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Original Article

Effects of Educational Intervention on Lifestyle Among Iranian Patients After Coronary Angioplasty: A Randomized Controlled Trial

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ABSTRACT

Background: Cardiovascular disease risk factors are associated with lifestyle, and patients undergoing coronary angioplasty require a great deal of training on modifying their lifestyle. The aim of this study was to survey the effects of educational intervention on lifestyle among Iranian patients after coronary angioplasty in Tehran in 2017.

Methods: This research was a randomized clinical trial with 2 groups of control (n = 29) and intervention (n = 28). The patients' lifestyle was evaluated by using a healthy lifestyle questionnaire at baseline and then at 1 month and 3 months after an educational intervention. The data were analyzed using SPSS, version 20.

Results: The mean age of the intervention and control groups was 62.54 ± 4.23 and 60.52 ± 5.37 years old, respectively. The Mann–Whitney *U* and Friedman tests showed that the scores of healthy lifestyle, healthy nutrition, and exercise and physical activity significantly improved in the intervention group in comparison with the control group at 1 month and 3 months after the educational program ($P < 0.001$). The Friedman test showed a significant increase in the score of avoiding tobacco and alcoholic beverages, health responsibility, health-based purchase, and healthy lifestyle in both groups at 1 month and 3 months after the educational program ($P < 0.05$). The results revealed that the score of stress management in both groups did not increase significantly during the survey.

Conclusions: In the present study, our educational program had a considerable effect on modifying lifestyle among the Iranian patients after coronary angioplasty. Psychological support programs for managing the stress of these patients are suggested. ***(Iranian Heart Journal 2019; 20(4): 38-45)***

KEYWORDS: Lifestyle, Coronary disease, Angioplasty, Nurses, Iran

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Cardiovascular diseases (CVDs) are the leading cause of morbidity and mortality. [1] About 54% of deaths from noncommunicable diseases in the Eastern Mediterranean Region are due to CVDs, [2] and there is a concern at the alarming increase of cardiovascular risk factors in Iran. [3] In Iran, the incidence of coronary artery disease and

coronary angioplasty is on an upward trend due to the industrialization of cities, air pollution, demographic changes, aging, [4] low physical activity, unhealthy diet, and mental stress. [5,6] Patients undergoing coronary angioplasty require a great deal of training in modifying their lifestyle. [6] A healthy lifestyle can reduce the risk of CVDs, [7] and most CVDs can be prevented by modifying behavioral risk factors. [1] Considering the high contribution of prevention in reducing mortality from CVDs, nurses—as the sole provider of multiple prevention programs—can play key roles in decreasing the risk of these diseases and promoting a healthy lifestyle. [8-11] In Iran, a limited number of studies have examined the impact of educational intervention on cardiac patients' lifestyle. [12] The current study was conducted to evaluate the efficacy of an educational program on lifestyle among Iranian patients after coronary angioplasty.

METHODS

This randomized clinical trial study (code: IRCT2017070334867N) was conducted at the cardiology clinic of a specialized hospital in Tehran in 2017.

By using a systematic randomization method, the study samples in the intervention and control groups were selected from among 200 patients who had met the criteria for inclusion in the study. The allocation of the patients to the 2 study groups was done via a simple randomized sampling method.

The age of the study patients was between 35 and 70 years old, they underwent angioplasty for the first time 1 week before joining the study, they did not have a history of open-heart surgery, they had no other diseases such as cancer, they had an ejection fraction > 30%, and they were not at high risk when performing exercise. In addition, the study patients were able to read, write, and answer the questions in the questionnaire. Patients were excluded if they failed to fill out the questionnaire completely or if they failed to participate in the educational sessions.

The following formula determined the sample size (with a 30% probability of dropping) in the intervention and control groups to be 30 individuals in each group: [13,14]

$$m = \frac{2(z_\alpha + z_\beta)^2 \sigma^2 \{1+(n-1)\rho\}}{nd^2}$$

This study was done on 60 patients. During the study, 3 subjects were dropped from the analysis and 57 subjects were assessed in 2 groups of intervention (n = 28) and control (n = 29).

Measures

A demographic characteristics questionnaire was used to evaluate the patients' age, gender, marital status, educational level, occupation, and monthly income adequacy.

