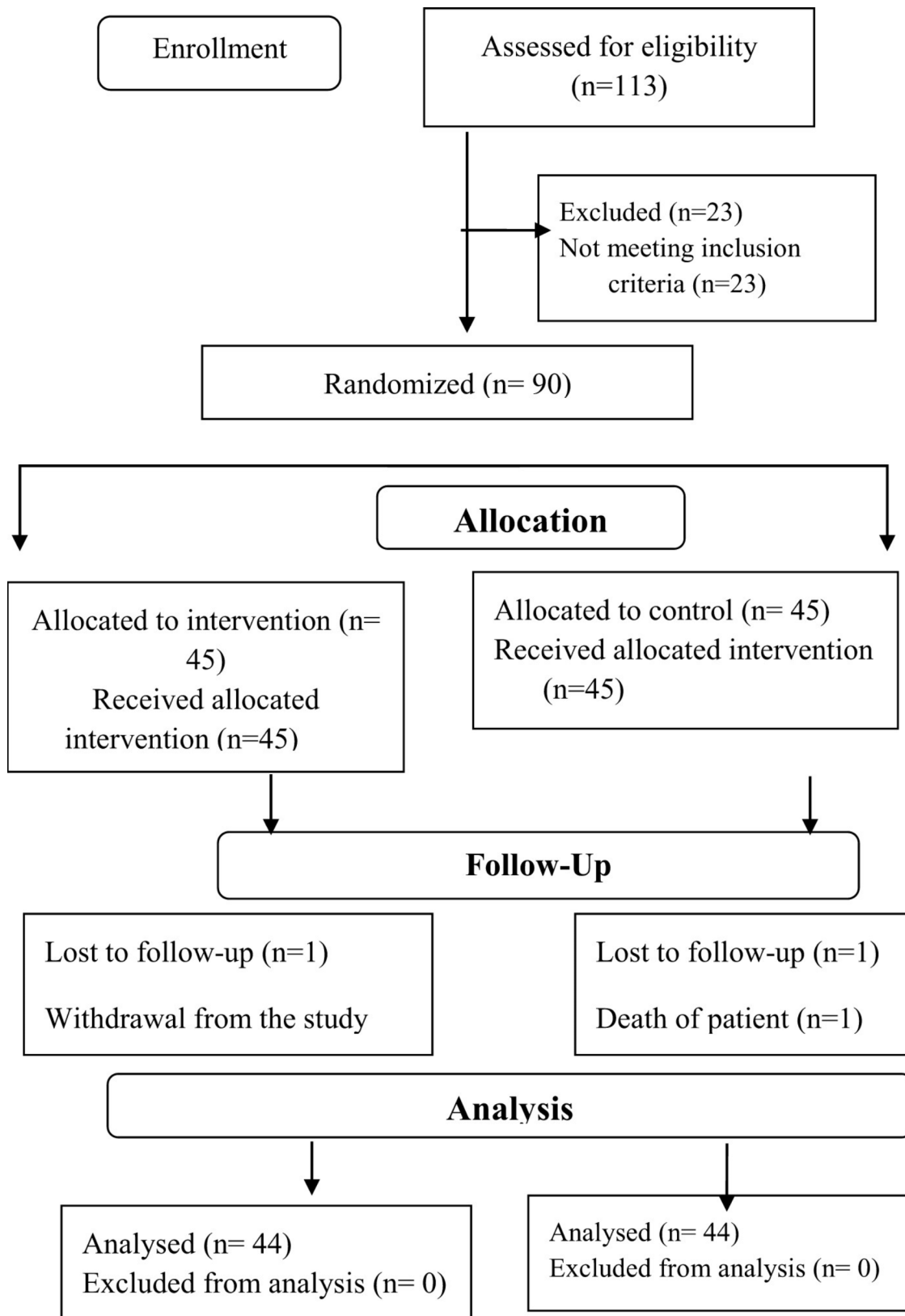
**Fig. 1** Displays the participants' consort flow diagram throughout the Study

threaten their health. In session six, the last session, the patients were asked to think of strategies to achieve their goals. To help improve the patients' lifestyles, the researchers explained that they should regularly visit their doctors for a check-up and para-clinical services every one to three months. The patients in the control group did not receive any intervention and were only provided with the educational booklet. As well as the patients in the control group received a routine program by health care providers in health centers. Additionally, participants within the intervention group were afforded the opportunity to receive telephone consultations with the researcher, lasting 10–20 min; in total, 60 to 90 min were considered for each person. The patient completed the questionnaires before, immediately after, and three months after the intervention. The first author (ZM) distributed and collected the questionnaires.

