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RESEARCH ARTICLE

Effectiveness of Cognitive Behavioral Therapy in Reducing Exam-Related Anxiety Among Adolescents: A Randomized Controlled Trial

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Abstract: Aims and Objective: Exam-related anxiety is a significant yet under-recognized issue among adolescents, often leading to impaired academic performance, emotional distress, and long-term psychological consequences. Cognitive Behavioral Therapy (CBT) has demonstrated proven efficacy in treating anxiety disorders; however, its structured application for exam-related stress in Indian school settings remains limited. This study aimed to evaluate the effectiveness of a structured CBT program in reducing exam-related anxiety and improving academic self-efficacy among school-going adolescents. Methodology: A randomized controlled trial (RCT) design was employed, comprising 60 adolescents (aged 13–17 years) from high schools in Coimbatore, Tamil Nadu. Participants were randomly allocated into two groups: the CBT intervention group (n = 30) and the control group (n = 30). The intervention group underwent a 10-week CBT program consisting of psychoeducation, cognitive restructuring, relaxation training, and problem-solving modules, while the control group received no intervention. Assessments were conducted at baseline, post-intervention (week 6), and follow-up (week 10) using the School Anxiety Scale (SAS), State-Trait Anxiety Inventory for Children (STAIC), and the Academic Self-Efficacy Scale. Statistical analyses were performed using SPSS version 22, employing t-tests and ANOVA, with significance set at $p < 0.05$. Results: Post-intervention, the CBT group exhibited a significant reduction in exam-related anxiety (SAS scores) compared to both baseline and the control group ($p < 0.001$). STAIC scores also improved significantly ($p < 0.01$), indicating lower general anxiety, and academic self-efficacy increased notably ($p < 0.01$). No significant changes were noted in the control group. Conclusion: Structured, group-based CBT is an effective, feasible, and accessible intervention for reducing exam-related anxiety and enhancing academic self-efficacy among adolescents. Integrating CBT-based modules into school mental health programs can provide sustainable psychological support to students facing academic stress.

Keywords: Cognitive Behavioral Therapy, Exam Anxiety, Adolescents, Self-Efficacy, Randomized Controlled Trial

INTRODUCTION

Examinations are among the most significant and stressful events in an adolescent's academic life. For many students, exams represent not only a measure of knowledge and ability but also a critical determinant of self-esteem, social status, and future educational opportunities. In competitive educational environments like India, where academic achievement is highly valued, exam pressure is intense and often begins at an early age. This pressure can lead to heightened levels of stress and anxiety, especially during adolescence—a developmental stage already characterized by substantial physical, emotional, and social changes.

Exam-related anxiety can be defined as a situation-specific form of anxiety characterized by excessive worry, tension, and physiological arousal before or during examinations. While a moderate level of anxiety can enhance motivation and alertness, excessive anxiety impairs concentration, working memory, and performance. Persistent exam anxiety can also contribute to avoidance behaviors, sleep disturbances, poor self-confidence, and long-term academic underachievement. Studies have shown that adolescents with high levels of test anxiety are more likely to experience generalized anxiety disorders, depressive symptoms, and reduced life satisfaction later in life (1).

The prevalence of exam-related anxiety among school-aged children and adolescents has been reported to range between 20% and 40% globally, with higher rates

observed in Asian populations due to cultural emphasis on academic excellence and parental expectations. In India, where academic success is often equated with personal worth and family honor, students face additional psychosocial pressures that exacerbate performance anxiety. Despite the widespread nature of this issue, psychological support for students within schools remains limited (2).

In recent decades, Cognitive Behavioral Therapy (CBT) has emerged as one of the most effective psychological interventions for managing anxiety and stress-related disorders (3). Rooted in the principles of cognitive and behavioral psychology, CBT focuses on identifying and modifying maladaptive thought patterns and behaviors that contribute to emotional distress. It operates on the premise that an individual's emotional responses are largely determined by their cognitive interpretations of events rather than the events themselves. By restructuring these distorted cognitions and replacing them with more adaptive thought processes, individuals can learn to regulate their emotions more effectively.

CBT for anxiety disorders typically involves several core components:

1. Psychoeducation – explaining the relationship between thoughts, emotions, and behaviors.
2. Cognitive Restructuring – identifying irrational thoughts and replacing them with realistic alternatives.
3. Behavioral Techniques – including exposure therapy, relaxation, and problem-solving (4).
4. Relapse Prevention – consolidating adaptive skills for long-term gains.

