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Cognitive behavioral therapy for challenges to quitting tobacco smoking among social science and religion students

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Abstract

Background: Tobacco smoking is a public health issue. The aim of this investigation was to determine the effect of cognitive behavioral therapy (CBT) on the disputation of challenges to quitting tobacco smoking among students enrolled in the Social Science and religious Education programmes.

Methods: The study adopted a pretest-posttest randomized controlled group design with follow-up. The population comprised of 76 tobacco smokers (randomized into 1 of 2 groups: n = 38 for the treatment group, n = 38 for the waitlist control group) completed the study. A self-report scale measuring dependence on cigarettes was used as the outcome measure. The treatment group was exposed to a 12-weeks CBT intervention. The treatment and waitlisted groups were evaluated at 3 time points: pretest, post-test, and follow-up. Statistical analyses were achieved using ANOVA.

Results: The result showed that CBT had a significant effect in reducing the challenges to quitting tobacco smoking among the student smokers in the treatment group in comparison with the waitlist control group. The positive behavioral gains after the CBT program also persisted at follow-up in the treatment group compared with the waitlist control group.

Conclusion: Therefore, this study suggests that CBT intervention is a time-effective treatment method for disputation of challenges to quitting tobacco smoking among students enrolled in the Social Science and Religious Education Programmes.

Abbreviations: % = percentage, CBT = cognitive behaovioural therapy, CSS-21 = challenges to stopping smoking-21, WCG = waitlist control group, α = 0.05, χ^2 = Chi-square.

Keywords: challenges to quitting tobacco smoking, cognitive behavior therapy, social science and religious education programme, stopping smoking

1. Introduction

Tobacco usage accounts for nearly 1.2 billion users around the globe, causing more than 7 million deaths per year with about 10 percentage (%) of these resulting from passive smoking.[1,2] It accounts for some 4,00,000 deaths per year in the USA and approximately 1,00,000 in the UK.[3,4] In Nigeria, WHO estimated about 13 million smokers in 2012,[5] with over 16,000 deaths attributable to smoking.[6] Studies have also revealed a high rate of tobacco consumption and increased independence in Nigeria.[7–12] Nigeria has been the most populous nation in

Africa with a large population of adolescents and young people, which affects health indices across the region needs to be guided on the risks inherent in tobacco use.[13,14] The Global Youth Tobacco Survey of Nigeria 2008 showed that 1 in 5 students aged 13 to 15 years had used tobacco, and about 1 in ten students currently smoked cigarettes.[15]

Most tobacco users were found to experience smoke dependence during their studentship and difficulty in curbing it.[16] The authors maintained that trend continues through their adult stage where they will reinforce a vicious cycle of tobacco users. Considerable evidence from research[17] also reported

that a good number of Nigerian students are tobacco-dependent. Tobacco dependence is a mental and behavioral disorder resulting from the use of psychoactive substances which make it incredibly difficult for users to quit the habit.[18,19]

The health consequences of tobacco use can be traced to the duration and quantity of tobacco use. Hence, early use of tobacco increases the likelihood of contracting non-communicable diseases and greater chances of morbidity and mortality.[20] Other health problems associated with tobacco use and dependence include the development of cardiovascular diseases,[21,22] chronic obstructive pulmonary disease, many forms of cancer (e.g., lung, trachea, and bronchus cancers),[20,23–26] as well as major disabling conditions, such as dementia, blindness (macular degeneration), deafness, peripheral vascular disease (leading to amputations), stroke, and premature death,[11] and therefore presents a major public health concern.

Given the prevalence of chronic health risk factors involved in tobacco consumption, the Nigeria National Tobacco Control Act of 2015, domesticated the WHO FCTC of 2005. However, implementation has been poor as most public places are yet to be smoke-free, and no funds have been dedicated to tobacco law enforcement.[27] Schools, especially, universities and their students are not exempted from the public places yet to be smoke-free. It has been noted that University students make use of tobacco for various reasons among which are to relieve stress and to raise their morale.[28] This has been found to have health, psychological and social implications and can lead many students to substance dependence.[29]

Social science and religious education students represent an important part of the population as they are social welfare providers, who are regarded as having a high degree of reliability in interpreting civic responsibilities that will help in controlling social-related vices among the general public. Hence, are advantageously placed to advance the anti-tobacco use and dependence message. Social science and religious students indulging in tobacco use within and outside the school settings set a poor example of civic-promoting behaviors and may have the potential to unintentionally reinforce tobacco use and dependency behaviors of others through modeling, rather than help users quit.[30] Some of them in religious education programme do not consider that they are religious education that should be role models to other students.

