ORIGINAL RESEARCH

The effectiveness of emotion regulation therapy (ERT) on improving depression, anxiety and stress in patients with myocardial infarction

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Abstract

Background: Among the cardiovascular diseases, myocardial infraction is one the main cause of mortality around the world. People with myocardial infarction are significantly more likely to suffer from psychological problems, such as depression, anxiety and stress. Therefore, psychological interventions can help their routine treatment. The purpose of this study was to determine the effectiveness of emotional regulation therapy on depression, anxiety and stress in patients with myocardial infarction.

Methods: In this single-case design, 5 patients with myocardial infarction referred to the Taleghani Hospital were selected using convenience sampling method. They received eight sessions of emotional regulation psychotherapy. These patients were evaluated by anxiety, stress, and depression scale (DASS-21) before starting treatment and after each session.

Results: The results showed that emotional regulation therapy significantly reduced depression, anxiety and stress in patients with myocardial infarction.

Discussion: According to the findings of this study indicating the effectiveness of emotional regulation therapy on depression, anxiety and stress in patients with myocardial infarction, this treatment can be used as part of a comprehensive treatment process for these patients.

Keywords: Myocardial infarction, Depression, Anxiety, Stress, Emotional regulation therapy

Introduction

Myocardial infarction is one of the most common diseases in industrialized and developing countries. In the United States, approximately 525,000 patients each year experience new acute myocardial infarction (AMI), and 190,000 have recurrent AMI. Despite the major advances in primary and secondary prevention of cardiovascular disease, over 1.5 million people experience myocardial infarction every year. By the year 2020, cardiovascular disease is predicted to be the main cause of death and the first cause of disability around the world (1). In the Iranian population, cardiovascular disease is one of the major causes of mortality and disability and is currently the first cause of death in people over the age of 35 in Iran (2).

The heart, as one of the most functional organs, plays a critical role in the health and function of other organs (3); it is obvious that the dysfunction of this organ puts our lives in danger. Several studies have shown that there is a significant relationship between cardiovascular disease and negative emotions such as depression, anxiety and stress. Cardiovascular complications not only include physical symptoms, but also it is significantly associated with psychological disturbances such as anxiety and depression that may lead to changes in the level of performance, occupational status, relationship status and quality of life of individuals (4-6). The meta-analysis that was conducted in 2011 on 29 studies showed that depression increased the risk of mortality associated with cardiovascular disease by 2.7 times in 24 months after myocardial infarction (7). Other studies also have indicated that 45 to 60 percent of patients develop depressive symptoms after a myocardial infarction (8-10). Frasure-Smith (2006) showed that the cost of treatment for depressed patients with cardiovascular disease is 41% higher than non-depressed patients and the cost of treating heart disease will be reduced if the depression is treated (11). Further studies have shown that most patients in the cardiac units have severe anxiety in the first 48 hours, and they consider the main cause of anxiety as fear of dying and fear of recurrent stroke (12, 13). High levels of anxiety and depression will delay the recovery process. Anxiety can increase the Q-T interval (which reflects the tendency to ventricular irregularities), heart rate, blood pressure and ventricular contractions. Some of the anxiety complications in patients with recurrent myocardial infarction are ventricular tachycardia and ventricular fibrillation. Approximately 70% to 80% of patients with myocardial infarction experience anxiety and this can prevent the adjustment of psychosocial problems and physical recovery after stroke (12, 14). In the case of stress studies, research has shown that the likelihood of a stroke (infraction) after a stressful day can be 9 times higher, and stress can also lead to negative emotions, depression, anxiety, anger, and hostility (15). In general, studies have shown that patients with myocardial infarction experience anxiety long after recovery (remission), and high anxiety may increase the risk of developing myocardial infarction (9, 16); therefore, one of the important issues that patients with myocardial infarction is facing, is their psychological and emotional problems that should be addressed in the treatment process (17). The aim of this study was to investigate the effectiveness of emotional regulation therapy in patients with myocardial infarction. Emotional regulation therapy is an emotion-based therapeutic approach and the purpose of treatment is to improve the patient's psychological function. An important issue in emotional regulation therapy is the patients' ability to identify their emotions. Emotional regulation acts like a balancing thermostat (18). Since the impact of improved emotional regulation processes on psychological issues in patients with myocardial infarction has been less studied, the present study examined the effectiveness of this type of psychotherapy on reducing depression, anxiety and stress in patients with myocardial infarction.

Methods

The present study is a single case experimental in terms of data collection method in which the participants are evaluated in the baseline and treatment stages, respectively. The main objective of single-case designs in clinical work (trial) is to assist clinical professionals in evaluating the effect of a clinical intervention in changing the clients' behavior. The underlying logic of single-case design is similar to group design and the effect of intervention is examined by comparing the different conditions presented to the subject.

