

## ■ Original article

## The effect of training coping styles to deal with negative emotions on mental health of patients undergoing open heart surgery

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### Abstract

**Background and Purpose:** Surgery is a stressful situation and this study aimed to evaluate the effect of negative emotions coping styles training on mental health of the patients undergoing open-heart surgery.

**Methods:** This study was conducted with a pretest-posttest design on the patients undergoing open-heart surgery during a course of six months in Mazandaran Heart Center, Sari, Iran in 2014. In total, 30 patients were selected using non-random sampling method, who were randomly assigned into intervention and control groups (15 cases in each group). In the intervention group, seven training sessions of coping strategies (inc. stress and anger management, dealing with anxiety, and depression) were individually held for the participants. Data collection was performed, using General Health Questionnaire by Goldberg and Hiller (1970) and coping strategies scale by Lazarus and Folkman (1985), which showed the Cronbach's alpha coefficient of 0.84 and 0.80, respectively. Data analysis was performed, using ANOVA and Conflicting t.

**Results:** In this study, the results of ANOVA were indicative of a significant difference between the groups, which suggest the positive effects of coping strategies on mental health ( $P=0.05$ ).

**Conclusion:** According to the findings of the present study negative emotions coping styles training had a positive impact on mental health of the patients, which was more significant in the intervention group.

**Keywords:** Coping strategies, Coronary heart disease, Mental health

### Introduction

Ischemic heart disease causes death and disability in the developed countries more than any other disease, leading to enormous economic expenses. This disease is the most prevalent chronic and life-threatening illness identified in the United States. Almost 13 million Americans have been diagnosed with ischemic heart disease and more than seven million people have had a history of myocardial infarction at least once (1).

In Iran, about 44% of mortality rate is attributed to

cardiovascular diseases, 24% of which is allocated to myocardial infarction (2). By current, coronary heart disease (CHD) is the first leading cause of mortality in the individuals aged > 35 years in Iran, which is expected to be the first cause of disability by 2020. In terms of healthcare expenses, high costs are annually spent to treat and prevent coronary artery disease and the associated rehabilitations by the health care system and the patients. However, this disease could be prevented with low costs (3).

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The statistics suggests that nearly 35-50 thousand heart surgeries are performed in Iran every year (4).

Researchers have considered cardiovascular diseases as psychosomatic illnesses (1) and suggested a combination of biological and psychological indices as contributing factors for these diseases (5). The stressful situations adversely affect the behavior of an individual and make him prone to the diseases and injuries. Despite lack of a causal relationship between the disease and these factors, significant association is observed in various studies (6).

Mental pressure could lead to unpleasant emotions including anxiety, anger, aggression, bipolar disorder, depression, and cognitive impairment (7). Anger, hostility, and depression are strongly associated with CHD, recognized as its underlying sources (5). In addition, the patients with CHD are at high risk of depression, which results in poor prognosis in these patients (8).

Anxiety disorders are known as common psychiatric disorders (9) and the main core of emotional dysregulation (10). Several studies have suggested that the psychological status of the patients such as depression and anxiety disorders highly affects the compliance of these patients with treatment recommendations and the effectiveness of the treatment plans (5). Since, stress is one of the most important psychological factors affecting CHD, the pattern of coping with stress is considered a better precursor to this disease, compared to the stress itself.

Currently, coping strategies are introduced as predictors of treatment outcomes in the patients with cardiac transplants (11). The application of coping strategies by the patients was shown to improve their mental and physical health. Therefore, coping is one of the variables extensively studied in the context of health psychology (3). Generally, experts agreed that coping with the identified risk factors, most of which are behavior-related, could prevent many mortalities caused by cardiovascular diseases (12).

As such, emotion-focused coping styles are known as the greatest preventive methods of morbidity in patients with heart transplants (11). Lazarus and Folkman (1984) suggested two

coping methods including problem- and emotion-focused coping strategies. The former strategy can be directed to both inside or outside resources. The coping strategies, which are directed to the outside resources, aim to change the environment or behavior of the surrounding people.

