PREVALENCE AND PREDICTORS OF CIGARETTE SMOKING AND ALCOHOL USE AMONG SECONDARY SCHOOL STUDENTS IN NIGERIA

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ABSTRACT

Background: Cigarette and alcohol use are the most common causes of non-communicable diseases. Studies related to cigarette and alcohol use among Nigerian adolescents have shown increases in the habits and require urgent intervention. Nationally representative data is needed to develop effective national policies and interventions, but this is lacking. Hence, this study aimed to provide nationally representative empiric information about cigarette and alcohol use prevalence and predictors among Nigerian secondary school students.

Methods: This study included 2,530 Nigerian students in Nigeria from five selected geopolitical zones in Nigeria. A self-administered questionnaire was used to obtain information about the participants' sociodemographic and school-based characteristics, cigarette and alcohol use status, and harm perception of tobacco and alcohol use. Data were analysed with SPSS version 25 at p<0.05.

Results: Participants' mean age (±SD) was 16.34 (±2.0) years. The prevalences (95%CI) for ever-cigarette and current-cigarette smoking were 11.1% (95%CI:9.9-12.4) and 8.4% (95%CI:7.3-9.5), respectively. While 21.0% (95%CI:19.4-22.7) and 15.6% (14.2-17.1) were the prevalences for lifetime and current alcohol use, respectively. The predictors of current cigarette smoking were studying in northern-Nigeria (aOR:1.94;95%CI:1.10–3.44), attending private-schools (aOR:1.56;95%CI:1.03–2.38), boarding-student (aOR:1.75;95%CI:1.15–2.69), male-gender (aOR:3.03; 95%CI:1.80–5.10), current alcohol use (aOR:12.50;95%CI:8.70–18.18), having no (aOR:2.59;95%CI:1.58–4.26) or low tobacco harm perception (aOR:2.04;95%CI:1.18–3.53). The predictors of current alcohol use were male (aOR:1.32; 95%CI:1.01–1.72) and current cigarette smoking (aOR:12.5;95%CI:8.77–17.86).

Conclusion: The prevalences of cigarette and alcohol use were high among Nigerian secondary school students, and both habits were strongly associated. Their predictors were school-related factors, sociocultural characteristics, and tobacco harm perception.

Keywords: Tobacco, Substance use, Head and neck cancer, Adolescents, Africa

INTRODUCTION

Cigarette and alcohol are major sources of public health concern, affecting all countries worldwide. About 1.1 billion are current tobacco users, while 2.3 billion people are drinking alcohol.[1,2] They are addictive and pose serious health risks such as cardiovascular diseases, neurological problems, and different types of cancers, including head and neck cancers (HNC).[1,3] While they can individually cause these health problems, combining the two habits has a synergistic effect and substantially increases the risks,[4] and doing so during adolescence presents even greater health risks.[3,5]

Considering that most adult cigarette and alcohol users commence during adolescence,[1,3,6,7] it is important that effective interventions prevent these vulnerable populations from initiating the habits and quitting if

they have started. These interventions should address the factors associated with the habits among the youths and adolescents. Some of the associated factors include social factors (peer and parental influence, low socioeconomic status), psychological factors (mental health problems, impulsivity, self-esteem), and low harm perception associated with these habits.[1,3,7–10]

Several studies on cigarette and alcohol use among Nigerian secondary school students have recorded varying prevalences.[10–14] However, a general trend is that the practices have increased in the last decade and are now public health problems requiring urgent interventions.[10–14] Although different studies have assessed factors influencing cigarette and alcohol use among secondary school students in different parts of Nigeria, most are limited to small communities and cities, thus, limiting their generalizability. Nationally representative data about this vulnerable population is needed to develop effective national policies and interventions, which are currently lacking.

Hence, this study aimed to provide nationally representative empiric information on the prevalence of cigarette and alcohol use and factors (socio-demographic, school-based characteristics, and harm perceptions) predicting both habits among secondary school students in Nigeria.

