

# Comparison of the Effectiveness of Emotional Self-Regulation Strategies and Pain Coping Strategies on Health Dimensions among Patients with Coronary Heart Disease

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## Abstract

**Background:** Healthy heart is essential to human life, and cardiovascular disease is not specific to any age or gender and can affect anyone at any age and gender.

**Objectives:** This study was conducted to compare the effectiveness of emotional self-regulation strategies and pain coping strategies on health dimensions among patients with coronary heart disease.

**Methods:** This semi-experimental study was conducted based on a pretest-posttest control group design and follow-up. The statistical population consisted of all patients with coronary heart disease referring to Heshmatieh Hospital in Sabzevar, Razavi Khorasan Province, Iran, within July-October, 2019. A total of 45 samples were randomly selected and divided into two experimental and one control group. The research instrument was the General Health Questionnaire. The data were analyzed using repeated measure analysis of variance in SPSS 25.

**Results:** The results showed that emotional self-regulation strategies and pain coping strategies had an effect on health dimensions and reduced physical symptoms, anxiety and insomnia, social dysfunction, and depression in patients with coronary heart disease ( $P < 0.001$ ). The findings also revealed that in the physical symptoms dimension, the difference between emotional self-regulation strategies and pain coping strategies was significant, and pain coping strategies were more effective than emotional self-regulation strategies ( $P < 0.001$ ).

**Conclusion:** Training emotional self-regulation and pain coping skills may enhance health outcomes in people with coronary heart disease.

**Keywords:** Coronary heart disease, Emotional self-regulation strategies, Health, Pain coping strategies

## 1. Background

Health has different dimensions, including physical health, good social relationships, and lack of anxiety, insomnia, and depression. In this regard, proper nutrition and exercise help to maintain physical and mental health (1). Physical health means affairs related to a person's feelings about their health and fatigue and includes physical symptoms. Mental health problems consist of those associated with anxiety, insomnia, depression, and suicidal thoughts, and social health includes the scope of people's ability to cope with professional demands and issues of daily life and their feelings about how to cope with common life situations (2). Anger, depression, and anxiety are forms of emotion that can be considered as forms of internal stress. The day-to-day forms of stress can also increase the risk of coronary heart disease and death. It has also been found that mental stress increases systolic blood pressure and epinephrine. Moreover, mental stress can reduce oxygen supply to the heart muscle (3). Worry, rumination of anger, and social loneliness have significant negative correlations with

adaptation to heart disease, meaning that an increase in worry, anger rumination, and social loneliness will lead to a decrease in adjustment to heart disease (4).

Many stressors and challenging factors reduce heart rate fluctuations. The results of pieces of research have shown that some types of personality, behavioral, and

psychological variables, directly and indirectly, reduce the quality of life of patients (6). Certain emotions, such as anxiety, are potentially important risk factors for cardiovascular disease. Coronary heart disease is a heart condition caused by fat lesions in the coronary arteries. The spread of fat plaques in the coronary arteries can lead to the blockage of blood flow and production of ischemia, which can have an acute or chronic nature (7). A large body of evidence supports the hypothesis that negative emotions affect the progression of heart disease. Specific emotions, such as anxiety, depression, and anger, are considered the most significant potential risk factors for cardiovascular disease (8). In this regard, the findings of studies have shown that the increase in the level of negative emotions is associated with the aggravation

of cardiovascular diseases. These results led researchers to conclude that emotion regulation affects the outcomes of these diseases (9).

Emotion regulation strategies include all conscious and unconscious strategies that are used to increase, maintain, and reduce emotional, behavioral, and cognitive components of an emotional response. Emotion regulation training (10) involves learning how to reduce and control negative emotions and how to use emotions positively. Researchers concluded that emotion regulation ability was an important component both in mental and physical health. Recent models related.

maladaptive and non-adaptive emotion regulation strategies have adverse effects on health, while adaptive strategies play a protective role in people's health (11). Physical and emotional feelings have a direct impact on each other, and sometimes it seems hard or even impossible to experience a good emotional feeling when a person does not physically feel good (12). In general, several research findings indicate the existence of a strong relationship between cognitive emotion regulation strategies and psychopathology (13). In addition, the results show that effective emotion regulation has favorable consequences on mental health, psychological well-being, physical health, and inter-individual relationships (14). Therefore, it can be said that emotion regulation is a key and decisive factor in psychological well-being and effective function with an important role in adapting to stressful life events and, as far as it should be noted, affects the entire quality of a person's life (15).

