Sociocultural Determinants of Tobacco Smoking Initiation among University Students in Bucaramanga, Colombia, 2012

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Date of Submission: Nov 01, 2013

Date of Acceptance: May 29, 2014

How to cite this article: Afanador LPC, Radi DSS, Pinto LEV, Pinzón CEP, Carreño MFC. Sociocultural Determinants of Tobacco Smoking Initiation among University Students in Bucaramanga, Colombia, 2012. Int J Prev Med 2014;5:1107-13.

Original Article

ABSTRACT

Background: Tobacco smoking is the leading cause of preventable mortality. The prevalence of smoking in adolescents in high schools ranges from 23.5% to 41%, respectively. In Colombia, these figures are similar and students entering the University are exposed to initiate smoking. The purpose of this study was to establish the determinants associated with the initiation of tobacco smoking among university students.

Methods: A case–control paired by sex and age study design was used. The study population was the students of a private university of Bucaramanga, Santander, Colombia. The final sample consisted of 167 cases and 314 controls randomly select undergraduate university students. Data analysis was performed using a Logistic regression model adjusted by gender and age; using the initiation of tobacco smoking as the dependent variable, and as independent variables relationship with parents, history of parental smoking, university social environment, being away from hometown, steady girlfriend/boyfriend who smokes, alcohol consumption, physical activity, and Francis Score.

Results: The social environment (odds ratio [OR]: 32.70, 7.40-144.55), being away from hometown (OR: 3.06, 1.55-6.07), history of steady girlfriend/boyfriend who smoke (OR: 2.87, 1.43-5.76), a bad relationship with the father (OR: 8.01, 2.01-31.83), history of tobacco consumption of the mother (OR: 2.66, 1.37-5.17) and alcohol consumption (OR: 4.79, 1.91-12.00) appeared as determinants of initiation of tobacco smoking. As protector factors we found media advertisement (OR: 0.19, 0.05-0.71), light physical activity 2-3 times a week (OR: 0.33, 0.12-0.88), and a high result in Francis score (OR: 0.95, 0.919-0.99).

Conclusions: University efforts for tobacco-free policies should focus on preventive advertisement, promoting physical activity and awareness among young students of social environmental factors that could influence their decision to start smoking tobacco.

Keywords: Colombia, epidemiologic determinants, smoking, students, universities

INTRODUCTION

Tobacco smoking is currently the most prominent cause of preventable mortality in the general population. It is estimated that by 2030, the consumption of tobacco will be the cause of about 8 million deaths annually, with 80% of these occurring in countries with low and middle incomes like Colombia.[1] In addition, there is also an estimated significant secondary loss due to smoking-related diseases, as well as working problems-related to the harmful effects, which increase the morbidity, job disability and mortality rates among the reproductive aged population.[2]

The increasing rates of tobacco smoking in the past 50 years are related with the growing consumption among 10-18 years old population; this change is promoted by advertising campaigns of the tobacco companies that motivate tobacco consumption among the younger population.[3] Another reason is the easy access to tobacco products, and illegal substances in the social environment of young people.[3-5]

The World Health Organization revealed that ¼ of adolescents that started smoking before they were 10 years old,[1] another ¼ of the adolescent population had their first contact with tobacco in high school, with the aggravation that about 20% of those adolescents became dependent on nicotine.[5-8] This situation creates great health problems, that can be seen from an early stage as a decrease of lung development and a decrease of pulmonary capacity compared with the population that does not smoke.[2]

In Colombia, the World Tobacco Survey of 2001 and 2007 showed overall prevalence of tobacco smoking in high school adolescents of 29.8%;[7-9] thus, it can be considered that a large proportion of students entering college haven't acquired the habit. However, due to the age group used in these studies, they only generate a part of the information needed to start preventive policies, making it necessary to study in depth the young adult population entering the university system to analyze factors that influence their decision to start smoking.[10,11]

Sociocultural determinants such as age, parental relationship, social environment, advertising, concomitant use of illicit substances, alcohol consumption and dependence, physical activity and religious beliefs, had some association with smoking in adolescents with differences across published studies found on the subject;[10-16] however, scientific literature about determinants associated with tobacco smoking initiation in young adults is very limited.

