Impacts of cognitive-behavioral intervention on anxiety and depression among social science education students

A randomized controlled trial

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Abstract

Background: Anxiety is a common disorder which refers to a significant and persistent fear of one or more social or performance situations. This study investigated the impacts of cognitive-behavioral intervention on anxiety and depression among undergraduate students enrolled in social science education programs at public universities in the Southeast Nigeria.

Methods: Participants were 55 undergraduate students enrolled in social science education programs at public universities in the Southeast Nigeria. The adequacy of the sample size used was determined using GPower software. Cognitive-behavioral treatment manuals on anxiety and depression were used to deliver the intervention. Data analyses were completed using repeated measures analysis of variance.

Results: Results indicated a significant positive impact of cognitive-behavioral intervention on anxiety and depression among social science education students exposed to the cognitive-behavioral intervention when compared to the waitlisted group. Results also showed that there was a significant time × group interaction for anxiety and depression. Follow-up tests showed that significant reduction in anxiety and depression persisted after 3 months for the cognitive-behavioral intervention group in comparison to the waitlisted control group.

Conclusion: We concluded that cognitive-behavioral intervention was a successful intervention which decreased the symptoms of anxiety and depression in social science education students who participated in the study. Additional studies are recommended to further corroborate the influence of cognitive-behavioral intervention in the reduction of anxiety and depressive symptoms in the Nigerian undergraduate student population.

Abbreviations: ANOVA = analysis of variance, B = unstandardized coefficient beta, CBT = cognitive-behavioral therapy, CI = confidence intervals, GDS = Goldberg depression scale, partial η^2 = partial eta squared, SD = standard deviation, SMGAD-A = severity measure for generalized anxiety disorder-adult, β = standardized coefficient beta, t = t test statistic.

Keywords: anxiety, cognitive-behavioral intervention, depression, Nigeria, social science education students

1. Introduction

1.1. Anxiety and depression in students

Anxiety is a common disorder which refers to a significant and persistent fear of one or more social or performance situations,[1–3] and it usually begins during the period of adolescence.[4] Anxiety can lead to significant impairments in social functioning, impaired peer relations, social skills deficit,[5–8] and comorbid psychological disorders.[9] Students suffering from anxiety usually have fewer and poor quality friendships and delayed or impaired romantic relationships.[10–12] Evidence continues to show anxiety significantly impairs students' social functioning and emotional development.[13,14] An anxious student often reports emotional distress as well.[15] Many people with a anxiety disorder are rarely identified, and many do not seek treatment.[16,17] Moreover, there is a limited number of psychotherapeutic interventions focused on students' anxiety disorder.[13,18,19]

Previous studies conducted in Nigeria reported prevalence of anxiety and depression in students to be high.[3,20–22] For

instance, Bakare et al[20] found that about 20% of Nigerian students suffer from anxiety disorder. Frank-Briggs and Alikor[3] reported about 34%. Dafaalla et al[21] revealed about 22%. Meanwhile, the indicators of the anxiety include stressful requirements, inability to satisfy supervisors, and impromptu schedule of lectures.[22] Despite the prevalence of anxiety disorders among students, only a few studies have aimed at treating anxiety symptoms in students in developing countries, including Nigeria. It is possible that cognitive-behavioral intervention might help reduce anxiety symptoms in students.

Another mood-related problem is depression. Depression in adolescents is a significant public health concern.[23–26] Earlier studies have shown the high rates of depression in students.[27–34] Students who exhibit symptoms of depression are vulnerable to conduct disorders, health problems, substance abuse, and poor academic achievement.[35–38]

Substantial evidence from Nigeria showed that majority of Nigerian students experience depression.[21,39–42] A cross-sectional survey indicated that 23% of Nigerian students were depressed.[43] Similarly, Chinawa et al[2] surveyed the prevalence of depression in Southeastern Nigerian States and found that students were experiencing depression. Despite this, little research is available regarding the role of cognitive-behavioral intervention in improving anxiety and depression symptoms.[44] Given the severity of the depressive condition, along with the repercussions, many Nigerian students have continued to seek remedial interventions.[45] Depression in adolescents can be addressed using psychotherapeutic approaches such as cognitive-behavioral intervention.

1.2. Cognitive-behavioral intervention

Cognitive-behavioral intervention is an effective therapy for changing automatic thinking and self-criticism, patterns of behavior that bring about anxiety and depression. Cognitive-behavioral intervention has been tested and shown to be effective in improving the mental health of people suffering from depressive symptoms in both low- and middle-income nations.[44,46,47] A follow-up study found that cognitive-behavioral intervention maintains its long-term efficacy in decreasing severity of depressive symptoms.[48] Researchers have reported the enduring positive clinical impact of cognitive-behavioral intervention in treating anxiety and depression.[49–52] Based on this far-reaching evidence, we evaluated the impacts of cognitive-behavioral intervention on anxiety and depressive symptoms in Nigerian undergraduate social science education students population. Our hypotheses included: cognitive-behavioral intervention will bring about significant positive impact in reducing anxiety and depression in participants exposed to the treatment intervention compared to a waitlisted group; and the significant positive impacts of cognitive-behavioral intervention might persist for the treatment group at a follow-up period.

