

Original Article

Variables related to smoking initiation among students in public and private high schools in the city of Belém, Brazil*

Denise da Silva Pinto¹, Sandra Aparecida Ribeiro²

Abstract

Objective: To analyze the variables related to smoking initiation among adolescent students in two high schools (one public and one private) in the city of Belém, Brazil, in 2005. **Methods:** An anonymous self-report questionnaire – comprising 27 closed questions regarding smoking experimentation, smoking habit, access to buying cigarettes, reasons for smoking experimentation, self-perception regarding academic performance, conversations about smoking with the family, and socioeconomic level – was used for data collection. The study comprised 1520 students: 724 (47.6%) from the private school and 796 (52.4%) from the public school. **Results:** Mean age of participants was 16.5 years. Of the 1520 students evaluated, 669 (44%) reported experimenting with smoking, and 11% smoked regularly. In the public school and the private school, respectively, 51.2% and 36.7% of the participants had experimented with smoking ($p = 0$); 14.6% and 7%, respectively, were regular smokers ($p = 0$). We found that, in both schools, the following factors were associated with smoking initiation and current smoking: curiosity, presence of smokers as social contacts, not being praised for not smoking, and perceiving oneself as having poor or mediocre academic performance. Socioeconomic level was found to be associated with experimentation and current smoking only among experimenters of higher socioeconomic classes (A and B) in the private school. **Conclusions:** Among the students evaluated, the variable most closely associated with smoking was curiosity. Experimentation and regular tobacco use were more common in the public school than in the private school.

Keywords: Smoking; Epidemiologic factors; Students.

* Study carried out in the Department of Preventive Medicine of the Federal University of São Paulo/Paulista School of Medicine, São Paulo (SP) Brazil.

1. Masters in Epidemiology in Department of Preventive Medicine of the Federal University of São Paulo/Paulista School of Medicine, São Paulo (SP) Brazil.

2. Associate Professor in the Department of Preventive Medicine of the Federal University of São Paulo/Paulista School of Medicine, São Paulo (SP) Brazil.

Correspondence to: Denise da Silva Pinto. Travessa Humaitá, 1655, Bairro do Marco, CEP 66093-110, Belém, PA, Brasil.

Tel 55 91 4009-2100. Fax 55 91 8151-0354. E-mail: denisefisio23@hotmail.com

Submitted: 4 January 2007. Accepted, after review: 25 February 2007.

Introduction

Smoking is currently considered one of the greatest problems in public health worldwide, and it is one of the most preventable causes of death. The World Health Organization states that smoking should be considered a pandemic, since 5 million individuals die worldwide every year due to smoking-related diseases.⁽¹⁾

Nicotine dependence occurs with the regular use of tobacco, and adolescent smokers are very likely to become adult smokers. Various studies have already shown that adolescents are at the highest risk for smoking initiation. Therefore, it has been considered that, during the transition years between high school and college, young individuals start, develop and consolidate the smoking habit.⁽²⁻⁵⁾

In the standardized study conducted by the Centers for Disease Control and Prevention from 1999 to 2005, comprising 750,000 adolescents ranging from 13 to 15 years of age in 131 countries, it was reported that 9% of the teenagers smoked, with a gradual decrease in the differences between genders, principally in American and European countries, where the study found no differences between boys and girls regarding smoking.⁽⁶⁾

In Brazil, the Fifth National Survey on Psychotropic Drug Use among students in public middle and high schools in 27 Brazilian state capitals revealed the following prevalences for tobacco consumption among 48,155 students: 24.9%, lifetime use; 15.7%, use within the last year; 9.9%, use within the last month; 3.8%, frequent use; and 2.7%, heavy use. However, in comparison with the previous survey, smoking experimentation decreased to approximately 7% in the age bracket from 10 to 12 years.⁽⁷⁾

In that survey, data related to a sample of 1558 individuals from 10 to 19 years of age residing in the city of Belém, capital of the state of Pará, Brazil, revealed the prevalence of tobacco use to be 23.7% for lifetime use, 16.1% for use within the past year, 10.5% for use within the last month, 3.5% for frequent use and 2.2% for heavy use. However, the studies carried out in the city of Belém to date have only considered the frequency of the use of drugs in general among students, without taking into consideration the factors that contribute to smoking initiation in the adolescent population of this region.⁽⁷⁾

The objective of the present study was to analyze the variables related to smoking initiation among adolescent students in two high schools (one public and one private) in the city of Belém. The following associations were established: the influence of parents, siblings and friends who smoke; access to buying cigarettes; self-perception regarding academic performance; conversations about smoking with the family; and socioeconomic level.

