



# Impacts of cognitive behavior therapy on occupational stress among science and social science education facilitators in open and distance learning centers and its implications for community development

## A randomized trial group

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### Abstract

**Background:** Extensive review of literature showed that no available study in Nigeria has explored the impact of cognitive behavior therapy (CBT) on the management of occupational stress among open and distance learning (ODL) centers science and social science education facilitators. Thus, this study determined the impacts of CBT on the management of occupational stress among science and social science education facilitators in ODL centers in South-South Nigeria.

**Methods:** A randomized controlled trial experimental design was adopted for the study with a sample size of 68 science and social science education facilitators in ODL centers in South-South states, Nigeria. Perceived stress scale (PSS) and Occupational stress index (OSI) were used for data collection. Using Cronbach alpha method, internal consistency reliability indices of 0.81 and 0.85 for PSS and OSI respectively were obtained in the Nigerian context. A 12-week cognitive behavior therapy intervention was conducted after which the participants in both the intervention group and the non-intervention group were administered posttest, while a follow-up assessment was administered after 2 months. Data collected were analyzed using mixed-design repeated-measures analysis of variance for the within-groups and between-groups effects.

**Results:** It was found that CBT intervention led to a significant decrease in the occupational stress among science and social science education facilitators in ODL in the South-South region of Nigeria.

**Conclusion:** Cognitive behavior therapy is effective in the management of occupational stress among science and social science education facilitators in distance learning centers.

**Abbreviations:** CBT = cognitive behavior therapy, ODL = open and distance learning, OSI = occupational stress index, PSS = perceived stress scale, SD = standard deviation, SPSS = statistical package for social sciences.

**Keywords:** cognitive behavior therapy, open and distance learning centers, community development, science and social science education facilitators, occupational stress, South-South

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The datasets generated during and/or analyzed during the current study are not publicly available, but are available from the corresponding author on reasonable request.

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## 1. Introduction

Over the past 20 years, there has been a significant change in the academic environment<sup>[1]</sup> resulting in the experience of occupational stress among academics.<sup>[2]</sup> Occupational stress in academia has been associated with job dissatisfaction, impaired work performance, poor psychological well-being, reduced employee engagement, among others.<sup>[3,4]</sup> Most academics experience a high level of occupational stress in Australia and New Zealand,<sup>[5]</sup> Canada,<sup>[6]</sup> UK,<sup>[2,7]</sup> South Africa (Dhanpat, Braine, & Geldenhuys as cited in<sup>[8,9]</sup> and in Nigeria.<sup>[10–12]</sup>

In line with the above submission,<sup>[13]</sup> found that the work environment in Nigeria is too stressful. According to Onasoga et al,<sup>[14]</sup> the working condition which is threatening and unsafe for the well-being of workers is the major cause of workers stress. According to Du Plessis,<sup>[8]</sup> academics in open and distance learning institutes experience much stress due to their over-reliance on technology to attend to students demands at any time of the day and retain their jobs. Consequently, the effort to keep up with information technology is one of the most cited stressors in distance education.<sup>[9]</sup> The distance learning academics need to be available 24 hours a day via their mobile phones and electronic mail.<sup>[8]</sup> Furthermore, the open distance learning (ODL) academics are exposed to unique challenges such as ever-changing technology applications to enable flexible learning, independent learning, and building of technology communities.<sup>[15]</sup>

According to Workers of America, as cited in,<sup>[16]</sup> occupational stress leads to low productivity, absenteeism, and increased rates of accidents on and off the job. Ekpenyong and Inyang<sup>[17]</sup> as reported in<sup>[16]</sup> reported that 39.25% of a group of workers in Nigeria have work-related disorders. Besides, Azodo and Ezeja<sup>[18]</sup> showed that in Nigeria, every 10 respondents showed severe occupational stress. It is believed that the level of work-related stress among Nigerian workers especially those in open distance learning centers can be managed if appropriately exposed to counseling therapy such as cognitive behavior therapy (CBT).

Cognitive-behavioral therapy (CBT) is a psychological intervention founded on emotions, cognition, and scientific approaches to human behaviors.<sup>[19]</sup> CBT is a group of psychotherapeutic techniques in which irrational behaviors are deemphasized by changing cognitions and behaviors.<sup>[20]</sup> According to Zafer,<sup>[21]</sup> CBT aims at reducing patients stress, target the disorders symptoms, re-evaluate the cognitive abilities of the patients as well as promote a helpful response to behavioral changes. According to James et al,<sup>[22]</sup> there are different treatment approaches to managing diverse mental disorders. In the treatment sessions, the therapists and their patients work together in understanding and identifying the challenges concerning the alignment between behavior, feelings, and thoughts.<sup>[23]</sup> A lot of studies have supported the effectiveness of cognitive behavior therapy (CBT) in the management of occupational stress or any form of irrational thoughts among university students and workers.