Despite the evidence of high profile of habitual tobacco use and dependency among the general public, especially young people and students, little is known about psychotherapeutic intervention options for this population, and more research is needed to identify effective psychotherapeutic interventions to restructure the thinking patterns of people towards tobacco use.[31] This highlights the need for cessation-based cognitive intervention and public health education campaigns like the cognitive behavioral therapy programs (CBT) that could disorient and distort the thoughts and feelings of current users and dependents to quit. Using for intervention to manage and control tobacco use and dependence, CBT integrates behavioral therapies (e.g., changing habits to anticipate and avoid temptations to smoke), and motivational therapies (e.g., therapists' support and reinforcement of patient-generated reasons for quitting and sustaining abstinence).

Beck[32] stated that cognitive behavior therapy (CBT) is an evidence-based approach for solving present problems and changing unhelpful thinking and behavior of individuals. Underlying the principles and practice of this approach in tobacco use and dependence is that what 1 thinks and feels about tobacco use has a large impact on his behavior. The behavior here is seen as the usage such as smoking and any other action that encourages it. We, therefore, argue that once the dysfunctional thinking pattern towards tobacco use is changed, a change in behavior (cessation or quit) will follow. As cognitive-behavioral approach alters and changes maladaptive cognition, it is assumed that automatic thoughts that are linked to tobacco use and dependence could

be modified using a cognitive approach.[33,34] CBT can be useful in helping individuals to learn cognitive coping skills required to manage negative moods or urges to smoke and quit smoking.[35] The skills involved in the use of CBT to quit tobacco use include: Individualized problem-solving strategies; changing thinking patterns; education about the quit process; identifying social or environmental cues that trigger the urge for tobacco use; identifying motivational cues; aversion therapy; social support.

The use of CBT intervention is found to be effective in restructuring dysfunctional beliefs and urges towards tobacco use and dependence.[36] Also, the therapeutic techniques involved in the use of CBT are found to be very helpful for the reduction of smoking cessation.[37] In the same vein, Stead and Lancaster[38] in their study revealed a significant reduction in smoking addiction among 1 in every 4 smokers in a CBT group at 6 months follow-up. When smokers strictly adhere to a well-designed CBT intervention, it can help them to quit smoking without relapsing.[32,39] This is evidenced in a study by Fiore et al,[40] on which they combined CBT with medication and recorded a strong positive correlation between the total amount of cessation counseling and abstinence. In another study, using schizophrenic patients,[41–43] found CBT to be effective in modification for smoking cessation. Despite the health consequences of cigarette smoking little is known about cognitive-behavioral intervention specifically designed to assist student tobacco users and dependence in Nigerian setting to quit tobacco usage. To the best knowledge of the present researchers and available literature available to us, no empirical study has investigated the effect of cognitive behavioral therapy on the disputation of challenges to quitting tobacco smoking among students enrolled in the Social Science and Religious Education programmes. In view of this, the main objective of this study was therefore to examine the effect a cognitive-behavioral intervention would have on the disputation of challenges to quitting Tobacco smoking among students enrolled in the Social Science and Religious Education programmes.

2. Methods

2.1. Design

The study utilized group pretest, posttest, and follow-up group randomized controlled design as in past studies.[44–47] This method was used to randomize the participants into 2 different groups (CBT group and comparison group).

2.2. Ethical adherence and participants

The researchers sought approval for conducting this study from their respective departmental research ethics committee at their institutions. The ethics in research with human participants as stipulated in American Psychological Association[48] guidelines were strictly adhered to by the researchers. They also ensured that the conduct of the study was in line with the Declaration of Helsinki. A total of 102 student tobacco smokers enrolled in the Social Science and Religious Education programmes in Nigeria were recruited for the study. Though a good number of people in school settings smoke tobacco why only 102 students were accepted to be enrolled into the program could be that other students may not want to be identified as smokers. However, 76 student tobacco smokers met the inclusion criteria and were enrolled as participants. Inclusion criteria include: being a current smoker; being in second to the 4th year, and using World Health Organization criteria. GPower 3.1 software[49] was employed to ensure that the participants were true representatives of the student populations, but it was unfortunate that sampled participants were inadequate.

