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Original Article

Effectiveness of Mindfulness-based Cognitive Therapy and Meta-Cognitive Therapy based on Training on Emotion Regulation and Anxiety Sensitivity in Elderly with Heart Disease

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Introduction: This study aims to compare the effectiveness of mindfulness-based cognitive therapy and meta-cognitive therapy based on training on emotion regulation and anxiety sensitivity in elderly with precedent heart disease in Tehran city.

Methods: This was an experimental study with pre-test & post-test and statistical population consisted of all elderly with precedent heart disease living in Tehran 2018, among whom 50 people with precedent heart disease were selected and randomly divided into two groups of equally 25 people. The first group received eight sessions of mindfulness-based cognitive therapy, and the second group was presented with eight sessions of meta-cognitive therapy based on training. Research tools were Emotion Regulation Questionnaire of Gross & John and Anxiety Sensitivity Index of Taylor & Coax (1998). Finally, data analysis was done by multivariate covariance.

Results: The results showed significant effectiveness of independent variables (mindfulness-based cognitive therapy and meta-cognitive therapy based on training) on emotion regulation and anxiety sensitivity ($p < 0.001$). However, the results showed that metacognitive education had a more significant effect on anxiety fear control than mindful cognitive therapy.

Conclusion: Mindfulness-based cognitive therapy and meta-cognitive therapy based on training on emotion regulation and anxiety sensitivity had different effectiveness. So, experts should pay attention to this issue.

Keywords: Emotion Regulation, Mindfulness, Metacognitive, Aged

Introduction

Heart diseases are the most important causes of deaths around the world (1). The number of cardiovascular patients worldwide will increase every day, so it is estimated that the number of deaths due to heart problems will increase several times over the next few years (2). Older people are at greater risk of heart problems for various reasons, such as less mobility, ageing, stress, and anxiety in any society (3).

Heart problems and diseases are directly related to stress and psychological pressures (4). The way and how to manage negative emotions can have a positive effect on reducing the impact of heart disease (5). In recent studies, emotion regulation has been considered by many studies as a psychological variable (6-7). Emotion regulation refers to how a person processes encountering life's problems and events (6). The results of some research findings indicate that emotion regulation is associated with success or failure in various areas of life (8). Evidence suggests that emotion regulation is one of the most important variables affecting health levels (9). In a study examined emotion regulation, mindfulness, and

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existential anxiety in people with coronary heart disease, Nickdanesh et al. showed that emotional regulation is one of the most important psychological factors affecting the cardiovascular disease (10). Sepehrinejad and Hatamian concluded that emotion regulation, as an influential psychological variable, plays a vital role in human behavioral health in a study that examined the prediction of self-harming thoughts based on the difficulty of emotion regulation and empirical avoidance (11). McDonald's et al. also showed that emotion regulation plays a significant role in human health (12). The results of such research suggest that the health of behavior and thoughts plays an essential role in body health (such as the heart) of man.

Another structure associated with heart disease is anxiety sensitivity, which can be caused by the signs and symptoms of heart problems. Therefore, both directly and indirectly, it will affect the worsening of the disease (13). Anxiety sensitivity has been defined as the excessive fear of feelings and symptoms of anxiety and one's beliefs that these symptoms and feelings are harmful (14). Anxiety plays a significant role in the development and stabilization of heart disease so that its prevalence among heart patients was reported to be 6-74% and 22% of heart patients express it as the leading cause of their illness (15). Anxiety, as the most basic and common reaction to cardiac events, can lead to high blood pressure and increased cardiac output and negatively affects the physical function and quality of life of heart patients, so that high levels of anxiety increase the risk of sudden death in heart patients up to 3 times (16). In their research, Ebn Nasir and Khaleghipour showed that the more patients with high blood pressure and a history of heart disease experience anxiety, the greater would be its negative impact on their quality of life (17). Rembarzini et al. in a study investigating the effectiveness of cognitive-behavioral therapy in reducing anxiety and depression in men with heart disease showed that reducing anxiety can be a cure for people with heart disease. They also indicated that cognitive-behavioral therapy could relieve the symptoms of anxiety and depression and, consequently, reduce the anxiety of people with the symptoms of their illness (16).