Methods

A cross-sectional study was conducted in two high schools (one public and one private) located in the same metropolitan area of the city of Belém.

Belém is located in the north of Brazil, and the state of Pará currently comprises 143 cities. The city has a population of 1,280,614 inhabitants, corresponding to approximately 21% of the population of the state. The adolescent population is estimated at 271,933 inhabitants, representing approximately 21.2% of the residents in the city.⁽⁸⁾

The study sample comprised 1520 high school students of up to 19 years of age: 796 (52.4%) from a public school and 724 (47.6%) from a private school. The study period was from August to November of 2005. We excluded 837 students because they did not give written informed consent, were absent from school on the day of the interview or were older than 19 years of age.

For data collection, an individual, anonymous, self-report, standardized questionnaire was used, comprising 27 closed questions regarding smoking experimentation, smoking habit, access to buying cigarettes, reasons for smoking experimentation, presence of smokers as social contacts (parents, siblings and friends), self-perception regarding academic performance, conversations about smoking with the family and socioeconomic level.

The socioeconomic level of students was determined using the Brazilian Economic Classification Criteria established by the National Association of Research Firms,⁽⁹⁾ in which data regarding the educational level of the head of the household, the possession of assets and access to various services are cross-referenced. Socioeconomic classes were determined according to the following scores: class A, from 34 to 25 points; class B, from 24 to

17 points; class C, from 16 to 11 points, class D, from 10 to 6 points; class E, from 5 to 0 points.

This questionnaire was simultaneously filled out by all the students who were present in the school upon our visit, in a collective fashion and without the presence of teachers.

All the students who reported they had smoked at least once in their lifetime were considered experimenters, whereas those who stated that they had been smoking for some time prior to our visit were considered current smokers.^(7,10,11) The remaining students were considered nonsmokers.

The Ethics in Research Committee of the Federal University of São Paulo approved the study. For the statistical analysis, we used the chi-square test (χ^2) and Student's t-test. Values of $p < 0.05$ were considered significant. Data were analyzed using the statistical software programs Epi Info 2002 and BioEstat 3.0.

Results

Of the 1520 students included in the study, there was a predominance of females in both schools (61.6% in the public school and 56.2% in the private school), with ages ranging from 13 to 19 years and a mean age of 17 years (± 1.26) in the public school and 16 years (± 1.02) in the private school. The most common socioeconomic levels were classes C (55.8%) and D (18.5%) in the public school and classes A (31.6%) and B (56.8%) in the private school.

The incidence of smoking experimentation was 44.7% (513 students): 52.1% in the public school and 36.7% in the private school ($p < 0.001$). The incidence of current smoking was 11% (167 students): 14.6% in the public school and 7% in the private school ($p < 0.001$) (Figure 1).

Of the students who reported experimenting with smoking, female students corresponded to 59% and 53%, respectively, in the public and private schools, which was not significantly different from that seen among male students. In both schools, the first cigarette was often obtained from a friend (59.2% in the public one and 64.7% in the private one).

