



Original Article

## The effectiveness of Mindfulness-Based Cognitive Therapy (MBCT) and Acceptance and Commitment Therapy (ACT) in sleep quality of students with test anxiety

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### Abstract

**Introduction:** This study aimed to evaluate the effectiveness of Mindfulness-Based Cognitive Therapy (MBCT) and Acceptance and Commitment Therapy (ACT) in sleep quality of students with test anxiety.

**Materials and Methods:** The study population included all in the academic year of 2015-2016. In the present study, 150 high school female students in Birjand-Iran, completed the Sarason Test Anxiety Questionnaire. Thirty-six students were randomly selected among students with anxiety scores above 20 and divided into three groups. Then, they fulfilled the Pittsburgh Sleep Quality Index (1989). One group received Mindfulness-Based Cognitive Therapy (MBCT), and another group received cognitive therapy based on Acceptance and Commitment Therapy (ACT). The control group did not receive any treatment. Data were analyzed using MANCOVA, and SPSS version 22.

**Results:** The results indicated that sleep problems were decreased significantly in both experimental groups ( $P < 0.05$ ). In addition, the effectiveness of MBCT was significantly higher than ACT ( $P < 0.05$ ).

**Conclusion:** According to the results, mindfulness-based cognitive therapy and acceptance and commitment therapy effectively improved sleep quality in students with test anxiety.

**Keywords:** Acceptance and commitment therapy, Mindfulness-based cognitive therapy, Sleep quality, Test anxiety

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### Introduction

Studies have reported the prevalence of exam anxiety in students as much as 10 to 30%, which is 17.2% for high school students in Iran (1). Many anxiety patients suffer from sleep disorders for no apparent reason. Insomnia is due to part of their anxiety disorder, changes the severity of other anxiety symptoms (2). Exam

anxiety is one of the situational anxieties, which is closely related to students' academic achievement. The negative effects of test anxiety on academic achievement have been confirmed in many studies. Studies have shown that students with high test anxiety spend more time in situations where their performance is being assessed, and think more about issues

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such as feeling inadequate, expecting punishment, losing value, have poor sleep quality and more involuntary and physical reactions (3). Insomnia potentially leads to the loss of better occupational and social opportunities, which can threaten a person's quality of life like other chronic disorders (4). Poor sleep quality may result from daily fatigue, decreased energy, and insomnia, which can negatively affect the quality of life (5). Physical and cognitive symptoms of poor sleep quality include fatigue, lack of concentration, low pain threshold, anxiety, nervousness, inflexible thinking, and lack of desire (6).

According to Spielman's studies, three categories of factors affect the history of insomnia. The first category is underlying conditions with long-lasting characteristics, which lower the threshold sufficient to initiate insomnia. The second category is accelerating conditions or time and contextual factors, which affect the onset of insomnia, and the third category is maintenance factors or those variables contributing to the persistence of insomnia over time. The relative importance of these factors changes over time. This pattern of insomnia may become independent based on a basic assumption or find functional autonomy. Other control variables are involved in maintaining sleep problems regardless of the nature of the accelerating events. Anxiety is more likely present at the time of sleep onset, while sleep retention is due to other issues. Continuing a normal sleep may be disrupted for a variety of reasons, which occur during the night, including urinary incontinence or side effects of certain medications (7). Studies have revealed that people with insomnia complain of an overactive mind, which may be hyperactive during the day. Some people are accustomed to thinking about things in bed, moving their hectic daily life to night, and becoming overwhelmed. Therefore, a busy and confused mind is the main enemy of sleep. This model assumes that people's emotions and behaviors are affected by their perception of events. A situation does not determine people's feelings but is the reconstruction of a situation in people's mind and specify their feeling. Thus feeling is related to interpretation and thinking about the situation. A situation cannot determine people's feelings. A cognition therapist is especially interested in a level of thinking which is spontaneous, superficial, and invisible (8). Insomnia is often a sign of other problems, among which anxiety