The patients' lifestyle was appraised using the Healthy Lifestyle Questionnaire, which is designed for Iranian cardiovascular patients and is based on HPLP II. [15] The questionnaire comprised 44 items in 6 subscales of diet (12 items), stress management (7 items), avoiding smoking and alcoholic beverages (6 items), exercise and physical activity (7 items), health responsibility (8 items), and health-based purchase (4 items). The items were calculated on a 4-choice spectrum (never = 1, low = 2, usually = 3, and always = 4). The score of each subscale was categorized into 5 categories in the form of 5 equal parts (very low=1, low=2, average=3, high=4, and very high=5).

Validity and Reliability

Maleki et al [15] reported that their literature review and content evaluation confirmed the content validity of the healthy lifestyle questionnaire and factor analysis supported the construct validity. Additionally, the alpha coefficient of internal consistency for the total scale was 0.914.

In the present study, the validity and reliability of this questionnaire were confirmed. The validity of this questionnaire for relevance,

clarity, and fluidity was assessed by cardiovascular experts, and the results were 0.96, 0.91, and 0.93 respectively. The content validity ratio (CVR) of the questionnaire was evaluated as acceptable (CVR = 0.6). Further, the reliability of the questionnaire was determined through the use of Cronbach's alpha to measure the internal consistency (alpha = 0.88) and test-retest was used to appraisal stability (r = 0.92).

Educational Intervention Program

The educational program lasted for 3 months, starting with 6 sessions in a month. This program consisted of intense health educational and behavior change activities—including lectures, discussions, and practical skills training. Healthy lifestyle areas—including diet and nutrition, exercise, physical activity and weight loss, stress management, and smoking cessation—were taught in these sessions. The training materials were slideshows, pamphlets, and booklets which were taken from the National Heart, Lung, and Blood Institute; National Health Service; and American Heart Association sites.

Statistical Analysis

The data collected were analyzed using SPSS, version 20. The Kolmogorov–Smirnov, independent t, χ^2, Fisher exact, nonparametric Mann–Whitney U, and Friedman tests were used. A P value <0.05 was assigned as the criterion of statistical significance.

Ethical Considerations

This research was conducted after receiving an ethical code (SBMU.PHNM.1395.699.IR) from the Nursing and Midwifery School. The participants were reassured that their responses to the questionnaire would be kept confidential and anonymous and that they could quit the study at any time with no penalty. Additionally, informed consent was obtained from the entire study population.