2. Methods

2.1. Statements of ethical consideration

The researchers obtained approval to conduct this study from the Department of Social Science Education at the University of Nigeria, Nsukka. Also, informed written consent was obtained from the participants. This study was conducted following the ethical standards for conducting research with human participants as stipulated by the American Psychological Association.[53] The study investigators also complied with the research

ethics according to the WMA Declaration of Helsinki. The intervention program was registered in the Clinical Trials Registry (UMIN-CTR) (UMIN000034913).

2.2. Study participants

Participants were comprised of 55 undergraduate students with a social science education major from public universities in Southeast Nigeria. The sample size was determined to be sufficient through calculations using the GPower 3.1.1 computer program software.[54] Power analysis indicated that a total of 44 participants (number of measurements = 3) were needed for a medium partial η^2 (0.25) when $\alpha = 0.05$ for a power of 0.95 with 2 independent groups, using a repeated measures analysis of variance (ANOVA), within-between subject interactions. The study participants volunteered to take part in the research and were not remunerated.

2.3. Measures
2.3.1. Severity measure for generalized anxiety disorder-adult. The severity measure for generalized anxiety disorder-adult (SMGAD-A) is a 10-item measure developed by Craske et al[55] to assess the severity of generalized anxiety disorder in adults. This study employed the SMGAD-A to determine how often the participants' thoughts, level of emotion, and behaviors related to their family members, state of health, finances, school, and job during the past 7 days. Each item was rated on a 5-point scale as follows: 0 = Never; 1 = Occasionally; 2 = Half of the time; 3 = Most of the time; and 4 = All of the time. The total score can range from 0 to 40, with higher scores indicating greater severity of generalized anxiety disorder. Sample items included: "felt moments of sudden terror, fear, or fright"; "felt anxious, worried, or nervous"; "had thoughts of bad things happening, such as family tragedy, ill health, loss of a job, or accidents"; "felt a racing heart, sweaty, trouble breathing, faint, or shaky"; "felt tense muscles, felt on edge or restless, or had trouble relaxing or trouble sleeping"; "avoided, or did not approach or enter, situations about which I worry"; "left situations early or participated only minimally due to worries"; "spent lots of time making decisions, putting off making decisions, or preparing for situations, due to worries"; "sought reassurance from others due to worries"; and "needed help to cope with anxiety (e.g., alcohol or medication, superstitious objects, or other people)." In the present study, internal consistency for this measure was 0.86 alpha.

2.3.2. Goldberg depression scale. This is an 18-item screening test developed by Goldberg,[56] which is used to assess depression level. The measure has 6 Likert-options and includes the following ratings: 5 = very much; 4 = quite a lot; 3 = moderately; 2 = somewhat; 1 = just a little; and 0 = not at all. The level of depression is determined on a scale; the higher the number, the more severe the depression. Given this scale, consider the following rates for levels of depression: 54 and above: severe depression; 36 to 53: moderate to severe depression; 22 to 35: mild to moderate depression; 10 to 21: possible symptoms; and 0 to 9: no depression likely. In the present study, internal consistency for this measure was 0.84 alpha.

2.4. Intervention
2.4.1. Cognitive behavioral treatment for adults with generalized anxiety disorder manual. This manual was developed by Stanley et al.[57] The manual has been used to reduce symptoms of anxiety disorder in adults.[58–60] Using this manual, the current

Table 1

Summary of cognitive behavioral treatment for adults with generalized anxiety disorder manual.

Time frame	Session	Topic	Activities	Techniques
Week 1	Session 1	Introduction, motivation, the meaning of anxiety, education, and breathing skills	• Established rapport and therapeutic relationship among the participants • Slated boundary of the session and confidentiality that guided the meeting • Making the participants become conscious of symptoms of anxiety and its management skills using CBT • Instruction to remain focused and attempt homework that would be given to them throughout the sessions • Meaning of anxiety, symptoms, ways to reduce it and relevant skills were discussed • Homework	• Establishing therapeutic alliance • Mood monitoring technique • Emotional disputation • Practice exercises
Week 2	Session 2	Muscle relaxation	• Review of the homework was done • Muscle relaxation skills (breathing, tensing instructions) were discussed and practiced • Addressed the progress of muscle relaxation • Participants' challenges about change were reviewed • Motivated to accept change. Practice exercise was given to the participants	• Emotional disputation • Cognitive restructuring • Relaxation • Reframing technique • Practice exercise
Weeks 3–5	Sessions 3–5	How to change thoughts Problem identification, solutions, and consequences,	• Addressed how to change thoughts. Review previous practice exercises • Dealing with identification of a problem • Considering possible solutions and consequences • Choosing best options/plan, acting out the plan and evaluation of the chosen plan. After that, a practice exercise was given to them.	• Cognitive disputation • Explanation, coping skills • monitoring and thoughts stopping • Problem-solving techniques • Reframing technique • Practice exercise
Week 6	Session 6	Changing behavior and sleep management skills	• Changing behavior and sleep management skills (bedtime, wake time, and bedroom usage) • Avoiding bedroom if you are not sleeping after 20 min • Do away with Naps • Put your feet on the floor at the same time every morning) • Practice exercise	• Problem-solving techniques • Self-acceptance technique • Reframing technique
Weeks 7–8	Sessions 7–8	Practice coping skills Review Termination	• Reviewing previous discussion • Practice coping skills • Termination	