and worry affect sleep more than any other psychological problem. The persistence of insomnia is often related to a preoccupation with insomnia and anxiety about its consequences. When the cause is not a physical illness or substance abuse, the cognition therapist recognizes spontaneous thoughts by helping the person to respond to spontaneous thoughts, identify and change mediating beliefs, identify the relationship between thought and feeling, and emotional and behavioral problems to understand and replace negative spontaneous thoughts with more adaptive thoughts, and making positive changes in a person's lifestyle by behavioral activation. Mindfulness-Based Cognitive Therapy (MBCT) means paying particular, purposive, present, and judgment-free attention. In mindfulness, the individual becomes aware of the mental pattern every moment, and identification skills learn more useful methods. There are two main ways for the mind; one in "doing" and the other in "being." In mindfulness, the mind moves from one way to another. This cognitive therapy includes various meditations, stretching yoga, introductory training on depression, body review exercises, and several cognitive therapy exercises, which illustrate the relationship between mood, thoughts, feelings, and bodily sensations. These exercises somehow pay attention to the physical situations and surroundings in the present moment of the path and reduce the automatic processing of anxiety and depression. Mindfulness meditation activates an area of the brain, creating positive emotions and beneficial effects on the immune function (9). Acceptance and Commitment Therapy (ACT) can be considered a process-based mindfulness therapy in addition to mindfulness techniques. ACT emphasizes six dimensions for psychological flexibility, one of which is mindfulness and being in the present, and uses the same mindfulness-based cognitive therapy techniques. Mindfulness can also be considered therapy in ACT therapy, which requires ACT to be complete, while mindfulness is independent and does not require ACT techniques. The ACT treatment method leads to lifestyle, affects various mood and anxiety problems at the onset of treatment, and improves mindfulness-based cognitive therapy. Anxiety disorder is easy to formulate in the ACT. Anxiety problems occur when clients tend to experience symptoms of natural anxiety such as palpitations, fears, and personal experiences, which lead to natural

anxiety, such as fear of making a mistake in the community, worrying about a future event, having an irrational recurring thought. Clients consider natural anxiety related to events which require control. Efforts to control event-related anxiety directly increase the severity of anxiety to an unacceptable level.

Clients start escape/avoidance strategies with a psychological nature (rumination, worry, and listening) or behavioral (checking, and situational avoidance), which lead to short-term control of unwanted anxiety, but reciprocally have an anxiety reversal effect. Emotional avoidance/escape is used more to counteract the return of anxiety and is enhanced by short-term relief of anxiety (10). This study aimed to evaluate the effectiveness of mindfulness-based cognitive therapy (MBCT) and acceptance and commitment therapy (ACT) in sleep quality of students with test anxiety.

### Materials and Methods

This study was registered in the Iranian Registry of Clinical Trials with the code IRCT20170408033292N3. The present study was conducted on all high school female students of the north area of Birjand city- Iran, in the academic year of 2015-16. One-hundred-fifty students completed the Sarason Test Anxiety Questionnaire. Then, 36 students with anxiety scores above 20 were randomly selected and divided into three groups. Then, they fulfilled Pittsburgh Sleep Quality Index. One group received MBCT, and another group received ACT. The control group did not receive any treatment and assigned in the waitlist.

### Research instruments

*A) The Sarason Test Anxiety Questionnaire:* This questionnaire was designed and validated by Sarason (1957) and contains with 37 yes-no options. The retest reliability coefficient for this

scale was reported as 0.87. The validity and reliability of this questionnaire have been measured in several studies with a Cronbach's alpha coefficient (0.88) and validity (0.72). The score range will be between 0 and 37. When the score is 12 or less, the test anxiety in the person is in the low (mild) range. A score of 12 to 20 indicates that test anxiety is moderate, and any score above 20 indicates high (severe) test anxiety. Individuals with a score higher than 15 endure considerable stress and discomfort with the exam (11).

*B) The Pittsburgh Sleep Quality Index (PSQI):* This 18-item questionnaire was developed in 1989 to assess sleep quality during the past month. Numerous studies have shown the high validity and reliability of this questionnaire. The questionnaire was developed at the Pittsburgh Psychiatric Institute with nine items, but the whole questionnaire has 19 items graded on a four-point Likert scale from zero to three because question five contains ten sub-items. This questionnaire has seven subscales, which are the mental quality of sleep, delay in falling asleep, sleep duration, sleep efficiency, sleep disorders, use of sleeping pills, and daily functional disorders. The total scores on the scale are between zero and 21. The range from 0 to 5 represents good sleep quality, 6 to 10 indicates relatively low sleep quality, 11 to 15 presents low sleep quality, and 16 to 21 shows poor sleep quality. The Cronbach's alpha coefficient of this questionnaire was 0.83 for its seven components, which indicates its high validity. Its validity and reliability of Persian version was reported from 0.78 to 0.82. Each of the seven Cronbach's alpha scales had an internal consistency and reliability coefficient of about 0.83 and 0.63 (12). The ACT group participated in 6 ninety-minute sessions, and the MBCT group participated in 8 ninety-minute sessions twice a week. Table 1 presents the content of each treatment.