The performance of the subject in the pre-intervention or baseline stage is used to predict the subject's behavior in the future. The basic logic of single-case designs is similar to group design, and the effect of intervention is examined by comparing the different conditions presented to the subject, as it measures the impact of method in question on the subjects individually.. In the single-case experimental design, the control group does not exist and the baseline of each patient is considered as its control group (20). The statistical population of the present study was patients with myocardial infarction referring to Ayatollah Taleghani Hospital. In this study, convenience sampling method was used. 5 patients with myocardial infarction referred to Taleghani Hospital who had inclusion criteria were selected to participate in the treatment. The inclusion criteria were included the diagnosis of myocardial infarction by the cardiologist, the ability to attend sessions, the absence of severe mental illness (psychotic disorders, bipolar disorder, etc.), having at least the literacy of reading and writing. Exclusion criteria were included the absence of more than 2 sessions. Before the intervention, a pretest was used to determine the baseline, and the patient's condition was evaluated in terms of the variables. Then, the intervention was presented to participants in 8 sessions of 45 minutes, and they were evaluated at the end of each session. Prior to the start of the study, enough information on intervention was provided to the participants and the written informed consent was received from them to enter this research. Also, the appropriateness of the treatment for the participants was ensured. In order to maintain the principle of confidentiality, the information obtained from the evaluation sessions and questionnaires were encoded in such a way that the identity of the subjects were reserved and were only available to the researcher.

Materials

Demographic characteristics were collected through personal information questionnaire that included age, sex, education level, marital status, history of referral to a psychologist or psychiatrist, history of smoking, alcohol and drugs.

Short form of depression, anxiety and stress scale (DASS-21):

This scale was developed by Loeffond and Lovibond (1995) to simultaneously measure the severity of depression, anxiety and stress in individuals. The short form of the DASS-21 scale consists of 21 phrases related to the symptoms of negative emotions (depression, anxiety and stress). After reading each item, the subject graded the severity/frequency of the symptom in the questions during the last week using a 4-degree scale (between zero and three). Each of the three scales of depression, anxiety and stress has 7 questions, and the score is obtained through the total score of the questions related to it. Since the shortened form of the original scale consists of 42 questions, the final score of each subscale has to be doubled. Various studies have shown that the DASS-21 subscales have desirable psychometric properties (21). This scale has been studied by Samani and Jokar (2007), which have reported test re-test reliability for depression, anxiety and stress scales of 81, 76, 77, respectively and Cronbach's alpha for scales depression, anxiety, and stress have been reported 81, 74, 78, respectively (22).

The protocol used in this study was based on Grass's emotional regulation. The content of Grass's emotional regulation plan is summarized briefly. Session 1: Establishing a therapeutic relationship (rapport), introducing emotional regulation therapy, familiarizing with the subject of research and introductory explanations, expressing the main and the secondary goals, expressing the framework and rules, presenting the assignment, and feedback. Session 2: discussion about the nature of emotion and various kinds of it, a daily note card to record emotion, a practical exercise of emotion (emotional state experience), and a distinction between physical, mental and sensational dimensions of each emotion, assigning homework and feedback. Session 3: discussion about the emotion function in the process of adjustment and the role of emotion in establishing communication, how to organize and stimulate human behavior, being in an emotional state, completing self-assessment forms of emotional responses, completing the form of emotional vulnerability, grading, talk (discussion) about the context and cause of self vulnerability and identifying self-

regulation strategies: Complete the form of assessment of the patient's response to emotion (emotional skill and its effectiveness), assignment and feedback. Session 4: preventing social isolation and avoidance, providing a list of individual and social goals, identifying the situations that need to be restored, improved or changed, training problem-solving skills and interpersonal skills, assignment and feedback. Session 5: introducing James Grass's emotion regulation process model, introducing attention change skills, training of the skill to stop rumination and worry, attention skill training, assigning homework and feedback. Session 6: Discussing the role of the mind in producing, maintaining, increasing and decreasing emotional response, identifying false evaluations and its effects on emotional states, completing a list of ideas and evaluating false impressions (evaluations) on emotion, teaching re-evaluation strategies and modifying incorrect evaluation (misinterpretation), and as a result of relieving and adjusting negative emotions, giving a homework and feedback. Session 7: exposure; creating emotional states in session; confronting with emotion and avoiding avoidance; describing the physical, mental and sensational effects of emotion, in writing and verbal ways, evaluating (identifying the extent and the use of an avoidance strategy) and examining its emotional consequences. Skill learning as follows:

- Emotion expression
- Behavioral modification through changing the environmental reinforcing factors
- Emotional drainage strategy (abreaction)
- Changing the emotional outcomes through reverse operation
- Changing
- Creating physical relaxation through relaxation training
- Assignment
- Feedback

Session 8: Reassessment and planning for the application of training, assessing the reparation of a list of Individual goals, grading the patient's achievement, encouraging patient success, applying the proposed practical plan for the application of actual skills, program setting, assignment and Feedback (23).