Sarida, Bergerb, and Segal-Engelchina<sup>[24]</sup> found significant effects of CBI on nurses' sense of coherence (SOC), perceived stress, and mood states. Cognitive restructuring intervention program of rational-emotive behavior therapy significantly reduced irrational thoughts arising from adverse childhood stress experience.<sup>[25]</sup> Sasha, Maria, and Ailsa<sup>[26]</sup> indicated that modified CBT yielded reductions in anxiety, obsessive-compulsive disorder (OCD), and depression. Dalgaard et al<sup>[27]</sup> found a

significant effect of a stress-management intervention (CBT) on a lasting return to work among patients with work-related stress complaints. Dalgaard et al<sup>[28]</sup> found significant group effects of Work-focused cognitive behavioral intervention on perceived stress and memory when compared to the control group. Eseadi et al<sup>[29]</sup> found a significant decline in depression was observed among the participants in the group after their exposure to rational emotive cognitive-behavioral coaching (RE-CBC). Zafer<sup>[21]</sup> found that cognitive behavioral therapy (CBT) is an effective method of treating people with irrational thoughts. Lauren and Kate<sup>[30]</sup> found that the CBT intervention program led to a reduced feeling of anger and increased self-esteem of clients. Onuigbo et al<sup>[31]</sup> found that the students exposed to rational emotive behavior therapy had a significant reduction in their depression scores both at post-treatment and follow-up evaluations, but no such changes were seen in the control group. Ugwuanyi et al<sup>[32]</sup> found that CBT-music intervention program led to a significant reduction in symptoms of test anxiety among the participants. Ugwuanyi et al<sup>[33]</sup> found that cognitive behavior therapy had a significant effect on the reduction of academic procrastination among physics, chemistry, and mathematics undergraduate students. It is evident from the above empirical evidence that CBT is effective in the management of occupational stress and other related irrational thoughts among workers and students. However, none of the studies considered the impact of CBT on the management of occupational stress among science and social science education facilitators in ODL centers in the South East, Nigeria.

Based on the foregoing and coupled with the fact that there is a lack of literature on the impact of CBT on the management of occupational stress among science and social science education facilitators in the ODL centers in the South East States, Nigeria, the current study was necessitated. Thus, the researchers hypothesized that there would be a significant impact of CBT on the management of occupational stress among science and social science education facilitators in the ODL centers.

## 2. Methods

### 2.1. Ethical approval

Ethical clearance letter was obtained for the conduct of the study through the University of Nigeria Committee on research ethics. Also, informed consent forms were given to the participants to sign before the commencement of the treatment.

### 2.2. Design of the study

A randomized controlled trial experimental design was adopted. Subjects were randomized into intervention and non-intervention groups. This study design has been used by<sup>[32,34–38]</sup> to carry out similar studies.

### 2.3. Participants

A total of 68 science and social science education facilitators were randomly sampled from all the open and distance learning (ODL) centers in South-South (SS) states, Nigeria. The recruitment of the participants was done through WhatsApp platforms of the science and social science education facilitators in those centers. Participation in the intervention program was made voluntary. Thus, the participants were asked to indicate their interest in

participating in the CBT intervention program. At the end of the advertisement period, 105 science and social science education facilitators volunteered to participate in the intervention program. These participants were screened for eligibility based on eligibility criteria which are:

1. Must be a staff of any of the ODL centers in SS Nigeria,
2. Must show signs of stress after the baseline measure using the occupational stress index (OSI).
3. Must be active in WhatsApp chatting and Zoom meeting platform.

The justification for using active WhatsApp and Zoom participants was for the fact that the intervention was delivered online and that disqualified all those who were not active in WhatsApp and Zoom from participating in the program. After checking for eligibility based on the eligibility criteria, 68 participants were selected and those formed the participants for the study. G-Power, version 3.1 gave 0.85 which is adequate sample size for this study.<sup>[39]</sup> The participants were randomized into intervention (n = 34) and non-intervention groups as shown in Figure 1.

**2.3.1. Demographic characteristics of the participants.**

Table 1 shows that there is a significant difference in the number of male and female science and social science education facilitators who participated in the study,  $\chi^2(1) = 11.87, P < .05$ . Similarly, significant differences exist with respect to the age, and religion of the participants,  $\chi^2(2) = 18.15, P < .050$ , and  $\chi^2(1) = 36.80, P < .050$ . The differences in the demographic characteristics of the participants were controlled by the researchers by ensuring that every participant was given adequate attention throughout the intervention period irrespective of the persons demographics. This enabled the researchers to conduct hitch-free intervention without discriminating among the participants based on their gender, age, and religion.

**2.4. Measures**

**2.4.1. Perceived stress scale (PSS).** Perceived stress scale developed by Cohen et al (1983) was adopted for the study. PSS is a 10-item, a self-reported unidimensional instrument developed to measure perceived stress in response to situations in a persons life. The items of PSS were structured on a 5-point scale of Never (0), Almost Never (1), Sometimes (2), Fairly Often (3), Very Often (4). The lowest and highest scores obtainable are 0 and 40 respectively. These items ask of workers feelings, thoughts, and activities about his/her work and home environments. Such items include: in the last month, how often have you been upset because of something that happened unexpectedly? The internal consistency reliability of the items of PSS was 0.81 using Cronbach alpha method.

