Effect of continuous care model on lifestyle of patients with myocardial infarction

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Original Article

Abstract

BACKGROUND: Myocardial infarction (MI) is a life threatening disease that influences the physical, psychological and social dimensions of the individual. Improper lifestyle is one of the causes of this disease. The use of nursing models could be one of the important and fundamental steps in changing the risk factors associated with MI. This study was carried out to evaluate the effect of continuous care model on the lifestyle of patients with MI.

METHODS: This randomized clinical trial was carried out on 70 patients with MI in coronary care units of hospitals affiliated to Shiraz University of Medical Sciences. Enrolled patients were randomly assigned to intervention or control groups using a randomization list (random permutated blocks with length 4). The continuous care model was used for 35 patients in the intervention group for a period of 3 months and in the control group, the usual cares were applied for 35 patients. Data were collected through lifestyle questionnaire before the intervention and 3 months after. The data were analyzed using chi-square, independent t-test and paired t-test.

RESULTS: Patients in the intervention group showed significant improvements in lifestyle (125.6 ± 15.4 vs. 180.1 ± 19.9). Moreover, the lifestyle score of intervention group was significantly better than that of the control group (117.9 ± 22.0 vs. 180.1 ± 19.9; $P < 0.001$) after three months.

CONCLUSION: Applying a continuous care model had positive effects on the lifestyle of patients with Myocardial Infarction. In order to reduce the risk factors and improve the lifestyle of patients with MI, nurses could use this model to create an effective change.

Keywords: Myocardial Infarction, Lifestyle, Continuous Care Model

Introduction

Acute myocardial infarction (MI) or heart attack refers to the ischemic necrosis of cardiac myocytes which occurs due to the lack or reduction of blood supply.[1] This disease is life threatening and influences the physical, psychological and social aspects of the patient's life. The prevalence of this disease is increasing throughout the world.[2] Cardiovascular diseases are known to be the first mortality cause in Iran and about 138000 deaths occur every year due to this disease (about 40% of the total mortality), half of which being due to MI.[3]

The incidence of MI in various parts of the world is being affected by demographic characteristics and lifestyle of the individuals.[4] It is supposed to be a life threatening disease by patients and they attribute it to their lifestyle.[5] Behavioral risk factors are often related and closer adherence to a healthier lifestyle might reduce the risk of coronary heart disease.[6] Several studies indicate that lifestyle change not only prevents but also controls the progress of cardiac diseases and reduces the occurrence of cardiac events in the patients with cardiovascular diseases.[7,8] Lifestyle modification to prevent the incidence of coronary vascular disorders is among the basic programs of WHO.[9] Choosing a healthy lifestyle along with a balanced diet reduce the rate of MI and the need to surgery and angioplasty.[10]

In spite of the availability of widespread studies regarding the importance of improving the risk

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factors and changing the lifestyle after MI, about half of the patients experience some complications like further MI three years after it[11] because changing the lifestyle is difficult. One of the problems of patients with acute MI is making change in their lifestyle during a short period of time. Moreover, patients are not provided with sufficient information in this regard during their hospitalization period[12] or forget the received information gradually and by time lapse.[13]

Evidence shows that no scientific and professional source is available in the Iranian society to help such patients and also their lifestyle is not sufficiently observed by physicians.[12,14] Experimental studies also have not suggested any proper solution to make behavioral change among patients with MI. Therefore, it seems that a program manageable by nurses (nurse-leader) along with a follow-up using phone could be a successful and practical model.[5] Using nursing models could be one of the important and basic steps to reach this objective. "Continuous care model" is one of the models planned by Ahmadi for patients suffering from chronic coronary vascular disease.[15] The aim was to establish and maintain a dynamic, flexible, and continuous care relationship between the nurse and the patient for improving the lifestyle of the patients. The continuous care model provides such conditions but this model has not been used for lifestyle change thus far. In view of the importance of improvement in lifestyle of MI patients, this study aimed to investigate the effects of applying a continuous care model on the lifestyle of patients with MI.

Materials and Methods

Patients and setting

This was a randomized controlled trial to examine the effects of applying a continuous care model on the lifestyle of patients with MI. The study was approved by the ethics committee of Shiraz University of Medical Sciences. In this study, 70 patients with MI who were hospitalized at cardiac care unit (CCU) of hospitals affiliated to Shiraz University of Medical Sciences in 2011, and fulfilled the inclusion criteria were selected.

