Available online at: http://journal.iepa.ir

Iranian Journal of Learning and Memory, 2019, 2 (6), 35-41

The Effectiveness of Metacognitive Strategies Training on Cognitive Failure in Patients with Generalized Anxiety Disorder

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Abstract

The purpose of the present research was to examine the effectiveness of meta-cognitive strategies training on the cognitive failure in patients with general anxiety disorder (GAD). This quasi-experimental design consisted of two groups, with pre-test/ posttest and the control group. Considering the experimental nature of the research and also, with regards to the drop in the number of 30 people (15 in each group), patients with generalized anxiety disorder (DSM-5) were selected according to the available criteria and were randomly assigned to the experimental and control groups according to entry requirements. In both groups, the scale of Broadbent et al. Cognitive Failures Questionnaire (CFQ) was carried out. Then, the experimental group underwent metacognitive strategies in 10 sessions of 90 minutes and the control group did not receive any training. At the end, the same questionnaire was administered in both groups. The results of the two groups were evaluated in two stages using relevant statistical tests. Multivariate covariance analysis showed that meta-cognitive strategies training significantly reduces cognitive failure and its subscales (distraction, memory defects and inadvertent errors) in patients with general anxiety disorder (P<0/05); there was no significant difference between meta-cognitive strategies training with the subscale of not remembering names (P>0/05). Despite the differences in the scores of cognitive failures in the group studied, it is recommended to use metacognitive strategies to reduce the symptoms of cognitive impairment in patients with generalized anxiety disorder.

Keywords: Cognitive failure**,** general anxiety disorder, meta-cognitive strategies training

Introduction

Generalized anxiety disorder, a type of anxiety occuring most of the day, at least for six months, is about some event or activity such as a job or academic activity whose intensity, duration, or frequency of anxiety and worry does not fit with the real probability or impact of the expected event and one finds it difficult to control this concern and to avoid the disturbing thoughts interfering with the tasks at hand (Association, 2013). It is associated with mental and medical disorders such as fear disorders, major depression (Wittchen & Jacobi, 2005) and gastrointestinal and respiratory diseases (Wittchen et al., 2002). The 12-month prevalence of generalized anxiety disorder in the US population is 0.9% in adolescents and 2.9% in adults while the 12-month prevalence for this disorder in other countries is 0.4 to 3.6%. Lifetime risk is 0.9% and women are twice as likely as men to develop the disorder. The prevalence of this diagnosis reaches a high level in the middle age and decreases in later years of life (Association, 2013). Despite the high prevalence of generalized anxiety disorder and related disorders, it remains more ambiguous than other anxiety disorders and is therefore difficult to treat (Mennin, Heimberg, Turk, & Fresco, 2005).

One of the factors that can make problems for people with GAD is cognition and cognitive deficits. Cognitive failures are the failure of one to complete the tasks that they are naturally capable of doing. These failures include various areas such as memory, distraction, forgetfulness, and inadvertent errors.

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Received: 04/06/2019
Accepted: 07/02/2019

Cognitive impairments due to interference with daily activities can cause serious harm to the individual (Doorn, Lang, & Weijters, 2010).

The apparently complex nature of GAD makes it difficult to conceptualize and treat. When comparing GAD with other disorders, we find that much less research has examined the psychopathological mechanisms involved in this disorder. On the other hand, research has shown that conventional treatments for this disorder have so far failed to adequately address these underlying mechanisms and can be recognized as an effective treatment for this disorder (Salmani, Hasani, Karami, & Mohammadkhani, 2013). The process of worry and difficulty in controlling thoughts stems from the strategies and metacognitive knowledge bases of people with GAD. These patients often have limited insight into their metacognitive beliefs (Adrian Wells, 2007). Patients with GAD are also permanently losing focus so that they are unable to pay close attention to new activities (Christopher & Gall, 2010).

Brown believed that metacognition is the kind of knowledge about cognitions or executive processes of decision making that the human being must perform both in cognitive processes and their development (Cited in Zare & Mohamadi Ahmadabadi, 2011). The meta-cognitive approach empowers individuals to free themselves from the mechanisms that cause maladaptive processing of worry, threat monitoring and maladaptive self-control, and through flexible emotion processing training, it can guide thinking and behavior in the face of threats and harm in the future (Wells & Sembi, 2004). Beliefs and behaviors positively influence one's cognition and play a decisive role in reducing one's cognitive deficits. Also, high levels of stress and anxiety can cause substances in the human body to damage people's memory and cognition (Lupien et al., 2005). Research findings have shown that metacognition has a significant and strong relationship with cognitive decline (Abolghasemi & Kiamarsi, 2009; Mecacci, 2005; Mecacci, Righi, & Rocchetti, 2006; Shahgholian, Azadfallah, Fathi Ashtiani, & Ashayeri, 2011). Balzan and Galletly (2015), in a study using metacognitive therapy for people with psychosis showed that metacognitive therapy reduces cognitive biases and increases one's insight.