This study aims to establish possible determinants associated with the initiation of tobacco smoking among university students who do not smoke tobacco before enrolling in an undergraduate program, and to provide useful information in order to develop health policies and programs with aims to prevent tobacco smoking initiation among adolescents and young adults population.

METHODS

Study design and participants

A case–control study paired by sex and age was performed. As a target population, we took all the undergraduate students of the "Universidad Autónoma de Bucaramanga, Bucaramanga, Colombia" who were enrolled between July 2011 and May 2012. UNAB is a private university, which has about 7000 undergraduate students. It was determined to find 168 cases and 168 controls for a 1:1 matched study, expecting an odds ratio (OR) of 2.5 for the exposure variable: "Having friends who smoke," calculating an α error of 0.05 and β of 0.20.[11]

The inclusion criteria for cases was to accept to be part of the study and to have started smoking at the university, even if they were or were not smokers at the time they answer the survey; this also included if they initiated smoking in another university. Inclusion criteria for controls were to agree to participate voluntarily in the study and that they had never smoked or tried any tobacco products at some point in their lives. Previous smokers were not eligible as controls, regardless of the nonsmoking time. A simple randomization process was performed in which for each case, within all potential controls of the same gender and age (up to 2 years or greater than the index case) assigned in a list of random numbers, a control was selected.

Study instrument and variable assessment

The Research Ethics Committee of the Faculty of Health Sciences and the directors of the UNAB approved the research project. A questionnaire

was developed by the research group, evaluating determinants associated with the onset of tobacco smoking according to the review of the available literature. The information was captured in a cross-sectional fashion by administering the questionnaire to students on an anonymous, voluntary, and confidential form.

The questionnaire consisted of 60 questions. The first 8 questions asses the individual genre, year of birth and age, city of origin, undergraduate program and socioeconomic situation. The following 5 questions were meant to define individual smoking age initiation as well as the smoking status of each individual as either nonsmoker (a person who has never smoke or consumed any tobacco); smoker (a person who smokes and has done it at least 1 time in the last month); and previous smoker (a person who smoked, but has not done it in the last 6 months). The next 12 questions assessed opinion on media influence on smoking, university social environment, living situation (lives with parents, other relatives, friends, alone, etc.) relationship with parents, history of parental smoking, steady girlfriend/boyfriend who smokes and best friend who smokes. Following 20 questions consists of items about the use of medication for anxiety or depression, consumption of other substances (for example, marihuana, cocaine, methamphetamines), academic performance, alcohol consumption, and the CAGE scale (acronym of its four questions) was included to assess alcohol abuse.[12] The last 15 questions assessed attitudes against Christianity using the Francis score;[13] and the habit of doing light or vigorous physical activity. Being a questionnaire created by the researchers, this specific questionnaire has not been validated or used in other studies. However, items like the CAGE scale have a sensibility of 66.7% and specificity of 86% with a negative predictive value of 90.7% and a positive predictive value of 55.6% to classify and individual as alcohol dependent.[12] Furthermore, the Spanish translation of the Francis scale of attitude toward Christianity has a high internal consistency with a Cronbach's alpha of 0.86.[13]

Statistical analysis

Following the survey implementation, participants were classified into four groups according to the inclusion criteria: Case, control, smoking before the start of the university and poorly filled out survey. The information was transcribed in duplicate in a database created in Epi Info 7.0.9 Developed by Centers for Disease Control and Prevention, 1600 Clifton Rd. Atlanta, GA 30333, USA.[14] The analysis was performed by calculating ratios and measures of dispersion and central tendency for both cases and controls. The analysis of the differences between the two groups was made in Stata 10 Developed by StataCorp, 4905 Lakeway Drive College Station, Texas 77845-4512, USA, considering as a dependent variable the beginning of tobacco consumption through independent *t*-test or Chi-square test and with logistic regression to control potential confusion, establishing meaningful relationships with $P < 0.05$.

