Original Article

Comparison of Mindfulness-Based Cognitive Therapy and Integrated Transdiagnostic Psychotherapy for Emotion Regulation and Distress Tolerance

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A B S T R A C T

Introduction: Cardiac disease significantly impacts global health, causing substantial disability and mortality. This study compared the effectiveness of mindfulness-based cognitive therapy (MBCT) and integrated transdiagnostic psychotherapy (ITP) on emotion regulation and distress tolerance in patients with type D personality, characterized by social inhibition and negative affectivity.

Methods: A semi-experimental design randomly assigned 60 cardiac patients with type D personality from Simorgh Heart Clinic, Mashhad, Iran, in 2022, to MBCT group (n = 20), ITP group (n = 20) and control group (n = 20). The MBCT and ITP groups received respective interventions, while the control group received no intervention. Emotion regulation and distress tolerance were assessed using validated scales before and after the interventions.

Results: MBCT demonstrated significantly greater improvement in both emotion regulation and distress tolerance compared to ITP and the control group.

Conclusion: This study suggests that MBCT may be a more effective intervention than ITP in improving emotion regulation and distress tolerance in cardiac patients with type D personality. Mindfulness-based approaches could offer valuable tools for managing emotional challenges in this population.

Keywords: Therapy, Emotion Regulation, Distress Tolerance, Cardiac Patients Personality

Introduction

Cardiovascular disease (CVD) stands as a prominent contributor to disability and mortality worldwide (1). It is widely recognized that this condition is intricately linked to certain lifestyles, including smoking, poor dietary habits, hyperlipidemia, hyperglycemia, hypertension, obesity, alcohol consumption, diabetes (2), lack of adequate social support, insufficient physical activity, and nonadherence to treatment and rehabilitation regimens (3). The study of personality (4) offers a supplementary perspective, enriching our comprehension of individual disparities in psychosocial risk factors. Negative affect (the propensity to experience negative emotions) and social inhibition (the inclination to restrain self-expression) emerge as two personality traits of particular relevance in this domain (5). The distressed personality model amalgamates social inhibition and negative affect, positing that a) negative emotions tend to accumulate within individuals (6), and b) social inhibition amplifies the impact of negative emotions on cardiac prognosis (5). Evidence indicates that a distressed personality may correlate with a more than twofold increase in the risk of adverse cardiac complications (7), with pathways such as

endocrine dysregulation, autonomic nervous system dysfunction, and immune system dysregulation potentially accounting for this association (8). Moreover, psychosocial stressors are widely acknowledged as key contributors to all these risk factors (9). Although the precise causal relationships between stress, anxiety, and cardiovascular health remain elusive, numerous studies have demonstrated their predictive value for poorer prognosis and increased mortality (10). Consequently, effective stress and anxiety management is deemed imperative for individuals with CVD to mitigate the likelihood of recurrent cardiac events and optimize overall health. Coping with stress represents a crucial "mental health care skill" (11) and constitutes an integral facet of "physical healthcare" for successful rehabilitation, alongside adherence to medication regimens and healthy dietary practices (12). Recent European guidelines for CVD prevention advocate stress management to foster a healthy lifestyle and reduce disease recurrence (13).

