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Effectiveness of Combined Relaxation and Systemic Desensitization to Reduce Examination Anxiety in Indian School-Going Adolescents

Anuradha Upadhyay[1], Prof. R.K. Sharma[2]*, Dr. Pooja Kaushik[3], Dr.Deepak Raghav[4] and Dr. Rashi Bhargava[5]

[1]Master of Occupational Therapy (Paediatrics) student, Santosh College of Occupational Therapy, Ghaziabad

[2]Dean, Paramedical and Principal, Santosh College of Occupational Therapy,Ghaziabad

[3]Assistant Professor, Department of Occupational Therapy, Santosh College of Occupational Therapy, Ghaziabad

[4]Professor/Principal, Department of Physiotherapy, Santosh Paramedical College and Hospital, Ghaziabad, India

[5]Assistant Professor, Department of Paediatrics, Santosh Medical College, Santosh Deemed to be University, Ghaziabad, India

ABSTRACT

Examination-related anxiety significantly impacts adolescents' academic performance and psychological well-being. This quasi-experimental study evaluated a combined intervention using Schultz's Autogenic Training and systematic desensitization in reducing examination-related anxiety among Indian school-going adolescents aged 14–16 years. A total of 80 students from Grades 8 to 10 at St. John's Public School, diagnosed with test anxiety, were selected through convenience sampling. The intervention spanned 15 days, including 10 sessions (two offline and three online per week) of 30 minutes each, integrating interactive discussions, relaxation training, and systematic desensitization techniques. Anxiety levels were pre- and post-evaluated using the Westside Test Anxiety Scale, Hamilton Anxiety Rating Scale, and the Fear Thermometer. Post-intervention results demonstrated a statistically significant reduction in anxiety: Westside Test Anxiety scores decreased from 4.33 ± 0.48 to 2.97 ± 0.27, Hamilton scores reduced from 24.94 ± 3.26 to 16.69 ± 3.25, and Fear Thermometer scores dropped from 8.55 ± 1.05 to 5.46 ± 1.08 ,with all results achieving high statistical significance ($p < 0.0001$). The reductions were consistent across gender and grade levels, indicating broad applicability. These findings underscore the efficacy of a structured mental health approach in mitigating exam-related anxiety. Incorporating such interventions into school-based programs may enhance students' resilience, academic outcomes, and psychological health.

KEY WORDS: DADOLESCENTS, AUTOGENIC TRAINING, EXAMINATION ANXIETY, SYSTEMATIC DESENSITISATION, SCHOOL-BASED INTERVENTION.

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INTRODUCTION

Examination anxiety is a prevalent psychological concern among adolescents, particularly within academic

settings1. It manifests as a performance-related form of anxiety, characterised by worry, fear of failure, and physiological symptoms such as restlessness, palpitations, and disturbed sleep, all of which can negatively affect academic performance and overall well-being2,3. While moderate levels of anxiety may enhance motivation, excessive anxiety impairs concentration, working memory, and cognitive processing, ultimately hindering academic success4.

In India, the issue is further exacerbated by an intensely outcome-focused education system and strong societal pressure to succeed academically. Students often face high expectations from parents, teachers, and peers, leading to feelings of inadequacy, self-doubt, and, in extreme cases, school avoidance or suicidal ideation5,6. Socioeconomic disparities, rigid exam structures, and limited access to mental health resources compound the problem7.

Various cognitive and behavioral factors contribute to the onset and persistence of exam anxiety, including fear of failure, perfectionism, low academic self efficacy, and poor study habits8,9. Chronic anxiety can also diminish students' confidence, social participation, and emotional resilience, with long-term consequences such as depression or generalized anxiety disorders10.

Non-pharmacological interventions—such as deep breathing, guided imagery, progressive muscle relaxation, and systematic desensitization—have been shown to significantly reduce exam-related anxiety by addressing both physiological arousal and maladaptive thought patterns7,11. These interventions enhance self-regulation, reduce autonomic stress responses, and improve academic engagement. Despite growing evidence, school-based mental health programs in India remain underdeveloped, and stigma often prevents adolescents from accessing available support12.

