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The Effectiveness of Mindfulness-Based Cognitive Therapy on Adaptive Cognitive Emotion Regulation Strategies in Individuals with Generalized Anxiety Disorder

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ABSTRACT

Objective: The present study aimed to investigate the effectiveness of mindfulness-based cognitive therapy (MBCT) on maladaptive cognitive emotion regulation strategies in individuals with generalized anxiety disorder (GAD) who referred to counseling centers in Dezful.

Methods: The study sample consisted of 30 individuals with GAD, selected through convenience sampling and randomly assigned to experimental (n = 15) and control (n = 15) groups. The research design was a clinical trial with a pre-test, post-test, and control group. Data were collected using the Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski et al., 2002). The experimental group received 10 sessions of MBCT based on Segal et al. (2002). Data were analyzed using descriptive statistics (mean and standard deviation) and inferential statistics, including univariate and multivariate analysis of covariance (ANCOVA and MANCOVA).

Results: Findings revealed that MBCT significantly increased positive refocusing/planning ($F = 125.27$, $p < 0.001$), positive reappraisal/broader perspective ($F = 96.62$, $p < 0.001$), acceptance ($F = 47.99$, $p < 0.001$), and the total score of adaptive cognitive emotion regulation strategies ($F = 406.81$, $p < 0.001$) in individuals with GAD.

Conclusions: The results indicated that MBCT enhances adaptive cognitive emotion regulation strategies in individuals with generalized anxiety disorder.

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Introduction

Anxiety is a natural and necessary response to stress, preparing individuals to act and react when faced with danger. Among psychological disorders, anxiety disorders are the most prevalent, with generalized anxiety disorder (GAD) recognized as one of the most common and often chronic psychiatric conditions. GAD is characterized by excessive anxiety, worry, and tension occurring on most days for at least six months, with concerns generally focused on everyday life events. Such anxiety is difficult to control, causes significant internal distress, and disrupts important areas of daily functioning. Moreover, specific symptoms of autonomic arousal, muscle tension, and hypervigilance are typically present. According to diagnostic criteria, anxiety and worry must be accompanied by at least three of six key symptoms—restlessness, fatigue, difficulty concentrating, irritability, muscle tension, and sleep disturbance—and should not be attributable to substance use or a general medical condition (Kakazadeh, 2019).

Epidemiological studies have reported the annual prevalence of GAD in the United States as ranging between 2.7% and 3.1%, with a lifetime prevalence of approximately 9.1% (McEvoy et al., 2011). In Iran, the prevalence and comorbidity of GAD with other psychiatric disorders appear slightly higher than in Western countries. Moreover, GAD is three times more common among women than men (Nourozi, Mikaeili, & Issazadegan, 2016).

Cognitive emotion regulation refers to cognitive processes that manage emotionally arousing information. In other words, it describes the way individuals think following a negative or stressful event (Zhou et al., 2008, as cited in Vahedi, Hashemi, & Einipour, 2013). According to Mennin and Fresco's (2013) model of emotion dysregulation, emotions range from adaptive to maladaptive functions, with three central components: motivational mechanisms, regulatory mechanisms, and contextual outcomes. Dysfunction in motivational systems, particularly heightened emotional intensity, contributes to the development of anxiety symptoms. At the regulatory level, maladaptive strategies such as excessive attention, avoidance, disengagement, and dysfunctional reappraisal play a significant role in anxiety. In contrast, adaptive cognitive emotion regulation strategies—including positive refocusing/planning, positive reappraisal/broader perspective, and acceptance—promote psychological well-being (Zhou et al., 2008; Vahedi et al., 2013). Research has shown that these adaptive strategies are negatively correlated with GAD (Aldao & Nolen-Hoeksema, 2010).