intervention lasted for a period of 8 weeks (1 session per 2-hours each week). Session 1 focused on introduction, motivation, the meaning of anxiety, education, and breathing skills. The meaning of anxiety, the symptoms, the ways to reduce it, and the relevant skills were discussed. After this 1st session, the researchers gave the participants homework to complete and were asked to hand it in ahead of time for researchers to review their work. Session 2 addressed the progress of muscle relaxation. Before beginning the 2nd session, the review of previous homework was done by the researchers. Muscle relaxation skills (breathing, tensing instructions) were discussed. A practice exercise was given to the participants. Sessions 3 and 4 addressed how to change thought patterns (explanation, coping skills, monitoring, and thoughts stopping). Session 5 focused on problem-solving techniques like the selection of a problem, considering possible solutions, consequences, choosing best options/plan, acting out the plan, and evaluation of the chosen plan. After the 1st activity, a practice exercise was given to the participants. Session 6 focused on changing behavior patterns, sleep management skills, and practice exercise. Session 7 focused on reviewing and practicing coping skills. Finally, session 8 focused on review and termination. Table 1 shows a summary of the cognitive-behavioral intervention manual for generalized anxiety disorder.

2.4.2. Treatment manual for cognitive-behavioral therapy for depression.
This treatment manual was developed by Rosselló and Bernal to assist depressed individuals in minimizing the severity of symptoms associated with depression.[61] Using this manual, the current intervention progressed through 12 sessions with 3 topics. Each topic lasted for 4 sessions. The first 4 sessions focused on how human thoughts contribute to mood states. Session 1 also dealt with familiarizing the participants with cognitive behavioral therapy (CBT), as well as the cues, rules, and regulations of the sessions. Also discussed at this session were the definition and explanation of thought, influence of thought on mood, the meaning of depression, a weekly schedule, set of rules, and confidentiality.

The next 3-therapy sessions emphasized the thought patterns related to depression, ways to modify automatic thoughts, and practice exercises. The third session focused on replacing depressive thoughts with functional thoughts using mood monitoring techniques. The next 4 sessions deal with action versus mood. The activities in sessions 5, 6, 7, and 8 examined how the participants' activities in the pleasurable activities decreased their depressive symptoms. Sessions 9 to 12 addressed how interaction with people can affect mood. Table 2 shows a summary of cognitive-behavioral intervention treatment manual for depression.

2.5. Procedure

We recruited 250 students in the social science education major in public universities in the Southeast zone of Nigeria. The recruitment process lasted from November 2016 to January 2017. Participants were recruited through word of mouth and

Table 2

Summary of cognitive behavioral therapy treatment manual for depression.

Time frame	Session	Activities	Techniques
Weeks 1–3	Sessions 1–4 How human thoughts contribute to his mood	• Familiarization of the participants with CBT • Introducing the cues, rules and regulations • Dealing with the influence of thought on mood • Setting weekly schedule, rules, and confidentiality • Definition and explanation of thought, the meaning of depression • Emphasizing the thoughts patterns of an individual living with depression, ways of modification automatic thoughts, and practice exercises • Replacing irrational thoughts with rational ones using • Dealing with action versus mood • Addressing each participant's problem using CBT	• Establishing therapeutic alliance • Mood monitoring technique • Emotional disputation • Practice exercises
Weeks 4–6	Sessions 5–8 How pleasurable activities decrease their depressive symptoms	• Examining how the participants' activities in the pleasurable activities decrease their depressive symptoms • Defining pleasurable activities and discuss the challenges (mostly depression) that could keep one off from these activities • Talking about how depressive symptoms could affect actions of the participants in pleasurable activities • Discussed how depressive symptoms in the participants could be increased due to inability to participate actively in pleasurable activities • Ability to manage moods and strategies to improve their mood • Reinforcing objective that is successfully achieved	• Emotional disputation • Cognitive restructuring • Relaxation • Reframing technique • Practice exercise
Weeks 7–8	Sessions 9–12 How individual interaction with people affects mood	• Addressed how individual interaction with people affects mood • Use of social support, and how it contributes to stressful situations • Learning to identify, describe, and strengthen their support group • Identifying challenging thought and modifying social depression-related indicators • Termination	• Mood monitoring techniques Cognitive restructuring • Problem-solving technique • Practice exercise

were evaluated individually. They were screened for eligibility, using the SMGAD-A and Goldberg depression scale (GDS). The eligibility screening exercise was conducted by the researchers and research assistants. Then, a pretest was administered to the participants, which enabled the researchers to obtain the baseline data. Social science education students (N=55) with severe anxiety and depressive symptoms were selected as participants. Other set criteria for eligibility involved providing written, informed consent and being readily available for the study. Those participants who met the inclusion criteria were selected. The screened participants who did not meet any of these criteria were not invited to participate in the study.