Witsam et al., (2014), in a study entitled 'Metacognitive Therapy in Patients with Psychosis as a New Approach to Psychotic Syndrome', found that metacognitive therapy was significantly effective in reducing the severity of delusions, enhancing clinical insight, and improving cognitive function (Vitzthum, Veckenstedt, & Moritz, 2014). In addition, Tabatabai et al., in a study on drug addicts, found that metacognitive strategies predict cognitive deficits (Tabatabaee, Sheikh, Malekirad, & Samandi, 2013). Al-Gharabiya also found that students' metacognitive skills are capable of predicting inverse cognitive deficits (Algharaibeh, 2017).Based on the above-mentioned points and research gap in this area, this study aimed to evaluate the effectiveness of metacognitive strategies training on cognitive deficits in patients with GAD.

Method

The research method is quasi-experimental design with two groups, pre-test and posttest with the control group.

Participants

The statistical population of this study consisted of patients with generalized anxiety disorder referred to counseling and psychotherapy services in Rasht from the winter 2016 to spring 2018 and psychiatrists confirmed their disorder according to DSM-5 criteria. Due to the nature of the research which is quasi-experimental and also with respect to the subject drop, 40 individuals were considered as the statistical sample (20 persons in each group) and considering the following entry conditions, they were randomly assigned to the experimental and control groups. The experimental group was exposed to metacognitive strategies training for 10 sessions of 2 hours. The control group received no training. Finally, after withdrawal of several patients from the training sessions, the number of experimental group was reduced to 15 and the control group randomly decreased to 15, too. The age was between 20 and 50 years and at least a high school diploma was required (due to the nature of the cognitive strategies training method that requires motivation and energy to use one's cognitive abilities). Inclusion criteria included lack of history of mental illness except for the subject of the study, lack of history of physical diseases affecting mood states, lack of experience of stresses such as divorce, and death of relatives in recent months, as well as the desire and satisfaction of participating in the project.

Instruments

A Researcher-made Demographic Questionnaire: including demographic information on age, sex, marital status, and education level.

Cognitive Failure Questionnaire (CFQ): This questionnaire was developed by Bradbent et al.

(Broadbent, Cooper, Fitzgerald, & Parkes, 1982). The Cognitive Failure Questionnaire contains 25 items in 4 subscales of distraction, memory deficits, inadvertent errors, and no name recall. The memory factor includes questions that measure memory deficits and forgetfulness. The distraction factor refers to the perceptual aspects of tasks in which there is diverted attention. The inadvertent error factor refers to errors that occur in the execution of the task and are associated with physical events. Non-recall agents include questions related to the memory of individuals' names (Wallace & Vodanovich, 2010). The answer to each material is in a 5-point Likert scale (never before). The questionnaire is scored in such a way that a higher score indicates higher cognitive deficits. In Wallace's (2004) study, the Cronbach's alpha coefficient for this questionnaire was 0.91, the internal consistency coefficient 0.94, and the test-retest validity was 0.82. The Cognitive Failure Questionnaire was validated by Abolghasemi and Kiamarsi (2009) in Iran. The internal consistency coefficient of Cronbach's alpha was 0.84. Its face validity was also verified by several psychologists and linguists, and its initial validity was calculated. Also, the correlation coefficient between this questionnaire and the mental health questionnaire was reported to be -0.41 (Abolghasemi & Kiamarsi, 2009).

Procedure

After selecting the sample group based on the inclusion criteria, informed consent was obtained from them to voluntarily participate in the research and assurance was given of the confidentiality of all information provided by them. Then, a demographic questionnaire was developed and emotional processing questionnaire was completed by patients with generalized anxiety disorder as the pretest. In the next step, metacognitive strategies training was performed on the experimental group.