The present study aims to explore the combined effects of relaxation training and systematic desensitization in managing examination anxiety. By targeting both cognitive and physiological components, this integrated approach has the potential to enhance coping skills, reduce academic stress, and improve overall student performance and psychological well-being.

MATERIAL AND METHODS

A quasi-experimental research design was used to evaluate the effects of relaxation training and systematic desensitization techniques on reducing examination-related anxiety among adolescents. Ethical clearance was obtained from the Institutional Ethics Committee of Santosh College of Occupational Therapy (Ref No. SCOT/NOV-24/ECPEADS-06), and permission to conduct the study was granted by St. John's Public School, Greater Noida (West). All participants were fully informed about the study's purpose and procedures, and written informed consent was obtained prior to participation. To ensure better accessibility and participation, intervention sessions were conducted both offline (at school) and online (virtually).

Using Cochran's formula with a 95% confidence level and 5% margin of error, the minimum sample size was calculated to be approximately 80 participants. A total of 80 adolescents, aged 14 to 16 years and enrolled in grades 8 to 10, were selected via convenience sampling based on availability and willingness to participate. The inclusion criteria were students aged 14–16 years from Grades 8 to 10, of both genders, with self-reported examination anxiety. Exclusion criteria included a history of serious medical illness and the presence of diagnosed learning disabilities. In this design, relaxation and systematic desensitization techniques served as the independent variables, while examination anxiety was the dependent variable. The intervention spanned 15 days, including pre-intervention assessment, 10 intervention sessions, and post-intervention assessment. Participants attended five sessions per week, with two offline and three online sessions. Each session lasted 30 minutes, divided into 6 minutes of interaction, 12 minutes of relaxation training using Schultz's Autogenic Training, and 12 minutes of systematic desensitisation exercises.

The study design and therapeutic approach were informed by previous research demonstrating the effectiveness of occupational therapy interventions in managing performance-related anxiety, such as fear of public speaking in school-aged children13.

Outcome Measures: The following outcome measurements were taken at baseline and again after 15 days of training. The assessment tools included the WTAS, a 10 item self report instrument designed to assess worry and performance-related impairment in test anxiety, and the HAM A, a 14 item clinician-rated scale evaluating both psychological and somatic anxiety symptoms, widely used and supported by strong reliability and validity evidence14 and Fear Thermometer is a straightforward visual analogue scale ranging from 0 to 10, enabling children and adolescents to effectively express their anxiety levels. It has demonstrated strong face validity and correlates well with standardized anxiety assessment tools15.

RESULTS

Table 1.0. Test of Normality (Shapiro–Wilk Test)

Variable	Shapiro-Wilk Statistic	p-value
Westside Test Anxiety Scale Pre	0.933	0.0004***
Westside Test Anxiety Scale Post	0.957	0.0089**
Hamilton Anxiety Rating Scale Pre	0.931	0.0003***
Hamilton Anxiety Rating Scale Post	0.920	0.0001***
Fear Thermometer Score Pre	0.871	<0.0001***

**p < 0.01, ***p < 0.001 (statistically significant).

Table 1.0 presents the results of the Shapiro–Wilk test, which was conducted to assess the normality of data distributions for each variable. The findings revealed that both pre- and post-intervention scores on the Westside Test Anxiety Scale, Hamilton Anxiety Rating Scale, and Fear Thermometer significantly deviated from normality ($p < 0.01$ or $p < 0.001$). As a result, non-parametric statistical tests were deemed appropriate and used for further analysis.

Table 2.0. Age Comparison Between Genders (Mean ± SD)

Gender	Mean Age ± SD	p-value
Male	14.86 ± 0.77	0.745
Female	14.92 ± 0.83	

The mean age of male participants was found to be 14.86 years with a standard deviation of 0.77, while the mean age of female participants was 14.92 years with a standard deviation of 0.83. The difference in mean age between the genders was minimal and statistically analysed using an independent samples t-test.The resulting p-value of 0.745 indicates that the observed difference in age between male and female participants is not statistically significant ($p > 0.05$).

