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The Effectiveness of Cognitive-Behavioral Therapy on Depression, Anxiety, and Quality of Life in Men with Asthma

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A B S T R A C T

Purpose: The aim of this study was to examine the effectiveness of cognitive-behavioral therapy (CBT) in reducing symptoms of depression, anxiety, and improving the quality of life in men with asthma.

Methods and Materials: This research was conducted using a quasi-experimental method with a pretest-posttest control group design. The statistical sample consisted of 30 men with asthma, who were randomly divided into two equal groups (15 each). The intervention group received cognitive-behavioral therapy, while the control group did not receive any intervention. The tools used in this study included the Beck Depression Inventory (BDI-II), the State-Trait Anxiety Inventory (STAI), and the Asthma Quality of Life Questionnaire (AQLQ). The data were analyzed using repeated measures analysis of variance and SPSS 22 software.

Findings: The results indicated that cognitive-behavioral therapy had a significant effect in reducing depression and anxiety and improving the quality of life in the intervention group compared to the control group.

Conclusion: These findings confirm the effectiveness of cognitive-behavioral therapy as an effective intervention in improving psychological well-being and enhancing the quality of life in patients with asthma.

Keywords: *Cognitive-Behavioral Therapy, Depression, Anxiety, Quality of Life, Asthma*

1. Introduction

Asthma is a relatively common disease that affects the lives of approximately 300 million people worldwide, and its prevalence is on the rise. Asthma patients often suffer from psychological disorders, particularly anxiety, depression, and an increased risk of suicide (Han et al., 2019; Jafarzadeh Dizaji et al., 2021; Li et al., 2023; Sanggamgem et al., 2023; Sanging-Talaksi et al., 2023). Studies have shown that anxiety and depression are prevalent in asthma patients and are associated with increased severity, heightened healthcare utilization, and poorer symptom control (Cojocaru et al., 2024; Lindenberg et al., 2022; Pourjaberi et al., 2023; Shabannezhad, 2024). Since asthma symptoms can resemble anxiety, asthma patients sometimes experience cognitive reactions that can lead to anxiety, resulting in higher levels of anxiety compared to the general population. Anxiety is the most common mental health issue and is strongly associated with other mental disorders, contributing significantly to the global disease burden (Bandelow & Michaelis, 2022). Anxiety is a painful feeling related to a current traumatic situation or the anticipation of an event connected to an indefinite object. Anxiety disorders are the most common category of mental disorders, with 11.6% of individuals affected by some form of it within a year (Bandelow & Michaelis, 2022). These disorders have a lifetime prevalence of 4.7% to 9.1% in adolescents and young adults. People with these disorders are prone to intense fear or anxiety responses to perceived threats, which can lead to distress and impairment in functioning (Mackenzie et al., 2023).

Anxiety disorders, including panic disorder, generalized anxiety disorder, and social anxiety disorder, involve excessive worry and fear that cause disabling effects on life, disrupt school and work performance, make coping with daily life difficult, increase social isolation, and reduce quality of life (Li et al., 2023; Ofem, 2023; Zhang et al., 2019). Anxiety is a component of personality structure, and from this perspective, some anxiety in childhood, adolescence, and youth can be considered normal, with its positive influence accepted in the developmental process. Anxiety provides opportunities for individuals to enhance their coping mechanisms to deal with stress and anxiety-inducing sources (Li et al., 2023). Asthma patients, who are aware of their anxiety-depression syndrome, may mistakenly interpret normal asthma symptoms as excessive, leading to negative consequences on their health and their ability to manage their illness, such as inappropriate medication use, disproportionate healthcare access, and increased mortality (Fang & Dingge, 2020; Ferreira et al., 2022).

On the other hand, the serious symptoms and signs of asthma can significantly impact physical, psychological, and social functioning, ultimately affecting the quality of life (Sanggamgem et al., 2023). According to the World Health Organization (WHO), quality of life (QOL) refers to individuals' perception of their position in life in the context of culture and value systems relative to their goals, expectations, and standards (Jafarzadeh Dizaji et al., 2021). Quality of life is also defined as the result of the interaction between individuals' personality and the continuity of life events. These events occur across various multidimensional domains, such as freedom, knowledge, economics, security, social relations, religion, environment, and recreation, all of which impact quality of life (Fahim et al., 2022; Keramati, 2021; Maarefvand & Shafiabady, 2024). Quality of life is subjective and dynamic, differing from one time period to another. Students' quality of life includes multiple dimensions: educational, research, physical, psychological, cultural, social, welfare, recreational, economic, and future personal growth aspects. Quality of life is an integral component of the health status of asthma patients (Li et al., 2023; Sanging-Talaksi et al., 2023).

