

Original Article



The Effectiveness of Metacognitive Therapy on Cognitive Emotion Regulation and Cognitive Flexibility in Patients with Generalized Anxiety Disorder

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Abstract

Introduction: People with generalized anxiety disorder face numerous problems in managing their emotions and cognitions. The present study aimed to investigate the effectiveness of metacognitive therapy on cognitive emotion regulation and cognitive flexibility in patients with generalized anxiety disorder.

Method: This was a quasi-experimental study conducted in the psychotherapy clinic of the Neurology and Psychiatry Specialized Hospital in Sari (October to March, 2024). 32 people were selected and randomly assigned to the experimental and control groups. The measurement tools included the Generalized Anxiety Disorder, Cognitive Emotion Regulation, and Cognitive Flexibility questionnaires. The experimental group received eight 120-minute sessions of metacognitive therapy, and the control group received no intervention. Data analysis was performed using multivariate analysis of covariance and SPSS-27 software.

Results: The mean score of "positive cognitive emotion regulation strategies" (before intervention: 12.31 vs. after intervention: 21.43), negative emotion regulation strategies (before intervention: 14.87 vs. after intervention: 24.07), and cognitive flexibility (before intervention: 19.94 vs. after intervention: 75.31) was increased after intervention ($P=0.000$).

Conclusion: Metacognitive therapy led to improved cognitive emotion regulation and increased cognitive flexibility in individuals with generalized anxiety disorder. It is recommended that all mental health professionals use metacognitive therapy in clinical practice to improve the mental health of these individuals.

Keywords: Metacognitive Therapy, Cognitive Emotion Regulation, Cognitive Flexibility, Generalized Anxiety Disorder

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Introduction

Anxiety disorders are among the most common mental disorders. The global prevalence of these disorders is between 10% and 25%.¹ According to epidemiological studies, one-third of the population will suffer from an anxiety disorder during their lifetime. Generalized anxiety disorder is one of the most chronic types of anxiety disorders in which a person becomes anxious and worried about everything.² This disorder is defined as excessive anxiety and worry about multiple events or activities for most of the time in life or over a period of at least six months, which causes difficulty in cognitive emotion

regulation and cognitive flexibility.^{3,4} Cognitive emotion regulation is the process by which an individual manages incoming information that provokes emotion and controls and manages emotional situations. In stressful and challenging situations, people use a variety of strategies, including positive and negative cognitive emotion regulation strategies.⁵ Positive coping strategies include acceptance, attention to planning, and evaluation, which improve self-esteem and social competence.⁶ Negative coping strategies are used by people with generalized anxiety disorder, which include blaming themselves and others, rumination, and catastrophic thinking. Negative



coping strategies increase stress, depression, and other psychological harm. People with long-term anxiety cannot manage their emotional reactions to environmental events due to anxiety. These people react to stressful situations in a uniform and inflexible way, which in the long term leads to a decrease in cognitive flexibility.⁷⁻⁹

Rosa-Alcázar et al. (2021) showed that individuals with generalized anxiety disorder have impaired cognitive flexibility.¹⁰ Şahin et al. (2022) reported that cognitive flexibility is related to anxiety and psychosis.¹¹ Nakhostin-Khayyat et al. (2024) reported that the higher the level of cognitive flexibility, the lower the level of anxiety in individuals.¹² In a study by Zarafshan et al. in 2015 in Iran, the prevalence of anxiety disorders was reported to be 8.6% in Saravan and 85% in Bandar Abbas.¹³ Alipour et al. estimated the prevalence of generalized anxiety disorder in Iran in 2025 to be 26%.¹⁴

One of the new therapeutic approaches in the treatment of psychiatric disorders is metacognitive therapy. In metacognitive therapy, it is important to understand how cognition works and how conscious experiences of oneself and the world are produced. Metacognition determines what we pay attention to and what information enters our consciousness. Metacognition also shapes appraisal and influences the types of strategies used to regulate thoughts and feelings.¹⁵⁻¹⁷