**Table 1.** Content of treatment sessions

ACT	
Session 1	Creative helplessness In creative helplessness, the clients should realize that they have tried to solve their problems, but the problem remains. Potential support activities: Extracting primary goals from references and past efforts to achieve those goals. Using the metaphor of a tug-of-war with a monster, the metaphor of a hungry tiger, the metaphor of a man in a well, or the metaphor of a well
Session 2	Control is the problem rather than the solution The objective of the session: Potential support activities, control as a problem/control of private events, rope-pulling with monsters, interrupting avoidance patterns contrary to changing feelings and thoughts. Content of the session: Action and experience versus thought and excitement, the practice of differentiation or separation means people to see thoughts as thoughts and nothing more than that, going to the cinema, and uninvited guests

Session 3	<p style="text-align: center;"><b>Cognitive defusion</b></p> <p>The objective of the session: Defusion in the ACT to help clients recognize the hidden features of language that create fusion to break the certainty of the reality of internal events and create a gap between thought and thinker and feeling. Content of the session: Openness and acceptance: Openness means being open and creating space for complicated feelings, impulses, and senses to flow freely in the presence of authorities; bus metaphor</p>
Session 4	<p style="text-align: center;"><b>Self as a background</b></p> <p>Session description: ACT distinguishes between three concepts of "self." These three meanings include conceptualized self as a dynamic self-awareness and self-observe process. Clients are more familiar with the conceptualized self but less familiar with the self as a dynamic self-awareness process, especially the observer. The objective of the session: The purpose of ACT at this stage of treatment is to find an alternative for the self defined by thoughts, feelings, memories, and inner feelings (conceptualized self) or connect with where the self is present with a transcendent sense and is not defined by transient thoughts and feelings. Content of the session: Attention to awareness and being in the present moment, using the metaphor of the chessboard, the metaphor of the house with furniture, the practice of conscious walking, and the practice of managing the mind when it wanders</p>
Session 5	<p style="text-align: center;"><b>Clarifying values</b></p> <p>ACT aims to identify the values of individuals in their life and take steps in that direction. Identification of values should be completely free. The therapist should identify factors affecting the process of identifying and measuring clients' values, and teach the individual to distinguish between value as a feeling and action. Generally, the importance of values and understanding of how values lead to interest is introduced by the clients. Clients need to know how much interest in behavioral activation is essential. Searching for values: Work begins by describing the client's values in employment, education, recreation, relationships and health, and personal growth. The client is asked to think about the different domains or sections. They dream or imagine something they have always dreamed of as if they could achieve their dreams now. People search for and evaluate essential goals in their lives, intraoperative valuation vs. emotional valuation, identifying a value-oriented behavior to perform this week, presenting a worksheet, values, actions, and achievements, providing a value search worksheet</p>
Session 6	<p style="text-align: center;"><b>Committed action</b></p> <p>The objective of the session: Commitment exercises, both in the session and as an out-of-session homework, will be the main focus of the rest of the ACT therapy sessions after identifying the values of the references. The main goal of the ACT is to use the desire to support action in line with selected values. Commitment involves active participation in actions likely to evoke negative thoughts, emotions, and physical states. At this stage of treatment, some actions have immediate consequences, but some require time, and metaphors can be used for clarification. Arboriculture metaphors are a useful metaphor at this stage. Content of the session: Committed action (goal setting and practical action) and review of past sessions and post-test for the group. Use the metaphor of begging at the door, arboriculture metaphor, identify a valued behavior (behavioral goal) for people this week, present a worksheet of values and goals, and practice time management. End of ACT: Objectives: 1. Teaching clients to be their therapists. 2. Maximizing the likelihood that clients will continue applying the skills learned in treatment after the sessions. 3. Addressing the clients' concerns about the end of the meetings. 4. Preparing for the companies after the end of the meetings. Thinking about the progress and the ongoing goals of the clients. 6. Metaphors of two mountains</p>
<b>MBCT</b>	
Session 1	<p style="text-align: center;"><b>Automatic guidance</b></p> <p>Everyone experiences the effects of distraction at all times. They may read all the pages of a book but then find that they do not understand it. In such cases, they may or may not even know what they are focusing on. In automatic guidance, the components of negative thinking with the possibility of control are considered. In this case, these components are combined and appear as a pattern of intense feelings of depression and anxiety. The objective of the session: The general objective of this treatment session is to create awareness about automatic guidance in clients. When the person realizes the automatic guidance, the mind is present. Content of the session: Shaping the group, determining the principles and rules of the course, getting to know the group members, and talking about what they want from the group and the course. Eat raisins with the presence of mind, meditation and body examination. Home exercise: Focus on daily activities such as eating a meal, taking a shower, and so on</p>
Session 2	<p style="text-align: center;"><b>Dealing with obstacles.</b></p> <p>The objective of the session: The objective of this session is to challenge people' obstacles. First, a physical examination exercise is performed so that the participants reach the presence of mind during the exercise, and then, they review what needs to be done with the help of the exercise. Attention and awareness training with limited thoughts related to test anxiety and undesirable sleep, full awareness of thoughts and feelings in a metacognitive way, emphasis on teaching the absence of negative emotions, training the connection between thoughts and feelings by emphasizing thoughts related to test anxiety and the resulting sleep problems, focusing more on the body, reveals mental whispers and leads to more control over daily events. Physical examination meditation, ten minutes of mental presence on the flow of breathing. Home exercise: 45 minutes of meditation, ten minutes of mindfulness, focusing on daily activity differently, and recording a daily report of a pleasant event</p>
Session 3	<p style="text-align: center;"><b>Presence of mind on breath and body</b></p> <p>In this session, it becomes clear that the purpose of the trained exercises is not to find predetermined solutions to problems, and failure can occur even at this stage. There may be many grounds for such failures. One of the most common strengths is that people feel they should be able to solve all the problems with the</p>