Research indicates that various therapeutic methods exist for reducing psychological problems, one of which is cognitive-behavioral therapy (CBT). Strong evidence suggests that CBT significantly improves issues across different domains (Rajaeinia, 2022). The essence of the cognitive-behavioral approach lies in its cognitive outputs, which mediate between situations and emotional, behavioral, and physiological responses. Thus, this approach is an important extension of the stimulus-response model of human behavior. CBT is recognized as a first-line, effective treatment for a wide range of disorders, including mental disorders (Law et al., 2019; Luyster et al., 2020; Rezaie et al., 2013). In CBT, individuals are taught to identify, evaluate, control, and change negative thoughts related to their behaviors to achieve cognitive restructuring (Gilbert et al., 2021). The characteristics of CBT, such as being group-based, active, goal-oriented, problem-focused, skills-based, and emphasizing feedback for enhancing clients' self-awareness, are highly appropriate (Law et al., 2019; Luyster et al., 2020; Rezaie et al., 2013).

To date, no comprehensive study has investigated the effectiveness of CBT on depression, anxiety, and quality of life in men with asthma. Therefore, given the importance and

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prominent role of complementary therapies in improving this disease, the present study seeks to answer the question: Is CBT effective in reducing depression, anxiety, and improving quality of life in men with asthma?

2. Methods and Materials

2.1. Study Design and Participants

This study is a quasi-experimental research with a pretest-posttest control group design. The main objective of this research was to investigate the effectiveness of cognitive-behavioral therapy (CBT) in reducing depression, anxiety, and improving the quality of life in men with asthma. This study included two groups: an intervention group that received CBT and a control group that did not receive any intervention. Participants in this study were selected through purposive sampling from men aged 20 to 35 with asthma. The total number of participants was 30, randomly assigned to the CBT group (15 participants) and the control group (15 participants). Inclusion criteria included a medical diagnosis of asthma, willingness to attend therapy sessions, and an age range of 20 to 35 years. Exclusion criteria included severe mental disorders requiring immediate intervention or the inability to attend sessions.

Before the intervention began, all participants in both the cognitive-behavioral therapy (CBT) group and the control group individually attended an initial assessment session. During this session, the Beck Depression Inventory, the State-Trait Anxiety Inventory, and the Asthma Quality of Life Questionnaire were completed. This assessment was considered the pre-test. The CBT group underwent eight weeks of structured therapy sessions, each designed based on CBT principles. The primary focus of these sessions was on accepting unpleasant psychological experiences and teaching psychological flexibility skills. The control group did not receive any intervention and continued with their standard medical treatment. Immediately after the completion of the therapy sessions, all participants completed the same pre-test questionnaires to evaluate the immediate effects of the intervention. A final assessment was conducted three months after the intervention to assess the persistence of the treatment effects. Before the study began, all participants were informed of the research purpose, and written informed consent was obtained. This study was conducted in accordance with the ethical principles of the university's ethics committee, and all ethical guidelines related to human research were followed.

2.2. Measures

2.2.1. Depression

This inventory is one of the most widely used self-report tools for measuring depression severity. The second version of this inventory includes 21 items, each with four response options (ranging from 0 to 3). The total score is obtained by summing the item scores, with a total score range of 0 to 63. Higher scores indicate greater depression severity. The BDI-II has demonstrated good reliability and validity in various studies (Rezaie et al., 2013; Shabannezhad, 2024; Zhang et al., 2019).

2.2.2. Anxiety

State-Trait Anxiety Inventory (STAI) includes two separate scales for assessing state anxiety and trait anxiety. Each scale contains 20 items. State anxiety is defined as a temporary response to stressful situations, whereas trait anxiety is defined as a stable personality characteristic. Each item is scored on a four-point Likert scale (ranging from 1 to 4). Higher scores indicate higher levels of anxiety (Shabannezhad, 2024; Zhang et al., 2019).