**2.4.2. Occupational stress index (OSI).** Occupational stress index developed by Srivastava and Singh (1984) was adopted for the study. The OSI is a 46-item scale which assesses the extent of stress employees experience in the context of their life. The response options for OSI are - 5 for absolutely true, 4 for almost true, 3 for partially true, 2 for almost false, and 1 for absolutely false. To estimate the level of workers occupational stress, we add up the scores on all the statements. If the score is below 115, it indicates low occupational stress, scores between 116 and 161, indicate occupational stress is of moderate level, and a score above 161 indicates a highly stressed worker. The internal consistency reliability of the items of OSI was 0.85 using Cronbach alpha method.

**2.5. Procedure**

Before the commencement of the intervention program, advertisement for the intervention program was made for the declaration of interest in participation through various WhatsApp platforms of the science and social science education facilitators in those centers. Through that channel, 105 science and social science education facilitators showed interest in participating in the program. Then the researchers went further to administer the OSI on those who volunteered to participate in the program to assess for eligibility based on the set eligibility criteria. The result of the selection gave rise to 68 participants who meet the inclusion or eligibility criteria. At that point, the PSS was administered on the selected participants to get the second baseline data for the study.

The participants were then randomized into intervention and non-intervention groups. Both groups were properly briefed on the objectives of the study and how the program would be carried out. The 12 weeks intervention and non-intervention programs were carried using Zoom platform which provides video-telephony and online chat services through a cloud-based peer-to-peer software platform. The first Zoom online contact was for familiarization and setting a good forum for the implementation of the program. As a means of motivation and to ensure active participation in the program, an arrangement was made to provide data bundles for the participants. The meeting time and day were set to be 6 to 8 PM 2 times in a week (Wednesday and Friday) for 12 weeks starting from 15/11/2019 to 15/02/2020. During the period, the participants in the intervention group were exposed to the CBT intervention program, while the participants in the non-intervention group were exposed to normal conventional counseling. At the end of the program, the OSI and PSS were administered on the participants to collect the post-test measure.

**Table 1**  
**Demographic characteristics of the participants.**

Demographics characteristics		Intervention Group	Non- Intervention Group	N (%)	$\chi^2$	P
Gender	Male	20	19	39 (57.35)	11.87	.000
	Female	14	15	29 (42.65)		
Age	20–25	2	3	5 (7.35)	18.15	.000
	26–35	14	19	33 (48.53)		
	≥36	18	12	30 (44.12)		
Religion	Christian	30	31	61 (89.71)	36.80	.000
	Moslem	4	3	7 (10.29)		

Two months after the intervention program (15/04/2020), a follow-up measure was obtained using the OSI and PSS to ascertain the level of retention of the impact of the CBT on the participants. The participants, research assistants, and the data analysts were blinded during the recruitment process, treatment, and data analyses. The data obtained at pre-test, post-test, and follow-up measures were cleaned and subjected to data analysis.

## 2.6. CBT intervention program

The CBT intervention program manual for persons with irrational thoughts was adapted for this study from.<sup>[40]</sup> According to Muñoz et al,<sup>[40]</sup> the interaction among thoughts, actions, and feelings is what constitutes cognitive-behavioral therapy. In this manual, therapy sessions were divided into 3 modules with each module having 4 sessions.

**2.6.1. Module I: how participants thoughts affect their work experience (Sessions 1–4).** This module presents information about how participants thoughts influence their work experience. The initial session of this module establishes the structure and purpose of the subsequent sessions. Besides, the time, day of the sessions, rules for the therapy, and limits of confidentiality were properly established. In this module, the participants are made to know the limits and scope of confidentiality since this can affect the type and quality of the therapeutic relationship.

The first session started with a dialogue on occupational stress: what it is and how the participants experience it. At this session also, the therapist presented the purpose of the first module, which is to understand how participants thoughts influence their work experience by explaining clearly what thoughts are. The next 3 sessions were based on how different types of thinking errors and dysfunctional thoughts associated with occupational stress. The participants were also made to understand how these thinking errors and dysfunctional thoughts associated with occupational stress can be debated and modified to manage occupational stress. Between sessions, some exercises are targeted to identify thinking errors. In the sessions also, the participants were exposed to strategies for increasing positive thoughts and decreasing unhealthy or dysfunctional negative thoughts, and thus, decreasing occupational stress symptoms.