RESULTS

Of the 6793 undergraduate students of the UNAB, 1010 (14.9%) students were surveyed as target sample. Of these surveys, 17 (1.6%) were excluded because of poor fulfillment. Of the remaining 993 surveys, 436 were discarded (43.9%) for being smokers before university entrance [Figure 1]. For the amount of controls and to increase the power of the study, we decided to perform the matching at a rate of one case per two controls. The sociodemographic characteristics of the study population are shown in Table 1.

Regarding to the smoking profile of cases, the average starting age of tobacco smoking was 17.92 (standard deviation = 1.4), among which 79 (47.0%) were current smokers and of those 17 (10.2%) smoked every day, and 8 (4.8%) smoked between 25 and 29 days a month. Of the 168 cases, 144 (85.7%) had previously tried to quit smoking

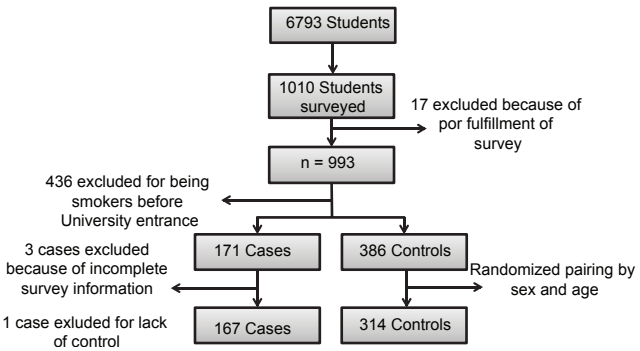

Figure 1: Sample selection

and 69 (41.1%) had stopped smoking within the last 6 months prior to the survey.

Table 1: Sociodemographic characteristics of students tested

Variable	Case (*n*=167)	Control (*n*=314)	*P* value
Age at beginning of university (years)*	17.5 (16.5-18.0)	17.5 (17.5-18.0)	<0.001
Current age (years)**	20.6 (2.4)	20.5 (2.3)	<0.001
Male (%)	68 (40.4)	123 (39.1)	0.514
Program (%)			
Administration	23 (13.7)	29 (9.2)	0.177
Economic sciences	4 (2.4)	6 (1.9)	
Communication and arts	12 (7.1)	12 (3.8)	
Law	16 (9.5)	27 (8.6)	
Education	4 (2.4)	17 (5.4)	
Engineering	23 (13.7)	28 (12.1)	
Music	2 (1.2)	1 (0.3)	
Health sciences	84 (50.0)	184 (58.6)	
Semester*	5.5 (3.0-7.0)	5 (3.0-7.5)	0.449
Originally from another city (%)	71 (42.3)	115 (36.6)	0.199
Socioeconomic status (%)			
Low	5 (3.0)	15 (4.8)	0.370
Medium	128 (76.2)	223 (71.2)	
High	35 (20.8)	75 (24.0)	

*Median and IQR, **Mean (SD). SD=Standard deviation, IQR=Interquartile range

Table 2: Advertising media and social environment influence

Variable	Case (*n*=167) (%)	Control (*n*=314) (%)	*P* value
Advertising media toward young people (yes)	118 (70.2)	236 (75.2)	0.249
Advertising media encouraging smoking (yes)	105 (62.5)	211 (67.2)	0.250
Advertising media influenced their decision			
Yes, it incited smoking	14 (8.3)	7 (2.2)	<0.001
Did not influence me	147 (87.5)	263 (84.0)	
Yes, it helped not smoking	7 (4.2)	43 (13.7)	
Social environment at the university			
Yes, it incited smoking	75 (44.6)	18 (5.6)	<0.001
Did not influence me	85 (50.6)	269 (86.2)	
Yes, it helped not smoking	8 (4.8)	25 (8.0)	

External factors influencing the decision to smoke can be seen in Table 2. The controls perceived that advertisements influenced their decision not to smoke ($P < 0.001$), whereas the cases perceived the university social environment encourages tobacco consumption ($P < 0.001$).

Social and family relations affecting the decision to start smoking were studied. Factors as having a bad relationship with the father ($P = 0.080$), history of parental smoking (mother and father $P = 0.004$ and 0.008), friends like a roommate and a steady boyfriend/girlfriend who smokes ($P < 0.001$), had a great influence on initiation of smoking. These results are shown in Table 3.