People with anxiety disorders need to improve their emotional and cognitive state, and increasing the quality of life of these people should also be considered. Therefore, timely diagnosis and treatment of these disorders are important. Previous treatments have examined the effectiveness of therapeutic approaches, especially cognitive-behavioral therapy, on common mental disorders such as depression and anxiety in individuals, but the present study examined the effectiveness of metacognitive therapy on improving the emotional and cognitive state of people with generalized anxiety disorder. Also, the present study was conducted on patients who had psychiatric disorders and had been referred to a specialized neuropsychiatric hospital for treatment, and the results were helpful for the treatment of patients. The present study aimed to investigate the effectiveness of metacognitive therapy on cognitive emotion regulation and cognitive flexibility in patients with generalized anxiety disorder.

Methods

The present study was a quasi-experimental pre-test-post-test study with a control group. The statistical population of this study included all patients with psychiatric disorders (inpatients) referred to Zare Burn and Psychiatric Hospital, Sari, Mazandaran Province, Iran, in 2024 (October-March). "The sample size of 16 participants per group was determined based on similar intervention studies and to achieve an adequate statistical power (≥ 0.80) for detecting a large effect size (Cohen's $d \geq 0.8$) at a significance level of 0.05. 32 people whose scores on the generalized anxiety scale were above the

cutoff score of "10" and who had been diagnosed with generalized anxiety disorder by a psychiatrist were included in the study."

The inclusion criteria for the study were residing in Sari, being between 18 and 40 years of age, having generalized anxiety disorder, having a minimum score of 10 on the generalized anxiety disorder scale, not receiving any other treatment intervention (medication or psychotherapy), having no history of a psychotic disorder, and providing informed consent to participate in the study. Failure to accurately answer the questions in the questionnaires, missing more than two sessions during the treatment period, and withdrawing from further cooperation at any stage were the exclusion criteria.

The generalized anxiety disorder 7-item (GAD-7) questions were distributed to the patients. Patients who scored at least 10 were referred to a psychiatrist for a clinical interview to definitively diagnose generalized anxiety disorder. When the number of subjects reached 32, the first stage of subject selection was completed. The minimum sample size for intervention studies was 10, and in this study, 16 subjects were randomly assigned to each group (experimental and control) by taking into account incomplete questionnaires, absence from therapy sessions, or withdrawal from further cooperation. Initially, a pre-test was administered to both groups, and then the experimental group received metacognitive therapy sessions for 8 120-minute sessions weekly in the group therapy ward of the hospital. Then, a post-test was administered to both groups. The control group members were assured that they would also receive the same number of therapy sessions of the same quality and time after the end of the study (Table 1).^{18, 19}

The GAD-7 is a 7-item anxiety scale designed to identify possible cases of generalized anxiety disorder and assess the severity of symptoms of this disorder. Subjects are asked how long they have been bothered by each of their symptoms during the past two weeks. Response options include not at all, several days, more than half of the days, and almost every day, which are scored from 0 to 3, respectively. The total score of the scale is obtained by summing the scores of its questions and has a range from 0 to 21. The cut-off point of this scale is 10 and above, which provides a reasonable cut-off point for identifying cases with generalized anxiety disorder. The reliability of this scale was 0.92 using Cronbach's alpha.²⁰ The internal consistency of this test using Cronbach's alpha was 0.85, indicating good reliability of this tool.²¹

The cognitive emotion regulation questionnaire (CERQ) is designed to assess cognitive strategies after experiencing a distressing event. This questionnaire has 36 items; each question is scored on a 5-point Likert scale from never (1) to always (5). This questionnaire has 9 subscales: acceptance, positive refocusing, refocusing on planning, positive reappraisal, perspective taking, self-blame, rumination, catastrophizing, and blaming others. Each subscale has 4 items, and the score for each subscale ranges from 4 to 20, and the total score ranges from 36 to

180. Cronbach's alpha coefficients for the subscales ranged from 0.62 to 0.80.²² The reliability of this instrument, based on the Cronbach's alpha test, ranged from 0.79 to 0.86, indicating adequate reliability of the instrument.²³

