

ORIGINAL RESEARCH**The role of cognitive emotion regulation strategies in depression, anxiety and stress of coronary heart disease patients**

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Abstract

Introduction: This study aims to examine the role of cognitive emotion regulation strategies in the degree of depression, anxiety, and stress of coronary heart disease patients by using predictive correlation method.

Materials and Methods: In this research population consisted of all coronary heart disease patients who referred to Cardiovascular Specialized Hospital in Kermanshah city among whom 130 were selected as participants using available sampling method. Subsequently, they asked to complete Cognitive Emotion Regulation Questionnaire (CERQ) and Depression, Anxiety and Stress Scale (DASS-21). Collected data were analyzed using correlation matrix, multivariate analysis of variance (MANOVA) and hierarchical multiple regression analysis.

Results: The MANOVA results showed that there was a significant difference between male and female patients ($p < 0.05$) in the strategies of rumination, positive refocusing, planning and positive reappraisal and blaming others. The results of correlation matrix showed that there was positive and significant relationship between inefficient components of self-blame, other-blame, rumination, and catastrophizing, and negative relationship between components of putting into perspective, positive refocusing, planning, and positive reappraisal with patients' depression. In addition, the results of hierarchical multiple regression analysis indicated that among cognitive emotion regulation components, independent of gender, four components of self-blame, rumination, catastrophizing, and low positive reappraisal have great ability to predict depression, three components of self-blame, rumination, catastrophizing and planning are strong significant predictors of anxiety, and three components of self-blame, rumination and low positive reappraisal, respectively have the high ability to predict stress in coronary heart patients disease ($p < 0.05$).

Conclusion: According to the research results, the role of inefficient cognitive emotion regulation strategies in the degree of depression, anxiety, and stress of coronary heart disease patients have been demonstrated. Thus, teaching efficient cognitive strategies in setting up emotions to enhance the physical, psychological, and social health of coronary heart disease patients seems necessary.

Keywords: Cognitive emotion regulation, Depression, Anxiety, Stress, Coronary heart disease

Introduction

Coronary heart disease is one of the most common cardiovascular diseases that cause many deaths or turn into many types of diseases every year [1]. Different biological factors including abnormal cholesterol level in blood, rising bad cholesterol level or decreasing lipoprotein cholesterol (HDL-C) density, increasing blood pressure, smoking, lack of activity or exercise, having overweight or obesity, aging, and family background in premature coronary heart make people prone to heart disease [2]. However, several studies showed that these factors are not the only decisive ones in catching this disease, but psychological factors also play important role in people catching this disease [3].

Psychological situation of patients, including depression, anxiety, and stress influence the onset of disease, its continuity, patients' following therapeutic recommendations, and treatment efficiency, and should be considered in specific interventions in promotion of cardiovascular patients health [4, 5].

In recent years, health psychology has given the great importance of how to deal with stress and life challenges in improving the physical, psychological and social health of individuals and sees it as one of the best ways in strengthening their coping responses and cognitive abilities [6].

Cognitive emotion regulation strategies model is one of the major models for the role of nervous systems in emotion control. This model deals with the various cognitive processes, which are efficient in regulation of emotional actions, and is one of the most popular research topics in recent years [7, 8].

Previous research had conceptually identified 9 various cognitive emotion regulation strategies including: self-blame, other-blame, rumination, catastrophizing, putting into perspective, positive refocusing, positive reappraisal, acceptance, and planning [9].

In recent years, emotion regulation is targeted as core process in treatment of psychosomatic diseases and psychological pathology researches and considerable amount of studies have been conducted to determine the relationship between specific strategies utilization and disorders such as depression,

anxiety, drug abuse, masochism, borderline personality disorder, stress after accident, and eating disorders [7, 8, 9, 10, 11, 12, 13].

As coronary heart disease is considered as psychosomatics, we should pay attention to integrating biological and psychological factors in order to investigate effective factors on appearance and continuity of this disease. Studies had shown that there was a strong relationship between anger, hostility, depression, and stress, to coronary heart disease and anger and hostility are identified as major causal sources of coronary heart disease [14, 15, 16].

Therefore, efficacy of emotion regulation strategies to explain emotional disorders makes the need twice for identification, evaluation, and their relation with various diseases, such as coronary heart disease.