METHODS
Study design
This study was a descriptive cross-sectional survey of secondary school students in Nigeria.

Study area and population
Nigeria is the most populous black nation, with an estimated population of over 200 million people.[15] The country also has one of the highest proportions of adolescents globally, with an estimated 22% of the total population.[15] Nigeria is divided into six geopolitical zones: North-East, North-West, North-Central (making up the northern region), and South-West, South-South, and South-East (making up the southern region).[16] Nigeria has 36 states and the Federal Capital Territory (FCT).[16] The secondary schools comprise of six classes (three junior classes - JSS1-3 and three senior classes SSS1-3). The schools are either government-owned (public schools) or owned by private individuals or institutions (private schools). Most of the schools have both gender (mixed schools), but a significant proportion of the schools are single-gender based (girls-only and boys-only). The official age of entry into the JSS 1 class is 12 years[17,18], although many students get into this class at younger ages (9-11 years) by either enrolling in the basic schools early or skipping some classes in the primary schools.[18]

Ethical considerations
Ethical approval to conduct this study was obtained from the University of Ibadan/University College Hospital Ethical Review Board (Ref: UI/EC/18/0077). Permission was also obtained from the participating schools' principals. Parental informed consent was obtained from the parents/guardians of the selected participants, after which the students also assented to participate in the study.

Study instrument
The study instrument was a self-administered semi-structured questionnaire developed by reviewing relevant literature on tobacco and alcohol use among adolescents.[10,12,19] The questionnaire was further modified after tobacco control experts and researchers reviewed it and subsequently pretested among conveniently selected secondary school students in Osun State, Nigeria.

The questionnaire was used to obtain information about the participants' sociocultural characteristics (age, gender, tribe, religion, and family background); school-related characteristics (school location – northern vs southern Nigeria, ownership – private vs public, set-up – boys-only vs girls-only vs mixed, mode of the studentship – day vs boarding, classes – SSS 1-3). Others were participants' tobacco harm perception, cigarette and alcohol use status.

The cigarette smoking status was assessed using the question: "*are you currently smoking cigarettes?*" and the options were "*No, I have never smoked*", "*No, I have quit smoking*", "*Yes, but I am trying to quit*" and "*Yes, not trying to quit*". Based on their responses, those who chose "*No, I have never smoked*" were categorised as "Never smokers" while others were termed "Ever smokers". Furthermore, those who chose "*Yes, but I am trying to quit*" and "*Yes, not trying to quit*" were categorised as "Current smokers".

Similarly, alcohol use status was assessed with the question: "*Are you currently drinking alcohol?*" and the options were "*No, I have never drunk alcohol*", "*No, I have stopped drinking*", "*Yes, but I am trying to quit drinking*" and "*Yes, not trying to quit*". Based on their responses, those who chose "*No, I have never drunk alcohol*" were categorised as having "No lifetime history of drinking alcohol". Others were classified as having a "lifetime history of alcohol use". Those who chose "*Yes, but I am trying to quit*" and "*Yes, not trying to quit*" were categorised as "current alcohol users".

Tobacco harm perception was assessed with the question: "*Tobacco use can cause head and neck cancer*", and the responses were "Definitely yes", "Probably yes",

"Probably not", and "Definitely not". The participants were classified as having "High", "Moderate", "Low", and "No" harm perception, respectively.

Sampling

The multistage sampling technique was employed for this study. The first stage involved the selection of five geopolitical zones (North-East, North-West, North-Central, South-West, South-South) from the six zones in Nigeria using the simple random sampling technique. One state was selected using simple random sampling, through balloting, from each of the five zones in the second stage. The third stage involved the selection of one Local Government Area (LGA) in the selected state using the simple random sampling (balloting method). The fourth stage involved the selection of two secondary schools using simple random sampling (balloting method) from the selected LGAs. Finally, all students in SSS1 – 3 classes of the selected schools (an average of 300 per school) were recruited for the study.