### Data analysis

The collected data were analyzed using SPSS version 23. The Kolmogorov-Smirnov test determined how much the quantitative variables followed a normal distribution. To analyze the data, we used descriptive statistics. Accordingly, inferential statistics applied included chi-square, independent-samples t-test, and repeated measures (ANOVA). Significance level was considered as $p < 0.05$.

### Results

The participants comprised 90 patients (69.3% male and 30.7% female) treated by coronary angioplasty and were divided into control ($N = 45$) and intervention ($N = 45$) groups. The independent t-test and chi-square test revealed no statistically significant differences between both groups ($p > 0.05$) (Table 1).

As to lifestyle and its dimensions, before the intervention, the results revealed an insignificant difference between the intervention and control groups' pre-test mean scores. Also, the two groups' mean scores on lifestyle post-testdid not significantly differ as measured immediately after the intervention. However, at the end of the study (three months after the intervention), we found a significant difference between the mean scores of the six lifestyle dimensions in both groups. Also, it was revealed that the differences in lifestyle mean scores in the intervention group exceeded those of the control group ($p < 0.001$) (Table 2). According to the results of the repeated measures analysis of variance, unlike the control group, the pattern of change in the lifestyle of the intervention group patients, was significant, indicating improvement ($p < 0.001$) (Table 2).

A comparison of the hope mean scores in both groups before the intervention ($p = 0.402$) and immediately after it ($p = 0.920$) showed that they did not vary significantly. However, three months after the intervention was done, we found a significant difference between the two groups in the hope mean scores ($p < 0.001$) (Table 3). We found no significant difference between the treatment adherence mean scores of both groups as measured before the intervention. However, we found a significant difference between the two groups' mean scores immediately after and three months after the intervention. Furthermore, the findings of this study revealed that the differences

**Table 1** Demographic information of the subjects (intervention and control groups)

| Variable | Grouping | Intervention group | Control group | *P*-value |
|---|---|---|---|---|
| Age (mean ± SD) | - | 58.43 ± 9.88 | 61.40 ± 12.31 | 0.21* |
| Duration of illness(month) | - | 5.65 ± 7.43 | 3.72 ± 4.93 | 0.24* |
| Marital status(number(percent)) | Single | 5(11.4%) | 4(9.1%) | 0.94** |
| | Married | 36(81.8%) | 37(84.1%) | |
| | Divorced or widowed | 3(6.8%) | 3(6.8%) | |
| Educational level (number(percent)) | Primary school | 4 (9.1%) | 7 (15.9%) | 0.73** |
| | High school | 23 (52.3%) | 23 (52.3%) | |
| | Diploma | 11 (25.0%) | 10 (22.7%) | |
| | Upper than diploma | 6 (13.6%) | 4 (9.1%) | |
| Sex(number(percent)) | Female | 12 (27.3%) | 15 (34.1%) | 0.64** |
| | Male | 32 (72.7%) | 29 (65.9%) | |
| Diabetes | yes | 18(40.9%) | 16(36.4%) | 0.82** |
| | no | 26(59.1%) | 28(63.6%) | |
| Dyslipidemia | yes | 15 (34.1%) | 11 (25.0%) | 0.48** |
| | no | 29(65.9%) | 33(75.0%) | |
| Hypertension | yes | 18 (40.9%) | 24 (54.5%) | 0.28** |
| | no | 26(59.1%) | 20(45.5%) | |
| Family history | yes | 29(65.9%) | 20 (45.5%) | 0.11 ** |
| | no | 15(34.1%) | 24(54.5%) | |

