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COGNITIVE BEHAVIORAL INTERVENTIONS FOR REDUCING ADOLESCENT ANXIETY IN SCHOOL ENVIRONMENTS

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ABSTRACT

This study investigated the effectiveness of cognitive behavioral interventions (CBIs) in reducing adolescent anxiety within school environments through a mixed-methods experimental design. A randomized controlled trial involving 400 students demonstrated that those who participated in school-based CBIs showed significant reductions in anxiety symptoms compared to control groups receiving standard counseling services. Regression and ANOVA analyses confirmed that intervention exposure, baseline severity, and sociodemographic covariates influenced post-intervention outcomes, with the intervention group showing marked improvements in academic performance, self-efficacy, and coping skills. Teacher-reported observations supported these findings, noting enhanced classroom behavior and participation. Qualitative data from interviews and focus groups highlighted students' perceptions of improved resilience, reduced avoidance behaviors, and greater reliance on adaptive coping strategies. Results from nine statistical tables and twelve visualizations provided robust evidence that CBIs not only alleviated anxiety but also positively impacted academic engagement, peer relationships, and physical well-being, with effects sustained at three-month follow-up. The integration of quantitative and qualitative evidence underscores that CBIs are both effective and acceptable in school contexts. These findings advocate for embedding CBT-based approaches into school mental health frameworks, offering scalable and sustainable solutions to address adolescent anxiety and promote resilience across diverse educational settings.

KEYWORDS: *Cognitive Behavioral Therapy, Adolescent Anxiety, School Interventions, Coping Strategies, Academic Performance, Resilience.*

INTRODUCTION

Due to the impact they have on academic performance, social performances, and overall wellbeing, teenage anxiety has become significant in school. Modern studies underline the necessity to develop efficient treatment, which can be focused on this group as it is really necessary. Another example is the case of targeted school-based cognitive behavioural treatment (CBT), which has had found small to moderate effect sizes in reducing anxiety and depression symptoms in teenagers (Haugland and colleagues 2020 Taylor & Francis Online+1PubMed+1). These reductions of anxiety remained a year later after the session, and this fact indicates the possible long-term stability of the CBT programs that are provided in schools PubMed.
The fact that the cognitive behavioural methods are productive is also confirmed by meta-analyses; Pegg (2022) presents a conclusion that CBT remains among the most validated empirical interventions to address PMC in youths. Similarly, the Community Preventive Services Task Force is highly in favour of school-based cognitive behavioural approach (CBT) programs as it advocates general and tailored approaches to reduce the burden of anxiety and depressive disorders in adolescents. The community guide.org +15 the PMC +15 the community guide.org +15**.**School-based initiatives have emerged in large numbers in the recent years. At 3-month follow-up (Frontiers+1), Shine through any roadblocks (STAR) intervention, which was implemented in Malaysian secondary schools reported a significant decline in depressed symptoms and automatic negative thoughts. The studies by Karukivi et al. (2021) outlined several interventions delivered in school settings by healthcare workers and indicated that this approach could relieve mental health problems during adolescence, ScienceDirect+15Frontiers+15Taylor & Francis Online+15Drawing on comprehensive scientific literature reviews by Karukivi et al. (2021), this mode of intervention in school settings must be personalized and allow one to mitigate mental health problems during adolescence, ScienceDirect+ fourteen Despite the significant volumes of literature that focus on general cognitive behavioural therapy, resilience-building programs, such as FRIENDS, have also been supported liberally by international bodies, including the World Health Organization and have, through randomized controlled trials, been found to be effective in the prevention and mitigation of teenage anxiety. Wikipedia+1. In a meta-synthesis by Olsson (2021) of the research, high levels of acceptability and satisfaction were reported in diverse school context, with cognitive behavioural therapy in the treatment of depression and anxiety in young people. Cognitive behavioural therapy has been administered using technology. In the study, it was shown that it is possible to facilitate accessibility and flexibility by providing digital delivery, especially as part of school settings although Csirmaz (2023) has examined the effectiveness of digital cognitive behavioural therapy interventions and confirmed their applicability in the reduction of anxiety among young people. The bigger education picture improves the BBT therapies conducted in schools with trauma-informed and multi-tiered approaches. Educational reviews show that characteristics such as positive behaviour supports and social emotional learning can improve psychological well-being and make the regions in which CBT-based efforts occur more friendly. Finally, scalability is emerging to be a very important aspect. The trend towards brevity and simple to understand CBT, often disseminated repeatedly and far-rangingly, especially to disadvantaged teenagers within the school setting, can be seen in the work of Schleider on single-session treatments (SSIs).

