

Original Article

The effectiveness of mindfulness-based cognitive therapy group training on improving autobiographical memory in working women with depression

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Abstract

This study aimed to assess the effectiveness of mindfulness-based cognitive therapy group training in enhancing autobiographical memory among working women with depression in Tehran in 2018. The research employed a quasi-experimental design with a pre-test-post-test and a control group. The population included all women working in schools in districts 1, 2, and 3 of Tehran. Thirty participants were selected through convenience sampling, randomly chosen from eligible women teachers with high depression scores who agreed to participate. As per the research design, the sample size for each experimental and control group was 15. The protocol involved eight weekly sessions lasting approximately 90 minutes each. The treatment was conducted by an experienced clinical psychologist using MBCT methods. The research tool was administered as a post-test. Data collection included the Beck Depression Inventory and Autobiographical Memories test. Descriptive statistics, such as mean and standard deviation, along with frequency and percentage, were measured. Inferential statistics were computed using the covariance test, and SPSS-20 software was utilized for data analysis. The results, obtained through the analysis of covariance, indicated that mindfulness-based cognitive therapy group training was effective in enhancing autobiographical memory in working women with depression. MBCT treatment not only reduced the severity of depressive symptoms in working women but also improved autobiographical memory. In conclusion, this study provides empirical evidence supporting the underlying theory of MBCT. Teachers may benefit from extensive training and safe practice environments. Women with severe depression or dysfunctional cognition may particularly gain from the specific therapeutic effects of MBCT.

Keywords

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Introduction

Hidden memories that can't be consciously accessed may protect the individual from the emotional pain of recalling the event. But eventually, those suppressed memories can cause debilitating psychological problems, such as anxiety, depression, post-traumatic stress disorder, or dissociative disorders (Kuchen, Becker, Claudino, & Höfer, 2020). In the group of patients suffering from recurrent depressive disorders, several cognitive disorders were observed. They primarily affect the functioning of memory, attention, and executive functions (Wachowska, Gałeczki, & Talarowska, 2017). Although depression is often associated with low mood, tiredness, and feelings of hopelessness, less known is that some people with depression may experience memory problems, such as

feeling forgetful. Approximately 35% of people with depression report experiencing memory problems. Researchers believe that memory problems are a result of changes in the brain's structure and functioning caused by depression (Morey-Nase, Phillips, Bryce, Hetrick, Wright, et al., 2019).

Ferrari et al. In a meta-analysis of world reports on the occurrence of depression showed that the prevalence of depression is 4.7%. The authors emphasize large differences between individual regions of the world regarding both the research method and the obtained results (Ferrari et al. 2013). The high and growing prevalence of depression and the complexity of its etiology (Gałeczki and Talarowska 2017, 2018) make it necessary to look for factors that may affect its occurrence, course, and response to treatment. Research

shows that the deterioration of cognitive functions is already present in patients during the first episode of depression (Talarowska et al. 2015) or may occur before it as discrete changes in the function of the central nervous system, measurable in radiological images, but not on the level of the neuropsychological examination (Mannie et al. 2010). Depression is an affective disorder with distinctive autobiographical memory impairments, including negative bias, overgeneralization, and reduced positivity (Qu, Sas, & Doherty, 2019).

Autobiographical memory (AM) is recollecting personal experiences that were voluntarily undertaken or involuntarily gained. Key autobiographical memory biases in depression include a negativity bias, whereby negative memories are recalled more quickly and frequently than positive memories; diminished positive memories, i.e. reduced recall of and reduced positive affect gained from positive memories (Warne, & Rice, 2022). AM can be conceptualized as a system of knowledge related to the self that interacts with active goals and self-image remembering. As such, AM encompasses both specific details from experienced past events, and personal factual knowledge, corresponding to Tulving's (1972) conceptualization of episodic and semantic memory, respectively (Fan, Romero, & Levine, 2020). Several interventions involving autobiographical memory impairment have yet to be investigated. There is a great need for therapeutic interventions that can improve cognitive symptoms in working women with depression.

