

Original Article

Effectiveness of Cognitive-Behavioral Therapy on Depression, Anxiety, Negative Autonomic Thoughts, and Coping Strategies of Students

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Abstract

Background and Aim: Students often struggle with multiple mental health issues, and there is a need for effective, short-term treatment. Cognitive behavioral therapy is one of the most effective and well-known treatment approaches. The present study aims to investigate the effectiveness of cognitive behavioral therapy on depression, anxiety, negative autonomic thoughts, and coping strategies in students of Payam Noor University of Ilam.

Materials and Methods: The research approach utilized was a quasi-experimental study characterized by a pre-test-post-test design alongside a control group. The statistical population for this study comprised all students enrolled at Payam Noor University of Ilam during the academic year 2023-2024. Among them, 30 people were selected purposefully and randomly assigned to two experimental (15 people) and control (15 people) groups. The research tools included the Beck Depression Inventory (second edition), Spielberg Anxiety Inventory, Negative Autonomic Thoughts Questionnaire (ATQ), and Endler and Parker Coping Strategies Questionnaire (1990). Cognitive-behavioral therapy (CBT) was used as an intervention method.

Results: The findings of the analysis of variance with control of pre-test scores showed that the difference between symptoms of depression, anxiety, negative automatic thoughts, and coping strategies of the experimental and control groups was statistically significant ($p < 0.05$). Therefore, cognitive behavioral therapy reduced symptoms of depression, anxiety, and negative automatic thoughts, and increased the number of coping strategies in students of Payame Noor University of Ilam in the experimental group compared to the control group in the post-test phase. The results showed that the eta square or the effect coefficient indicated that cognitive behavioral therapy caused (63% reduction in symptoms of depression, 32% reduction in anxiety, 21% reduction in negative automatic thoughts, and 24% increase in coping strategies) in students of Payame Noor University of Ilam.

Conclusion: Therefore, it can be said that cognitive behavioral therapy can reduce problems related to students' mental health, including depression, anxiety, negative automatic thoughts, and coping strategies. It is recommended that university counselors use this approach to educate, prevent, and treat students.

Keywords: Anxiety, CBT, Coping strategies, Depression, Negative thoughts, Students

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Introduction

The prevalence of mental illness among students is gradually increasing worldwide (1). Considering the significant importance of mental health across various segments of society and the crucial role that students play in shaping the future of the nation, it is essential to tackle this issue (2). Entering university brings about a critical change in social, family, and individual life and is considered a very sensitive period (3). During this period, the individual faces many changes in lifestyle, nutrition, and social relationships. Problems such as depression and anxiety are among the most common mental health problems in these individuals (4). The cognitive behavioural approach has been successful in understanding the causes and treating disorders such as generalized anxiety, post-traumatic stress, obsessive-compulsive disorder, social anxiety, and depression (5).

The cognitive-behavioral model of depressive disorder identifies anxiety as a key feature of depression, and the goal of cognitive-behavioral therapy is to understand the causes of anxiety and eliminate this maladaptive process. Anxiety is a key feature of the cognitive-attentional syndrome (CAS), which is activated in response to negative thoughts and emotions, sadness, and the experience of loss (6). An important step in understanding the causes of depression in cognitive-behavioral therapy is to develop a cognitive-behavioral model of anxiety and depression, which is rooted in the self-regulatory executive function model of psychological disorders. This model assumes that people vulnerable to depression engage in worry and rumination about the functioning of underlying beliefs and metacognitions (7). In this approach, automatic negative thoughts are considered a key feature of mental disorders such as depression, so the emphasis is on eliminating anxiety to reduce symptoms of depression (8). Negative thoughts are the main risk factors for depression (9). In recent years, rumination as a tendency to repetitive negative thoughts in the onset, persistence, and recurrence of depression and anxiety has attracted the theoretical and practical attention of many researchers (10).

Rumination has been defined as a thinking style

characterized by repetitive, recurrent, intrusive, and uncontrollable thoughts (11). Ruminative response style is a type of response to distress in which a depressed or anxious person repeatedly and passively focuses on symptoms of distress and their causes and consequences (12). These thoughts involuntarily enter consciousness and divert the person's attention from the desired topics and current goals and focus on feelings of depression and their causes and consequences (13). Ruminations lead to negative automatic thoughts, which play an effective role in the creation and continuation of mental disorders such as generalized anxiety disorder (14). Therefore, identifying and introducing effective treatment methods to control these mental disorders is of interest to psychologists and researchers. The cognitive therapy approach is one of the conventional and accepted methods in the world used to help patients reduce their negative thoughts and attitudes and correct negative beliefs.