	<p>ability to solve a problem, a feeling that does not go away quickly. The objective of the session: Awareness more than occupation and distraction of the mind. The individual is taught to focus more consciously and justly on breathing, to be more focused and integrated. Content of the session: Understanding the wandering mind, teaching the body inspection technique, controlling the wandering mind with physical examination, reviewing negative spontaneous thoughts to be aware of the scattering and preoccupation of the mind. The practice of seeing and hearing for 5 minutes, reviewing assignments, and breathing with the presence of mind. Home exercise: Practicing yoga, a list of unpleasant events</p>
Session 4	<p style="text-align: center;">Staying on time</p> <p>People who have experienced negative emotions spend a lot of time and energy on comparisons. These people often suffer from feelings of loneliness, loss, hopelessness, and rejection and are easily saddened by unpleasant situations. There is an innate tendency to the past and regret in these people. While the mind presence approach is not to control the mind and replace positive mental images with negative ones in the past, present, or future, people are encouraged to let go of feelings of hopelessness and regret about the past. Content of the session: Realizing what is considered an unpleasant experience. Defining the area of test anxiety or other areas in which the group is involved, such as stress, sleep problems, and early insomnia. Five minutes of the presence of a visual or auditory mind and three minutes of breathing space, introducing this method as a coping strategy for use when the current situation evokes complicated feelings. Walking with the presence of the meditative mind. Home exercise: Three minutes of breathing space three times a day, three minutes of breathing space as a coping strategy when experiencing unpleasant feelings</p>
Session 5	<p style="text-align: center;">Admission and permission of presence</p> <p>Session description: People who have experienced unpleasant feelings in the past often try hard to drive them away and avoid negative memories and emotions. Avoiding unpleasant events and trying to minimize discomfort requires much effort. The subject of this session is a different approach to feelings, negative emotions, and acceptance. The objective of the session: The purpose of using these skills is to prevent negative emotions and create a different relationship with life, and the focus of these efforts is to develop a different relationship with experience. Different communication means allowing the experience to be present exactly as it is, without being judged or trying to change it from what it is. Content of the session: Different communication means allowing the experience to be present, exactly as it is, without judging it or trying to change it from what it is. Reading the guest house poem by Rumi and identifying its theme and meaning in the group, three minutes of breathing space. Home exercise: Sitting meditation, three minutes of regular breathing space (3 times a day), and three minutes of breathing space as a coping strategy (whenever you notice unpleasant feelings)</p>
Session 6	<p style="text-align: center;">Thoughts, not facts</p> <p>Session description: Unconscious people infer facts, perceive the senses differently, and are rarely aware of what they are doing as if the mind has an interpretation of all events. They quickly understand how these interpretations take place and create a series of emotional reactions that make them last. For example, a friend's phone might be interpreted as "he/she needs me" or "he/she is abusing me." People's reaction depends entirely on the interpretation that comes from an event. Different interpretations of events in different situations cause many problems. People vulnerable to test anxiety and sleep problems have a particular style of interpreting events. Their thoughts are self-centered, and these thoughts cause them to feel inadequate and fail. When this flow becomes internal, it is difficult to suppress because subsequent events reinforce it. Opposite information is ignored, and attention is paid to information in harmony with the thoughts. The objective of the session: The objective of this session is for participants to reduce their union with thoughts and view them as thoughts, not truth. Content of the session: 40-minute sitting meditation, awareness of breathing and body, sounds, and thoughts, 3 minutes of breathing space. Home exercise: 4 minutes daily exercise, and 3 minutes regular breathing space (3 times a day)</p>
Session 7	<p style="text-align: center;">How can I best take care of myself?</p> <p>Session description: Being receptive to thoughts, feelings, and body sensations during sessions is one of the most important issues. This acceptance helps people realize the critical moments in which they are immersed in thinking in an old and constructive way. In this therapy session, the person is instructed to find activities to help increase pleasant feelings. Finding activities should be based on the MBCT approach when inappropriate events and unpleasant feelings threaten the person. Content of the meeting: Paying attention to the relationship between activity and paying attention to the things they do during the day, which are included in two groups: 1- There are things that calm and strengthen people or 2- Things that make people irritable and anxious and reduce people's energy. Finally, people see how they can spend more time on things that increase their energy and make them more relaxed, and skillfully deal with things that reduce their energy, irritate them, and make them anxious (Identifying signs of anxiety and develop work to address the threat). Sitting meditation - Awareness of breathing, body, sounds, thoughts, and mindsets. Home exercise: Selecting activities after the program, regular three-minute breathing (twice a day) and breathing as a coping strategy, developing a practical plan to deal with test anxiety and insomnia. Identify the warning signs of the problem (test anxiety, depression, and insomnia) and deal with it with activities such as deep breathing, which made the person feel good in the past</p>
Session 8	<p>Using what they have learned to deal with subsequent mood swings (irritability, deafness, and anxiety)</p> <p>Session description: This session begins with a physical examination exercise to provide a complete cycle. Participants are then given the opportunity to recall their experiences from across the program and do an exercise in which they think about the past. The objective of the session: Regular practice of mindfulness helps maintain balance in life. Positive intentions are reinforced because these exercises are associated with positive reasons for self-care. Exercise and review of the whole program - What were the most valuable things you could do to help you achieve them in your life? and post-test implementation for the group</p>

