Comparison of the Effectiveness of Mindfulness-Based Cognitive Therapy and Integrated Transdiagnostic Psychotherapy on Reducing Anxiety Sensitivity and Rumination in Cardiac Patients with Type D Personality

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Abstract

Background: Cardiovascular disease is one of the leading causes of disability and mortality in the world, and almost one out of every 4 Cardiac Patients have type D personality traits. This personality type also predicts some of the psychological components of people, including anxiety sensitivity and rumination.

Objectives: The goal of this research was to compare the effectiveness of mindfulness-based cognitive therapy and integrated transdiagnostic psychotherapy on anxiety sensitivity and rumination in cardiac patients with type D personality.

Methods: The research methodology was semi-experimental, and the statistical population of the present research includes all Cardiac Patients who visited the Simorgh Heart Clinic in Mashhad in 2022. The sample size includes 60 individuals who were randomly placed in two experimental groups and one control group. Twenty persons were included in the integrated transdiagnostic therapy group, 20 were replaced in the mindfulness-based cognitive therapy group, 20 were replaced in the control group, and mindfulness-based cognitive therapy intervention and integrated transdiagnostic psychotherapy were conducted for the two groups. The research tool (means) includes Rees and Peterson (1985) and Nolen-Hoeksema (1991) anxiety sensitivity scale.

Results: Mindfulness-based cognitive therapy has been more influential on both research variables between the effectiveness of mindfulness-based cognitive therapy and integrated transdiagnosis on anxiety sensitivity and rumination of Cardiac Patients under study.

Conclusion: Mindfulness can have desirable results on anxiety sensitivity and rumination in Cardiac Patients with type D.

Keywords: Anxiety Sensitivity, Mindfulness-Based Cognitive-Therapy, Integrated Transdiagnostic Psychotherapy, Rumination, Cardiac Patients, Personality.

1. Background

Subjects related to personality play an important role in predicting the consequences and events of life (1). Personality is associated with many behavioral and health consequences both in terms of its disorder aspect and in the level of personality traits and characteristics,

and this field of study can be more dynamic when it investigates the relationship of this structure with significant consequences of life (2). The existence of undesirable personality traits in individuals with mental and physical health problems, such as increased anxiety symptoms and increased likelihood of recurrent episodes of depressive disorder and worse outcomes in mood states (3), problematic interpersonal relationships, extensive levels of social dysfunction (4-6), and professional and occupational problems (7) as well as medical problems (8).

One of the most important personality traits, which has recently received attention, is the type D personality. Research has shown that the existence of a type D trait or "distressed personality" in people is a major risk factor for the development and prognosis of coronary heart disease (9, 10). This disease has been included in the list of the most disabling diseases as the first cause of disability since 2030 (11). The importance of this personality type in increasing the risk of coronary heart disease is so great that it has been recommended in "The European Cardiovascular Prevention Guideline" to consider this type as a major risk factor for screening for heart problems since 2012. This type of personality is characterized by the simultaneous desire to experience negative emotions (negative affectivity) and to avoid expressing these emotions in social interactions with others (social inhibition), and almost one out of every four heart patients have the components of this personality type (12). There is no accurate picture regarding how this personality type affects the formation of heart disease or its poorer prognosis, and it is a multifaceted issue. However, one of the possibilities is that these people have fewer healthcare-related behaviors. Consequently, they are exposed to the risk of future heart disease and earlier disease progression (13).

However, the risks of this personality type are not only related to health-related behaviors but also predict some of the psychological components of individuals. One of the components affected by this personality type is the "anxiety sensitivity" (AS) component. This concept refers to the fear of physical sensations related to anxiety, which is interpreted as a process that has harmful physical, psychological, and social results (14). People with high levels of anxiety significantly receive their feelings and thoughts in stressful situations and face severe anxiety responses in stressful situations in the state of increased readiness (15). Regarding the relationship between type D personality and anxiety sensitivity, the findings indicate that people with this personality type experience higher anxiety sensitivity (16).