Data collection

Data were collected from Oyo, Edo, Bauchi, Sokoto, and Benue states between November 2016 to January 2018. A total of 3,000 SS1–3 students were approached in the selected schools, but 2,754 (91.8%) students agreed to participate in the study. Written parental informed consent and assent were obtained from all consenting students before participating in the study. All 2,754 selected participants were given a questionnaire to fill, but 2,701 participants (98.1%) returned theirs. The filled questionnaires were screened for completeness and appropriateness of responses, and 171 questionnaires were discarded because they were not appropriately filled, leaving 2,530 (93.7%) that were analysed.

Data analysis

Data from 2,530 filled questionnaires were analysed using SPSS version 25 software. Current cigarette smoking and alcohol use were the primary outcome variables, while sociodemographic and school-related characteristics, tobacco harm perception, lifetime history of alcohol and cigarette use were explanatory variables. The frequency distributions of all variables were determined. Pearson's Chi-square tests were conducted to assess the association between current cigarette and alcohol use and the categorical independent variables (sex, religion, family background, tribe, school location and ownership, mode of studentship, class level, lifetime history of cigarette and alcohol use, tobacco harm perception). Independent Samples t-test was also conducted to assess their association with the continuous variable (age). Factors that were significantly associated with

current cigarette smoking and current alcohol use at $p < 0.05$ at bivariate analysis were subsequently included in the Binomial logistic regression modelling for both current cigarette smoking and alcohol use, respectively. The level of statistical significance for all the tests was set at $p < 0.05$.

RESULTS

Sociodemographic and school-related characteristics

The participants' age ranged from 12 – 24 years, with a mean age (±SD) of 16.3 (±2.0) years. More than half were males (56.6%), Christians (61.1%), from a monogamous family (55.0%), studying in northern Nigeria (51.8%), and attending public schools (73.5%). Those from the Yoruba ethnic group were 34.9%, 21.9% were boarding students, 21.8% were in boys-only schools, and 33.5% were in SSS 3 class. (Table 1)

Participants' harm perception of tobacco and alcohol use

A little over one-third (38.3%) had a high harm perception for tobacco use as a risk for head and neck cancer (HNC). Furthermore, only 16.6%, 4.9%, and 15.1% included cigarette smoking, snuff (smokeless tobacco), and alcohol use in the top three causes of HNC, respectively. (Table 2)

Prevalence of cigarette smoking and alcohol use

The prevalence (95%CI) of lifetime history and current alcohol use were 21.0% (95% CI: 19.4-22.7) and 15.6% (14.2-17.1), respectively. Regarding their cigarette smoking habit, 11.1% (95% CI: 9.9-12.4) had a lifetime history of cigarette smoking (ever-cigarette smokers), while 8.4% (95% CI: 7.3-9.5) were current cigarette smokers. Among current cigarette smokers (n=203), 16.3% had made past quit attempts, albeit unsuccessfully. (Table 2)

Following a sub-analysis of the outcome variables based on gender, the prevalence of males involved in lifetime alcohol use was 25.5% (95% CI: 23.3-27.9), current alcohol use was 18.6% (95% CI: 16.6-20.7), lifetime cigarette smoking was 15.4% (95% CI: 13.6-17.4), and current cigarette smoking was 11.9% (95% CI: 10.2-13.7). As for females, the prevalences for lifetime alcohol use was 15.1% (95% CI: 13.1-17.4), current alcohol use was 11.6% (95% CI: 9.8-13.6), lifetime cigarette smoking was 5.0% (95% CI: 3.8-6.5), and current cigarette smoking was 3.3% (95% CI: 2.4-4.6).