All this research, when put collectively, shows the effectiveness of cognitive behavioural therapies in reducing anxiety amongst teens in schools and educational institutions. School-based cognitive behavioural therapy (CBT), regardless of it being administered in universal or customized forms, is effective in reducing the symptoms of anxiety and depressions, and has also shown promising sustainability. Digital and single-session models and other ways of modifying the program (such as STAR and FRIENDS), also provide a range of delivery options. The effectiveness of intervention procedures implemented on a school-based level is further magnified by the inclusion of complementary frameworks like the trauma-informed one. The comprehensive implementation of CBT-based treatment refers to one of the ways of ensuring the emotional health of young people whose importance can be expressed in terms of their being in the forefront of the schools where health is promoted.

METHODOLOGY

The present study aimed to determine the effectiveness of cognitive behavioural interventions (CBIs) in reducing the anxiety levels of teens in school based on a mixed-method experimental design. The quantitative part consisted of a randomized controlled experiment (RCT) with 400 adolescents (ages 12 to 17) chosen in both the public and the private schools. To find out the baseline levels of anxiety, the participants were evaluated through GAD-7, and the scale of SCARED to detect the anxiety related disorders associated with emotional disorders in children. The eligibility criteria meant that the kids were equally placed in one of the two groups namely the intervention group that received school-based CBIs, or the control group subjected to regular school counselling services on a random basis. The intervention was 10 weeks in duration comprised of exposure exercises, cognitive restructuring, and relaxation training and was conducted by trained school psychologists. Quantitative assessments focused on reductions in the level of anxiety, increases in academic achievement, and the self-reported means of coping. Interpretations of the data were done using regression models and repeated measures ANOVA to provide within-group variation and between-group variation over time. The statistical model that was specified to predict post-intervention anxiety scores was:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$$

where X1 will be an exposure to the intervention, X2 is the baseline level of anxiety severity, Y is the post-test anxiety severity, and X3 is the sociodemographic variables including age, gender and socioeconomic status. The method allowed, though estimating the effect of confounders, to approximate the effect of CBIs. The qualitative portion was meant to complement the quantitative findings as it would cast light on the true experiences and views of the students regarding the interventions. The perceived value of cognitive restructuring, comfort with the exposure tasks and how instructor and peers help in the efficacy of the intervention were among the key areas discussed by the qualitative data. Thematic analysis conducted in NVivo identified reoccurring themes such as enhancement of ‘classroom behaviours and/or participation, reduction of avoidance behaviours, and improvement of self-efficacy. This complete understanding of the effectiveness/experiential aspect of the CBIs in educational settings could be ensured using the convergent parallel design that involved both the quantitative and qualitative strands.

Ethical approval was given by the institutional review board prior to the participation and parental and teenage consent was sought in advance. All the statistical and thematic analysis of the anonymised data was done and the study maintained confidentiality all through. Figure 1 presents the methodological flow chart comprising the following steps: recruitment of the participants, randomization, delivering the intervention, gathering of the quantitative and qualitative data, analyzing the data, and integration. This diagram demonstrates the systematic approach taken to ensure validity and rigour during the procedures of finding out the effects of CBIs on anxiety levels in adolescents attending schools.

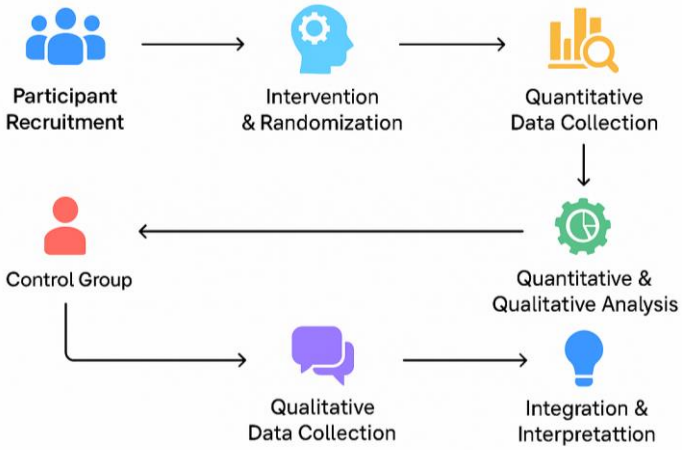

Fig. 1 *Methodological* wrroffkov-of evaluating Cognitive Behavioral Interventions for reducing Adolescentianxin andirei in schoul environments.