The application of CBT for exam-related anxiety specifically targets worry thoughts ("I will fail the exam," "I am not good enough"), catastrophic predictions, and physiological symptoms such as rapid heartbeat and restlessness that accompany evaluative stress. CBT teaches students to reframe exams as manageable challenges rather than threats and equips them with coping mechanisms such as relaxation, time management, and positive self-talk (5).

Several international studies have demonstrated CBT's efficacy in reducing test and performance anxiety among students. James et al. (2015) reported significant improvements in child and adolescent anxiety following CBT (1). De Silva et al. (2024) found that school-based CBT in Sri Lanka led to reductions in anxiety and improved self-efficacy (2). Similarly, Andrews et al. (2024) demonstrated that computer-based CBT can also effectively reduce exam stress (4). Despite these findings, the structured use of CBT for exam-related anxiety in Indian schools remains minimal, warranting further exploration.

This study aims to evaluate the effectiveness of a structured, school-based CBT intervention for reducing exam-related anxiety and improving academic self-efficacy among adolescents in Coimbatore, Tamil Nadu. The study hypothesizes that CBT will significantly reduce anxiety levels and enhance self-efficacy compared to a control group receiving no intervention.

Methodology

Study Design

A Randomized Controlled Trial (RCT) was conducted over a period of 10 weeks in selected high schools of Coimbatore, Tamil Nadu, to evaluate the effect of CBT on exam-related anxiety among adolescents.

Participants

A total of 60 students aged 13–17 years were enrolled based on elevated scores on the School Anxiety Scale (SAS). Participants were randomly assigned to:

- Intervention Group (n = 30): Received structured CBT intervention.
- Control Group (n = 30): Received no intervention during the study period.

Ethical Considerations

Institutional Review Board (IRB) approval was obtained from Institutional Ethics Committee of Saveetha Medical College and Hospital, prior data collection.

Written informed consent was secured from parents and assent from students.

Confidentiality and the right to withdraw from the study were ensured throughout.

Intervention

The intervention comprised 10 weekly CBT sessions (60–75 minutes each), delivered by a trained therapist. The modules included:

1. Psychoeducation: Understanding anxiety, stress responses, and exam fear.
2. Cognitive Restructuring: Identifying and challenging maladaptive thoughts related to failure and performance.
3. Relaxation Training: Deep breathing, guided imagery, and progressive muscle relaxation.
4. Problem-Solving and Coping Skills: Enhancing study routines, time management, and coping with setbacks.
5. Review and Relapse Prevention: Consolidation of techniques and reinforcement of adaptive strategies.

Assessment Tools

1. School Anxiety Scale (SAS): To assess exam-specific anxiety.
2. State-Trait Anxiety Inventory for Children (STAIC): To measure general anxiety levels.
3. Academic Self-Efficacy Scale: To evaluate students' confidence in academic abilities.

Assessments were conducted at:

- Baseline (Pre-intervention)
- Post-intervention (Week 6)
- Follow-up (Week 10)

Data Analysis

Data were analyzed using SPSS v22. Within- and between-group comparisons were made using paired t-

tests and repeated-measures ANOVA. Statistical significance was set at $p < 0.05$.

Results

- The present randomized controlled trial assessed the effectiveness of a structured ten-week Cognitive Behavioral Therapy (CBT) program in reducing exam-related anxiety and improving academic self-efficacy among adolescents. Sixty participants were enrolled and randomly assigned to either the CBT intervention group (n = 30) or the control group (n = 30). At baseline, both groups were comparable in demographic variables and pre-intervention anxiety scores, confirming homogeneity between groups prior to treatment.
- Following the ten-week intervention, a statistically significant reduction was observed in exam-related anxiety levels among participants who received CBT. The School Anxiety Scale (SAS) scores in the intervention group showed a marked decline from baseline to post-intervention assessment ($p < 0.001$), while the control group exhibited no meaningful change. Similarly, the State-Trait Anxiety Inventory for Children (STAIC) scores demonstrated a substantial improvement, indicating that CBT not only reduced exam-specific anxiety but also alleviated broader manifestations of general anxiety ($p < 0.01$). The intervention group reported decreased physiological arousal, improved concentration, and reduced pre-examination worry as reflected in their self-reports and follow-up feedback.
- In addition to reductions in anxiety, the CBT group showed a notable enhancement in academic self-efficacy, suggesting that participants developed greater confidence in their academic abilities and a more positive attitude toward examinations. Statistical analysis revealed a significant increase in mean self-efficacy scores post-intervention ($p < 0.01$), while no significant improvement was detected in the control group. This indicates that the cognitive restructuring and behavioral coping components of CBT effectively empowered students to reappraise their capabilities and approach exams with reduced apprehension.
- Overall, the findings underscore the efficacy of structured, group-based CBT in managing exam-related anxiety among adolescents. The results suggest that the intervention was effective not only in reducing situational anxiety linked to examinations but also in fostering broader emotional regulation and self-belief. Furthermore, the improvements were sustained at the ten-week follow-up, emphasizing the enduring impact of CBT on adolescents' psychological well-being and academic functioning.