2.2.3. Asthma Quality of Life

Asthma Quality of Life Questionnaire (AQLQ) was designed by Jones et al. (1992) and consists of 32 items in four domains (symptoms, daily activities, emotional impact, and environmental impact). Participants rate the items based on the impact of asthma over the past week. Each item is scored on a seven-point Likert scale (ranging from 1: very poor to 7: very good). Higher scores indicate better quality of life (Jafarzadeh Dizaji et al., 2021; Li et al., 2023; Sanging-Talaksi et al., 2023).

2.3. Interventions

2.3.1. Cognitive-Behavioral Therapy (CBT)

Participants in this group received eight weekly CBT sessions. Each session lasted 90 minutes and was conducted by a psychologist specializing in CBT (Rezaie et al., 2013).

Session 1: Introduction and Initial Assessment

The goal of the first session is to familiarize the participants with the therapist and the structure of cognitive-behavioral therapy (CBT). The therapist provides an overview of the CBT model, highlighting its role in managing depression, anxiety, and improving quality of life. Participants are asked to complete initial questionnaires to

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assess their levels of depression, anxiety, and quality of life. Additionally, they are introduced to self-monitoring techniques, which involve observing and recording their thoughts, feelings, and behaviors in daily life.

Session 2: Identifying Negative Thoughts and Cognitive Distortions

This session focuses on identifying automatic negative thoughts related to depression and anxiety. The participants are trained in thought recording techniques, where they log their thoughts in response to specific situations. They also learn to recognize common cognitive distortions, such as overgeneralization, catastrophizing, and all-or-nothing thinking. By raising awareness of these patterns, the therapist helps the participants understand how distorted thinking contributes to their emotional distress.

Session 3: Challenging Negative Thoughts

In the third session, participants learn cognitive restructuring techniques to challenge their negative and irrational thoughts. They are guided to critically evaluate the evidence for and against these thoughts and to replace them with more balanced and realistic alternatives. Exercises are provided to help participants practice these skills between sessions, allowing them to confront and modify their automatic negative thoughts more effectively.

Session 4: Anxiety Management Training

This session introduces participants to methods for identifying anxiety triggers and managing anxiety more effectively. The therapist teaches relaxation techniques, including progressive muscle relaxation and diaphragmatic breathing. These exercises are practiced in session, and participants are encouraged to apply them in real-life situations to reduce their physical and emotional anxiety responses.

Session 5: Stress Management and Relaxation Techniques

Building on the anxiety management strategies from the previous session, this session focuses on stress management techniques and coping skills. Participants learn mindfulness practices to enhance their ability to stay present and calm in stressful situations. They also practice visualization techniques and progressive muscle relaxation to reduce the impact of stress on their physical and psychological well-being.

Session 6: Behavioral Activation and Behavior Change

In this session, participants explore the role of avoidance behaviors in maintaining their depression and anxiety. They are introduced to behavioral activation techniques, which encourage engagement in meaningful and pleasurable activities. The therapist helps the participants plan and schedule these activities, aiming to increase their sense of accomplishment and improve their overall quality of life.

Session 7: Preventing Relapse of Depression and Anxiety

The focus of this session is on relapse prevention. Participants review the progress they have made and the skills they have developed throughout the therapy. They are introduced to techniques for identifying early signs of depression or anxiety and strategies to prevent their recurrence. The therapist works with the participants to develop a personalized plan for managing future challenges and maintaining long-term well-being.

Session 8: Review and Conclusion

In the final session, the therapist conducts a comprehensive review of the participants' progress. Participants complete post-treatment questionnaires to assess changes in their levels of depression, anxiety, and quality of life. The therapist provides feedback and practical strategies for sustaining improvements in the long term. The session ends with a discussion of future goals and a plan for continued personal development.

2.4. Data Analysis

The data were analyzed using SPSS version 24. First, the normal distribution of the data was assessed using the Shapiro-Wilk test. Then, repeated measures analysis of variance (ANOVA) was used to compare the pre-test, post-test, and follow-up results between the groups. For pairwise comparisons, the Bonferroni post hoc test was employed. The significance level for all tests was set at 0.05.