The cognitive flexibility inventory (CFI) questionnaire measures and examines 3 aspects of cognitive flexibility, including: the tendency to perceive difficult situations as controllable, the ability to perceive multiple alternative explanations for human events and behaviors, and the ability to generate multiple alternative solutions to difficult situations. This questionnaire has 20 questions, and its scoring is based on a 7-point Likert scale from strongly disagree (1) to strongly agree (7), which measures three dimensions of perception of control, perception of different options, and perception of justification of behavior. Higher scores mean greater flexibility of the subject. The Cronbach's alpha coefficient for the total scale was 0.90, and for the subscales, 0.87, 0.89, and 0.55, respectively.²⁴ The Cronbach's alpha coefficient was 0.84, and for the subscales, 0.72, 0.77, and 0.63.²⁵

To analyze the data, Levine's test, regression, Box test, and multivariate analysis of covariance were used with SPSS-27 software ($P < 0.05$).

"All 32 participants completed the study, and no attrition occurred during the intervention period."

Results

So that the average scores of "positive cognitive emotion regulation strategies and cognitive flexibility" in the experimental group before receiving the intervention were 12.31 and 59.37, respectively, and after receiving the intervention were 21.43 and 75.31, respectively. The scores of "negative cognitive emotion regulation strategies" in the experimental group decreased before the intervention (mean: 41.87) compared to after the intervention (mean: 24.07) (Table 2).

The significance level for the variables of positive ($P=0.50$) and negative ($P=0.11$) emotion regulation strategies, cognitive flexibility ($P=0.23$), alternatives ($P=0.088$), control ($P=0.99$), and alternatives to human behaviors ($P=0.50$) was not significant, and the variances were homogeneous. Therefore, the assumption of equality of variances was possible based on the covariance and the implementation of the covariance. The assumption of homogeneity of the regression slopes of the interaction between the two groups (experiment and control) pre-test (positive emotion regulation strategies ($P=0.056$), negative emotion regulation strategies ($P=0.056$), and cognitive flexibility ($P=0.11$)), the research variables were not significant. Therefore, the data supported the hypothesis of homogeneity of the regression slopes, and the implementation of the covariance was possible. The results of the Box test to examine the assumption

Table 1. Content of metacognitive therapy training sessions on cognitive emotion regulation and cognitive flexibility in patients with generalized anxiety disorder

Sessions	Aim	Content
First	Program Outline and Goals	Conducting a pre-test, preparing and introducing metacognitive therapy, and presenting the logic of metacognitive therapy.
Second	Introduction to Understanding the Treatment Model	Familiarity with cognitive attentional syndrome (and how it affects the persistence of mental disorders, questioning the effectiveness of self-regulatory (coping) behaviors, and testing thought suppression.
Third	Teaching concepts related to treatment	Challenging negative metacognitive beliefs related to the uncontrollability of ruminations, negative thoughts, and emotions, training in the practice of dissociative mindfulness, and practicing dissociative mindfulness on neutral thoughts.
Fourth	Metacognitive techniques training related to generalized anxiety disorder	Continuing to challenge the belief of uncontrollability (examining contrary evidence), conducting the rumination postponement experiment, and conducting the loss of control experiment in the therapy session
Fifth	Metacognitive techniques training related to generalized anxiety disorder	Challenging metacognitive beliefs related to the uncontrollability of risk and harm, introducing verbal methods and behavioral experiments.
Sixth	Metacognitive techniques training related to generalized anxiety disorder	Challenging positive metacognitive beliefs, presenting a strategy of incongruence and dissonance, and conducting a rumination adjustment experiment.
Seventh	Metacognitive techniques training related to generalized anxiety disorder	Providing a new processing program including: identifying the process of ruminations-anxiety-stress-emotions and worries, emphasizing the use of detached awareness for triggering thoughts, allowing emotions and ruminations to rise and fall without trying to examine them, and repeatedly implementing new thinking styles.
Eighth	Overall conclusion	Monitoring progress, providing a summary of the techniques presented in all therapy sessions, answering questions and problems in applying these techniques, obtaining feedback from all sessions, and administering post-tests.