Also, the results of studies that investigated the pathophysiological mechanisms for cardiac disease with type D personality have reported rumination as a variable with a significant positive correlation with this personality type (17). Rumination is a type of negative, internal, largely uncontrollable, and repetitive speech that is highly internalized, emerges with high intensity and repetition, and usually includes emotional content (18). Extending the seminal work of Nolen-Hoeksema et al., Treynor distinguished between rumination, brooding, and reflective rumination. A negative ruminating style causes the continuation of negative emotions just like the rumination by brooding and unwanted rumination and, therefore, contributes to distress emergence. On the contrary, upbeat rumination styles, i.e., reflective and deliberate rumination, are related to problem-solving and identifying positive consequences of traumatic or stressful events (19). Also, Nolen-Hoeksema's (1991) theory of response styles widely supports the evidence that rumination exacerbates depression, reinforces negative thinking, impairs problem-solving, interferes with instrumental behavior, and erodes social support. In addition to depression, rumination is also associated with psychological pathologies, including anxiety, (binge eating) gluttony, excessive alcohol consumption, and self-harm (20).

Mindfulness-based interventions (MBIs) have been suggested as an effective and applicable method to handle various mental and physical disorders, including cardiovascular diseases (21-35), as well as preventing the recurrence of mental rumination patterns in these patients**.** Mindfulness-based treatments

can have a positive impact on the significant reduction of alexithymia and reduce the pain in patients even through reducing the amount of negative emotions and alexithymia (36). Of course, psychological risk factors for cardiovascular diseases are usually posed as a cohort of factors (37), which include a set of rumination and anxiety disorders and a combination of negative emotions and social inhibition (38). Likely, the ordinary processes existing in the background of these negative emotions generally increase the risk of cardiovascular disease development (39). Research has shown that treatments that deal with the main sensational and emotional processes beyond diagnostic boundaries can effectively improve and promote mental health in cardiovascular patients (40). In response to these findings, Barlow et al. (41) have designed an integrated transdiagnostic treatment protocol consisting of four main sections as follows: increasing emotional awareness, facilitating flexibility in assessments, identifying and preventing behavioral and emotional avoidance, and internal and situational exposure with emotion clues (42).

The importance of two integrated transdiagnostic treatment interventions and mindfulness-based cognitive therapy has been shown in research, but it is unclear which is superior and more useful for patients. It seems that these two treatments have been investigated separately in clinical trial studies, and their effectiveness in people with heart disease who have type D personalities has not been specifically considered. The necessity of such research is apparent both from a theoretical viewpoint to improve the perspective of the researchers in this field and from a clinical viewpoint to enhance the treasury of existing treatments regarding the psychological problems of heart patients. In this regard, the question of the current research is, which mindfulness-based cognitive therapy (MBCT) and integrated transdiagnostic psychotherapy can be more effective in improving anxiety sensitivity and rumination in heart patients with type D personality?

2. Objectives

The objective of this research was to compare the effectiveness of mindfulness-based cognitive therapy and integrated transdiagnostic psychotherapy on anxiety sensitivity and rumination in heart patients with type D personality.

3. Methods

The research methodology is semi-experimental, and the statistical population of this research includes all Cardiac Patients who visited Simorgh Heart Clinic in Mashhad in 2022. The sample size included 60 individuals of these people who were selected according to the entry criteria and randomly divided into three 20-individual groups. Entry criteria include obtaining the necessary cutoff score in the D personality questionnaire, presence of heart disease, non-participation in simultaneous psychotherapy sessions, no history of more than three treatment sessions in the person's history, no clinical diagnosis associated with drug withdrawal disorders, depression disorder, and adjustment disorder based on the diagnosis of Ballinger and experts, not taking medical drugs at the same time and drug abuse and dependence, not having a history of hospitalization and psychotic episodes, and the minimum age of 40 and the maximum of 70 years. It is also one of the exit criteria. Period, absence of more than two sessions in treatment sessions, sudden occurrence of trauma, bereavement, and adaptation problems for people in the period of the implementation of sessions, or severe recurrence of heart disease.

The sample size was calculated for three independent groups with a test power of 0.8 and a significance level 0.05. It should be noted that the sample size was based on the formula provided by Tabachnik and Fidel (43) for experimental designs. According to this formula, the sample size in each group should not be less than 15 individuals. The sampling method was in a way that among all the cardiac patients of the Simorgh Heart Clinic in Mashhad who were under treatment during the period of the research implementation and who visited the clinic, a total of 260 questionnaires of Denault's type D personality (DS-14) (2005) were completed in the form of "available sampling" aiming at identifying people with

type D personality (keeping in mind that previous studies have shown that one out of every four Cardiac Patients usually has this personality type). Then, among these individuals, 67 individuals who had type D personality traits and were willing to participate in the therapy sessions were invited to the therapy sessions. Finally, these 60 individuals were randomly placed in two experimental and one control group. All three groups responded to the research questionnaires before and after