3. Findings and Results

The minimum age of participants in this study was 20, and the maximum was 35 years. Additionally, given the significance level greater than 0.05, no significant difference was found between the three groups, indicating that the groups were homogeneous in terms of age. The educational level of the intervention and control groups was also compared, and with a significance level greater than 0.05 ($p > 0.05$), no significant difference was observed between the groups in terms of education level, confirming homogeneity.

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Table 1

Comparison of Means and Standard Deviations of Research Variables

Variable	Group	Before Intervention	After Intervention	Follow-up
Depression	CBT Group	27.3 (3.49)	23.5 (3.81)	23.4 (3.71)
	Control Group	28.4 (2.99)	28.0 (3.07)	28.2 (3.19)
Anxiety	CBT Group	48.6 (3.35)	38.8 (5.54)	39.6 (5.67)
	Control Group	50.3 (4.32)	49.8 (4.24)	49.6 (4.15)
Quality of Life	CBT Group	63.2 (6.78)	72.0 (2.23)	71.6 (2.35)
	Control Group	63.8 (5.68)	63.9 (5.62)	63.6 (5.70)

Table 1 presents the mean values of depression, anxiety, and quality of life for the CBT and control groups. As observed, there were no significant differences between the groups in the pre-test for depression, anxiety, and quality of life. However, after the intervention, the CBT group showed a notable improvement compared to the control group, and this difference was also evident in the follow-up phase. The Shapiro-Wilk test was used to assess the assumption of normal distribution, and as the results were not significant, it was concluded that the distribution of scores for the dependent variables was normal. The next assumption for conducting mixed ANOVA was the homogeneity of error variances. In this study, the Levene's test was used to examine this assumption, and the results showed that the F-value was significant only for the post-test and follow-up depression scores. However, considering the equality of group sizes, this assumption was disregarded, and for other variables, the homogeneity of variance was confirmed. To test the assumption of equality of covariance matrices, the Box's M test was used, and as the F-value was significant, it was concluded that the assumption of equal covariance matrices was not met. However, given the equality of group sizes, this assumption could be ignored. The Mauchly's test was used to assess the assumption of sphericity, and it was found that this assumption was not met for any of the variables. Therefore, in the ANOVA calculations, the Greenhouse-Geisser corrected degrees of freedom were used. A mixed ANOVA was performed to test the hypotheses. Table 2 summarizes the results of the mixed ANOVA.

Table 2

Results of Mixed ANOVA on Depression, Anxiety, and Quality of Life

Source	Test	Value	F	df Hypothesis	df Error	Sig.	Eta Squared
Time	Pillai's Trace	0.593	29.9	2	41	.001	0.593
	Wilks' Lambda	0.407	29.9	2	41	.001	0.593
	Hotelling's Trace	1.45	29.9	2	41	.001	0.593
	Roy's Largest Root	1.45	29.9	2	41	.001	0.593
Time * Group	Pillai's Trace	0.438	5.88	4	84	.001	0.219
	Wilks' Lambda	0.564	6.80	4	82	.001	0.249
	Hotelling's Trace	0.772	7.71	4	80	.001	0.278
	Roy's Largest Root	0.768	16.1	2	42	.001	0.435

As shown in Table 2, all the tests, including Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root, are significant, indicating a significant difference in depression, anxiety, and quality of life based on group, time of assessment, and the interaction between group and time of assessment.

thinking intervention group and the dual balance training group, based on test phases, group membership, and the interaction effect of test phase and group membership ($P < .05$). The results of the Bonferroni post hoc test for comparing mean differences based on test phases across the groups are presented in Table 3.

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Table 3

Mixed ANOVA Results for the Effect of Group and Time of Assessment on Dependent Variables

Effect	Source	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.	Effect Size
Within-Subjects	Time	Depression	461.5	1.06	433.3	173.9	.001	0.805
		Anxiety	2292.5	1.01	2250.6	113.02	.001	0.729
		Quality of Life	688.4	1.04	660.4	54.3	.001	0.564
	Time * Group	Depression	272.3	2.13	127.8	51.3	.001	0.710
		Anxiety	1208.8	2.03	593.3	29.7	.001	0.587
		Quality of Life	395.2	2.08	189.5	15.6	.001	0.426
Between-Subjects	Group	Depression	501.8	2	250.9	10.3	.001	0.330
		Anxiety	2754.4	2	1377.2	32.03	.001	0.604
		Quality of Life	635.3	2	317.6	4.51	.017	0.177