**2.6.2. Module II: how participants activities affect their work experience (Sessions 5–8).** Sessions 5-8 allowed the participants to associate participation in pleasant activities with occupational stress symptoms. There was a discussion on how the presence of occupational stress can limit participation in pleasant activities, which in turn, increases stress symptoms. During these sessions, pleasant activities were defined and obstacles for engaging in them were identified. The participants were also exposed to situations that will enable them to establish clear goals which can help to decrease occupational stress. Sessions were set aside for coaching the participants on steps in establishing reachable goals and those steps were practiced in sessions. The main focus of sessions 5-8 was to enable the participants to increase their control over their lives and learn to identify alternatives that will allow them to have more freedom and choices. The therapist guided the participants in setting achievable goals and carrying out activities that helped the participants in improving their work experiences.

**2.6.3. Module III: how participants relationships affect their work experience (Sessions 9–12).** This module introduced the

participants on how their relationships affect their work experience by clearly discussing social support and how it helps in confronting difficult situations. These sessions enabled the participants to learn how to identify and strengthen their social support networks. The last sessions integrate themes from the previous modules. The therapist together with the participants examined how thoughts affect the activities, social support, and relationships the participants engage in. Exercises were used to teach assertive communication skills that will help the participants establish healthy satisfying relationships. The CBT intervention program ended by reconsidering and integrating the main themes of each module. During the final session, an evaluation of the therapy experience was carried out with the participants to identify strengths and successes achieved.

## 2.7. Data analysis

The SPSS software version 26 was used to conduct the statistical analysis. Mixed design repeated measures analysis of variance was used to analyze the data collected. The assumption of the sphericity of the test statistic was tested using Mauchly test of sphericity and it was not significant (Mauchly  $W=.815$ ,  $P=.582$ ), implying that the assumption was not violated. The effect size of the intervention on management of occupational stress among science and social science education facilitators in ODL centers was reported using Partial Eta squared ( $\eta_p^2$ ) value. The data for this study are at the custody of the corresponding author and can be made available on request. The summary of the materials and methods is shown in Figure 2.

## 3. Results

Table 2 showed that the mean occupational stress rating of the participants in the intervention group as measured by OSI ( $M=173.74$ ,  $SD=9.55$ ) was slightly less than that of the participants in the non-intervention group ( $M=173.85$ ,  $SD=9.71$ ). However, at the post-test, the mean occupational stress rating of the participants in the intervention group ( $M=53.74$ ,  $SD=4.41$ ) was far less than that of the non-intervention group participants ( $M=143.12$ ,  $SD=14.35$ ). Similarly, at the follow-up measure, the mean occupational stress rating of the participants in the intervention group ( $M=52.68$ ,  $SD=7.58$ ) was far less than that of the non-intervention group participants ( $M=141.00$ ,  $SD=12.88$ ).

As measured by PSS, Table 2 also showed that the mean perceived stress rating of the participants in the intervention group ( $M=35.18$ ,  $SD=.72$ ) was almost the same as that of the participants in the non-intervention group ( $M=35.24$ ,  $SD=0.70$ ). However, at the post-test, the mean perceived stress rating of the participants in the intervention group ( $M=12.62$ ,  $SD=1.00$ ) was far less than that of the non-intervention group participants ( $M=23.59$ ,  $SD=7.83$ ). Also, at the follow-up measure, the mean perceived stress rating of the participants in the intervention group ( $M=11.94$ ,  $SD=1.35$ ) was far less than that of the non-intervention group participants ( $M=22.88$ ,  $SD=7.31$ ). Figure 3 shows the bar chart presentation of the mean occupational stress ratings of the intervention and non-intervention groups as measured by OSI and PSS.

Table 3 showed that there was a significant difference across the 3 time measures,  $F(2, 132)=1644.969$ ,  $P<.050$ ,  $\eta^2=.961$ , and significant differences between groups,  $F(1, 66)=1139.293$ ,