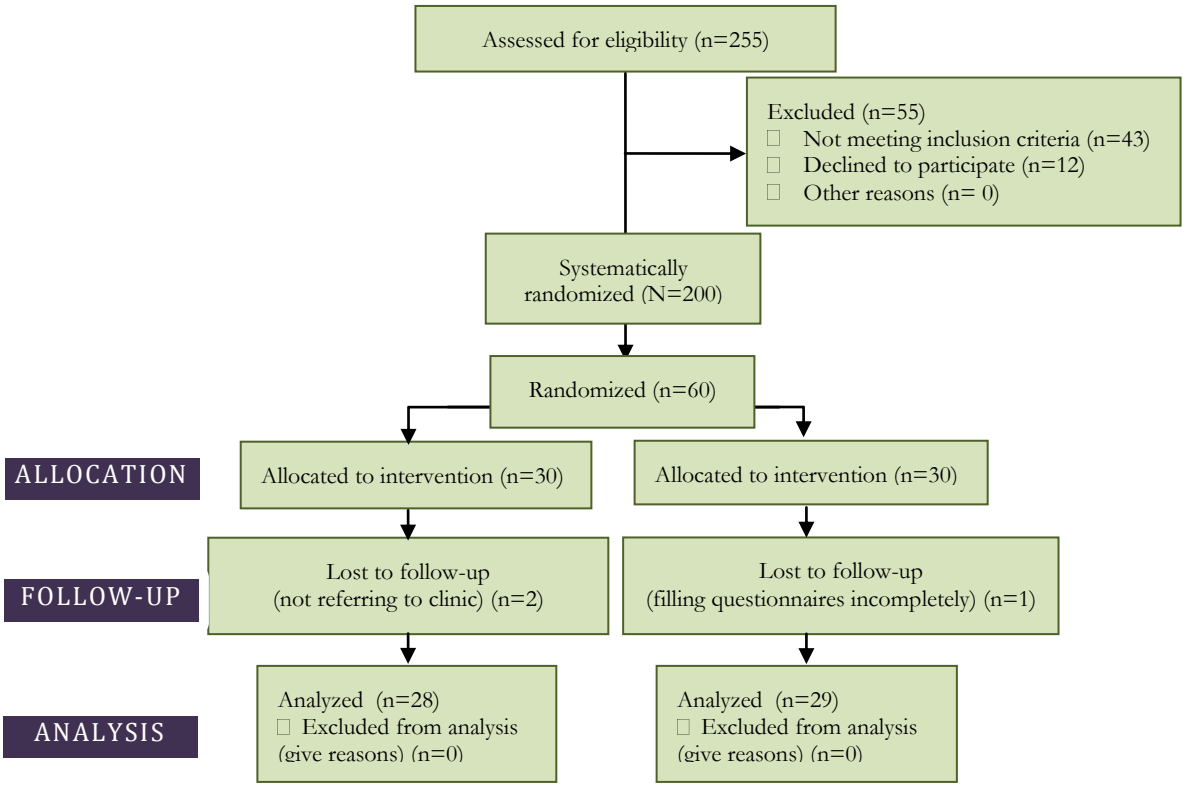

Figure 1. CONSORT flowchart of the participants

RESULTS

The *t*-test and the χ^2 test revealed that the intervention and control groups did not differ significantly in terms of key demographics at the start of the study. The mean age of the patients was 62.54 ± 4.23 years in the intervention group and 60.52 ± 5.37 years old in the control group. In both groups, there was a preponderance of men, about 80% of the patients were married, most patients had high school diplomas, and the monthly income of 50% of the patients was less than their living expenses (Table 1).

Table 1. Demographic characteristics of the research samples in the intervention and control groups

Demographic characteristic		Intervention Group		Control Group		*P* value
		N	%	N	%	
Gender	male	15	53.6	18	62.1	0.516
	female	13	46.4	11	37.9	
Marriage	single	0	0	0	0	0.612
	married	23	82.14	24	82.75	
	divorced	5	17.58	3	10.34	
	widowed	0	0	2	6.89	
Education	elementary	6	21.4	3	10.3	0.339
	middle school	10	35.7	8	27.6	
	high school	11	39.3	14	48.3	
	university	1	3.6	4	13.8	
Monthly income	less than costs	14	50	17	58.6	0.633
	equal to costs	10	35.7	7	24.1	
	more than costs	4	13.3	5	17.2	

The mean and the standard deviation of the healthy lifestyles scores of the patients in the intervention and control groups, at baseline and then at 1 month and 3 months after the educational intervention, are shown in Table 2.

The Mann–Whitney *U* test demonstrated a significant rise in the scores of healthy nutrition, exercise and physical activity, and healthy lifestyle (total) in the intervention group in comparison with the control group at 1 month and 3 months after the educational intervention ($P < 0.001$).

The nonparametric alternative to the one-way ANOVA with repeated measures, the Friedman test revealed that the scores of healthy nutrition and exercise and physical activity in the intervention group significantly increased at 1 month after the educational program and remained high after 3 months ($P = 0.001$). Moreover, the Friedman test showed that at 1 month and 3 months after the educational program, there was a significant increase in the scores of avoiding tobacco and alcoholic beverages, health responsibility, health-based purchase, and healthy lifestyle in both groups ($P < 0.05$).

The Mann–Whitney *U* and Friedman tests showed that there was no significant difference in the stress management score between the intervention and control groups, and the score of this subscale in both groups did not increase significantly at 1 month and 3 months after the educational program (Table 2).