Based on the results of the mixed ANOVA in Table 7, the main effect of time of assessment and the interaction effect of group and time of assessment on all three dependent variables are significant, and each is examined individually. The results in Table 3 show that the main effect of time of assessment is significant for all three dependent variables. This means that the scores for depression, anxiety, and quality of life of all participants, regardless of group, differ significantly between the pre-test, post-test, and follow-up. The Bonferroni post hoc test was used to examine the source of these differences. Depression scores in the intervention group showed a significant decrease from pre-test to post-test. The control group's follow-up scores did not differ significantly, while the intervention group's scores remained stable over time. Anxiety scores in the intervention group also significantly decreased from pre-test to post-test, while the control group showed no significant change in follow-up scores. Quality of life scores in the intervention group significantly increased from pre-test to post-test, while no significant change was observed in the control group at follow-up, with the intervention group maintaining these improvements over time.

4. Discussion and Conclusion

In this study, the effectiveness of cognitive-behavioral therapy (CBT) on reducing depression, anxiety, and improving the quality of life in men with asthma was examined. The results indicated that CBT had a positive impact on reducing depression and anxiety while enhancing the quality of life in these individuals. These findings are consistent with many previous studies that have demonstrated the efficacy of CBT in alleviating psychological issues such as anxiety and depression and improving quality of life.

The present study's results showed that the mean anxiety scores in the intervention group significantly decreased. These findings align with numerous studies. Similar results were reported by Mackenzie et al. (2023), showing that CBT reduces not only anxiety but also other psychological problems. One reason for CBT's success in reducing anxiety is its focus on accepting unpleasant experiences and practicing mindfulness during therapy (Mackenzie et al., 2023). For instance, this study utilized exercises such as "deep breathing" and "mindful meditation," which helped participants remain in the present moment and accept their thoughts and feelings without trying to change them. This approach mirrors the findings of Fang and Dinghe (2020), who demonstrated that increasing present-moment awareness can reduce anxiety (Fang & Dingge, 2020).

The findings also indicated that the mean depression scores in the therapy group significantly decreased. This result is consistent with previous studies showing the positive effects of CBT on reducing depression. For example, Han et al. (2019) demonstrated that CBT can reduce depression symptoms and improve quality of life (Han et al., 2019). Additionally, studies such as Ferreira et al. (2022) have confirmed that CBT can reduce stress and anxiety, which indirectly contributes to reducing depression (Ferreira et al., 2022). In contrast, the control group, which did not receive any intervention, showed no significant change in depression. This highlights the importance of psychological interventions in improving the mental health of individuals with asthma. As studies such as Sanging-Talaksi et al. (2023) have shown, individuals with asthma are at a higher risk for depression due to the physical and

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psychological challenges associated with the disease and require psychological support (Sanging-Talaksi et al., 2023).

One of the most significant findings of this study was the improvement in quality of life in the intervention group. This result reflects the broad impact of CBT on all aspects of an individual's life. According to the World Health Organization's definition, quality of life encompasses physical, psychological, social, and cultural dimensions, and this therapy has demonstrated its ability to improve not only psychological aspects but also social abilities and physical functioning. Sanggamgem et al. (2023) also concluded that controlling asthma symptoms and using stress and anxiety management techniques can improve patients' quality of life (Sanggamgem et al., 2023). However, some studies have suggested that CBT may not be as effective in improving quality of life as it is in reducing anxiety and depression. For instance, Zhang et al. (2019) found that CBT's impact on quality of life may not be the same for everyone, and individual factors such as disease severity and social support play a critical role in the effectiveness of this therapy (Zhang et al., 2019).

Overall, the findings of this study suggest that CBT can be an effective method for reducing depression, anxiety, and improving quality of life in men with asthma. This research aligns with previous studies showing that CBT can be a useful tool for managing psychological problems associated with chronic illnesses such as asthma. However, to generalize the results to various populations, more research with diverse groups and different conditions is needed.

Authors' Contributions

All authors significantly contributed to this study.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the interview and participated in the research with informed consent.

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