The researchers provided necessary explanations and ensured the participants about confidential information. Then the participants fulfilled the consent form. The data were analyzed by multivariate analysis of covariance using SPSS version 22.

## Results

In term of demographic variables, the equal numbers of the students were selected from the second, third and fourth grades of the high school participated in the study (33.3%).

The results of inferential statistics analysis using analysis of covariance had the following results:

According to the P-value obtained in the two groups of pre-test and post-test, all components are higher than the error level of 0.05, so the distribution of components was normal. Considering that one of the presuppositions of using analysis of covariance is the homogeneity of variance among communities, Levene's test

showed a 95% error level between the variances of the two groups. The results of multivariate analysis of covariance indicated that there is a significant difference between the sleep quality of experimental and control groups in at least one of the dependent variables.

Meanwhile, the P-value of the M box statistic (0.013) is higher than the error level of 0.001. The effect size results indicates that the group variable explains only 87% of the changes in the dependent variable of sleep quality and 59% of the changes in the dependent variable of sleep disorders (Table 2). The significance level of the components of mental quality of sleep ( $P=0.005$ ) and sleep disorders ( $P=0.048$ ) is less than the error level of 0.05. In other words, mindfulness-based therapy, and commitment and acceptance therapy improved students' mental sleep quality and decreased sleep disorders significantly. The results of Bonferroni test related to sleep disorders and mental quality of sleep were presented in Table 3.

