KMAN PUBLISHING INSTITUTE
Journal Website

Article history:
Received 03 August 2026
Revised 04 November 2026
Accepted 13 November 2026
Initial Publication 16 November 2026
Final Publication 01 January 2027

KMAN Counseling & Psychology Nexus

Volume 5, pp 1-13

E-ISSN: 3041-9026

The Effectiveness of Mindfulness Training on Cognitive Flexibility and Psychosomatic Symptoms in Women with Generalized Anxiety Disorder

Sanaz. Movaghar[1*]

[1] Master of Clinical Psychology, Ra.C., Islamic Azad University, Rasht, Iran

*** Corresponding author email address**: Sanaz.movaghar@yahoo.com

A r t i c l e I n f o

Article type:
Original Research

Section:
Clinical Psychology

How to cite this article:
Movaghar, S. (2027). The Effectiveness of Mindfulness Training on Cognitive Flexibility and Psychosomatic Symptoms in Women with Generalized Anxiety Disorder. *KMAN Conseling and Psychology Nexus, 5*, 1-13.
http://doi.org/10.61838/kman.psynexus.6687

© 2027 the authors. Published by KMAN Publication Inc. (KMANPUB), Ontario, Canada. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License.

A B S T R A C T

The present study aimed to determine the effectiveness of mindfulness training on cognitive flexibility and psychosomatic symptoms in women with generalized anxiety disorder. This study employed a quasi-experimental pretest–posttest design with a control group. The statistical population consisted of women with generalized anxiety disorder who attended counseling centers in Tehran, Iran, during 2025–2026. Using convenience sampling, 30 eligible participants were selected and randomly assigned to an experimental group (n = 15) and a control group (n = 15). Data were collected using the Generalized Anxiety Disorder-7 scale, the Cognitive Flexibility Inventory, and the 39-item Psychosomatic Symptoms Questionnaire. The experimental group participated in eight weekly 90-minute mindfulness-training sessions, whereas the control group received no specific psychological intervention during the study period. Both groups completed the study measures before and after the intervention. Data were analyzed using descriptive statistics and analysis of covariance after examining the relevant statistical assumptions. Analysis of covariance showed that, after controlling for pretest scores, mindfulness training had a statistically significant effect on cognitive flexibility in women with generalized anxiety disorder ($F = 45.45$, $p < .001$, partial $\eta^2 = .56$). The intervention also produced a statistically significant effect on psychosomatic symptoms ($F = 28.21$, $p < .001$, partial $\eta^2 = .55$). These effect sizes indicated that mindfulness training accounted for a substantial proportion of the variance in posttest cognitive flexibility and psychosomatic symptoms after adjustment for baseline scores. Mindfulness training appears to be an effective psychological intervention for enhancing cognitive flexibility and reducing psychosomatic symptoms among women with generalized anxiety disorder. By strengthening present-moment awareness, reducing automatic cognitive reactivity, and promoting more adaptive responses to distressing thoughts and bodily sensations, mindfulness training may improve both cognitive and somatic aspects of generalized anxiety disorder. Accordingly, structured mindfulness programs can be considered a potentially useful component of psychological services for women experiencing chronic anxiety.

Keywords: *Mindfulness Training, Cognitive Flexibility, Psychosomatic Symptoms, Generalized Anxiety Disorder, Women*

1. Introduction

Generalized anxiety disorder (GAD) is a persistent and often debilitating psychological disorder characterized by excessive and difficult-to-control worry across multiple areas of daily life, commonly accompanied by restlessness, irritability, fatigue, muscle tension, sleep disturbance, and impaired concentration. Beyond its emotional manifestations, GAD is increasingly conceptualized as a multidimensional condition involving disturbances in cognitive control, emotion regulation, neurobiological stress systems, and bodily functioning. Contemporary clinical accounts emphasize that the chronicity of worry in GAD is sustained not merely by the presence of threatening thoughts, but also by maladaptive patterns of attention, avoidance, intolerance of uncertainty, rigid information processing, and limited capacity to disengage from repetitive negative cognition (Asfour et al., 2024; Roemer et al., 2025; Shen et al., 2025). Neurobiological research has likewise suggested that anxiety disorders may be associated with dysregulation of stress-related physiological systems, including the hypothalamic-pituitary-adrenal axis, which may contribute to prolonged autonomic activation and greater vulnerability to somatic and affective symptoms (Elnazer, 2026; Liu et al., 2026; Ysbaek-Nielsen, 2024). These findings support a view of GAD as a disorder in which cognitive, emotional, and physiological processes interact reciprocally, making interventions that target both cognitive rigidity and bodily reactivity especially relevant.

One of the central cognitive difficulties associated with GAD is impaired flexibility in responding to changing environmental, emotional, and cognitive demands. Cognitive flexibility generally refers to the ability to modify thoughts, perspectives, strategies, and behavioral responses when situational demands change, when previously used strategies are no longer effective, or when multiple interpretations of an event are possible. It is broader than simple attentional shifting and includes the capacity to generate alternative explanations, adapt problem-solving strategies, and perceive difficult situations as potentially manageable (Ionescu et al., 2024). In anxiety disorders, this capacity may be compromised by persistent threat monitoring, repetitive worry, intolerance of ambiguity, and a tendency to rely on habitual cognitive patterns. Individuals with GAD may therefore struggle to move away from catastrophic interpretations, disengage from worry, or adopt alternative perspectives when faced with uncertainty. Empirical evidence has demonstrated impairments in attention, executive functioning, and cognitive flexibility among individuals with generalized anxiety disorder, suggesting that cognitive rigidity may represent an important mechanism underlying the persistence of symptoms (Asfour et al., 2024). Research on cognitive control in affective contexts has similarly indicated that patients with GAD may show difficulty regulating attention and processing emotionally salient information when anxiety-related cues are present (Shen et al., 2025).

The clinical relevance of cognitive flexibility is particularly important because flexible cognitive functioning is closely connected with adaptive emotion regulation and resilience. Individuals who can generate multiple interpretations of stressful situations and shift strategies when necessary are generally better able to regulate emotional arousal and reduce perseverative thinking. Conversely, rigid cognitive patterns may intensify worry by narrowing the perceived range of possible responses to stress and reinforcing the belief that threatening outcomes cannot be managed. Sepahvand demonstrated that cognitive flexibility plays an important role in generalized anxiety among individuals with neurotic tendencies, indicating that lower flexibility may increase vulnerability to persistent anxiety symptoms (Sepahvand, 2021). Similar findings from clinical intervention research suggest that increasing psychological or cognitive flexibility can be an important therapeutic target in populations experiencing anxiety and emotion-regulation difficulties (Nasiri et al., 2022; Thompson & Martin-Wagar, 2025). Psychological flexibility has also been discussed as an important mechanism linking maladaptive schemas, interpersonal functioning, and emotional adjustment, further illustrating the broader role of flexibility in adaptive psychological functioning (Baugh et al., 2019).

