

Physical Activity Intervention Effects on Tobacco Smoking Cessation among University Students

Aaron Olalekan Akinloye, Mary Sam-Odutola and Adetoun Akinwusi

Abstract

Meta-analytical studies have confirmed that tobacco smoking is on the increase and that by the year 2020 tobacco use will cause 18%, and 11% of all deaths in developing and developed countries respectively. Although multiple studies have examined the effects of several techniques on quitting tobacco smoking with different population groups, the success rate is low. This study, therefore, investigated the effects of physical activity intervention on tobacco smoking cessation among university students in southwestern Nigeria. The moderating effect of gender was also examined. The study adopted a pretest-posttest, control group, experimental design with 2x2 factorial matrix. One hundred and twenty one undergraduate active smokers were selected from the Universities of Lagos and Ibadan, using network and purposive sampling techniques. Participants were randomly assigned to Physical Activity and Control groups. The Tobacco Smoking Cessation Questionnaire ($r = 0.86$) was used. The treatment lasted eight weeks. Two hypotheses were tested at the 0.05 level of significance. Data were analyzed using analysis of covariance. Treatment had a significant effect on tobacco smoking cessation among undergraduate smokers ($F_{(3,117)} = 353.789$, $\eta^2 = 0.85$). Undergraduate smokers exposed to physical activity intervention performed best with a mean score of ($\bar{x} = 70.55$) compared to Control ($\bar{x} = 35.48$) group. There was no significant main effect of gender

on tobacco smoking cessation. There was no significant interaction effect of treatment and gender on smoking cessation ($F_{(6,114)} = 407$, $n^2 = 0.07$). Physical activity intervention was empirically effective in quitting tobacco smoking among university students. Health care providers involved in anti-tobacco smoking cessation education should expose university undergraduate smokers to this intervention.

Keywords: physical activity intervention, tobacco smoking cessation, University students.

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1. Introduction

Tobacco smoking is a health problem inducing habit in which many young adults, most especially undergraduates, engage. Tobacco can be taken in several forms; it can be chewed, drunk as tea, sniffed and smoked in the form of cigarettes or cigars. Smoking is one of the contributory factors to peoples' ill health and sudden death. It is the most consumed form of tobacco use and the substance most commonly smoked. By nature, people get involved in some actions regardless of

circumstances which sometimes lead to unpleasant results.

Tobacco smoking is a significant risk factor for cardiovascular disease, cancer, respiratory function impairment and also one of the major causes of premature mortality in industrialised and developing nations (Doll, Edwards & Forbes, 2004). Cessation of tobacco smoking increases the user's life span and reduces morbidity (United States Department of Health and Human Services, 1990). Many attempts to stop smoking are made unaided, with a success rate of around 2% to 4% (Hughes, 2007).

Physical activity therapy for tobacco dependence and withdrawal can contribute substantially to improved health by enabling cessation of tobacco use. The World Health Organization (2004) confirmed that, among persons who might ultimately achieve tobacco abstinence without therapy, the benefits can be profound if treatments help them to achieve tobacco abstinence earlier, because the risk of disease is strongly related to the duration of tobacco use. Tobacco smoking is assumed to be prevalent among adolescents and youths in the age range 4- 14 years, 15-24 years, 30 years and above.

Fawibe and Shittu (2011) affirmed that tobacco smoking control is urgently needed to prevent the epidemic of tobacco-related diseases and deaths in developing countries, especially among undergraduates of the University of Ilorin. Umaru *et al.* (2014) examined the effect of cognitive restructuring intervention on tobacco smoking among university students and found that the intervention given had a significant effect on tobacco smoking cessation. Odey *et al.* (2012) noted that the prevalence of cigarette smoking was higher among young

adults in Nigeria, especially male young adults. They further found that cigarette smoking was significantly associated with obesity and diabetes among smokers. Salawu *et al.* (2009) noted that 28% of university students in north-east, Nigeria engage in risk behaviours such as alcoholism, bullying, smoking and prostitution, among others. Tobacco use remains the leading cause of preventable morbidity and mortality worldwide and serves as precursor to various diseases such as cancer, cardiovascular and respiratory diseases that place a lot of challenges on the fragile health care systems of developing countries (Moronkola & Akinterinwa, 2003). Consequently, the evidence which indicated the foregoing prompted the researchers to investigate whether this habit is applicable and extrapolates to other universities in Nigeria. Successful cessation and relapse-prevention programmes for smokers of this category have drawn little attention. Several concepts in the literature have been advanced that contribute to a good understanding of the place of physical activity therapy in tobacco disease control efforts.