In recent years, health psychology has attached great importance to how people cope with stress and life challenges to improve their physical and mental health, considering the most direct method of intervention to be strengthening adaptive coping responses and cognitive abilities. In other words, coping is an important moderating variable in the field of stress (15). Therefore, if a person's coping efforts are effective, adequate, and adaptive (problem-focused strategies and social entertainment), stress is considered less stressful, and the reaction to it is also aimed at reducing negative consequences (16). On the other hand, if the coping style or pattern is maladaptive (emotion-focused strategies and avoidance strategies), not only does it not control stress, but this reaction itself is considered a source of stress and makes the situation worse. Therefore, prevention science experts seek to strengthen human strengths through adaptive coping strategies as a shield against mental illness and increase mental health (17).

Numerous studies in the field of health psychology have shown the positive effect of using adaptive coping strategies, such as stress management based on cognitive-behavioral theory and the use of cognitive-behavioral techniques in stressful situations and negative emotions in shaping individuals' physical and mental health (18). Some studies concluded that cognitive-behavioral group therapy increases the use of

problem-focused coping responses and decreases the use of emotion-focused coping responses, which leads to lower anxiety and depression. A study found that cognitive-behavioral group therapy in patients with panic significantly reduced the use of maladaptive coping strategies (19). Cognitive behavioral therapy has also shown positive effectiveness in reducing automatic, intrusive thoughts (20). Although studies have been conducted in this field, previous studies have also emphasized the need for further studies in the student group. No study was found that simultaneously examined the effectiveness of cognitive behavioral therapy on the four variables of depression, anxiety, automatic thoughts, and coping styles. Therefore, the researcher intends to answer the question in this study: What is the effect of cognitive behavioral therapy training on symptoms of depression, anxiety, negative automatic thoughts, and coping strategies in students of Payam Noor University of Ilam?

Methods

The study was a quasi-experimental research design with a pre-test-post-test and a control group. The statistical population of this study included all students of Payam Noor University of Ilam in the academic year 2023-2024. Using a convenience sampling method, 30 students were selected from the statistical population and randomly assigned into two experimental groups (15 people) and one control group (15 people) (18). Inclusion criteria were being a student of Payam Noor University in Ilam Branch and not being under psychiatric treatment at the time of the study. If a student was under treatment for another mental disorder during the research or was absent for more than two sessions, they were excluded from the study.

Materials

Beck Depression Inventory

The 13-item Beck Depression Inventory was used. Each question has four answer options, with scores of 0, 1, 2, and 3. Reynolds and Gold (21) reported an internal consistency reliability of 0.83 for the 13-item Beck Depression Inventory. Beck et al. (22)

documented the test-retest reliability of this questionnaire from 0.48 to 0.86. The reliability coefficient of this questionnaire was 0.83. In Iran, Ghasemzadeh (23) reported the split reliability of this questionnaire using Cronbach's alpha as 0.89 and 0.87, respectively.

Spielberger Anxiety Inventory

The STAI includes self-report scales to measure state and trait anxiety. The state (Form Y-1) consists of twenty items that evaluate a person's feelings "at this moment and at the time of responding." The reliability coefficient of the test was examined separately in the norm and criterion groups. The reliability for the norm group (600 people) in the state and trait anxiety scales based on Cronbach's alpha is 0.90 and 0.90, respectively, and this rate in the criterion group (130 people) is 0.94. In addition, the reliability of the test was calculated through the ratio of the variance of the true scores to the observed variance, and its value in the norm group was recorded as 0.945 (24). Vatankhah (25) also calculated the reliability of the Spielberger test as 89% and 90%, respectively, in a preliminary study. In addition, the correlation between the two forms of anxiety is very high (0.96 to 0.98), and the correlation between the Spielberger trait anxiety scale and other scales that measure the anxiety construct is high. The correlation of this scale with the ASQ test is between 0.75 and 0.77, and its correlation with the TMAS scale is estimated to be between 0.79 and 0.83 (25).

Negative Self-Thoughts Questionnaire (ATQ)

Holohan Kendall developed this scale for the cognitive assessment of self-disclosure in depression. It is a self-report measurement in which a set of 30 items is rated on a 5-point Likert scale. The respondent needs to indicate how often each thought has occurred in the past week (never=1 and always=5). It involves statements demonstrating different aspects of depression, such as demoralization, self-criticism, brooding rage, and interpersonal dissatisfaction, primarily based on traditional negative cognitions. Sadig and Tahir reported appropriate validity and reliability for this scale (26). Persian version of ATQ held a high internal consistency rate (0.96) (17).