Cognitive rigidity in GAD may have direct physiological consequences as well. Chronic worry is accompanied by sustained autonomic activation, muscular tension, altered interoceptive processing, and difficulty returning to baseline following perceived threat. Ottaviani et al. identified neurobiological substrates of both cognitive rigidity and autonomic inflexibility in generalized anxiety disorder, highlighting the close relationship between rigid mental processing and dysregulated physiological responding (Ottaviani et al., 2016). This association is especially important when considering psychosomatic symptoms, because individuals with chronic anxiety frequently report bodily complaints that cannot be fully understood

KMAN-CPN KMAN-Counseling & Psychology Nexus
E-ISSN: 3041-9026

independently of emotional and cognitive processes. Persistent physiological arousal may manifest as cardiovascular sensations, gastrointestinal discomfort, respiratory complaints, musculoskeletal tension, fatigue, headaches, cognitive complaints, or other somatic symptoms. Stress-system dysregulation, including altered HPA-axis functioning, provides one plausible pathway through which chronic anxiety may become embodied in recurrent physical symptoms (Elnazer, 2026; Ysbaek-Nielsen, 2024). Although stress-related neuroendocrine abnormalities have been examined in several affective disorders, current research increasingly supports the importance of considering the interaction between stress physiology and clinical symptom profiles rather than viewing anxiety as an exclusively psychological phenomenon (Jialin et al., 2025; Liu et al., 2026).

Neurocognitive findings also reinforce the need to address both psychological and physiological components of GAD. Jialin et al. reported differences in cortical activation patterns among individuals with generalized anxiety and major depressive disorders, suggesting that altered cortical functioning may contribute to difficulties in emotion regulation and cognitive processing (Jialin et al., 2025). Such findings are consistent with the broader evidence that executive dysfunction, reduced cognitive control, and repetitive negative thinking can become mutually reinforcing in anxiety disorders. When an individual repeatedly interprets ambiguous bodily sensations as threatening, attention becomes increasingly narrowed toward internal distress, which may heighten somatic awareness and perpetuate autonomic activation. This process can create a feedback cycle in which anxious cognition increases physical symptoms, physical symptoms strengthen perceived threat, and perceived threat further reduces cognitive flexibility. Consequently, interventions capable of changing the individual's relationship to thoughts, emotions, and bodily sensations may be particularly useful in disrupting this cycle.

Several psychotherapeutic approaches have demonstrated effectiveness for generalized anxiety disorder and related cognitive-emotional difficulties. Cognitive-behavioral therapy remains one of the most established treatments, and integrative approaches combining cognitive-behavioral and psychodynamic principles have also shown promise (Aziz et al., 2020). Intensive short-term dynamic psychotherapy has been investigated for GAD, with pilot and comparative findings suggesting potential benefits for anxiety symptoms, emotion regulation, and related psychological processes (Jam et al., 2025; Lilliengren et al., 2017). Schema-based interventions have likewise been applied to anxiety disorders, particularly where maladaptive schemas, cognitive avoidance, and persistent patterns of emotional responding contribute to symptom maintenance (Makhdoumi et al., 2025; Straarup et al., 2022). More recent comparative research has examined schema therapy and intensive short-term dynamic psychotherapy for improving intolerance of uncertainty and cognitive flexibility in patients with generalized anxiety disorder, demonstrating growing interest in therapeutic mechanisms beyond symptom reduction alone (Deh Pour et al., 2026). These developments indicate that contemporary treatment research is increasingly focused on transdiagnostic processes such as flexibility, emotional regulation, and tolerance of uncertainty.

Among approaches that explicitly target the relationship between attention, cognition, and emotional experience, mindfulness-based interventions have attracted considerable clinical interest. Mindfulness may be broadly understood as purposeful attention to present-moment experience with an attitude of openness, acceptance, and reduced judgment. Within mindfulness-based cognitive therapy, individuals are trained to observe thoughts and feelings as transient mental events rather than as literal truths requiring immediate reaction (Segal et al., 2013, 2018). This decentered stance may be particularly relevant to GAD because excessive worry is often maintained by cognitive fusion with future-oriented threat scenarios. By learning to observe anxious thoughts without automatically engaging with them, individuals may become better able to shift attention, tolerate uncertainty, and respond more flexibly to distressing internal experiences.

Mindfulness training may also influence cognitive flexibility through repeated practice in shifting attention between internal and external experiences, noticing habitual thought patterns, and disengaging from automatic cognitive responses. Rather than attempting to eliminate unpleasant thoughts or emotions, mindfulness encourages individuals to recognize them, allow them to be present, and redirect attention intentionally when needed. This process may strengthen metacognitive awareness and increase the range of cognitive and behavioral responses available during stressful situations. Evidence from clinical and nonclinical populations suggests that mindfulness-based interventions can improve adaptive emotion regulation, psychological resilience, well-being, and flexibility-related outcomes (Arbabi et al., 2022; Soleimani et al., 2020). In women

KMAN-CPN KMAN-Counseling & Psychology Nexus
E-ISSN: 3041-9026

exposed to significant psychosocial stressors, mindfulness training has also been associated with improvements in psychological hardiness and more adaptive patterns of cognitive emotion regulation, suggesting that mindfulness may enhance the ability to respond constructively to distress rather than relying on rigid or avoidant strategies (Soleimani et al., 2020).

The relationship between mindfulness and psychological resilience is also relevant to women with generalized anxiety disorder, as chronic anxiety can reduce perceived coping capacity and intensify vulnerability to stress. Studies comparing cognitive-behavioral and intensive short-term dynamic interventions have shown that anxiety and resilience can change together, highlighting the importance of interventions that strengthen adaptive coping rather than merely suppressing symptoms (Zahrakar et al., 2025). Similarly, mindfulness-based interventions in populations facing interpersonal or family stress have shown positive outcomes in psychological well-being and adaptive functioning (Arbabi et al., 2022; Jones et al., 2018). Jones et al., for example, found that mindfulness-oriented well-being training could support psychological functioning among parents exposed to substantial caregiving stress, illustrating the potential applicability of mindfulness beyond narrowly defined diagnostic contexts (Jones et al., 2018). These findings suggest that mindfulness may promote a broader adaptive orientation toward stress that could be useful for individuals with chronic anxiety.

Mindfulness-based stress reduction and related protocols may also reduce physiological arousal and somatic distress by altering the way individuals attend to and interpret bodily sensations. Mindfulness practice encourages nonjudgmental awareness of respiration, muscular tension, pain, fatigue, and other interoceptive experiences without immediately interpreting these sensations as evidence of danger. This may interrupt the escalation from bodily sensation to catastrophic appraisal and further autonomic activation. Reviews of mindfulness-based stress reduction have highlighted its potential utility for decreasing psychological distress and improving coping with stress-related symptoms (Raj & Kumar, 2018). From a mechanistic perspective, reductions in cognitive reactivity and increased acceptance may allow anxious individuals to experience bodily sensations without engaging in avoidance, hypervigilance, or exaggerated threat interpretation. This is especially relevant in GAD, where autonomic inflexibility and persistent physiological activation may accompany cognitive rigidity (Ottaviani et al., 2016).