The emerging literature suggests that physical activity, that is, body movements that enhance or maintain physical fitness and overall health, along with psychological variables which promote exercise adherence, may mediate tobacco smoking cessation (Ussher, Taylor & Faulkner, 2008; Marcus *et al.*, 1999). Potential mediating mechanisms include reductions in weight gain, withdrawal symptoms and cigarette cravings; notably, the latter two factors are known contributors to cessation resistance and smoking relapse (*ibid.*, 1999; Taylor, Ussher & Faulkner, 2007; Van Rensburg *et al.*, 2009). The mechanism underlying the observed beneficial effect of physical activity on withdrawal and craving is not clear. Physical activity has been shown to have some similarities to smoking in its effects on stimulating the central nervous

system and neurobiological processes in the brain. Thus, that exercise may provide an alternative reinforcer to smoking (Horn *et al.*, 2011).

The relationship between physical activity and smoking among undergraduates has reported both significant and non-significant findings. A systematic review of thirteen randomised controlled trials by Usshar *et al.* (2008) found mixed results for physical activity interventions as catalysts for smoking abstinence. Albrecht *et al.* (2004) confirmed that studies showed significantly higher smoking abstinence rates among participants who received the physical activity intervention, compared with control subjects, at the end of the intervention period. For example, Hedblad *et al.* (1997) observed that middle-aged male smokers who regularly participated in leisure-time activity demonstrated a reduction in the risk of cardiovascular disease compared to sedentary smokers. Another study by Manson *et al.* (1999) posited that results showed a 32% reduction in the risk of coronary heart disease associated with regular bouts of walking and vigorous physical activity among current female smokers. Also, regular sessions of recreational activity could reduce the risk of lung cancer in smokers, as well as male and female smokers who were in the highest physical activity level had 28% and 35% abstinence reduction respectively (Mao *et al.*, 2003).

2. Statement of the Problem

Smoking cigarettes is a vital risk factor for cardiovascular disease, cancer and respiratory diseases which may result in morbidity and premature mortality among people in industrialised and the developing nations of the world. Despite the well-known risks to health, cigarette smoking is still highly prevalent worldwide, even among university undergraduates in Nigeria. Previous studies indicated that university students

indulge in negative health behaviours such as smoking, alcohol consumption, cultism, theft, examination malpractice, prostitution and the use of twisted logic, among other things. Non-involvement in smoking prolongs life and reduces morbidity and mortality but many attempts to stop smoking are made unaided around the world, with low success rates. There have been several studies on tobacco smoking among university undergraduates generally in Nigeria but there is a paucity of studies on physical activity interventions in relation to quitting smoking. Thus, this study determined the effects of physical activity therapy on tobacco smoking cessation among university students in Southwestern Nigeria.

2.1. Significance of the Study

This study is significant because the outcome has provided an empirical basis for the efficacy of physical activity intervention in modifying the behaviours of undergraduates.

2.2. Main Objective

The main aim of this study is to examine the effects of physical activity therapy on tobacco smoking cessation among university students in Southwestern Nigeria.

2.3. Hypotheses

The following hypotheses were tested in this study:

1. There is no significant main effect of treatment on tobacco smoking cessation among participants
2. There is no significant interactive effect of gender

and smoking experience on tobacco smoking cessation among participants.

3. Methodology

The research design that was used in this study is a pretest-posttest, control quasi experimental design using a 2x2 factorial matrix. The study adopted this design because the participants for the study were randomly assigned to the treatment group and the control group. The factorial matrix that was used in this study is based on the fact that the study involves the use of Physical Activity with control at two levels, with moderating variables of gender that is, male and female, at two levels. The population for the study consisted of undergraduates (male and female full-time matriculated undergraduates) in two universities in Southwestern Nigeria, that is the University of Lagos and the University of Ibadan.

The sample size for this study consisted of 121 university undergraduate smokers. To select participants for the study, network and purposive sampling techniques were used. In the first instance, purposive sampling technique was adopted for the two universities from the Southwestern geopolitical zone. The second sampling technique that was used to identify undergraduate smokers in halls of residence in each of the institutions is the network sampling technique. The selected universities were grouped as thus: University of Lagos (Experimental group, Physical activity) and University of Ibadan (Control group, Placebo). The criteria included in this study are: smokers who were undergraduates; those screened and confirmed to be smokers; male and female undergraduate smokers who showed genuine interest by completing the informed consent form and questionnaire; those who were available and accessible throughout the intervention and who complied with the conditions of the study.