Individuals with GAD experience heightened negative affect due to pervasive anxiety and worry, which prevents them from regulating and expressing their emotions effectively. Consequently, they face significant emotional dysregulation and difficulties in managing fear, tension, and irritability. Prior studies confirm that impaired cognitive emotion regulation is a central psychological characteristic of GAD (Mahajeri-Avval et al., 2020; Moghtader, 2016; Aldao & Nolen-Hoeksema, 2010).

One promising intervention is mindfulness-based cognitive therapy (MBCT), which differs from traditional cognitive-behavioral therapy by focusing less on altering the content of thoughts and more on changing awareness, attention, and the individual's relationship with thoughts. MBCT emphasizes acceptance rather than change, encouraging patients to perceive thoughts merely as mental events rather than reflections of reality—an approach referred to as metacognitive awareness. By incorporating behavioral, cognitive, and metacognitive techniques to enhance attentional control, MBCT reduces negative affect, rumination, and maladaptive worry responses, fostering more positive perspectives and adaptive cognitive regulation (Kabat-Zinn, 2003; Shaban et al., 2020). Through practices and exercises, MBCT helps individuals disengage from automatic, past- and future-oriented thought patterns and cultivate present-moment awareness, thereby improving emotional control.

Given that cognitive emotion regulation encompasses both cognitive and emotional elements, interventions neglecting mindfulness or cognition often fail. MBCT addresses this gap by targeting both present-moment awareness and dysfunctional cognitive-emotional patterns, making it a particularly relevant approach for individuals with GAD. Since GAD is associated with significant impairments in daily life, social relationships, and occupational functioning—and given its high prevalence, chronic course, and frequent comorbidity—it is considered one of the most disabling psychiatric disorders in adulthood (Javadi & Ghorbani, 2019). Although GAD often begins early in life, it is also common in adulthood, with higher prevalence among women, middle-aged individuals, those living alone, and those with lower income.

Some studies have even referred to GAD as a "foundational anxiety disorder" because understanding its etiology may shed light on the origins of other anxiety, depressive, and bipolar disorders. Left untreated, GAD follows a chronic, fluctuating course with poor prognosis. Its 12-month prevalence is estimated at 3.1%, and lifetime prevalence at 4–7% (Zimmerman et al., 2020).

Individuals with GAD are often so preoccupied with future worries that they struggle to live in the present, limiting their ability to enjoy positive life experiences. Symptoms such as fatigue, irritability, restlessness, muscle tension, poor concentration, and sleep difficulties further contribute to impaired functioning (Zolfaghari, Bahrami, & Ganji, 2017).

Despite its significant negative consequences, GAD remains comparatively under-researched relative to other anxiety disorders (Javadi & Ghorbani, 2019). Pharmacological treatments often provide rapid symptom relief; however, high relapse rates following medication discontinuation and the lack of long-term safety data present major challenges. While MBCT has demonstrated effectiveness in preventing relapse of depression, fewer studies have explored its role in reducing anxiety symptoms in individuals with GAD.

Importantly, without strengthening adaptive cognitive emotion regulation strategies, individuals with GAD may face more chronic illness trajectories, complex treatment courses, and increased comorbidities. Enhancing such strategies can improve emotional and cognitive functioning, facilitate better emotion management, and ultimately enhance quality of life. Yet, literature reviews indicate that few studies have directly examined the effectiveness of MBCT on cognitive emotion regulation in patients with GAD (Mahajeri-Avval et al., 2020; Momeni et al., 2017). Therefore, the present study seeks to address this gap.

The current research aimed to investigate the effectiveness of mindfulness-based cognitive therapy on adaptive cognitive emotion regulation strategies in individuals with generalized anxiety disorder attending counseling centers in Dezful.

Material and Methods

This study employed an applied research design in the form of a clinical trial with a quasi-experimental pretest-posttest design including a control group. The statistical population consisted of all individuals diagnosed with generalized anxiety disorder (GAD) (N = 59) who referred to counseling centers in Dezful during 2021–2022. Diagnosis was established by a clinical specialist according to the DSM-5 criteria for GAD. From the eligible population, 30 individuals were selected using convenience sampling and then randomly assigned into two groups: an experimental group (n = 15) and a control group (n = 15).