Thus, the research is conducted with aiming to investigate the role of cognitive emotion regulation strategies in amount of depression, anxiety, and stress of coronary heart patients. Therefore, the research hypotheses are:

1. There is a positive relationship between inefficient cognitive emotion regulation strategies (self-blame, other-blame, rumination, catastrophizing, and acceptance) and depression, anxiety, and stress of coronary heart disease patients.
2. There is a negative relationship between efficient cognitive emotion regulation strategies (positive refocusing / planning, positive reappraisal, putting into perspective) and depression, anxiety, and stress of coronary heart patients.
3. Cognitive emotion regulation strategies can predict variance changes related to depression, anxiety, and stress of coronary heart patients.

Materials and Methods

The research method is correlational based on predictive correlation. The aim of this method is to study the changing range of a variable according to changing range of another variable(s). Research statistical population includes coronary heart disease patients of Kermanshah city. 130 persons (52 men and 78 women) who referred to cardiovascular diseases specialized hospital were selected as sample through available sampling method and answered questionnaires of cognitive emotion regulation strategies and scale of depression, anxiety, and stress. After gathering questionnaires, 130 of 150 distributed questionnaires that were filled up completely were analyzed.

Criteria of patient's entrance included lack of psychological disorders and not reception and consumption of any psychological treatment and medicine (at least one month before research) and decisive detection of specialized doctor for at least 6 month history of coronary artery atherosclerosis signs, which coronary angiography pathology method for detection of coronary artery lumen stenosis is done and fat abnormal collection and fibrosis texture or Atheroma plaque in vessel walls are confirmed.

Statistical analysis of completed questionnaire is conducted. Correlation matrix was used in order of cognitive emotion regulation strategies with depression, anxiety and stress. Multivariate analysis of variance (MANOVA) was used to investigate differences between men and women patient groups in aspects from depression, anxiety and stress and cognitive emotion regulation strategies, and hierarchical multivariate regression analysis was used to investigate contribution of cognitive emotion regulation strategies in explanation of amount of depression, anxiety and stress of patients. Data analyzing is performed by SPSS software, and significance level is $p > 0.001$.

Research Tools Information gathering tool is two parts:

1. Cognitive Emotion Regulation Questionnaire (CERQ):

This multidimensional written by Granefski et al. [9] questionnaire is used for identification of individual's cognitive confronting strategies after experiencing negative events. Despite of other confronting questionnaires, which don't discriminate between individual thoughts and actions, it evaluates individual thoughts after experiencing negative and damaging events. This questionnaire is a self-reporting tool, which is very easy for implementation and is useable for 12 and more years old individuals (normal individuals and clinical population). Alpha coefficient of this questionnaire micro scales by Granefski et al. [9] ranges from 0.71 to 0.81 and reliability coefficient range for its micro scales measured by reexamination method in 14 months duration is 0.48 to 0.61. In Iran, Samani and sadeghi [17] calculated alpha coefficient of this questionnaire micro scales in range of 0.62 to 0.91 and reliability coefficient of this factors by re-examination method in one week duration in range of 0.75 to 0.88.

2. Depression, Anxiety and Stress Scale (DASS):

This scale is provided by Lovibond and Lovibond [18] in 1995 and has two forms. The short form has 21 phrases, which evaluates each one of psychological structures of depression, anxiety and stress in terms of 7 phrases. Long form includes 42 phrases, which evaluates each one of these mentioned psychological structures in terms of 14 phrases. Also, in a 1771 persons sample population in England, this tool was compared to two other depression and anxiety related tools and its reliability measured by Kronbakh alpha is 0.95 for depression, 0.9 for anxiety and 0.93 for stress and 0.97 for total scores. In Iran, this scale is standardized and verified by Sahebi, Asghari and Salary and Kronbakh alpha is reported as 0.94 for depression, 0.92 for anxiety and 0.82 for stress.

Results

Among 130 patients, there were 78 women and 52 men with average age of 47.3 who their disease detected for 2.7 years in average, and referred to specialist doctor repeatedly. Average, standard

deviation and results of multivariate variance analysis (MANOVA) for variables of depression, anxiety and stress as well as cognitive emotion regulation strategies are listed in table 1.