The eligible participants were randomized to the treatment group or the waitlist control group. The randomization process adopted a simple random allocation sequence, using Random Allocation Software developed by Saghaei[62] (Fig. 1). Twenty-eight participants were assigned to the treatment group (18 females and 10 males), and 27 participants were waitlisted (17 females and 10 males). The researchers used the treatment manuals to guide the intervention, which aimed to reduce participants' levels of anxiety and depression. The treatment session lasted for 120 minutes during each meeting. Before the commencement of each session, we reviewed the homework from the participants. The participants were invited to share their feelings and thought patterns. All the sessions were delivered using English language by 3 of the therapists. At the conclusion of the intervention, the participants in both the treatment and waitlist control groups were evaluated for the second time (time 2).

The researchers conducted follow-up meetings that lasted for 2 weeks, resulting in a 3rd assessment (time 3) after 3 months. All of the participants attended and completed all of the sessions; no

participants dropped out of the study. Selection and potential bias during the process of recruitment and randomization were eliminated by covering the treatment allocation from the research assistants and participants. Also, the data analyst was blinded by the researchers until the time he completed all analyses by hiding information in the scale that could reveal the group that received the treatment intervention.

2.6. Study design and data analyses

This study employed a group randomized controlled trial design with follow-up. To detect changes across each assessment, a repeated measures within-between subjects ANOVA with interaction was used. The partial η^2 was reported to verify the effect size at each time point. We also reported the confidence intervals (CIs) of each assessment. The within-subjects variables were time points. Group was entered as the between-subjects factors. The study results were interpreted as significant at $P < .05$. No missing values were observed in the data after screening was done. Post-hoc analyses were completed, using Bonferroni correction for P-values. Responder analysis and analysis for mean adherence to the cognitive-behavioral intervention were conducted. The researchers entered and analyzed all statistical data via IBM SPSS, version 22 (IBM Corp, Armonk, NY).

3. Results

3.1. Demographic statistics of the study participants based on group

Table 3 shows the demographic statistics of the 2 groups which included age, length of time the individuals have lived with
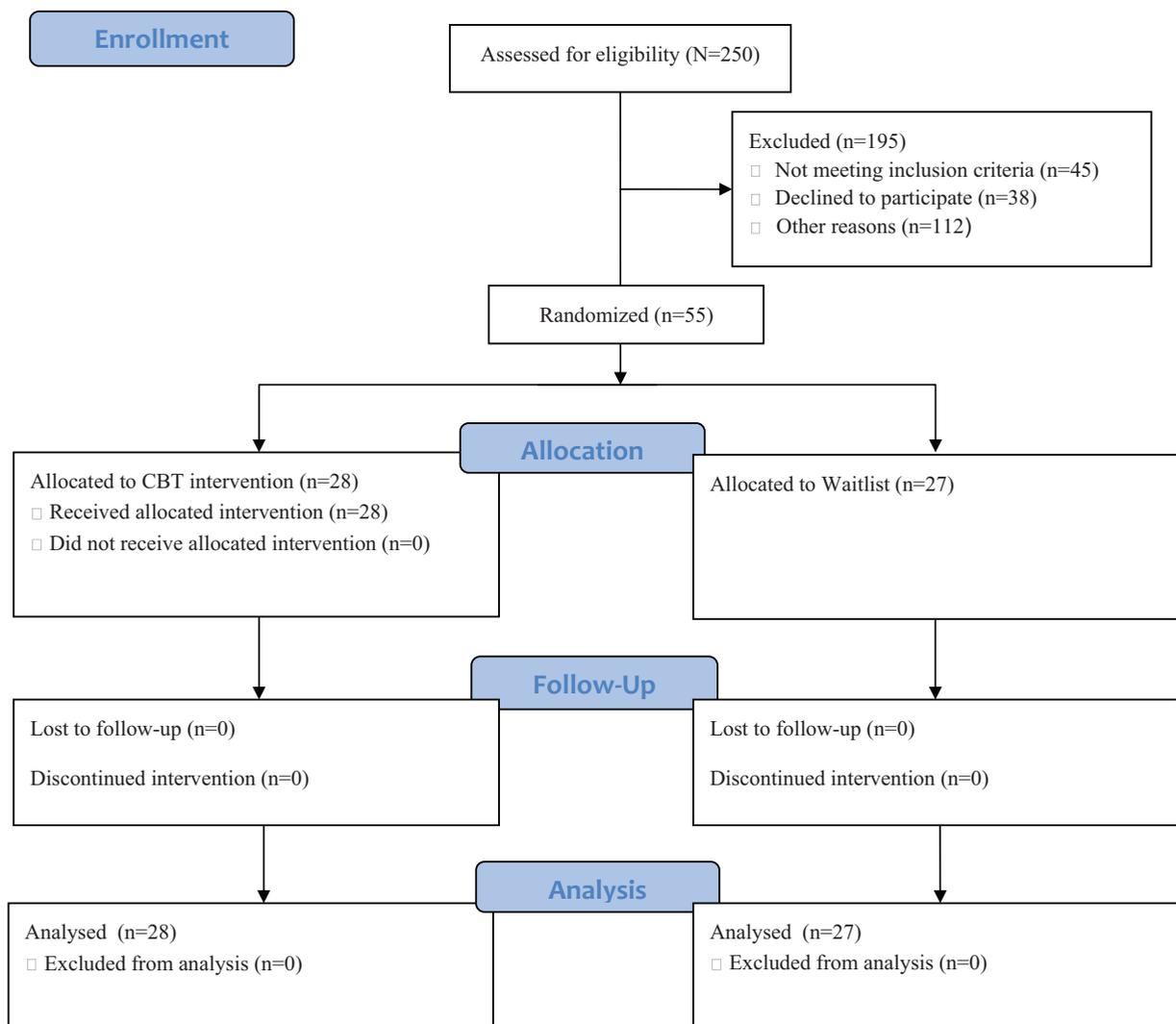
Figure 1. Participants eligibility criteria using CONSORT flow diagram.