Table 2. Descriptive indicators of metacognitive therapy on cognitive emotion regulation and cognitive flexibility in patients with generalized anxiety disorder

Groups		Before intervention		After intervention	
		Mean	Standard deviation	Mean	Standard deviation
Positive emotion regulation strategies	Experimental	12.31	4.31	21.43	4.97
	Control	13.06	4.37	12.50	4.27
Negative emotion regulation strategies	Experimental	14.87	9.12	24.07	5.96
	Control	42.18	6.78	42.62	13.98
Cognitive flexibility	Experimental	19.94	15.37	75.31	15.83
	Control	57.68	15.09	58.75	14.94

of homogeneity of the dispersion matrix (variance-covariance matrix) showed that the quantitative research variables (cognitive emotion regulation and cognitive flexibility in patients with generalized anxiety disorder) were equal between the control and experimental groups, and the test of homogeneity of the dispersion matrices was not significant (Box statistic=7.55, F statistic=1.20, degree of freedom-1=10, degree of freedom-2=4302.78, $P=0.40$). There was a significant difference between the post-test of cognitive emotion regulation (positive ($P=0.000$) and negative ($P=0.000$) emotion regulation strategies) and cognitive flexibility ($P=0.000$) in patients with generalized anxiety disorder in the experimental group and the control group. The effect sizes of 0.56 and 0.47 indicated that 56% and 47% of the improvement in patients' scores in the experimental group on positive and negative emotion regulation strategies, respectively, was related to the effect of metacognitive therapy. The effect size of 0.51 also indicated that 51% of the improvement in patients' scores in the experimental group on cognitive flexibility was related to the effect of metacognitive therapy (Table 3).

Discussion

The present study aimed to investigate the effectiveness of metacognitive therapy on cognitive emotion regulation and cognitive flexibility in patients with generalized anxiety disorder. The results of this study showed that there was a significant difference between the intervention and control groups in terms of cognitive emotion regulation in patients. Therefore, metacognitive therapy reduced maladaptive cognitive emotion regulation and increased adaptive cognitive regulation in the experimental group compared to the control group. In this regard, Fisher et al. showed that metacognitive therapy for cancer patients was associated with a reduction in anxiety, depression, fear of disease recurrence, worry/rumination, and metacognitive beliefs at the end of treatment, and these results were consistent with our study.² Contrary to our study, Vahidi Moghadam et al. showed that although there was no

significant difference between the intervention and control groups, cognitive and positive coping strategies were effective in improving emotional regulation in patients with chronic hypertension.³ The results of the study by Azizi et al. also showed the effectiveness of two treatments, the Moritz approach and the Wells approach, on cognitive flexibility (obsessive-compulsive disorder) in people with obsessive-compulsive disorder.⁴ Metacognitive therapy helps people manage and observe their thoughts instead of engaging with them, and metacognitive beliefs make people more able to control their thoughts and come to the conclusion that worrying and rumination are futile. This treatment helps people learn how to deal with their negative feelings and undesirable emotions.^{2,3} This type of therapy, by teaching skills such as cognitive emotion regulation strategies, enables individuals to respond to internal events in a flexible and decentralized manner, and individuals learn that by distancing themselves from thoughts and experiencing them in a detached manner, they can respond in a new way to anxiety triggers.³ In a study by Wells et al., patients with heart failure felt that their psychological needs were not being met in cardiac rehabilitation, and their narratives of distress could be briefly explained by the metacognitive model. Metacognitive therapy showed significant reductions in the severity of anxiety and depression in patients with heart failure.⁵ The results of the aforementioned studies were consistent with our study.²⁻⁴ This treatment, by influencing the beliefs, thoughts, and insights of people with generalized anxiety disorder, makes them resistant and capable of dealing with psychological pressures and negative emotions. Metacognitive therapy provides the basis for obtaining better results by creating insights in patients with generalized anxiety disorder. Increasing metacognitive control allows people with generalized anxiety disorder to establish a new relationship with their thoughts.³⁻⁵ The findings of the present study showed that there was a significant difference between the intervention and control groups in terms of cognitive flexibility attitudes in patients with generalized anxiety disorder. This means that metacognitive therapy led to an increase