The most promising interventions so far appear to be cognitive training and physical activity is mindfulness-based cognitive therapy (Chan, McCarthy, Devenish, Sullivan, & Chan, 2015; Treanor, McMenamin, O'Neill, Cardwell, Clarke, et al., 2016). However, due to a lack of active control groups and the consideration of biological outcomes, it remains unclear to what extent these interventions are effective. Recently, more attention has been given to mindfulness-based cognitive interventions (MBCIs) as a potential candidate intervention to improve cognitive symptoms in depressed patients (Van der Gucht, Melis, Ahmadoun, Gebruers, et al., 2020). An MBC is an evidence-based intervention teaching participants to pay attention to whatever arises, in the here and now, in a compassionate and non-judgmental manner (Kabat-Zinn, 2003). MBCT increases the flexibility of cognitive activities, reduces rumination, overgeneralization in autobiographical memory, and critical self-assessment, and increases useful cognitive activities such as non-judgmental observation of mental content. According to this approach, patients are encouraged to process the experiences in a non-judgmental manner as they have been formed and to change their relationships with and embrace challenging thoughts and feelings (Segal, Williams, & Teasdale, 2018). The practice of mindfulness is capable of enhancing mental health, and reducing stress levels amongst students and the benefits may assist with interpersonal development, such as greater empathetic levels and improved interpersonal responsibility

(Henning, Park, Moir, Krägeloh, Mysko, et al., 2018). Research shows that mindfulness exercises, including body review exercises, are effective in reducing pain in patients with chronic lower back pain (Zou, Zhang, Yang, Loprinzi, Yeung, et al., 2019). Moreover, MBCT strategies were effective in resilience in the wives of schizophrenia patients (Solati, 2017). The current study uses mindfulness-based cognitive training to modify autobiographical memories. The study aimed to assess the effectiveness of mindfulness-based cognitive therapy group training on improving autobiographical memories in working women with depression.

Methods

Participants

This research is a quasi-experimental study and a pre-test-post-test with a control group. The statistical population of this study consisted of all women teachers in education in districts 1, 2, and 3 of Tehran in 2018. By using G*Power software, 30 participants were selected with an average effect of 0.69 at significance levels of 0.05 and 0.95. The 30 participants were recruited through convenience sampling and were randomly selected from among eligible women teachers who scored high on depression tests but agreed to participate in the study. According to the research design, the sample size for each experimental and control group was 15 people. As part of this study, it identified 20 depressed women teachers aged 25 to 45 who were married with children and scored ten on the Beck Depression Inventory Short Version. In the absence of attendance at the study sessions, missing more than two training sessions, leaving the study at any time, or not wanting to continue, participants were excluded from the study.

Instrument

Autobiographical Memories test:

This test consists of 48 short sentences that were selected based on the study of Kormi-Nouri, Moniri, & Nilsson (2003). To examine the types of episodic memory (verbal, practical, and visual), 48 sentences were divided into three lists of 16 sentences, and each list was used for verbal, practical, and visual tasks, respectively. The usual method used for verbal and practical assignments is that the sentences are presented to people by listening. In verbal assignments, sentences are shown to the subject visually (written on the card) and he has to write and memorize the same sentence on paper.

Each sentence was shown to individuals for 6 to 9 seconds. In the practical task, the subject had to perform and memorize the action with the means provided to him/her at the same time as seeing the sentence. In the illustration task, the subject had to visualize and memorize the sentence by seeing it in his mind. To neutralize any possible effect of the order, the effect of the sentence itself on the order of execution of the

sentences, and their verbal, practical, and illustrative nature in each list was different from the other list so that 48 sentences were equally among the lists for assignments Verbal, both practical and illustration tasks were used.