Upon this, a written informed consent form was sent to the participants using their various email addresses as provided by their departments in their respective universities. After
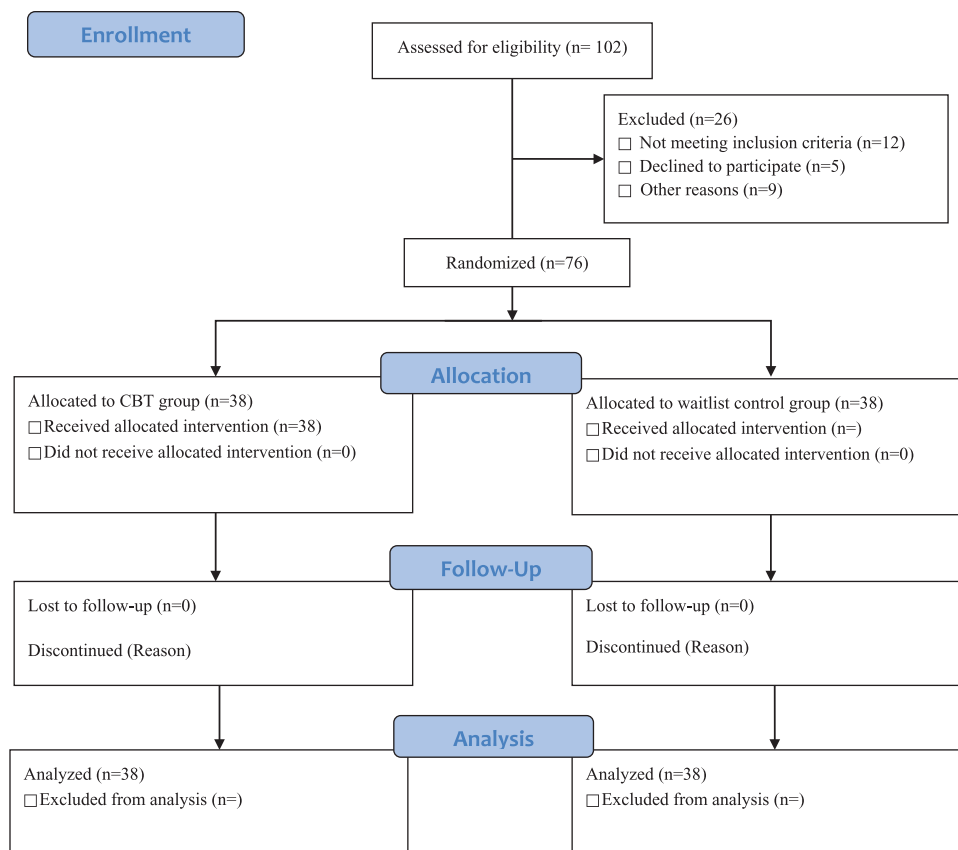
Figure 1. Consort participant eligibility flowchart.

reading the free and informed consent form, the students were informed about the purpose of the study and were given the freedom to decide whether to participate or not. One hundred and 2 students completed the written informed consent forms. The researchers employed exclusion criteria which were listed out to include: being a 1st-year student; being an ever-smoker; currently involved in any smoking cessation treatment or medication; being an experimenter; being a never smoker; being a former smoker. This gave rise to having 2 hundred tobacco users who met the inclusion criteria and were selected as participants in this study. The inclusion criteria include: being a social science education student; being a current smoker; must be identified using the dependent measure (CSS).

2.3. Dependent measure

The instrument used for data collection is the challenges to stopping smoking-21 (CSS-21) scale. The CSS is a 21-item scale developed and validated by Thomas et al[50] to identify challenges to stopping smoking. There are 2 dimensions of the instrument. The first dimension focused on intrinsic components (physical, psychological, or cognitive) of stopping with 9-items. The internal reliability of the 9-items was 0.86. Samples of intrinsic factor dimension include *"Feeling lost without cigarettes, Being addicted to cigarettes, Thinking about never being able to smoke again after I stop smoking, et cetera."* On the other hand, this dimension of CSS has 12 items, addressing the social dimension of excessive smoking control and stopping. Samples of the items in cluster 2 include *"Difficulty in finding someone to help me to stop smoking, Lack of support or encouragement from health professionals to stop smoking, Belief that medicines to stop smoking do not work, et cetera."* The internal consistency reliability of the CSS-21 was reported to valid and reliable. To confirm the reliability in the Nigerian context, the current study

found an internal consistency of 0.71alpha using Nigerian student populations. Using SPSS Statistics, the items were labeled from CSS1 to CSS21. After entering the data, analyze button was selected through which scale led to a reliability analysis dialogue box. The data were transferred to the items box. The items and scale were selected. A "continue" box was clicked that generated the output. The value showed 0.71 which is acceptable as a reliable scale.[51,52]