Inclusion criteria: Meeting DSM-5 diagnostic criteria for GAD (i.e., excessive anxiety and worry occurring on most days for at least six months, difficult to control, accompanied by at least three of the following: restlessness, fatigue, difficulty concentrating, irritability, muscle tension, or sleep disturbance), causing significant impairment in personal, social, or occupational functioning, absence of other psychiatric disorders and not receiving any other psychological interventions.

Exclusion criteria: Presence of another psychiatric disorder, receiving other psychological interventions during the study and missing more than three treatment sessions.

Instrument

Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski et al., 2002): This 36-item multidimensional instrument assesses cognitive coping strategies following negative events. Items are scored on a five-point Likert scale ranging from 0 ("never") to 4 ("always"). It measures seven subscales:

1. Positive Refocusing/Planning
2. Positive Reappraisal/Broader Perspective
3. Acceptance
4. Self-Blame
5. Other-Blame
6. Rumination
7. Catastrophizing

Adaptive strategies include positive refocusing/planning, positive reappraisal/broader perspective, and acceptance**.** Maladaptive strategies include self-blame, other-blame, rumination, and catastrophizing**.**

Garnefski et al. (2002) reported Cronbach's alpha coefficients between 0.71 and 0.81 and test–retest reliability between 0.48 and 0.61. In Iran, Samani and Sadeghi (2009) reported internal consistency between 0.62 and 0.91, with test–retest reliability ranging from 0.75 to 0.88. Nikoukhah and Yousefi (2021) reported Cronbach's alpha of 0.71 for the total scale, 0.67 for adaptive strategies, and 0.73 for maladaptive strategies. In the present study, internal consistency reliability for adaptive strategies was $\alpha = 0.87$.

Intervention

After obtaining ethical approval, participants in the experimental group underwent the Mindfulness-Based Cognitive Therapy (MBCT) protocol for GAD, developed by Segal, Williams, and Teasdale (2002). The program consisted of 10 weekly sessions, each lasting 90 minutes. The control group received non-specific, unrelated psychoeducational sessions to control for therapist and participant effects.

Table 1. Mindfulness-Based Cognitive Therapy Protocol for Generalized Anxiety Disorder (Segal, Williams & Teasdale, 2002)

Session	Content Summary
1	Pretest questionnaires, setting goals and group rules, introductions, raisin-eating exercise, body scan practice, brief breathing focus, homework: daily body scan.
2	Review homework, thoughts–feelings exercise (mindful walking), pleasant events log, 10–15 min sitting meditation, homework: daily body scan, mindful breathing, pleasant events recording, awareness in daily activities.
3	50-min mindful seeing/hearing, 30–40 min sitting meditation, 3-min breathing space, lying down with mindfulness, homework: mindful lying down (days 1, 3, 5), yoga practice (days 2, 4, 6), unpleasant events log (3 times daily).
4	5-min mindful seeing/hearing, meditation on breath/body/sounds/thoughts, psychoeducation about GAD, regular and coping 3-min breathing space, homework: daily sitting meditation (6 days), breathing space practice (3x/day).
5	40-min sitting meditation, breathing space, reading poetry, homework: sitting meditation (6 times/week), regular and coping breathing space practices.
6	40-min sitting meditation, mindfulness of thoughts and alternative perspectives, discussion on mindful breathing, homework: daily coping and regular 3-min breathing space practices.
7	40-min sitting meditation, observation of activity–anxiety link, planning pleasurable activities, mindful walking, homework: structured practice plan, daily 3-min breathing space.
8	Body scan practice, session review, handouts distribution.
9	Homework review, program consolidation, strategies for continuation, identifying positive reasons for sustained practice.
10	Reflection on participants' experiences, addressing concerns, treatment summary, posttest questionnaires.