the implementation of the treatment sessions and after one month in the follow-up phase. (Figure 1) In addition, the participants' presence was voluntary, and the subjects were assured that their information would remain confidential. It should also be mentioned that the control group members who participated in this research were freely and intensively treated with mindfulness-based cognitive therapy after completing the research to comply with ethical issues .
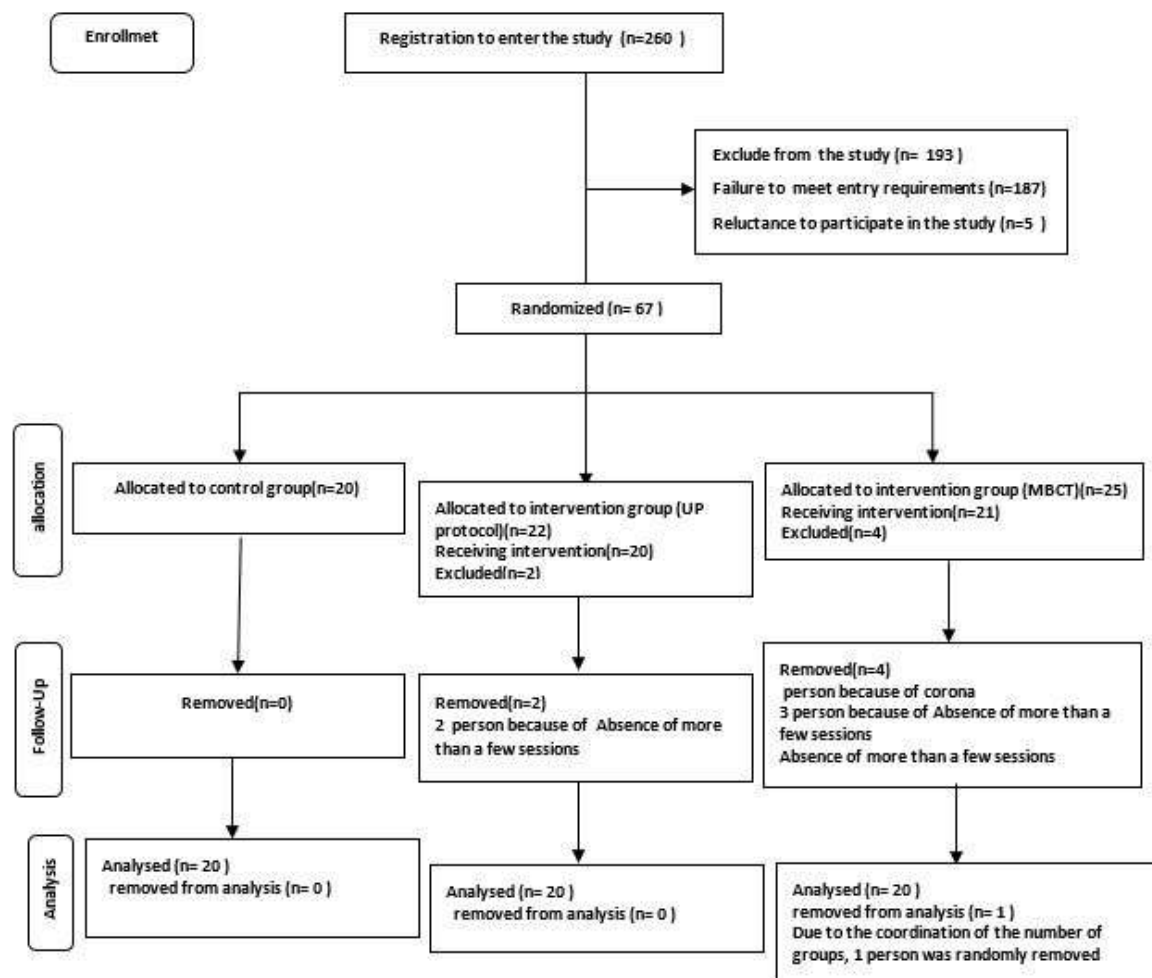

Figure 1. Consort flowchart

Furthermore, all the ethical standards of the research, including maintaining confidentiality, completing the consent form to participate in the research, and not being forced to continue the sessions, were observed in line with the Declaration of Helsinki. This research (ethics

code: AR.IAU.TJ.REC.1402.002) was registered and approved by the Ethics Committee of Torbete-Jam Azad University. After completing the study, the control group participants were offered voluntary participation in MBCT treatment.