Table No. 3. Grade Distribution of Subjects

Grade	Count	Percentage (%)
8	30	37.50%
9	29	36.25%
10	21	26.25%

Table No. 3 shows Grade Distribution of Subjects provides a summary of the participants' academic grade levels, offering insights into the representation of each grade within the study sample. Among the total of 80 adolescent participants, Grade 8 students constituted the largest proportion, with 30 students accounting for 37.50% of the sample. This was closely followed by Grade 9, which included 29 students or 36.25% of the total, and Grade 10, which comprised 21 students or 26.25%.

Pre–post intervention comparisons were evaluated using the Wilcoxon signed-rank test.Pre–post intervention analysis showed highly significant reductions in anxiety scores across all tools (Table 4.0). The Westside Test Anxiety Scale decreased by a mean of 1.36 points ($p< 0.0001$), the Hamilton Anxiety Rating Scale by 8.25 points ($p < 0.0001$), and the Fear Thermometer by 3.09 points ($p < 0.0001$).

Table 5 presents a grade-wise comparison of anxiety and fear scores before and after the intervention.Grade-wise and gender-wise comparisons were analyzed using the Kruskal–Wallis test and Mann–Whitney U test, respectively. Pre-intervention Westside Test Anxiety Scale scores showed a significant difference across grades ($p = 0.0353$), with Grade 10 students reporting the highest anxiety, likely due to academic pressure and board exam stress. Post-intervention scores, however, showed no significant difference ($p = 0.1105$), indicating uniform effectiveness of the intervention.

For the Hamilton Anxiety Rating Scale, both pre- and post-intervention scores showed no significant differences across grades ($p = 0.1746$ and $p = 0.7950$, respectively), suggesting comparable general anxiety levels and response to treatment. Similarly, Fear Thermometer scores did not significantly differ across grades (Pre: $p = 0.5083$), supporting the intervention's equal impact across academic levels.

Table 4.0: Pre–Post Comparison of Anxiety Tools

Tool	Pre-Intervention (Mean ± SD)	Post-Intervention (Mean ± SD)	Mean Difference	p-value
Westside Test Anxiety Scale	4.33 ± 0.48	2.97 ± 0.27	1.36	<0.0001*
Hamilton Anxiety Rating Scale	24.94 ± 3.26	16.69 ± 3.25	8.25	<0.0001*
Fear Thermometer Score	8.55 ± 1.05	5.46 ± 1.08	3.09	<0.0001*

Table No. 5. Grade-wise Comparison of Anxiety and Fear Scores

Tool	Grade 8 (Mean ± SD)	Grade 9 (Mean ± SD)	Grade 10 (Mean ± SD)	p-value
Westside Test Anxiety Scale (Pre)	4.16 ± 0.48	4.39 ± 0.42	4.49 ± 0.49	0.0353
Westside Test Anxiety Scale (Post)	2.99 ± 0.30	2.89 ± 0.23	3.05 ± 0.25	0.1105
Hamilton Anxiety Rating Scale (Pre)	25.23 ± 3.04	24.07 ± 3.16	25.71 ± 3.57	0.1746
Hamilton Anxiety Rating Scale (Post)	16.37 ± 2.92	16.86 ± 3.59	16.90 ± 3.33	0.7950
Fear Thermometer Score (Pre)	8.70 ± 1.12	8.38 ± 1.12	8.57 ± 0.87	0.5083

Table No. 6: Gender-wise Comparison of Anxiety and Fear Scores			
Tool	**Male (Mean ± SD)**	**Female (Mean ± SD)**	**p-value**
Westside Test Anxiety Scale (Pre)	4.24 ± 0.45	4.43 ± 0.50	0.0829
Westside Test Anxiety Scale (Post)	2.96 ± 0.26	2.98 ± 0.28	0.7847
Hamilton Anxiety Rating Scale (Pre)	25.30 ± 3.26	24.51 ± 3.25	0.2831
Hamilton Anxiety Rating Scale (Post)	17.33 ± 3.29	15.95 ± 3.08	0.0580
Fear Thermometer Score (Pre)	8.49 ± 1.14	8.62 ± 0.95	0.5763

Table No. 6 provides a gender-wise comparison of anxiety and fear scores before and after the intervention. Pre-intervention, females showed slightly higher test anxiety (Westside: 4.43 ± 0.50) than males (4.24 ± 0.45), though not statistically significant ($p = 0.0829$). Post-intervention scores were nearly identical for both genders, indicating equal effectiveness ($p = 0.7847$). For general anxiety (HAM-A), males scored slightly higher pre-intervention, but post-intervention, females showed marginally greater improvement ($p = 0.0580$). Fear levels were comparable across genders both before and after intervention, with no significant differences ($p > 0.05$).