* Independent sample t test. **Chi square test

Mohebi *et al. BMC Research Notes*      (2025) 18:105

Page 6 of 9

**Table 2** Comparing the average scores of lifestyle dimensions before, immediately and three months after the intervention in the intervention and control groups

| Variables | Time of evaluation | Intervention | Control | *P*-value* |
|---|---|---|---|---|
| Nutrition | Before | 25.29±4.34 | 24.38±4.38 | 0.37 |
| | Immediately | 30.95±4.32 | 29.56±5.41 | 0.22 |
| | 3mounth later | 34.02±3.25 | 24.50±4.26 | <0.001 |
| | *P*-value | <0.001 | <0.001 | |
| Spiritual growth | Before | 12.93±2.12 | 12.70±2.48 | 0.32 |
| | Immediately | 16.54±3.12 | 16.11±3.24 | 0.52 |
| | 3mounth later | 18.45±2.40 | 13.86±2.60 | <0.001 |
| | *P*-value | <0.001 | <0.001 | |
| Stress management | Before | 12.50±2.04 | 12.61±2.37 | 0.62 |
| | Immediately | 16.40±3.01 | 15.65±3.27 | 0.30 |
| | 3mounth later | 17.97±2.28 | 14.09±3.23 | <0.001 |
| | *P*-value | <0.001 | <0.001 | |
| Physical activity | Before | 26.59±4.92 | 24.90±6.20 | 0.058 |
| | Immediately | 34.72±4.98 | 32.15±7.97 | 0.27 |
| | 3mounth later | 40.00±3.89 | 28.13±5.7 | <0.001 |
| | *P*-value** | <0.001 | <0.001 | |
| Interpersonal communication | Before | 18.09±3.82 | 16.06±4.08 | 0.10 |
| | Immediately | 21.50±3.61 | 20.56±4.71 | 0.39 |
| | 3mounth later | 24.50±3.06 | 17.95±3.95 | <0.001 |
| | *P*-value** | <0.001 | <0.001 | |
| Health responsibility | Before | 17.56±3.44 | 16.31±3.38 | 0.06 |
| | Immediately | 22.00±3.03 | 20.11±5.02 | 0.13 |
| | 3mounth later | 24.43±2.81 | 18.68±4.04 | <0.001 |
| | *P*-value** | <0.001 | <0.001 | |
| Total lifestyle score | Before | 112.96±4.97 | 108.93±6.29 | 0.034 |
| | Immediately | 141.60±5.44 | 134.14±5.77 | <0.001 |
| | 3mounth later | 159.38±4.32 | 117.21±4.91 | <0.001 |
| | *P*-value** | <0.001 | <0.001 | |

* Independent sample t-test. **Repeated measures ANOVA

**Table 3** Comparing the mean scores of hope dimensions before, immediately and three months after the intervention in the intervention and control groups

| group | Before intervention | Immediately after the intervention | 3months after the intervention | *p*-value* |
|---|---|---|---|---|
| intervention | 34.54±4.74 | 39.02±3.54 | 45.59±5.06 | <0.001 |
| control | 33.72±3.37 | 38.54±5.59 | 36.09±4.47 | <0.001 |
| total | 34.13±4.11 | 38.78±4.65 | 40.84±6.73 | <0.001 |
| *p*-value** | 0.402 | 0.920 | <0.001 | |

* Independent sample t-test. **Repeated measures ANOVA

in treatment adherence mean scores in the intervention group exceeded those of the control group (Tables 4 and 5).

## Discussion

According to the findings of this study, an increase in the lifestyle mean score of the intervention group patients was observed; as the t-test results showed, a statistically significant difference was found between both groups' post-test lifestyle mean scores. These findings are in the same line with those of other studies on the impact of education on the patients' lifestyle after coronary angioplasty. A study carried out by Khodaveisi et al. (2022)

aimed to investigate the impact of education using Pender's model on health-promoting behaviors in patients who had undergone coronary angioplasty; it was proved that education effectively improved the patients' lifestyles [26].