Following ethical approval (Code: **IR.DUMS.REC.1401.020**) from the Ethics Committee of Dezful University of Medical Sciences, pretests were administered to both groups. The experimental group then received the 10-session MBCT protocol, while the control group attended neutral, non-therapeutic sessions. After completion, posttests were administered, and data from pretest and posttest were analyzed.

Results

The demographic characteristics of age, duration of illness, gender, and education level of individuals with Generalized Anxiety Disorder (GAD) in the experimental and control groups are presented in Tables 2.

Table 2. Demographic characteristics: age and duration of illness (in years) of individuals with GAD in the experimental and control groups

Variable	Group	N	Mean	SD
Age	Experimental	15	27.78	2.45
	Control	15	29.12	2.17
Duration of illness (years)	Experimental	15	3.20	1.08
	Control	15	4.54	1.19

As shown in Table 2, the mean age of the experimental and control groups was 27.78 and 29.12 years, with a standard deviation of 2.45 and 2.17, respectively. The mean duration of illness in years for the experimental and control groups was 3.20 and 4.54, with standard deviations of 1.08 and 1.19, respectively.

Table 3. Frequency of education level of individuals with GAD in the experimental and control groups

Variable (Education)	Group	N	Diploma	Associate	Bachelor
Education level	Experimental	15	6	3	6
	Control	15	2	4	9
Total	30	8	7	15	

As shown in Table 3, in terms of education, the experimental and control groups had 6 and 2 individuals with a diploma, 3 and 4 individuals with an associate degree, and 6 and 9 individuals with a bachelor's degree, respectively.

Table 4. Frequency of gender of individuals with GAD in the experimental and control groups

Variable (Gender)	Group	N	Female	Male
Gender	Experimental	15	6	9
	Control	15	9	6
Total	30	15	15	

As shown in Table 4, in terms of gender, the experimental and control groups consisted of 6 and 9 females and 9 and 6 males, respectively. Descriptive statistics of the scores of effective cognitive emotion regulation strategies in the experimental and control groups with GAD are presented in Table 5.

Table 5. Descriptive statistics of scores of effective cognitive emotion regulation strategies in the experimental and control groups with GAD

Variable	Stage	Group	N	Min	Max	Mean	SD
Positive refocusing / Planning	Pre-test	Experimental	15	7	16	11.40	2.44
		Control	15	8	14	11.13	1.68
	Post-test	Experimental	15	19	32	25.93	4.13
		Control	15	7	15	12.07	2.49
Positive reappraisal / Broader view	Pre-test	Experimental	15	6	13	9.60	1.80
		Control	15	5	11	8.07	1.75
	Post-test	Experimental	15	16	22	18.33	2.02
		Control	15	6	16	9.13	2.50
Acceptance	Pre-test	Experimental	15	4	11	7.53	1.95
		Control	15	4	10	7.60	1.84
	Post-test	Experimental	15	9	15	12.13	1.76
	Control	15	2	9	6.93	2.25	
Effective cognitive emotion regulation strategies (total)	Pre-test	Experimental	15	21	35	28.53	3.46
		Control	15	21	32	26.80	3.09
	Post-test	Experimental	15	51	62	56.40	3.37
		Control	15	22	34	28.13	3.92

As shown in Table 5, in the pre-test stage, the mean and standard deviation of the Positive Refocusing/Planning scores were 11.40 (SD = 2.44) for the experimental group and 11.13 (SD = 1.68) for the control group. In the post-test stage, the mean and standard deviation were 25.93 (SD = 4.13) for the experimental group and 12.07 (SD = 2.49) for the control group.

For Positive Reappraisal/Broader Perspective, in the pre-test stage, the mean and standard deviation were 9.60 (SD = 1.80) for the experimental group and 8.07 (SD = 1.75) for the control group. In the post-test stage, the mean and standard deviation were 18.33 (SD = 2.02) for the experimental group and 9.13 (SD = 2.50) for the control group.