First, the descriptive statistics of sociological characteristics and the research variables were calculated. Then, parametric assumptions, including normality assumption with skewness and kurtosis test, Kolmogorov Smirnov, Shapiro-Wilk, equality of variances assumption by Levine's test, and Mauchly's sphericity test, were calculated. First, the difference of the pre-tests was calculated by a variance analysis test to calculate the research hypotheses. Then, the research hypotheses were calculated with the mixed variance analysis at the level of overall scores and subscales. All these calculations were made by SPSS-26 software. The 95% confidence interval was drawn to conduct the intra-group and inter-group comparison of scores of the three groups in the three phases of treatment.

Research Tool (Means)
Anxiety Sensitivity Questionnaire (ASI)

Is a self-report questionnaire that has 16 items and is based on a five-point Likert scale (very low = 0 to very high = 4). Each item reflects the belief that anxious feelings are experienced unpleasantly and have the potential to lead to a traumatic consequence. Higher scores determine the degree of experiencing fear from anxiety symptoms. The range of scores is between 0 and 64. The structure of the questionnaire is composed of three factors: Fear of physical concerns (8 items), fear of not having cognitive control (4 items), and fear of anxiety being observed by others (4 items). Investigating the psychometric properties of this scale has shown its internal stability (alpha between 0.80 and 0.90). The retest reliability of 0.75 after 2 weeks and 0.71 for three years has shown that anxiety sensitivity is a stable personality construct (44). Anxiety Sensitivity Questionnaire (ASI) is a self-report questionnaire that has 16 items. The questionnaire was developed by Reiss and Peterson in 1985. The structure of the questionnaire consists of three factors: fear of physical concerns (8 questions), fear of not having cognitive control (4 questions), and fear of being observed by others (4 questions).

Nolen-Hoeksema Rumination Questionnaire:

The questionnaire was designed and developed by Nolen-Hoeksema and Maro in 1991 to measure rumination. It has 22 questions and measures the rumination based on a four-point Likert scale. It has three subscales: reflection, brooding, and depression. The minimum score will be 22, and the maximum will be 88. A score between 22 and 33 indicates low rumination, a score between 33 and 55 indicates moderate rumination and one higher than 55 indicates high rumination. According to a study conducted on students of the Ferdowsi University of Mashhad, depression and anxiety questionnaires and the Nolen-Hoeksema rumination questionnaire scale were investigated. Cronbach's alpha coefficient equal to 0.88% was calculated as an index of internal consistency for the scale of rumination responses (45).

The intervention protocol used in this research is as follows:

Segal et al.'s cognitive therapy intervention based on mindfulness (46) was performed in eight 90-minute sessions. The content are described in the table 1.

Table 1. Summary of mindfulness-based cognitive-therapy sessions:		
Session	**Session content**	**Session techniques**
1	Familiarizing the members with each other, introducing the group rules, introducing the mindfulness-based cognitive therapy method, explaining the therapy benefits for the group	Reviewing the immediacy-based cognitive therapy and stating the goals of each session, automatic guidance, practicing eating raisins (the actual practice is to get aware and realize how much they lose when they deprive themselves of the decadent reception of sensory experience), physical examination practice, homework, discussion and determination of weekly sessions and distribution of tapes and pamphlets of the first session.
2	Challenges with obstacles that people face	Facing obstacles, reviewing last week's homework, practicing physical examination, reviewing the practice, reviewing the homework, practicing thoughts and feelings, recording pleasant events, sitting meditation for 1-10 minutes, assigning homework,
3	Becoming more aware of the scattered mind and learning to focus intentionally. Awareness of breathing to be more focused and integrated	Seeing and hearing practice, introduction of 30 to 40-minute sitting meditation practice, homework review, 3-minute breathing space practice and review, homework,
4	Training the person to look at the events from	Staying in the present moment, the five-minute practice of seeing and hearing, 40

	another aspect in order to gain a broad and different perspective on them and to increase focus on that issue.	minutes of meditation, mindfulness of breath and body, voice and thoughts, exercise review, homework, homework assignments
5	Instructing permission to be present to the experience exactly as it is, without any judgment or trying to change	Allowing to present different communication means allowing the experience to be present exactly as it is, without judging it, 40 minutes of sitting meditation, practice revision, homework revision, space of breathing, and revision.
6	Instructing techniques to understand that thoughts are just thoughts	Thoughts are not facts, 40-minute sitting meditation, mindfulness of breath, body, sounds, and thoughts, practice review, homework review, preparing for course completion,
7	Instructing techniques for awareness and breathing control	Self-care: 40 minutes of sitting meditation, awareness of breathing, body, sounds, and then thoughts, reviewing exercise, being aware of depression symptoms, making plans for possible coping with depression symptoms, making a list of mastery and enjoyable activities, reviewing homework, practice observing the relationship between activity and mood.
8	Regular practice of immediacy to maintain balance	Revision of past contents and conclusion

Integrated transdiagnostic psychotherapy was performed in twelve 120-minute sessions, according to the protocol of Barlow et al., which was introduced in 2017 (41). The mentioned protocol is described in the table 2.