There was no statistical difference between genders in the frequency of current smoking. The frequency of female smokers was 48.3% in the public school and 51% in the private school. Of the current smokers, 67.2% and 62.7% of the students in the

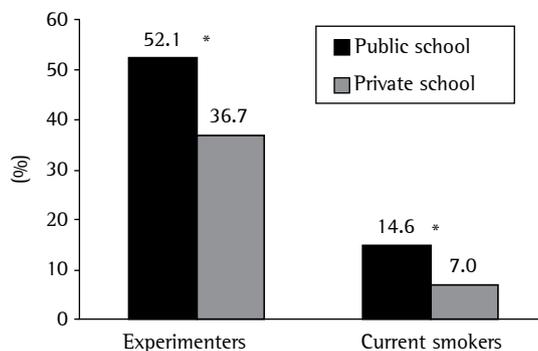


Figure 1 – Distribution of students (n = 1520) regarding smoking experimentation and current smoking in the two schools (public and private) – Belém, Brazil, 2005. * $p < 0.05$

public school and in the private school, respectively, reported being smokers for over 12 months; 59.5% and 39.2% of the students in the public school and in the private school, respectively, reported smoking every day.

In addition, 83.6% and 82.4% of the smokers in the public school and in the private school, respectively, reported buying their own cigarettes. Considering only the students who were younger than 18 years of age, 52.2% of those who experimented with smoking and 68.7% of the current smokers had never been denied when trying to buy cigarettes.

Smokers reported that the main influence for their current smoking was their curiosity (62.1% in the public school and 73.1% in the private school, respectively), followed by the influence of friends, parents, siblings and the media (Figure 2).

Regarding the relationship between experimenting with smoking and conversations about smoking with the family, Table 1 shows that those students whose parents did not talk about smoking at home or those who reported that their parents would not be upset if they smoked did not show differences from those whose parents talk about smoking or would be upset with smoking. However, students who had never been praised for not smoking showed higher experimentation with smoking (prevalence ratio [PR] = 1.32; 95% confidence interval [95% CI]: 1.15-1.51) than did those who reported having been praised.

Figure 3 shows the relationship between current smokers and nonsmokers and their self-perception

regarding academic performance; smokers showed a significant association with their own perception of having a poor or mediocre academic performance. Similarly, those who experimented with smoking showed significant association with poor academic performance in the public school (PR = 1.46; 95% CI: 1.23-1.72), but not those in the private school (PR = 1.17; 95% CI: 0.93-1.46).

Table 2 shows the relationship between experimenting with smoking and socioeconomic level of the students, according to the school type. Experimenting with smoking showed a significant association with socioeconomic levels A and B in the private school (PR = 2.10; 95% CI: 1.25-3.49); however, there was no association with the various socioeconomic levels in the public school.

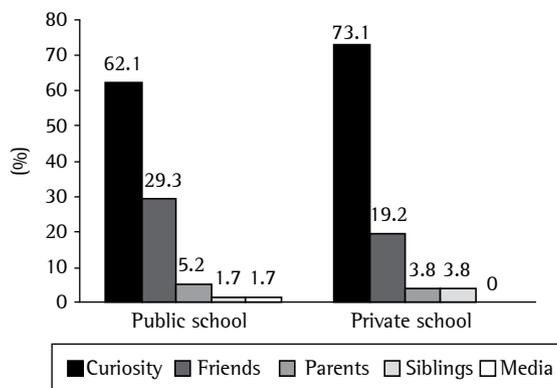


Figure 2 - Distribution of students who were current smokers (n = 167) regarding the main influence on smoking, by school type - Belém, Brazil, 2005.

Discussion

Most national and international studies on smoking during adolescence are school-based.^(4,7,10-12) Few are population-based studies.^(13,14) Although some authors reported that school-based studies underestimate the problem, using the school environment as a data source favors the execution of field research since this makes programmed, simultaneous data collection possible, respecting ethical regulations and minimizing losses and financial costs of the study.⁽¹⁴⁾

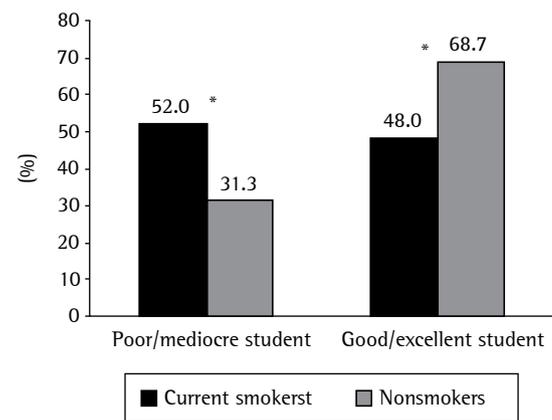


Figure 3 - Comparison between the rates of current smokers and nonsmokers (n = 1007), except for experimenters, regarding self-perception of academic performance (poor/mediocre or good/excellent) - Belém, Brazil - 2005. *p < 0,05

Table 1 - Comparison between students who experimented with smoking and are current nonsmokers and those who never smoked (n = 1353), regarding conversations about smoking with the families - Belém, Brazil - 2005.