Conversely, the strategies directed to the inside resources are more focused on re-evaluating the attitudes and needs of oneself and obtaining skills and responses. On the other hand, the emotion-focused coping style is used to inhibit emotional distress (13). There is also a third method, namely avoidant coping, which entails avoiding stressors and denying the stressful factors (14).

Patients undergoing heart surgery are at the risk of stressful conditions and anxiety due to the threatening nature of such operations. Moreover, surgery is a stressful situation, which leads to elevated anxiety levels in the patients (15). However, post-operative stress is a normal reaction caused by changes in mental image, disruption of the integrity in individuals, and lifestyle modifications. Surgery is mainly recognized as an important and stressful experience for the patients and their families, creating psychogenic (fear and anxiety) and physiologic reactions, which turns health improvement and stress reduction into important issues (16).

In the previous studies, conducted by Vingerhoets et al. (1996) and Williams et al. (2001), it was demonstrated that the patients with CHD confront the life pressures and problems more emotionally, compared to the healthy individuals (17). The results obtained by Paul et al. (2016) were indicative of the importance of psychological interventions in the improvement of patient's stability and reduction of cortisol hormone and depression during the first days of recovery (18). In another study by Siam et al. (2012), it was concluded that self-care training could lead to increased use of problem-focused coping strategies and reduced application of emotion-focused coping strategies in the trainees (3).

Riolosca et al. (2013) conducted a study to evaluate the impact of coping strategies on the patients with systolic heart failure and recognized three various coping strategies including problem-

focused, emotion-focused, and avoidant strategies.

Coping styles could be also used in educational or psychotherapy materials for patients with heart failure, experiencing psychological complications of chronic physical diseases at the time (19).

Up to date, the current psychological interventions have been unsuccessful in completely preventing psychological disorders or improving mental health. With this background in mind, this study aimed to evaluate the effect of negative emotions coping styles training on mental health of the patients undergoing open-heart surgery.

## Materials and Methods

This study was conducted with a pretest-posttest design on all the patients (N=30), who underwent coronary artery bypass grafting (CABG) within a course of six months in the Mazandaran Heart Center, Sari, Iran, in 2014. The samples were selected via convenience sampling method and randomly assigned into intervention and control groups (15 patients in each group).

### *Inclusion and exclusion criteria*

The inclusion criteria were as follows: 1) diagnosis of coronary artery disease by angiography, 2) voluntary participation, 3) lack of emergency medical conditions, 4) full awareness during the study, 5) lack of mental or physical disabilities, and 6) adequate literacy to fill in the questionnaire.

After seven individual sessions, the mental health of both intervention and control groups was evaluated. It is worth mentioning that no educational intervention regarding coping strategies could be carried out for the participants in the control group due to the limited time pre- and post-surgery and the patients' physical weakness.

### *Data collection tools*

Data collection was carried out, using General Health Questionnaire (GHQ 12) and Lazarus coping strategies scale.

### *General Health Questionnaire*

The 12-item GHQ, which was developed

by Goldberg and Hiller (1970), consists of four subscales: 1) somatic symptoms (including items about the feelings of an individual towards health and weakness, accompanied with physical symptoms), 2) anxiety and sleep disorders, 3) social function (evaluating the extent of patients' ability to cope with the demands of professional and daily life issues and revealing their true feelings about coping with common situations in life), 4) depression symptoms (consisting of items on acute depression and suicidal tendencies) (20).

The reliability of this questionnaire was confirmed by Montazeri et al. (2004) at the Institute of Health Sciences ( $\alpha=0.86$ ). In addition, the validity of this questionnaire was established by checking its convergence with the quality of life questionnaire, which indicated its feasibility (21).