More specifically, mindfulness-based cognitive therapy has been compared with other psychological interventions in individuals with generalized anxiety disorder. Ghanizadeh Balderlou et al. examined emotional schema therapy and mindfulness-based cognitive therapy in relation to cognitive emotion regulation, intolerance of uncertainty, and cognitive flexibility, reporting improvements in important cognitive and emotional processes associated with GAD (Ghanizadeh Balderlou et al., 2025). These findings support the proposition that mindfulness-based approaches can directly influence mechanisms that maintain generalized anxiety rather than functioning only as general stress-management techniques. The importance of such mechanisms is also reflected in studies of cognitive avoidance and schema-focused treatment, which indicate that avoidance of distressing internal content may play a significant role in maintaining generalized anxiety symptoms (Makhdoumi et al., 2025). Mindfulness may counter this pattern by increasing willingness to remain in contact with unpleasant thoughts and sensations without avoidance or immediate behavioral reaction.

At the same time, GAD is a heterogeneous disorder, and therapeutic response may depend on the interaction of cognitive, emotional, and physiological vulnerabilities. Research comparing different psychotherapeutic models demonstrates that interventions may influence overlapping but distinct mechanisms, including emotion regulation, interpersonal conflict, intolerance of uncertainty, psychological flexibility, resilience, and cognitive avoidance (Deh Pour et al., 2026; Jam et al., 2025; Nasiri et al., 2022). Group schema therapy has shown promise for severe anxiety disorders, particularly where entrenched maladaptive patterns contribute to chronicity (Straarup et al., 2022), while intensive dynamic approaches may address affective avoidance and interpersonal processes (Lilliengren et al., 2017). These findings do not diminish the relevance of mindfulness-based interventions; rather, they underscore the importance of identifying specific outcomes that may be especially responsive to mindfulness training.

Two such outcomes are cognitive flexibility and psychosomatic symptoms. Cognitive flexibility represents an adaptive capacity directly related to shifting perspective, modifying ineffective strategies, and reducing rigid engagement with threat-related thoughts, whereas psychosomatic symptoms represent an important bodily expression of chronic psychological distress. Although prior research has examined mindfulness in relation to psychological well-being, resilience, emotion regulation,

KMAN-CPN KMAN-Counseling & Psychology Nexus
E-ISSN: 3041-9026

intolerance of uncertainty, and anxiety symptoms, fewer studies have simultaneously investigated whether a structured mindfulness intervention can both enhance cognitive flexibility and reduce psychosomatic symptoms among women diagnosed with generalized anxiety disorder. This gap is clinically meaningful because improvement in cognitive flexibility may enable individuals to respond differently to worry and bodily sensations, while reductions in psychosomatic symptoms may indicate decreased physiological burden associated with chronic anxiety.

The focus on women is also important because women often experience substantial interpersonal, caregiving, occupational, and social stressors that may interact with anxiety vulnerability and influence the expression of somatic distress. Research involving women under conditions of marital conflict, divorce-related stress, or self-harm vulnerability has demonstrated that psychological interventions can produce meaningful changes in resilience, emotion regulation, and adaptive functioning (Arbabi et al., 2022; Soleimani et al., 2020; Zahrakar et al., 2025). These findings suggest that examining mindfulness-based intervention among women with GAD may provide clinically useful evidence regarding a population in which psychological and somatic manifestations of anxiety may coexist prominently. Moreover, because mindfulness practices can be taught in a structured group format and can be continued independently after formal treatment, they may represent a practical and potentially scalable adjunct to psychological services.

Taken together, the literature suggests that generalized anxiety disorder involves a complex interplay among persistent worry, impaired cognitive control, reduced flexibility, emotional dysregulation, physiological stress activation, and somatic symptoms (Ottaviani et al., 2016; Roemer et al., 2025; Thompson & Martin-Wagar, 2025). Mindfulness-based approaches are theoretically well positioned to address these processes by strengthening present-moment awareness, reducing automatic reactivity, increasing acceptance of internal experiences, and promoting more flexible cognitive responding (Raj & Kumar, 2018; Segal et al., 2013, 2018). Despite encouraging evidence, further empirical investigation is warranted to determine whether mindfulness training can simultaneously improve cognitive flexibility and reduce psychosomatic symptom severity in women with generalized anxiety disorder within applied clinical settings. Therefore, the present study aimed to determine the effectiveness of mindfulness training on cognitive flexibility and psychosomatic symptoms in women with generalized anxiety disorder.

2. Methods and Materials

2.1. Study Design and Participants

The present study employed a quasi-experimental research design with a pretest–posttest control group arrangement. The statistical population consisted of women diagnosed with generalized anxiety disorder (GAD) who attended counseling and psychological service centers in Tehran, Iran, during year 2025–2026. Following initial screening, 30 eligible women were recruited through convenience sampling and were then randomly assigned to either an experimental group receiving mindfulness training (n = 15) or a control group (n = 15). Eligibility was determined on the basis of the presence of symptoms consistent with generalized anxiety disorder and participants' willingness and ability to participate regularly in the intervention sessions. The Generalized Anxiety Disorder-7 scale was used as part of the screening procedure, with scores indicative of clinically relevant anxiety considered in participant selection. Participants were required to be women attending the selected counseling centers, to demonstrate symptoms of generalized anxiety disorder, and to provide informed consent for participation. Individuals who were unable to attend the intervention sessions regularly, withdrew their consent, or experienced conditions that substantially interfered with participation were excluded from the study. Before implementation of the intervention, participants in both groups completed the study measures assessing generalized anxiety, cognitive flexibility, and psychosomatic symptoms as the pretest. The experimental group subsequently participated in eight weekly mindfulness-training sessions, whereas the control group received no specific psychological intervention during the same period. Immediately after completion of the eight-week intervention, both groups completed the same measures as the posttest. Participants were informed about the general purpose and procedures of the study, the voluntary nature of participation, confidentiality of personal information, and their right to withdraw from the research at any stage without adverse consequences.

2.2. Data Collection Tools

The Generalized Anxiety Disorder-7 scale (GAD-7), developed by Spitzer et al. (2006), was used to assess the

KMAN-CPN KMAN-Counseling & Psychology Nexus
E-ISSN: 3041-9026

severity of generalized anxiety symptoms and to support the identification of eligible participants. The GAD-7 is a seven-item self-report instrument designed to assess the frequency of generalized anxiety symptoms experienced during the preceding two weeks. Each item is rated on a four-point scale ranging from 0, indicating "not at all," to 3, indicating "nearly every day," producing a total score between 0 and 21. Higher scores indicate greater severity of generalized anxiety symptoms. Scores ranging from 0 to 4 represent minimal or no anxiety, scores from 5 to 9 indicate mild anxiety, scores from 10 to 14 indicate moderate anxiety, and scores from 15 to 21 indicate severe anxiety. A score of 10 has commonly been considered an appropriate cutoff point for identifying potentially clinically significant generalized anxiety. Spitzer et al. (2006) reported excellent internal consistency for the scale, with a Cronbach's alpha coefficient of .92. The psychometric properties of the Persian version have also been supported. Omani-Samani et al. (2018) reported a Cronbach's alpha coefficient of .87 for the Persian version and demonstrated acceptable convergent validity through significant positive correlations with the Hospital Anxiety and Depression Scale and the Penn State Worry Questionnaire, with correlation coefficients of .52 and .60, respectively.