Influences	Experimenter		PR (95% CI)	p value
	Yes (n = 513)	No (n = 840)		
Parents talk about smoking				
No	211 (41.0%)	320 (38.0%)	1.08 (0.94-1.24)	0.267
Yes	302 (59.0%)	520 (62.0%)		
Parents praise for not smoking				
No	235 (46.0%)	293 (35.0%)	1.32 (1.15-1.51)	<0.001
Yes	278 (54.0%)	547 (65.0%)		
Parents would be upset if you smoked				
No/I don't know	103 (20.0%)	152 (18.0%)	1.08 (0.91-1.27)	0.365
Yes	410 (80.0%)	688 (82.0%)		

PR: prevalence ratio; and CI: confidence interval.

Table 2 – Comparison between students who experimented with smoking and are current nonsmokers and those who never smoked, (n = 1353), regarding socioeconomic level according to the type of school - Belém, Brazil - 2005.

School	Socioeconomic level	Experimenter		PR (95% CI)	p value
		Yes (n = 513)	No (n = 840)		
Public	A + B	77 (26.0%)	92 (24.0%)	1.05 (0.86-1.27)	0.599
	C + D	221 (74.0%)	290 (76.0%)		
Private	A + B	202 (94.0%)	391 (85.4%)	2.10 (1.25-3.49)	0.001
	C + D	13 (6.0%)	67 (14.6%)		

PR: prevalence ratio; and CI: confidence interval.

We used an individual, anonymous, self-report, standardized questionnaire for data collection, which is the type of instrument used as the standard method in studies on smoking⁽¹⁰⁾ and is useful for the investigation of the frequency of tobacco use and of associated factors.

The proportion of adolescents who experimented with smoking in their lifetime was 44.7%. However, this rate was significantly higher in the public school than in the private school. This value is different from that of the last national survey on psychotropic drug use,⁽⁷⁾ which reported a prevalence of lifetime use of 23.7% in Belém. However, when we analyze those data regarding age brackets, the prevalence of lifetime use in the 16 to 18 year age bracket was 35.9% and that in the over 18 year age bracket was 41.4%, which is closer to the values found in the present study, in which the students were mainly in the 16 to 17 year age bracket.

Regarding the variable gender, experimentation and current smoking were the same for males and females. These findings corroborate those of some other studies showing, in historic series, that smoking has been more frequent among girls, a trend that has already been reported in developed countries, where females present rates of smoking experimentation and current smoking that are equal to or greater than those of males.^(4,6,13)

The fact that most students obtained their first cigarette from a friend shows that the initiation of smoking is linked to their social relationships, showing that these students need to identify themselves with and be part of their social group. This need and their curiosity, which are inherent characteristics of adolescents, are decisive in this process.

Regarding the higher prevalence of smoking among students in the public school, the data found in the literature are controversial. In a similar survey carried out in the city of São Paulo,⁽¹⁵⁾ the propor-

tion of smokers in the public and in the private schools was the same; only the number of cigarettes smoked per day was different.

However, in another study, data similar to those of the present study were reported, showing that the prevalence of smokers among adolescent Argentine students was higher in public schools (14.6%) than in private schools (11.4%).⁽¹⁶⁾

The smoking habit of current smokers revealed a predominance of daily use for over 12 months, which shows that the mechanisms of the biological action of nicotine, with the onset of chemical dependence, must already be present in these students. In addition, these students reported that they buy their own cigarettes, showing a relative autonomy regarding the maintenance of the habit.

The easy access to cigarettes also works as an incentive for the maintenance of the smoking habit because the adolescent becomes self-sufficient to buy cigarettes whenever there is the biological and psychosocial need.