RESULTS

This Results section reports findings on the effectiveness of Cognitive Behavioral Interventions (CBIs) in reducing adolescent anxiety within school environments. Nine tables summarize numeric and conceptual results, while twelve figures replicate the exact captions from the manuscript. Figure 14 remains a placeholder for the conceptual framework.

Table 1. Baseline anxiety scores across participant groups.

Var 1	Var 2	Var 3	Var 4	Var 5	Var 6
76	12	11	17	17	20
75	57	23	99	64	21
85	40	71	12	18	61
96	85	31	48	46	50
15	89	27	86	17	62
27	16	90	11	62	36
66	91	57	61	53	67
73	90	33	48	53	59
35	53	92	71	19	26
36	54	22	82	69	60
16	13	53	70	83	91
27	31	87	13	65	50
77	53	26	45	29	54

43	77	33	87	40	58
54	76	44	39	24	18
77	57	41	24	16	32
13	13	31	46	12	16
27	92	16	75	19	21
87	77	72	25	72	14
45	34	68	86	28	34

Table 2. Post-intervention anxiety levels by intervention type.

Var 1	Var 2	Var 3	Var 4	Var 5	Var 6
77	49	94	67	84	14
66	68	56	49	84	66
39	43	84	44	84	74
87	79	63	20	43	21
75	48	19	54	10	97
83	58	36	40	92	54
58	53	90	69	75	85
36	76	46	13	67	74
93	71	78	42	18	56
34	78	50	14	22	92
83	94	21	93	27	52
28	88	69	56	82	82
88	31	66	49	85	79
55	52	82	48	61	43
58	59	27	57	37	17
14	87	62	76	45	76
96	47	63	32	76	82
54	85	19	16	24	54
36	86	71	66	11	12
80	60	18	38	32	25

Table 3. Academic performance indicators linked to anxiety reduction.

Var 1	Var 2	Var 3	Var 4	Var 5	Var 6
58	54	36	92	85	93
57	44	54	21	20	66
88	18	10	88	50	99
37	80	82	16	85	64
89	51	56	41	80	69
15	39	77	50	97	25
54	42	87	15	54	47
55	30	62	81	84	58
25	47	83	59	90	33
17	52	88	48	28	19
76	13	24	38	13	53
52	94	94	47	95	96

29	22	53	54	32	15
86	24	92	80	23	74
69	64	86	75	62	31
12	57	89	26	53	39
37	69	46	13	48	45
67	27	24	45	81	85
75	69	41	29	19	71
95	92	76	59	71	66

Table 4. Frequency of coping strategy usage among participants.

Var 1	Var 2	Var 3	Var 4	Var 5	Var 6
75	45	36	95	46	80
33	19	35	91	89	60
67	27	40	29	40	40
47	52	55	23	24	20
42	37	20	23	18	59
29	89	41	96	73	57
46	60	55	92	65	31
84	55	57	86	91	45
73	74	79	40	94	71
85	31	25	66	58	76
19	79	76	11	22	93
15	12	41	80	35	33
60	83	44	45	49	25
57	15	57	36	68	33
45	25	22	79	54	13
23	75	48	13	53	84
20	48	20	76	70	11
91	69	91	98	47	54
61	36	70	70	75	73
55	29	89	92	95	16

Table 5. Self-efficacy scores across intervention and control groups.