2.4. Treatment procedure

Out of the 100 and 2 (102) students screened, 76 students were admitted into the study. Randomization of the participants was conducted using the flip char by balloting technique. Here the researchers wrote out inscriptions "TG" and "WL" (depicting treatment group and waitlist group respectively) on paper into 102 pieces each and folded the papers into a container. The participants were all invited and after a brief introduction, they were asked to pick a card from the container. The participants with TG inscription were randomly assigned to the CBT group (38 participants), while those with inscription WL were randomly assigned to the waitlist control group. This ensured the participants equal chances of getting into either the treatment or waitlist control group (38 participants). See Figure 1. Being that 4 members of the research group were grounded in the basics and principles of CBT practices and administration, 4 of them carried out the intervention process. Since the participants were conversant with English language, the intervention was delivered using English Language. The study duration lasted for 24 sessions, 3 times per month for 8 months. Given a total of 12 weeks and 4 weekly follow-up sessions held after 30 days. 120 minutes duration was mapped out for each of the sessions. The final assessment was done on participants in both intervention and waitlisted groups. The researchers developed a CBT intervention package that was used

for the treatment process. The goal was to change and restructure thought processes combined with the new learning behavior of tobacco users and dependence towards quitting tobacco use and to prevent relapse. The participants were given a self-help CBT manual structured to align with the series of the sessions at the onset of the treatment. The therapists used the first month sessions to introduce the program, get familiarized with the participants, and discuss the established guiding principles for the rest of the sessions. The cognitive restructuring techniques used include but are not limited to the double standard method, thinking in shades of gray, re-attribution, and defining terms.[53] For further clarification, the therapists adopted the yoga-enhanced CBT techniques.[54] and behavioral and experiential techniques. This helped to expose the participants to the 10 stages of smoking cessation.[53] Skills demonstrated during the therapy were active listening, empathy, genuineness, and positive regard skills. This enabled the therapists to incorporate components of a person-centered treatment in the CBT intervention package. The therapists also included discussion on the rate of tobacco consumption and factors that militate against its cessation or quitting using postponement and gradual reduction and practice exercises as suggested by experts.[55] Other strategies employed include: Socratic questioning, behavioral activation, problem-solving techniques, relaxation techniques, imagery, respiratory practices, homework assignments were also used.[36,56]

2.5. Cognitive-behavioral therapists and treatment fidelity

The Cognitive-behavioral therapists used were 2 professionals with good practice experience. They had long-range orientation in CBT where their masters and Ph.D. degrees were obtained. They were within the age range of 37 to 48 years. Based on their experiences in CBT, the researchers only briefed them on the procedure to deliver the CBT manual.

Considering the high proportion of student smokers who have recorded several failed efforts to stop smoking as reported in earlier works of literature [e.g.,[53]] we had treatment assessors. These were teams of researchers assigned to monitor the activities of the therapists and participants. The goal was to ensure that each participant's level of attendance was recorded. In addition, it aimed at adequate implementation of the treatment session, adhering to the recommendations of the treatment manual as planned by the researchers. During the initial meeting, participants were made to understand there was a team that would monitor their compliance level. The team also used a treatment checklist at each treatment session.

2.6. Data analysis

The data from Time 1 (pretest), Time 2 (posttest), and Time 3 (follow-up) were subjected to statistical analysis using SPSS version 18. Specifically, 2-ways Analysis of covariance (ANCOVA) was used for the method of data analysis. ANCOVA was used by the researchers. The assumption of the homogeneity of variance was determined using Leven's test of equality of variance was met, ($F = 0.628$, $P = .600$ at time. There was complete randomization of participants into treatment and control groups; the independent variable has 2 levels (Cognitive Behaovioural Therapy and waitlisted control groups) and the levels were categorical; the dependent variable:- challenges to stopping tobacco usage was measured as continuous data; and data at pretreatment, post-treatment, and follow-up levels were simultaneously analyzed as the sub-dependent variable. The effect size of the intervention was reported using Partial Eta squared.