depression and anxiety, gender, and socioeconomic status. There were 28 participants in the treatment group (18 females and 10 males), and 27 participants were waitlisted (17 females and 10 males), with no statistically significant difference. The mean age of the participants was 21.43 (SD = 1.45) for the treatment group and 20.41 (SD = 5.51) for the waitlisted control group, with no statistically significant difference, $P = -.348$.

3.2. Means and distributions of the anxiety and depression measure

Table 4 shows the means and distributions of the anxiety and depression measure of the 2 groups at preintervention, post-intervention, and follow-up.

3.3. Pretreatment, posttreatment, and follow-up data analyses

Based on the assessment via the SMGAD-A, our ANOVA test in Table 5 indicated that there were no significant pretreatment differences in the level of anxiety between the social science education students in the treatment and waitlisted control groups, $F(1,53) = 1.45$, $P = .22$, partial $\eta^2 = 0.050$, 95% CI: 23.49–23.71.

At time 2, there was a significant positive impact of cognitive-behavioral intervention on anxiety symptoms of social science education students in the treatment group when compared to the waitlisted control group, $F(1,53) = 531.59$, $P = .000$, partial $\eta^2 = 0.91$, 95% CI: 20.39–23.59. The ANOVA results also showed that there was a significant time × group interaction for anxiety, $F(2,50) = 925.09$, $P = .000$, partial $\eta^2 = 0.974$. Follow-up tests showed that significant reduction in anxiety symptoms persisted after 3 months for social science education students in the treatment group in comparison to the waitlisted control group, $F(1,53) = 551.27$, $P = .000$, partial $\eta^2 = .93$, CI: 15.99–16.74. Therefore, these results imply that the cognitive-behavioral intervention had a significant positive impact in reducing the degree of anxiety among the social science education students in the treatment group compared to the waitlisted group. Figure 2 is an error bar showing the change in anxiety symptoms of participants.

As measured by GDS, the ANOVA test showed that there were no pretreatment differences in depression scores between social science education students in the treatment and waitlisted control

Table 3

Demographic statistics of the 2 groups.

Group		N (%)		χ^2	P
Treatment group		28 (50.9%)		0.018	.893
Waitlisted group		27 (49.1%)			
		Treatment group	Waitlisted group	t	P
Age, yr, M±SD		21.43±1.45	20.41±5.51	0.947	.348
Length of anxiety and depression, mo, M±SD		3.89±1.10	3.11±0.89	2.889	.006
		N (%)		χ^2	
Gender	Male	10 (50%)	10 (50%)	0.010	.919
	Female	18 (51.4%)	17 (48.6%)		
Socioeconomic status	Middle	19 (50%)	19 (50%)	0.041	0.840
	Low	9 (52.9%)	8 (47.1%)		

% = percentage, χ^2 = Chi-square, M±SD = mean and standard deviation, t = t test.

Table 4

Means and distributions of the anxiety and depression measure of the 2 groups.

Group statistics	Anxiety (SMGAD-A)			Depression (GDS)		
	Pretreatment	Posttreatment	Follow-up	Pretreatment	Posttreatment	Follow-up
Treatment group, n=28						
Mean	23.68	10.75	11.29	68.57	14.68	22.64
SD	0.48	3.35	1.21	10.06	1.63	1.59
Kurtosis	−1.46	−0.58	0.29	−1.58	1.63	−0.96
Skewness	−0.81	0.75	0.61	0.07	−1.14	−0.31
Waitlisted group, n=27						
Mean	21.89	30.74	20.04	65.11	64.63	63.78
SD	6.04	11.94	5.80	13.06	17.13	18.14
Kurtosis	10.49	1.25	7.96	0.48	1.65	5.22
Skewness	−3.41	−0.79	−2.81	−0.66	−1.13	−2.03

n = number of participants per group, SD = standard deviation, SMGAD-A = severity measure for generalized anxiety disorder-adult, GDS = Goldberg depression scale.

groups, $F(1,53)=0.03$, $P=.87$, partial $\eta^2=0.001$, CI: 65.58–71.10 (Table 6).