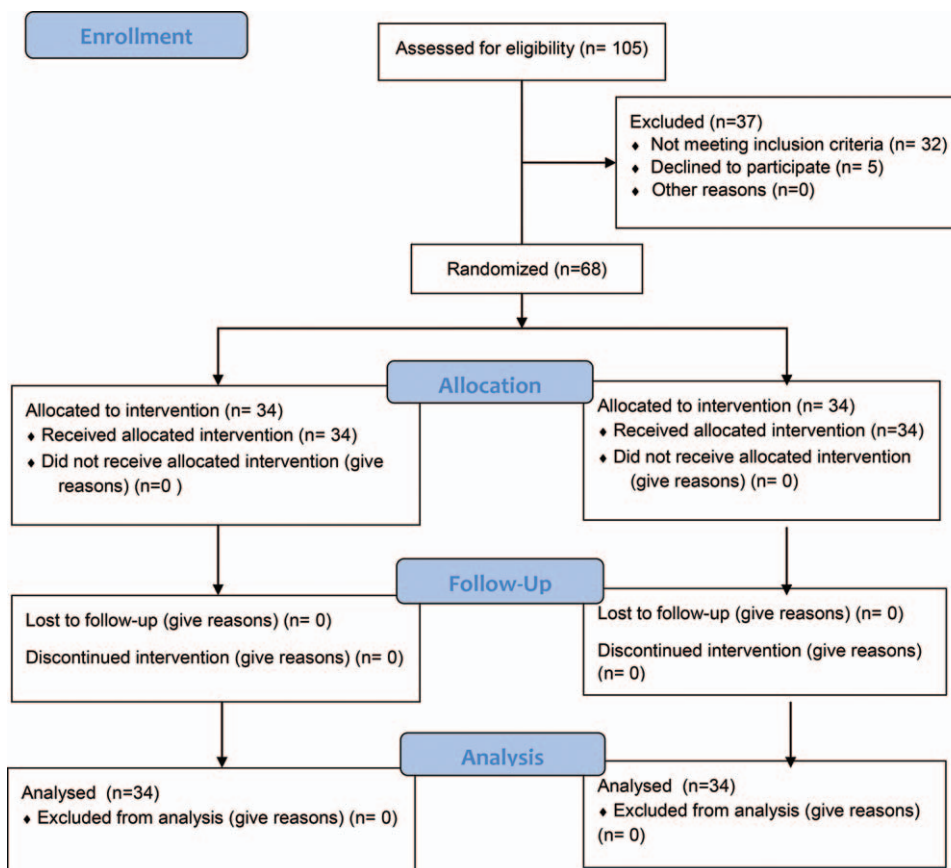


Figure 1. Consort flow diagram for participants allocation.

$P < .050$ ,  $\eta^2 = .945$ , in the management of occupational stress among science and social science education facilitators in ODL centers as measured by OSI. Besides, there was a significant interaction between time and treatment,  $F(2, 132) = 558.112$ ,  $P < .050$ ,  $\eta^2 = .894$ , as measured by the OSI.

On the other hand, there was a significant difference across the 3 time measures,  $F(2, 132) = 609.547$ ,  $P < .050$ ,  $\eta^2 = .902$ , and significant differences between groups,  $F(1, 66) = 74.583$ ,  $P < .050$ ,  $\eta^2 = .531$  in the management of occupational stress among science and social science education facilitators in ODL centers as measured by PSS. Also, there was also a significant interaction between time and treatment,  $F(2, 132) = 59.366$ ,  $P < .050$ ,  $\eta^2 = .474$ .

The above interaction effects showed that there was no significant difference between the baseline, and the non-intervention group did not change over time in their management of occupational stress. However, the mean occupational stress ratings of the intervention group decreased significantly over time, implying that CBT had significant effects on the management of occupational stress among science and social science education facilitators in ODL centers. Besides, the effect sizes of .945 and .531 indicated that 94.5 percent and 53.1 percent reductions in the occupational stress of the science and social science education facilitators as measured by OSI and PSS respectively, can be as a result of their exposure to CBT intervention. Figures 4 and 5 showed the nature of the interaction effects of time and treatment on the management of occupational stress among

science and social science education facilitators as measured by OSI and PSS.

As measured by OSI, Table 4 showed that the mean differences for the various pairs of measures are significant at  $P < .050$  except for the mean differences between measures 2 and 3, 3 and 2 with  $P > .050$ . However, as measure by PSS, the mean difference for all the pairs of measures are significant at  $P < .050$ .

#### 4. Discussion

The findings of the study showed that the CBT intervention program had significant impacts on the management of the occupational stress among science and social science education facilitators in ODL centers in South-South, Nigeria. The finding did not beat the expectations of the researchers in that the intervention program has the inherent ability to change the clients irrational thoughts or believes to rational ones and that has been empirically proven by this research. Similar studies have demonstrated the impact of CBT intervention program on the management of irrational thoughts such as test anxiety, burn out, or stress using different participants.

Sarida, Bergerb, and Segal-Engelchina<sup>[24]</sup> found significant effects of CBI on nurses sense of coherence (SOC), perceived stress, and mood states. Eseadi et al<sup>[25]</sup> found that cognitive restructuring intervention program of rational-emotive behavior therapy significantly reduced irrational thoughts arising from adverse childhood stress experience. Sasha, Maria, and Ailsa<sup>[26]</sup> indicated that modified CBT yielded reductions in anxiety,