3. Results

Table 1 shows that the CBT group comprised 27 males (71.1%) and 11 (28.9%) females; the waitlist control group comprised

29 males (76.3%) and 9 (23.7%) females. From the analyses of results, no significant gender difference was observed among the study participants ($\chi^2 = 0.271$, $P = .601$). In the CBT group, the average mean age of participants was 22.53 ± 3.20 whereas, in the waitlist control group, the average mean age of participants was 22.66 ± 3.32. No significant age difference was observed among the participants ($t = -0. 176$, $P = .861$). However, the overall average was 22.59 ± 3.24 with skewness and kurtosis of 0.597 and -0.285 respectively. Regarding location, in the CBT group, 15 participants (39.5%) were from a rural area, 23 (60.5%) were from urban areas. In the waitlist control group, 14 participants (36.8%) were from a rural area, 24 (63.2%) were from urban areas. No significant location difference was observed among the participants ($\chi^2 = 0.056$, $P = .813$). Concerning students' tobacco status, in the treatment, 5(13.2%) of the participants were ex-tobacco users, 13 (34.2%) of the participants were occasional tobacco users, and 20 (52.6%) of the participants were daily tobacco users. In the waitlist control group, 4(10.5%) of the participants were ex-tobacco users, 13 (34.2%) of the participants were occasional tobacco users, and 21 (55.3%) of the participants were daily tobacco users. No significant tobacco status difference was observed among the participants ($\chi^2 = 0.136$, $P = .934$). Concerning a number of years in tobacco usage, in the treatment (CBT) group, 8 participants (21.1%) have used tobacco for a period of 2years and below, 10 (26.3%) have used tobacco for 3 to 4 years, 14 (36.8%) have used tobacco for 5 to 6 years, and 6 (15.8%) have used tobacco for 7 years and above; In the waitlist control group, 9 participants (23.7%) have used tobacco for a period of 2 years and below, 11 (28.9%) have used tobacco for 3 to 4 years, 11 (28.9%) have used tobacco for 5 to 6 years, and 7 (18.4%) have used tobacco for 7 years and above. No significant number of years in tobacco usage difference was observed among the participants ($\chi^2 = 0.543$, $P = .909$). Concerning the level of study, in the treatment (CBT) group, 6 participants (15.8%) were in year 1, 13 (34.2%) were in year 2, 11 (28.9%) were in year 3 and 8 (21.1%) were in year 4; In the waitlist control group, 10 participants (26.3%) were in year 1, 10 (26.3%) were in year 2, 13 (34.2%) were in year 3 and 5 (13.2%) were in year 4. No significant level of study difference was observed among the participants ($\chi^2 = 2.250$, $P = .522$). Regarding socioeconomic status, in the treatment (CBT) group, 10 participants (26.3%) were from parents with low socioeconomic status, 18 (47.4%) were from parents with moderate socioeconomic status, and 10 (26.3%) were from parents with high socioeconomic status; In the waitlist control group, 9 participants (23.7%) were from parents with low socioeconomic status, 14 (36.8%) were from parents with moderate socioeconomic status, and 15 (39.5%) were from parents with high socioeconomic status. No significant socio-economic status difference was observed among the participants ($\chi^2 = 1.553$, $P = .460$). Regarding ethnicity, in the treatment (CBT) group, 15 participants (39.5%) were from Igbo, 5 (13.2%) were from Hausa, 7 (18.4%) were from Yoruba, and 11 (28.9%) were from another ethnic background; In the waitlist control group, 13 participants (34.2%) were from Igbo, 6 (15.8%) were from Hausa, 10 (26.3%) were from Yoruba and 9 (23.7%) were from another ethnic background. No significant ethnic difference was observed among the study participants ($\chi^2 = 0.963$, $P = .810$).

Table 2 reveals the mean and standard deviation outcomes for the participants in the treatment and control groups as measured by CSS-21 scale. At Time 1 (pretest) stage for CBT, male and female participants had mean scores of (=72.36, SD = 3.04), and (=72.48, SD = 5.21) respectively; For the waitlist control group (WCG) at pretest stage, male and female participants had mean scores of (=72.71, SD = 3.96), and (=71.87, SD = 3.20) respectively. At Time 2 (posttest) stage, male and female participants in CBT group had mean scores of (=36.12, SD = 3.54), and (=36.65, SD = 5.19) respectively; For the WCG, the mean scores of male and female participants were (=59.02, SD = 8.22), and

Demographic characteristics of the participants.