### *Lazarus coping strategies scale*

Lazarus coping strategies scale is a 66-item questionnaire, designed based on the list of coping strategies (Lazarus & Folkman, 1980), which evaluates a wide range of individuals' beliefs and actions in case of facing with internal and external stressful situations. This scale contains two major emotion and problem-focused subscales, each divided into four separate subscales including 1) direct coping, 2) distancing oneself from the situation, 3) self-control, 4) seeking social support, 5) taking responsibility, 6) avoiding digression, 7) planned problem solving, and 8) positive reappraisal (6).

Each item was scored on a four-point Likert scale (from 0=never used to 3=extremely used). The score of each subscale is calculated by summing up all the scores in that subscale. The reliability of this scale was confirmed in a study conducted on 763 male and female students in several public high schools of Tehran, Iran ( $\alpha=0.80$ ). In the present study, the reliability of coping strategies scale showed a Cronbach's alpha coefficient of 0.87 (22).

Another tool used in this study was a therapeutic package designed by the researcher, using the books of "Life Skills" (2005), "Cognitive Therapy Techniques" (2003), and "The Relaxation and Stress Reduction" (2002) written by Caliente, Leahy, and Davis, respectively. Another tool employed was

pre- and post-operative educational brochure for patients with coronary artery disease undergoing CABG (provided by an education research team at the Mazandaran Heart Center, Sari, Iran). This tool was evaluated and confirmed by the faculty members of clinical psychology prior to the study.

**Results**

In this study, 73.4% of the samples were male and 26.6% were female (the number of males was more in both groups). Moreover, most of the participants were within the age group of 50-60 years in both intervention and control groups, whereas a small number of the participants belonged to the age group of 60-70 and 40-50 years in the intervention and control groups, respectively. In terms of literacy level, almost 60% of the subjects had basic education and high school diploma and 40% of them had higher education degree.

Some of the confounding variables in this study included efficient styles of coping with negative emotions (independent variable), mental health of the patients (dependent variable), and some of variables collected at pre-test (demographic characteristics), which were controlled.

The ANOVA test was used to evaluate the research hypothesis, in so doing we compared the performance of the intervention and control groups in form of pre- and post-test evaluation of the mental health; however, the assumptions of this test were established before its implementation and the results are provided in Table 1.

According to Table 1, F ratio of the association between the independent variable and the covariate (15.61) was not significant, since the error variance of 0.3 was greater than the significance level (0.05). Therefore, assumption of homogeneity is observed in the regression slope.

According to Z statistic obtained in the non-parametric test, the results of Kolmogorov-Smirnov test was estimated at 1.29 and its comparison with the given critical value was not significant for the confidence interval of 95% (1.96) and the observed values were less than the critical value. Therefore, the zero assumption was confirmed and the distribution of the dependent variable (post-test) was reported to be normal in the intervention and control groups.

Given the fulfillment of the major assumptions of ANOVA, this test was used to evaluate the effect of training coping strategies to deal with negative emotions on the mental health of the patients undergoing open-heart surgery and the results are provided in Table 3.

As shown in Table 3, sum of squares, mean square, and F ratio (5.38) were estimated at 1 and 28 degrees of freedom. Since the calculated F was greater than the proposed F value (4.20) and the obtained significance level was less than the desired error level (0.05), a significant difference was observed between the variables. Therefore, it could be concluded, with a 95% confidence interval, there was a significant difference between the control and intervention groups, in terms of their mental health. This difference was in favor of the group receiving

**Table 1.** Pre-test of homogeneity of regression coefficients for mental health

Source of changes	Sum of squares	Degrees of freedom	Mean square	F ratio	Level of significance
Pre-test	0.15	1	0.15	0.01	0.91
Groups	65.84	1	65.84	5.34	0.02
Error variance	169.64	2	84.82	15.61	0.3
Total	146.72	27	5.43	-	-

**Table 2.** Kolmogorov-Smirnov test for mental health

Variable	K-S	P-value
Mental health	1.294	0.070

training for coping strategies; consequently, this approach had a positive impact on the mental health of the patients with CHD.

