

RESEARCH ARTICLE

Determinants of Smoking Initiation and Susceptibility to Future Smoking among School-Going Adolescents in Lagos State, Nigeria

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Abstract

Background: It is projected that low and middle-income countries will bear a major burden of tobacco related morbidity and mortality, yet, only limited information is available on the determinants of smoking initiation among youth in Africa. This study aimed to assess the determinants of smoking initiation and susceptibility to future smoking among a population of high school students in Lagos, Nigeria. **Materials and Methods:** Baseline data from an intervention study designed to assess the effect of an anti-smoking awareness program on the knowledge, attitudes and practices of adolescents was analyzed. The survey was carried out in six randomly selected public and private secondary schools in local government areas in Lagos state, Nigeria. A total of 973 students completed self-administered questionnaires on smoking initiation, health related knowledge and attitudes towards smoking, susceptibility to future smoking and other factors associated with smoking. **Results:** Of the respondents, 9.7% had initiated smoking tobacco products with the predominant form being cigarettes (7.3%). Males (OR: 2.77, 95% CI: 1.65-4.66) and those with more pro-smoking attitudes (OR: 1.44, 95% CI: 1.34-1.54) were more likely to have initiated smoking. Those with parents and friends who are smokers were 3.47 (95% CI: 1.50-8.05) and 2.26 (95% CI: 1.27-4.01) times more likely to have initiated smoking. Non-smoking students, in privately owned schools (OR: 5.08), with friends who smoke (5.09), with lower knowledge (OR: 0.87) and more pro-smoking attitudes (OR 1.13) were more susceptible to future smoking. In addition, respondents who had been sent to purchase cigarettes by an older adult (OR: 3.68) were also more susceptible to future smoking. **Conclusions:** Being male and having parents who smoke are predictors of smoking initiation among these students. Consistent with findings in other countries, peers not only influence smoking initiation but also influence smoking susceptibility among youth in this African setting. Prevention programs designed to reduce tobacco use among in-school youth should take these factors into consideration. In line with the recommendations of article 16 of the WHO FCTC, efforts to enforce the ban on the sales of cigarettes to minors should be also emphasised.

Keywords: Tobacco smoking - adolescents - susceptibility - Lagos State, Nigeria

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Introduction

Tobacco smoking, the most important preventable cause of death overall and the leading cause of cancer-related mortality, remains a major public health concern particularly among young people (Sari et al., 2011; Canon et al., 2012). The vast majority of smokers begin using tobacco products well before the age of 18 years (Centre for Disease Control, 2012). The argument for smoking prevention among adolescents is based on the observation that, if smoking does not start during adolescence, it is unlikely ever to occur (US Department of Health and Human Services, 1994) and on data indicating that the

probability of cessation among adults is inversely related to age at initiation (Coombs et al., 1992; Breslau et al., 1996; Tyas et al., 1998). Even infrequent experimental smoking in adolescence significantly increases the risk of adult smoking (Breslau et al., 1990, Tyas et al., 1998). Once smoking has begun, cessation is difficult and smoking is likely to be a long-term addiction (Pierce et al., 1996). It has been predicted that if the pattern currently seen among youth continues, a lifetime of tobacco use would result in the deaths of 250 million children and young people alive today, most of them in developing countries (World Health Organization 2012).

Tobacco smoking among the youth is also of public

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health concern because of the immediate and long-term health sequelae associated with tobacco use such as asthma, chronic cough, chronic obstructive airways disease, cancers and cardiovascular diseases (American cancer society, 2005). Adolescent tobacco use has also been linked to other risky health-related behaviours, mental health problems, suicide, motor vehicle accidents, violent crime and even dental problems (USDHHS, 2004). Furthermore, research on the sequence of drug use suggests that cigarette smoking may serve as a “gateway” to illicit drugs (Mackay et al., 2002).

Tobacco use in any form is dangerous and addictive and every effort should be made to discourage its use. However, smoked tobacco products which may be cigarettes, pipes, cigars or hand-rolled tobacco are particularly harmful because the burning process releases a dangerous cocktail of about 7,000 chemicals of which about 70 are known carcinogens (USDHHS 2005; 2010).