Coping skills scale by Endler and Parker

The Coping with Stressful Situations Questionnaire was used to assess coping strategies. This test consists

of 48 questions. The subject must answer one of five options: very little, little, medium, much, and very much. Finally, the dominant style of the individual is determined according to the scores he or she obtains in the test. The minimum and maximum scores are 16 to 80 for each coping style, respectively. They calculated the reliability of this scale using Cronbach's alpha in a range of 0.82 to 0.90 (27). Also, in the study of Purmenati et al., the reliability coefficient for each of the problem-oriented, emotion-oriented, and avoidant styles was 0.86, 0.84, and 0.80, respectively. The correlation coefficients obtained from the test-retest of the subscales in a one-week interval were also obtained in a range of 0.61 to 0.64 (28).

Intervention

Cognitive restructuring helps the patient identify and examine their negative thoughts. This skill is the core of CBT. Cognitive-behavioral therapy was applied in 8 sessions with specific goals for the experimental group (Table 1).

Analysis

Descriptive statistics methods, such as mean and standard deviation, minimum and maximum scores, were used to analyze the statistical data of the study. In the inferential statistics section, the Levene test was used to test the research hypotheses. The results were statistically analyzed using SPSS 22 statistical software. The Kolmogorov-Smirnov test was used to determine whether the data were normal or not.

Results

Descriptive findings

Demographic findings showed that subjects in the control group were aged 21-30 (16.7%), 31-40 (23.3%), and 41-50 (10%). In the experimental group, subjects were aged 21-30 (16.7%), 31-40 (20%), and 41-50 (13.3%). The gender of 8 people (23.3%) in the control group and 9 people (30%) in the experimental group was male, and the gender of 9 people (30%) in the control group and 8 (20%) in the experimental group was female. Eight people (26.7%) in the control group and 7 people (23.3%) in the experimental group were single, and 7 people (23.3%) in the control group and 8 people (26.7%) in the experimental group were married. Participants in the control group included individuals holding a bachelor's degree (33.33%) and

those possessing a master's degree (16.67%), forming the sample. In the experimental group, the sample consisted of undergraduate subjects (40%) and graduate students (10%). The descriptive indices of the variables are as Table 2.

Based on the results of the Kolmogorov-Smirnov test, the distribution of variables (depressive symptoms, anxiety, negative automatic thoughts, and coping strategies) was normal, and the first assumption of the analysis of covariance has been met. The results of the Levene test also showed that the F value of the Levene test for depressive symptoms, anxiety, negative automatic thoughts, and coping strategies in students of Payame Noor University of Ilam is not significant at the $P < 0.05$ level. The lack of significance of this value indicates that the difference in variance of the studied groups for rumination, cognitive flexibility, and self-criticism is not significant in students with depressive symptoms at Islamic Azad University.

Therefore, the assumption of homogeneity of variances has been met. An examination of the regression slopes showed that, given that the value related to the interaction of the group with depressive symptoms, anxiety, negative automatic thoughts, and coping strategies in students of Payame Noor University of Ilam is not significant for the four variables. Therefore, the regression slopes related to the research variable are homogeneous, and the assumption of homogeneity of regression slopes has also been observed. The results of Table 3 show that the significance levels of all tests allow the use of multivariate analysis of variance. These results show that about symptoms of depression, anxiety, negative automatic thoughts, and coping strategies in the studied groups, there is a significant difference in at least one of the dependent variables ($P > .05$, $F = 15.86$).

Table 4 findings of the analysis of variance with control of pre-test scores showed that the difference between symptoms of depression, anxiety, negative automatic thoughts and coping strategies of the experimental and control groups is statistically significant ($p > .05$). The F value calculated at 1 and 28 degrees of freedom is greater than the value in the table.

Therefore, cognitive behavioral therapy has reduced symptoms of depression, anxiety, negative automatic thoughts, and increased the number of coping strategies in students of Payame Noor University of Ilam in the

experimental group compared to the control group in the post-test stage. The eta square or the effect coefficient indicates that cognitive behavioral therapy has caused (63% reduction in symptoms of

depression, 32% reduction in anxiety, 21% reduction in negative automatic thoughts, and 24% increase in coping strategies) in students of Payame Noor University of Ilam.