Results

A graphical or visual analysis was used to analyze the data. Based on the profile process, the effects of the independent variable on the dependent variable were examined. On the basis of dispersion (descent and ascension), scores, percentages of recovery, the permanent change index (RCI) and the effect size - firstly introduced by Jacobson and Trax (1991), were used. In this study, to calculate the recovery rate, the pre-test score is reduced from the post-test score and the principle is divided into the pre-test score, if the recovery rate is less than 50, then the results can be considered clinically significant (24).

The permanent change index indicates that the statistical change is due to the treatment intervention. For RCI to be clinically significant, the absolute value of the result should be equal to or greater than 1.96, which indicates that the results are mostly due to active factors and manipulation of the experimenter, rather than the measurement error (25).

$$RCI = \frac{X\,post - X\,pre}{\sqrt{2}SE^2}$$

The descriptive statistics of participants in the demographic variables of employment, education, and marital status are presented in Table 1.

Table 1 Patients' descriptive findings

variables	First	second	third	fourth	fifth
Age	50	59	58	70	59
Sex	man	man	Female	man	Female
education	Diploma	guidance	guidance	Bachelor	guidance
marital status	Married	Married	widow	Married	Married
History of referral to psychiatrist or psychologist					
Drug use history Drug narcotic drugs				Alcohol sometimes	

Recovery (improvement) and the effect of treatment in the subscales of depression, anxiety and stress in each subject

Table 2 Comparison of depression scores of subjects and their recovery rates

Subjects	Basic line	Session 1	Session2	Session 3	Session 4	Session 5	Session 6	Session 7	Difference before and post test آزمون	The recovery rate	Overall improvement	RCI
First	16	18	14	14	12	8	6	6	10	%62		5/34
second	16	16	12	16	10	6	2	0	16	%100	%68	8/55
third	24	22	22	16	18	12	12	10	14	%58		7/48
fourth	18	18	22	20	14	10	10	6	12	%66		6/41
fifth	20	18	20	16	14	12	12	9	11	%55		5/88

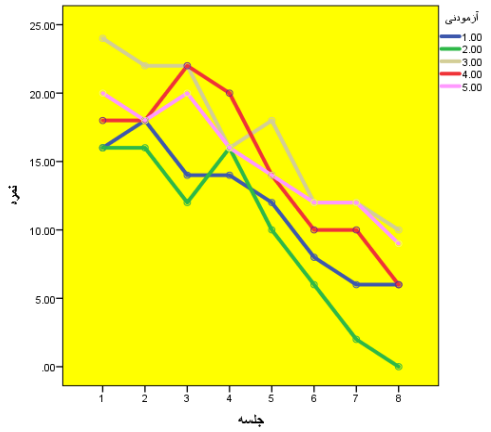

Chart 1 Patients' depression score during eight sessions of therapy

The RCI score for all five subjects is greater than 1.96, meaning that the results are mostly due to active factors and manipulation of the experimenter, rather than the measurement error. The percentage of recovery for each of the five subjects is remarkable (considerable), and in general, it can be said that in all five subjects, the overall recovery index is 68%, which is significant. Therefore, based on these results, it can be concluded that emotional regulation therapy has improved depression in patients with myocardial infarction in the post-intervention phase than before intervention.

Table 2 Comparison of anxiety scores of subjects and their recovery rates

RCI	Overall improvement	The recovery rate	Treatment sessions: Difference before and post test	Session 7	Session 6	Session 5	Session 4	Session 3	Session2	Session 1	Basic line	Subjects
5/23	%69.8	%71	10	4	8	8	6	10	12	12	14	**First**
10/47		%90	20	2	4	8	10	16	14	18	22	**second**
7/32		%54	81	8	8	10	12	10	18	20	22	**third**
5/23		%65	62	6	10	10	14	16	20	18	16	**fourth**
4/18		%57	8	6	8	6	10	14	14	16	14	**fifth**