DISCUSSION

The present study evaluated the effectiveness of a combined intervention—relaxation training using Schultz's Autogenic Training and systematic desensitization—in reducing examination-related anxiety among Indian adolescents. The findings demonstrated significant reductions across all outcome measures, confirming the efficacy of this dual therapeutic approach in addressing both cognitive and physiological symptoms. Post-intervention scores decreased notably across all tools: the Westside Test Anxiety Scale dropped from 4.33 ± 0.48 to 2.97 ± 0.27, the Hamilton Anxiety Rating Scale from 24.94 ± 3.26 to 16.69 ± 3.25, and the Fear Thermometer from 8.55 ± 1.05 to 5.46 ± 1.08,with all results achieving high statistical significance ($p < 0.0001$). These results highlight the intervention's effectiveness in reducing both cognitive worry and physiological symptoms.

Grade-wise comparisons revealed that although Grade 10 students initially showed higher anxiety (Westside Pre: 4.49 ± 0.49), post-intervention scores across Grades 8–10 converged (range: 2.89–3.05, $p = 0.1105$), indicating the program was equally effective across academic levels.

The decrease in Westside Test Anxiety scores highlights the intervention's role in alleviating cognitive interference and performance-related worry, while improvements in the Hamilton Anxiety Rating Scale reflect reduced somatic symptoms such as tension and restlessness. The decline in Fear Thermometer scores further indicates better emotional regulation and diminished anticipatory fear. Recent studies report that students in higher grades, especially those preparing for board examinations, tend to exhibit elevated anxiety levels—findings consistent with the present study's grade-wise baseline results16. Importantly, post-intervention scores showed convergence across grades, suggesting the intervention's broad effectiveness.

Additionally, gender differences in anxiety intervention outcomes appear minimal, with both boys and girls benefiting, though females may show slightly greater responsiveness due to higher internalising tendencies17, consistent with current findings. The multidimensional nature of academic anxiety, encompassing physiological and emotional symptoms, has been emphasised in recent literature18. This is supported by moderate pre-intervention correlations between general anxiety and fear scores in this study. The reduction of these correlations post-intervention suggests the therapeutic model effectively addressed multiple anxiety domains independently.

Despite these promising results, the study has several limitations. It was confined to a single school with a small convenience sample, lacked a control group, and did not include long-term follow-up, which limits conclusions about the sustainability of the intervention's effects. Additionally, the reliance on self-reported data and the inability to isolate the specific contributions of relaxation training versus systematic desensitization further constrain the findings. To address these issues, future research should incorporate control groups, extend the duration of the intervention, and include long-term follow-up assessments. Moreover, recruiting larger and more diverse samples from multiple schools would enhance the generalizability of the results and provide a deeper understanding of the intervention's efficacy.

CONCLUSION

The study found that a combined intervention of relaxation training and systematic desensitization significantly reduced examination-related anxiety among adolescents. Scores on the Westside Test Anxiety Scale, Hamilton Anxiety Rating Scale, and Fear Thermometer showed marked improvement post-intervention (all $p < 0.0001$). Grade-wise analysis revealed initially higher anxiety in Grade 10 students, but post-intervention scores were comparable across all grades, indicating consistent effectiveness. Gender-wise differences were minimal, though females showed slightly greater improvement in general anxiety. Overall, the

intervention proved effective in addressing both cognitive and physiological symptoms of anxiety, supporting its use in school-based mental health programs for adolescents.

Ethical Clearance:
Ref No. SCOT/NOV-24/ECPEADS-06,13/11/2024.

Conflict of interest statement: NONE.

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