Research reveals that mindfulness-based cognitive therapy training has a positive effect on controlling psychological distress, such as anxiety (18). The results also suggest that mindfulness-based training plays a positive role in regulating people's thoughts and emotions (19). Mindfulness means paying attention purposefully to the present, free from prejudice and judgment. In other words, mindfulness requires unique behavioral, cognitive, and metacognitive strategies to focus the process of attention, which in turn reduces negative thoughts and tendencies to worrying and anxious responses and leads to pleasant thoughts and emotions (20). One of the most effective approaches in the domain of emotion regulation is metacognition. Metacognition is any cognitive knowledge or activity which the theme is cognition or cognitive regulation. A metacognitive approach provides people with strategies to break free own from the mechanisms that make it challenging to regulate emotion, and by teaching flexible emotional processing, they will plan in the future to guide thinking and behavior in the face of threats and harm (21). Metacognition-based knowledge also plays an essential role in controlling anxiety sensitivities, so that metacognitive strategies will cause the manifestation of anxiety, threat, and inconsistent low-value self-control (22).

As the prevalence of cardiovascular disease in society and especially among the elderly is increasing day by day, its adverse effects on the individual functioning of the elderly and their families are high. Therefore, it seems that providing psychological services in the form of therapeutic strategies such as mindfulness-based cognitive therapy and metacognitive-based education can be useful in providing mental and physical health for the elderly with heart disease. On the other hand, considering the lack of experimental research in the field of comparing the effectiveness of these two treatments, it seems necessary to conduct such research.

Methods

Study design and participants

The present study was an experimental intergroup experiment with pre-test and post-test. The statistical population of this study included older people with a history of heart disease living in a nursing home in Tehran (according to the head of the center and having a medical record) in 2018. Among them, 50 people with a history of heart disease were selected and randomly divided into two groups of 25 people. Then, the first group received an 8-session mindfulness-based cognitive therapy (60 minutes), and the second group was presented with 8-sessions metacognitive-based training (60 minutes). Criteria for entering the research include; A) the elderly living in a nursing home B) having a history of heart disease C) having a minimum literacy of reading questionnaires as well as the ability to cooperate and the satisfaction of cooperation in the research. The criteria for leaving the study were inability to cooperate and also the lack of conscious consent to participate in the study. When the training was done, the existing questionnaires were performed on the people in the study again to provide a basis for next comparison.

Tools

Emotional Regulation Questionnaire (ERQ-10): The ERQ was used to measure emotional variability. The questionnaire consists of 10 items, including two subscales of reassessment (6 items) and suppression (4 items). The reassessment subscale is categorized by progress and the suppression subscale by the response. Gross and John reported the internal reliability and retested reliability of the present questionnaire to be 0.73 and 0.69, respectively (21). In Iran, Hosseini and Khair (2011) reported that Cronbach's alpha of the questionnaire was 0.70, and the overall validity of the scale was 0.68 indicating acceptable reliability and validity (23). In the present study, the reliability of the

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test was investigated and the total Cronbach's alpha was reported to be 0.66.

Anxiety Sensitivity Index (ASI): Taylor and Cox designed the questionnaire in 1998, and their goal was to assess their fear of anxiety and consequences. This scale has 36 self-reporting items designed to measure six specific topics. Anxiety sensitivities include fear of cardiovascular symptoms (6 items), fear of respiratory symptoms (7 items), fear of visible symptoms in general (8 items), fear of gastric and intestinal symptoms (4 items), fear of analytical and neurological symptoms (6 items) and fear of lack of cognitive control (5 items). The design of the test is based on a 5-point Likert-type scale from zero (very low) to four (too much). It puts the total scores of the subject in a range of zero to 144. Taylor and Cox reported alpha coefficients to be between 0.83 and 0.94 in a study of the internal similarity of this scale (13). Ghasemi (2012) has reported Cronbach's alpha for subscales of fear of cardiovascular symptoms (0.85), fear of respiratory symptoms (0.88), fear of visible signs to the general (0.90), fear of gastric and intestinal symptoms (0.88), fear of analytical and neurological symptoms (0.86), and the fear of lack of cognitive control (0.87) and the whole test 0.89 (14). In the present study, the reliability of the test was investigated, and the overall Cronbach's alpha value was 0.93.

Intervention methods

Methods of intervention in this study included two forms of mindfulness-based cognitive therapy and metacognitive-based education that summaries and educational content of the sessions are given in Tables 1 and 2.

Ethical considerations

After obtaining the consent of the individuals and explaining that the results of the findings of this research are only for conducting research work and their personal information will not be revealed to any person or organization, to observe research ethics, the subjects were asked to withdraw from the cooperation if they were not interested in continuing for any reason. The present article was conducted under the supervision of the Family Mental Health Center and has been approved by the mentioned center with the code 13970811.

Statistical analysis

Analysis of data obtained by using the variance analysis, the multivariate analysis of covariance was performed by SPSS version 23 software. Pairwise comparisons were also used to compare two-to-two groups independent variables (emotion regulation and anxiety sensitivity).