Similarly, a study by Mohammadi, et al., which explored the effects of an educational intervention based on the multimedia education in combination with teach-back method on the lifestyle of patients with a cardiac disorder, demonstrated that the education significantly contributed to improving the patients' lifestyles and promotion of the quality of life. Even though the study's population and educational model above differed from

Mohebi *et al. BMC Research Notes*      (2025) 18:105

Page 7 of 9

**Table 4** Comparison of the percentage of adherence to treatment dimensions before, immediately and three months after the intervention in the intervention and control groups

| group | Dimensions | Before intervention | Immediately after the intervention | 3months after the intervention | *p*-value* |
|---|---|---|---|---|---|
| intervention | high | 5(11.4%) | 21(47.7%) | 26(59.1%) | <0.001 |
| | moderate | (72.7%)32 | (47.7%)21 | (40.9%)8 | |
| | low | 7(15.9%) | 2(4.5%) | 0(0.0%) | |
| control | high | 3(6.8%) | 10(22.7%) | 5(11.4%) | 0.039 |
| | moderate | (90.9%)40 | (77.3%)34 | (79.5%)35 | |
| | low | (2.3%)1 | (0.0%)0 | (9.1%)4 | |
| *p*-value* | P- Value | 0.053 | 0.011 | <0.001 | |

*Chi square tests

**Table 5** Comparing the mean scores of treatment adherence before, immediately and three months after the intervention in the intervention and control groups

| group | Before intervention | Immediately after the intervention | 3months after the intervention | *p*-value* |
|---|---|---|---|---|
| intervention | 31.97±6.39 | 39.75±5.27 | 40.22±5.61 | <0.001 |
| control | 31.72±4.92 | 36.54±4.89 | 32.90±5.94 | <0.001 |
| total | 31.85±5.67 | 38.14±5.30 | 36.56±6.82 | <0.001 |
| *p*-value** | 0.837 | 0.004 | <0.001 | |

* Independent sample t-test. **Repeated measures ANOVA

those of the present study, the results are consistent and demonstrate that education improves patients' lifestyles [27]. Similarly, Rohani et al. (2019) found that the subjects' lifestyle scores increased significantly in the post-test stage [28]. Another study by Babaei et al. (2020) assessed the impact of an educational intervention using the Health Belief Model on the adoption of health-promoting behaviors by individuals at risk of cardiovascular diseases. It was found that the intervention significantly increased the participants' lifestyle mean scores [29].

As the results of the current study showed, the educational discharge program using Orem's self-care model effectively increased hope in the patients who had experienced coronary angioplasty. The intervention boosted hope in the intervention group and the control group patients; however, the latter experienced a much slighter change. An explanation for this outcome is that by completing Snyder's hope scale three times, the patients in the control group became mentally prepared to have more hope. In a systematic review, Miles et al. concluded that filling out the questionnaires and scales could cause changes in the respondents' behaviors [30]. Also, education and counseling provided by caregivers in hospitals and clinics increased hope and satisfaction in patients, as verified by the findings of a study by Woo et al. [31]. Another reason for the increase in the control group's hope mean score is that the patients may have benefitted from the experiences of other cardiac disease patients among their friends or relatives. The results of the present study are also consistent with those of a study conducted by Kamalpur (2019). In the latter study, data analysis showed a significant difference between the patients' pre-test and post-test scores of hope, confirming

the assumption that education increases hope in patients with a cardiac disease [32]. Similarly, in their study, Alipour Shahir et al. (2021) concluded that mindfulness training contributed to the patients' increase in hope [33]. As with other studies, the present study indicated that effective patient education significantly increased hope in patients who often experienced loss of hope after being diagnosed with a cardiovascular disease [34]. In a quasi-experimental study, Wangungu et al. found that the intervention increased the medication adherence of the intervention group as compared to the control group [35].

Similarly, according to a study conducted by Kobrae et al. (2022), educational packages, as an easy-to-use and safe method of education, can help increase health literacy and treatment adherence in patients with a cardiac disorder and prevent their illness from advancing [36]. Ghorbanimoghadam et al. (2022) found that the intervention had a positive impact on the patients' treatment adherence and its subcategories [37]. Another study, which explored the effects of an educational program using text messages about treatment adherence, i.e. a healthy regimen, exercise, and secondary prevention following an acute coronary syndrome over 12 months, reported similar results despite the differences between the mentioned study and the present study in the educational interventions tested and the length of follow-up [38]. Another study carried out by Ranjbaran et al. (2022) in Iran indicated that the intervention designed using the health action process approach caused improvements in diet and medication adherence in patients with type 2 diabetes [39].