Teaching metacognitive strategies to patients with GAD

The meta-cognitive model used in this method was based on a general modeling of the Wells model. Due to the conditions and nature of the generalized anxiety disorder, changes were made to it and educational methods as well as activity planning were incorporated. According to Wells' model in teaching metacognitive strategies, training sessions were 10 sessions per week and each session for 2 hours. The summary of the work done in 10 sessions is as follows*:*

The First Session: Getting to know each other, acquainting members with the nature of their illness and the role of metacognitive factors in reducing the incidence and exacerbation of anxiety symptoms, introducing metacognitive strategies training and determining patient goals and expectations of education.

The Second Session*:* Homework review, continuation of preparation, implementation of verbal and behavioral documentation techniques on uncontrollable beliefs; homework assignment: continuing to delay concern and familiarity with loss of control.

The Third Session*:* Homework review, continuing to challenge uncontrollable beliefs by providing controversial evidence, running an experimental session for control loss test, investigating and stopping nonconforming control and avoidance behaviors; homework assignment: continuing to delay concern and reversing concern avoidance behaviors and loss control experiments.

The Fourth Session*:* Homework review, continuing challenge with uncontrollable beliefs when needed, challenging beliefs with risk, trying to lose control and self-harm through concern testing; homework assignment: inducing concerns to test risks.

The Fifth Session*:* Homework review, continuing the challenge with beliefs about dangerous concerns, running a challenge test with risk-based beliefs at the treatment session; homework assignment: behavioral tests for challenging risk-beliefs.

The Sixth Session*:* Homework review, continuing challenge with risk beliefs, emphasizing reversing any remaining unconventional strategies; homework assignment: behavioral tests for challenging risk beliefs.

The Seventh Session*:* Homework review, challenging positive beliefs about worry if a patient's belief in negative beliefs reaches zero; homework assignment: implementing incompatibility strategies and other behavioral tests to challenge positive beliefs about worry.

The Eighth Session*:* Homework review, continuing to challenge positive beliefs, implementing a treatment session for inappropriate strategy; homework assignment: behavioral tests (such as increasing and decreasing anxiety levels

The Ninth Session: Homework review, work on reversing the remained symptoms, implementation of a treatment session for inappropriate strategy, continuing to challenge positive beliefs, starting a new program, homework assignment: Asking the patient to write a treatment summary sheet.

The Tenth Session: Review homework, work on a treatment plan (relapse prevention), reinforce alternative programs and explain how it works using some instances, planning for support sessions, starting a new program, homework assignment: identifying ongoing treatment applications.

It should be noted that the control group was not trained based on the program. Finally, emotional processing questionnaire was completed again by the patients with generalized anxiety disorder as the posttest and then the two groups were compared.

Data Analysis

In addition to descriptive methods for testing research hypotheses, statistical inference methods including multivariate analysis of covariance (MANCOVA) were used in this study. It should be noted that all data were analyzed using SPSS version 24 software.

Findings

Findings showed that the mean age of the patients and standard deviation of age in the two groups were 33.40 ±8.58 and 35.67± 6.25 years, respectively. Five subjects in metacognitive strategies training group and 7 subjects in the control group were male and 10 subjects in metacognitive strategies training group and 8 subjects in the control group were female. Most of the patients had a high school diploma.

Table 1.
Frequency and Percentage of Respondents Based on Demographic Characteristics Status

Variable		The Experimental group	The Control group
Marriage Status	Single	5	2
	Married	9	12
	Divorced	-	1
	Passed Away	1	-
Age	20-30 Years	8	8
	31-40 Years	5	3
	41-50 Years	2	4
Education	diploma	8	7
	Associate	2	3
	BA	5	4
	MA	-	1

Table 2.
Statistical Descriptive Indicators for Overall Cognitive Deficits Score by Group and Time

Variable	Exp. Group		Control Group		Shapiro-Wilk	
	Pre-test	Post-test	Pre-test	Post-test		
Distraction	M±SD	M±SD	M±SD	M±SD	**Statistic**	**Sig**
	5.91±17.20	5.91± 12.33	2.39 ± 16.53	2.94 ±16.73	0/944	0/119
Memory Deficits	5.45±11.87	2.18± 6.20	2.46± 10.07	3.05 ± 10.20	0/952	0/191
Inadvertent Errors	5.17± 11.47	5.07± 6.53	2.26 ± 11.67	2.91 ± 10.80	0/939	0/067
No Name Recall	1.05± 4.67	1.92± 3.40	1.34 ± 4.33	1.55 ±4.40	0/971	0/200

Multivariate analysis of covariance was used according to the pre-test. Before performing the multivariate analysis of covariance, Shapiro-Wilk, Box and Levin tests were used to observe its assumptions. Approved. Multivariate analysis of covariance was then used, the results of which are presented in Table 3.