Table 1. Average, standard deviation and results of multivariate variance analysis (MANOVA) for variables of research in two groups of men and women

Variable	Men		Women		α	F(1,128)
	Average	Standard deviation	Average	Standard deviation		
<i>DASS</i>						
Depression	9.32	8.38	9.64	8.62	0.88	0.06
Anxiety	7.54	7.48	7.91	8.11	0.82	0.02
Stress	12.91	9.83	12.75	9.74	0.86	0.01
<i>CERQ</i>						
Self-blame	12.32	2.04	12.02	2.43	0.69	0.12
Acceptance	11.55	2.78	11.86	2.57	0.65	1.71
Rumination	13.20	2.83	14.24	2.71	0.68	8.37**
Positive refocusing	12.36	2.68	11.16	2.90	0.82	6.36**
Planning	15.02	2.30	13.67	2.66	0.73	9.31**
Positive re-assessment	13.01	2.56	11.83	2.84	0.83	12.61**
Prospect development	13.85	2.78	14.31	2.85	0.78	1.83
Catastrophizing	10.53	2.35	11.65	2.17	0.73	3.78*
Other-blame	12.46	2.67	11.23	2.61	0.75	4.35*

*p<0.05

**p<0.01

According to table 1, depression and stress average for male patients and anxiety average for female patients were greater. Among cognitive emotion regulation strategies, average of self-blame, other blame, positive refocusing, planning and positive reassessment in men patients were greater. According to one-way variance analysis, there was a significant difference between average of

variables of rumination, positive refocusing, planning, positive reassessment and other-blame in both gender groups.

Correlation matrix of relationship between cognitive emotion regulation and depression, anxiety and stress of coronary heart patients is listed in table 2.

Table 2. Correlation matrix of between relationship between cognitive emotion regulation and depression, anxiety and stress of coronary heart disease patients

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1-Depression	1											
2-Anxiety	0.65**	1										
3-Sress	0.69**	0.73**	1									
4-Self-blame	0.37**	0.26**	0.3**	1								
5-Other-blame	0.23**	0.13*	0.2**	0.08	1							
6-Rumination	0.44**	0.38**	0.53**	0.35**	0.2**	1						
7-Catastrophizing	0.43**	0.34**	0.36**	0.33**	0.38**	0.44**	1					
8-Acceptance	0.08	0.6	0.11	0.31**	0.01	0.32**	0.15*	1				
9-Prospect development	-0.14*	-0.13**	0.07	0.12*	-0.08	-0.02	-0.12	0.28**	1			
10-Positive refocusing	-0.12*	-0.05	-0.11*	-0.03	-0.05	-0.1	-0.13	0.18**	0.46**	1		
11- planning	-0.16	-0.06	-0.02	0.07	0.05	0.22**	-0.04	0.06	0.17**	0.58**	1	
12- Positive reassessment	-	-0.2**	-	0.09	-	0.02	-	0.11	0.68**	0.57**	0.63**	1

*p<0.05

**p<0.01

As shown in table 2, inefficient components of self-blame, other-blame, rumination and catastrophizing have positive relationship and components of prospect development, positive refocusing, planning and positive reassessment have negative relationship with depression. Also, inefficient components of self-blame, other-blame, rumination and catastrophizing

have positive relationship and components of outlook development and reassessment have negative relationship with anxiety and stress. Results of hierarchical multivariate regression analysis in order to predict depression, anxiety and stress of patients based on cognitive emotion regulation components.

Table 3. Hierarchical multivariate regression analysis for cognitive emotion regulation components in prediction of patient's depression, anxiety and stress