At time 2, the results showed a significant postive impact of cognitive-behavioral intervention on depressive symptoms of social science education students in the treatment group when compared to the waitlisted group, $F(1,53)=514.47$, $P=.000$, partial $\eta^2=0.91$, 95% CI: 38.93–43.42. Furthermore, the ANOVA results also showed that time × group interaction effect for depression was significant, $F(2,50)=128.06$, $P=.000$, partial $\eta^2=0.84$. Follow-up tests showed that significant reduction in depression scores persisted after 3 months for the social science education students who benefitted from the cognitive-behavioral intervention in comparison to the waitlisted group., $F(1, 53)=261.91$, $P=.000$, partial $\eta^2=0.918$, CI: 43.28–47.04. Therefore, these results imply that the cognitive-behavioral intervention had a significant positive impact in reducing symptoms of depression among the social science education students in the treatment group compared to the waitlisted group. Figure 3 is an error bar showing the change in symptoms of depression.

Given the significance of the observed results, post-hoc analyses with Bonferroni correction for P-values were conducted. Table 7 shows the post-hoc results for level of anxiety of participants by group. Also, Table 8 shows the post-hoc results for level of depression of participants by group. In each case, the mean difference was considered significant at the 0.05 level.

3.4. Responder and mean adherence to cognitive-behavioral intervention treatment data analyses

In the primary analysis, a participant was considered a responder if their GDS scores at times 2 and 3 were consistently below the baseline score (time 1). At time 2 (posttreatment evaluation), the entire treatment group (100% of participants) responded to the CBT intervention, demonstrating improvement in the scores of their symptoms of depression. However, at time 3 (follow-up evaluation), only 25% of the CBT participants consistently maintained the remission gained at time 2, while 75% seemed to

Table 5

Anxiety level of participants across the 3 time points by group.

Measure	Treatment group, n=28			Waitlisted group, n=27			df	F	Significance	Partial η^2
	Time 1 M (SD)	Time 2 M (SD)	Time 3 M (SD)	Time 1 M (SD)	Time 2 M (SD)	Time 3 M (SD)				
	23.68 (0.47)			23.52 (0.51)			1,53	1.453	0.223	0.050
SMGAD-A		10.75 (3.35)			33.22 (8.35)		1,53	531.594	0.000	0.912
			11.29 (1.21)			21.44 (1.93)	1,53	551.262	0.000	0.933

df = degree of freedom, F = ANOVA, M (SD) = mean (standard deviation), SMGAD-A = severity measure for generalized anxiety disorder-adult.
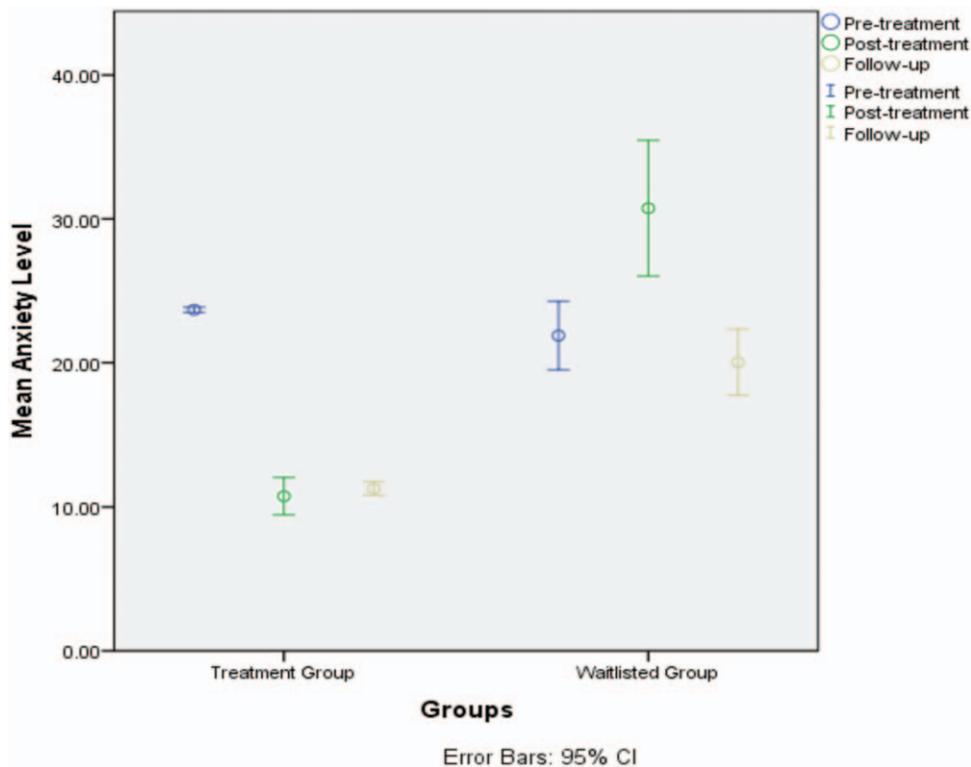
Figure 2. Error bars showing mean anxiety levels of cognitive behavioral therapy group in comparison with waitlisted group.

have experienced a slight relapse in their treatment gain. (Table 9).