For all subjects, a verbal list was presented first and the order of presenting practical lists and illustrations was changed randomly in each group. The reason for presenting the verbal list was initially that the subjects did not use practical and visual solutions in verbal coding. In the semantic memory test, two-fluid language tests (alphabetical letters and semantic categories) were used. The alphabet test consisted of 9 letters of the alphabet that were examined in terms of letter frequency (high frequency, medium frequency, and low frequency). In the semantic categories section, 30 semantic categories were used, and the subjects were asked to recall the words related to those categories. The test time was about 60 minutes for each subject.

To perform episodic memory tests, after presenting instructions and doing some examples, the person was asked to perform tasks. At the end of the list, to create a gap between the decoding and recall stages, the semantic memory test was performed. The reason for the gap was to create long-term learning memory for the subjects. To do this, semantic memory tests (alphabetical letters and semantic categories) were divided into three parts. In each section, the semantic category and the alphabet are presented, and each section is presented between event memory tasks. The instructions for the alphabet were as follows. "I show you a letter, and you have to memorize and write down every word that starts with that letter." The reminder time for each letter was three minutes. In the semantic categories section, the category was also presented to him, and he had to memorize and write down any number of words that were related to the word in 2 minutes. Free reminders and token reminders were used to measure episodic memory tests. First, a free recall test was introduced, during which the person was given a blank sheet of paper and asked to count any number of sentences he or she remembered.

The subject had no time limit. After that, the reminder test was presented with the help of a token. During which the signs (clues) containing the verbs or nouns that were in the list of sentences were shown to the people, and he was asked to write down as many sentences as he could remember according to the signs. For half of the people, the verb sign was used and for the other half, the noun sign was used.

It should be noted that from the end of one test until the beginning of the next test, the subject was allowed to rest and relieve fatigue. In general, two scoring methods were used how to score episodic memory tests (free recall tasks and token-assisted recall). Strict scoring and easy scoring if the subject remembers and notes exactly the main sentence of the text (decoding stage), he will be given a strict score, and in case of semantic (conceptual) similarity of the sentences by the subjects with the text sentences The main, easy score was given

to him. In episodic memory tests (verbal, practical, and visual), once as a complete sentence and once separately for the free reminder and reminder with the help of signs to the name and verb, strict and easy scores were given. In scoring the semantic memory test (alphabetical letters and semantic categories), it was noted that the words written by the subject are semantically related to the categories and not repetitive. And related words were given a score of one and otherwise a score of zero. Cronbach's alpha in this test was reported by Kormi-Nouri et al (2003) as 0.89 and the validity was 0.73.

The Beck Depression Inventory Short Version (BDI-S, BDI-13):

The inventory consists of 13 items assessing the severity of depression symptoms using statements scored from 0 to 3 (Beck, & Beck, 1972). The Farsi (Persian) version was used for this study. It was translated and validated with three nonclinical college student samples. The following norms were proposed: normal (0–3); mild depression (4–7); mild to average depression (8–11); average depression (12–15); and severe depression (16–39). Additionally, internal consistency values (Cronbach's alpha) of 0.818, 0.818, and 0.821 were obtained for the Portuguese-speaking Chinese community in Brazil (). Cronbach's alpha from previous studies with Iranian samples ranged from 0.89 to 0.94 (Kormi-Nouri, et al., 2003).

Procedure

All participants were women teachers in education in districts 1, 2, and 3 of Tehran and received psychiatric treatment at the baseline. A clinical psychologist with a Master's degree interviewed the participants using the structured clinical interview for DSM-IV (SCID) to ensure the accuracy of the diagnosis mentioned in the patients' medical records. The participants were monitored to determine whether they had personality disorders. Although they had personality traits, there was no sign that they were suffering from a disorder. Then, The Autobiographical Memory Test was administered to both groups before and after treatment. The authors designed a treatment protocol for the experimental group using the MBCT for depression by Segal et al., (2018). The protocol comprises eight weekly sessions of approximately 90 minutes with an experienced clinical psychologist conducted per week in MBCT methods. The protocol details were explained to the subjects in the preliminary interview session. Meanwhile, the control group continued their treatment as usual (TAU) which included taking medication for depression and anxiety prescribed by their psychiatrists. The instructions for the treatment sessions are briefly shown in Table 1.