Table 2. Integrated transdiagnostic psychotherapy protocol	
Session	**The content of the meetings**
1	Introduction and logic of treatment; Strategies to improve the motivation of choosing treatment goals
2	component model of emotional ۳Psychological education about the adaptive function of emotions; experiences
3	The natural flow of emotions and the role of avoiding emotional awareness
4	cognitive flexibility; Thought traps and questions opposite the downward arrow
5	identifying strategies to avoid excitement; Rationale for replacing emotion-based behaviors with alternative behaviors
6	Psychological training about artificial conditioning, Symptom induction tests, artificial exercises
7-11	the logic of confronting the construction and examination of individual hierarchies, Emotionally focused situational encounters
12	Revision of skill, emphasis on continuing to perform exposures, review of progress and future goals of relapse prevention strategies

4. Results

As mentioned earlier, the pre-test, post-test, and follow-up data were recorded in three 20-individual groups, including two experimental groups and one control group for the two variables of emotion regulation and distress tolerance. In the following, first, the descriptive indices and then the inferential investigation of the research data in terms of the significance of the interventions used in the experimental groups in the post-test and follow-up phases, and then, the comparison of the effectiveness of the two treatments was reported. Table 3 displays the descriptive statistics of anxiety sensitivity and rumination of the three research groups in the three phases: pre-test, post-test, and follow-up.

Table 3. Descriptive statistics of anxiety sensitivity and rumination.							
Dependent Variable	**Time**	**Pre-Test**		**Post-Test**		**Follow-Up**	
	Group	Average	St. D.	Average	St. D.	Average	St. D.
Anxiety Sensitivity	**Mindfulness**	49.60	64.5	40.15	5.40	42.55	5.39
	Transdiagnosis	48.50	5.01	38.45	5.72	42.00	5.61
	Control	48.30	4.93	46.40	5.41	46.40	4.30
Rumination	**Mindfulness**	54.20	3.66	43.60	4.31	42.00	4.21
	Transdiagnosis	53.10	3.16	47.60	3.11	45.35	3.44
	Control	50.65	3.95	51.90	4.71	52.70	2.54

Note. N=60 (size of each group: 20 individuals).

Regarding the effectiveness of mindfulness-based cognitive therapy treatment and integrated transdiagnosis on the level of anxiety sensitivity of heart patients, despite the closeness of the anxiety sensitivity averages of the three groups in the pre-test phase, significant differences have been observed among the scores of the three group, especially between the two groups of treatment and control in the post-test and follow-up phases. The level of anxiety sensitivity decreased in the post-test and follow-up phases compared to the pre-test phase in all three groups, but this decrease was more significant in the two groups of mindfulness and transdiagnosis. The average scores decreased from 49.60 (SD=5.64) in the pre-test to 40.15 (SD=5.40) in the post-test and to 42.55 (SD=5.49) in the follow-up phase in the

mindfulness group. The average scores decreased from 48.50 (SD=5.01) in the pre-test to 38.45 (SD=5.72) in the post-test phase and to 42.00 (SD=5.61) in the follow-up phase in the transdiagnosis group. The average decreased from 48.30 (SD=4.93) in the pre-test phase to 46.40 (SD=5.41) in the post-test and to 46.40 (SD=4.30) in the follow-up phase in the control group. Table 2 displays the results of the analysis of the covariance test to check the significance of intergroup differences.

As the results of Table 4 display, the anxiety sensitivity scores of the three groups had a significant difference both in the post-test and in the follow-up phases: for the post-test scores: $F_{(2,56)} = 18.43$, $p<0.001$, $\eta^2 = 0.40$; For follow-up scores: $F_{(2,56)} = 6.02$, $p<0.004$, $\eta^2 = 0.18$.

Table 4. The results of analysis of covariance test for intergroup differences in anxiety sensitivity and rumination in three phases of measurement.