Nigeria is one of the most populous countries in Africa, with an estimated population of 162 million people of which youth are estimated to be more than 30%. In Nigeria, the prevalence of tobacco use among adults (12.3% males <1% in females) is generally lower than in more developed countries (National Population Commission, 2009). The prevalence among youth however, tends to be higher than among adults. A mean lifetime smoking prevalence of 26.4% was reported among secondary school students with values ranging from 7.2% to 42.9% (Osibogun et al., 2009). Relatively lower rates were however reported in younger adolescents in the 2008 Global Youth Tobacco Survey (GYTS) with rates of cigarette smoking initiation ranging from 4.7-16.1% among 13-15 year old students. (Ekanem, 2009) These apparently low rates, combined with the huge number of youth, provide a potentially lucrative market for the tobacco industry who may target them as “replacement smokers” to replace those smokers who die or quit (American Cancer Society, 2003).

The first-use smoking experience is symbolically significant and may be an enduring life event (Delorme et al., 2003). The initiation and progression of tobacco smoking among youth is however a complex process that may be influenced by a wide range of contextual factors ranging from the macro level policy and media influences to more localized community, peer and family factors. (Turner et al., 2004) an understanding of the various factors associated with the onset of adolescent smoking is thus an essential component of the efforts to prevent smoking initiation among young people particularly in Africa where such information is sparse. Furthermore, an understanding of the factors associated with susceptibility to initiate smoking among never-smokers may be helpful in identifying and preventing smoking initiation among the large population of young Nigerians who may be at risk of smoking in the near future.

The purpose of this study was therefore to identify the determinants of smoking initiation and susceptibility among a sample of in-school youth using baseline data obtained from an intervention study originally designed to influence the tobacco related knowledge, attitudes and practices of a sample of high school students in Lagos state, Nigeria.

Materials and Methods

Study population

This study was conducted in Lagos State, the commercial capital of Nigeria, a country with an estimated population of 162 million people as at 2011, of which the youth are estimated to be over 30 percent. (Population Reference Bureau, 2009; World Bank, 2012) There are twenty local government areas (LGA) in the state, sixteen of which are classified as urban. There were 609 public schools and 421 private schools registered in Lagos state as at the time of the survey.

Study design

This study utilized the baseline data of an intervention study carried out in 2009/2010 academic year designed to evaluate the effect of an anti-smoking awareness program on the smoking related knowledge, attitudes and practices of secondary school students in Lagos state. A minimum sample size of 419 was determined for each group. Hence, a minimum sample size of 838 was employed for the study in both groups. Giving allowance for a possible non-response rate of 20%, this was increased to a minimum of 1006 students in both groups.

Data collection tool

A questionnaire was designed by the research team after a thorough literature review and adaptations from the World Health Organisation Global Youth Tobacco Survey tool (CDC, 2008). The questionnaire had four sections assessing: socio demographic information, information on the knowledge of tobacco related health risks, information on the students attitudes towards smoking, information assessing the smoking behaviour of the students and the possible factors associated with tobacco smoking. The questionnaire was pre-tested among fifty students equally distributed among the secondary school classes in public and private secondary schools in another LGA that was not part of the study. Thereafter, appropriate corrections were made in order to improve the clarity of the questions.

Sampling method

Two LGA's were randomly selected from the list of the sixteen urban LGA's in Lagos state. One LGA (Ifako-ijaiye) was randomly selected as the intervention group and the other (Lagos Mainland) as the control group. A list of public and private schools in each LGA was obtained. Public schools in Lagos state are stratified into junior and senior schools each having three sets of classes for each grade. However private schools include both junior and senior grades. Hence, three schools in each LGA were selected: one private school (which includes both senior and junior classes), one junior secondary school (JSS) and one senior secondary school (SSS) were randomly selected from the list of schools in each LGA. Hence, a total of six schools were used for the survey. Only five grades (Grade 8, Grade 9, Grade 10, Grade 11 and Grade 12) were used for the study. First year (Grade 7) students were excluded because they were not in school at the time of the survey, as they had not completed their registration process. Five schools of the six selected schools had comparatively

larger classes (an average of 50 students) so only one class in each grade was selected. The sixth selected school had relatively fewer students in each class so two classes in each grade were selected for the survey in that school. In all, twenty-five classes were selected and used for the survey. There were 1031 students in the classes selected for the study.

Data collection procedure

All the students present in school in the selected classes on the day of the study were included in the survey. Self-administered questionnaires were given to all the students after an informed written consent. Each questionnaire took about 20 minutes to complete.