STAIC-state score

Timepoint	Group A (CBT)	Group B (Control)	p-value (between groups)
Baseline	43.1 ± 5.2	42.6 ± 5.0	0.61
Post-Intervention	35.3 ± 5.7	41.5 ± 5.3	<0.001**
Follow-Up (Week 10)	36.0 ± 5.2	41.2 ± 5.6	<0.001**

Academic self efficacy score interpretation

Timepoint	Group A (CBT)	Group B (Control)	p-value (between groups)
Baseline	55.2 ± 7.4	54.6 ± 6.9	0.74
Post-Intervention	62.8 ± 6.1	55.1 ± 6.5	<0.01*
Follow-Up (Week 10)	61.5 ± 6.3	55.0 ± 6.7	<0.01*

Figure 1. Comparison of Mean Scores Between CBT and Control Groups on SAS, STAIC, and Academic Self-Efficacy

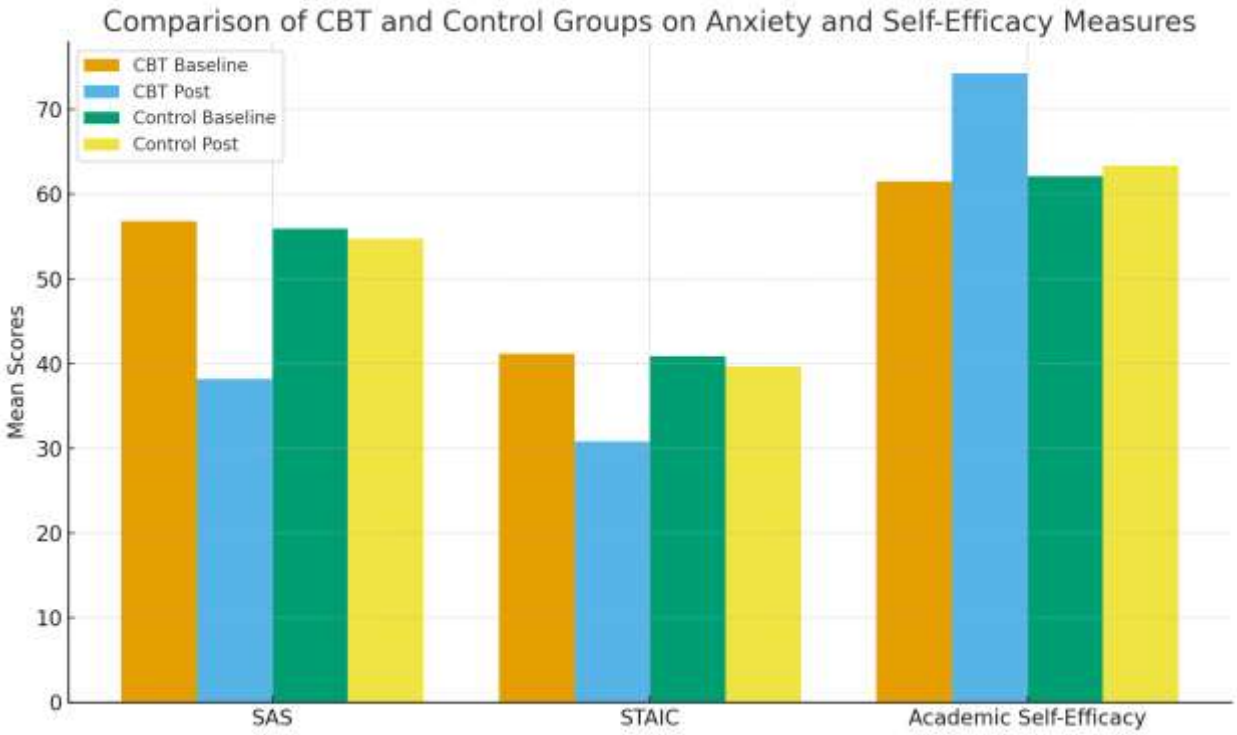

Figure 1 illustrates the pre- and post-intervention mean scores of the Cognitive Behavioral Therapy (CBT) group and the control group across three key psychological measures—School Anxiety Scale (SAS), State-Trait Anxiety Inventory for Children (STAIC), and Academic Self-Efficacy Scale.