Characteristics	CBT Group n(%)	Waitlist control group n(%)	Statistic	sig
Gender χ²				
Male	27(71.1)	29(76.3)	.271	.602
Female	11(28.9)	9(23.7)		
Age t-test				
Average Age	22.53 ± 3.20	22.66 ± 3.32	-.176	.861
Age Range	18-30yrs			
Skewness	0.597			
Kurtosis	-0.287			
Location χ²				
Rural	15(39.5)	14(36.8)	.056	.813
Urban	23(60.5)	24(63.2)		
Students' Tobacco Status				
Ex-Tobacco User	5(13.2)	4(10.5)	.136	.934
Occasional User	13(34.2)	13(34.2)		
Daily User	20(52.6)	21(55.3)		
Number of Years in Tobacco Usage				
2yrs & below	8(21.1)	9(23.7)	.543	.909
3-4yrs	10(26.3)	11(28.9)		
5-6yrs	14(36.8)	11(28.9)		
7yrs & above	6(15.8)	7(18.4)		
Level of study				
Yr 1	6(15.8)	10(26.3)	2.250	.522
Yr 2	13(34.2)	10(26.3)		
Yr 3	11(28.9)	13(34.2)		
Yr 4	8(21.1)	5(13.2)		
Parents' Socio-Economic Status				
Low	10(26.3)	9(23.7)	1.553	.460
Moderate	18(47.7)	14(36.8)		
High	10(26.3)	15(39.5)		
Ethnicity				
Igbo	15(39.5)	13(34.2)	.963	.810
Hausa	5(13.2)	6(15.8)		
Yoruba	7(18.4)	10(26.3)		
Others	11(28.9)	9(23.7)		

χ² = Chi-square, %=Percentage, CBT = cognitive behaovioural therapy, n = number of participant, sig = Associated probability, t = independent sample t-test.

Mean and standard deviation of participants in challenges to stopping tobacco for CBT and WC groups with regards to gender.

Gender	Number		Time1 (Pretest)		Time2 (Posttest)		Time3 (Follow-up)	
	CBT N_1	WCG N_2	CBT Mean(SD)	WCG Mean(SD)	CBT Mean(SD)	WCG Mean(SD)	CBT Mean(SD)	WCG Mean(SD)
Male	27	29	72.36(3.04)	72.76(3.96)	36.12(3.54)	59.02(8.22)	29.18(3.81)	53.99(7.67)
Female	11	9	72.48(5.21)	71.87(3.20)	36.68(5.19)	53.85(14.34)	27.45(4.07)	51.61(14.07)
Total	38	38	72.20(3.72)	72.55(3.77)	36.28(4.02)	57.80(10.03)	28.68(3.91)	53.43(9.41)

CBT = Cognitive Behaovioural Therapy, N_1 = number of participants in CBT group, N_2 = number of participants in WCG group, Time1 = pretreatment stage tobacco score, WCG = waitlist control group.

(=53.85, SD = 14.34) respectively. At Time 3 (follow-up) stage, male and female participants in CBT group had mean scores of (=29.18, SD = 43.81), and (=27.45, SD = 4.07) respectively; For the WCG, the mean scores of male and female participants were (=53.97, SD = 7.67), and (=51.61, SD = 15.07) respectively. The overall mean/standard deviation of challenges to stopping tobacco scores at pretest, posttest, and follow-up stages for the CBT group was 72.20(3.72), 36.28(4.02), and 28.68(3.91) respectively. The mean result presented in Table 2 indicates that there was a continuous decrease in the mean challenges to stopping tobacco scores of participants in the treatment group over time. For the WCG, the overall mean/standard deviation of challenges to stopping tobacco scores at pretest, posttest, and follow-up stages was 72.55 (3.77), 57.80 (10.03), and 53.43 (9.41) respectively. Although there was a steady decrease in the

mean challenges to stopping tobacco scores of participants in the waitlisted group over time, it was not as low as that of the treatment group.

Table 3 shows the treatment effect of CBT in reducing challenges to stopping tobacco. Secondly, the result in the same shows the influence of gender on challenges to stopping tobacco. Thirdly, the Table shows the interaction effect of groups and gender with respect to CBT and challenges to stopping tobacco. The results of CBT treatment for the participants in the treatment group compared to the WCG over the 3 periods indicate that before the treatment (Time 1), there was no significant difference between the treatment and control groups in initial mean challenges to stopping tobacco score among participants in Nigeria as measured by CSS_21, $F (1, 76) = 0.011$, $P = .916$, =0.000, $\Delta R2 = -0.036$. At the post-treatment (Time 2) the effect

Table 3

Multivariate Analysis of Variance showing the effect of CBT on challenges to stopping Tobacco usage in Nigeria as measured by CSS-21.