Measures

Cigarette smoking was assessed using the standard WHO GYTS definition (CDC, 2008). In addition, respondents were asked if they had ever used a non-cigarette smoked tobacco products i.e. pipes, cigars or hand-rolled tobacco. Based on this, respondents who had ever smoked a cigarette or any other type of smoked tobacco product were categorized as having initiated tobacco smoking, while those who had never used a smoked tobacco product were categorized as never-smokers. The standard GYTS survey question, "At any time during the next 12 months do you think you will smoke cigarettes?" was used to assess future smoking intentions with Yes, No or Not sure as options. For the purpose of this study, students who answered in the affirmative were classified as susceptible to smoking initiation; all other responses were classified as not susceptible. To assess the knowledge of tobacco related health risks, sixteen questions were asked. Each correct response was given a score of one, while each incorrect response was given a score of zero. Five attitudinal questions adapted from the GYTS questionnaire were used to assess the smoking related attitudes of the students using a four point Likert scale with scores ranging from zero to three. The most positive pro-smoking response was awarded three points while the least positive response was awarded a zero.

Data analysis

Mean knowledge and attitude scores \pm standard deviations were computed. Chi-square and student's t-tests were conducted firstly to look for associations between the various factors and smoking initiation and then to look for associations with smoking susceptibility among never smokers. P values of ≤ 0.05 were considered statistically significant. Logistic regression analyses were carried out to determine the factors associated with having smoking initiation and with future smoking susceptibility. For the multivariate analyses, all the variables that were statistically significant on the bivariate were entered into the multivariate analyses using a block entry approach. SPSS version 17.0 was used for data analysis.

Ethical considerations

Approval for this study was obtained from the ethics and research committee of the Lagos University Teaching

Hospital. Permission was also obtained from the Lagos state Ministry of Education and the school principal of each school. Written informed consent was obtained from each respondent. There were no names printed on the questionnaires and the students were assured of the confidential nature of the study. They were also given the choice to participate or not in the study.

Results

A total of 1031 students were surveyed, out of which 989 agreed to participate in the survey (Response rate 95.9%). Of these 973 questionnaires were properly filled and subsequently analysed.

Respondents' ages ranged from 10-21 years with a mean of 14.2 ± 2 years. There were slightly more males (52.9%) than females (47.1%). Only 3.7% had a parent who smoked and 14.4% had friends who smoked (Table 1). Of the respondents, 9.7% had initiated smoking tobacco, of which cigarettes were the most predominant form (75.5%). Others included hand-rolled tobacco (21.3%), cigars (2.1%) and pipes (2.1%). Figure 1 shows the type of tobacco products used among those who had ever used smoked tobacco. The age of smoking initiation ranged from 7-19 years with a mean of 11.6 ± 2.2 years and a median of 11 years. Of the students who had initiated tobacco smoking, more than a third of them (36.1%) had progressed towards current smoking at the time of the survey.

A bivariate analysis showed that majority of respondents who had initiated smoking were male (69.1%)

Table 1. Factors Associated with Smoking Initiation among the Respondents

Variables	Had Initiated Smoking n=94		Not had Initiated Smoking n=879		P	Total n=973 Freq (%)
	Freq (%)	Freq (%)	Freq (%)	Freq (%)		
Age (in years)	14.2 \pm 2.1	14.2 \pm 1.7	0.98	14.2 \pm 2.0		
Sex	Male	65 (12.7)	446 (87.3)	<0.001	511 (100.0)	
	Female	29 (6.3)	462 (93.7)		462 (100.0)	
Class	Junior Sec.	24 (5.8)	387 (94.2)	<0.001	411 (100.0)	
	Senior Sec.	70 (12.5)	492 (87.5)		562 (100.0)	
Ethnicity	Yoruba	73 (10.5)	619 (89.5)	0.228	692 (100.0)	
	Igbo	13 (7.1)	169 (92.9)		182 (100.0)	
	Hausa	0 (0.0)	17 (100.0)		17 (100.0)	
Minority	8 (9.8)	74 (90.2)		82 (100.0)		
Religion	Christianity	74 (10.1)	657 (89.9)	0.396	731 (100.0)	
	Islam	20 (8.3)	222 (91.7)		242 (100.0)	
School Type	Public	48 (9.3)	468 (90.7)	0.688	516 (100.0)	
	Private	46 (10.1)	411 (89.9)		457 (100.0)	
Tobacco-related health risk knowledge	7.2 \pm 3.1	8.4 \pm 2.9	<0.001	8.3 \pm 2.9		
Positive attitude towards smoking	9.2 \pm 3.9	4.9 \pm 3.1	<0.001	5.4 \pm 3.4		
In favour of smoking ban in public places	Yes	38 (6.3)	570 (93.7)	0.31	626 (100.0)	
	No	56 (15.3)	309 (84.7)		347 (100.0)	
Parent smokes	Yes	11 (24.4)	34 (75.6)	0.002	45 (100.0)	
	No	83 (8.9)	845 (91.1)		928 (100.0)	
Friend smokes	Yes	29 (19.5)	120 (80.5)	<0.001	149 (100.0)	
	No	65 (7.9)	759 (92.1)		824 (100.0)	
Has been sent to purchase cigarettes by an older adult	Yes	39 (12.7)	267 (87.3)	0.027	306 (100.0)	
	No	55 (8.2)	612 (91.8)		667 (100.0)	