For Acceptance, in the pre-test stage, the mean and standard deviation were 7.53 (SD = 1.95) for the experimental group and 7.60 (SD = 1.84) for the control group. In the post-test stage, the mean and standard deviation were 12.13 (SD = 1.76) for the experimental group and 6.93 (SD = 2.25) for the control group.

For the total score of Effective Cognitive Emotion Regulation Strategies, in the pre-test stage, the mean and standard deviation were 28.53 (SD = 3.36) for the experimental group and 26.80 (SD = 3.09) for the control group. In the post-test stage, the mean and standard deviation were 56.40 (SD = 3.37) for the experimental group and 28.13 (SD = 3.92) for the control group.

After checking and confirming the assumptions of covariance analysis—including the Kolmogorov-Smirnov test for normality of data distribution, the test of homogeneity of regression slopes, and Levene's test for homogeneity of variances—both multivariate and univariate

ANCOVA were used to examine the effectiveness of mindfulness-based cognitive therapy (MBCT) on effective cognitive emotion regulation strategies in individuals with GAD. The results are presented in Tables 6 and 7.

Table 6. Results of multivariate covariance analysis (MANCOVA) for differences between the experimental and control groups in effective cognitive emotion regulation strategies

Test	Value	Hypothesis df	Error df	F	Sig.	Eta²	Power
Pillai's Trace	.94	3	23	135.57	.001	.94	1.00
Wilks' Lambda	.05	3	23	135.57	.001	.94	1.00
Hotelling's Trace	17.68	3	23	135.57	.001	.94	1.00
Roy's Largest Root	17.68	3	23	135.57	.001	.94	1.00

The results in Table 6 show that, after controlling for pre-test scores, the significance levels of all tests indicate a significant difference between the experimental and control groups in at least one of the effective cognitive emotion regulation strategies (positive refocusing/planning, positive reappraisal/broader perspective, and acceptance). To determine in which strategies the differences occurred, three separate ANCOVAs were performed within the MANCOVA framework, and the results are presented in Table 7.

Table 7. Results of univariate ANCOVA on post-test scores of effective cognitive emotion regulation strategies (controlling for pre-test scores)

Variable	Source	SS	df	MS	F	Sig.	Eta²	Power
Positive Refocusing/Planning	Pre-test	21.31	1	21.31	1.88	.18	.06	.26
	Group	1413.05	1	1413.05	125.27	.001	.82	1.00
	Error	304.55	27	11.28				
Positive Reappraisal/Broader View	Pre-test	0.38	1	0.38	0.07	.79	.003	.05
	Group	517.73	1	517.73	96.62	.001	.78	1.00
	Error	144.67	27	5.35				
Acceptance	Pre-test	42.00	1	42.00	0.10	.75	.004	.06
	Group	203.06	1	203.06	47.99	.001	.64	1.00
	Error	114.24	27	4.23				
Total Effective Strategies	Pre-test	15.39	1	15.39	1.15	.29	.04	.17
	Group	5423.31	1	5423.31	406.81	.001	.93	1.00
	Error	359.93	27	13.33				

As shown in Table 7, after controlling for pre-test scores, there were significant differences between the experimental and control groups in Positive Refocusing/Planning ($F = 125.27$, $p < .001$), Positive Reappraisal/Broader Perspective ($F = 96.62$, $p < .001$), Acceptance ($F = 47.99$, $p < .001$), and the total score of Effective Cognitive Emotion Regulation Strategies ($F = 406.81$, $p < .001$).

In other words, MBCT significantly increased effective emotion regulation strategies in the experimental group compared to the control group. Specifically, the post-test means of the

experimental group versus the control group were: Positive Refocusing/Planning = 25.93 vs. 12.07; Positive Reappraisal/Broader Perspective = 18.33 vs. 9.13; Acceptance = 12.13 vs. 6.93; and Total Effective Strategies = 56.40 vs. 28.13. Thus, it can be concluded that Mindfulness-Based Cognitive Therapy was effective in enhancing effective cognitive emotion regulation strategies among individuals with Generalized Anxiety Disorder.