Using a self-reporting method for participants, the mean adherence to cognitive-behavioral intervention sessions among participants, which was based on binary logistic regression analysis, was 75.0% ($B = -1.09$, Wald$= 6.34$, df$= 1$, $P = .01$, Exp(B)$= 0.33$). That is, 75% of the participants demonstrated successful adherence to the cognitive-behavioral intervention sessions. Linear regression analysis indicated that sex significantly predicted adherence to the cognitive-behavioral intervention sessions, with more female participants (57.14%) showing successful adherence than male participants (17.86%), F $(1,26) = 5.91$, $P = .022$, $B = -0.39$, $\beta = -0.43$, $t = -2.43$, 95% CI$= -0.72$ to 0.06. Participants' age did not significantly predict adherence to the cognitive-behavioral intervention sessions, F $(1,26) = 0.35$, $P = .557$, $B = -0.04$, $\beta = -0.12$, $t = -0.59$, 95% CI$= -0.16$, -0.09. The level of adherence to the cognitive-behavioral intervention sessions did not influence the treatment outcome. There were no reports of adverse effects of the cognitive-behavioral intervention.

4. Discussion

We examined the impacts of cognitive-behavioral intervention on anxiety and depression among Nigerian undergraduate students enrolled in a social science education major. We found that the cognitive-behavioral intervention had a significant positive impact on decreasing the levels of anxiety and depression symptoms among the study participants in the cognitive-behavioral intervention group compared to those in the waitlisted control group. We also found that the considerable reduction of anxiety and depression levels among participants in the cognitive-behavioral intervention group persisted at 3 months follow-up evaluation. These results supported the findings from earlier studies, which showed long-standing benefit of cognitive-behavioral intervention in maintaining of reduction in anxiety and depression.[48,52]

In line with our findings, numerous studies[48,63-66] have shown that cognitive-behavioral intervention led to successful treatment of anxiety disorder in students. In addition, young people exposed to cognitive-behavioral approach have high

Table 6										
Depression level of participants across the 3 time points by group.										
	Treatment group, n = 28			**Waitlisted group, n = 27**						
Measure	**Time 1 M (SD)**	**Time 2 M (SD)**	**Time 3 M (SD)**	**Time 1 M (SD)**	**Time 2 M (SD)**	**Time 3 M (SD)**	**df**	**F**	**Significance**	**Partial η^2**
	68.57 (10.06)			68.11 (9.94)			1,53	0.029	0.865	0.001
GDS		14.68 (1.63)			67.67 (11.64)		1,53	514.472	0.000	0.910
			22.64 (1.59)			67.67 (9.61)	1,53	261.909	0.000	918

df = degree of freedom, F = ANOVA, GDS = Goldberg depression scale, M (SD) = mean (standard deviation).
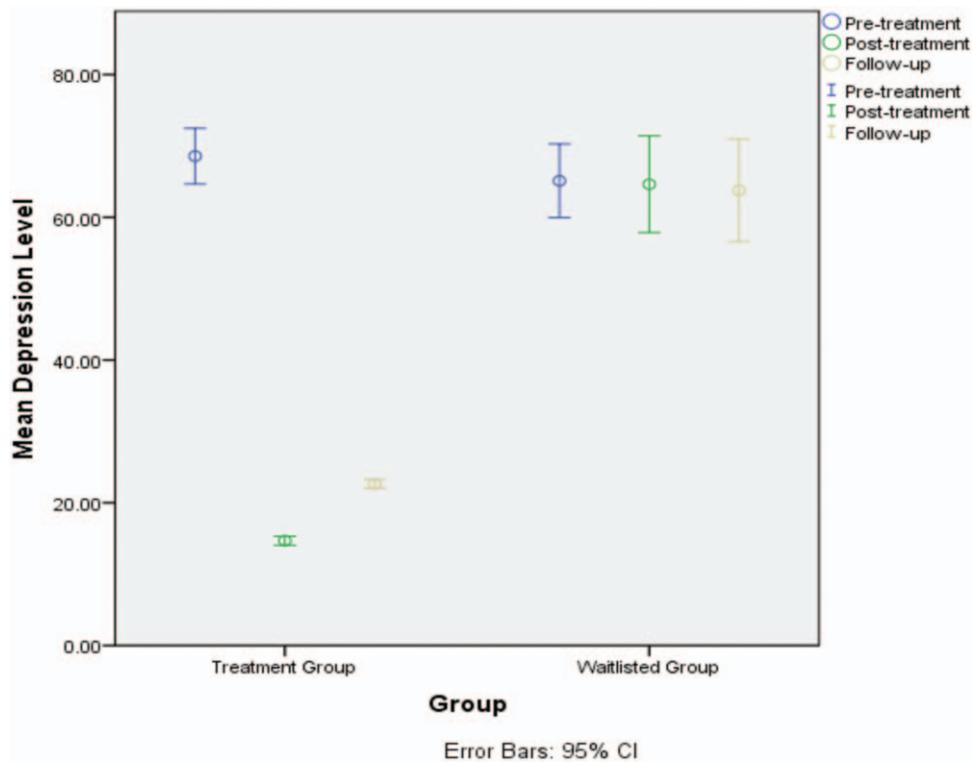
Figure 3. Error bars showing depression levels of cognitive behavioral therapy group in comparison with waitlisted group.