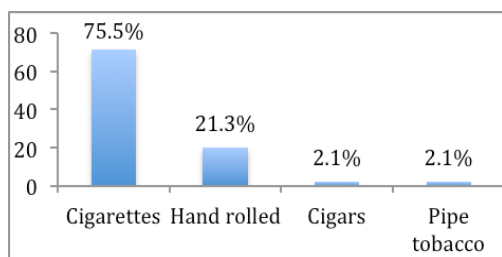


Figure 1. Types of Smoking among the Respondents

Table 2. Determinants of Smoking Initiation among Respondents

Variables	Adjusted OR	95% CI	p value
Male gender	2.77	1.65-4.66	<0.001
Positive attitude towards smoking	1.44	1.34-1.54	<0.001
Parent smokes	3.47	1.50-8.05	0.004
Friend smokes	2.26	1.27-4.01	0.006

Table 3. Factors Associated with Reported Smoking Susceptibility

Variables	Susceptible to smoking n=146 Freq(%)	Not susceptible n=733 Freq(%)	P	Total never-smoker N=879 Freq(%)
Age(in years)	14.6±2.1	14.2±2.0	0.039	14.2±1.7
Sex				
Male	58 (12.9)	392 (87.1)	0.002	450(100.0)
Female	88 (20.5)	341 (79.5)		429(100.0)
Class				
Junior Sec.	76 (19.6)	311 (80.4)	0.032	387(100.0)
Senior Sec.	70 (14.2)	422 (85.8)		492(100.0)
Ethnicity				
Yoruba	105 (71.9)	514 (70.1)	0.622	619(100.0)
Igbo	24 (16.4)	145 (19.5)		169(100.0)
Hausa	2 (1.4)	15 (2.0)		17(100.0)
Minority	15 (10.3)	59 (8.0)		74(100.0)
Religion				
Christianity	110 (16.7)	547 (83.3)	0.855	657(100.0)
Islam	36 (16.2)	186 (83.8)		222(100.0)
School Type				
Public	34 (7.3)	434 (92.7)	<0.001	468(100.0)
Private	112 (27.3)	299 (72.9)		411(100.0)
Tobacco-related health risk knowledge	7.0±3.0	8.7±2.8	<0.001	8.4±2.9
Positive attitude towards smoking	6.45±3.0	4.68±2.9	<0.001	4.9±3.1
In favour of smoking ban in public places				
Yes	77 (13.5)	493 (86.5)	0.001	570(100.0)
No	69 (22.3)	240 (77.7)		309(100.0)
Parent smokes				
Yes	6 (17.6)	28 (82.4)	0.868	34(100.0)
No	140 (16.6)	705 (83.4)		845(100.0)
Friend smokes				
Yes	56 (46.7)	64 (53.3)	<0.001	120(100.0)
No	90 (11.9)	669 (88.1)		759(100.0)
Ever been offered a cigarette				
Yes	36 (37.5)	60 (62.5)	<0.001	96(100.0)
No	110 (14.0)	673 (86.0)		783(100.0)
Has been sent to purchase cigarettes by an older adult				
Yes	85 (31.8)	182 (24.8)	<0.001	267(100.0)
No	61 (41.8)	551 (75.2)		612(100.0)

and in a senior secondary class (10th grade and above). There was no statistically significant association between ethnicity, religion, school type (public vs. private) and having initiated smoking. Students who had initiated smoking had significantly lower tobacco related health