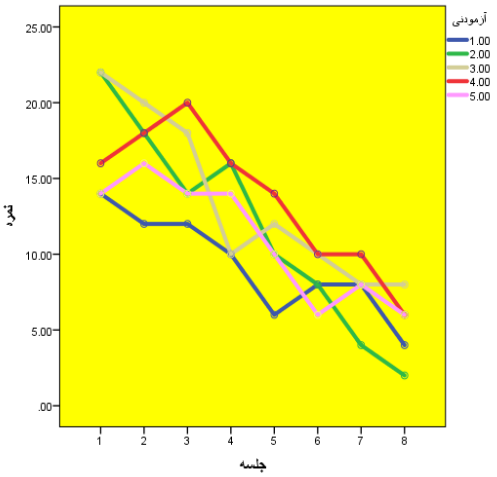

Chart 2 Patients' anxiety score during eight sessions of therapy

The RCI score for all five subjects is greater than 1.96, meaning that the results are mostly due to active factors and manipulation of the experimenter, rather than the measurement error. The percentage of recovery for each of the five subjects is remarkable (considerable), and in general, it can be said that in all five subjects, the overall recovery index is 69.8% which is significant. Therefore, based on these results, it can be concluded that emotional regulation therapy has improved anxiety in patients with myocardial infarction in the post-intervention phase than before intervention.

Table3 Comparison of stress scores of subjects and their recovery rates

RCI	Overall improvement	The recovery rate	Treatment sessions: Difference before and post test	Session 7	Session 6	Session 5	Session 4	Session 3	Session2	Session 1	Basic line	Subjects
3/42	%59	%50	10	10	12	16	18	20	22	28	20	**First**
8/90		%76	26	8	12	16	24	30	34	32	34	**second**
8/21		%70	24	10	10	16	22	28	28	32	34	**third**
4/79		%53	14	12	14	16	20	18	22	24	26	**fourth**
3/74		%45	10	12	16	14	18	20	18	20	22	**fifth**

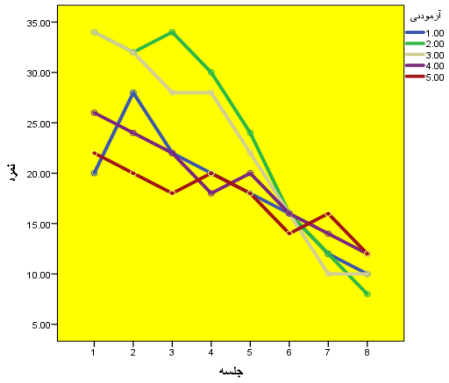

Chart 3 Patients' stress score during eight sessions of therapy

The RCI score for all five subjects is greater than 1.96, meaning that the results are mostly due to active factors and manipulation of the experimenter, rather than the measurement error. The percentage of recovery for each of the five subjects is remarkable (considerable), and in general, it can be said that in all five subjects, the overall recovery index is %59, which is significant. Therefore, based on these results, it can be concluded that emotional regulation therapy has improved stress in patients with myocardial infarction in the post-intervention phase than before intervention.

Discussion

The purpose of this study was to determine the effectiveness of emotional regulation therapy on the improvement of depression, anxiety and stress in patients with myocardial infarction. In this study, increasing the rate of recovery rate, high effect size, and reviewing the process of change showed that the intervention of emotional-cognitive regulation therapy was effective on depression, anxiety and stress, and clinically resulted in significant changes before and after intervention.

The results of current study are consistent with the findings of the studies conducted by Martin and Dahlon 2005 (26), Schwarz et al. 2008 (27), Linde Cobst in 2009 (28), Quid et al (2010) (29), Abdi et al., 2010(30), Manin and Fresco 2013 (31), Sobhi et al., In 2015 (32), Foroughy in 2016 (33), Shast Fooladi and Monsheyee, 2016 (34).

In the explanation of the effectiveness of emotional regulation therapy on depression, anxiety and stress the studies have shown emotional disorders can be conceptualized through inappropriate use of emotional regulation strategies. The emotional regulation processes are damaged in patients with depression, and depressed people have a lower capacity to tolerate negative emotions and little awareness of their emotions compared to normal people. They use dysfunctional coping skills to cope with their emotions (35); and use maladaptive strategies such as rumination, self-blame, other-blame and catastrophizing. Studies have shown significant positive correlation between depression (36), anxiety, stress (37), and dysfunctional components of cognitive-emotional regulation, and suggested that these symptoms as the most important risk factors for cardiovascular disease (38). In this regard, the study by Schroevers et al. showed that patients who were using adaptive strategies in dealing with stressful events had less depression and had higher levels of health and well-being (27).

According to the Grass's model, the emotional response takes a path that can be examined at several points (dealing with position, attention, evaluation, and response); therefore, emotional regulation can occur in any of the points of this path. Emotional regulation therapy causes improved emotional regulation patterns, increased individual's emotional awareness, being adapted to stressful events of life, decreased rumination, positive thinking and changes individual assessments (evaluations) (39) and helps individuals to manage their emotions (39, 40).

Conflict of interests

Authors declare no conflict of interests.

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