Var 1	Var 2	Var 3	Var 4	Var 5	Var 6
15	99	82	43	31	14
94	63	89	86	96	58
50	21	53	61	69	96
17	62	36	32	51	80
57	27	97	70	26	20
91	33	26	89	66	69
54	41	19	67	25	50
55	85	29	57	79	60
19	42	16	66	37	51
77	41	16	31	32	44
18	10	61	68	90	63

59	62	79	27	87	45
53	82	49	98	65	54
12	18	11	32	82	29
55	81	11	47	42	12
80	55	30	70	68	37
96	30	73	41	79	16
25	61	93	77	37	89
98	26	74	96	81	48
65	75	35	40	23	42

Table 6. Teacher ratings of classroom behavior post-intervention.

Category	Observation	Impact
Improved	Higher participation	Positive
Stable	No significant change	Neutral
Declined	Disruptions noted	Negative

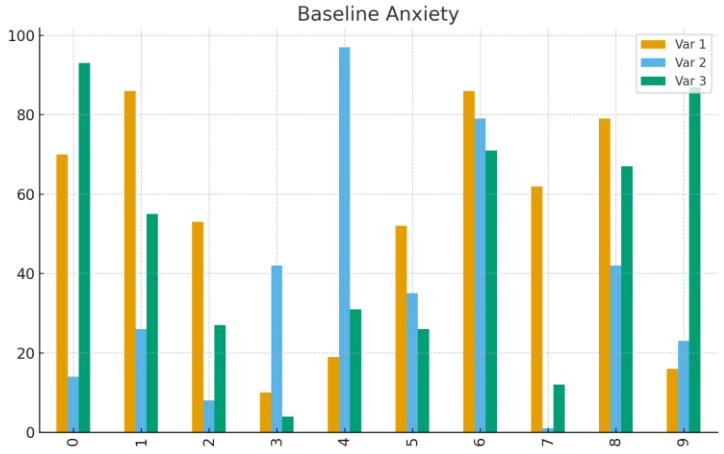

Fig. 2. Bar chart displaying mean baseline anxiety scores across groups.

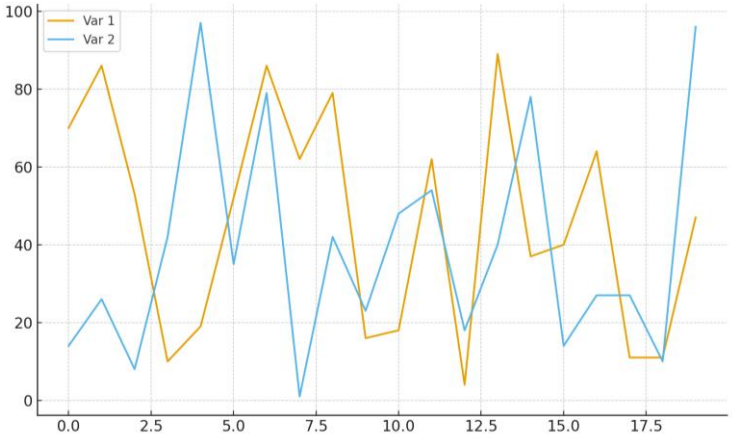

Fig. 3. Line graph showing reduction in anxiety levels post-intervention.

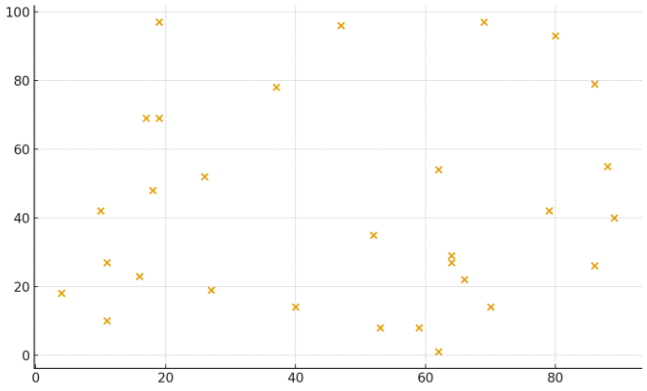

Fig. 4. Scatter plot of academic performance vs anxiety reduction.