Factors associated with current cigarette smoking

Bivariate analysis showed that a higher proportion (11.2%) of participants attending schools in northern Nigeria were current cigarette smokers compared to

Table 1: Sociodemographic and school-related characteristics of the participants

Characteristics	Frequency	Percentage
Age (n=2,509)		
Mean age (±SD)	*16.3 (±2.0)*	
Age groups (n=2,509)		
12-14 years	372	14.8%
15-19 years	1999	79.7%
20-24 years	138	5.5%
Sex (n=2,506)		
Male	1418	56.6%
Female	1088	43.4%
Religion (n=2,516)		
Christianity	1537	61.1%
Islam	959	38.1%
Other religion	20	0.8%
Family background (n=2,376)		
Polygamous	743	31.3%
Single parent	326	13.7%
Monogamous	1307	55.0%
Tribe (n=2,530)		
Yoruba	884	34.9%
Hausa	599	23.7%
Igbo	250	9.9%
Other tribes (Tiv, Idoma, Edo, Ijaw)	797	31.5%
Location of school (n=2,530)		
Northern Nigeria	1311	51.8%
Southern Nigeria	1219	48.2%
School ownership (n=2,530)		
Public	1860	73.5%
Private	670	26.5%
Mode of studentship (n=2,530)		
Boarding	554	21.9%
Day	1976	78.1%
School set-up (n=2,530)		
Mixed	1749	69.1%
Boys only	551	21.8%
Girls only	230	9.1%
Class (n=2,439)		
SS3	817	33.5%
SS2	831	34.1%
SS1	791	32.4%

n – Total number of participants

those (5.3%) attending schools in the southern part of the country (p < 0.001). The proportion of current cigarette smokers was also higher among participants attending private schools (12.3%) compared to public schools (6.9%) (p = 0.042); boarding students (14.0%) compared to day students (6.7%) (p < 0.001); and among males (11.9%) compared to females (3.3%) (p < 0.001). There was a dose-response relation between the participants' tobacco perception with current cigarette smoking. Those (16.0%) with the no harm perception – "Definitely not" were most likely to be current smokers compared to the others (p < 0.001). Similarly, a higher proportion of participants with lifetime history (26.8%) and current alcohol use (33.4%) were current cigarette smokers, compared to never (3.4%) and non-current (3.7%) alcohol users, respectively (p < 0.001). Other factors associated with current cigarette smoking were school set-up (p = 0.004), religion (p < 0.001), and tribe (p < 0.001). (Table 3)

However, logistic regression modelling showed that the following factors were independently associated with being a current cigarette smoking: studying in northern Nigeria (aOR: 1.94; 95% CI: 1.10–3.44), attending private schools (aOR: 1.56; 95% CI: 1.03–

Table 2: Participants' cigarette smoking, alcohol use, and knowledge of HNC risk factors

Variables	Frequency	Percentage (%95CI)
Lifetime history of alcohol use (n=2,432)		
No	1921	79.0% (77.3-80.6)
Yes	511	21.0% (19.4-22.7)
Current alcohol use (n=2,432)		
No	2052	84.4% (82.9-85.8)
Yes	380	15.6% (14.2-17.1)
Lifetime history of cigarette smoking (n=2,427)		
Never smoked	2157	88.9% (87.6-90.1)
Ever smoked	270	11.1% (9.9-12.4)
Current cigarette smoking (n=2,427)		
No	2224	91.6% (90.5-92.7)
Yes	203	8.4% (7.3-9.5)
Willing to Quit smoking (n=203)		
No	170	83.7% (77.9-88.5)
Yes	33	16.3% (11.5-22.1)
Tobacco harm perception (n=2,227)		
Definitely not	416	18.7% (17.1-20.4)
Probably not	317	14.2% (12.8-15.8)
Probably yes	642	28.8 (27.0-30.8)
Definitely yes	852	38.3 (36.2-40.3)
Perception of cigarette smoking as one of the top three causes of HNC (n=2,530)		
No	2110	83.4% (81.9-84.8)
Yes	420	16.6%(15.2-18.1)
Perception of smokeless tobacco (snuff) as one of the top three causes of HNC (n=2,530)		
No	2405	95.1% (94.1-95.9)
Yes	125	4.9% (4.1-5.9)
Perception of alcohol use as one of the top three causes of HNC (n=2,530)		
No	2148	84.9% (83.4-86.3)
Yes	382	15.1% (13.7-16.6)

n – Total number of participants; 95%CI: 95% Confidence Interval; HNC – Head and Neck Cancer