Numerous studies have explored the nexus between emotion regulation strategies and cardiovascular health. For instance, research on non-clinical cohorts has linked suppressive emotion regulation (14) with heightened CVD risk, while highlighting the beneficial effects of reappraisal on heart health (15). Investigations into clinical populations typically associate task-oriented and problem-focused strategies (12) with improved health outcomes. However, a recent systematic review (11) concluded that emotion-focused strategies are as pertinent to physical and psychological self-care in cardiovascular patients as problem-focused strategies. While much of the research on emotion regulation and cardiovascular health has centered on cognitive strategies involving thought processes, a meta-analysis (16) indicated that behavioral emotion regulation strategies may be more efficacious than cognitive ones in ameliorating emotional effects. Therefore, focusing on activities could enrich our understanding of emotion regulation in cardiovascular patients. Distress tolerance, defined as one's capacity to withstand negative emotional states, emerges as a significant cognitive-emotional factor influencing the manifestation of psychiatric symptoms (17). Lower distress tolerance levels have been linked to psychiatric symptomatology through mechanisms such as avoidance tendencies and heightened attention to unpleasant or threatening stimuli (17). Improving distress tolerance through behavioral interventions is feasible (18), with mindfulness-based interventions emerging as effective tools for reducing psychological stress across various physical and mental disorders (19). Mindfulness-based stress reduction (MBSR) and mindfulness-based cognitive therapy (MBCT) have both shown promise in alleviating pain, anxiety, and stress in individuals with chronic conditions like fibromyalgia, cancer, arthritis, and coronary artery disease (20-22).

In addition to conventional medical interventions, mindfulness-based approaches have been proposed as effective means of addressing clinical issues in cardiovascular patients, targeting both psychological and physical symptoms (23, 24). Psychosocial risk factors for CVD typically coalesce within individuals or groups (25), encompassing anxiety disorders, aggression, anger, stress, rumination, anxiety sensitivity, phobic anxiety, distress tolerance, and specific combinations of negative emotions and social inhibition (26). For instance, anxiety disorders have been specifically linked to CVD onset and negative prognoses (27), with high rates of comorbidity between anxiety and depressive disorders in both the general population (28) and cardiovascular patients (29). These findings suggest a shared underlying mechanism involving negative emotions that may heighten the risk of CVD development and vice versa (30). Interventions transcending diagnostic boundaries, such as integrated transdiagnostic psychotherapy (ITP), offer promise in improving mental health outcomes among individuals with CVD (31). While transdiagnostic approaches have demonstrated efficacy in various health conditions, including functional gastrointestinal disorders (32), cancer (33), HIV (34), and headaches (35), their application in cardiovascular populations remains limited. ITP, as proposed by Barlow et al., comprises eight principles aimed at addressing emotional disorders by targeting core emotional processes underlying symptomatology (36).

Notably, few studies have concurrently compared the effectiveness of these interventions in improving emotional regulation and enhancing distress tolerance among cardiovascular patients with type D personality. Furthermore, most clinical trials investigating these interventions separately have neglected to assess their efficacy specifically in individuals with type D personality. Thus, the current research seeks to bridge this gap by comparing the clinical superiority of MBCT and ITP in improving emotional regulation and distress tolerance in cardiovascular patients with type D personality.

Methods

Study design and participants

This study employs a semi-experimental design, encompassing three groups (two experimental and one control) with pre-test, post-test, and voluntary sampling. This design is practical and applicable, offering direct implications for treatment and is essentially a clinical trial.

The statistical population comprises all cardiac patients who visited Simorgh Heart Clinic in Mashhad, Iran in 2022. From this population, 60 individuals were selected based on inclusion criteria and randomly assigned to three groups, each consisting of 20 participants. Inclusion 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, the minimum age of 40 and the maximum of 70 years. exclusion criteria includs Period, absence of more than two sessions in treatment sessions, sudden occurrence of trauma, bereavement and adaptation problems for people in the time period of the implementation of sessions or severe recurrence of heart disease.

Sample size calculation was conducted for three independent groups with a test power of 0.8 and a significance level of 0.05. The research sample size was determined utilizing formulas from Tabachnick and Fidell or experimental designs (37). According to these calculations, each group should consist of at least 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 the 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 groups and one control group. All the three groups responded to the research questionnaires before and after the implementation of the treatment sessions as well as after one month in the follow-up phase. In addition, the participants' presence was voluntarily 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 in order to comply with ethical issues. (Figure 1)

Instruments

Emotion Regulation Scale: Developed by Gross and John in 2003. This scale comprises 10 items, divided into two subscales: reappraisal (6 items) and suppression (4 items). Responses are rated on a seven-point Likert scale, ranging from completely disagree (1) to completely agree (7). Cronbach's alpha coefficients are 0.79 for reappraisal and 0.73 for suppression, with a reported retest validity of 0.69 after 3 months for the entire scale (38). The Persian version of Gross and John's Emotional Regulation Questionnaire, adapted for Iranian culture, was standardized by Ghasempour et al., (40).

