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Prevalence of Depression and Anxiety Among Nigerian Adolescents and the Impact of School-Based Cognitive Behavioural Therapy: A Randomized Controlled Trial

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Abstract

Mental health disorders, including depression and anxiety, pose a significant challenge among adolescents in low- and middle-income countries [LMICs] like Nigeria, where access to mental health care is limited. This study evaluated the prevalence of these conditions and the efficacy of school-based Cognitive Behavioural Therapy [CBT] among Nigerian adolescents through a randomized controlled trial [RCT]. 239 adolescents between the ages of 12 and 18 from secondary schools in Abeokuta, Ogun State, were randomly divided into two groups: 120 students participated in a CBT intervention group, while the remaining 119 formed a control group. The CBT programme, delivered by trained school counsellors over three weeks [three 45-minute sessions per week], focused on cognitive restructuring and coping strategies. Pre- and post-intervention assessments used the Patient Health Questionnaire-9 [PHQ-9] and Generalised Anxiety Disorder-7 [GAD-7] scales. Statistical analysis employed repeated measures ANOVA with significance set at $p < 0.05$. Baseline prevalence indicated 46.3% mild and 26.0% moderate depression, and 38.0% mild and 42.4% moderate anxiety. Post-intervention, the CBT group showed a significant reduction in anxiety [$p = 0.001$, Cohen's $d = 3.586$] and a borderline significant reduction in depression [$p = 0.059$, Cohen's $d = 3.856$] compared to the control group. Additional benefits included improved emotional regulation [$p = 0.02$, Cohen's $d = 0.61$] and coping strategies [$p = 0.01$, Cohen's $d = 0.69$], with no significant changes in the control group. In conclusion, School-based CBT is an effective and feasible intervention for reducing anxiety and depression among Nigerian adolescents, with potential for scalability in similar settings. Future studies should explore extended interventions and longitudinal outcomes to optimise impact.

***Keywords**: Adolescent Mental Health Challenges, Cognitive Behavioural Therapy, Randomized Controlled Trial, School-based Mental Health Interventions.*

Introduction

Mental health disorders, particularly depression and anxiety, represent a significant public health challenge among adolescents globally, with profound implications for their development and well-being [1]. Adolescence is a critical period marked by rapid emotional, psychological, and social transitions, rendering young individuals particularly susceptible to these conditions [2]. In low- and middle-income countries [LMICs] like Nigeria, where mental health resources are scarce, the burden is exacerbated by socioeconomic stressors, academic pressures, and limited access to care [3, 4]. Recent studies indicate a high prevalence of depression [up to 46%] and anxiety [up to 42%] among Nigerian adolescents, often

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leading to impaired academic performance, social withdrawal, and increased risk of long-term mental health issues if unaddressed [5, 6].

School-based interventions, such as Cognitive Behavioral Therapy (CBT), have emerged as promising, accessible strategies to mitigate these challenges in resource-limited settings [7, 8]. CBT targets maladaptive thought patterns and behaviours, fostering emotional regulation and coping skills, and has demonstrated efficacy in reducing depressive and anxiety symptoms in diverse adolescent populations [9, 10]. However, evidence from LMICs remains limited, with few randomized controlled trials [RCTs] evaluating school-delivered CBT in Nigeria [11]. This gap is particularly evident in regions like Abeokuta, Ogun State, where cultural stigma and infrastructural barriers hinder mental health support [12].

The present study addresses this void by examining the prevalence of depression and anxiety among adolescents in Abeokuta secondary schools and assessing the impact of a school-based CBT intervention through an RCT. Using validated tools like the Patient Health Questionnaire-9 (PHQ-9) and Generalized Anxiety Disorder-7 [GAD-7], we aimed to quantify baseline symptom levels and evaluate post-intervention changes compared to a control group. This research not only highlights the feasibility of CBT in Nigerian schools but also informs policy for scalable mental health programs, potentially reducing the long-term societal burden of adolescent mental health disorders [13].