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Time1	6.011	3	2.004	.140	.936	.006
	Time2	8978.454	3	2992.818	52.116	.000	.685
	Time3	11706.801	3	3902.267	74.381	.000	.756
Intercept	Time1	306342.991	1	306342.991	21350.075	.000	.997
	Time2	126029.485	1	126029.485	2194.642	.000	.968
	Time3	96220.837	1	96220.837	1834.053	.000	.962
GROUP	Time1	.159	1	.159	.011	.916	.000
	Time2	5869.534	1	5869.534	102.210	.000	.587
	Time3	8772.134	1	8772.134	167.205	.000	.699
GENDER	Time1	2.163	1	2.163	.151	.699	.002
	Time2	77.946	1	77.946	1.357	.248	.019
	Time3	62.116	1	62.116	1.184	.280	.016
GROUP * GENDER	Time1	3.733	1	3.733	.260	.612	.004
	Time2	119.774	1	119.774	2.086	.153	.028
	Time3	1.562	1	1.562	.030	.863	.000
Error	Time1	1033.097	72	14.349			
	Time2	4134.671	72	57.426			
	Time3	3777.371	72	52.463			
Total	Time1	400224.160	76				
	Time2	181283.948	76				
	Time3	143586.446	76				
Corrected Total	Time1	1039.107	75				
	Time2	13113.125	75				
	Time3	15484.172	75				

a. R Squared = .006 (Adjusted R Squared = -.036)
b. R Squared = .685 (Adjusted R Squared = .672)
c. R Squared = .756 (Adjusted R Squared = .746)

α = 0.05, a = Time 1; b = Time 2; c = Time 3, CBT = cognitive behaovioural therapy, CSS-21 = challenges to stopping smoking-21, Time1 = pretreatment stage tobacco score, Time2 = Post-treatment stage tobacco score, Time3 = Follow-up stage tobacco score.

of CBT was significant in decreasing the mean challenges to stopping tobacco score among participants as measured by CSS_21, F (1, 76) = 102.210, P = .001, =0.587, $\Delta R2$ = 0.672. After the post-treatment (Time 3), a follow-up result show that F (1, 76) = 167.205, P = .001, =0.699, $\Delta R2$ = 0.746. The (partial eta squared) values or effect size of 0.587, and 0.746 at post-treatment (Time 2) and follow-up (Time 3) levels indicate that CBT accounted for 58.6%, and 74.6% decrease in overcoming challenges to stopping tobacco respectively. Table 3 reveals that there was no significant influence of gender on mean challenges to stopping tobacco score of participants at Time 1, Time 2, and Time 3, F (1,76) = 0.151, P = .699, =0.002; F (1, 76) = 1.356, P = .248, =0.016; and F (1, 76) = 1.189, P = .280, =0.016, respectively. The (partial eta squared) values or effect size of 0.019 at post-treatment level indicate that gender accounted for 1.9%decrease in challenges to stopping tobacco among participants. Concerning interaction effect of groups and gender after treatment, Table 3 reveals that there was no significant interaction effect in the mean challenges to stopping tobacco score among participants at Time 1, Time 2, and Time 3, F (1,76) = 0.260, P = .612, =0.004; F (1, 76) = 2.086, P = .153, =0.028; and F (1, 76) = 0.030, P = .863, =0.000, respectively. The (partial eta squared) values or effect size of 0.028 at post-treatment level indicate that interaction between groups and gender accounted for a 2.8% decrease in challenges to stopping tobacco among participants respectively.

4. Discussion

This study aimed at examining the effect of cognitive-behavioral therapy on the disputation of challenges to quitting Tobacco smoking among students enrolled in the Social Science and Religious Education programmes in Enugu state Nigeria. Following the intervention with CBT, the researchers found a significant decrease in tobacco use and dependence among participants in the treatment group compared with those in the waitlisted control group. Significant gains of CBT intervention were also registered at follow-up for those in the treatment group. These findings align with previous studies.[32,39,57–63] that applied CBT intervention in the reduction of smoking habit among smokers. The results further give credence to studies.[32,39] revealed that a CBT program has the capability to make tobacco users quit smoking as they remain committed to the intervention. The present findings are also in line with studies that showed that CBT is effective in helping people to quit smoking.[62] Given that this current study utilized a group format, our findings suggest that CBT offers individuals the opportunity to learn behavioral techniques for smoking cessation, and to provide each other with mutual support.[64]