The results of studies have shown that emotions have a negative effect on heart disease. In this respect, depression has usually been found in people who have had heart disease before. Moreover, people with heart disease are almost three times more likely to be depressed than healthy individuals. In addition, if patients having a heart attack are depressed during or shortly afterward, they are more at risk for future heart problems or cardiac death. High levels of stress hormones may also hurt the heart further. It has been revealed that individuals with high levels of phobic stress are three times more likely to have a fatal heart attack than those who were at a low level in this regard. Furthermore, sudden cardiac death is three times higher in men with high levels of anxiety (16). One of the social-psychological interventions that can be effective is training emotion regulation strategies that can improve emotion regulation patterns in patients by emphasizing exercise and emotion regulation skills (17).

On the other hand, the use of passive coping strategies (e.g., being dependent on others and relying on them to get help to control pain and limit activity) is associated with more severe depression, pain, and physical disability (18). It has been found that active acceptance, tolerance, and adjustment of

negative emotions affect mental health and therapeutic outcomes, and interventions involving general emotional regulation skills increase the effectiveness of psychotherapy interventions (19). The negative affect or feelings of distress was associated with prolonged stress-related cardiovascular reactions, which would result in the reduction of cardiovascular recovery (20). Pain coping strategies include techniques for pain control. The training of pain coping skills helps patients with chronic pain to manage pain (21).

Attention methods, including attention to scenes, pleasant emotions, and such stimuli as music and pleasant smells, are different from pain. Individuals report a decrease in their pain intensity following attention to pain reversal. Any activity that causes

changes in attention to pain or moves patients' emotional

states to positive directions can reduce pain intensity in patients with chronic pain (22). In this regard, this treatment is effective in increasing pain acceptance and reducing pain-related anxiety and pain intensity in male patients with chronic pain (23). Additionally, emotion regulation reduces emotion regulation problems and improves distress tolerance in patients with tension headaches (24). According to the contents of this study, the effectiveness of emotional self-regulation strategies was compared with that of pain coping strategies on health dimensions in coronary heart disease patients

## 2. Objectives

This study was conducted to compare the effectiveness of emotional self-regulation strategies and pain coping strategies on health dimensions in coronary heart disease patients.

## 3. Methods

This semi-experimental study was conducted based on a pretest-posttest design and follow-up. The statistical population of this study consisted of all patients with coronary heart disease referring to Heshmatieh Hospital, Sabzevar, Razavi Khorasan Province, Iran, within July 6-October 7, 2019. A total of 45 samples were randomly selected and divided into two experimental and one control group. Afterward, the questionnaires were carried out among the three groups. The required sample size was determined at 45 based on the effect size = 0.40,  $\alpha = 0.95$ ,  $1 - \beta$  (err prob) = 0.80 test power, and 10% drop-out rare in each group. The inclusion criteria were having maximum age of 80 years; being diagnosed with coronary heart disease, including stable/unstable angina or myocardial infarction; having one month passed from the acute phase rather than the inflammatory phase of the disease; lacking acute diseases, immune diseases, and serious

psychiatric disorders requiring immediate novels; and having personal and informed consent for participating in the study. On the other hand, the patients who did not participate in the research procedures (i.e., pre-test, post-test, and follow-up), did not receive any other psychotherapy interventions in the study, disrupted the treatment process, and were absent for two consecutive sessions during the intervention were excluded from the research. To administer the General Health Questionnaire-28, firstly, 45 out of 102 cardiac patients were randomly selected and placed in three groups. All participants attended treatment sessions until the end of the study and no drop-outs were reported.