Emotional Distress Tolerance Scale (DTS): Designed to assess emotional distress tolerance across various dimensions, the DTS evaluates tolerance, absorption, evaluation, and regulation aspects. Respondents reflect on times of distress and select responses that best represent their experiences. Scoring involves assigning points based on a five-point scale (1- Completely agree, 2- Slightly agree, 3- Neither agree nor disagree, 4- Slightly disagree, 5- Completely disagree), with each option corresponding to 1 through 5 points. Statement 6 is reverse-scored. Higher scores indicate greater distress tolerance. The total score is derived from summing responses to all questions, while scores for each aspect are obtained by summing respective questions. Simons and Gaher (17) reported alpha coefficients of 0.72, 0.82, 0.70, and 0.82 for tolerance, absorption, evaluation, and regulation, respectively, indicating good internal consistency. The questionnaire demonstrated favorable criterion validity and initial convergence. The Persian version of this scale was approved by Alavi, reporting high internal consistency reliability for the total scale ($\alpha = 0.71$) and moderate reliability for subscales (0.54 for tolerance, 0.42 for absorption, 0.56 for evaluation, and 0.58 for regulation) (41).

Interventions

This research employs Segal et al.'s MBCT intervention (42), consisting of 8 weekly 90-minute sessions focusing on table 1.

ITP was performed in twelve 120- minute sessions, according to the protocol of Barlow et al., which was introduced in 2017 (43). The mentioned protocol is described in the table 2.

Statistical analysis

First, descriptive statistics were computed for both sociodemographic characteristics and research variables. Parametric assumptions, including normality (assessed through skewness and kurtosis tests, Kolmogorov-Smirnov, and Shapiro-Wilk tests), equality of variances (examined via Levine's test), and sphericity (evaluated using Mauchly's sphericity test), were checked. Next, differences in pre-test scores were analyzed using analysis of variance (ANOVA) to assess the research hypotheses. Subsequently, ANCOVA was employed to examine research hypotheses at both overall score and subscale levels. All analyses were conducted using SPSS 26 software. Additionally, Excel 2019 was utilized to create 95% confidence interval charts of the means for intra-group and inter-group comparisons of scores across the three treatment phases.