The data and information were analyzed using SPSS20 software. The mean and standard deviation of variables, frequency, and percentage of variables are measured. Inferential statistics are computed using the covariance

test. They were also tested using multivariate analysis of covariance (MANCOVA). Nevertheless, the mean and standard deviation of the dependent variables have been

calculated and reported in the two stages of pre-and post-test. A significance level of 0.05 was applied.

Table 1. Summary of treatment sessions (Segal, et al.,2018)

First session	Objectives and interventions, Establish orientation of the session and set the rules, raising exercises to train to be in the present moment, body scan practice, and breath focus exercise.
Second session	Familiarity with members, presentation of session summaries, introduction to self-guidance, meditation practice, homework presentation. Body scan practice thought and feeling exercise, pleasant event calendar, mindfulness of routine activity.
Third session	Practice meditation, analyze barriers to practice, teach the basics of mindfulness, and continue practicing meditation and mindfulness. Seeing and hearing exercise, sitting meditation, three-minute breathing space, mindful walking, unpleasant event calendar.
Fourth session	The practice of seeing and hearing, the practice of meditation and practice of breathing, and mindfulness of the body. Seeing and hearing exercise, sitting meditation, defining the territory of depression, negative automatic thought, diagnosis criteria for depression.
Fifth session	Recognize stress and people's responses to it, breathing exercises, body scan exercises, and mindfulness. Sitting meditation, breathing space, reading poems related to mindfulness, and introducing the concept of "acceptance".
Sixth session	Practice meditation, ensuring the body's mindfulness against stress. Sitting meditation, mood, thoughts and alternative points exercise, breathing space, observing thoughts and feelings technique.
Seventh session	Continue practicing mindfulness and meditation against stress reactions. Sitting meditation, exercise to explore links between activity and mood, behavioral activation (generate a list of pleasure and mastery activities), and identifying actions to do in low-mood periods.
Eighth session	Practice four-dimensional meditation, teaching awareness of the present moment, and practicing recognizing and accepting pleasant and unpleasant events. Body scan practice, review the whole course, discuss how to keep up what has been developed over the past seven weeks, and discuss plans and positive reasons for maintaining the practice. Summarize previous sessions

Result

The mean age of the participants in the MBCT and control groups was 39 and 42 years old, respectively.

Table 2. Mean and standard deviation of episodic and semantic memory in pre-and post-test stages

Groups	Stages	Indices	Autobiographical Memories	
			Episodic	Semantic
Experimental	Pre-test	Mean \pm SD	31.45 \pm 8.73	29.64 \pm 7.79
		Shapiro -Wilk	0.944	0.914
	Post-test	Mean \pm SD	39.31 \pm 8.44	28.29 \pm 7.80
		Shapiro -Wilk	0.937	.908
Control	Pre-test	Mean \pm SD	28.61 \pm 9.56	27.88 \pm 10.27
		Shapiro -Wilk	0.920	0.908
	Post-test	Mean \pm SD	39.21 \pm 8.95	28.30 \pm 10.72
		Shapiro -Wilk	0.948	0.927

According to Table 2, in addition to the mean and standard deviation, the dimensions of autobiographical memories (episodic and semantic) of the Shapiro-Wilk index are also shown in each of them. As can be seen, none of the Shapiro-Wilk indices are significant at the 0.05 level indicating that the distribution of scores of research variables in both pre-and post-test stages is normal. After confirming the assumptions of covariance analysis among the research data, an analysis of covariance was performed. Investigation of the assumption of variance-covariance homogeneity by "M. Box" showed that the observed covariance matrices of the dependent variables are the same between the experimental and control groups. On the other hand, the result of the Bartlett sphericity test was significant at the level of 0.05, which indicates a sufficient correlation between the dependent variables. Therefore,

MANCOVA is a suitable method for comparing the effects of independent variables in the present study.