quality of life with regard to health and wellbeing, as well as lower levels of anxiety.[13] Goodyer et al[67] demonstrated that cognitive-behavioral intervention had a positive effect on sustaining reduced levels of anxiety. A previous study noted that applicability of cognitive-behavioral intervention improved the psychological health of individuals.[68] In the same vein, other studies further have indicated that cognitive-behavioral intervention was useful in the treatment of adolescents with depressive symptoms.[68–70]

More studies maintained that cognitive-behavioral intervention brought about a cognitive change in adolescents if well applied.[70] The current findings supported Weisz et al and

Fotowwat et al,[71,72] who found that cognitive-behavioral intervention was effective in treating students with depression. Our results are impressive, and ours was the 1st study of its kind to use cognitive-behavioral intervention to decrease social science students' anxiety and depressive symptoms in Nigeria. We believe that students' experiences at the university could be a source of psychological distress. Cognitive-behavioral therapists in developing countries (like Nigeria) should assist students in recognizing how anxiety and depressive thoughts can be managed. This may serve as a way of identifying, challenging, and modifying anxiety and depression-related symptoms.[44] Given the effectiveness of cognitive-behavioral intervention, the government

Table 7

Post-hoc analysis of anxiety level of participants at time 2 by group using Bonferroni correction for *P*-values.

(I) Group	(J) Group	Mean difference (I − J)	Std. error	Sig.	95% Confidence interval	
					Lower bound	Upper bound
Treatment group	Waitlisted group	−8.9841*	1.57411	0.000	−12.8691	−5.0992
Waitlisted group	Treatment group	8.9841*	1.57411	0.000	5.0992	12.8691

Based on observed means.
* The mean difference is significant at the .05 level.

Table 8

Post-hoc analysis of depression level of participants at time 2 by group using Bonferroni correction for *P*-values.

(I) Group	(J) Group	Mean difference (I − J)	Std. error	Sig.	95% Confidence interval	
					Lower bound	Upper bound
Treatment Group	Waitlisted Group	−29.2086*	2.87853	0.000	−36.3128	−22.1043
Waitlisted Group	Treatment Group	29.2086*	2.87853	0.000	22.1043	36.3128

Based on observed means.
* The mean difference is significant at the .05 level.

Table 9

Responder analysis.

Depression level as measured by GDS	Time 1		Time 2		Time 3	
	N	Marginal %	N	Marginal %	N	Marginal %
Severe depression	28	100%	–	–	–	–
Moderate to severe depression	–	–	–	–	–	–
Mild to moderate depression	–	–	–	–	21	75%
Possible symptoms	–	–	28	100%	7	25%
No depression likely	–	–	–	–	–	–

CBT = cognitive behavioral therapy, GDS = Goldberg depression scale, Marginal % = marginal percentage, N = number of participants.

could assist students by funding school-based cognitive-behavioral intervention programs specifically aimed at reducing symptoms of depression. This may help students to desensitize their automatic thoughts.

4.1. Limitations

There is no research work without limitations. Some of the limitations for this study included the use of only self-reporting screening tools for assessment. The self-report measures could also be affected by social desirability bias. Therefore, we suggest that further studies explore alternative measures (e.g., observation, interview, and case review) in assessing anxiety and depression in the undergraduate student population during cognitive-behavioral intervention. This could be helpful, as individuals are more familiar with their own emotions and feelings than the researchers.

While we were pleased with the results from the study, we believe that the results could be improved in future studies. We think that the targeted sample might limit us from generalizing the finding to a broader population. Therefore, we suggest that future research use a substantial number of samples, which would include students from other academic departments. The time interval for our study was seemingly short, as we evaluated the impact of cognitive-behavioral intervention on students with anxiety and depressive symptoms. The assessment interval could affect the generalizability of the findings of the present study to other populations. Given this limitation, we recommend further study to make a change in the timeframe.

5. Conclusion

This study has contributed to the scientific record by documenting the impact of cognitive-behavioral intervention on anxiety and depressive symptoms among undergraduate social science education students in Nigeria. Our study demonstrated a significant positive impact of cognitive-behavioral intervention treatment on anxiety and depression among social science education students exposed to the cognitive-behavioral intervention compared to participants in a waitlisted group. The study results showed that there was a significant time × group interaction for anxiety and depression. Follow-up tests revealed that significant reduction in anxiety and depression persisted after 3 months for the students in the cognitive-behavioral intervention group in comparison to the students in the waitlisted group. Additional studies are required to corroborate the impact of cognitive-behavioral intervention in reduction of anxiety and depression symptoms in the Nigerian undergraduate student population.

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