Ethical considerations

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.
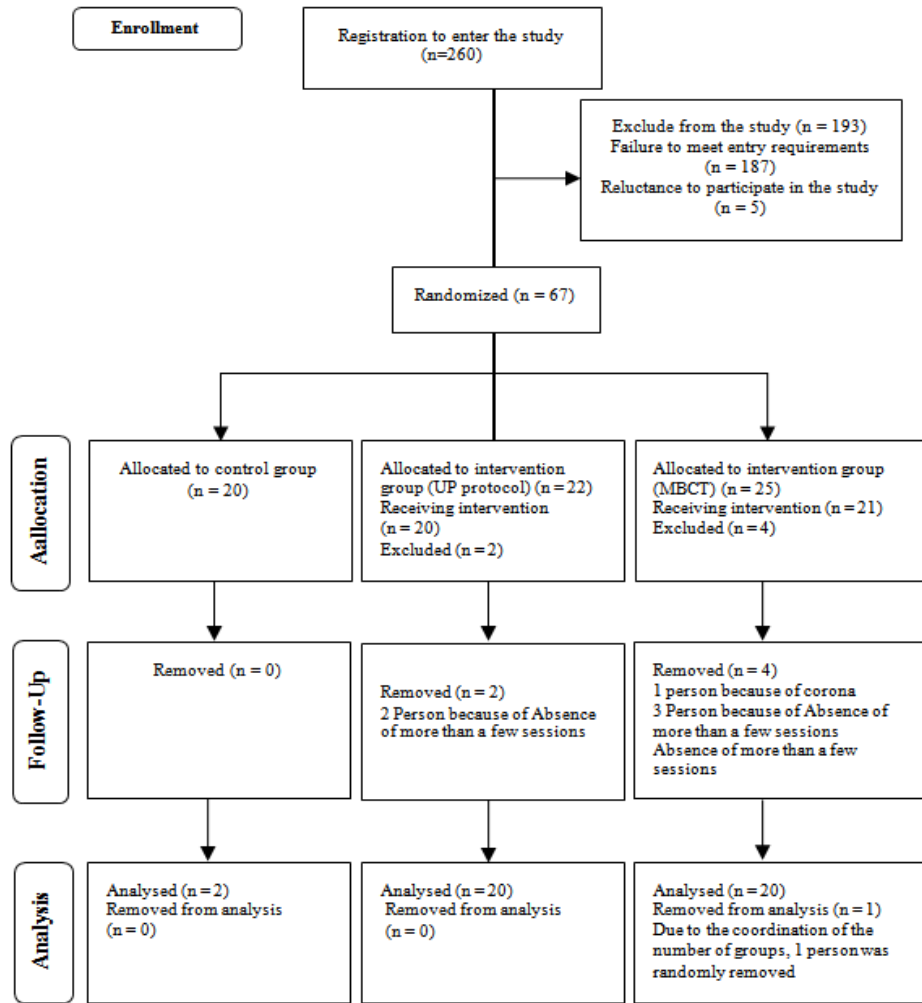
Figure 1. Consort flowchart

Results

The average age of the participants in the three groups was 59.00 ± 6.16, 61.15 ± 6.67, and 60.75 ± 7.93, respectively. Regarding gender, 32 people (53%) were men and 28 people (47%) were women. Regarding the marital status, from the sample of 60 people who formed three groups, 36 people (60%) were married and 24 people (40%) were single.

Table 3 presents the descriptive statistics for emotional regulation and distress tolerance within the research sample.

In evaluating the impact of MBCT and ITP on the emotional regulation levels of coronary heart patients, although the pre-test phase showed similar emotional regulation averages across the three groups, significant discrepancies emerged among the groups' scores, particularly between the treatment groups and the control group in the post-test and follow-up phases. Across all groups, emotional regulation levels increased during the post-test and follow-up phases compared to the pre-test phase, with the most pronounced increases observed in the MBCT and ITP groups. Specifically, in the MBCT group, average scores rose from 27.20 (SD = 2.31) in the pre-test to 39.25 (SD = 3.56) in the post-test, and further to 46.55 (SD = 4.14) in the follow-up phase. In the ITP group, average scores increased from 26.15 (SD = 2.05) in the pre-test to 41.65 (SD = 2.94) in the post-test, and slightly decreased to 40.70 (SD = 4.16) in the follow-up phase. Conversely, the control group's average scores increased from 26.30 (SD = 2.89) in the pre-test to 31.30 (SD = 3.45) in the post-test, and then to 30.50 (SD = 2.98) in the follow-up phase.