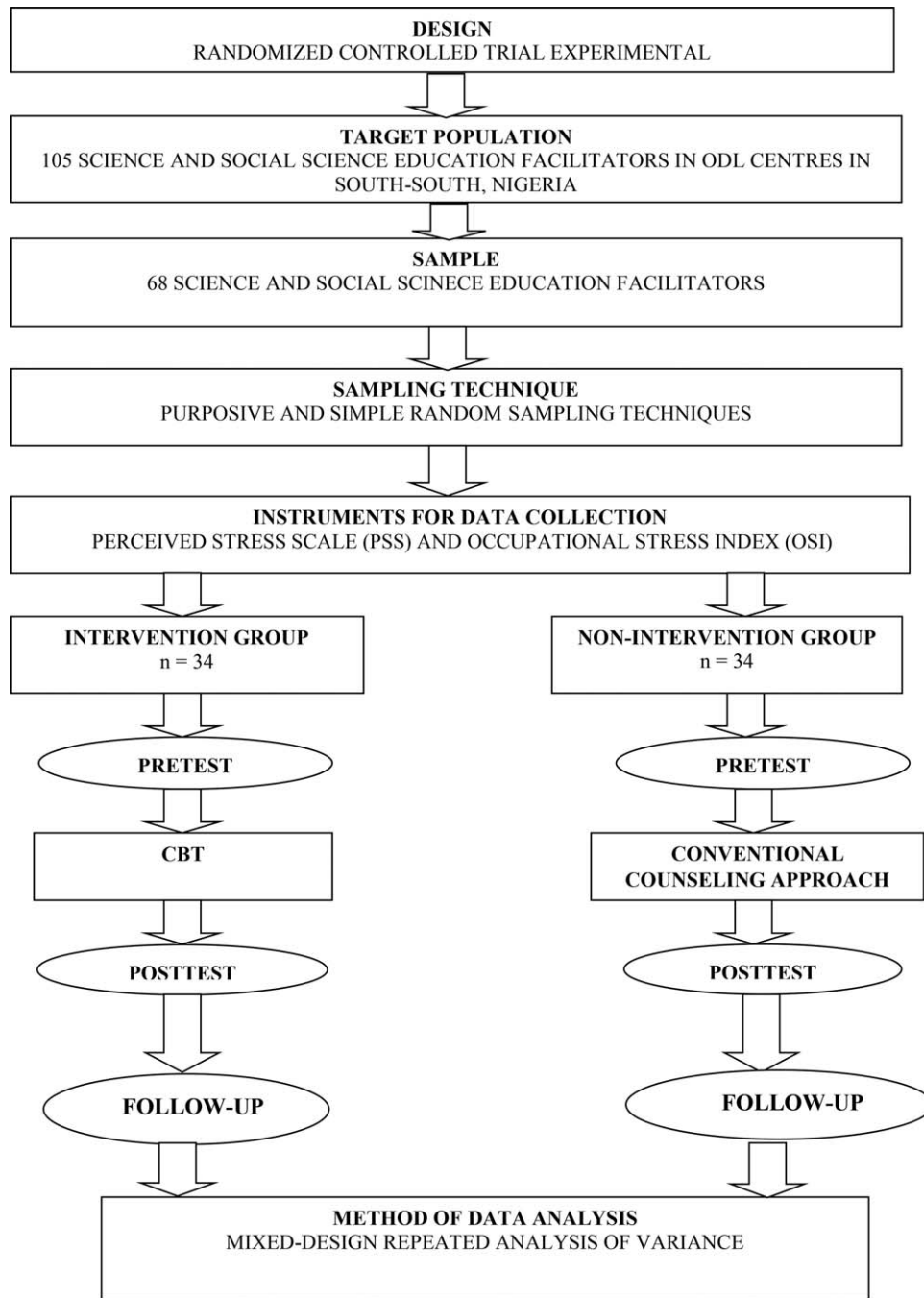


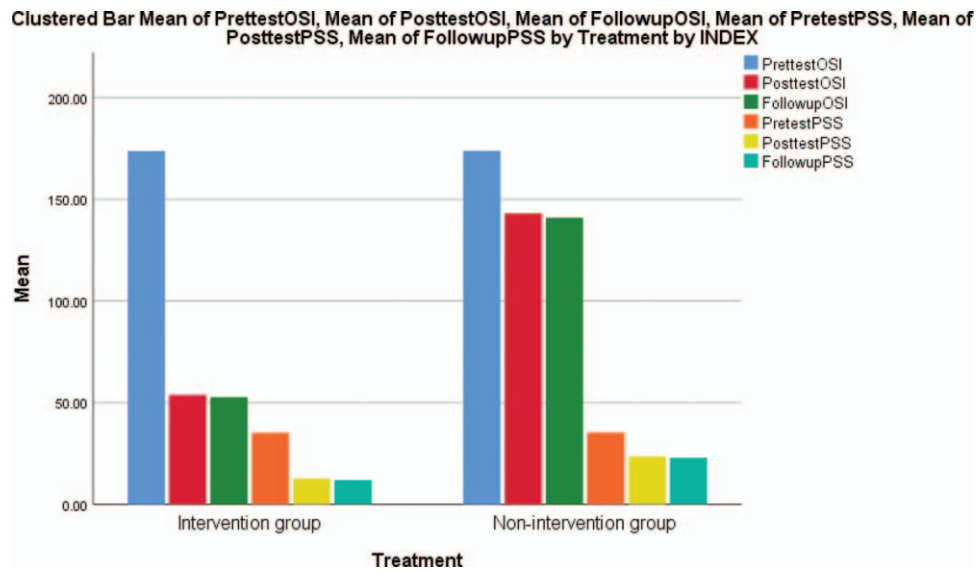
Figure 2. Schematic representation of the research method.