As can be seen in Table 2, the null hypothesis for the normal distribution of the Cognitive Failure Variable Score distribution is confirmed. In other words, the non-significance level of Shapiro-Wilk index indicates that the score distribution is normal for the cognitive failure variable (P <0.05). According to the Box test which was not significant for any of the variables, the homogeneity of variance / covariance matrices was correctly observed (P = 0.109, F = 1.57, BOX = 18.613). Based on Levin test and its non-significance for all variables (distraction, memory impairment, inadvertent errors and non-recall of names with significance levels of 0.136, 0.147, 0.103 and 0.426, respectively), the equality of inter-group variances has been observed. The results of the

Lambda-Wilks test showed that the effect of group on the components of cognitive deficit was significant (P <0.001, F = 3.477, Lambda Wilks = 0.602). Eta squared (which is actually the squared correlation coefficient between the dependent variables and group membership) shows that the difference between the two groups with respect to the dependent variables in the whole is significant and the difference is 0.398, i.e. 39.8% of the variance of the difference between the two groups was due to the dependent variables.

Multivariate analysis of covariance was used to test the hypothesis of the present study: "Teaching metacognitive strategies reduce cognitive deficits in patients with generalized anxiety disorder". The results are shown in the following table:

Table 3.
Multivariate Covariance Analysis Test Results to Determine the Effectiveness of Metacognitive Strategies Training on Cognitive Deficits

Source of change		SS	df	MS	F	P	Eta
Group	Distraction	94.330	1	94.330	7.834	0.010	0.246
	Memory Deficits	99.138	1	99.138	14.582	0.001	0.378
	Inadvertent Errors	100.094	1	100.094	7.853	0.10	0.247
	No Name Recall	10.298	1	10.298	3.245	0.084	0.119
Pre-Test	Distraction	47.411	1	47.411	3.937	0.059	0.141
	Memory Deficits	19.326	1	19.326	2.843	0.105	0.106
	Inadvertent Errors	16.613	1	16.613	1.303	0.265	0.052
	No Name Recall	5.693	1	5.693	1.794	0.193	0.070

The results of the table show that there is no significant difference between the analysis of covariance with pre-test scores on cognitive deficit of the two groups before the study (P <0.05). In fact, the effect of pre-test scores on post-test is not significant. But by controlling for this non-meaningful relationship and with respect to the calculated F coefficient, the difference between the mean learning styles of the two groups was statistically significant (P<0.05). Therefore, it can be stated that teaching metacognitive strategies can decrease distraction, memory deficits and inadvertent errors in the experimental group compared to the control group in the post-test. The chi-square or the effect coefficient indicated that the interventions reduced distraction, memory deficits, and inadvertent errors of the experimental group by 24.6%, 37.8%, and 24.7% respectively compared to the control group. The results also showed that according to the calculated F coefficient, the difference between the mean of No recall of the names of the two groups was not statistically significant. Therefore, it may be possible that the teaching of metacognitive strategies was not effective in inability of remembering names.

Discussion and Conclusion

The purpose of this study was to evaluate the effectiveness of metacognitive strategies training on reducing cognitive deficits in patients with GAD. The results showed that there was a significant difference between the scores of cognitive deficits subscales (distraction, memory deficits and inadvertent errors) and metacognitive strategies training. This means that the experimental and control groups differ in cognitive deficits and some of its subscales. The results of the studies done by Shahgholian et al. (2010); Abolghasemi and Kiamarsi (2009); Macauxi et al. (2006); Macauxi (2005); Balzan and Galtley (2015) are in line with this study showing that teaching metacognitive strategies is effective in reducing cognitive deficits. One of the explanations for cognitive deficits in patients with GAD is that metacognition is defined as a thought process about thinking (Flavell, 1979). Flavell defined meta-cognition as the knowledge of the individual about his or her cognitive processes and products and everything else related to those processes, and he believes that metacognition is a cognitive knowledge or process that participates in the evaluation, review or control of cognition and adjusts cognitive performance. In support of this, the role of metacognition in the psychological disorders developed through the information processing model can also be pointed out.