Mohebi *et al. BMC Research Notes*        (2025) 18:105

Page 8 of 9

In the present study, the intervention group exhibited higher mean scores for both treatment adherence, lifestyle and hope at the three-month post-intervention assessment compared to the immediate post-intervention period. This finding contrasts with the results of Rahpeima et al., whose study reported a decline in the intervention group's mean treatment adherence scores at one month post-intervention relative to the immediate post-intervention measurements [17]. A potential explanation for these divergent outcomes lies in the fact that participants in the current study, in addition to attending in-person educational sessions and online meetings, received ongoing telephone consultations throughout the three-month post-intervention period. Moreover, this sustained improvement may be attributable to participants' exposure to supplementary cardiac self-care education via peer group and audiovisual media channels.

## Limitations

Due to the 7th wave of COVID-19, the researcher had to use online education and telenursing instead of face-to-face training in 2 out of 6 training sessions, which may have caused intervention choice bias, which the researcher did not control. Another study limitation was the short interval between the intervention and assessment of the patients' outcomes. Further studies are suggested to consider longer time periods for assessing patients'outcomes. Also, this study was conducted in the south of Iran; it is also suggested that it should be carried out in other regions of Iran and other countries as well.

## Implications for nursing practice and education

This study provided valuable findings regarding the application of Orem's self-care model, in patients undergoing coronary angioplasty and can be the basis of other research in this field. Nursing professors should institutionalize the use of nursing models in the education and nursing curriculum; also, nursing managers can use educational interventions in other chronic diseases based on Orem's self-care model to improved adherence to treatment, lifestyle, and hope.

## Conclusion

The results of our study showed that the Orem's self-care model effectively improved the discharge program of patients who had experienced coronary angioplasty and improved the patients' self-care skills, including adherence to treatment, lifestyle, and hope of these patients. Therefore, it is suggested that healthcare administrators establish this new approach to patient education in the discharge plans of other patients.

## Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s13104-025-07164-9.

Supplementary Material 1

## Data availability
The data that support the findings of this study are available from the corresponding author upon reasonable request.

## Declarations

### Ethics approval and consent to participate
This study was done based on the principles outlined in the revised Declaration of Helsinki. This internationally recognized statement provides ethical guidance for physicians and researchers conducting human subject research. Written informed consent was obtained from all the participants. Furthermore, the participants were explicitly informed about the measures taken to ensure anonymity and confidentiality of their data. For added ethical oversight, approval for the study was obtained from the Research Ethics Committees of Fasa University of Medical Sciences, Fars, Iran, with the code of IR.FUMS.REC.1401.035. All the research methods were performed following the principles of the Declaration of Helsinki.

### Consent for publication
Not applicable.

### Competing interests
The authors declare no competing interests.

## References
1. Roth GA, Mensah GA, Johnson CO, Addolorato G, Ammirati E, Baddour LM, et al. Global burden of cardiovascular diseases and risk factors, 1990–2019: update from the GBD 2019 study. J Am Coll Cardiol. 2020;76(25):2982–3021.
2. Sarrafzadegan N, Mohammadifard N. Cardiovascular disease in Iran in the last 40 years: prevalence, mortality, morbidity, challenges and strategies for cardiovascular prevention. 2019.
3. Emamgholipour S, Moeini S. Comparison of the economic burden between coronary artery bypass grafting and percutaneous coronary intervention at a One-Year Follow-up. Iran Heart J. 2022;23(1):106–11.
4. Almeida AS, Fuchs SC, Fuchs FC, et al. Effectiveness of clinical, surgical and percutaneous treatment to prevent cardiovascular events in patients referred for elective coronary angiography: an observational study. Vasc Health Risk Manag. 2020;16:285–97.

5.  Mäkikallio T, Holm NR, Lindsay M, et al. Percutaneous coronary angioplasty versus coronary artery bypass grafting in treatment of unprotected left main stenosis (NOBLE): a prospective, randomized, open-label, non-inferiority trial. Lancet. 2016;388(10061):2743–52.