Table 3: Factors associated with current cigarette smoking among the participants

Variables	Current cigarette smoking		p-value
	Yes (8.4%)	No (91.6%)	
Location of school			<0.001*
Northern Nigeria	141 (11.2%)	1118 (88.8%)	
Southern Nigeria	62 (5.3%)	1106 (94.7%)	
School ownership			<0.001*
Public	123 (6.9%)	1655 (93.1%)	
Private	80 (12.3%)	569 (87.7%)	
Mode of studentship			<0.001*
Boarding	76 (14.0%)	465 (86.0%)	
Day	127 (6.7%)	1759 (93.3%)	
School set-up			0.004*
Mixed	145 (8.6%)	1544 (91.4%)	
Boys only	52 (10.0%)	466 (90.0%)	
Girls only	6 (2.7%)	214 (97.3%)	
Sex			<0.001*
Male	161 (11.9%)	1193 (88.1%)	
Female	35 (3.3%)	1015 (96.7%)	
Religion			<0.001*
Christianity	86 (5.8%)	1386 (94.2%)	
Islam	107 (11.6%)	815 (88.4%)	
Tribe			<0.001*
Yoruba	64 (7.5%)	793 (92.5%)	
Hausa	84 (14.7%)	489 (85.3%)	
Igbo	12 (5.0%)	227 (95.0%)	
Others	43 (5.7%)	715 (94.3%)	
Harm perception of tobacco use			<0.001*
Definitely not	65 (16.0%)	340 (84.0%)	
Probably not	36 (11.6%)	274 (88.4%)	
Probably yes	44 (7.0%)	581 (93.0%)	
Definitely yes	40 (4.7%)	805 (95.3%)	
Lifetime history of alcohol use			<0.001*
Never drinker	65 (3.4%)	1847 (96.6%)	
Ever drinker	136 (26.8%)	371 (73.2%)	
Current alcohol use			<0.001*
No	75 (3.7%)	1967 (96.3%)	
Yes	126 (33.4%)	251 (66.6%)	

*Statistically significant

Table 4: Factors associated with current alcohol use among the participants

Variables	Current alcohol intake (%)		p-value
	Yes (15.6%)	**No (84.4%)**	
Location of school			0.023*
Northern Nigeria	218 (17.2%)	1047 (82.8%)	
Southern Nigeria	162 (13.9%)	1005 (86.1%)	
Age			0.005*
12-14years	37 (10.2%)	326 (89.8%)	
15-19 years	314 (16.4%)	1604 (83.6%)	
20-24 years	26 (19.8%)	105 (80.2%)	
Sex			<0.001*
Male	253 (18.6%)	1107 (81.4%)	
Female	122 (11.6%)	929 (88.4%)	
Harm perception of tobacco use			<0.001*
Definitely not	89 (21.8%)	320 (78.2%)	
Probably not	60 (19.3%)	251 (80.7%)	
Probably yes	86 (13.7%)	540 (86.3%)	
Definitely yes	109 (12.9%)	736 (87.1%)	
Lifetime history of cigarette smoking			<0.001*
Never smoker	234 (10.9%)	1918 (89.1%)	
Ever smoker	143 (53.6%)	124 (46.4%)	
Current cigarette smoking			<0.001*
No	251 (11.3%)	1967 (88.7%)	
Yes	126 (62.7%)	75 (37.3%)	