Table 4. Determinants of Smoking Susceptibility

Variables	Adjusted OR	95% CI	p value
Being in a private school	5.08	3.22-8.03	<0.001
Knowledge of tobacco related health risks	0.87	0.80-0.93	<0.001
Positive attitude towards smoking	1.13	1.06-1.22	0.001
Friend smokes	5.09	3.09-8.37	<0.001
Ever been sent to purchase a cigarette by an older adult and went	3.68	2.41-5.61	<0.001

risk knowledge scores and more pro-smoking attitudes. A significantly higher proportion (58.5%) of respondents who had ever been sent to purchase cigarettes by an older adult and went had initiated smoking (Table 1).

A multivariate analysis showed that males were 3.77 times more likely to have initiated smoking. For every unit increase in pro-smoking attitude towards smoking, students were 1.44 times more likely to have initiated smoking. Those with parents and friends who are smokers were 3.47 and 2.26 times respectively more likely to have initiated smoking (Table 2).

In assessing factors associated with smoking susceptibility, bivariate analyses showed that females, students in junior classes (Grades 8 and 9) and in private schools were associated with smoking susceptibility. Furthermore, susceptible never-smokers had lower knowledge of tobacco related health risks and more pro-smoking attitudes. More susceptible students favoured a ban on smoking in public places than those who were not susceptible (Table 3). The regression model showed that the most important determinants for smoking susceptibility among the never-smokers were having a friend who smokes and being in a non-government i.e. privately owned school.

A bivariate analyses assessing the factors associated with current smoking was also carried out (Table not shown). However, none of the variables were significant hence a multivariate analyses could not be done.

Discussion

Consistent with findings obtained in similar studies in many parts of Africa, the lifetime prevalence of smoking in this study (9.7%) is much lower than among adolescents in other parts of the world like Europe and America (World Health Organisation, 2000, World Health Organisation 2001). Some countries in Asia, notably Japan, have reported rates of ever use as high as 90% among male youth (Mazakazu et al., 2003) which are significantly higher than the rate of 12.6% observed in males in this study. Smoking rates among youth in India, are however more similar, though slightly higher than our findings (Sinha et al., 2007; Dhavani et al., 2009; Arora et al., 2010; Gajalakshmi et al., 2010). Similar to reports from studies carried out in the developed world and other countries in Africa, is the fact that manufactured cigarettes (75.5%) are the predominant form of tobacco used by the adolescents. In some countries in Asia particularly India, the use of other forms of tobacco is more common than manufactured cigarettes (Raute, 2011). In this study, we also observed that almost one in five of the students who had initiated smoking had used hand-rolled tobacco. While

most efforts at tobacco control in Nigeria have focused on cigarettes, it may be important to consider incorporating hand rolled forms of tobacco in tobacco control efforts.

The lifetime prevalence of smoked tobacco use in our study was not high as reported in some other studies carried out in Nigeria. Our prevalence of 9.7% (12.6% males, 6.3% females) is slightly higher than the prevalence reported in a similar study carried out among secondary school students in an urban setting also in Lagos (5.2%) (Oshodi et al., 2010). Other studies have reported rates of 10.6%, 7.2% and 3% among students in neighbouring states also in the south-western zone of Nigeria (Osungbade et al., 2008; Yisa et al., 2009). These studies however considered cigarettes only and did not consider other forms of smoked tobacco as was done in our study. The lifetime prevalence of cigarette use in this study of 7.3% (9.9% males, 4.4% females) was similar to the findings of the WHO GYTS of 7.7% reported for Lagos state (9.1% males, 5.5% females) (Ekanem, 2009). They are also similar to rates reported in Ghana's GYTS (World health organisation, 2000). Of the students who had initiated smoking, more than one in three (36.1%) had progressed towards current smoking at the time of the survey. In countries like Nigeria and other similar African settings, where smoking rates are comparatively low, efforts to reduce the likelihood of adolescent experimentation with tobacco products may be helpful in reducing teen smoking rates.