Objectives and Hypotheses

This study aims to evaluate the effectiveness of school-based Cognitive Behavioural Therapy (CBT) in reducing depression and anxiety among Nigerian adolescents through a randomized controlled trial (RCT). The following are the specific objectives that direct this research:

1. To assess the current prevalence of depression and anxiety among adolescents in selected secondary schools in Abeokuta, Ogun State.
2. To measure the pre- and post-intervention levels of depression and anxiety symptoms using standardised tools such as the Patient Health Questionnaire-9 (PHQ-9) and Generalised Anxiety Disorder-7 (GAD-7).
3. To compare the effectiveness of the CBT intervention group with a control group receiving no intervention.
4. To analyse the impact of CBT on reducing depressive and anxiety symptoms among adolescents over a defined period using statistical methods such as repeated measures ANOVA and linear regression models.

The study tests the following hypotheses:

1. H1: There is a significant prevalence of depression and anxiety symptoms among adolescents in the selected school settings.
2. H2: Adolescents who participate in CBT interventions will show a significant reduction in depression and anxiety symptoms, as measured by standardised tools like PHQ-9 and GAD-7, compared to their baseline levels.
3. H3: Adolescents in the CBT intervention group will experience a greater reduction in depression and anxiety symptoms compared to those in the control group receiving no intervention.
4. H4: The CBT intervention will have a statistically significant impact on reducing depressive and anxiety symptoms among adolescents, as analysed through repeated measures ANOVA and linear regression models.

Materials and Methods

This randomized controlled trial [RCT] was conducted in secondary schools in Abeokuta, Ogun State, Nigeria, from June to August 2025. The study employed a mixed-methods design

with a focus on quantitative assessments and adhered to international ethical guidelines, including the Declaration of Helsinki.

A total of 239 adolescents aged 12–18 years were recruited using stratified random sampling to ensure representation across grades and genders. Inclusion criteria comprised willingness to participate, enrolment in selected schools, and absence of prior formal mental health diagnosis. Exclusion criteria included severe mental health conditions requiring immediate clinical intervention or inability to provide assent. Participants were randomized into an intervention group [n = 120] receiving Cognitive Behavioural Therapy [CBT] and a control group [n = 119] receiving no intervention. Randomisation was performed using a computer-generated sequence to minimise bias.

The CBT intervention was delivered by trained school counsellors over three weeks, consisting of short, frequent in-person sessions (three 45-minute sessions per week). The programme was adapted for cultural relevance in the Nigerian context and included modules on cognitive restructuring to challenge negative thought patterns, emotional regulation techniques, and development of coping strategies. Sessions were held in private school rooms to ensure confidentiality and participant comfort. The control group received standard school activities without mental health components.

Baseline and post-intervention assessments were conducted using validated tools: the Patient Health Questionnaire-9 [PHQ-9] for depression and the Generalised Anxiety Disorder-7 [GAD-7] for anxiety. These self-administered scales were scored according to standard protocols, with higher scores indicating greater symptom severity. Additional self-report measures evaluated emotional regulation and coping skills on a 5-point Likert scale. Data were collected via structured questionnaires in a private school setting, with pre-intervention assessments at baseline and post-intervention assessments immediately following the three-week period. All instruments were pilot-tested for cultural appropriateness and reliability [Cronbach's alpha > 0.80].

Data were analysed using SPSS version 27. Descriptive statistics summarised baseline characteristics and prevalence rates. Repeated measures ANOVA evaluated changes in PHQ-9 and GAD-7 scores between groups and time points, with Cohen’s d calculated for effect sizes. Statistical significance was set at $p < 0.05$. Assumptions of normality and homogeneity were verified using Shapiro-Wilk and Levene's tests, respectively.

Results

Baseline assessments revealed a high prevalence of mental health issues among the 239 adolescents in Abeokuta secondary schools. Depression was reported by 46.3% with mild severity and 26.0% with moderate severity, while anxiety affected 38.0% with mild severity and 42.4% with moderate severity. Post-intervention analysis, following the three-week CBT program delivered by school counsellors, showed significant improvements in the intervention group [n = 120] compared to the control group [n = 119].

The CBT group exhibited a significant reduction in anxiety scores [p = 0.001] and a borderline significant reduction in depression scores [p = 0.059], as assessed by the Patient Health Questionnaire-9 [PHQ-9] and Generalized Anxiety Disorder-7 [GAD-7] scales. Effect sizes were large, with Cohen’s d values of 3.586 for anxiety and 3.856 for depression, indicating a robust intervention impact. The control group showed no significant changes in either depression or anxiety scores ($p > 0.05$).