Table 3. Summary of multivariate analysis of covariance on cognitive emotion regulation and cognitive flexibility in patients with generalized anxiety disorder in the experimental and control groups

Groups		Sum square	Degree of freedom	Mean squares	F	Significance level	Eta squared (η^2)	statistical power
Between-group	Positive emotion regulation strategies	639.96	1	639.96	33.84	0.000	0.56	1
	Negative emotion regulation strategies	2447.87	1	2447.87	23.09	0.000	0.47	0.99
	Cognitive flexibility	1877.35	1	1877.35	27.99	0.000	0.51	0.99
Within-group	Positive emotion regulation strategies	491.64	26	18.90	-	-	-	-
	Negative emotion regulation strategies	3206.30	26	123.31	-	-	-	-
	Cognitive flexibility	1743.42	26	67.05	-	-	-	-
Total	Positive emotion regulation strategies	1284.96	31	-	-	-	-	-
	Negative emotion regulation strategies	6244.87	31	-	-	-	-	-
	Cognitive flexibility	9310.96	31	-	-	-	-	-

in cognitive flexibility in the experimental group compared to the control group. Rafiee et al. similarly reported that a positive psychotherapy intervention was effective in increasing cognitive flexibility, increasing posttraumatic growth, and reducing marital frustration in women with cancer.⁶ In a study by Valizadeh et al., the use of Wells' metacognitive model was also effective in the adjustment of patients with obsessive-compulsive disorder and depression.⁷ Metacognitive therapies effectively address dysfunctional attitudes in patients with generalized anxiety disorder, helping them to develop a new relationship with their thoughts and gradually adjust maladaptive cognitive patterns. In a study by Rezaei et al., metacognitive therapy significantly reduced dysfunctional attitudes in patients with generalized anxiety disorder. This treatment helped patients develop a new relationship with their thoughts and gradually adjust maladaptive cognitive patterns.⁸ The main goal of metacognitive therapy is to enable patients to communicate with their thoughts to develop flexible metacognitive awareness. Patients undergoing treatment can prevent cognitive processing in the form of worry, rumination, and revision. The metacognitive approach allows patients with generalized anxiety disorder to free themselves from worry, threat, and maladaptive self-control. Training allows the processing of emotional flexibility to plan and plan for the future to guide thinking and behavior in the face of threat and harm. Behavioral interpretation principles can also challenge metacognitive beliefs, and increasing metacognitive control allows the individual to establish a new relationship with their thoughts. This increases individuals' flexibility.⁴⁻⁶

This study also had limitations. The samples were selected only from Mazandaran province (Sari city), so the sample size was very small and limited to one city. This reduced statistical power and limited generalizability. Therefore, the results cannot be generalized to other cities in the country with different cultures and religions. Due to time constraints and lack of access to patients, follow-up to assess the durability of treatment effects (for example, 3 or 6 months after the intervention) was not performed, and the results were not separated by gender (women and men may have responded differently to the treatment). It is suggested that future studies be conducted in other cities in the country and, by increasing the number of subjects, studies be conducted separately in genders, women, and men. Also, elderly groups, along with information on demographic indicators such as education level, should be used in future research. Although in this study, medication use and co-occurrence with other neurological disorders were exclusion criteria, the use of psychotropic medications or the co-existence of other disorders (such as depression), which may confound the results, should also be considered.

Conclusion

The comparison of the mean scores of "positive cognitive emotion regulation strategies and cognitive flexibility" in the experimental group increased before and after

receiving the intervention. Therefore, according to the results, it can be said that metacognitive therapy affects cognitive emotion regulation and cognitive flexibility in patients with generalized anxiety disorder.

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Competing Interests

The authors declare that they have no conflict of interest.

Ethical Approval

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