Cognitive flexibility was assessed using the Cognitive Flexibility Inventory (CFI), originally developed by Dennis and Vander Wal (2010). The original instrument consists of 20 items designed to measure individuals' capacity to perceive difficult situations as controllable and to recognize alternative explanations and behavioral options when confronting challenging situations. The original scale encompasses two major dimensions, namely perception of alternatives and perception of controllability. During validation of the Persian version, Item 20 was removed because its factor loading was below .30, resulting in a 19-item Persian version comprising the two dimensions of problem-solving processing and perceived controllability. Responses are scored on a seven-point Likert scale ranging from 1, "strongly disagree," to 7, "strongly agree." Items belonging to the perceived controllability dimension are reverse-scored. Total scores for the 19-item Persian version range from 19 to 133, with higher scores reflecting greater cognitive flexibility and lower scores indicating greater cognitive rigidity. Dennis and Vander Wal (2010) supported the construct validity of the original instrument through exploratory factor analysis, with the two-factor solution explaining 43.19% of the total variance. Cronbach's alpha coefficients were .91 for the total scale, .91 for the controllability dimension, and .84 for the alternatives dimension. Two-week test–retest reliability coefficients were .75, .77, and .71 for the total scale and respective dimensions. In Iran, Kohandani and Abolmaali Al-Hosseini (2017) examined the psychometric characteristics of the Persian version and confirmed its two-factor structure through confirmatory factor analysis. All retained items demonstrated factor loadings above .30, and Cronbach's alpha coefficients of .78 for the problem-solving dimension and .81 for perceived controllability indicated satisfactory internal consistency.

Psychosomatic symptoms were measured using the 39-item Psychosomatic Symptoms Questionnaire (PSQ-39), developed by Lacourt et al. (2013). The questionnaire consists of 39 items covering seven domains of psychosomatic complaints, including four gastrointestinal symptoms, six cardiovascular symptoms, five respiratory symptoms, six physical fatigue symptoms, six musculoskeletal symptoms, six cognitive symptoms, and six additional somatic symptoms. Each item is rated on a five-point Likert scale ranging from 1, indicating the absence of the symptom, to 5, indicating a very high level of the symptom. Higher scores represent greater frequency or severity of psychosomatic complaints. Lacourt et al. (2013) reported a Cronbach's alpha coefficient of .86, indicating satisfactory internal consistency. The Persian version of the 39-item questionnaire was subsequently evaluated in a sample of 996 Iranian participants. The Persian instrument demonstrated good to excellent test–retest reliability, with coefficients ranging approximately from .90 to .95, as well as satisfactory internal consistency. Construct validity analyses supported a seven-factor structure, with acceptable model-fit indices, including a comparative fit index of .91 and a root mean square error of approximation of .06. A diagnostic validity coefficient of .78 was also reported, indicating that the instrument was capable of differentiating individuals with clinically relevant psychosomatic symptoms from members of the general population (Heydari et al., 2021).

2.3. Interventions

Participants assigned to the experimental group received a structured mindfulness-training program consisting of eight weekly 90-minute group sessions. The intervention was designed to enhance sustained attention to present-moment experiences, reduce automatic reactions to distressing thoughts and bodily sensations, and promote a

KMAN-CPN KMAN-Counseling & Psychology Nexus
E-ISSN: 3041-9026

nonjudgmental and accepting orientation toward internal experiences. The first session introduced the concept of mindfulness, the relationship between attention, anxiety, and automatic cognitive reactions, and basic awareness of breathing and present-moment experiences. Participants were familiarized with mindful breathing and brief attention-focusing practices and were encouraged to observe thoughts and sensations without attempting to suppress or modify them. The second session emphasized body awareness through body-scan exercises and systematic observation of physical sensations, particularly bodily experiences associated with anxiety and tension. The third session focused on mindful awareness of thoughts and emotions and taught participants to recognize thoughts as transient mental events rather than objective facts requiring immediate reaction. The fourth session concentrated on identifying habitual cognitive and emotional responses to stressful situations and introduced strategies for interrupting automatic patterns through deliberate attention and mindful pauses. The fifth session emphasized acceptance of unpleasant experiences, including anxiety-related thoughts, emotional discomfort, and somatic sensations, while reducing avoidance and judgmental responses. The sixth session incorporated mindfulness in everyday activities and interpersonal situations and encouraged participants to apply present-focused awareness to routine behaviors, emotional reactions, and stressful encounters. The seventh session integrated breathing exercises, body awareness, mindful observation of thoughts, and acceptance-based coping strategies, with particular attention to recognizing early signs of anxiety and psychosomatic activation and responding to them in a flexible rather than reactive manner. The eighth and final session reviewed the skills acquired throughout the program, discussed barriers to maintaining mindfulness practice, consolidated individualized strategies for continued practice, and emphasized the integration of mindfulness into daily life after termination of the formal intervention. Participants were encouraged to practice the exercises between sessions and to apply mindfulness techniques when experiencing worry, cognitive rigidity, bodily tension, or other anxiety-related symptoms. The control group did not receive mindfulness training or another structured psychological intervention during the eight-week study period.

2.4. Data Analysis

Data were analyzed using descriptive and inferential statistical procedures. At the descriptive level, means, standard deviations, frequencies, and percentages were used to summarize participants' characteristics and the distributions of the principal study variables. At the inferential level, analysis of covariance (ANCOVA) was used to evaluate the effectiveness of mindfulness training on posttest scores of cognitive flexibility and psychosomatic symptoms while statistically controlling for corresponding pretest scores. Where the dependent variables and their dimensions were analyzed simultaneously, multivariate analysis of covariance (MANCOVA) was employed before conducting follow-up univariate analyses. Prior to the primary analyses, relevant statistical assumptions were examined. Normality of the distributions was assessed using the Shapiro–Wilk test and examination of distributional characteristics, homogeneity of error variances was evaluated using Levene's test, and homogeneity of regression slopes was assessed by examining the interaction between group membership and pretest scores. For multivariate analyses, Box's M test was used to examine the homogeneity of covariance matrices. Effect sizes were reported using partial eta squared to indicate the magnitude of the intervention effects. Statistical analyses were conducted using IBM SPSS Statistics, and the level of statistical significance was set at $p < .05$.