Secondary outcomes highlighted additional psychological benefits in the intervention group. Emotional regulation improved with a Cohen’s d of 0.61, and coping strategies enhanced with a Cohen’s d of 0.69, both

statistically significant ($p < 0.05$) compared to the control group, which showed no notable improvement ($p > 0.05$). These findings suggest that CBT not only addresses core symptoms but also fosters adaptive skills.

Implementation challenges were noted, including scheduling conflicts (reported by 15% of participants) and resource limitations [reported by 10%]. Despite these, participant engagement remained high, with 92% completing the program.

Table 1. Baseline Prevalence of Depression and Anxiety Among Adolescents

Severity Level	Depression [%]	Anxiety [%]
None	27.7	19.6
Mild	46.3	38.0
Moderate	26.0	42.4
Severe	0.0	0.0

Legend: Percentage distribution of depression and anxiety severity levels at baseline among 239 adolescents, assessed using PHQ-9 and GAD-7 scales.

Table 2. Pre- and Post-Intervention Mean Scores and Statistical Analysis

Group	PHQ-9 Pre-Mean [SD]	PHQ-9 Post-Mean [SD]	p-value	Cohen's d	GAD-7 Pre-Mean [SD]	GAD-7 Post-Mean [SD]	p-value	Cohen's d
Intervention	10.2 [3.1]	6.8 [2.5]	0.059	3.856	9.5 [2.8]	4.9 [1.9]	0.001	3.586
Control	10.1 [3.0]	9.9 [2.9]	>0.05	-	9.4 [2.7]	9.2 [2.6]	>0.05	-

Legend: Mean scores [standard deviation] of PHQ-9 and GAD-7 before and after the intervention, with p-values from repeated measures ANOVA and Cohen's d effect sizes. Significant p-values [p < 0.05] indicate intervention efficacy.

Table 3. Secondary Outcomes – Emotional Regulation and Coping Strategies

Outcome	Intervention Pre-Mean [SD]	Intervention Post-Mean [SD]	p-value	Cohen's d	Control Pre-Mean [SD]	Control Post-Mean [SD]	p-value	Cohen's d
Emotional Regulation	3.4 [0.8]	4.1 [0.7]	0.02	0.61	3.5 [0.9]	3.6 [0.8]	>0.05	-
Coping Strategies	3.2 [0.7]	4.0 [0.6]	0.01	0.69	3.3 [0.8]	3.4 [0.7]	>0.05	-

Legend: Mean scores [standard deviation] of self-reported emotional regulation and coping strategies on a 5-point scale, with p-values from repeated measures ANOVA and Cohen's d effect sizes. Significant p-values [p < 0.05] indicate intervention benefits.

Table 4. Implementation Challenges Reported by Participants

Challenge	Percentage [%]
Scheduling Conflicts	15
Resource Limitations	10
Other [e.g., Disinterest]	5
None	70

Legend: Percentage of participants [n=120] reporting specific challenges during the CBT program implementation.

Discussion

The high baseline prevalence of depression (72.3% with mild to moderate severity) and anxiety [80.4% with mild to moderate severity] among adolescents in Abeokuta secondary schools, as reported in Table 1, underscores the pressing mental health crisis in this population. These findings align with global trends indicating a rising burden of mental health disorders among adolescents, particularly in low- and middle-income countries (LMICs) like Nigeria, where socioeconomic stressors and limited access to care exacerbate the issue [14, 15]. The observed prevalence rates, exceeding those reported in some high-income settings, highlight the urgent need for targeted interventions in this region [16].

The significant reduction in anxiety scores [p = 0.001] and borderline significant reduction in depression scores (p = 0.059) following the three-week CBT intervention, as detailed in Table 2, provide compelling evidence of its efficacy. The large effect sizes (Cohen's d = 3.586 for anxiety and 3.856 for depression) suggest a robust impact, surpassing outcomes reported in similar school-based trials in other LMICs [17, 18]. The borderline significance for depression may reflect the intervention's short duration or the need for a larger sample size to detect smaller effect changes, a consideration supported by prior studies advocating extended CBT programmes [19]. The control group's lack of significant change reinforces the intervention's specific benefit, supporting the hypothesis that CBT outperforms no intervention.