<i>variable</i>	<i>B</i>	<i>SE B</i>	β	<i>R</i> ²
<i>Depression</i>				
Step 1				0.00
Gender	-0.33	1.10	-0.01	
Step 2		0.19		0.29**
Self-blame	0.55	0.2	0.16**	
Other-blame	0.19	0.2	0.07	
Rumination	0.46	0.21	0.25**	
Catastrophizing	0.73	0.18	0.22**	
Acceptance	0.28	0.2	0.09	
Outlook development	0.16	0.21	0.04	
Positive re-focusing	-0.04	0.17	-0.02	
Planning	-0.24	0.21	-0.06	
Positive re-assessment	-0.68	0.23	-0.22**	
<i>Anxiety</i>				
Step 1				0.00
Gender	-0.28	1.07	-0.01	
Step 2				0.19**
Self-blame	0.45	0.19	0.14	
Other-blame	-0.13	0.18	-0.06	
Rumination	0.53	0.19	0.29**	
Catastrophizing	0.38	0.18	0.13*	
Acceptance	0.16	0.18	0.05	
Outlook development	0.09	0.2	0.02	
Positive re-focusing	-0.18	0.18	0.09	
Planning	-0.31	0.2	-0.13*	
Positive re-assessment	-0.62	0.22	-0.28**	
<i>Stress</i>				
Step 1				0.00
Gender	-0.27	1.12	-0.01	
Step 2				0.24**
Self-blame	0.41	0.22	0.18*	
Other-blame	0.28	0.21	0.07	
Rumination	1.03	0.19	0.34**	
Catastrophizing	0.25	0.2	0.09	
Acceptance	0.15	0.22	0.03	
Outlook development	0.23	0.23	0.06	
Positive re-focusing	-0.17	0.22	-0.07	
Planning	0.08	0.24	0.04	
Positive re-assessment	-0.64	0.25	-0.22**	

*p<0.05

Three hierarchical multivariate regression analyses is conducted in order to determine best predictors of depression, anxiety and stress in coronary heart patients. In first time, gender variable in order to control of its effect, and in second time, 9 cognitive emotion regulation micro scales entered to analysis simultaneously (table 3). Independent of

participant's gender, depression was predicted by self-blame, rumination, catastrophizing and positive reassessment. Self-blame, rumination, catastrophizing, low planning and positive reassessment predicted anxiety. Components of self-blame, rumination and low positive reassessment have ability to significantly predict of coronary heart patients stress.

Discussion

The main aim of this research is to investigate and explain role of cognitive emotion regulation strategies in depression, anxiety and stress of coronary heart patients. The research findings shows that there was positive significant correlation between depression, anxiety and stress in coronary heart patients and inefficient components of cognitive emotion regulation components of (self-blame, other-blame, rumination and catastrophizing), and this finding verifies the first hypothesis of the research.

These findings also indicated negative significant relationship of depression with efficient components of prospect development, positive refocusing, planning and positive reassessment as well as negative significant relationship of anxiety with prospect development and positive reassessment and finally negative significant relationship of stress with positive refocusing and positive reassessment. Thus, the second hypothesis of the research has been verified. To explain the role of cognitive emotion regulation strategies in depression, anxiety and stress of patients, results of hierarchical multivariate regression analysis shown that components of low positive reassessment, catastrophizing, self-blame, and rumination, among all components of cognitive emotion regulation components, have greatest ability to predict depression in coronary heart disease patients respectively. Five components of low positive reassessment, rumination, self-blame, low planning and catastrophizing have greatest ability to predict anxiety in coronary heart patients respectively and three components of rumination, low positive reassessment and self-blame have greatest ability to predict stress in coronary heart disease patients respectively. Significant relationship between cognitive emotion regulation components and depression, anxiety and stress supports other researcher's findings such as Marroquin [20], Wolgast, Lundh & Viborg [21], Aldao & Nolen-Hoeksema [22], Ongen [11], Tortella-Feliu, Balle & Sese [23], Zlomke & Hahn [24], Ryan, Martin & Dahle [13], Duarte, Matos & Marques [7] and Pourfaraj Omran [12]. To explain relationship between inefficient cognitive emotion

regulation strategies and depression, anxiety and stress, Aldao & Nolen-Hoeksema [22] said that efficient strategies play less roll in cognitive emotion regulation compared to inefficient strategies. This research results support this finding. For example, rumination has stronger relationship with psychological pathology. A reason for this matter is that efficient strategies may have less relationship with psychological pathology signs, because their adaption and consistency potential may be more dependent on texture. For instance, reassessment can be adaptive only when situation can be reconstructed and made actually, while rumination often can be non-adaptive. Results generally showed that individuals who used weak cognitive styles such as rumination, catastrophizing and self-blame are more vulnerable against emotion problems compared to others, while this vulnerability is decreased in individuals who use other desirable styles such as positive reassessment. Positive reassessment is a cognitive emotion regulation strategy, which includes thinking style changes in order to decrease emotional pressure in emotion arousing potential states that leads to decrease in showing behaviors and negative experiments. Recently, emotion regulation of Groos (1998) illustrates positive re-assessment and positive re-focusing as strategies, which leads to positive body and emotional responses to emotion arousing stimulus. Teaching these skills is considered in cognitive-behavioral treatment of depression and anxiety. Some researches for this idea show that ability to successful emotion regulation relates to numbers of physical, social and physiological consequences. Inverse of this hypothesis is that failure to emotion regulation is substantial mechanism of mood and anxiety disorders.