**Table 2**

Mean analysis of the occupational stress ratings of the intervention and non-intervention groups at 3 different times.

Treatment	Measure	n	Pre-test (1)		Post-test (2)		Follow-up (3)	
			Mean	SD	Mean	SD	Mean	SD
Intervention	OSI	34	173.74	9.55	53.74	4.41	52.68	7.58
Non-intervention		34	173.85	9.71	143.12	14.35	141.00	12.88
Intervention	PSS	34	35.18	.72	12.62	1.00	11.94	1.35
Non-intervention		34	35.24	.70	23.59	7.83	22.88	7.31

OSI = Occupational stress index, PSS = perceived stress scale, SD = standard deviation.



**Figure 3.** Graph of the pre-test, post-test and follow-up mean occupational stress ratings of the participants in intervention and non-intervention control groups as measured by OSI and PSS.

obsessive-compulsive disorder (OCD), and depression. Dalgaard et al<sup>[27]</sup> found a significant effect of a stress-management intervention (CBT) on a lasting return to work among patients with work-related stress complaints. Dalgaard et al<sup>[28]</sup> found significant group effects of Work-focused cognitive behavioral intervention on perceived stress and memory when compared to the control group.

Eseadi et al<sup>[29]</sup> a significant decline in depression was observed among the participants in the group after their exposure to rational emotive cognitive behavioral coaching (RE-CBC). Zafer<sup>[21]</sup> found that cognitive behavioral therapy (CBT) an effective method of treating people with irrational thoughts. Lauren and Kate<sup>[31]</sup> found that the CBT intervention program led to a reduced feeling of anger and increased self-esteem of the client. CBT-music intervention

program led to a significant reduction in the symptoms of test anxiety among participants.<sup>[32]</sup> Cognitive behavior therapy had a significant effect on the reduction of academic procrastination among physics, chemistry, and mathematics undergraduate students.<sup>[33]</sup> This finding has implications for community development in that when the science and social science education facilitators in ODL centers manage their occupational stress well, they will give in their best in preparing the learners in ODL centers which in turn will help the learners to contribute to the development of the communities they belong.

**4.1. Limitations of the study**

The findings of this study may have suffered some limitations arising from the poor browsing network encountered during the

**Table 3**

**Mixed design repeated measures analysis of variance for the tests of within-subjects effect and between-subjects effects of the intervention.**

Measure	Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	
Tests of Within-subjects effect								
OSI	Time	Sphericity Assumed	263046.951	2	131523.475	1644.969	.000	.961
	Time * Treatment	Sphericity Assumed	89247.657	2	44623.828	558.112	.000	.894
	Error(Time)	Sphericity Assumed	10554.059	132	79.955			
PSS	Time	Sphericity Assumed	13818.029	2	6909.015	609.547	.000	.902
	Time * Treatment	Sphericity Assumed	1345.794	2	672.897	59.366	.000	.474
	Error(Time)	Sphericity Assumed	1496.176	132	11.335			
Tests of Between-subjects effect								
OSI	Intercept		3087300.078	1	3087300.078	19629.453	.000	.997
	Treatment		179186.843	1	179186.843	1139.293	.000	.945
	Error		10380.412	66	157.279			
PSS	Intercept		113365.103	1	113365.103	3091.062	.000	.979
	Treatment		2735.338	1	2735.338	74.583	.000	.531
	Error		2420.559	66	36.675			

OSI = occupational stress index, PSS = perceived stress scale,  $\eta^2$  = effect size.