Table 1. Content of sessions of cognitive-behavioral therapy(20)

Session	Content
First session	Introduction , explanation of the program and rules of the sessions, justification of individuals for the mental health education process, self-confidence of individuals, primary cognitive therapy methods, identification of negative anxiety-provoking thoughts, brief statement of the problem and goal of each group member.
Session 2	Rationale and rationale for progressive relaxation training and its implementation, teaching the art of relaxation.
Session 3	Cognitive techniques for challenging anxiety-provoking thoughts, creating alternative interpretations or predictions, examining evidence and possibilities of phobia reduction (distraction and exposure therapy), examining beliefs related to anxiety with the help of a therapist.
Session 4	Identifying worrying behaviors, identifying passive avoidance behaviors, mental relaxation training
Session 5	Identifying and examining effective and ineffective beliefs, progressive relaxation training, continuing to identify and examine core beliefs, identifying and examining metacognitive worrying beliefs
Session 6	Continuing to identify and examine core beliefs, continuing to identify and examine metacognitive worrying beliefs, creating new perspectives, practicing progressive relaxation
Session 7	Continuing to identify and examine core beliefs, continuing to identify and examine metacognitive worrying beliefs, applied relaxation methods
Session 8	Continue cardiac treatment components if needed, introduce relapse prevention program, review client progress, review psychoeducation

Table 2. Mean and standard deviation of depressive symptom components in the pre-test and post-test stages of the experimental and control groups

Variable	Control		Intervention		
		M	SD	M	SD
Negative thoughts	Pre test	10.3333	3.5118	10.7333	3.6114
	Post test	9.8667	3.4198	3.6114	2.5410
Anhedonia	Pre test	9.1333	2.7996	9.7300	3.2144
	Post test	9.0000	2.5919	4.0000	2.5991
Depression	Pre test	19.4667	5.7304	20.4642	5.6811
	Post test	18.8666	4.6557	7.2000	4.6012
Anxiety	Pre test	19.4666	5.3704	20.7333	6.5297
	Post test	19.8000	5.1989	12.5333	5.7304
Automatic negative thoughts	Pre test	69.4667	17.9756	76.1333	24.7930
	Post test	73.0000	16.2524	55.2667	18.5104
Problem solving coping	Pre test	16.4000	3.2680	18.0637	2.7637
	Post test	17.0667	2.6865	24.0667	3.5348
Emotional coping	Pre test	18.5333	1.8073	19.3333	1.3972
	Post test	17.8667	2.4162	15.1333	3.4198
Coping	Pre test	34.9333	3.3904	37.4000	3.0659
	Post test	34.9333	4.0261	39.9333	5.0774

Table 3. Results of anlysis of multi covaricance

Test	Value	F	Df	Dferror [^]	P
Pillais Trace	0.71	15.86	4	25	0.001
Wilks Lambda	0.28				
Hotelling's Trace	2.53				
Roy's Largest Root	2.53				

Table 4. Analysis of covariance for depression, anxiety, negative automatic thoughts and coping strategies

Variable	Source	SS	df	MS	F	P	eta
depression	Between group	5096.03	1	5096.03	237.76	0.001	0.89
	withingroup	1020.83	1	1020.83	47.62	0.001	0.63
	error	600.13	28	21.42			
Anxiety	Between group	7840.83	1	7840.43	261.94	0.001	0.90
	withingroup	396.03	1	396.03	13.23	0.001	0.32
	error	838.13	28	29.93			
Automatic negative thoughts	Between group	123392.53	1	123392.53	406.71		
	withingroup	2358.53	1	2358.53	7.77	0.009	0.21
	error	8494.93	28	303.39			
Coping	Between group	42037.37	1	42037.37	2002.24	0.001	0.98
	withingroup	187.50	1	187.50	8.93	0.006	0.24
	error	28	28	20.99			

Discussion

The present study aimed to investigate the effectiveness of cognitive behavioral therapy on symptoms of depression, anxiety, negative automatic thoughts, and coping strategies in students of Payam Noor University of Ilam. One of the results of the present study was the effectiveness of cognitive behavioral therapy training on symptoms of depression. The results of this study are consistent with Gautam et al. (29). In explaining this, it can be said that cognitive-behavioral therapy reduces symptoms of depression in people. Cognitive-behavioral therapy was implemented in various groups and showed that this intervention leads to an increase in constructive responses and a reduction in symptoms of depression. In addition to targeting the processing of maladaptive information at the individual level that leads to development and disorder, cognitive-behavioral therapy restores interpersonal relationships by focusing on behavioral activation and social competence training, and learning these skills is used in everyday life even after treatment (30).