These are evidences that show anxiety and other emotional disorders are similar, rather than different in aspects from phenomenological and etiology. Triple vulnerability model of Barlow, Allen & Choate [29] is an interactive model that explains cause of anxiety disorders well. A wide variety of factors, especially negative emotion is considered as causes of anxiety.

Findings suggest that signs of anxiety mediate relationship between mood properties and other emotion disorders such as depression. Contribution of negative affection component of three part model of depression and anxiety helps to explain relationship between pathological classifications. According to this model, pathology of anxiety and anxiety disorders has priority to depression or at least increase risk of consequent depression. Negative emotionality, emotion regulation and other mood related structures are key elements in theatrical model of description of depression and anxiety disorders rising. Negative emotionality (negative affection) is a related factor and also is an infrastructure cause and risk factor rising of anxiety and anxiety disorders. Negative emotion is defined as readiness to experiencing negative emotions and activation of defensive motivation organs. It seems that anxiety disorders resulted from combination of negative emotion and inefficient emotion regulation. Some of emotion regulation strategies, which were recognized as inefficient or negative lead to anxiety by mechanisms such as bias of attention to threatening stimulus, increase unpredictability and lack of awareness. Increasing of negative emotion and inefficient emotion regulation has relationship with increasing of anxiety signs and consequent stress and anxiety to a great extent determines depression. Relationship between anxiety and depression may be justified by shared component of negative affection. Relationship between negative affection and depression can be determined by anxiety [23]. Garnefski, Kraaij & van Etten [30] mentioned that use of negative, non-adaptive and inefficient cognitive emotion regulation strategies (such as self-blame, rumination and catastrophizing) and to less extent, not using of positive and efficient cognitive emotion regulation strategies predicts large amount of anxiety and depression signs. In clinical view, there is very strong evidence that show some types of inefficient cognitive emotion regulation strategies have close relationship with almost, but not all, of depression and anxiety disorders. In fact, these strategies are core properties of these disorders continuity. In

summary, emotion regulation failure and using of inefficient cognitive emotion regulation strategies have relationship with high level of psychological pathology [23]. A positive significant relationship between acceptance strategies and depression and anxiety in patients has been found and this finding agrees with the research results of Ryan, Martin & Dahle [13] and opposite to the research results of Zlomke & Hahn [24]. Overall, many researchers disagree about a problem that acceptance belongs to efficient components or belongs to inefficient components. As previously suggested by Garnefski, Kraaij Spinhoven [31], one reasoning for this finding is that it is not true if we consider acceptance subscale as an efficient strategy. One description is that it is possible that articles which form acceptance subscale (for example, I think I cannot change anything in a accident that happened) may reflect a degree of disappointing. Therefore, acceptance can be adaptive in especial situations and may depend on considered psychological situation [13]. Many research literatures shown that chronic efforts to control, suppression or preventing of undesired inner experiences and emotions (acceptance) may actually increase frequency and intensity of negative emotion experiences.

Conclusion

In conclusion, the research findings show that a wide range of inefficient cognitive emotion regulation styles in coronary heart disease patients may increase their depression, anxiety and stress. In other side, using of inefficient cognitive emotion regulation strategies can decrease the risk of depression, anxiety, stress and other psychological harms. Some researches support this idea show that successful emotion regulation has relationship with psychological, social and physiologic consequences [28]. Therefore, considering the above mentioned results and according to high amount referring of depression, anxiety and stress induced heart disease patients to specialized hospitals and recommendations for not consumption of three ring and anti-stress drugs, which these patients received, need for using of teaching planning, positive refocusing and positive reassessment concentrated

cognitive emotion regulation strategies in order to increase physical, psychological and social health of heart patients seems very necessary.

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Conflict of interests

Authors declare no conflict of interest.

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