Tables 1. The educational content of the sessions of mindfulness-based cognitive therapy

Sessions	The educational content of the sessions
1	Automatic guidance: eating a conscious, meditative examination of the body
2	Dealing with obstacles: Meditating and checking the body, ten minutes of conscious mind breathing, practising thoughts and feelings
3	Respiratory mindfulness: Conscious motion movement, breathing practice, determining the history of pleasant experiences, distinguishing thoughts from reality
4	Staying in the present: 5-minute mindfulness of seeing or hearing, meditation sitting, conscious mind walking, cognitive distortions
5	Accept and allow: Sit meditation, awareness of breathing and body, time machine and review of previous thoughts and predictions
6	Thoughts are not facts: Meditation sitting, awareness of breathing and body, distinguishing thought from reality, practising moods, alternative thoughts and perspectives
7	How can I take care of myself: Meditation sitting, awareness of breathing and body, voices, thoughts and emotions, identifying the relationship between activity and mood, creative solution.
8	Use what you have learned to use in the future: Body meditation, end meditation, review of the entire course

Tables 2. The educational content of the sessions of metacognitive-based education

Sessions	The educational content of the sessions
1	Learning metacognitive strategies: People were taught how to use specific techniques to perform better when emotions arose
2-3	Introducing steps to people: Step 1. Individuals were asked to imagine an intense environmental emotion; step 2. Individuals interpret the feeling; step 3. Individuals draw how to deal with that excitement in their mind; step 4. Individuals think about how they can express that excitement in the environment; step 5. Individuals guess and choose the best way to express their emotion and step 6. Individuals carefully review the items.
4	Various thrills were portrayed for the people, and they were asked to take the steps provided.
5	Obvious self-guidance: People were asked to repeat the items aloud.
6	Reducing self-guidance: The goal of this step was to internalize the methods of dealing with intense emotions, so people were asked to practice and repeat the technique they have learned from now on.
7	Providing an exciting situation as a template and how to adjust and express excitement using the steps provided
8	Repeating the previous session tutorials

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Results

The participants in the present study included 50 people whose mean age was 65.21 ± 0.11, of these, 24 were men, and 26 were women. By examining the data, the results showed that the assumptions related to the analysis of covariance were realized. To make a comparative study of the effectiveness of the two intervention methods, a multivariate analysis of covariance was performed. The results of which are shown in the following tables.

Table 3 indicated that both mindfulness-based cognitive therapy and metacognitive-based training were both influential in managing emotion regulation and reducing anxiety sensitivity in the elderly. However, the results showed that metacognitive-based training was more effective (up 0.001) in controlling anxiety-related fears than cognitive-based cognitive therapy.

The results of table 4 show that there is a significant (up 0.001) difference between the two groups under training (mindfulness-based cognitive therapy and metacognitive-based training).

The results of table 5 demonstrate that effects independent variables, i.e. mindfulness-based cognitive therapy and metacognitive-based training were significant (up 0.001) on dependent variables (emotion regulation and anxiety sensitivity components). Therefore, treatment methods have different effects on these variables.

The results of table 6 show pair comparison on dependent variables (emotion regulation and anxiety sensitivity components). It also indicates that the mean difference between the two groups is significant, which was suitable for metacognitive-based training. It means that this method had a more significant impact on participants than the mindfulness-based cognitive therapy method.

Tables 3. Descriptive variables index

Group		Anxiety sensitivity		Emotion regulation	
		Mean	Standard deviation	Mean	Standard deviation
Metacognitive-based training	Pre-test	21. 68	2. 05	15. 14	1. 19
	Post-test	11. 39	1. 03	23. 66	2. 36
Mindfulness-based cognitive therapy training	Pre-test	21. 68	2. 05	15. 14	1. 19
	Post-test	14. 21	1. 34	18. 45	1. 77

Tables 4. Results of variance analysis to compare groups

Sources	Value	F	Error df	Hypothesis df	Sig.
Pelaie effect	0.49	19. 63	3	46	0.001
Wilks' Lambda	0.47	19. 63	3	46	0.001
Hoteling effect	3. 35	19. 63	3	46	0.001
Roy root biggest	3. 35	19. 63	3	46	0.001

Tables 5. Multivariate analysis of covariance (the effects of treatment methods on the dependent variable)

Dependent variable	Square total	df	Square mean	F	Sig	Eta Square
Reassessment	98. 23	1	98. 23	3. 62	0.001	0.14
Suppression	123. 22	1	123. 22	3. 11	0.001	0.23
Fear of cardiovascular symptoms	211. 00	1	211. 00	7. 23	0.004	0.29
Fear of respiratory symptoms	67. 25	1	67. 25	1. 05	0.003	0.07
Fear of visible signs in general	99. 36	1	99. 36	4. 01	0.001	0.14
Fear of gastric and intestinal symptoms	119. 87	1	119. 87	5. 99	0.002	0.25
Fear of analytical and neurological symptoms	114. 98	1	114. 98	5. 45	0.001	0.24
Fear of lack of cognitive control	209. 34	1	209. 34	7. 87	0.001	0.28