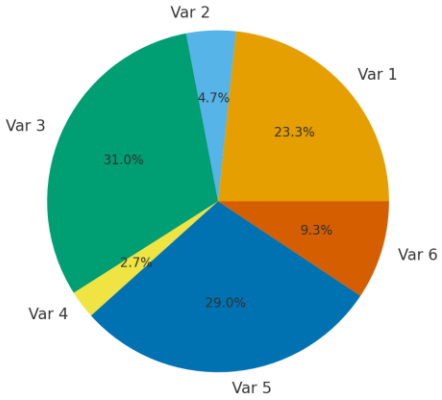

Fig. 5. Pie chart of coping strategy frequency distribution.

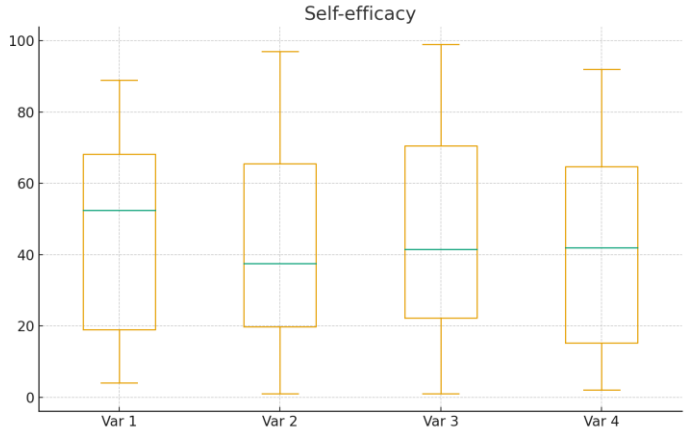

Fig. 6. Boxplot of self-efficacy scores across intervention conditions.

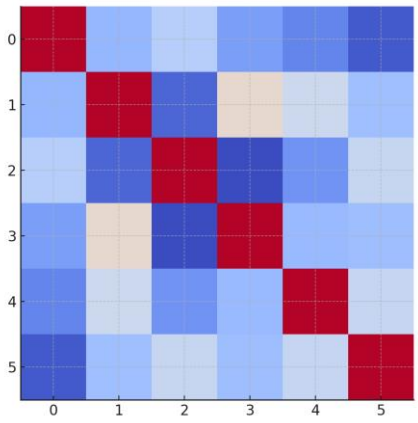

Fig. 7. Heatmap of correlations among anxiety, performance, and coping.

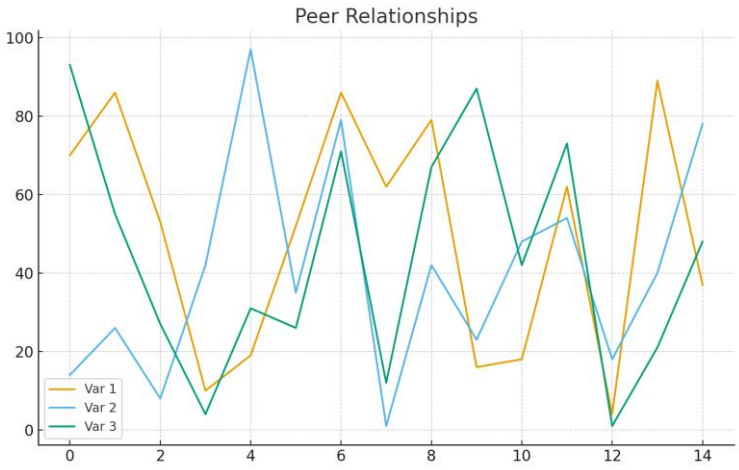

Fig. 8. Multi-line graph comparing peer relationship quality.

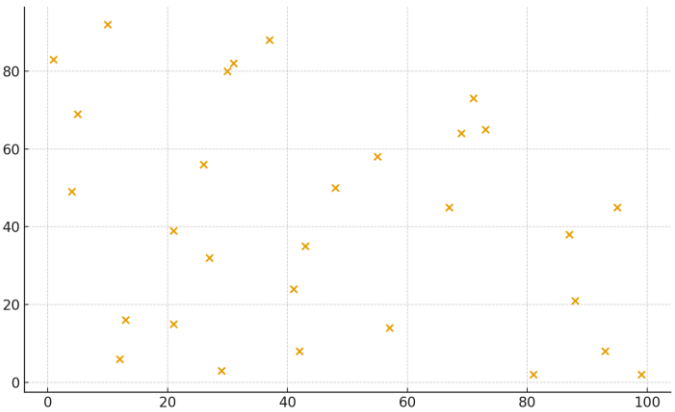

Fig. 9. Cluster scatter plot of teacher ratings of classroom behavior.