Among the four statistics (Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root), the Wilkes Lambda test was selected to report the value of F. The results of multivariate analysis of covariance using Wilkes-Lambda statistic showed that the linear combination of Autobiographical Memories (Episodic and semantic) was significantly different in the experimental and control groups. The results showed that the value of (Wilkes Lambda=0.207, partial $\eta^2=0.79$, P-value >0.001 , (F=20.133 (25 and 4)) was significant at the level of 0.01.

Table 3 shows that the error variances of the post-test variables in the two groups are not significantly different. Therefore, the post-test data indicates that the error variances of the two groups are equal.

Table 3. Leven test for equality of error variances

Variables	F	Df1	Df2	P-value
Episodic	2.142	1	28	0.154
Semantic	0.461	1	28	0.503

Table 4. An analysis of covariance for the comparison of variables

Variables	Mean Square	F	P-value	partial η^2
Episodic	49.158	13.630	0.001	0.36
Semantic	27.900	12.284	0.002	0.34

According to Table 4, the implementation of the independent variables at the significant level of 0.001 was observed in the episodic memory dimension (P-value<0.001, F=13.630 and in the semantic dimension (P-value<0.001, F=12.284) for working women with depression. Therefore, mindfulness-based cognitive therapy group training proved effective for improving episodic memory for working women with depression.

Discussion

The current study was based on enhancing autobiographical memories of working women with depression receiving MBCT. Working women with larger increases in mindfulness showed significantly larger increases in episodic memory. Previous research has reviewed evidence from training programs that manipulate autobiographical processing to treat mood, anxiety, and stress-related disorders. Studies have shown the effects of the MBCT on Psychological Symptoms and Quality of Life in Systemic Lupus Erythematosus Patients (Solati, Mousavi, Kheiri, & Hasanpour-Dehkordi, 2017). Other studies have shown the efficacy of MBCT on pain tolerance in patients with low back pain (Cattanach, Thorn, Ehde, Jensen, & Day, 2021), inability, pain, and daily stress in rheumatoid arthritis patients (Oliveira, de Vilela Araújo, Branco, Claudio, Michel, et al., 2021). It also showed the impact of MBC therapy on diabetes-related distress and self-care (Bao, 2022) and anxiety disorders (Sado, Ninomiya, Nagaoka, Koreki, Goto, et al., 2022). The results of these studies are consistent with our findings on the efficacy of this approach in reducing depression in working women. The literature suggests that cognitive reactivity in bipolar patients can increase relapse vulnerability, is enhanced by depressive mood and dysfunctional attitudes, and could be improved with MBCT. Autobiographical memory (AM) could be involved in cognitive reactivity and improved with MBCT training (Docteur, Mirabel-Sarron, Lefèvre, Sala, Husky, Swendsen, & Gorwood, 2020).

In the study conducted by Docteur, et al., (2020) patients receiving MBCT demonstrated significantly decreased depressive symptoms, dysfunctional attitudes over general memories and omissions, and increased specific memories. General autobiographical memory and omissions at baseline respectively predicted lower anxiety and dysfunctional attitude improvement following therapy, but the improvement of AM did not explain the impact of MBCT on depression and dysfunctional attitude improvement. The ability to

retrieve specific, single-incident autobiographical memories has been consistently posited as a predictor of recurrent depression. Elucidating the role of autobiographical memory specificity in patient response to depressive treatments may improve treatment efficacy and facilitate the use of science-driven interventions (Hitchcock, Haag, Smith, Kuyken, Crane, et al., 2021). Hitchcock, et al., (2021) examined recent methodological innovations in individual patient data meta-analysis to determine a) whether mindfulness-based cognitive therapy (MBCT) improves memory specificity compared to control interventions, and b) whether pre-treatment memory specificity influences treatment response. The majority of studies have investigated the effectiveness of MBCT in preventing depression relapses. Thus, their initial analysis focused on MBCT datasets only (n = 708), and was repeated including an additional dataset (n = 880). The memory specificity of MBCT or Control intervention was not significantly different from baseline to post-treatment. Based on baseline memory specificity, treatment outcome could not be predicted by symptom levels or risk of relapse (Hitchcock, et al., (2021, 2022).