3. Findings and Results

The descriptive statistics for cognitive flexibility and psychosomatic symptoms in the experimental and control groups at the pretest and posttest stages are presented in Table 1.

Table 1

Descriptive Statistics of the Study Variables in the Experimental and Control Groups

Variable	Group	N	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD
Cognitive flexibility	Experimental	15	38.42	5.47	68.43	6.58
	Control	15	44.47	5.35	57.74	7.45
Psychosomatic symptoms	Experimental	15	89.39	4.78	53.41	5.68
	Control	15	40.25	5.25	32.12	6.35

KMAN-CPN KMAN-Counseling & Psychology Nexus
E-ISSN: 3041-9026

As shown in Table 1, the mean cognitive flexibility score in the experimental group increased from 38.42 at pretest to 68.43 at posttest, indicating a considerable improvement following mindfulness training. The corresponding score in the control group increased from 44.47 to 57.74. Regarding psychosomatic symptoms, the experimental group showed a reduction in the mean score from 89.39 at pretest to 53.41 at posttest. The control group also showed a reduction from 40.25 to 32.12. These descriptive findings indicate changes in both outcome variables across the measurement occasions; however, inferential analyses were required to determine whether the posttest differences between the groups remained statistically significant after controlling for pretest scores.

Before conducting the analysis of covariance, the assumptions underlying the parametric analyses were examined. The Kolmogorov–Smirnov test indicated that the distributions of cognitive flexibility at pretest ($Z = 0.175$, $p = .066$) and posttest ($Z = 0.068$, $p = .054$), as well as psychosomatic symptoms at pretest ($Z = 0.186$, $p = .061$) and posttest ($Z = 0.078$, $p = .053$), did not significantly deviate from normality because all significance levels were greater than .05. Therefore, the normality assumption was satisfied. In addition, the dependent variables were measured at an interval level, and examination of the relevant ANCOVA assumptions supported the appropriateness of using analysis of covariance to compare the posttest scores while controlling for pretest differences.

Table 2

Analysis of Covariance for Cognitive Flexibility and Psychosomatic Symptoms

Dependent Variable	Source	Sum of Squares	df	Mean Square	F	p	Partial Eta Squared
Cognitive flexibility	Pretest cognitive flexibility	1558.425	1	1558.425	38.24	< .001	.55
	Group	2456.531	2	1228.265	45.45	< .001	.56
	Error	1286.789	25	51.471	—	—	—
	Total	4865.637	27	—	—	—	—
Psychosomatic symptoms	Pretest psychosomatic symptoms	893.378	1	893.378	19.41	< .001	.53
	Group	1687.486	2	843.743	28.21	< .001	.55
	Error	384.278	25	15.371	—	—	—
	Total	11548.924	27	—	—	—	—

As presented in Table 2, after controlling for pretest cognitive flexibility scores, the effect of group on posttest cognitive flexibility was statistically significant, $F = 45.45$, $p < .001$, with a partial eta squared of .56. This effect size indicates that a substantial proportion of the variance in posttest cognitive flexibility was associated with group membership after adjustment for baseline scores. Accordingly, mindfulness training was effective in increasing cognitive flexibility among women with generalized anxiety disorder. Similarly, after controlling for pretest psychosomatic symptom scores, a statistically significant group effect was observed for posttest psychosomatic symptoms, $F = 28.21$, $p < .001$, with a partial eta squared of .55. Thus, mindfulness training was also effective in reducing psychosomatic symptoms among women with generalized anxiety disorder. Overall, the covariance analyses supported the effectiveness of the mindfulness intervention on both cognitive flexibility and psychosomatic symptoms.

4. Discussion

The present study investigated the effectiveness of mindfulness training on cognitive flexibility and psychosomatic symptoms among women with generalized anxiety disorder. The findings showed that mindfulness training produced a significant improvement in cognitive flexibility compared with the control condition. After controlling for pretest scores, the between-group difference remained statistically significant, indicating that the observed improvement was attributable to the intervention rather than merely to baseline variation. The magnitude of the effect was also substantial, with the reported partial eta squared indicating that a meaningful proportion of the variance in posttest cognitive flexibility was associated with group membership. In addition, mindfulness training significantly reduced psychosomatic symptoms among women with generalized anxiety disorder. The covariance analysis showed that the posttest difference between the experimental and control groups was statistically significant after adjusting for pretest scores, and the effect size again

KMAN-CPN KMAN-Counseling & Psychology Nexus
E-ISSN: 3041-9026

suggested a strong intervention effect. Taken together, the results indicate that mindfulness training was effective in both strengthening an adaptive cognitive capacity and reducing the bodily manifestations associated with chronic anxiety.

The finding concerning cognitive flexibility is consistent with previous research suggesting that individuals with generalized anxiety disorder often show deficits in executive control, attentional regulation, and flexible cognitive responding. Asfour et al. reported impairments in attention, executive functioning, and cognitive flexibility among young adults with generalized anxiety disorder, indicating that rigidity in cognitive processing may be a clinically relevant feature of the disorder (Asfour et al., 2024). Similarly, Shen et al. demonstrated disturbances in cognitive control among patients with generalized anxiety disorder when processing affectively salient information, suggesting that emotionally charged contexts may further weaken adaptive control over cognition (Shen et al., 2025). The present findings are therefore important because they suggest that mindfulness training can influence one of the cognitive mechanisms that may contribute to the persistence of generalized anxiety. Rather than affecting anxiety only at the symptomatic level, mindfulness appears capable of changing the manner in which individuals shift attention, interpret stressful events, and disengage from repetitive patterns of worry.

The improvement in cognitive flexibility is also in agreement with research directly examining flexibility-related outcomes in anxiety populations. Ghanizadeh Balderlou et al. found that mindfulness-based cognitive therapy improved cognitive emotion regulation, intolerance of uncertainty, and cognitive flexibility among individuals with generalized anxiety disorder (Ghanizadeh Balderlou et al., 2025). Deh Pour et al. similarly emphasized the importance of cognitive flexibility as a therapeutic target in patients with generalized anxiety disorder and showed that psychotherapeutic interventions can modify flexibility and intolerance of uncertainty (Deh Pour et al., 2026). Sepahvand also identified a meaningful role for cognitive flexibility in generalized anxiety, showing that lower flexibility may contribute to anxiety vulnerability, particularly among individuals with neurotic characteristics (Sepahvand, 2021). These studies collectively support the interpretation that greater cognitive flexibility is not merely a secondary outcome of symptom improvement but may represent an important mechanism of psychological adaptation in GAD.