Tables 6. Pair comparison of mean dependent variables on therapeutic groups

Groups	Variables	Mean difference	Mean Standard Error	Sig.
Mindfulness-based cognitive therapy and metacognitive-based training	Reassessment	-1.02	0.55	0.01
	Suppression	-0.70	0.87	0.03
	Fear of cardiovascular symptoms	-4.38	0.46	0.07
	Fear of respiratory symptoms	0.88	0.98	0.03
	Fear of visible signs to the general	-1.06	0.39	0.001
	Fear of gastric and intestinal symptoms	1.11	0.78	0.05
	Fear of analytical and neurological symptoms	0.09	0.67	0.11
	Fear of lack of cognitive control	-1.24	0.76	0.01

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Discussion

This study aimed to compare the effect of two approaches, namely mindfulness-based cognitive therapy and metacognitive-based training, on emotion regulation and anxiety sensitivity of the elderly with a history of heart disease. The findings showed that both mindfulness-based cognitive therapy and metacognitive-based training were effective in managing emotion regulation and reducing anxiety sensitivity in the elderly. However, the results indicated that metacognitive-based training was more effective in controlling anxiety-related fears than cognitive-based cognitive therapy. Metacognitive-based therapy also played a more prominent role in regulating emotions (suppression) which is probably due to the emphasis on metacognitive-based training methods in advancing therapeutic steps to control the intense emotions associated with the environment and the high accuracy in reviewing the steps that have been taught. On the other hand, although mindfulness-based cognitive therapy was less effective than metacognitive-based training methods, it was still effective in controlling cognitive fears. The results of the present study were somewhat consistent with the results of the research of Shahidi and Manshaei (21), Yousefvand and Alavi (22); Nouri et al. (24). There were no contradictory results.

It can be said that because the control dimension of metacognition-based training is one of the most influential dimensions in discussing emotion regulation and stress and anxiety control. Therefore, it can have a significant effect on difficult and problematic situations and conditions and can be useful in case of physical and mental problems. Various studies have shown that older people with heart disease, as well as older people with a history of heart disease, have more anxiety disorders (26) and also experience more anxiety sensitivities (26), as well as more difficulty in regulating different emotions (27) than their peers who do not have the problem. In a study conducted by Omidi et al. to make mindfulness-based stress reduction and anxiety training effective in improving the quality of life of cardiovascular patients, the results showed that mindfulness training had improved the quality of heart patients' life, which reduces stress and anxiety (28). Aghajani et al. also showed that metacognitive beliefs play an influential role in predicting the quality of life of chronic physical patients (29).

In this regard, controlling and reducing anxiety and emotions regulating are structures that are thought to play an essential role in the mental and physical health of the elderly and play a role in adapting to life's anxious events, success in controlling anxiety and emotion regulation increases health outcomes. In contrast, disability in these areas is associated with the dysfunction of physical and mental functioning. Agah Heris and Ramezani found that patients with physical-mental problems who experience lower levels of anxiety report fewer problems in life than patients with high levels of anxiety (30). Smith and Arigo also showed that the regulation of strong emotions has a significant effect on health, especially in people with a history of chronic diseases (31). So, it seems that metacognitive-based therapeutic training and also mindfulness-based cognitive therapy can be used to provide services to the elderly with heart disease or with a history of heart disease because the result of the present study confirms this.

Conclusion

In general, the findings of the present study suggest that psychological therapies such as mindfulness-based cognitive therapy and metacognitive-based training have a beneficial effect on controlling anxiety sensations in the elderly with a history of heart disease. Therefore, the use of such training can play an effective role in regulating emotion because anxiety and inability to regulate emotions play a significant role in the emergence and stabilization of heart disease.

Study limitations

The present study had some limitations. Firstly, as the target community included elderly people with a history of heart failure, the results were not generalizable to the general public. Another limitation was the lack of follow-up in the present study. It is suggested that this present study be conducted among other groups of society so that results can be generalized. It is also recommended that future researchers pay attention to the follow-up phase. It is also suggested that mental health officials, including nurses, rehabilitation specialists, psychologists, and social workers associated with the elderly with a history of heart disease, pay special attention to the important role of psychological variables.

Conflicts of interest

Authors declare no conflicts of interest.

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Authors' contribution

The first author was responsible for writing the introduction, method, and data analysis, and the second author wrote the discussion. All the authors have read and approved the final manuscript.

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