Some pre-treatment abilities to retrieve specific memories may also influence clinical outcomes following MBCT. The ability to narrow in on specific experiences - those individuals with a relatively strong pre-treatment tendency to focus on specific details of personal experience - may develop more efficient MBCT skills, or experience ceiling effects of treatment, such that those with lower pre-treatment specificity have more to gain from developing MBCT skills. Furthermore, a large degree of narrative discourse in treatment draws upon specific autobiographical memories. Participants share recent experiences to elicit support from the group, or seek advice from the teacher (e.g., regarding uncomfortable homework practice). Again, there is little prior research in this area. To date, although there is some evidence showing that memory specificity does predict spontaneous symptom changes, its relationship to treatment change remains unexamined (Hallford, Barry, Austin, Raes, Takano, 2020). Reduced ability to recall specific, detailed memories of autobiographical events is an established marker of recurrent depression that is prototypically measured using a cognitive paradigm—the Autobiographical Memory Test (Williams & Broadbent, 1986). In the AMT, depressed individuals recall their past in overgeneralized summaries (e.g., I never did well at school'), rather than isolating specific, single-incident

events (e.g., I failed my final-year math exam. Reduced specificity in autobiographical memory underlies the overgeneralized, negative self-beliefs which drive depression (Hitchcock, Rees, & Dalgleish, 2017), is associated with increased frequency of depressive episodes and suicide attempts, continues to characterize patients in remission and predicts the course of depression, including relapse (Hallford, Rusanov, Yeow, & Barry, 2021).

During the MBCT, participants learn how to decenter or step back, from the ruminations or thoughts about the past that fill the mind of someone suffering from depression (Manjaly & Iglesias, 2020). The combination of this re-orientation away from the generic past and the focus on enhancing the salience of the specifics of the current experience suggests that MBCT may operate by shifting the cognitive processing style that is indexed by memory specificity. The literature exploring these possibilities is minimal. According to prior studies, memory specificity increases following MBCT (Williams, Teasdale, Segal, & Soulsby, 2000). Currently, this finding has not been confirmed by other researchers (Jermann, Van der Linden, Gex-Fabry, Guarin, Kosel, et al., 2013). Similarly, mixed findings were found for other interventions for depression, such as cognitive-behavioral therapy (CBT) and antidepressants (McBride, Segal, Kennedy, & Gemar, 2007). Identification of patient-level cognitive factors that may promote or interfere with the efficacy of such interventions and modulate treatment responsiveness may help explain why gold-standard interventions do not work for everyone. The authors can explain the treatment effect of MBCT on AM with the cultivation of awareness through mindfulness practices. Enhanced mindful attention to both internal and external experiences is beneficial for depressed working women. This enables depressed working women to notice specific details of their environment and ongoing experiences, along with the accompanying thoughts, emotions, and bodily sensations, as the event unfolds itself. Specific encoding of autobiographical events in combination with enhanced internal awareness may facilitate specific retrieval of an emotional event, and hence an increase in AM after MBCT.

Conclusion

MBCT treatment reduced the severity of depressive symptoms in working women and improved AM in this study. This study provides empirical evidence supporting the theory underpinning MBCT. Teachers need extensive training and locations where they can practice in a safe environment. Working women with severe depression or dysfunctional cognition may benefit more from MBCT's specific therapeutic effects.

Limitations

This study has several limitations. A lack of information regarding participants' experiences with depression, such as the age at which depression began and whether

they had chronic distress, was not explored. This could have affected their responsiveness to the interventions. In addition, no follow-up assessments were performed after the 8-week intervention. The permanence of the treatment effects remained questionable. Further research is needed to investigate the temperance of outcome measures regarding the continuation of mindfulness practices after interventions. Because of the sample characteristics, the findings may not be generalizable. Study outcomes may only be generalizable to working women with depressive symptoms.

Disclosure Statement

The authors reported no conflict of interest.

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