#### General Health Questionnaire-28

This 28-item questionnaire, developed by Goldberg and Hilber (1979), includes 4 subscales of body symptoms, anxiety and insomnia, social dysfunction, and depression, each of which has 7 items. The reliability values of this questionnaire were estimated at 0.88 and

0.81 using a test-retest method. The validity of

this questionnaire was reported to be 0.78 in a study conducted by Goldberg's using the Symptom Checklist

90. Sensitivity, specificity, and correlation coefficients

with scores without clinical evaluation were reported to be 0.86, 0.77, and 0.70, respectively (25). The Persian version of this questionnaire was validated by Nazifi et al. (26) and the results showed that the Cronbach's alpha coefficient of the subscales of this questionnaire was between 0.74 and 0.92.

Educational sessions were held for each experimental group. For the first experimental group, emotional self-

regulation training sessions were conducted based on Gross's model (6), and for the second group, pain coping strategies training sessions were conducted. Emotion regulation training sessions were held in eight 90-minute sessions once a week for 2 months. The training of emotion regulation strategies was conducted by the main researcher of this study. Table 1 summarizes the training sessions.

**Table 1. Emotional self-regulation training sessions**

Session	Subject	Goal
First	Getting to know and communicating with each other	Relationship
Second	Selecting position	Providing emotional training
Third	Selecting position	Evaluating emotional vulnerability and emotional skills of members, including self-assessment to identify their emotional experiences, emotional vulnerability, and self-regulatory strategies
Fourth	Correcting position	Making a change in the lifestyle of participants
Fifth	Expanding attention	Attention Change Skills Training
Sixth	Assessing cognition	Changing cognitive assessments
Seventh	Adjusting response	Changing behavioral and physiological consequences of emotion
Eighth	Evaluating application	Reassessing and planning for the application of training

The sessions of pain coping strategies training were held in eight 90-minute sessions once a week

for 2 months. The training was conducted by one of the main

**Table 2. Pain coping strategies training sessions**

Session	Goal
First	Communicating, stating the objectives of the meeting, defining rules
Second	Providing training of attention-restoring strategy from pain and its types: 1) Paying attention to senses, 2) Paying attention to daily issues
Third	Providing a new interpretation of pain, which is acceptable
Fourth	Teaching positive self-talk
Fifth	Teaching pain-ignoring strategy
Sixth	Training strategy of disaster and spirituality
Seventh	Training to increase behavioral activity
Eighth	Reviewing sessions, questions, and answers; and planning for the application of training

All data were collected, and analyzed by SPSS software (version 25). At first, the normality of data distribution was determined using the Shapiro-Wilk test, and subsequently, to describe the demographic

information, mean, percentage, standard deviation, and frequency distribution tables were used. Eventually, the role of training of emotional self-regulation strategies and coping with pain was

investigated through mixed analysis of variance.

**4.Results**

Initially, descriptive findings related to the demographic characteristics of the research samples and mean and standard deviation scores related to health dimensions among the research groups were presented in the pre-test, post-test, and follow-up stages. The results of comparing

gender and age using the Chi-square test showed that there was no significant difference between the three groups. However, in the context of marital status, the results of the Chi-square test indicated that there was a significant difference between the research groups and the number of married cases was higher than single ones. Furthermore, the number of married people in the coping strategies group was higher than in other groups.

**Table 3. Descriptive statistics of health dimension**

Dimensions	Groups	Steps					
		Pre-test		Post-test		Follow up	
		M	SD	M	SD	M	SD
Physical symptoms	Control	12.80	1.97	12.46	1.80	13.40	1.72
	Emotional regulation strategies self	12.46	2.92	10.60	2.82	11.00	3.11
	Pain coping strategies	13.06	2.46	7.53	1.24	7.06	1.09
Anxiety and insomnia	Control	12.13	1.99	11.60	2.09	11.40	2.13
	Emotional regulation strategies self	12.53	2.47	8.46	1.18	9.00	1.06
	Pain coping strategies	11.93	1.94	8.53	1.18	8.46	1.06
Social dysfunction	Control	9.66	1.95	9.46	2.16	8.73	1.66
	Emotional regulation strategies self	10.60	2.26	6.00	1.69	5.13	1.18
	Pain coping strategies	9.93	1.98	5.86	1.24	6.46	1.99
Depression	Control	3.86	1.18	4.33	1.11	4.26	1.27
	Emotional regulation strategies self	4.46	1.30	2.00	0.92	1.73	0.79
	Pain coping strategies	4.26	1.27	2.53	0.95	2.80	1.01