Cognitive-behavioral therapy was effective in treating anxiety. This result is consistent with recent research (31, 32). Cognitive-behavioral therapy (CBT) is widely recognized as an effective treatment for anxiety disorders. This therapeutic approach is grounded in the assumption that individuals with anxiety disorders have developed maladaptive patterns of perceiving and responding to their environment, coupled with an absence of effective coping mechanisms. From this perspective,

individuals with anxiety disorders are characterized by excessive worry and anxiety, often stemming from a predisposition to perceive threats, engage in avoidance behaviors, and experience helplessness instead of adopting constructive responses.

Following the identification of potential threats, these individuals frequently respond with anxiety, worry, and avoidance, which in turn fosters the development of automatic and persistent response patterns. Over time, these anxious thoughts, feelings, and behaviors become repetitive and habitual, evolving into largely unconscious processes. Since the core feature of anxiety disorders is excessive worry, CBT aims to address this by altering patients' perceptions and processing styles. Through cognitive restructuring within therapy sessions, patients are guided to employ logical analysis and adopt new strategies to solve problems more effectively.

The effectiveness of CBT in reducing anxiety and worry can be attributed to its targeted interventions. Techniques addressing the physiological components of anxiety include diaphragmatic breathing, progressive relaxation, and mental relaxation training. These strategies specifically aim to reduce the physical manifestations of anxiety by equipping clients with skills to manage anxiety symptoms and triggers, ultimately lowering baseline physical tension. Such techniques serve as foundational emotion regulation skills, which individuals with anxiety disorders typically lack.

Additionally, CBT has been shown to reduce negative automatic thoughts, a significant contributor to the maintenance of anxiety. By addressing both the cognitive and physiological dimensions of anxiety,

CBT offers a comprehensive framework for alleviating symptoms and improving overall emotional regulation. The results of the present study showed that cognitive-behavioral therapy is effective in reducing negative automatic thoughts in students. The results are consistent with the results of researchers such as Kürümlüoğlugil and Tanrıverdi (33). In the explanation of the present finding, it can be said that cognitive-behavioral therapy, by targeting negative cognitions, attempts to change them and improve defective psychological symptoms. The goal of cognitive-behavioral therapy is to identify irrational and ineffective thoughts, and the individual gains insight into the role of these thoughts and replaces them with other thoughts (34). Using cognitive-behavioral therapy, individuals are encouraged to value any increase in their daily activity levels and reinforce them with positive thinking. In cognitive behavioral therapy, the individual struggles with their negative thoughts. Nonjudgmental exposure to negative thoughts and attempts to replace negative thoughts about themselves and the world around them through cognitive and behavioral therapy are pathways and mechanisms that have paved the way for improving communication skills and reducing negative automatic thoughts in individuals.

Another finding of this research is the effectiveness of cognitive behavioral therapy in increasing coping strategies. In explaining this hypothesis, it can be said that coping has received much attention as a factor that mediates the relationship between psychological stress and physical or mental disorders. Consider coping to be an individual's cognitive and behavioral efforts to overcome stress or minimize its effects. Coping is one of the variables that can predict behavioral health (35). The lack of adequate coping skills is a significant risk factor contributing to the onset of behavioral problems in young individuals. The results of the present study indicate that participants initially exhibited impulsive and emotionally driven responses to problems, often acting without considering the consequences. However, following treatment, they demonstrated a shift toward more logical and reflective problem-solving strategies. This transformation highlights the efficacy of cognitive-behavioral therapy (CBT), which emphasizes the identification and correction of

cognitive errors, fostering patient awareness of maladaptive thought patterns.

Conclusion

The findings of this study support the effectiveness of cognitive behavioral therapy on symptoms of depression, anxiety, negative automatic thoughts, and coping strategies in students of Payam Noor University of Ilam. Unlike pharmacological interventions, which cannot directly facilitate this cognitive awareness, CBT uniquely addresses the underlying cognitive processes contributing to behavioral problems. Thus, cognitive-behavioral interventions are critical for achieving sustained improvements in coping mechanisms and behavioral regulation. To enhance the generalizability of these findings and comprehensively evaluate the efficacy of treatment approaches, future research should include diverse population groups, such as non-student cohorts and female-specific groups. Expanding the scope of evaluation will provide a broader understanding of the applicability and effectiveness of these interventions. Furthermore, the development and implementation of disorder-specific treatment protocols, tailored to both individual and group settings, are essential for accurate and equitable comparisons between therapeutic approaches. For instance, while general treatment models for mental disorders are often employed, disorder-specific protocols—such as those developed for depression and anxiety—are necessary to refine and validate treatment efficacy. Researchers are encouraged to focus on creating specialized CBT protocols for other psychological disorders to ensure a systematic and precise evaluation of therapeutic outcomes across various conditions.

Conflict of Interest

The authors declare that they have no conflict of interest.

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