6.  Zafari E, Rokhafroz D, Dashtbozorgi B, Maraghi E. The effectiveness of based-mobile education on anxiety of patients candidate coronary angiography. Crit Care Nurs. 2019;12(2):35–41.

7.  Hassankhani H, Haririan H, Jafari A, Porter JE, O'Brien F, Feizollahzadeh H. Learning needs of Iranian patients with coronary heart disease: A Cross-sectional, comparative study. Clin Nurs Res. 2021;30(2):193–9.

8.  Pellett C. Discharge planning: best practice in transitions of care. Br J Community Nurs. 2016;21(11):542–8.

9.  Dimla B, Parkinson L, Wood D, Powell Z. Hospital discharge planning: A systematic literature review on the support measures that social workers undertake to facilitate older patients' transition from hospital admission back to the community. Australas J Ageing. 2023;42:20–33. https://doi.org/10.1111/ajag.13138.

10. Nasiri A, Akbari A, Jani H. Challenges and implementation strategies of the discharge planning according to the nurses' experiences: A qualitative study. Mod Care J 2022;19(2):e121663. https://doi.org/10.5812/modernc-121663

11. Aghabekyan S, Thompson ME, Abrahamyan L. Medication noncompliance and patient satisfaction following percutaneous coronary intervention. J Interv Cardiol. 2012;25(5):469–75. https://doi.org/10.1111/j.540-8183.2012.00743.x.

12. Salari A, Rouhi Balasi L, Ashouri A, Moaddab F, Zaersabet F, Nourisaeed A. Medication adherence and its related factors in patients undergoing coronary artery angioplasty. J Caring Sci. 2018;7(4):213–8. https://doi.org/10.15171/jcs.2018.032. Published 2018 Dec 1.

13. Godfrey CM, Harrison MB, Lysaght R, Lamb M, Graham ID, Oakley P. Care of self-care-care by other-care of other: the meaning of self-care from research, practice, policy and industry perspectives. Int J Evid Based Healthc. 2011;9(1):3–24. https://doi.org/10.1111/j.1744-1609.2010.00196.x.

14. Hartweg DL, Metcalfe SA. Orem's Self-Care deficit nursing theory: relevance and need for refinement. Nurs Sci Q. 2022;35(1):70–6. https://doi.org/10.1177/08943184211051369.

15. Nasiri M, Jafar Z, Rakhshan M et al. Application of Orem's theory-based caring programs among chronically ill adults: A systematic review and dose-response meta-analysis. Int Nurs Rev 2022 https://doi.org/10.1111/inr.12808

16. Rostami K, Maryami M, Rambod M. The effect of telephone counseling based on Orem's model on adherence to treatment and resilience of patients with coronary angioplasty: a randomized clinical trial. BMC Cardiovasc Disord. 2023;23(1):489.

17. Rahpeima E, Bijani M, Karimi S, Alkame A, Dehghan A. Effect of the implementation of interdisciplinary discharge planning on treatment adherence and readmission in patients undergoing coronary artery angioplasty. Investigación y Educación en Enfermería. 2022.

18. Yildiz FT, Kaşikçi M. Impact of training based on Orem's theory on self-care agency and quality of life in patients with coronary artery disease. J Nurs Res. 2020;28(6):e125.

19. Altman DG. Better reporting of randomised controlled trials: the CONSORT statement. BMJ. 1996;313(7057):570–1.

20. Sabaté E, Organization WH. Adherence to long-term therapies: policy for action: meeting report, 4–5 June 2001.

21. Snyder CR, Sympson SC, Ybasco FC, Borders TF, Babyak MA, Higgins RL. Development and validation of the state hope scale. J Personal Soc Psychol. 1996;70(2):321–35.

22. Matinfar. The effectiveness of meaning therapy on life expectancy in heart patients. New Ideas Psychol Q. 2021;7(11):1–9.

23. Walker SN, Kerr MJ, Pender NJ, Sechrist KR. A Spanish Language version of the health-promoting lifestyle profile. Nurs Res. 1990;39:268–73.

24. Zeidi IM, Hajiagha AP, Zeidi BM. Reliability and validity of Persian version of the Health- promoting lifestyle profile. J Mazand Univ Med Sci. 2012;22(1):103–13. (Persian).