As seen in Table 3, the mean scores of health and its dimensions show more changes in the experimental groups than in the control group, and there is a downward trend in the mean scores in the

experimental groups (physical symptoms, anxiety and insomnia, social dysfunction, and depression).

**Table 4. Results of repeated measure analysis of variance of health dimensions**

Dimensions	Evaluation	Source of change	SS	Df	MS	F	P	Eta
Physical symptoms	Within subjects	Time	11.787	1	11.787	42.43	0.001	0.50
		Time*Group	170.95	2	85.47	30.77	0.001	0.59
		Error	116.66	42	2.77			
Anxiety and insomnia	Between subjects	Group	305.200	2	152.600	14.22	0.001	0.41
		Error	450.53	42	10.72			
		Time	149.51	1	149.51	92.07	0.001	0.68
Anxiety and insomnia	Within subjects	Time*Group	38.28	2	19.14	11.79	0.001	0.36
		Error	68.20	42	1.62			
		Group	109.88	2	54.94	8.13	0.001	0.27
Social dysfunction	Between subjects	Error	283.55	42	6.75			
		Time	243.37	1	243.37	169.79	0.001	0.80
		Time*Group	77.42	2	38.71	27.00	0.001	0.56
Social dysfunction	Within subjects	Error	60.20	42	1.43			
		Group	115.43	2	57.71	7.48	0.002	0.26
		Error	323.86	42	7.71			
Depression	Within subjects	Time	36.10	1	36.10	36.86	0.001	0.46
		Time*Group	37.26	2	18.63	19.26	0.001	0.47
		Error	41.13	42	0.97			
Depression	Between subjects	Group	47.03	2	23.65	11.21	0.001	0.34
		Error	88.57	42	2.10			

Table 4 shows that the influence of measurement time on dependent variables is significant; hence, it can be stated that the mean scores of health dimensions are significantly different in the pre-test, post-test, and follow-up stages, independent of the group. Furthermore, the relationship between time and group has a significant effect, implying that emotional self-regulation and pain coping mechanisms have an impact on health aspects.

However, the effect of the group alone is significant; regarding this, it can be concluded that regardless of the time of measurement, there is a significant difference between the mean scores of health dimensions in the experimental and control groups. In the following, considering that the results showed the significant interactive effect of tests and groups, the Bonferroni test was used to determine the differences between groups.

**Table 5. Bonferroni test for paired comparison of groups in post-test and follow-up (health dimensions)**

Dimensions	Steps	Group		Meandifference	P
Physical symptoms	Post-test	Emotional self-regulation strategies	Pain coping strategies	3.06	0.001
		Emotional self-regulation strategies	Control	-1.86	0.042
		Pain coping strategies	Control	-4.93	0.001
	Follow-up	Emotional self-regulation strategies	Pain coping strategies	3.93	0.001
		Emotional self-regulation strategies	Control	-2.40	0.012
		Pain coping strategies	Control	-3.93	0.001
Anxiety and insomnia	Post-test	Emotional self-regulation strategies	Pain coping strategies	-0.06	1.00
		Emotional self-regulation strategies	Control	-3.13	0.001
		Pain coping strategies	Control	-3.06	0.001
	Follow-up	Emotional self-regulation strategies	Pain coping strategies	0.53	1.00
		Emotional self-regulation strategies	Control	-2.40	0.001
		Pain coping strategies	Control	-2.93	0.001
Social dysfunction	Post-test	Emotional self-regulation strategies	Pain coping strategies	0.13	1.00
		Emotional self-regulation strategies	Control	-3.46	0.001
		Pain coping strategies	Control	-3.60	0.001
	Follow-up	Emotional self-regulation strategies	Pain coping strategies	-1.33	0.097
		Emotional self-regulation strategies	Control	-3.60	0.001
		Pain coping strategies	Control	-2.26	0.002
Depression	Post-test	Emotional self-regulation strategies	Pain coping strategies	-0.53	0.44
		Emotional self-regulation strategies	Control	-2.33	0.001
		Pain coping strategies	Control	-1.80	0.001
	Follow-up	Emotional self-regulation strategies	Pain coping strategies	-1.06	0.001
		Emotional self-regulation strategies	Control	-2.53	0.001
		Pain coping strategies	Control	-1.46	0.001