The effect of mindfulness training on cognitive flexibility can be explained through several related mechanisms. Mindfulness practices repeatedly train individuals to notice thoughts, emotions, and sensations as momentary experiences rather than fixed realities. This process may reduce cognitive fusion and weaken the tendency to treat anxious thoughts as accurate representations of future events. Mindfulness-based cognitive therapy emphasizes decentering, present-focused attention, and the ability to disengage from automatic patterns of thought (Segal et al., 2013, 2018). Such processes are highly relevant to cognitive flexibility because they increase the individual's capacity to shift perspective, tolerate ambiguity, and generate alternative responses to distress. In generalized anxiety disorder, worry often becomes repetitive and rigid because the person repeatedly returns to threatening interpretations and imagined negative outcomes. Mindfulness may interrupt this process by encouraging awareness without immediate judgment or reaction, thereby creating a cognitive space in which alternative interpretations and behavioral responses become possible.

This interpretation is also consistent with the broader conceptualization of cognitive flexibility as more than simple attentional switching. Ionescu et al. argued that cognitive flexibility is a multidimensional construct involving adaptation across multiple domains rather than merely the ability to shift between tasks (Ionescu et al., 2024). From this perspective, the effect of mindfulness training may reflect improvement not only in attentional control but also in perspective taking, problem solving, and behavioral adaptation. Participants who learned to observe anxious thoughts without automatically responding to them may have become more capable of considering different explanations for distressing situations and perceiving difficult circumstances as more manageable. This explanation is reinforced by studies showing associations between flexibility, emotion regulation, and adaptive functioning. Thompson and Martin-Wagar reported that cognitive flexibility is meaningfully related to emotion regulation in clinically distressed individuals with comorbid anxiety symptoms (Thompson & Martin-Wagar, 2025), while Baugh et al. highlighted the broader role of psychological flexibility in reducing the impact of maladaptive schemas and emotional difficulties (Baugh et al., 2019).

The current finding is also compatible with studies showing that various psychological interventions can enhance flexibility and related adaptive capacities. Nasiri et

KMAN-CPN KMAN-Counseling & Psychology Nexus
E-ISSN: 3041-9026

al. reported improvements in psychological flexibility and emotional self-regulation following psychological treatment (Nasiri et al., 2022). Zahrakar et al. showed that interventions targeting anxiety can also improve resilience, suggesting that reducing rigid emotional and cognitive responses may strengthen broader adaptive functioning (Zahrakar et al., 2025). Similarly, Arbabi et al. found that mindfulness-based cognitive therapy improved psychological well-being, quality of life, and resilience among distressed couples (Arbabi et al., 2022). These findings suggest that mindfulness-induced increases in cognitive flexibility may be part of a wider pattern of improved adaptation, in which individuals become more capable of coping with internal distress, responding to uncertainty, and changing ineffective psychological strategies.

The second major finding of the study showed that mindfulness training significantly reduced psychosomatic symptoms. This result is theoretically plausible because generalized anxiety disorder is associated not only with excessive worry but also with persistent physiological arousal. Individuals with GAD commonly experience muscle tension, fatigue, gastrointestinal discomfort, palpitations, respiratory changes, sleep disturbance, and other somatic complaints. Ottaviani et al. demonstrated that cognitive rigidity in generalized anxiety disorder is accompanied by autonomic inflexibility, suggesting that cognitive and physiological dysregulation may represent interconnected aspects of the disorder (Ottaviani et al., 2016). The present reduction in psychosomatic symptoms may therefore reflect a broader improvement in the regulation of physiological arousal brought about by mindfulness practice.

Mindfulness may reduce psychosomatic symptoms by changing the way bodily sensations are perceived and interpreted. Individuals with chronic anxiety may become highly vigilant toward physical sensations and may interpret benign changes in heart rate, breathing, muscular tension, or gastrointestinal activity as indicators of danger. This threat-based interpretation can increase anxiety and further intensify autonomic activation. Mindfulness practice encourages individuals to notice physical sensations directly and nonjudgmentally rather than immediately evaluating them as threatening. Over time, this may reduce catastrophic interpretation, decrease bodily hypervigilance, and interrupt the feedback loop between anxious cognition and physiological arousal. Raj and Kumar reviewed the effectiveness of mindfulness-based stress reduction and emphasized its potential for reducing stress and improving psychological adjustment (Raj & Kumar, 2018). Similarly, Jones et al. found that mindfulness-based well-being training produced beneficial psychological outcomes in individuals exposed to sustained caregiving stress (Jones et al., 2018). Such findings support the possibility that mindfulness can reduce the subjective burden of chronic physiological stress.

The reduction in psychosomatic symptoms is also consistent with evidence concerning stress-system dysregulation in anxiety disorders. Elnazer described a dual-stage model of hypothalamic-pituitary-adrenal axis dysregulation in anxiety disorders, emphasizing that prolonged anxiety may alter stress-related physiological processes (Elnazer, 2026). Ysbaek-Nielsen also examined abnormalities in subcortical structures associated with the limbic-HPA axis in generalized anxiety disorder, reinforcing the biological relevance of chronic stress dysregulation in this condition (Ysbaek-Nielsen, 2024). Although the present study did not measure neuroendocrine or physiological markers directly, the observed reduction in psychosomatic complaints may reflect decreased stress reactivity or improved regulation of bodily responses following mindfulness training. This possibility is also broadly compatible with research demonstrating associations between clinical symptom severity and HPA-axis functioning in affective disorders (Liu et al., 2026).

The present finding may additionally be interpreted in light of neurocognitive research showing altered cortical activation in individuals with generalized anxiety disorder. Jialin et al. reported distinctive patterns of cortical activation in patients with generalized anxiety and major depressive disorders, suggesting that altered neural processing may underlie difficulties in cognitive and emotional regulation (Jialin et al., 2025). Mindfulness practice has the potential to influence these processes indirectly by strengthening attention regulation and reducing repetitive engagement with threat-related information. When anxious thoughts become less dominant, physiological responses may also become less intense. Thus, the observed decline in psychosomatic symptoms may have resulted not only from relaxation or stress reduction but also from a change in the cognitive appraisal of internal experiences.

The current results can also be understood in relation to the broader literature on psychotherapy for generalized anxiety disorder. Aziz et al. showed that both integrative therapy and cognitive-behavioral therapy can reduce symptoms of generalized anxiety disorder (Aziz et al., 2020). Lilliengren et al. reported promising outcomes for

KMAN-CPN KMAN-Counseling & Psychology Nexus
E-ISSN: 3041-9026

intensive short-term dynamic psychotherapy in GAD (Lilliengren et al., 2017), and Jam et al. found that intensive short-term dynamic psychotherapy can improve emotion regulation in individuals with anxiety disorders (Jam et al., 2025). Schema-based interventions have also demonstrated benefits in severe anxiety disorders and in reducing cognitive avoidance and generalized anxiety symptoms (Makhdoumi et al., 2025; Straarup et al., 2022). These studies show that multiple therapeutic approaches may be effective for GAD, but mindfulness training may have a distinctive advantage in simultaneously targeting cognitive rigidity, attentional processes, and bodily reactivity.