Table 1. Mindfulness-based cognitive therapy protocol

Session	Session content	Session techniques
1	Familiarizing the members with each other, introducing the group rules, introducing the MBCT 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 real practice is to get aware and realize how much they lose when they deprive themselves of the rich 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	Challenge 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 on 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 a person to look at events from another aspect in order to gain a broad and different perspective on them and to increase focus on that issue.	Staying in the present moment, five-minute practice of seeing and hearing, 40 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 be 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 its 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, review homework, practice observing the relationship between activity and mood.
8	Regular practice of immediacy to maintain balance	Revision of past contents and conclusion

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	Psychological education about the adaptive function of emotions; three component model of emotional 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 test, 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

Covariance analysis test results for intergroup differences in emotion regulation and distress tolerance are presented in table 4. Notably, significant differences in emotion regulation scores among the three groups were observed in both the post-test and follow-up phases. Despite the initial similarity in average scores among the three groups during the pre-test phase, significant differences emerged between the treatment and control groups in the post-test and follow-up phases regarding the effectiveness of MBCT and ITP on distress tolerance levels of cardiac patients, as indicated in table 3. In contrast to the hypothesis, the scores of the control group remained relatively stable across the three phases,

with changes primarily observed in the scores of the two treatment groups concerning distress tolerance.

In the MBCT group, average scores decreased from 62.10 (SD = 4.13) in the pre-test to 48.15 (SD = 4.92) in the post-test, and slightly increased to 48.35 (SD = 4.00) in the follow-up phase. Similarly, in the transdiagnostic group, average scores decreased from 61.60 (SD = 3.73) in the pre-test to 51.30 (SD = 3.31) in the post-test phase, and increased to 52.00 (SD = 2.97) in the follow-up phase.

Table 4 displays the significant differences in distress tolerance scores among the three groups in both the post-test and follow-up phases.

Table 5 further illustrates the results of pairwise comparisons of the groups' scores to elucidate intergroup differences. According to these results, both the post-test and follow-up scores of the two treatment groups were significantly higher than those of the control group in the emotional regulation variable (p < 0.05). Additionally, the comparison between the two treatment groups revealed that while the ITP group exhibited 2.42 points higher emotional regulation levels than the MBCT group in the post-test phase (p = 0.028; mean difference = -2.42), this trend reversed in the follow-up phase, with the MBCT group scoring approximately 6 points higher than the ITP group (p < 0.001; mean difference = 5.97). Therefore, the findings of this research support the effectiveness of MBCT over ITP treatment.

Furthermore, according to the results in Table 5, the distress tolerance levels of both treatment groups were significantly lower than those of the control group in both the post-test and follow-up phases (p < 0.05), indicating the effectiveness of both treatments in reducing distress tolerance. However, the comparison between the two treatment groups revealed a lower distress tolerance level in the MBCT group both in the post-test (p = 0.015; mean difference = -2.85) and follow-up phases (p = 0.003; mean difference = -3.37). Consequently, MBCT intervention demonstrates significant superiority in comparison to ITP treatment.

Table 3. Descriptive statistics of emotional regulation and distress tolerance in the participants (n = 20 in each group)

Dependent variable	Group	Pre-test Mean	Standard deviation	Post-test Mean	Standard deviation	Follow-up Mean	Standard deviation
Emotion regulation	MBCT	27.20	2.31	39.25	3.56	46.55	4.14
	ITP	26.15	2.05	41.65	2.94	40.70	4.16
	Control	26.30	2.89	31.30	3.45	30.50	2.98
Distress tolerance	MBCT	62.10	4.13	48.15	4.92	48.35	4.00
	ITP	62.60	3.73	51.30	3.31	52.00	2.97
	Control	61.60	3.66	61.05	4.32	61.15	4.84

Table 4. Covariance analysis of inter-group differences of research variables in three phases of measurement. (n = 20 in each group)

Dependent variable		Effect source	Sum of squares (SS)	Degree of freedom (df)	Mean square (MS)	F	Significance (p)	Effect size (η^2)	Statistical power
Emotion regulation	Post-test	Pre-exam	20.00	1	20.00	0.02	0.896	0.01	0.05
		Intervention	1172.12	2	586.6	51.90	0.001	0.65	1.00
		Error	632.30	56	11.29				
	Follow up	Pre-exam	35.5	1	35.5	0.37	0.547	0.01	0.09
		Intervention	2630.63	2	1315.32	18.90	0.001	0.76	1.00
		Error	816.80	56	59.14				
Distress tolerance	Post-test	Pre-exam	305.38	1	305.38	81.23	0.001	0.30	0.99
		Intervention	1917.70	2	958.85	75.74	0.001	0.73	1.00
		Error	718.32	56	83.12				
	Follow up	Pre-exam	273.75	1	237.75	83.23	0.001	0.30	0.99
		Intervention	1835.67	2	917.82	89.79	0.001	0.74	1.00
		Error	643.35	56	16.11				