Table 2. Healthy lifestyle and its subscales in the patients at baseline and then at 1 month and 3 months after the educational program in the intervention and control groups

Healthy Lifestyle and its Subscales	Group	Baseline	One Month Afterward	Three Months Afterward	*P* value
		Mean ± SD	Mean ± SD	Mean ± SD	
Healthy nutrition	Intervention	3.11±0.31	3.71±0.46**	3.71±0.46**	<0.001*
	Control	3.28±0.45	3.41±0.50	3.41±0.62	0.135
Stress management	Intervention	2.71±0.60	2.86±0.45	2.82±0.44	0.156
	Control	2.83±0.46	2.93±0.53	2.93±0.53	0.097
Avoiding tobacco and alcoholic beverages	Intervention	4.50±0.63	4.68±0.54	4.68±0.54	0.016*
	Control	4.79±0.49	4.83±0.46	4.79±0.49	0.028*
Exercise and physical activity	Intervention	1.75±0.64	2.21±0.73**	2.21±0.73**	<0.001*
	Control	1.83±0.65	1.79±0.67	1.72±0.64	0.368
Health responsibility	Intervention	3.11±0.68	3.57±0.57	3.57±0.57	<0.001*
	Control	3.21±0.62	3.62±0.56	3.66±0.61	<0.001*
Health-based purchase	Intervention	3.86±1.07	4.18±1.15	4.14±1.14	<0.001*
	Control	3.76±0.95	3.90±1.07	3.90±1.07	0.018*
Healthy lifestyle (total)	Intervention	3.11±0.41	3.68±0.47**	3.71±0.46**	<0.001*
	Control	3.21±0.55	3.41±0.50	3.41±0.50	0.011*

* Significance: $P < 0.05$ in the Friedman test. ** Significance: $P < 0.05$ in the Mann–Whitney U test

DISCUSSION

A healthy lifestyle is recognized as a major contributor to the prevention and control of CVDs. [16] In the current study, we implemented a healthy lifestyle education program for Iranian patients with coronary artery disease. The results revealed that this program caused favorable changes in the healthy nutrition, exercise and physical activity, and healthy lifestyle of the intervention group after the 1-month period and these changes persisted at 3 months' follow-up.

In terms of healthy nutrition, the consumption of imbalanced diets with high energy, sugar, and salt contents and low-nutrient density has played a critical role in the development of CVD risk factors among Iranians. [17] Educational programs strengthen the motivation of patients and help them adhere to the recommended healthy diet. We found that after the educational program, there was a significant increase in the mean score of healthy nutrition in the intervention group. This finding is in line with the results of many studies assessing the efficiency of educational interventions on lifestyle among cardiac patients. [18-20]

In patients with coronary artery disease, exercise improves endothelial function, halts the progression of coronary stenosis, and reduces cardiovascular event rates. [21] Many studies have shown that educational programs are an effective strategy to increase the physical activity of cardiac patients. [19,20,22] The results of the present study also showed a significant increase (26.3%) in the score of exercise and physical activity in the intervention group after the program.

Our results indicated that after the educational program, there was a favorable change in the scores of avoiding tobacco and alcoholic beverages, health responsibility, health-based purchase, and healthy lifestyle in both groups. This rise in the scores in the control group may have been due to the patients' responses to the physical and emotional symptoms after angioplasty. [23] Many researchers have found that patients adjust their habits as a reaction to common symptoms after angioplasty such as loss of autonomy, self-confidence, uncertainty and worry about the future, depression, and

anxiety. [24] An investigation conducted on 4535 coronary patients revealed that the patients were more likely to adopt healthy behaviors. In addition, increasing the score of avoiding tobacco and alcoholic beverages in the control group might have been due to the brief advice from their doctor to stop smoking. Perk et al [25] showed that a brief recommendation to stop smoking could significantly help patients quit smoking.

Our results revealed that there was no significant difference in the score of stress m0anagement between the intervention and control groups and that the score of this subscale in both groups did not increase significantly over the 3 months. A systematic review on the treatment of anxiety in patients with coronary heart disease showed that stress was a secondary outcome. [26]

Dehdari et al, [27] in their study on stress among Iranian patients after percutaneous coronary intervention (PCI) and coronary artery bypass graft surgery, reported that the PCI patients had higher stress and anxiety score than did the surgical patients because of uncertainties surrounding the PCI procedure. They also noted that more than 70% of their PCI patients had anxiety at 12 months' follow-up.