The relationship between lifestyles and academic performance differences were not significant. The level of religious beliefs, according to the Francis scale showed differences between cases and controls.

The conditional logistic regression model adjusted for gender and age of the smoking initiation in the university using the variables that were found statistically significant showed as increasing risk determinants: The university social environment (OR: 32.70, 95% confidence interval [CI] for OR: 7.40-144.55), being away from hometown (OR: 3.06, 95% CI for OR: 1.55-6.07), having friends who quit smoking having friends who did no smoke anymore did increase the risk? (OR: 2.72, 95% CI for OR: 1.45-5.12), having or have had a steady girlfriend/boyfriend who smokes (OR: 2.87, 95% CI for OR: 1.43-5.76), a poor relationship with the father (OR: 8.01, 95% CI for OR: 2.01-31.83), history of tobacco consumption of the mother (OR: 2.66, 95% CI for OR: 1.37-5.17) and alcohol consumption (OR: 4.79, 95% CI for OR: 1.91-12.00). On the other hand, as protective factors: Advertising media (OR: 0.19, 95% CI for OR: 0.05-0.71), light physical activity 2-3 times a week (OR: 0.33, 95% CI for OR: 0.12-0.88) and a high score of Francis (OR: 0.956, 95% CI for OR: 0919-0997) [Table 4].

DISCUSSION

The results of this research suggest that the first use of tobacco in the university context is related to social factors such as having or have had a sentimental partner who smokes, poor parental relationship, history of tobacco consumption by parents and the university social environment. We

Table 3: Social and familiar environment

Variable	Case (*n*=167) (%)	Control (*n*=314) (%)	*P* value
Relationship with parents			
Relationship with mother			
Excellent	92 (55.1)	197 (62.9)	0.195
Good	60 (35.9)	100 (31.9)	
Regular	13 (7.8)	14 (4.5)	
Bad	2 (1.2)	2 (0.6)	
Relationship with father			
Excellent	60 (35.9)	133 (43.5)	0.080
Good	75 (44.9)	136 (44.4)	
Regular	19 (11.4)	27 (8.8)	
Bad	13 (7.8)	10 (3.3)	
Mother or father who had smoked			
Father	77 (45.8)	106 (33.8)	0.008
Mother	59 (35.1)	70 (22.3)	0.004
Mother currently smokes	13 (7.7)	12 (3.8)	0.114
Father currently smokes	20 (11.9)	30 (9.5)	0.337
Sharing house hold with smokers	39 (23.2)	51 (16.2)	0.059
Living alone	56 (33.3)	105 (33.3)	0.727
Living with a friend	55 (32.7)	55 (17.5)	<0.001
Close friends who smoke	163 (97.0)	287 (91.4)	0.030
Mates who smoke	160 (95.2)	298 (94.9)	0.826
Steady girlfriend/ boyfriend who smokes			
No	69 (41.3)	177 (57.6)	<0.001
I haven't had a boyfriend/girlfriend	7 (4.2)	17 (5.5)	
Yes	91 (54.5)	113 (36.8)	

found that media advertising has a protective impact toward the first use of tobacco, and that young people who perform light physical activity weekly and have a religious belief system are less likely to initiate consumption. These findings are consistent with other studies. Regarding the importance of the social environment, Tyas and Pederson[15] in a review of literature, identified that students believe that smoking acts as a social function because of the strong influence of peers who smoke, that situation is similar in this study. Other studies found that poor relationship with parents, especially a poor relationship with the mother, is associated with tobacco smoking in the young population.[11,15,16] In this study, no clear association was seen with the relationship with the mother, but certainly there

Table 4: Conditional logistic regression model, adjusted for gender and age

Determinant	OR (CI 95%)	*P* value
Being away from hometown	3.06 (1.55-6.07)	0.00058
Social environment	32.70 (7.40-144.55)	>0.000001
Steady girlfriend/ boyfriend who smokes	2.87 (1.43-5.76)	0.00007
Bad relationship with the father	8.01 (2.01-31.83)	0.0271
History of maternal smoking	2.66 (1.37-5.17)	0.00166
Current consumption of alcohol	4.79 (1.91-12.00)	0.001
Advertising media	0.19 (0.05-0.71)	0.0163
Light physical activity	0.33 (0.12-0.88)	0.00012
Francis score	0.95 (0.91-0.99)	0.0275