Discussion

The findings of this study demonstrated that mindfulness-based cognitive therapy (MBCT) significantly increased the mean scores of adaptive cognitive emotion regulation strategies—including positive refocusing/planning, positive reappraisal/broader perspective, acceptance, and the overall score—among participants in the experimental group compared to the control group. Specifically, the mean scores of the experimental group versus the control group were as follows: positive refocusing/planning (25.93 vs. 12.07), positive reappraisal/broader perspective (18.33 vs. 9.13), acceptance (12.13 vs. 6.93), and overall adaptive cognitive emotion regulation (56.40 vs. 28.13). These findings indicate that MBCT effectively enhances adaptive cognitive emotion regulation strategies among individuals with generalized anxiety disorder (GAD).

This result is consistent with previous studies by Birami, Hashemi, Bakhshipour, Alilou, and Eghbali (2014), Hosseini Khalkhal (2016), Bashiri (2020), Maleki (2019), Fazli Nikoo (2017), and also Goldin and Gross (2010), all of which found that MBCT increased adaptive cognitive emotion regulation strategies across various clinical populations.

Several mechanisms may explain the effectiveness of MBCT in enhancing adaptive cognitive emotion regulation strategies among individuals with GAD. Practices such as body scanning, mindful seeing and listening, mindful walking or lying down, yoga exercises, and focused breathing help individuals achieve a state of both physical and psychological relaxation, reducing stress and negative emotions. People with GAD typically experience sympathetic nervous system hyperactivation and physiological stress responses; however, MBCT redirects attention toward relaxation and adaptive cognitive strategies, including positive refocusing, planning, and acceptance.

Additionally, mindfulness practices involving observation of thoughts and emotions or mindful walking assist individuals in recognizing the link between cognitive emotion regulation and

adaptive strategies. These practices highlight the ways in which thoughts shape emotions and, in turn, influence behaviors. Exercises such as recording pleasant events, listing daily unpleasant experiences, and bringing mindful awareness to routine activities help participants with GAD focus on positive emotions and employ adaptive cognitive emotion regulation strategies such as positive refocusing/planning, positive reappraisal, and acceptance. Recording pleasant events, for instance, encourages individuals to direct attention toward positive experiences, to evaluate events constructively, and to develop a broader and more accepting perspective toward both positive and negative situations. This challenges the maladaptive expectation that events inherently carry only a negative or distressing meaning.

Similarly, practices such as generating alternative thoughts and adopting new perspectives help individuals with GAD strengthen their use of adaptive cognitive regulation strategies. These exercises encourage participants to adopt a more positive outlook, to accept experiences, and to avoid negative interpretations of events.

The present study had some limitations. First, no follow-up phase was conducted due to challenges in long-term access to individuals with GAD. Second, self-report measures may have been subject to response bias, with participants possibly portraying themselves as better or worse than they actually were. Third, the findings are limited in generalizability due to the relatively small and localized sample.

Future research is recommended to include follow-up assessments, utilize structured clinical interviews alongside self-report instruments, and recruit larger and more diverse samples from different regions to enhance the generalizability of findings.

Overall, the present study confirmed the effectiveness of mindfulness-based cognitive therapy in improving adaptive cognitive emotion regulation strategies among individuals with generalized anxiety disorder. Based on these findings, MBCT is recommended as a therapeutic approach to enhance adaptive cognitive regulation strategies in GAD populations. Moreover, the results highlight the utility of the MBCT protocol, suggesting that mental health professionals should consider implementing this intervention. It is also recommended that relevant organizations and institutions provide financial and logistical support to facilitate the delivery of MBCT in counseling centers and psychiatric clinics.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by ethics committee of Dezful University of Medical Sciences.

Author contributions

All authors contributed to the study conception and design, material preparation, data collection and analysis. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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