The Brazilian anti-smoking legislation,⁽¹⁷⁾ which prohibits the sale of any tobacco products to individuals younger than 18 years of age, carrying a penalty of six months to two years in prison, as well as a fine, for the sellers, appears to be inoperative, since most of the students younger than 18 years of age have been able to buy cigarettes.

In fact, the consistently low prices of tobacco products, maintained in part by their availability on the black market, as well as the sale of single cigarettes near school doors and other places frequented by adolescents, facilitate the access of teenagers to cigarettes.

The economic issue involved in the habitual use of cigarettes has been evaluated in some market studies, showing that a marked increase in the prices of cigarettes significantly reduces smoking among

young people, who are more sensitive to price variations than are adult smokers.⁽³⁾

With regard to the influence of parents on the smoking habits of children, there is no consensus in the literature.^(4,14,16-20) Some studies have shown that this behavior can facilitate the smoking habit in children, due to the behavioral example set and the availability of cigarettes in the home. Such easy access to cigarettes also causes early direct biochemical stimulation of the nicotinic receptors, which are acquired through inheritance.^(2,21)

Similarly, the presence of siblings and friends who smoke has been shown to be strongly associated with smoking experimentation and current smoking of the students. The influence of smokers in the same age bracket as the adolescent is particularly strong in the initial phases of tobacco use, since the first attempts to experiment with smoking frequently occur with siblings and friends, and these may provide expectations, reinforcement and subsequent suggestions in favor of the maintenance of the habit. Various studies on smoking during adolescence are unanimous in pointing out these associations.^(14-16,18,20-23)

The self-perception of students regarding their poor academic performance was shown to be associated with smoking initiation and current smoking, since considering their academic performance poor or mediocre was significantly present among the experimenters in the public school. These findings are in agreement with those of a follow-up study⁽²⁰⁾ in which the students who reported mediocre or below average academic performance were more predisposed to the genesis and maintenance of the smoking habit.

The socioeconomic levels of students showed different associations with smoking experimentation depending on the type of school. Socioeconomic levels A and B showed significant associations with smoking experimentation in the private school but not in the public school, although the number of experimenters from classes C and D was small in the private school. This fact, together with other data from this study, shows that experimentation during adolescence is probably more closely linked to patterns in the social group than to the socioeconomic level.

Therefore, the results of the present study have provided various data regarding the variables related with smoking initiation among students

from different social realities in the city of Belém. These findings could serve to expand the arsenal of regional interventions designed to combat and prevent smoking in the community, schools and families, especially targeting adolescents.