**Table 3.** Results of ANOVA after mental health post-test

Source of changes	Sum of squares	Degrees of freedom	Mean square	F ratio	Level of significance
Pre-test	97.84	1	97.84	12.53	0.001
Groups	42.03	1	42.03	5.38	0.028
Error variance	218.52	28	7.8	-	-
Total	663	31	-	-	-

## Discussion

In the current study, the trainings for negative emotions coping styles significantly affected the mental health of the patients undergoing CABG, whereas no such impact was observed in the control group; therefore, the research hypothesis was confirmed in this regard.

The results obtained in the current study are in line with a study by Khanjani (2010) investigating not using the positive coping strategies, such as taking responsibility, positive evaluation, and problem solving when faced with negative incidences in life on the patients with CHD as well as their lack of active participation in the treatment process (11). In the mentioned study, coping strategies were compared between the healthy individuals and those with cardiac problems. In another study, Paul et al. (2016) examined the effect of compatibility interventions on reduced amount of cortisol hormone and depression in patients after CABG (18).

In a study, Siam et al. (2012) examined the impact of self-care training on increased use of problem-focused coping strategies and the reduced application of emotion-focused strategies two months after cardiac surgery. They confirmed the effects of confounding variables on physical improvement of the patients (3). In addition, Hashemi et al. (2011) investigated the effect of inoculation training and the use of problem-focused coping strategies on stress monitoring and the vital signs (e.g., blood pressure) in patients undergoing cardiac surgery (16). In the mentioned study, changes in blood pressure were translated as a physiological response against stress, which could be controlled by biofeedback, relaxation, and effective breathing to some extent.

Furthermore, Sogoli Tape et al. (2012), Riolesca et al. (2013), and Heydari Pahlavian et al. (2011)

examined the effect of training or psychotherapy on patients with heart failure experiencing the psychological complications caused by chronic physical diseases and the use of problem-focused coping strategies (17, 19, 23).

Coping style is a part of the individuals' psychological lifestyle and cannot be changed easily. Inconsistent with our findings, Heydari Pahlavian et al. (2011) conducted an ex post facto study to evaluate coping strategies in people when faced with stressful situations before infraction. This lack of consistency between the studies could be due to the fact that the present study was a quasi-experimental research and coping strategies of the patients with CHD were considered as independent variables and the effects of these strategies on the mental health of the patients were evaluated after training. Moreover, to control the effects of confounding variables, it was attempted to conduct the present study at the time of admission and prior to the surgery.

Coping responses were described as emotional, cognitive, and behavioral attempts to adapt to the environment or to prevent the negative outcomes of stressful situations. Therefore, if these coping styles were effective, high-quality, and adjusting, less stress would be observed in the patients. On the other hand, if the coping strategies were inconsistent and inadequate, not only they could not control stress levels, but also they would act as a source of pressure and worsen the patient's health.

According to the findings of the current study, implementation of the various psychological programs, such as coping strategies could significantly improve the recovery of the patients and decrease the risk factors for CHD. This improvement takes part by changing the patients' lifestyle, modifying their behavioral and psychological system, and even can significantly prevent the occurrence of such

diseases. Therefore, appropriate training of disease management could increase the positive attitudes of the patients toward the future and reduce the sense of vulnerability, in which healthcare teams and institutes could have a pivotal role.

Given the rising prevalence of CHD and considering the various social-psychological stressors, it is recommended that training the coping strategies be prioritized in different levels at school and university.

Since the present study employed convenience sampling (non-random) and the participants were aged > 40 years, our results should be generalized with caution, in the pediatric population.

### Conflicts of interest

The authors declare no conflicts of interest.

### Authors' contributions

M. Mohammadi contributed with the study design, proposal provision, and drafting of the article. A. Mahmoodi assisted in sampling and training the subjects. B. Mirzayian performed the statistical analysis. J. Heydari involved in data collection and article provision. H. Jafari helped with proposal provision and proofreading of the article.

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