Table 5. Paired comparisons of post-test scores and follow-up of emotion regulation and distress tolerance. (n = 20 in each group)

Dependent variable	Intergroup comparison	Time	Mean difference	Standard error of difference	p	95% Confidence interval	
						Lower limit	Upper limit
Emotion regulation	MBCT ↔ITP	Post-test	-2.42	1.07	0.028	-4.59	-0.27
		Follow up	5.97	1.22	0.001	3.51	8.42
	MBCT ↔control	Post-test	7.93	1.07	0.001	5.78	10.08
		Follow up	16.15	1.22	0.001	13.71	18.59
	ITP↔ control	Post-test	10.35	1.06	0.001	8.22	12.48
		Follow up	10.18	1.21	0.001	7.73	12.61
Distress tolerance	MBCT↔ITP	Post-test	-2.85	1.13	0.015	-5.12	-0.85
		Follow up	-3.37	1.07	0.003	-5.52	-1.21
	MBCT ↔control	Post-test	-13.20	1.13	0.001	-15.47	-10.93
		Follow up	-13.09	1.07	0.001	-15.24	-10.93
	ITP↔ control	Post-test	-10.35	1.14	0.001	-12.63	-8.07
		Follow up	-9.72	1.08	0.001	-11.88	-7.56

Discussion

The present research was conducted aiming at comparing the effectiveness of MBCT and ITP on emotion regulation and distress tolerance in coronary heart patients with type D personality. The results of the research showed that MBCT interventions and ITP have a significant effect on the research variables, but a significant difference was observed in the level of effectiveness of these two treatments, and MBCT has had a higher effectiveness on both research variables. In line with the research findings (44-46) it has been shown that MBCT is influential in improving the emotion regulation and there are mechanisms through which the MBCT can increase the emotion regulation. For example, this therapy emphasizes developing skills that involve paying attention to present moment experiences without judgment. This awareness enables people to recognize and regulate their emotions more effectively. In addition, cognitive reconstruction is emphasized in mindfulness-based cognitive-therapy and helps people identify and challenge unhelpful or automatic negative thoughts that contribute to emotional distress. By recognizing and reframing these thoughts, people can develop more adaptive ways to interpret and respond to emotional experiences. Acceptance of emotions also encourages people to develop an attitude of acceptance towards their emotions (feelings) instead of attempting to suppress or avoid them. People learn to respond to their emotions with self-care and self-compassion instead of self-criticism or self-judgment through mindfulness practices. Self-compassion provides a supportive framework with emotion regulation and helps people bounce back more effectively from emotional challenges. In addition, MBCT improves the distress tolerance by increasing people's capacity to tolerate and cope with difficult emotional experiences. This increased distress tolerance enables people to regulate their emotions more skillfully. It is important to note that these mechanisms are interconnected and work synergistically within the framework of MBCT. They help increase emotion regulation abilities and promote overall psychological well-being together. One of the important strategies of emotion regulation is reappraisal, redefining the meaning of stimulation or adverse conditions in such a way as to reduce its negative emotional impact (47). Mindfulness can be a way to increase reappraisal. Mindfulness can facilitate the reappraisal by increasing introspective awareness on the impact of negative emotions on the body's physiological conditions. This hypothesis is acceptable considering the known relationships between introspection and reappraisal (48). There is a significant theoretical and clinical relationship between mindfulness and distress tolerance in line with the research findings. It has recently been suggested that "a conscious awareness of internal states and the capability to not automatically and unconsciously respond to unwanted stress with a change strategy (for example, avoidance)" could theoretically lead to effective or healthier distress tolerance. In fact, the inability to tolerate distress often reinforces the automatic avoidance of unwanted distress unconsciously. Therefore, mindfulness-based strategies may promote healthy non-avoidance through practicing attentiveness and present awareness of internal experience, including unpleasant feelings (such as pain), relevant cognitive appraisals (for example, this pain is unbearable), and tendencies toward habitual responses (such as thoughts, actions, feelings, and needs) to experienced distresses. Doing so can promote the more effortful decision-making skill or power of adaptively weighing whether to end or continue an experienced distress state at a particular moment; In contrast, the avoidance behaviors of distress intolerance are more automatic and habitual (for example, escape/avoidance, emotional suppression, etc.) (49). Furthermore, focusing on the present moment and being aware of distress without attempting to escape, reduce, or suppress undesired distress states may lead to increased distress tolerance through unenhanced exposure to feelings, thoughts, and bodily experiences. The researchers proposed that new relationships are formed by experiencing unwanted distress without evaluation or avoidance (i.e., non-reinforcement practice); In other words, unpleasant