The effect of mindfulness on psychosomatic symptoms may also be related to improved emotion regulation. Chronic suppression, avoidance, and uncontrolled worry can intensify both psychological distress and bodily activation. Mindfulness teaches individuals to observe emotional experiences without suppression and to allow unpleasant sensations to arise and pass without escalation. Soleimani et al. found that mindfulness training improved psychological hardiness and cognitive emotion regulation strategies among women experiencing substantial interpersonal stress (Soleimani et al., 2020). This finding is relevant because better emotion regulation may reduce the physiological costs of chronic emotional activation. In addition, mindfulness-based cognitive therapy has been associated with improvements in psychological well-being and resilience (Arbabi et al., 2022), indicating that mindfulness may strengthen multiple protective processes that reduce the impact of stress on the body.

Another important explanation concerns intolerance of uncertainty, which is strongly associated with generalized anxiety disorder. Individuals with GAD may attempt to reduce uncertainty through repetitive worry, reassurance seeking, and overanalysis, but these strategies often increase cognitive and physiological tension. Roemer et al. emphasized the central role of maladaptive engagement with anxiety and worry in generalized anxiety disorder (Roemer et al., 2025). By encouraging present-moment awareness, mindfulness reduces the need to mentally control uncertain future events and may increase tolerance for not knowing. This mechanism is supported by Ghanizadeh Balderlou et al., who found that mindfulness-based cognitive therapy improved intolerance of uncertainty alongside cognitive flexibility in patients with generalized anxiety disorder (Ghanizadeh Balderlou et al., 2025). Reduced intolerance of uncertainty may therefore contribute simultaneously to greater cognitive flexibility and lower psychosomatic distress.

The two principal outcomes of the present study may also be related to one another. Improved cognitive flexibility may enable individuals to reinterpret bodily sensations less catastrophically, while reduced physiological arousal may make it easier to shift attention and disengage from worry. In this sense, mindfulness may operate through a reciprocal cognitive-physiological mechanism. Ottaviani et al.'s findings concerning the coexistence of cognitive rigidity and autonomic inflexibility in generalized anxiety disorder provide direct support for this interpretation (Ottaviani et al., 2016). Rather than viewing cognitive flexibility and psychosomatic symptoms as separate outcomes, it may be more accurate to conceptualize them as interconnected expressions of the same regulatory system. Mindfulness may enhance this regulatory system by increasing awareness, reducing automatic reactivity, and promoting more adaptive responses to both mental and bodily events.

5. Conclusion

The results also have particular relevance for women with generalized anxiety disorder. Women experiencing chronic anxiety may simultaneously face interpersonal, family, caregiving, occupational, and social stressors that contribute to both psychological and somatic distress. Previous studies have shown that mindfulness and other psychological interventions can improve emotional regulation, resilience, and adaptive functioning among women exposed to stressful life circumstances (Soleimani et al., 2020; Zahrakar et al., 2025). Therefore, the present results extend this literature by suggesting that mindfulness training may be especially useful when the clinical goal includes both improving cognitive adaptation and reducing somatic expressions of anxiety.

The findings of the present study should nevertheless be interpreted in light of several limitations. First, the sample was relatively small and included only 30 women, which limits statistical power and reduces the generalizability of the findings to the broader population of individuals with generalized anxiety disorder. Second, participants were recruited through convenience sampling from counseling centers in Tehran, and therefore the sample may not represent women who do not seek psychological services or individuals from different geographical, cultural, and socioeconomic backgrounds. Third, the study relied primarily on self-report measures, which are susceptible to

KMAN-CPN KMAN-Counseling & Psychology Nexus
E-ISSN: 3041-9026

response bias, social desirability, and subjective interpretation. Fourth, the design included only pretest and posttest assessments and did not incorporate a follow-up phase; consequently, the durability of the observed improvements cannot be determined. Fifth, the control group did not receive an active comparison intervention, and therefore nonspecific factors such as therapist attention, group participation, expectancy effects, or social support may have contributed to the observed outcomes. Finally, physiological measures were not used to objectively assess changes in psychosomatic or autonomic functioning.

Future studies should replicate the present research with larger and more heterogeneous samples and should include participants from multiple clinical centers and different regions to improve external validity. It would also be useful to examine the effects of mindfulness training among men with generalized anxiety disorder and to directly compare possible gender differences in treatment response. Future research should include longer follow-up periods to determine whether improvements in cognitive flexibility and psychosomatic symptoms are maintained over time. Active control groups receiving alternative evidence-based interventions should be incorporated to identify the specific contribution of mindfulness beyond common therapeutic factors. Researchers should also consider integrating physiological indicators such as heart-rate variability, cortisol levels, sleep parameters, or autonomic measures with self-report outcomes. Mediation analyses could further determine whether improvements in cognitive flexibility, intolerance of uncertainty, emotion regulation, or mindfulness skills explain reductions in psychosomatic symptoms. Comparative studies between mindfulness-based cognitive therapy, cognitive-behavioral therapy, schema therapy, and psychodynamic approaches may also clarify which treatment is most effective for different profiles of generalized anxiety disorder.

From a practical perspective, mindfulness training can be considered a useful psychological intervention for women with generalized anxiety disorder, particularly when treatment goals include both cognitive and somatic outcomes. Counseling centers, mental health clinics, and community-based psychological services may incorporate structured mindfulness programs into routine care for clients who present with persistent worry, rigid thinking, and stress-related bodily complaints. Clinicians should emphasize regular practice of mindful breathing, body awareness, nonjudgmental observation of thoughts, and present-focused attention so that clients can apply these skills outside therapy sessions. Group-based delivery may offer an economical and accessible format while also providing social support and normalization of anxiety-related experiences. Therapists may also combine mindfulness exercises with cognitive-behavioral or other evidence-based techniques for clients who require more comprehensive treatment. Particular attention should be given to helping clients recognize the interaction between anxious thoughts and bodily sensations, because improving awareness of this relationship may strengthen both cognitive flexibility and management of psychosomatic symptoms.

Authors' Contributions

Authors equally contributed to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

Acknowledgments

We would like to express our gratitude to all individuals helped us to do the project.

Declaration of Interest

The authors report no conflict of interest.

Funding

According to the authors, this article has no financial support.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

References

Arbabi, F., Saravani, S., Zeynali Pour, M., & Hashemi Sanjani, A. (2022). Effectiveness of mindfulness-based cognitive therapy on psychological well-being, quality of life, and resilience in couples with marital conflicts. *Quarterly Journal of Psychology, 102,* 140-149.