**Table 2.** Intergroup analysis of covariance of sleep quality components

Variable	Group	Sum of square	Degree of freedom	Mean square	F	P	Effect size
Poor mental quality of sleep	Pre-test	0.88	1	0.88	3.91	0.05	0.47
	Group	2.94	2	1.47	6.54	0.00	0.87
	Error	5.62	25	0.22			
Delay in falling asleep	Pre-test	3.28	1	3.28	5.58	0.02	0.62
	Group	0.31	2	0.15	0.26	0.76	0.08
	Error	14.71	25	0.58			
Reducing sleep duration	Pre-test	12.11	1	12.11	17.96	0.00	0.98
	Group	1.83	2	0.91	1.36	0.27	0.26
	Error	16.85	25	0.67			
Sleep disorders	Pre-test	235.56	1	235.56	34.47	0.00	0.99
	Group	44.01	2	22.01	3.22	0.04	0.59
	Error	170.83	25	6.83			
Hypnotic medicine	Pre-test	6.34	1	6.34	28.41	0.00	0.99
	Group	0.29	2	0.14	0.66	0.52	0.14
	Error	5.58	25	0.22			
Daily dysfunction	Pre-test	33.89	1	33.89	15.40	0.00	0.96
	Group	1.86	2	0.93	0.42	0.65	0.11
	Error	55.01	25	2.20			

**Table 3.** Adjusted mean scores of mental quality of sleep and sleep disorders

Variable	Group	Mean	Standard error	P
Poor mental quality of sleep	MBCT	0.52	0.12	0.01
	ACT	1.02	0.12	
	MBCT	0.52	0.12	0.00
	Control	1.12	0.12	
	ACT	1.02	0.12	0.03
	Control	1.12	0.12	
Sleep disorders	MBCT	4.46	0.65	0.45
	ACT	3.76	0.66	
	MBCT	4.46	0.65	0.00
	Control	8.43	0.65	
	ACT	3.76	0.66	0.04
	Control	8.43	0.65	

The adjusted mean scores in Table 3 show that the components of poor mental quality of sleep and sleep disorders have decreased after mindfulness-based therapy, as well as commitment and acceptance therapy. The results of the Bonferroni test indicate a significant difference between the effect of mindfulness-based therapy, as well as commitment and acceptance therapy on sleep quality ( $P < 0.05$ ). Mindfulness is more effective than acceptance and commitment but there is no significant difference between the effect of mindfulness, as well as acceptance and commitment on sleep disorders ( $P > 0.05$ ).

### Discussion

This study aimed to determine the effectiveness of MBCT and ACT on the sleep quality of high school students with test anxiety. The results of MANCOVA showed MBCT and ACT positively affected the quality of students' sleep. Sadri Demirchi and Cheraghian examined the effectiveness of the mindfulness structural model on psychological well-being and the effect of psychological well-being on sleep quality (13). The results are consistent with the study conducted by Hooshi and Khodabakhshi Kolaei. They confirmed the effectiveness of mindfulness therapy in reducing mental rumination and, consequently, the quality of sleep in the elderly (14). In addition, Hosseinpour et al. investigated the effectiveness of MBCT and medication in improving the sleep quality of migraine patients and found that short-term MBCT in addition to medication can be effective in improving migraine disorder and sleep quality (15). Also, it is concluded that MBCT improved mental sleep quality, sleep delay, sleep duration, and sleep disorders in women with a generalized anxiety disorder (16).

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The effectiveness of mindfulness and cognitive behavioral therapies on sleep quality in different ages and groups was approved in studies by Bagholi and Mahdavi (17), Koushki and Harun-Al-Rashidi (18), Alami et al. (19), Davoodi et al. (20). It is suggested that this study be conducted on the effectiveness of mindfulness on students' achievements in national and entrance exams. A study should be conducted on the effectiveness of MBCT and ACT on students' depression due to the relatively high statistics of depression and to strengthen the concentration and success of pre-university students in the pilot and national exams. The findings of this research can be effectively applied in counseling centers, psychiatric clinics, health centers, hospitals, and schools. These results can promote mental health and increase the overall academic performance of students. Given the role of MBCT and ACT on sleep quality, the use of these techniques leads to better sleep in these people.

### Conclusion

The results of this study showed that Mindfulness-Based Cognitive Therapy (MBCT) and Acceptance and Commitment Therapy (ACT) affect the mental quality of sleep and sleep disorders in students with test anxiety. The effectiveness of MBCT on sleep quality was higher than ACT. However, no difference was observed between the two methods regarding sleep disorders.

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