dimensions compared to the control group (lower mean indicates higher health). Furthermore, the results of a significant level of comparison between the experimental groups (intervention methods) show that the difference between emotional self-regulation strategies and pain coping strategies is significant, and it can be said that pain coping strategies are more effective than emotional self-regulation strategies in the physical symptoms.

## 5. Discussion

The results showed that emotional self-regulation strategies and pain coping strategies had an effect on health dimensions and reduced physical symptoms, anxiety and insomnia, social dysfunction, and depression in patients with coronary heart disease. The results also showed that in the physical symptoms dimension, the difference between emotional self-regulation strategies and pain coping strategies were significant, and pain coping strategies were more effective than emotional self-regulation strategies. This finding was in line with the results of studies conducted by Smith et al. (14) and Stoney (15); nonetheless, to the best of our knowledge, no research has examined the effects of pain coping strategies and emotional self-regulation at the same time. In explaining the results related to the physical symptoms, it can be said that chronic stress, severity, and perceived rate could be considered as a sign of distress and increased emotions leading to failure. In particular, stress disorders are partly identified by increasing sensitivity in basic motivational systems related to threats/safety, rewards/losses, or both (25). In this context, it can be said that patients with congestive heart failure often fall asleep hard, stay up for long periods, and suffer from insomnia. Dyspnea due to congestive heart failure leads to these sleep disorders, and shortness of breath is often exacerbated when lying down. Patients with heart problems are very concerned about their health and are often afraid of a stroke or heart attack (26). This anxiety makes them hard to sleep at night. Over time, this insomnia and sleep disorder change to chronic insomnia. The provision of the ground for proper emotion management and strategic training to deal with pain can be used to relieve insomnia and anxiety in such patients. In the context of social dysfunction, it can be said that, like any other behavior, adaptive emotional regulation allows the person to function successfully in the environment and use behaviors tailored to his goal when faced with a problematic emotional experience. Adaptive emotional regulation requires such skills as awareness and emotional acceptance (27).

In contrast, a person who uses maladaptive emotional regulation, when faced with problematic experiences, cannot adjust his behaviors in a way that can achieve his goals in the environment. People who suffer from chronic stress excitement are usually involved in managing negative thinking (e.g., worry, rumor, or self-criticism) to control motivation-related distress; consequently, the employment of pain coping strategies can better manage the distress of these patients (18).

When it is too painful to face an issue, one may deny its existence. It seems that these patients are less emotionally involved with the disease using emotional coping styles, which in the short term causes less stress, minimizes anxiety, and increases the perceived recovery (29).

One of the limitations of the study was the size of the sample. Since this study was limited to patients with coronary heart disease in Tehran, Iran, caution should be given in extrapolating the findings to other locations and cities. It is recommended that this study be repeated with a different sample group and the results be assessed and compared with those of the current study. Furthermore, it is suggested that the therapies used in this study be compared with other psychological procedures. Finally, researchers should examine the findings of this study as fresh research hypotheses in future studies. It is proposed that this research be followed up in the form of individual counseling following the group training if it is repeated in other places and the outcomes be analyzed.

## Conclusion

It can be concluded that the training of emotional self-regulation strategies and pain coping strategies could improve health dimensions among patients with coronary heart disease.

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