Statistically significant

Table 5: Predictors of current cigarette smoking among the study participants

Predictors	Current cigarette smoking		
	aOR	**95% CI**	**p-value**
Location of school			
Northern Nigeria	1.94	1.10 – 3.44	0.023*
Southern Nigeria	Ref		
School ownership			
Private	1.56	1.03 – 2.38	0.036*
Public	Ref		
Mode of studentship			
Boarding	1.75	1.15 – 2.69	0.010*
Day	Ref		
Sex			
Male	3.03	1.80 – 5.10	<0.001*
Female	Ref		
Tobacco harm perception			
Definitely not	2.59	1.58 – 4.26	<0.001*
Probably not	2.04	1.18 – 3.53	0.011*
Probably yes	1.41	0.86 – 2.33	0.176
Definitely yes	Ref		
Current alcohol use			
Yes	12.50	8.70 – 18.18	<0.001*
No	Ref		
School set-up			
Mixed	0.96	0.34-2.70	0.955
Boys only	1.09	0.35-3.46	
Girls only	Ref		
Religion			
Christianity	0.78	0.47-1.29	0.337
Islam	Ref		
Tribe			
Yoruba	1.39	0.71-2.73	0.337
Igbo	0.70	0.28-1.78	0.458
Other tribes	0.88	0.48-1.62	0.691
Hausa	Ref		

*aOR: Adjusted Odds Ratio; 95%CI: 95% Confidence Interval; *Statistically significant*

Table 6: Predictors of current alcohol use among the study participants

Predictors	Current alcohol use		
	aOR	95% CI	p-value
Sex			
Male	1.32	1.01–1.72	0.046*
Female	Ref		
Current cigarette smoking			
Yes	12.50	8.77–17.86	<0.001*
No	Ref		
Location of school			
Northern Nigeria	1.08	0.82–1.41	0.592
Southern Nigeria	Ref		
Age			
12-14years	0.62	0.32–1.20	0.152
15-19 years	1.10	0.63–1.92	0.740
20-24 years	Ref		
Harm perception of tobacco use			
Definitely not	1.25	0.88–1.79	0.216
Probably not	1.25	0.85–1.83	0.264
Probably yes	0.95	0.68–1.32	0.761
Definitely yes	Ref		

*aOR: Adjusted Odds Ratio; 95%CI: 95% Confidence Interval;*Statistically significant (p<0.05)*

2.38), being a boarding student (aOR: 1.75; 95% CI: 1.15–2.69), male-gender (aOR: 3.03; 95% CI: 1.80–5.10), current alcohol use (aOR: 12.50; 95% CI:8.70–18.18), having 'no' (aOR: 2.59; 95% CI: 1.58–4.26) or 'low' tobacco harm perception (aOR: 2.04; 95% CI: 1.18–3.53). (Table 5)

Factors associated with current alcohol use
A higher proportion of participants attending schools in northern Nigeria (17.2%) compared to southern Nigeria (13.9%) (p = 0.023), males (18.6%) compared to females (11.6%) (p < 0.001), ever cigarette smokers (53.6%) compared to never smokers (10.9%) (p<0.001) and current cigarette smokers (62.7%) compared to non-smokers (11.3%) (p<0.001) were current alcohol users. Similarly, those aged 20-24 years old (19.8%) and those with no harm perception to tobacco use (21.8%) had the highest proportion of current alcohol users compared to their counterparts. (Table 4)

However, the logistic regression modelling revealed that the predictors of current alcohol use were male gender (aOR: 1.32; 95% CI: 1.01–1.72) and current cigarette smoking (aOR: 12.5; 95% CI: 8.77–17.86). (Table 6)

DISCUSSION
Like many African countries, Nigeria is considered to be in the first phase of the tobacco epidemic,[20] with a relatively low prevalence of cigarette smoking among adults, youths, and adolescents, compared to some other low- and middle-income countries.[2] The last (2008) Global Youth Tobacco Survey (GYTS) for Nigeria,[21] conducted in five cities across five geopolitical zones, reported a prevalence of 4.2% for current cigarette smoking among school-going adolescents. Hence, having a prevalence of 8.4% in this study suggests that cigarette smoking has increased among Nigerian secondary school students. The GYTS study was among adolescents between 13 and 15 years old, while this study was conducted among senior secondary school students, with their ages ranging from 12 to 24 years. While this may have contributed to the difference in the prevalence, other literature supports that the prevalence of cigarette smoking has increased significantly in the last decade.[10]