Also, the results of the present study show that the scores of the cognitive deficits subscales (distraction, memory deficits, and inadvertent errors) were lower in the experimental group that experienced metacognitive strategies training than the control group. This result is likely to indicate that cognitive failure can be attributed to factors such as being multitask and worried that may lead to impaired cognitive functioning by reducing cognitive flexibility in individuals with GAD. Performing conscious behaviors of conscious observation, communicating

with thoughts, and using optimal metacognitive strategies reduce stress and thereby increase cognitive flexibility. People with proper metacognition employ strategies that lessen stress and create positive emotions and mental health in order to regulate their cognition, thereby causing the individual to experience less cognitive impairment (Abolghasemi & Kiamarsi, 2009). The results are in line with those of Tabatabai et al. (2013) and al-Gharibaba (2017) who found that meta-cognitive strategies reduce cognitive deficits. The reason for this, as mentioned, is that the acquisition of meta-cognitive strategies enhances the positive self-concept of people with anxiety and causes them to have more and more effective strategies to deal with problems and as a result, people do not passively confront with issues such as before. They can do and act actively and positively and manage cognitive issues properly. In fact, one's knowledge of cognitive strategies brings about a kind of meta-cognition that focuses on meta-cognitive strategies. For this reason, a person who is more knowledgeable about this component has more control over the use of meta-cognitive strategies and, given the nature of the task, chooses the most efficient strategy. In addition, this person continually reviews his performance and changes his strategy if necessary. Thus one's knowledge of cognitive strategies is associated with better decision making (Luo, Xue, Shen, & Lu, 2013).

On the one hand, according to the results of the present study, it seems that metacognitive strategies training in recent decades has led to the use of this method in reducing cognitive deficits. Indeed, one of the newest approaches to the treatment of GAD is the training of metacognitive strategies (Wells, 1999). In metacognitive strategies education-based therapy, individuals are given strategies to free themselves from mechanisms that lock them in processing maliciously, threat monitoring, and maladaptive self-control, and through flexible processing training, adapt a plan for the future to guide thinking and behavior in the face of threats and harm (Wells & Sembi, 2004). Beliefs and behaviors positively influence one's cognition and play a critical role in reducing one's cognitive deficits (Lupien et al., 2005).

Based on what was mentioned above, and considering the effectiveness of metacognitive strategies training on distraction, memory deficits and inadvertent errors in patients with GAD in recent research and its concordance with the findings of the present study, it can be concluded that metacognitive strategies training can reduce cognitive deficits in patients with GAD. Given that, and considering the role of cognitive factors in GAD, it is important to employ effective metacognitive methods to reduce symptoms of the disease, which, together with drug therapy, can help patients with GAD to use non-invasive and effective practices based on self-regulatory mechanisms. The results also showed that the mean difference in the 'no-recall name' component of the two groups was not statistically significant; in other words, teaching meta-cognitive strategies had no effect on the no-recall of names in people with GAD. Therefore, the findings are not consistent with the results of other researches such as Shahgholian et al. (2010); Abolghasemi and Kiamarsi (2009); Macauxi et al. (2006); Macauxi (2005); Balzan and Galtley (2015);); Tabatabai et al. (2013) and Al Ghariba (2017). In explaining the meaninglessness of the component of recalling names in people with GAD, it can be pointed out that metacognition is thinking about thinking.

In other words, metacognitive training is a therapy for strengthening the abilities of the mind, including recalling. Metacognition is a way to reinforce optimal recall strategies; therefore, it takes more time to be effective than other components. In other words, one's self-regulation improves in the first place, and in the next step he / she can benefit from better strategies for his or her cognitive levels. As a result, it is likely that metacognitive effectiveness will appear in this component during the follow-up. In addition, the group's treatment process can be cited as an obstacle to the meaningfulness of this component; perhaps the possibility of further practicing metacognitive methods individually can compensate for this gap.

Limitations and Recommendations

Although the research method was quasi-experimental, the use of questionnaires limited the results. In addition to the absence of follow-up periods and lack of control over some variables such as economic and social status, as well as the type of occupation limited the generalizability of results due to the need to use available samples. However, it is recommended to include follow-up studies in periods of 6 months and 1 year and to check the consistency of the results over time. It is also recommended to use random sampling in future research to extend the results with greater confidence. According to the results of this study, this plan can be used to design and develop psychological interventions to reduce general anxiety and ultimately improve the outcome of the disease.

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