As depicted in the figure, participants who received CBT showed a marked decline in both SAS and STAIC scores following the ten-week intervention, indicating a significant reduction in exam-related and general anxiety levels. In contrast, the control group exhibited minimal change between baseline and post-intervention scores, suggesting that anxiety levels remained largely unchanged in the absence of therapeutic intervention.

Additionally, the Academic Self-Efficacy scores of the CBT group increased notably after the intervention, reflecting enhanced confidence, better coping strategies, and a more positive approach to academic challenges. The control group demonstrated negligible improvement in self-efficacy, highlighting the specific effectiveness of CBT in fostering adaptive academic beliefs and emotional regulation.

Discussion

The present study demonstrated that Cognitive Behavioral Therapy (CBT) is an effective intervention for reducing exam-related anxiety and improving academic self-efficacy among adolescents. These findings align with previous literature supporting CBT's efficacy in anxiety management across age groups (1,2). The observed reduction in School Anxiety Scale (SAS) and STAIC scores confirms that CBT successfully modifies maladaptive cognitions, thereby improving emotional regulation.

CBT enables adolescents to challenge dysfunctional beliefs about performance and failure—such as catastrophizing and perfectionism—which are common contributors to exam anxiety. Through cognitive restructuring and relaxation, participants learned to interpret exams as opportunities rather than threats, resulting in reduced physiological arousal and avoidance behaviors (3,4).

The notable improvement in academic self-efficacy parallels findings from Bandura's social cognitive theory, which posits that self-efficacy enhances motivation and achievement. Participants in this study reported improved study planning, better focus, and greater confidence in tackling exams, reflecting both cognitive and behavioral change. These outcomes are consistent with prior school-based interventions demonstrating that CBT improves self-confidence and academic functioning (2,4,5).

Moreover, the results corroborate findings from Andrews et al. (2024) and Ulrich et al. (2025), which emphasize CBT's adaptability in school and technology-based formats (4,5). By integrating CBT into educational environments, schools can address academic stress systematically and cost-effectively.

While the study's small sample size and short follow-up period limit generalizability, its implications are noteworthy. School-based CBT can serve as a preventive tool for exam-related stress, promoting emotional well-being and resilience. Future research should include larger samples, extended follow-ups, and

digital CBT modules for broader accessibility and long-term outcome evaluation (3–5).
In summary, this study contributes to growing evidence that structured CBT not only mitigates exam-related anxiety but also fosters sustained emotional stability and academic self-belief among adolescents (1–5).

Conclusion

The findings of this randomized controlled trial provide compelling evidence that Cognitive Behavioral Therapy (CBT) is an effective and feasible intervention for reducing exam-related anxiety and enhancing academic self-efficacy among adolescents. By addressing both the cognitive and behavioral components of anxiety, CBT equips students with adaptive coping strategies that improve not only emotional well-being but also academic confidence and performance.

Participants who underwent the structured ten-week CBT program demonstrated significant reductions in both exam-specific and general anxiety, accompanied by meaningful improvements in academic self-efficacy. These results underscore CBT's dual benefit in modifying maladaptive thought patterns and fostering a sense of control and competence in the academic environment. The intervention's focus on cognitive restructuring, relaxation, and problem-solving allowed students to reinterpret exams as manageable challenges rather than overwhelming threats, thereby reducing avoidance behaviors and physiological stress responses.

From an educational standpoint, the outcomes highlight the urgent need for school-based mental health initiatives that go beyond crisis management to emphasize prevention and resilience-building. The implementation of CBT modules within school settings can provide adolescents with lifelong emotional regulation skills, reduce the stigma surrounding mental health, and contribute to a more supportive learning environment. Such programs are particularly relevant in the Indian context, where academic stress is pervasive and access to mental health professionals in schools remains limited.

Moreover, the positive effects observed in this study suggest that CBT interventions can be adapted into group and digital formats, enhancing scalability and accessibility for students across diverse educational settings. Future research should focus on longitudinal studies to evaluate the sustainability of these benefits and explore hybrid models that integrate face-to-face and technology-assisted CBT delivery.

In conclusion, Cognitive Behavioral Therapy offers a structured, evidence-based, and cost-effective approach to managing exam-related anxiety among adolescents. Incorporating CBT into school curricula and student wellness programs can play a transformative role in promoting psychological resilience, emotional stability, and academic success. The study's results advocate for a paradigm shift toward proactive, skills-based mental health interventions that empower adolescents to navigate academic pressures with confidence, balance, and mental strength.

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