The inclusion criteria were age below 70 years, able to comprehend, MI for the first time, not having a severe and life threatening disease (does not have ejection fraction less than 30%), access to telephone, propensity of participating in the program, possessing insurance booklet, not having uncontrolled diabetes mellitus, hypertension, hyperlipidemia (under treatment), and not being one

of health and treatment personnel or member of their families. In cases of lack of cooperation or the need to coronary artery bypass graft (CABG) during the study, patients were excluded. Patients possessing the inclusion criteria were enrolled in the study after completing the informed consent form, being equally divided into two intervention and control groups using a randomization list (random permutated blocks with length 4).

Intervention and outcome evaluation

Patients were visited daily in CCU of hospitals of Shiraz University of Medical Sciences by the researcher. Data collection was done through questionnaires before the intervention and 3 months after that. One questionnaire was about demographic information like age, sex, education level, marriage status, and occupation. The Walker and Pender's Lifestyle Questionnaire was also employed which included 52 items of lifestyle behaviors consisting of health responsibility (9 items), physical activity (8 items), nutrition (9 items), interpersonal relations (9 items), spiritual growth (9 items), and stress management (8 items). Items were rated on a 4-point Likert-type scale (4 = as usual, 3 = most of times, 2 = sometimes, and 1 = never). Thereafter, the obtained scores from each domain were divided by the number of questions of that domain and the mean score of that domain was calculated for patients of both groups by researcher via interview at the beginning and 3 months after the intervention.

The reliability and content validity of this questionnaire was determined by Safabakhsh with Cronbach's alpha of 0.83.[16] The content validity of the questionnaire was confirmed by 10 faculty members of Shiraz Nursing and Midwifery College. The Cronbach's alpha for each dimension was 0.928 (health responsibility), 0.943 (physical activity), 0.907 (nutrition), 0.849 (spiritual growth), 0.859 (interpersonal relations), and 0.703 (stress management).

The continuous care model was used in the intervention group for a period of 3 months. In the control group, the usual cares were applied. The continuous care was performed in four stages at the time of hospitalization of the patient:

1. Orientation: The first stage of continuous care model consisted of orientation with the aim of making a relationships with the client, attracting his/her collaboration to take part in the research, and creating motivation regarding the necessity of continuous care in the client.

2. Sensitization: The second stage of continuous care model was sensitization which was carried out

simultaneously with orientation, focusing on making the client sensitive to accept his/her health responsibility. In this stage, all educational needs of the patient was also evaluated and the necessary explanations regarding MI disease and its complications, the necessity of continuous care and the importance of improving lifestyle were presented to the patient during 45-60 minutes sessions. The orientation and sensitization was carried out by involving the patient and one of his/her family member. Family members were encouraged and instructed to participate in lifestyle change and to provide support for the rehabilitation practice of the patient. The above two stages took place at the first 3 weeks of the total period of performing the model (12 weeks).

3. Control: In this stage, the survey and continuity of care took place. Nine weeks were allocated to this stage during which the individual and group consultations (in the form of groups of 10 persons) and speech and question-answer sessions (considering the type and nature of needs and problems of patient and his/her family) were carried out at Shiraz Imam Reza clinic. The number of sessions depended upon the rate of knowledge, severity, and the number of similar problems for each of the subjects. On average, 2-4 sessions in the presence of patient and one of his/her family member were held for each group for a period of 1-2 hours. Then continuous care consultations took place daily, weekly and continuously in attendance at clinic or by telephone contacts depending on the type of care requirements. The telephone number of the researcher was given to patients to receive the answers of probable questions.

4. Evaluation: It was the fourth and final stage of the model but this step was considered from the beginning throughout all stages. The objective of this stage was to evaluate the process of care and determine and control the patient's behavior while being followed by researcher and by completing the self-report forms by the patients. The Benson's relaxation training CD and the training booklets regarding the disease were also given to patients of the intervention group.

Statistical analysis

Frequency distributions, mean, and standard deviation (SD) were calculated for the demographic variables. Chi-square analyses were used to assess the differences between groups in demographic variables at baseline. Paired sample t-test was used to test the changes in mean scores of the outcome variables for each group separately. Moreover, an independent sample t-test was applied in order to disclose differences in the mean scores of lifestyle and its related dimensions between the intervention and control groups. Mean differences between groups together with the corresponding 95% confidence Intervals (95% CI) were provided. For statistical analysis, SPSS version 15 (SPSS Inc., Chicago, IL) was used. Results of the tests with $P < 0.05$ were reported as to be statistically significant.