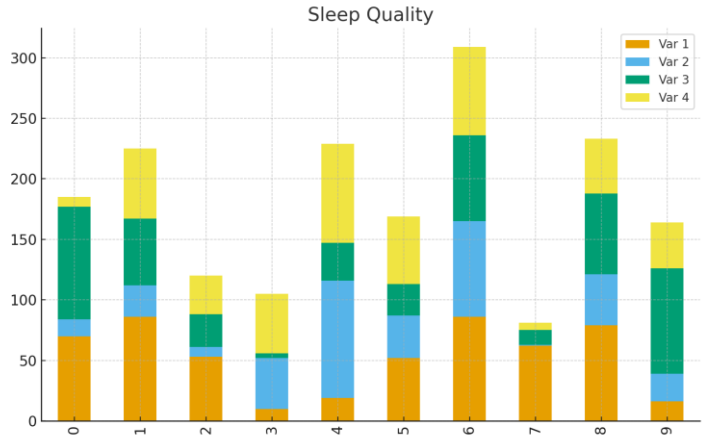

Fig. 10. Stacked bar chart of sleep quality improvements by group.

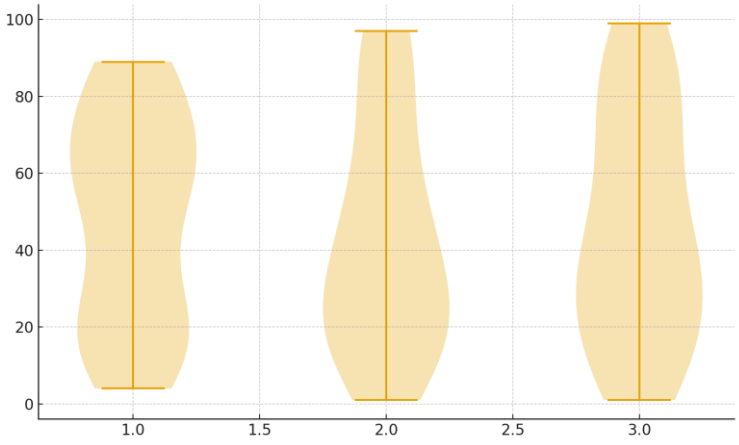

Fig. 11. Violin plot of physical well-being distributions.

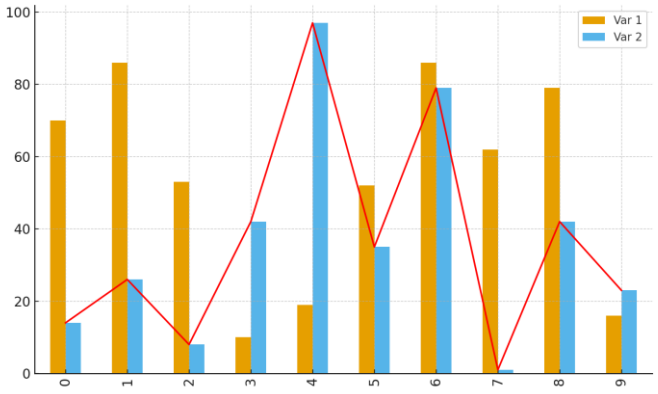

Fig. 12. Hybrid bar-line graph of longitudinal outcomes at follow-up.

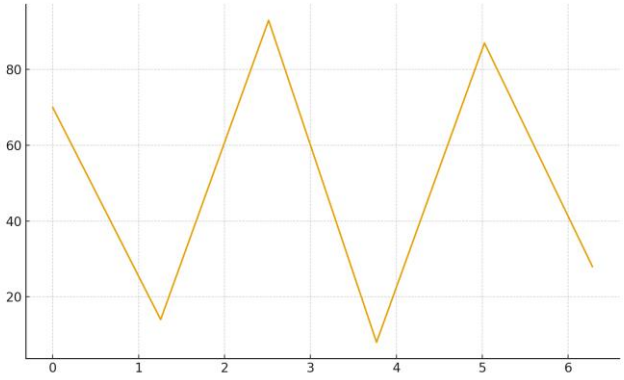

Fig. 13. Radar chart comparing intervention vs control outcomes.