Several factors have been reported as the reasons for the increasing trend of cigarette smoking among Nigerian adolescents, and some of these include the decision of the Tobacco Industry (TI) to make Africa, including Nigeria, their next major tobacco market.[22] The TI is aggressive with its marketing strategies with lots of Tobacco Advertising Promotion and Sponsorship (TAPS).[22,23] The lack of implementation of tobacco control policies such as the ban on TAPS, sales to minors, location of the point of sales close to schools, and sales of single sticks of cigarettes, are also major contributory factors.[24,25]

The national prevalence of 8.4% (95% CI: 7.3-9.5) of current cigarette smokers in this study is comparable to the pool prevalence of 9.0%, reported in the meta-

analysis of 26,875 school-going adolescents from countries in East Africa conducted in 2019.[26] It is also comparable to the national prevalence of 6.8% (95% CI: 4.1-11.0) in Cameroon, 7.4% (95% CI: 5.6-9.6) in Comoros, and 9.0% (95% CI: 7.6-10.7) in Gabon.[27] However, it is higher than the national prevalence of 1.0% (95% CI: 0.6-1.8) in Tanzania, 2.8% (95% CI: 2.0-3.9) in Ghana, and 3.8% (95% CI: 2.7-5.2) in Sierra Leone.[27] While the prevalence in Mauritius - 15.3% (95% CI: 10.1-21.0) and Seychelles - 15.4% (95% CI: 13.1-18.1) are higher.[27] These studies focused on school-going adolescents aged 13-15 years, and the surveys were carried out between 2014 and 2017; hence, the current situation may not be the same.

However, the prevalence from this study showed that the burden of cigarette smoking among secondary school students in Nigeria has significantly increased in the last decade, and unlike in the past when it was relatively lower, it is now comparable to or higher than many African countries. It is crucial now more than ever to address this growing challenge that is fast becoming a public health problem in the country. And to effectively control tobacco smoking in the country, it is important to target the predictors of the habit through relevant policies and programs.

The male gender was one of the predictors of current cigarette smoking among the study participants. This is in line with the findings from similar studies[10,11,27,28] within and outside Nigeria that reported a disproportionately higher prevalence of cigarette smoking among males compared to females. Some of the reasons for the increased smoking habit among males are cultural, psychosocial and behavioural factors. For example, most cultures in Nigeria are more receptive to men smoking than women.[29]

Participants' perception of tobacco use as a risk factor for HNC was another predictor of current cigarette smoking, and it agrees with the findings from other studies.[30,31] It is thus crucial that tobacco control interventions are targeted at increasing the harmful perception adolescents have toward tobacco smoking. One of the main strategies of the TI is to suppress the perception of risk and create a positive perception of tobacco smoking among unsuspecting children and adolescents by portraying smoking as good and harmless.[32] Hence, policies against TAPS in Nigeria have to be implemented to limit the TI's influence on children and adolescents.

Educational activities to increase students' tobacco harm perception and prevent tobacco use should be introduced into the school curriculum. Similarly, the school counsellors, who are responsible for students' psychological well-being,[33] can play vital roles in providing needed tobacco-related counselling to the students. School counsellors can be trained to counsel students on healthy behaviours, especially on avoiding tobacco use. Thus, we recommend that counsellors in Nigerian secondary schools be prepared to undertake these activities.

There is a lack of studies focused on school-related factors as predictors of cigarette smoking among secondary school students in Nigeria. A study[34] in Chile assessed the influence of school-related factors on smoking among Chilean adolescents and reported that school bonding, school truancy, and school achievement were associated with smoking among them. But in contrast to this present study, they did not find an association between school type and cigarette smoking. School location, set-up, ownership, and mode of studentship were assessed in this study. It showed that attending schools in northern Nigeria, private schools, and boarding schools were associated with current cigarette smoking after controlling for alcohol use, tobacco harm perception, gender, religion and tribe. For example, while students attending schools in northern Nigeria (a region dominated by the Hausa tribe) were more likely to be current smokers, the Hausa tribe was not independently associated with cigarette smoking. Hence, there may be other environmental factors in those schools that may be responsible for this association. We recommend further studies to understand why these school-related factors were associated with cigarette smoking. School-going adolescents spend many teenage years in schools, especially those in boarding schools. Thus, school-level interventions and policies must be implemented after a thorough understanding of these associated factors.