Results

The detailed demographic information about 70 participants is shown in table 1. The results of this study showed that both groups were similar as to the variables of age, sex, education level, marital and occupation status ($P > 0.05$).

Table 1. Baseline characteristics of the patients in control and intervention groups

		Control group n (%)	Intervention group n (%)	P*
Age group	≤ 50 years	14 (40.0)	15 (42.9)	0.810
	> 50 years	21 (60.0)	20 (57.1)	
Sex	Female	14 (40.0)	12 (34.3)	0.620
	Male	21 (60.0)	23 (65.7)	
Levels of education	Illiterate	13 (37.1)	12 (34.3)	
	Primary	3 (8.6)	6 (17.1)	0.170
	Secondary	5 (14.3)	10 (28.6)	
	Diploma or higher	14 (40.0)	7 (20.0)	
Marital status	Single	1 (2.9)	1 (2.9)	
	Married	32 (91.4)	30 (85.7)	0.690
	Widow	2 (5.7)	4 (11.4)	
Occupation	Employed	2 (5.7)	2 (5.7)	
	Retired	8 (22.9)	4 (11.4)	0.600
	Self-employment	13 (37.1)	17 (48.6)	
	House-keeper	12 (34.3)	12 (34.3)	

*P-value based on chi-square test

Table 2. Comparing dimensions of Life style in the two groups before intervention

Variables	Control group	Intervention group	P
	Mean ± SD	Mean ± SD	
Health responsibility	17.8 ± 3.8	19.2 ± 4.6	0.150
Physical activity	12.5 ± 2.8	13.2 ± 3.4	0.330
Nutrition	19.9 ± 3.6	21.5 ± 3.4	0.070
Spiritual growth	62.2 ± 5.1	27.8 ± 4.8	0.180
Interpersonal relations	24.3 ± 5.1	26.3 ± 4.2	0.070
Stress management	17.7 ± 4.2	17.5 ± 3.6	0.830
Total score	118.5 ± 16.3	125.6 ± 15.4	0.060

Table 3. Differences of mean scores within groups between baseline and three months later

Variables	Control group			Intervention group		
	Baseline	Three months later	P*	Baseline	Three months later	P*
	Mean ± SD	Mean ± SD		Mean ± SD	Mean ± SD	
Health responsibility	17.8 ± 3.8	17.2 ± 4.4	0.39	19.2 ± 4. 6	31.5 ± 3.6	< 0.001
Physical activity	12.5 ± 2.8	12.5 ± 4.0	1.00	13.2 ± 3.4	25.9 ± 5.3	< 0.001
Nutrition	19.9 ± 3.6	20.2 ± 4.4	0.73	21.5 ± 3.4	31.9 ± 3.4	< 0.001
Spiritual growth	62.2 ± 5.1	25. 9 ± 6.2	0.69	27.8 ± 4.8	32.2 ± 3.4	< 0.001
Interpersonal relations	24.3 ± 5.1	24.3 ± 5.6	0.90	26.3 ± 4.2	31.3 ± 3.8	< 0.001
Stress management	17.7 ± 4.2	17.9 ± 4.4	0.88	17.5 ± 3.6	27.4 ± 7.1	< 0.001
Total score	118.5 ± 16.3	117.9 ± 22.0	0.83	125.6 ± 15.4	180.1 ± 19.9	< 0.001

* Based on paired t-test

Table 4. Difference in mean of lifestyle score and its dimensions between control and intervention group

	Change in control group	Change in intervention group	Difference between control and intervention		
	Mean ± SD	Mean ± SD	Mean difference	95% CI*	P**
Health Responsibility	-0.57 ± 3.8	12.2 ± 6.2	-12.8	(-15.3, -10.3)	< 0.001
Physical activity	0.00 ± 4.2	12.7 ± 6.5	-12.7	(-15.4, -10.1)	< 0.001
Nutrition	0.26 ± 4.4	10.5 ± 4.2	-10.2	(-12.3, -8.14)	< 0.001
Spiritual growth	-0.34 ± 5.0	4.34 ± 5.9	-4.68	(-7.30, -2.07)	0.001
Interpersonal relations	-0.08 ± 3.9	4.91 ± 5.5	-5.00	(-7.26, -2.73)	< 0.001
Stress management	0.11 ± 4.3	9.83 ± 7.1	-12.5	(-12.5, -6.91)	< 0.001
Total score	-0.63 ± 17.1	54.5 ± 25.2	-55.1	(-65.4, -44.9)	< 0.001