The research instrument used for data collection was a self-developmental instrumentation. The questionnaire has two sections. Section one consists of demographic profiling of the participants including age, sex and smoking experience, while section two contains question items relating to physical activity variables on Tobacco Smoking Cessation (the TSCQ).

4. Findings

On the distribution of participants by age, 28 (23.1%) of the participants were between the age of 18 and 22 years, 49 (40.5%) were between 23 and 27 years, 28 (23.1%) were between 28 and 31 years and 16 (13.2%) were aged 33 years and above. This showed that the majority of the participants were between the ages of 23 and 27 years. This implies that tobacco smoking as a habit is on the increase among university students in Nigeria, particularly those with 23 years to 27 years age bracket. The distribution of participants by gender, 80 (66.1%) of the participants are males and 41 (33.9%) are females, showing that the majority of the participants are male. The implication of this is that tobacco smoking is decreasing among female undergraduates in Nigerian universities compared to male counterparts. It is important to note that more awareness on the anti-tobacco smoking crusade is needed in all educational institutions in Nigeria.

4.1. Hypotheses Testing

There is no significant main effect of treatment on tobacco smoking cessation among students in the universities in Southwestern Nigeria.

Source	Sum of Squares	df	Mean Square	F
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Corrected Model	29170.321	3	9723.440	241.824
Pretest Tobacco	0.265	1	0.265	0.007
Treatment	28450.781	2	14225.390	353.789
Error	4704.422	117	40.209	
Total	33874.744	120		

Table 1: *Main Effects of Treatment on Tobacco Smoking Cessation among Students in the Universities in Southwestern Nigeria; source: Original Research (R-squared = 0.861, Adjusted R-Squared = 0.858)*

The results in Table 1 above show that there is a significant main effect of the treatment group on tobacco smoking cessation among students in the universities ($F(3,117) = 353.789$, $P < 0.05$, $\eta^2 = 0.858$). This denotes a significant difference in the groups on tobacco smoking cessation among university students in Nigeria. Hence, the null hypothesis is rejected.

The Table also shows the contributing large effect size of 85.8%, which value indicates how much of the variance in the dependent variable is explained by independent variables. This implies that the treatment given did have an impact on student smokers. This implies that there would be a substantial improvement towards cessation of tobacco smoking with different population groups, particularly university students in Nigeria, when using this treatment.

There is no significant interaction effect of treatment and gender on Tobacco smoking cessation among university students in Nigeria.

Source	Sum of Squares	df	Mean Square	F	Sig.	Eta ² /size
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Corrected Model	29219.030	6	4869.838	119.243	0.000	0.863
Pretest Tobacco	0.162	1	0.162	0.004	0.950	0.000
Main Effect						
Treatment	13259.020	2	6629.510	162.330	0.000	0.740
Gender	18.501	1	18.501	0.453	0.502	0.004
2-Way Interactions						
Treatment x Gender	33.225	2	16.612	0.407	0.667	0.007
Error	4655.714	114	40.840			
Total	33874.744	120				

Table 2: *Interaction Effects of Treatment and Gender on Tobacco Smoking Cessation among Undergraduates in the First Generation Universities; source: Original Research (R-squared = 0.863, Adjusted R-Squared = 0.855)*

The main effect is that there was a significant difference in the Treatment group but none was found in Gender. There was no significant interaction effect of Treatment and Gender ($F(6,114) = 0.407, P > 0.05, \eta^2 = 0.007$). This indicates that there is no significant effect of gender and treatment on tobacco smoking cessation among students in the universities. Hence, the null hypothesis is not rejected. The table also shows a contributing effect size of 0.07. The partial eta squared of 0.007 implies that the interaction effect of treatment and gender accounted for 0.07% of the observed variance on tobacco smoking cessation. It means that treatment and gender when taken together do not significantly affect the cessation of tobacco smoking among undergraduate smokers.