Dependent V.	Stage	Source	SS	df	Ms	F	Sig.	η^2	St. P.
Anxiety sensitivity	**Post-test**	**group**	768.79	2	384.40	18.43	0.001	0.40	0.99
		Error	1168.15	56	20.86				
	Follow up	**group**	262.30	2	131.15	6.02	0.004	0.18	0.87
		Error	1220.48	56	21.79				
Rumination	**Post-test**	**group**	962.93	2	481.47	41.34	0.001	0.60	0.99
		Error	652.24	56	11.65				
	Follow up	**group**	1375.81	2	687.90	76.45	0.001	0.73	1.00
		Error	503.88	56	9.00				

Note. N=60 (size of each group: 20 individuals).

Table 5 displays the adjusted means of anxiety sensitivity in the post-test and follow-up phases after adjusting the impact of pre-test differences.

Table 5. The results of calculating the adjusted mean of anxiety sensitivity and rumination after controlling the pre-test impact.

DependentV.	Group	Time	Adjusted Mean	Mean St. Error	95% Confidence Interval Lower Limit	95% Confidence Interval Upper Limit
Anxiety Sensitivity	**Mindfulness**	**Post-test**	39.67	1.03	37.61	41.72
		follow up	42.21	1.05	40.11	44.31
	Transdiagnosis	**Post-test**	38.63	1.00	36.58	40.68
		follow up	42.13	1.04	40.04	44.22
	Control	**Post-test**	46.70	1.02	44.65	48.75
		follow up	46.61	1.05	44.52	48.71
Rumination	**Mindfulness**	**Post-test**	42.61	0.79	41.03	44.18
		follow up	41.27	0.69	39.85	42.63
	Transdiagnosis	**Post-test**	48.31	0.77	46.78	49.84
		follow up	45.13	0.67	43.78	46.48
	Control	**Post-test**	53.18	0.80	51.57	54.79
		follow up	53.68	0.71	52.27	55.10

Note. N=60 (size of each group: 20 individuals)

As displayed in Table 5, the post-test and follow-up scores of anxiety sensitivity of the two treatment groups are outside the 95% confidence interval of the control group in all cases, which indicates the effectiveness of both treatments in improving the anxiety sensitivity of the individuals. More accurate statistical significance calculations can be seen in the table of pairwise comparisons (Table 6).

The results of Table 6 show that both the post-test and the follow-up scores of the two treatment groups were lower than the control group in the anxiety sensitivity variable, and the difference was statistically significant ($p<0.05$). However, the comparison between the two treatment groups shows no significant difference was observed in the post-test and follow-up scores of the two mindfulness and transdiagnosis groups ($p>0.05$). Therefore, the research hypothesis regarding the difference in the effectiveness of the two treatments was rejected in this research.

Table 6. Results of pairwise comparisons of post-test and follow-up scores of anxiety sensitivity and rumination.							
Dependent V.	**Intergroup Comparison**	**Time**	**Mean D.**	**St. Error of Difference**	**Sig.**	**95% Confidence Interval**	
						lower limit	**upper limit**
Anxiety Sensitivity	**Mindfulness ↔ Transdiagnosis**	**Post-test**	1.04	1.45	0.478	-1.78	3.94
		follow up	0.08	1.48	0.957	-2.89	3.05
	Mindfulness ↔ Control	**Post-test**	-7.4	1.45	0.001	-9.94	-4.13
		follow up	-4.41	1.48	0.004	-7.38	-1.43
	Transdiagnosis ↔ Control	**Post-test**	-8.07	1.44	0.001	-10.96	-5.18
		follow up	-4.49	1.48	0.004	-7.44	-1.53
Rumination	**Mindfulness ↔ Transdiagnosis**	**Post-test**	-5.71	1.09	0.001	-7.89	-3.53
		follow up	-3.89	0.96	0.001	-5.81	-1.97
	Mindfulness ↔ Control	**Post-test**	-40.58	1.17	0.001	-12.92	-8.24
		follow up	-12.44	1.03	0.001	-14.50	-10.39
	Transdiagnosis ↔ Control	**Post-test**	-4.87	1.12	0.001	-7.12	-2.62
		follow up	-8.55	0.99	0.001	-10.53	-6.58

Note. N=60 (size of each group: 20 individuals).