* 95% CI: 95% confidence interval

** Based on independent sample Student's t-test

Moreover, the mean scores related to various dimensions and the total score of lifestyle of subjects in intervention and control groups were examined before the intervention (Table 2). The findings based on independent sample t-test showed that both groups were similar before the intervention (P > 0.05). The mean scores and SDs for the intervention and control groups at baseline and 3 months of follow-up visits are shown in table 3. The intervention group improved significantly on all related dimensions of lifestyle (health responsibility, physical activity, nutrition, interpersonal relations, spiritual growth and stress management) as well as the total lifestyle score at the three months follow-up visits. However, in the control group the changes in the mean score remained stable over the three months and these changes based on paired sample t-test were not statistically significant.

Table 4 provides the mean difference and confidence intervals for changes between baseline and three months follow-up in both groups for the total lifestyle score and its dimensions. When comparing the differences between the changes from the baseline to the three month evaluation of the intervention and the control group, independent sample t-test showed a statistically significant increase in the mean scores of lifestyle and its related dimensions in the intervention group (P < 0.05).

Discussion

Results of the present study showed that there was a significant difference before and after the intervention in both groups. Therefore, applying continuous care model could have positive effects on the lifestyle of patients with MI. The features of

this study were: 1) Initiating of intervention at the time of hospitalization of the patient when most patients are motivated to change behavior, 2) evaluating all educational needs of the patients and the necessary explanations regarding MI and its complications, 3) follow-up care after discharge and providing essential information, 4) using self-report form and nurse-reinforcement of daily health behaviors, and 5) involving one of his/her family member to participate in lifestyle change and provide support for patients.

Similar to the results of this research, another study indicated that a nurse-led cardiac rehabilitation program can significantly improve the health behaviors and cardiac physiological risk factors in coronary heart disease patients.[17] Based on these findings, it is necessary to consider the role of nurses in a cardiac rehabilitation program.

Some studies showed that participation in cardiac rehabilitation programs had positive changes in various risk factors like blood pressure, total cholesterol, triglyceride, HDL and LDL cholesterol[17,18] energy expenditure, fat, and stress.[18] Following up the client's behavior at home helped better controlling the heart disease. This reduced the frequency of their rehospitalization, cost of hospitalization and mortality rate.[9]

Gordon et al. also showed a reduction in risk factors of patients with MI, CABG, percutaneous coronary intervention, or angina after participating in traditional cardiac rehabilitation, cardiac rehabilitation with physician supervision, and a community-based exercise program run by exercise physiologists.[19]

In addition, several studies showed that continuous care model has positive effects on the quality of life of patients after CABG[20] and heart failure, in all physical, emotional and general dimensions.[21] This model was effective in the reduction of the hospitalization period and chest pain in patients with coronary vascular diseases.[9] However, the study carried out by Mohammadi et al. aiming to determine the effect of applying cardiac rehabilitation at home on the quality of life of patients with MI showed that the rehabilitation program consisting of training sessions regarding MI disease and its complications, dietary and medicinal regime, risk factors of the disease, etc. at home had no particular effect on various dimensions of the quality of life of this group of patients and there was no significant difference between groups.[22] These discrepancies could be related to sample size or follow-up period of patients.

Some evidences showed that education programs and follow-up by telephone have positive effects on knowledge, self-care behaviors, and disease symptoms of patients with cardiac failure.[13] Patients forget the therapeutic recommendations gradually after discharge from the hospital; therefore, it is necessary to provide such information. On the other hand, the number of healthy undesirable behaviors of patients with MI increases if it is not followed-up at home.[22] Since the patients' participation in cardiac rehabilitation programs after an acute MI is low,[23] they require education and follow-up regarding the control of symptoms, medicinal information, and improvement of lifestyle.[24]

Conclusion

Considering the results of the present study and the available evidence, a management program by the nurses (nurse-leader) accompanying follow-up by telephone could be a successful and practical model for behavior change in patients with MI. Therefore, continuous care model could be applied by nurses as an effective method to reduce risk factors and improve the lifestyle of patients with MI. Rehabilitation centers also could apply this model to follow the patients after MI. Further studies with larger sample size and longer follow-up are recommended to investigate the influence and continuity of the effects of these interventions.

Conflict of Interests

Authors have no conflict of interests.

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