Given that the present study included a low number of participants, clinical trials using techniques of the CBT approach are not impeded by a few study participants.[37] Moreover, our sample, as with all samples of tobacco users in cessation trials, is representative of only those users who are ready to take action to quit tobacco use. Furthermore, this study was also limited to student smokers who were moderate and heavy smokers. It may be that different outcome would result in light smokers or mixed groups and did not involve students in their first year. These study participants were only male smokers; it may be that different outcomes would occur with female tobacco users or diverse groups. This being the case, the findings may not be entirely generalizable. Because of the preceding, the researchers suggest that future research should use larger samples composed of both genders and carry out a further evaluation in other countries to ascertain the validity of the present findings. Other researchers can further this study by carrying out a comparison study with different approaches owing to effectiveness, and follow-up assessments at intervals of 6 and 12 months or more. The researchers did not adhere to the follow-up standard practice of evaluation of 6 months (minimum) since they conducted the

follow-up at a 1-month interval from the close of intervention. This may be too short a period compared to the standard practice for follow-up evaluation. We, therefore, recommend that subsequent studies should consider the use of 6 months (minimum) to ascertain the long-term effect of CBT in changing and modifying tobacco use and dependence. Another major limitation of the study is the lack of data for individual demographic characteristics of the participants which may be associated with a behavioral intention to stop smoking example, employment history, ethnicity, income level, religious beliefs, psychopathology, et cetera Despite these limitations, researchers, clinicians, and policymakers should use other measures of abstinence or dependence when there is a need to determine how well tobacco users would respond to an intervention designed to break the use and dependency habits.[48]

Given that majority of health promotion programs in Nigeria aim to bring out sustainable health and lifestyle changes in the people, the Nigerian therapists and public health professionals need to help smokers in university settings in different parts of the country to stop smoking through large-scale CBT interventions. Worth noting is that the effectiveness of the CBT depends on the extent of application of the techniques, the treatment procedures adopted, and the therapists' skills.[49] Giving up tobacco use and dependence is essential for people who smoke to reduce their risk of tobacco-related disease and premature death.[38] Thus, researchers and clinicians whose central role is health promotion need to carry out further evaluations in order to identify more effective techniques within the CBT model for assessing and breaking the habit of cigarette smoking in the Nigerian student population. It would be helpful if researchers and clinicians seek to know which assessment techniques have the most heuristic value in measuring smoking cessation outcomes in this population. Future interventions aimed to break tobacco use and dependence among students using CBT need to carry out a verification of the self-reported abstinence status of the participants by collecting their expired carbon monoxide using a Bedfont Micro Smokerlyzer as used by Rohsenow et al.[65]

5. Limitations

Like other studies on smoking, the present study has weaknesses and these are: Firstly, we have noted it 1 of the major limitations of the study is the lack of a 2nd follow-up to justify that CBT is a time-effective treatment modality in quitting smoking. Secondly, we acknowledge that smoking is correlated with some psychological disturbances and symptoms and this study should have assessed the depressive level of moderate and heavy student tobacco smokers. Then the outcome would have been correlated with the outcome of depression. Therefore, we suggest that future studies should fill gaps. Thirdly, no evaluation parameters like urine cotinine level and its correlation with decreased cigarette dependence have been used in this study. Fourthly, this study was also limited to social science student tobacco smokers who were moderate and heavy smokers. Fifthly, there is no doubt that the sample size used in this study is not a true representation of the actual smoker populations. It is an indication that the generalizability of the finding cannot be drawn for all smoker populations. In that case, there should be cautious when interpreting the outcome of this study. It may be that different outcomes would result in light smokers or mixed groups. There is also a need for comparison with different approaches regarding effectiveness, and follow-up assessments at intervals of 6 and 12 months or more are warranted given that some researchers and clinicians might argue that the follow-up in the present study was done so close after post-treatment. We also considered that the standard practice for follow-up evaluation which is at least 6 months was not strictly adhered to. Therefore, subsequent studies should consider the use of 6

months (minimum) to ascertain the long-term effect of CBT in changing and modifying smoking habits. Despite these limitations, researchers, clinicians, and policymakers should use other measures of abstinence or dependence when there is a need to determine how well smokers will respond to an intervention designed to break the smoking habit.[41]

6. Conclusion

In conclusion, this suggested that cognitive behavioral therapy is an effective therapeutic approach for assisting the student to dispute challenges to quitting tobacco smoking among students enrolled in the Social Science and Religious Education programmes in Enugu state Nigeria. Secondly, the significant effect of CBT is not limited to gender, indicating that male or female folk who have challenging thoughts against attempting to quit tobacco smoking can dispute such thoughts using CBT. The positive behavioral gains after the CBT program also persisted at follow-up in the treatment group compared with the waitlisted group. On that note, we recommend further evaluations to investigate the moderating and mediating effects of users' characteristics such as employment status, marital status, age, and educational level on the intervention in university settings. Such features might become critical factors to consider in implementing CBT for smoking cessation as they may provide a blueprint for follow-up assessments and further evaluations in other countries.

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