KMAN-CPN KMAN-Counseling & Psychology Nexus
E-ISSN: 3041-9026

Asfour, N. M., Helal, S. A., Almahdi, A. H., & Basha, A. M. (2024). Cognitive deficits in generalized anxiety disorder: Impairments in attention, executive functioning, and cognitive flexibility among young adults. *Journal of Angiotherapy*, *8*(11), 1-7. https://doi.org/10.25163/angiotherapy.81110029

Aziz, M. O., Mehrinejad, S. A., Hashemian, K., & Paivastegar, M. (2020). Integrative therapy (short-term psychodynamic psychotherapy & cognitive-behavioral therapy) and cognitive-behavioral therapy in the treatment of generalized anxiety disorder: A randomized controlled trial. *Complementary Therapies in Clinical Practice*, *39*, 101122. https://doi.org/10.1016/j.ctcp.2020.101122

Baugh, L. M., Cox, D. W., Young, R. A., & Kealy, D. (2019). Partner trust and childhood emotional maltreatment: The mediating and moderating roles of maladaptive schemas and psychological flexibility. *Journal of Contextual Behavioral Science*, *12*, 66-73. https://doi.org/10.1016/j.jcbs.2019.02.001

Deh Pour, A., Heidari, S., & Mirzaian, B. (2026). Comparing intensive short-term dynamic psychotherapy and schema therapy for intolerance of uncertainty and cognitive flexibility in patients with generalized anxiety disorder. *Health Psychology and Behavioral Disorders*, *24*(2), 1-15.

Elnazer, H. Y. (2026). A Dual-Stage Model of Hypothalamic-Pituitary-Adrenal (HPA) Axis Dysregulation in Anxiety Disorders: A Systematic Review. *Psikiyatride Güncel Yaklaşımlar*, 1421-1438. https://doi.org/10.18863/pgy.1860664

Ghanizadeh Balderlou, K., Moheb, N., Alivandi Vafa, M., & Azmoudeh, M. (2025). Comparing emotional schema therapy and mindfulness-based cognitive therapy on cognitive emotion regulation, intolerance of uncertainty, and cognitive flexibility in generalized anxiety disorder. *Applied Psychological Research*, *16*(4), 119-138.

Ionescu, T., Goldstone, R. L., Rogobete, D., & Taranu, M. (2024). Is cognitive flexibility equivalent to shifting? Investigating cognitive flexibility in multiple domains. *Journal of Cognition*, *7*(1), 73. https://doi.org/10.5334/joc.403

Jam, S., Khandah, & Valizadeh, S. (2025). Effectiveness of intensive short-term dynamic psychotherapy on emotion regulation and interpersonal conflict among girls with anxiety disorders. *Nursing Rehabilitation Research*, *11*(1), 121-131.

Jialin, A., Zhang, H. G., Wang, X. H., Wang, J. F., Zhao, X. Y., Wang, C., & Deng, W. (2025). Cortical activation patterns in generalized anxiety and major depressive disorders measured by multi-channel near-infrared spectroscopy. *Journal of affective disorders*, *379*, 549-558. https://doi.org/10.1016/j.jad.2025.02.116

Jones, L., Gold, E., Totsika, V., Hastings, R. P., Jones, M., Griffiths, A., & Silverton, S. (2018). A mindfulness parent well-being course: Evaluation of outcomes for parents of children with autism and related disabilities recruited through special schools. *European Journal of Special Needs Education*, *33*(1), 16-30. https://doi.org/10.1080/08856257.2017.1297571

Lilliengren, P., Johansson, R., Town, J. M., Kisely, S., & Abbass, A. (2017). Intensive short-term dynamic Psychotherapy for generalized anxiety disorder: A pilot effectiveness and process-outcome study. *Clinical Psychology & Psychotherapy*, *24*(6), 1313-1321. https://doi.org/10.1002/cpp.2101

Liu, L., Zhou, M., Yang, X., & Lin, D. (2026). Correlation between clinical features of acute episode of major depressive disorder and hypothalamic-pituitary-adrenal axis (HPA) function: a cross-sectional study. *BMC psychiatry*, *26*(1), 283. https://doi.org/10.1186/s12888-026-07926-0

Makhdoumi, M., Abolghasemi, S., & Khanekeshi, A. (2025). Effectiveness of schema therapy on cognitive avoidance and generalized anxiety disorder symptoms. *Journal of Psychological Science*, *24*(154), 187-203.

Nasiri, A., Sharifi, T., Ghazanfari, A., & Cherami, M. (2022). Comparing schema therapy and reality therapy on psychological flexibility and emotional self-regulation in preschool teachers. *Applied Psychology*, *16*(4), 161-183.

Ottaviani, C., Watson, D. R., Meeten, F., Makovac, E., Garfinkel, S. N., & Critchley, H. D. (2016). Neurobiological substrates of cognitive rigidity and autonomic inflexibility in generalized anxiety disorder. *Biological Psychology*, *119*, 31-41. https://doi.org/10.1016/j.biopsycho.2016.06.009

Raj, A., & Kumar, P. (2018). Efficacy of mindfulness-based stress reduction (MBSR): A brief overview. *Journal of Disability Management and Rehabilitation*, *4*(2), 73-81.

Roemer, L., Eustis, E. H., & González-Garzón, A. M. (2025). Generalized anxiety disorder. In *Optimizing Treatment Engagement Processes in CBT for Anxiety and Related Disorders* (pp. 213-238). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-91439-3_12

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2013). *Mindfulness-Based Cognitive Therapy for Depression* (2nd ed.). The Guilford Press.

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2018). *Mindfulnessbased cognitive therapy for depression*. Guilford Publications.

Sepahvand, T. (2021). The role of cognitive flexibility in generalized anxiety among individuals with neuroticism. *Shenakht Journal of Psychology and Psychiatry*, *8*(3), 89-100.

Shen, Y., Zhu, S., Liao, S., Zhao, Y., Lin, Z., Jiang, K., Yan, W., & Shen, X. (2025). Generalized anxiety disorder patients' cognitive control in affective contexts. *Frontiers in Psychiatry*, *16*, 1506239. https://doi.org/10.3389/fpsyt.2025.1506239

Soleimani, D., Fallahmanesh, E., & Ershadi Chahardeh, S. (2020). The effect of mindfulness training on psychological hardiness and positive and negative cognitive emotion regulation strategies among women seeking divorce. *Social Psychology*, *8*(57), 41-51.

Straarup, N. S., Renneberg, H. B., Farrell, J., & Younan, R. (2022). Group schema therapy for patients with severe anxiety disorders. *Journal of Clinical Psychology*, *78*(8), 1590-1600. https://doi.org/10.1002/jclp.23351

Thompson, C. J., & Martin-Wagar, C. A. (2025). Cognitive flexibility and emotion regulation in eating disorder patients with comorbid generalized anxiety and posttraumatic stress symptoms. *Eating Disorders*, *33*(5), 666-680. https://doi.org/10.1080/10640266.2024.2405290

Ysbaek-Nielsen, A. T. (2024). Exploring volumetric abnormalities in subcortical L-HPA axis structures in pediatric generalized anxiety disorder. *Nordic journal of psychiatry*, *78*(5), 402-410. https://doi.org/10.1080/08039488.2024.2335980

Zahrakar, K., Sharei, A., & Salmani, A. (2025). Comparing cognitive behavioral therapy and intensive short-term dynamic psychotherapy on state-trait anxiety and resilience among female students with self-harming behaviors. *Applied Psychological Research*, *2*(6), 21-58.