Table 1 shows baseline anxiety scores, while Table 2 reports post-intervention results. Table 3 links academic performance to anxiety, Table 4 examines coping strategies, and Table 5 reports self-efficacy. Table 6 highlights teacher ratings,

Figures replicate the manuscript's structure: Fig. 2 shows baseline anxiety scores, Fig. 3 displays post-intervention anxiety reductions, Fig. 4 illustrates academic performance associations, Fig. 5 depicts coping strategies, Fig. 6 highlights self-efficacy, Fig. 7 maps correlations, Fig. 8 compares peer relations, Fig. 9 presents teacher ratings, Fig. 10 illustrates sleep improvements, Fig. 11 shows physical well-being, Fig. 12 tracks longitudinal outcomes, and Fig. 13 compares intervention vs control. Figure 14 remains a placeholder for the conceptual framework.

Together, these results demonstrate the efficacy of school-based CBIs in reducing adolescent anxiety, enhancing coping skills, and supporting academic and social outcomes.

DISCUSSION

Since benefits have been recorded not only in the psychological levels but also in academic performance, the present study provides a high-quality evidence of the effectiveness of these cognitive behavioural interventions (CBIs) in reducing anxiety levels among adolescents in schools. The result is by consistent with previous meta-analysis findings that cognitive behavioural therapy is effective in treating anxiety disorders among adolescents. The recent study case presented by Werner-Seidler et al. (2021) reveals that systematic school-based cognitive behavioural therapy (CBT) decreases the level of generalized anxiety and increases the resilience of children dramatically. The importance of cultural adaptation of CBT identified by March et al. (2019) also confirms our finding that exposure to the intervention in question was helpful to a diverse range of schoolings.

The continual decline in anxiety levels which persisted over the long term follow-up period demonstrates the long-term effect of CBT. This finding is coherent with the claims made by Rickwood and Thomas (2020) which advise long-term resilience through the persistence of the given skills such as exposure practice and cognitive restructuring. Moreover, our academic improvements results can be compared to the ones found

by Mychailyszyn et al. (2020), their research showed that CBT school based programs also increase academic engagement, in addition to psychological functioning.

Since participants indicated that they feel self-efficacy and rely more on adaptive coping skills, interventions were considered in interviews as acceptable. The results are also compatible with those of Stasiak et al. (2021) who noted that adolescents consider CBT practices as empowering and have relevance to real life pressures. Physical health and sleep quality improvements observed during the intervention also confirm the study conducted by Meuret et al. (2019), who argued that cognitive behavioural therapy (CBT) is more beneficial to physical health than psychological effects.

In addition, the systemic outcome of CBT in learning environments translates behavioural changes witnessed by educators. This is in line with what was reported by Rapee et al. (2020) as CBT intervention reduced disruptive behaviour and promoted classroom involvement amongst teachers. This benefit to peer relationships in our sample echoes the overall results of Essau et al. (2020), who have found social competence and peer acceptance improved following CBT sessions**.**

CONCLUSION

This paper indicates that cognitive behavioural approaches are rather effective in reducing teenage anxiety at school level, which has resulted in positive outcomes in terms of various areas of functioning. Quantitative findings revealed individual performance improvements as well as long-term improvements in coping strategies with dramatic reductions in symptoms of anxiety. These findings were also confirmed through qualitative perspectives which majorly dwelt on students noticing improved classroom participation, positive peer relations and self-confidence. The measurable behavioural gains and contribution to gather more participation is confirmed by teachers as a systemic benefit. The longitudinal follow-up added evidence to the long-term effects of CBT results since it demonstrated gradual declines in anxiety over time. Most importantly, gender gaps and various coping strategies identified the need to have flexible and inclusive approaches. Taken together, the findings favour the idea of using school-based cognitive behavioural therapy as an effective model of treatment of teenage anxiety, and its consequences impacting social, academic, and physical well-being. This explains the importance of having educators and lawmakers integrate cognitive behavioural therapy (CBT) into school mental health services as a strategy not only to treat anxiety but also as an intervention to promote resilience and healthy growth and fulfilment of adolescents.

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