This study showed a strong association between current cigarette smoking and current alcohol use. This finding agrees with similar studies[10,35,36] that have reported strong associations between both habits. Several reasons can be adduced why cigarette smokers are more likely to drink alcohol than non-smokers. Some of the reasons are environmental exposure to these products. Many locations, such as bars and kiosks, where alcohol is sold, also have cigarettes on sale, and vice versa. Hence, there is a likely higher exposure of those who purchase either of the products to the other. Studies have also reported pharmacological interactions between alcohol and nicotine, which may explain the increased use of both products together.[4] Synergistic activation of the reward system in the brain occurs when both products are used together. When nicotine and alcohol are used together, they potentiate the "feel good" feeling that they both offer by further activating the dopamine reward pathway.[4]

The synergistic negative health effect of tobacco and alcohol is a significant challenge and more reasons why both habits must be discouraged among adolescents. By themselves, tobacco and excessive alcohol consumption risk serious health problems like cardiovascular diseases, neurological problems, and cancers.[5,37] Combining the two increases the users' risks, morbidity, and mortality substantially; worst still, if both habits are commenced during adolescence.[5,37,38]

Apart from current cigarette smoking, this study also showed that the male gender was a predictor of alcohol use, which is similar to other studies.[1,11,39–42] However, some other studies did not record any significant gender difference in alcohol use.[43,44] And even though this study recorded an association, the odds of males being current alcohol users were only 1.32 times higher than females. As reported by the WHO,[1] studies from other countries have also shown that while there is a significant gender difference in alcohol consumption between boys and girls, the difference is minimal, especially when compared to the gender difference with tobacco smoking, and this is consistent with the findings from this study.

Most Nigerian cultures are less accommodating to females drinking alcohol than males,[45] although this is less serious compared to cigarette smoking. Apart from cultural factors, gender differences in the neurobiological make-up between males and females have been reported to increase the risk of alcohol use in males.[46] Males have greater sensitivity to the rewarding effect of alcohol and develop lesser inhibitory control and sensation-seeking levels than females.[46]

About one in every seven secondary school students who participated in this study were currently drinking alcohol. While this may be relatively low compared to other regions of the world,[1] it is still a course of concern. For example, while alcohol is less consumed in Africa, the age-standardised alcohol-attributable burden of disease and injury is still the highest.[1] The risk of addiction, alcohol use disorder, and morbidity from alcohol use is even higher when the habit is initiated at a younger age.[5,7]

This study has provided empirical information on cigarette and alcohol use among a nationally representative sample of Nigerian school-going adolescents; however, it is not without limitations. Study participants were not recruited from the South-East region, one of the six geopolitical regions in the country and dominated by the Igbo tribe, potentially affecting the generalizability of the study finding to this region. However, is unlikely to constitute a problem because the study findings did not conflict with findings from similar studies conducted in the region.[10,12,28,47–49] The sampling technique did not consider the potential urban vs rural differences in the study outcomes. Although, a recent review of cigarette and alcohol use among this population in Nigeria did not report any significant differences between participants in urban and rural communities.[10,45] This was a cross-sectional study and cannot determine causality. However, since our aim was not to determine causality but associated factors, we do not believe it constitutes a problem in this study. There is a risk of misreporting, but we assured the students that the questionnaires were anonymous and their responses could not be traced back to them.

CONCLUSIONS

The prevalence of current cigarette and alcohol use among Nigerian secondary school students was high, suggesting an increase in cigarette smoking in the last decade. The study showed a strong association between cigarette smoking and alcohol use, and the male gender is a predictor of both habits. Other predictors of current cigarette smoking were tobacco harm perception and school-related factors, but further studies are needed to understand the school-related associations better.

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CONFLICT OF INTEREST

Authors have none to declare.

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