Regarding the effectiveness of mindfulness and transdiagnosis treatment on the level of rumination in cardiac patients, as the results of Table 3 display, there were differences in the averages of the three groups in all three phases of pre-test, post-test, and follow-up to rumination. The average scores decreased from 54.20 (SD=3.66) in the pre-test to 43.60 (SD=4.31) in the post-test and to 42.00 (SD=4.21) in the follow-up phaseهn the mindfulness group. The average scores decreased from 53.10 (SD=3.16) in the pre-test to 48.60 (SD=3.11) in the post-test phase and to 45.35 (SD=3.33) in the follow-up phase in the transdiagnostic group. A continuous but partial increase was observed in the rumination scores from the pre-test to the post-test phase in the control group. Based on the information in Table 4, the rumination scores of the three groups had a significant difference both in the post-test phase and in the pre-test phase: For post-test scores: $F_{(2,56)}=41/34$, $p<0.001$; $\eta^2=0.60$; For follow-up scores: $F_{(2,56)}=76.45$, $p<0.001$; $\eta^2=0.73$.

Finally, the post-test and follow-up rumination levels of both treatment groups are significantly lower than the control group ($p<0.05$) based on the results of Tables 5 and 6. This means that both treatments are effective in rumination reduction, but the results of the paired comparison (Table 6) for the two treatment groups show a lower level of rumination in the mindfulness group both in the post-test ($p<0.001$; mean difference=-5.71) and in the follow-up ($p<0.001$), mean difference=-3.89). Therefore, mindfulness intervention has a significant superiority regarding comparing the two treatments.

5. Discussion

The present research was conducted aiming to compare the effectiveness of mindfulness-based cognitive therapy and integrated transdiagnostic psychotherapy on anxiety

sensitivity and rumination in Cardiac Patients with type D personality. The results of the research showed that integrated transdiagnostic psychotherapy and mindfulness-based cognitive therapy interventions have a significant impact on the research variables. No significant difference has been observed in the effectiveness of the two groups of mindfulness and transdiagnosis regarding the anxiety sensitivity variable. However, finally, the lower level of rumination in the group of mindfulness-based cognitive therapy supports the superiority of the effectiveness of this treatment in the rumination variable.

In line with the research findings, various research (24-30) have shown that mindfulness-based cognitive therapy is effective in reducing the anxiety sensitivity of people with heart disease. In people with high anxiety sensitivity, there is a flawed cycle between physical feelings, negative interpretations and evaluations, and anxiety, which continuously and permanently keeps the person in a state of alertness to physical symptoms related to anxiety, such as increased heartbeat, increased pace of breathing, tremors, and dizziness and leads to an increase in anxiety sensitivity in them. This method helps people with a history of heart disease to reduce their anxiety when facing the symptoms of heart disease, to be aware of their emotions, and to be able to regulate and handle them in the best way. In explaining the effects of mindfulness-based cognitive therapy on anxiety sensitivity reduction, it is necessary to mention the mechanism of this treatment on the client's avoidance and how he/she deals with his/her fears and anxieties. Avoiding the experience of fear and anxiety is a main factor in the continuation of the disorder in the case of people with high anxiety sensitivity (47). Avoiding the experience is called experience control and means any efforts to control or change the form, frequency, or situational sensitivity of internal experiences such as thoughts, feelings, physical changes, or memories (48). People with high anxiety sensitivity have dogmatic beliefs about the necessity of avoiding the experience of fear and anxiety and do not easily quit these beliefs. They believe that the only way to escape from the symptoms of their suffering psychopathology is to stick to these inefficient dogmatic beliefs and show strong resistance to abandoning them. Adjustment and correction of beliefs about avoidance and the need to control the experience of fear and anxiety is conducted by reducing the effort to control them and catastrophizing and downplaying them to get rid of painful symptoms in mindfulness-based cognitive therapy sessions.

Another finding of this research shows that mindfulness-based cognitive therapy reduces rumination in heart patients compared to the control group. This finding is consistent with the findings of (49-53). In explaining this finding, it can be said that the rumination and mental repetition of negative thoughts are among the characteristics of people with type D personality. Patients with heart disease have disturbing (distressing) thoughts. These patients prevent the thoughts and feelings and avoid situations or activities that provoke these thoughts due to the type D personality, and this leads to an increase in anxiety in them. According to the research findings, it can be concluded that rumination and anxiety can be decreased using mindfulness-based cognitive therapy techniques, including cognitive flexibility training, attention improvement, decentralization, mental enrichment, stopping rumination, correction of positive and negative beliefs about rumination, as well as challenging negative beliefs related to emotions.