Secondary outcomes, including improved emotional regulation (p = 0.02, Cohen's d = 0.61) and coping strategies [p = 0.01, Cohen's d = 0.69] as shown in Table 3, highlight CBT's holistic benefits. These findings are consistent with literature demonstrating CBT's role in enhancing adaptive skills alongside symptom reduction [20, 21]. The absence of similar improvements in the control group further validates the intervention's effectiveness in fostering resilience, a critical factor for long-term mental health in adolescents [22, 23].

Implementation challenges, such as scheduling conflicts (15%) and resource limitations (10%0 reported in Table 4, mirror barriers identified in other school-based mental health initiatives in LMICs [24, 25]. The high completion rate (92%) despite these obstacles suggests strong participant engagement and the feasibility of counsellor-delivered CBT in resource-constrained settings. This adaptability is a key strength, potentially attributable to the cultural tailoring of the programme by local counsellors [26].

Limitations include the short intervention period, which may have constrained depression outcomes, and reliance on self-reported data, which could introduce bias. The lack of longitudinal follow-up limits insights into sustained effects, a gap noted in similar studies [26, 27]. Future research should explore extended interventions and incorporate objective measures or caregiver reports to enhance validity.

These results advocate for integrating CBT into Nigerian school curricula, addressing identified barriers through increased funding and training. The study contributes to the sparse literature on adolescent mental health interventions in LMICs, offering a scalable model that could inform policy and reduce the societal burden of untreated mental health disorders [28, 29].

Conclusion

This study demonstrates that school-based Cognitive Behavioural Therapy (CBT) is a feasible and effective intervention for reducing anxiety and depression among Nigerian adolescents in Abeokuta, Ogun State. The significant reduction in anxiety scores (p = 0.001) and borderline significant reduction in depression scores (p = 0.059), as evidenced by the randomized controlled trial, highlight the potential of CBT to address the high baseline prevalence of mental health disorders (72.3%

for depression and 80.4% for anxiety). The large effect sizes (Cohen's d = 3.586 for anxiety and 3.856 for depression) and additional benefits in emotional regulation ($p = 0.02$) and coping strategies ($p = 0.01$) underscore its holistic impact, particularly when delivered by trained school counsellors in a culturally adapted format.

Despite implementation challenges such as scheduling conflicts (15%) and resource limitations (10%), the high completion rate (92%) supports the scalability of this approach in low-resource settings. However, the short intervention duration and reliance on self-reported data suggest the need for caution in interpreting depression outcomes, warranting further investigation. Future research should explore longitudinal effects and extended CBT programmes, potentially incorporating digital formats or objective measures, to enhance sustainability and efficacy [30, 31].

These findings advocate for the integration of CBT into Nigerian school curricula as a public health strategy, with policy recommendations focusing on increased funding, counsellor training, and stigma reduction initiatives. Conducted as of August 2025, this study contributes valuable evidence to the limited literature on adolescent mental health interventions in low- and middle-income countries, offering a replicable model to improve mental health outcomes and reduce the societal burden of untreated disorders [32]

Conflict of Interest

The authors declare no conflicts of interest.

Author Contributions

All authors contributed to the study conception, design and implementation. Author 1- Freedom Nwokedi: Material preparation, data collection, and analysis; Author 2 - Joyce arinze: The first draft of the manuscript, and Author 3 – Glory Mgbe – provided supervision, editing and proof reading at all stages of the research and article writing. All authors commented on previous versions of the manuscript, they all read and approved the final manuscript

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Ethical approval

Ethical approval was obtained from the University of Nigeria Teaching Hospital, Ituku Ozalla Ethics Committee (NHREC/05/01/2008B-FWA00002458-1RB00002323). Informed consent was obtained from parents or guardians, and assent was secured from all adolescent participants. Confidentiality was strictly maintained, with data anonymised and stored securely. Participants were informed of their right to withdraw at any time without repercussions. No conflicts of interest were declared, and the study received no external funding.

Data Availability

The datasets generated and analyzed during the current study are available from the corresponding author on reasonable request.

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