In the present study, the monthly income of most of the patients was lower than their living expenses, which can engender financial stress. Financial stress can increase the stress level of patients and divert energy from focusing on health and a healthy lifestyle.

As can be seen in Table 2, the scores of healthy nutrition, stress management, avoidance of tobacco and alcoholic beverages, exercise and physical activity, health responsibility, and health-based purchase in the intervention group were upgraded to 3.71, 2.82, 4.68, 2.18, 3.17, and 4.14, respectively. Since the scores were ranged from "very low = 1" to "very high = 5", the scores of exercise and physical activity and stress management were low. To mitigate these problems among patients undergoing PCI, aside from educational interventions, we recommend that nursing models and rehabilitation programs be taken into consideration. [28-30]

CONCLUSIONS

The results of the current study indicated that lifestyle education had a positive effect on lifestyle among Iranian patients after coronary angioplasty. Psychological support programs aimed at managing stress among these patients are suggested.

Limitations

Because of the time limit, this research was conducted only in 3 months. A thorough evaluation of the effects of the lifestyle education programs requires much longer follow-up periods because behavioral changes tend to occur at different times.

Conflict of Interest

No conflict of interest was declared by the authors.

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REFERENCES

1. WHO. Health topics. Cardiovascular diseases (CVDs) 2019. Available from: https://www.who.int/cardiovascular_diseases/global-hearts/Global_hearts_initiative/en/

2. WHO E. Health topics. Cardiovascular diseases 2019. Available from: http://www.emro.who.int/health-topics/cardiovascular-diseases/index.html

3. Maddahi M-E, Nikpajouh A, Khalatbari J, Zakerini SM, Hashemi S. Effects of

metacognitive training and mindfulness-based cognitive therapy on couple communication patterns with the mediation of perceived stress, perceived social support, and emotion regulation in patients with coronary heart disease. Iranian Heart Journal. 2018;19(1):6-14.

4. Estebsari F, Dastoorpoor M, Mostafaei D, Khanjani N, Khalifehkandi ZR, Foroushani AR, et al. Design and implementation of an empowerment model to prevent elder abuse: a randomized controlled trial. Clinical interventions in aging. 2018;13:669.

5. Ahmadi A, Mobasheri M, Soori H. Prevalence of major coronary heart disease risk factors in Iran. International Journal of Epidemiologic Research. 2014;1(1).

6. Sharif F, Moshkelgosha F, Molazem Z, Kalyani MN, Vossughi M. The effects of discharge plan on stress, anxiety and depression in patients undergoing percutaneous transluminal coronary angioplasty: a randomized controlled trial. International journal of community based nursing and midwifery. 2014;2(2):60.

7. Barbaresko J, Rienks J, Nöthlings U. Lifestyle Indices and Cardiovascular Disease Risk: A Meta-analysis. American journal of preventive medicine. 2018;55(4):555-64.

8. Jørstad HT, Minneboo M, Helmes HJ, Fagel ND, op Reimer WJS, Tijssen JG, et al. Effects of a nurse-coordinated prevention programme on health-related quality of life and depression in patients with an acute coronary syndrome: results from the RESPONSE randomised controlled trial. BMC cardiovascular disorders. 2016;16(1):144.

9. Dobber J, Latour C, Snaterse M, van Meijel B, ter Riet G, Scholte op Reimer W, et al. Developing nurses' skills in motivational interviewing to promote a healthy lifestyle in patients with coronary artery disease. European Journal of Cardiovascular Nursing. 2018:1474515118784102.

10. Tailakh A, Mentes JC, Morisky DE, Pike NA, Phillips LR, Evangelista LS. Prevalence, awareness, treatment, and control of hypertension among Arab Americans. The Journal of cardiovascular nursing. 2013;28(4):330.

11. Hayman LL, Berra K, Fletcher BJ, Miller NH. The role of nurses in promoting cardiovascular health worldwide: the global cardiovascular nursing leadership forum. Journal of the American College of Cardiology. 2015;66(7):864-6.

12. Ghaffari S, Hakim H, Pourafkari L, Asl ES, Goldust M. Twenty-year route of prevalence of risk factors, treatment patterns, complications, and mortality rate of acute myocardial infarction in Iran. Therapeutic advances in cardiovascular disease. 2013;7(3):117-22.