The World Health Organisation reports that smoke free laws not only protect people from second hand smoke but also help current smokers quit and reduce smoking initiation (World Health Organisation, 2012). There is currently no law banning smoking in public places in Lagos state where our study was conducted however Nigeria is currently working towards the passage of its National tobacco control bill, which includes a ban on smoking in public places in all the states of the federation. Majority (64.3%) of the students in this study (whether tobacco users or not) expressed support for the ban on smoking in public places. Our findings are similar to the findings of Nigeria's GYTS but slightly higher than the findings of the GYTS among Ghanaian students (54%) (World Health Organisation 2000). Studies in Egypt have also shown that many students express support for smoke-free policies (El Ansari et al., 2012). Adolescents support for smoke free laws may be used as a leverage to facilitate the passage of smoke free legislation both locally and nationally.

Parental smoking behaviours do have an influence on their children and studies in other parts of the world have reported the role of parental and peer influence in the initiation of tobacco use among adolescents. (Flay, 1994; Sen et al., 2000; Gilman, 2009; Muttappallymyalil et al., 2012). In this study, despite the fact that only a small percentage of respondents had a parent who smokes tobacco, having a parent who is a smoker was found to be a significant determinant of smoking initiation. Similarly, consistent with findings observed in studies conducted in India (Sen et al., 2000; Muttappallymyalil et al., 2012) having a friend who smokes was also a significant predictor of initiation. Efforts to control tobacco among

adults particularly parents may help to reduce teen smoking rates in our environment. Efforts targeted at peer influences should also be encouraged for effective tobacco control among youth.

In a country like Nigeria, where a majority of adolescents are non-smokers, tobacco control efforts tend to focus on the prevention of smoking initiation rather than cessation among youth. Prevention efforts targeted at young non-smokers who are susceptible to initiate smoking in the future may help in the prevention of smoking initiation among these at-risk youth. In this study, we observed that school factors influence smoking susceptibility as the type of school a child is enrolled was found to be a significant predictor of smoking susceptibility. In Nigeria, schools are generally classified on the basis of government ownership, as being public (government owned) or private. While there were no statistically significant variations in the prevalence of either smoking initiation or current smoking by school, we did find that students in privately owned schools were five times more likely to be susceptible to smoking uptake in the future compared with public school students. As with smoking prevalence, peer smoking (but not parental smoking) was a significant predictor of smoking susceptibility as those with friends who smoke were five times likely to be susceptible. In contrast, some studies in India (Sen et al., 2000; Dhavan et al., 2009) have however noted that being in a government owned schools was associated with cigarette smoking). Other studies have noted the influence of school factors and peers in the prevention of tobacco initiation (Maxwell, 2002; Leatherdale and Manske, 2005).

In Nigeria, it is common practice for younger persons to run errands for older ones. We observed that a significant proportion of students (most of them less than 18 years of age) had been sent to purchase cigarettes by an older adult. This is despite the fact that the law in Nigeria bans the sale of cigarettes to children less than 18 years (minors). Those students who had been sent to purchase cigarettes were about three times more likely to be susceptible to future smoking initiation when compared with those who had never been sent to purchase cigarettes. Violations of the law regarding the purchase of cigarettes by minors among adults may be a factor in influencing future smoking intentions. Enforcement of these laws may play a role in reducing smoking initiation by minors.

While many studies on the possible determinants of smoking initiation and use have been carried out in many countries, there is limited data in Africa. This is one of the few studies using a relatively large sample of students in Nigeria on the determinants of smoking initiation among youth. Another strength is the fact that we assessed the determinants of smoking susceptibility, which is a key factor in the prevention of initiation among youth. This is particularly important in many countries in Africa with currently low smoking rates but high potential for increased use. The study does however, have some limitations; data was collected on the smoking initiation only. While these students are distinctly different from never users, one cannot say for sure that they will progress to become current users. We were not able to assess

the determinants of current use because the number of current users was too low to detect significant differences across the groups. Similarly, the assessment of smoking susceptibility uses self-report of perceived smoking susceptibility. The students' report of their intentions may not always match their actions. Also, the data are cross sectional in nature hence no causal associations can be made. Finally, smoking status was not validated with biochemical assessments. It would however have been difficult to utilise biochemical methods to validate the smoking initiation. The study however provides useful insights into the factors to consider in planning adolescent anti-smoking programs in this and similar settings.

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