The integrated transdiagnostic treatment was effective in anxiety sensitivity in this research, in line with the findings of the research (54-58). This treatment protocol has an outstanding performance in increasing the positive affection in this group of heart patients due to involving clients in reducing behavioral patterns caused by excitement and replacing them with pleasurable behaviors. In addition, integrated transdiagnostic therapy instructs people how to face their inappropriate emotions and respond to environmental anxiety-causing stimuli more adaptively. By changing the habits of emotional self-discipline, this approach reduces the frequency and intensity of the use of maladaptive emotional habits and reduces anxiety sensitivity (59).

One of the techniques that leads to the reduction of rumination in integrated transdiagnostic treatment is cognitive reappraisal, through which a person becomes aware of the effect of mutual

relationship between thoughts and emotions, and inconsistent evaluations are automatically identified (60). Therefore, it can be said that this technique in integrated transdiagnostic treatment can make people with heart disease aware of inefficient cognitive processes that lead to double health anxiety and perceive less cognitive confusion and anxiety by revising cognitive processes and putting ruminative thoughts aside (59).

Finally, it seems that both treatments have impacted the research variables according to the common components existing in these two treatments. However, the mechanism of mindfulness-based cognitive therapy has been more stable than the integrated transdiagnostic treatment after the follow-up phase. Persistence in conducting mindfulness exercises by patients after the post-test can be one of the reasons justifying this.

The superior effectiveness of mindfulness-based cognitive therapy (MBCT) over integrated transdiagnostic psychotherapy (UTT) in reducing rumination can be attributed to the unique mechanisms and techniques inherent in MBCT. Unlike UTT, which addresses a broad spectrum of emotional and cognitive issues through generalized strategies, MBCT specifically targets the habitual and automatic thought patterns characteristic of rumination. By fostering a non-judgmental awareness of the present moment, MBCT helps individuals become more conscious of their ruminative thoughts and observe them without getting entangled. This approach not only reduces the frequency and intensity of rumination but also empowers individuals to develop greater cognitive flexibility and emotional regulation. The mindfulness practices integral to MBCT, such as meditation and mindful breathing, encourage patients to detach from negative thoughts and reduce their impact.

Moreover, MBCT's structured sessions provide practical tools for managing and diminishing ruminative thought patterns, which are less emphasized in the more generalized approach of UTT. As a result, patients practicing MBCT are better equipped to interrupt the cycle of negative thinking and prevent the escalation of distressing thoughts, leading to a more significant and sustained reduction in rumination. This targeted intervention makes MBCT particularly effective for individuals with type D personality, who are prone to persistent and distressing ruminative thoughts, thereby highlighting its superiority in this context.

Due to the limited number of the statistical population of the research, the generalization of the results of this research should be done with caution. It is also suggested that considering the limitations of this research, similar studies should be conducted by using non-random sampling and having an independent examiner (a person other than the researcher) in order to prevent possible biases and to conduct the research in a double-blind manner. Also, choosing a sample with different personality traits from heart patients and comparing them with each other can help choose effective treatment for different groups of heart patients.

6. Conclusion

The results of the research showed that mindfulness-based cognitive therapy interventions and integrated transdiagnostic psychotherapy have a significant impact on the research variables. However, a significant difference was observed in the effectiveness of these two treatments, and mindfulness-based cognitive therapy has had a higher effectiveness on both research variables.

Availability of data and materials: The datasets created and/or analyzed during the study are not publicly available, but can be made available upon request from the corresponding author.

Conflicts of interests: All authors declared that they have no competing interests.

Consent for publication: I give my consent for the publication of identifiable details, which can include photograph(s) and/or videos and/or case history and/or details within the text ("Material")

to be published in the above Journal and Article. I confirm that I have seen and been given the opportunity to read both the Material and the Article (as attached) to be published by Razavi International Journal of medicine.

Ethics approval and consent to participate :
This research (ethics code AR.IAU.TJ.REC.1402.002, clinical trial ID 74262) was registered and approved by the Ethics Committee of Torbat-e Jam Azad University. After completing the study, control group participants were offered MBCT on a voluntary basis, ensuring ethical considerations were met. The research adhered to all ethical standards, including confidentiality, Informed consent, voluntary participation and respect for participants as participants' rights and well-being were prioritized throughout the study. The study was conducted in accordance with the principles of the Helsinki Declaration.

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Author contributions: All authors studied the final draft of the research and made the necessary revisions and are responsible for the final report.

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