OR=Odds ratio, CI=Confidence interval

was an association with the relationship with the father. Some studies suggest that this association is sex-dependent, Foshee and Bauman found that poor relationship with the father increased risk of tobacco smoking in female adolescents, which could explain the findings of this study considering that almost 60% of the sample was female.[16] A history of parental smoking has been associated in other studies, being greater the impact of having a mother who smokes, which is consistent with the findings of this study.[10,15,16] In our study, having a steady girlfriend/boyfriend who smokes is associated with tobacco smoking initiation, similar to Tyas and Pederson review that showed the influence of peers on smoking.[15]

Regarding the protective factors, there is controversy as to whether religion has an impact on tobacco smoking. Wagner and Andrade found no association in Brazilian school students between religion and tobacco smoking along with consumption of other illicit substances, while Gomes *et al*. found that the nonreligious group had a higher smoking prevalence. This supports the data found in this study.[17,18] Furthermore, this study showed a protective effect in the habit of doing light physical activity, which has not been observed in other studies.[19,20] A possible explanation is that possibly young adults with healthy habits like doing physical activity may be more likely to avoid unhealthy conducts like smoking tobacco. It is important noticing that all these associations

were observed in studies made in the context of adolescents and young adults that were already smokers, while this study seeks to establish the association for the first use of tobacco.

This study has some limitations. The study sample was taken from the population available the days when the research team conducted surveys and not by random assignment of the entire population, which can lead to confusion bias in underestimating the magnitude of some determinants; however, the random selection of cases, the pairing by age and gender of cases and controls and the double-checking assignment can reduce this bias by giving greater statistical power. The results may be subject to recall bias because the information was collected by retrospective questions; however, it was attempted to control this by using multiple-choice questions focused on the determinants object to the evaluation. An advantage of the study is that the controls were equal or older than cases ($P = 0.01$), which ensures a longer induction time for controls, which despite this exposure period did not ended smoking.

In the analysis of the impact of advertising on tobacco smoking initiation, it was not differentiated between smoking prevention or smoking promotion, which limits the interpretation of results, but generates a line of work to analyze the true impact of advertising, because it is known that antismoking mass advertising has an effect on reducing the consumption and prevalence, but whether the effect is sustained over time is unknown.[21] In Colombia, since 2009 explicit smoking promotion advertising is not allowed legally.[22]

The results of this research are important when analyzed in the context of strengthening tobacco control policies. Interventions such as school programs, antismoking campaigns, increased cigarette prices, and measures for restricting youth access have proven effective in the control of tobacco, especially in cases where they have been combined.[21,23] Some of these promotion measures focus on changing behaviors in adolescents and young adults with the goal of achieving smoking cessation and even prevent smoking initiation; therefore, the results of this study allow expanding the evidence on which these interventions are built, creating tools to improve the effectiveness of these control policies. In the legal framework, in 2006, Colombia signed the Framework Convention for the Control of tobacco, but only until 2009 with the 1335 law, national implementation strategies were regulated, including smoke-free spaces, prohibition on sales to minors and legislation on the packaging and advertising.[20] In the case of the UNAB, national policies are implemented through campaigns and by banning smoking on campus, but there is no additional internal regulation.

CONCLUSION

The results of this research can improve the development of control measures provided in the 1335 law, initially at the local level, and promote studies that assess the impact of measures taken since 2009 to encourage changes in epidemic control of smoking in the university environment. It also adds new evidence for the building of tobacco control policies that could be applied in other countries.

ACKNOWLEDGMENTS

The authors would like to thank the Universidad Autónoma de Bucaramanga for the logistic support in the application of the study. Furthermore, they would like to thank Luis Alfonso Diaz Martinez for his support in the data analysis and critical review of this manuscript.

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Source of Support: Nil, **Conflict of Interest:** None declared.