25. Rakhshan M, Kordshooli KR, Ghadakpoor S. Effects of family-center empowerment model on the lifestyle of heart failure patients: A randomized controlled clinical trial. Int J Community Based Nurs Midwifery. 2015;3(4):255.

26. Khodaveisi M, Younesi Z, Pakrad F, Tapak L. The effect of education based on Pender's model on Health-Promoting behaviors in patients undergoing coronary angioplasty: A randomized control trial study. J Sabzevar Univ Med Sci. 2022;29(4):496–511.

27. Mohammadi F, Jahromi MS, Bijani M, Karimi S, Dehghan A. Investigating the effect of multimedia education in combination with teach-back method on quality of life and cardiac anxiety in patients with heart failure: a randomized clinical trial. BMC Cardiovasc Disord. 2021;21(535):1–9.

28. Khodabandehlooie S, Estebsari F, Rohani C, Shaarbaf Eidgahi E. Effects of educational intervention on lifestyle among Iranian patients after coronary angioplasty: A randomized controlled trial. Iranian Heart Journal. 2019.

29. Babaei S, Shakibazadeh, Shojaizadeh D. Evaluating the effect of educational intervention based on the health belief model on healthy lifestyle promoting behaviors in people prone to cardiovascular disease. Iran Health Educ Health Promotion Q. 2020;8(3):224–39.

30. Miles LM, Elbourne D, Farmer A, Gulliford M, Locock L, McCambridge J, et al. Bias due to measurement reactions in trials to improve health (MERIT): protocol for research to develop MRC guidance. Trials. 2018;19(1):1–8.

31. Woo BFY, Lee JXY, Tam WWS. The impact of the advanced practice nursing role on quality of care, clinical outcomes, patient satisfaction, and cost in the emergency and critical care settings: a systematic review. Hum Resour Health. 2017;15(1):1–22.

32. Kamalpur H, Jafarnjad, Bakr A. Nvestigating the effect of face-to-face self-centered care training on the life expectancy of cardiovascular patients admitted to Bandar Abbas Shahid Mohammadi hospital in 95–96. J Fac Med Mashhad Univ Med Sci. 2019;62(4):1574–80.

33. Alipour Shahir M, Esfahani Khaleghi A, Arabzadeh M, Alipour Shahir B. BEffectiveness of mindfulness on stress, happiness and hope in patients with cardiovascular disease. RJMS. 2021;28(3):19–30.

34. Gholamzadeh, S., Moradizadeh, H. A., Zarifsanaiey, N., Raiesi, H. An Interactive Multimedia Training on Anxiety, Uncertainty, and Hope among Patients Undergoing Percutaneous Coronary Intervention: An Interventional Study. Interdisciplinary Journal of Virtual Learning in Medical Sciences, 2022; 13(1): 54-62. doi: 10.30476/ijvlms.2022.94449.1134

35. Wangungu E. The Effect of an Educational Intervention on Medication Adherence in Persons with Coronary Artery Disease. 2021.

36. Kobrae AA. writer, worker M, Kamran, Miranzadeh. The effect of educational package on adherence to treatment and health literacy in patients with heart failure. Faiz Sci Res Journal::: Kashan Univ Med Sci. 2022;26(3):302–10.

37. Ghorbanimoghaddam V, Zarei, Moezi T. Investigating the effect of educational program based on information model, motivation and behavioral skills on treatment compliance in patients after coronary angioplasty. J Nurs Educ. 2022;11(4):82–93.

38. Chow CK, Thiagalingam A, Santo K, Kok C, Thakkar J, Stepien S, et al. TEXT messages to improve medication adherence and secondary prevention (TEXTMEDS) after acute coronary syndrome: a randomised clinical trial protocol. BMJ Open. 2018;8(1):e019463.

39. Ranjbaran S, Shojaeizadeh D, Dehdari T, Yaseri M, Shakibazadeh E. The intervention designed based on health action process approach on diet and medication adherence among patients with type 2 diabetes: a randomized controlled trial. Diabetol Metab Syndr. 2022;14(1):3. https://doi.org/10.1186/s13098-021-00773-x. Published 2022 Jan 4.

## Publisher's note