tension is "a sensation that enters consciousness and is then repressed", or thinking that the unpleasant tension is unbearable or the need to escape from it "is just a thought that is being experienced, comes, and goes." Thus, mindfulness can help change the concept of unwanted experience (i.e, from something that is intolerable to something that can be experienced or tolerated) by shifting the response tendency from automatic avoidance to natural awareness and thus can be therapeutically and directly effective in targeted efforts to promote appropriate distress tolerance.

In the case of transdiagnostic integrated psychotherapy in which the results of the research showed that it had effects on the research variables, many studies (50-52), confess in line with the research findings that an intervention plan is based on focusing on core emotions' dysregulation at the core of psychopathology and produces some changes in a wide set of outcomes, including positive and negative emotions. This approach has been described as a "common mechanisms" approach, and each of the core modules of transdiagnostic integrated psychotherapy targets achieving different aspects of emotion regulation. For example, a module focusing on cognitive flexibility promotes the development of cognitive revision skills in situations with intense emotions, and modules related to the tolerance enable the development of skills to tolerate distress rather than unhelpful avoidance behaviors in infuriating situations. There is also a module related to awareness of response and coping, which is very important for promoting emotional awareness as a foundation for improving emotion regulation. The transdiagnostic integrative psychotherapy is a cognitive-behavioral approach to developing adaptive emotion regulation skills (such as reappraisal and acceptance) and reducing maladaptive skills of emotion regulation (such as suppression and avoidance). This is consistent with research that has linked the role of maladaptive emotion regulation patterns versus reduced engagement with adaptive emotion regulation strategies in the onset and maintenance of psychopathology (53). In line with the findings of the research, the research of Bardeen et al., (54) also shows that transdiagnostic psychotherapy can have a positive impact on the distress tolerance. Finally, it seems that both treatments have had an influence on the research variables according to the common components existing in these two treatments but the MBCT mechanism has been more stable than the integrated transdiagnostic treatment after the follow-up phase. Persistence in doing mindfulness exercises by patients after the post-test can be one of the reasons justifying it.

Conclusion

Both of MBCT and ITP interventions have a significant impact on the emotion regulation and distress tolerance, but a significant difference was observed in the level of effectiveness of these two treatments, and MBCT has a higher effectiveness on both of them.

Study limitations

Random sampling was not possible in the research due to the selection of the research sample from cardiac patients, who have type D personality, and multiple inclusion and exclusion criteria in the research. Therefore, one should be careful in generalizing the results without considering these cases.

Conflict of interests

The authors declare no conflict of interests.

Acknowledgement

Authors' 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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