13. Ornish D, Scherwitz LW, Billings JH, Gould KL, Merritt TA, Sparler S, et al. Intensive lifestyle changes for reversal of coronary heart disease. Jama. 1998;280(23):2001-7.

14. Diggle P, Diggle PJ, Heagerty P, Heagerty PJ, Liang K-Y, Zeger S. Analysis of longitudinal data: Oxford University Press. 2002:28-29.

15. Maleki A, Haghjoo M, Ghaderi M. The impact of gender differences on healthy lifestyle and its subscales among patients with coronary artery disease. Research in Cardiovascular Medicine. 2016;5(4):6.

16. Foroushani AR, Estebsari F, Mostafaei D, Ardebili HE, Shojaeizadeh D, Dastoorpour M, et al. The effect of health promoting intervention on healthy lifestyle and social support in elders: a clinical trial study. Iranian Red Crescent Medical Journal. 2014;16(8).

17. Majabadi HA, Solhi M, Montazeri A, Shojaeizadeh D, Nejat S, Farahani FK, et al. Factors influencing fast-food consumption among adolescents in tehran: a qualitative study. Iranian Red Crescent Medical Journal. 2016;18(3).

18. Eshah NF, Bond AE, Froelicher ES. The effects of a cardiovascular disease prevention program on knowledge and adoption of a heart healthy lifestyle in Jordanian working adults. European Journal of Cardiovascular Nursing. 2010;9(4):244-53.

19. Irmak Z, Fesci H. Effects of nurse-managed secondary prevention program on lifestyle and risk factors of patients who had experienced myocardial infarction. Applied Nursing Research. 2010;23(3):147-52.

20. Yavarikia M, Shahamfar J, Amidfar H. Assessment of the Role of Education in Changing Lifestyle in Patients with Coronary Heart Diseases. Journal of cardiovascular and thoracic research. 2011;3(2):63.

21. Winzer EB, Woitek F, Linke A. Physical activity in the prevention and treatment of coronary artery disease. Journal of the American Heart Association. 2018;7(4):e007725.

22. Redfern J, Briffa T, Ellis E, Freedman SB. Choice of secondary prevention improves risk factors after acute coronary syndrome: 1-year follow-up of the CHOICE (Choice of Health Options In prevention of Cardiovascular Events) randomised controlled trial. Heart. 2009;95(6):468-75.

23. Ko Y, Boo S. Self-perceived health versus actual cardiovascular disease risks. Japan Journal of Nursing Science. 2016;13(1):65-74.

24. Antoniou K, Dokoutsidou H. QUALITY OF LIFE AFTER CORONARY INTERVENTION. Health Science Journal. 2009;3(2).

25. Perk J, De Backer G, Gohlke H, Graham I, Reiner E, Verschuren M, et al. [InlineMediaObject not available: see fulltext.] European Guidelines on Cardiovascular Disease Prevention in Clinical Practice (Version 2012). International Journal of Behavioral Medicine. 2012;19(4):403.

26. Farquhar JM, Stonerock GL, Blumenthal JA. Treatment of Anxiety in Patients with Coronary Heart Disease: A Systematic Review. Psychosomatics. 2018;59(4):318-32.

27. Dehdari T, Heidarnia A, Ramezankhani A, Sadeghian S, Ghofranipour F. Anxiety, self efficacy expectation and social support in patients after coronary angioplasty and coronary bypass. Iranian journal of public health. 2008;37(4):119-25.

28. Rezapour P, Shahriari M, Moieni M, Sanei H. Investigating the effect of collaborative care on depression, anxiety, and stress of patients after coronary angioplasty. Medical-Surgical Nursing Journal. 2016;5(2):51-7.

29. Molazem Z, Rezaei S, Mohebbi Z, Ostovan M-A, Keshavarzi S. Effect of continuous care model on lifestyle of patients with myocardial infarction. ARYA atherosclerosis. 2013;9(3):186.

30. Moattari M, Adib F, Kojuri J, Tabatabaee SHR. Angina self-management plan and quality of life, anxiety and depression in post coronary angioplasty patients. Iranian Red Crescent Medical Journal. 2014;16(11).