4.2. Discussion of Findings

The finding is in line with the view of World Health Organisation (2004), which stated that behavioural and physical activity therapy for tobacco dependence and withdrawal can contribute substantially to improved health by enabling cessation of tobacco use. The findings affirm the view of Ussher *et al.* (2008) as part of the emerging literature that suggests that physical activity, that is, body movements that enhance or maintain physical fitness and overall health, along with psychological variables which promote exercise adherence, may mediate tobacco smoking cessation. The mechanism underlying the observed beneficial effect of physical activity on withdrawal and craving is not clear. It seems plausible that the attention to somatic cues during physical activity presents a unique strategy for distracting smokers from the cravings and negative cognitions experienced during smoking abstinence. Physical activity has been shown to have some similarities to smoking in its effects on stimulating the central nervous system and neurobiological processes in the brain, thus that exercise may provide an alternative reinforcer to smoking cessation.

Besides the potential benefits of physical activity for moderating psychological withdrawal symptoms and cravings, physical activity has also been shown to reduce post-smoking cessation weight gain. The weight control benefits of physical activity may be of particular importance to female smokers who report taking up smoking to control weight and report fear of post-cessation weight gain as a motivation for continued smoking. Physical activity has also been shown to have a positive effect on other factors that may protect against smoking relapse, includes perceived coping ability and self-

esteem. Albrecht *et al.* (2004) in support of this result, confirmed that studies showed significantly higher smoking abstinence rates among participants who received the physical activity intervention, compared with control subjects, at the end of the intervention period.

Gender differences in smoking quitting rates are frequently reported and are the subject of much speculation but this study found no significant effect of gender on smoking cessation. This result is contrary to the view of Ellis *et al.* (2008), who concluded that women were more responsive to tobacco control programmes but men required a more intensive strategy. Potential mediating mechanisms include reductions in weight gain, withdrawal symptoms and cigarette cravings, in particular. The latter two factors are known contributors to cessation resistance and smoking relapse. Morell *et al.* (2008) corroborated the above submission in their findings that there were no gender differences among undergraduates in terms of their smoking behaviour. Marcus *et al.* (1998) found that women had significantly higher quitting rates in a cessation intervention, compared with programmes with no fitness component.

Among students, cross sectional studies have consistently shown that smoking is negatively associated with participation in sport. There is some evidence to suggest that this pattern may be different for boys versus girls and some of the evidence is contradictory.

Lancaster *et al.* (2000), in support of the findings of this study, stated that both individual and group therapy have been shown to improve quitting rates beyond those seen with self-help materials alone. There appears to be no difference between individual and group therapy in terms of tobacco smoking quitting rates. Consequently, either therapy approach may be of benefit (*ibid.*,

2000). Groups are theoretically more cost effective but their usefulness may be limited by difficulties in recruiting and retaining participants (Stead & Lancaster, 2000). Fiore, 2000; Hajek & Stead (2000) concluded that the predictors of successful quitting were less nicotine dependence, social and environmental factors, self-esteem, social supports, increased physical activity and self-efficacy.

This result is also in line with the views of Albrecht *et al.* (2004), who confirmed that studies showed significantly higher smoking abstinence rates among participants who received a physical activity intervention, compared with control subjects, at the end of the intervention period. Hedblad *et al.* (1997) observed that middle-aged male smokers who regularly participated in leisure-time activity demonstrated a reduction in the risk of cardiovascular disease, compared to sedentary smokers. This result also corroborated the findings of Manson *et al.* (1999), that a 32% reduction in the risk of coronary heart disease is associated with regular bouts of walking and vigorous physical activity among female smokers. Mao *et al.* (2003) also found that regular sessions of recreational activity could reduce the risk of lung cancer in smokers, as well as male and female smokers who were in the highest physical activity level and who had 28% and 35% abstinence reduction levels respectively.

5. Conclusion and Recommendations

The conclusion is that physical exercise had significant effects on tobacco smoking quitting among university students in Southwestern Nigeria compared to those in the control group. The outcome of this study suggests that health care providers should promote the application of this treatment, most especially among the young adults who believe that life is characterized by freedom and mere adventure. Also, the results of this study indicate that though several attempts to

stop cigarette smoking have yielded little success, with the conceptualization and application of this treatment, the confidence level of student smokers in the institutions of higher learning, particularly at the universities in Nigeria, would be boosted.

The following recommendations are made: stakeholders involved in tobacco smoking cessation should employ the use of physical activity (dance, step and chair aerobics, three times a week for 30 minutes each day) as a therapy among university student smokers; counselling units should be established within the universities to identify undergraduate smokers early and help them quit the habit, since it is easier to stop when one is a beginner; tobacco cessation education should be included as a topic in general studies across all Nigerian institutions of higher learning and agencies involved in anti-tobacco smoking should intensify their efforts towards tobacco smoking cessation in Nigeria.

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