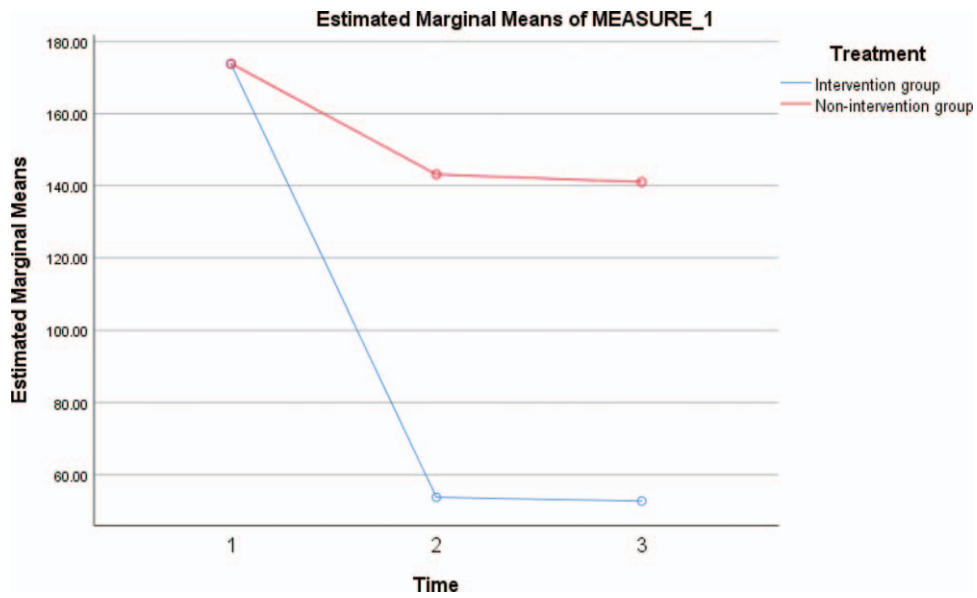


Figure 4. Interaction graph of time and treatment as measured by OSI.

intervention program. During the intervention period, there were obstructions in the flow of the intervention contents as a result of poor browsing network. Despite that efforts were made to flow well in the intervention procedure, the generalizability of the findings should be handled with caution. Also, the researchers could not analyze potential moderators such as gender, tribe, age, and religion on the impact of CBT on occupational stress. Based on that, therefore, the researchers suggested that future researchers can replicate the study through face to face contact and considering the moderating influence of any of the potential moderators on the impacts of CBT on the occupational stress of science and social science education facilitators.

**5. Conclusion**

This study has shown that CBT had a significant impacts on the management of occupational stress among science and social science education facilitators in ODL centers in South-South, Nigeria. This has contributed to the existing body of knowledge in the area of science and social science education in that it is the first research output that proved the impact of CBT on the management of occupational stress among science and social science education facilitators in ODL in centers in the South-South, Nigeria. Based on the findings of the study, the researchers recommended that seminars and workshops should be organized by the relevant ODL authorities for the science and social science

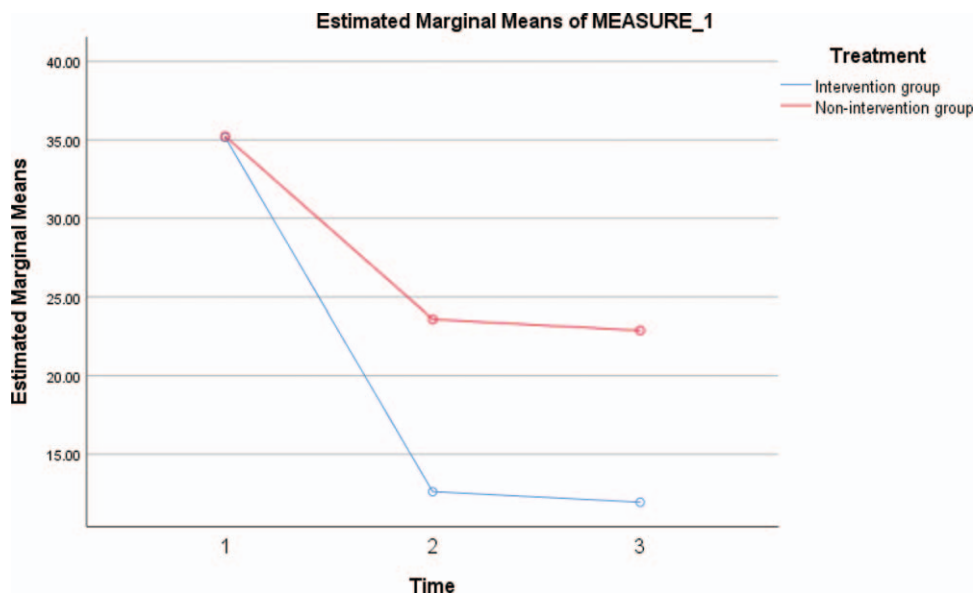


Figure 5. Interaction graph of time and treatment as measured by PSS.



**Table 4****Post Hoc Pairwise Comparisons for the significant difference across the 3 times.**

Measure	(I) Time	(J) Time	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence interval for difference	
						Lower bound	Upper bound
OSI	1	2	75.368*	1.760	.000	71.045	79.690
		3	76.956*	1.848	.000	72.417	81.495
	2	1	-75.368*	1.760	.000	-79.690	-71.045
		3	1.588	.738	.105	-.226	3.402
	3	1	-76.956*	1.848	.000	-81.495	-72.417
		2	-1.588	.738	.105	-3.402	.226
PSS	1	2	17.103*	.716	.000	15.344	18.862
		3	17.794*	.677	.000	16.131	19.458
	2	1	-17.103*	.716	.000	-18.862	-15.344
		3	.691*	.169	.000	.276	1.107
	3	1	-17.794*	.677	.000	-19.458	-16.131
		2	-.691*	.169	.000	-1.107	-.276

OSI = occupational stress index, PSS = perceived stress scale.

education facilitators to be counseled using the CBT intervention program. This seminar or workshop should be organized from time to time to enable the science and social science education facilitators to cope with the challenges of the ODL work demands.

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