References

1. World Health Organization [Homepage on the Internet]. Geneva: World Health Organization, 2007 [cited 2006 Dec 27]. Tobacco Free Initiative (TFI): Why is tobacco a public health priority? Available from: http://www.who.int/tobacco/health_priority/en
2. Kirchenchtejn C, Chatkin JM. Dependência da Nicotina. *J Bras Pneumol*. 2004;30(Supl 2):S11-S18.
3. Elders MJ, Perry CL, Eriksen MP, Giovino GA. The report of the Surgeon General: preventing tobacco use among young people. *Am J Public Health*. 1994;84(4):543-7.
4. Instituto Nacional do Câncer [Homepage on the Internet]. Rio de Janeiro: INCA e Ministério da Saúde; 2007 [cited 2006 Dec 27]. VIGESCOLA - Vigilância de tabagismo em escolares. Dados e fatos de 12 capitais brasileiras. Available from: http://www.inca.gov.br/vigescola/docs/vigescola_completo.pdf
5. Giovino GA. Epidemiology of tobacco use among US adolescents. *Nicotine Tob Res*. 1999;1 Suppl 1:S31-40.
6. Warren CW, Jones NR, Eriksen MP, Asma S; Global Tobacco Surveillance System (GTSS) collaborative group. Patterns of global tobacco use in young people and implications for future chronic disease burden in adults. *Lancet*. 2006;367(9512):749-53.
7. Galduróz JCF, Noto AR, Carlini EA. V Levantamento nacional sobre o consumo de drogas psicotrópicas entre estudantes do ensino fundamental e médio da rede pública de ensino nas 27 capitais brasileiras - 2004. São Paulo: Centro Brasileiro de Informações Sobre o Uso de Drogas Psicotrópicas (CEBRID) - Departamento de Psicobiologia da Universidade Federal de São Paulo; 2004.
8. Instituto Brasileiro de Geografia e Estatística [Homepage on the Internet] Brasília: IBGE, 2007 [cited 2006 Dec 27]. Censo Demográfico 2000. Available from: <http://www.ibge.gov.br>
9. Associação Nacional de Empresas de Pesquisa - ANEP [Homepage on the Internet]. São Paulo, 2007 [cited 2005 Jun 15]. Critério de Classificação Econômica Brasil (CCEB). Available from: http://www.anep.org.br/codigosguias/abep_ccceb.pdf
10. Centers for Disease Control and Prevention [Homepage on the Internet]. Atlanta: The Centers; 2007 [cited 2004 Set 15]. Global Youth Tobacco Survey - GYTS. Available from: <http://www.cdc.gov/tobacco/global/GYTS.htm>
11. Galduróz JCF, Noto AR, Carlini EA. IV Levantamento sobre o uso de drogas entre estudantes de 1º e 2º graus em 10 capitais brasileiras - 1997. São Paulo: Centro Brasileiro de Informações Sobre o Uso de Drogas Psicotrópicas (CEBRID) - Departamento de Psicobiologia da Universidade Federal de São Paulo; 1997.
12. Ivanovic DM, Castro CG, Ivanovic RM. Factores que inciden en el hábito de fumar de escolares de educación básica y media de Chile. *Rev Saude Publica*. 1997;31(1):30-43.
13. Carlini EA, Galduróz JCF, Noto AR, Nappo SA. I Levantamento domiciliar sobre o uso de drogas psicotrópicas no Brasil:

- estudo envolvendo as 107 maiores cidades do país - 2001. São Paulo: Centro Brasileiro de Informações Sobre o Uso de Drogas Psicotrópicas (CEBRID) - Departamento de Psicobiologia da Universidade Federal de São Paulo; 2002.
14. Malcon MC, Menezes AMB, Chattkin M. Prevalência e fatores de risco para tabagismo em adolescentes. *Rev. Saúde Pública.* 2003;37(1):1-7.
 15. Peres JA. Análise epidemiológica do uso do cigarro em estudantes do ensino fundamental e ensino médio [thesis]. São Paulo: Universidade Federal de São Paulo; 2001.
 16. Bolzán A, Peleteiro R. Tabagismo durante la adolescencia temprana. Estudio em escolares argentinos. *J Pediatr.* 2003;79(5):61-6.
 17. Instituto Nacional do Câncer [Homepage on the Internet]. Brasília: INCA; 2007 [cited 2005 Apr 15]. Legislação federal sobre tabaco no Brasil. Available from: <http://www.inca.gov.br/tabagismo/economia/leisfederais.pdf>
 18. Malcon MC, Menezes AMB, Maia MFS, Chatkin M. Prevalência e fatores de risco para tabagismo em adolescentes na América do Sul: uma revisão sistemática da literatura. *Rev. Panam. Salud Publica.* 2003;13(4):222-8.
 19. Altman DG, Levine DW, Coeytaux R, Slade J, Jaffe R. Tobacco promotion and susceptibility to tobacco use among adolescents aged 12 through 17 years in a nationally representative sample. *Am J Public Health.* 1996;86(11):1590-3.
 20. Pierce JP, Choi WS, Gilpin EA, Farkas AJ, Merritt RK. Validation of susceptibility as a predictor of which adolescents take up smoking in the United States. *Health Psychol.* 1996;15(5):355-61.
 21. Sant'anna CC, Araújo AJ, Orfaliais CS. Abordagem de grupos especiais: crianças e adolescentes. *J Bras Pneumol.* 2004;30(Supl 2):S47-S54.
 22. Segat FM, Santos RP, Guillande S, Pasqualotto AC, Benvegnú LA. Fatores de risco associados ao tabagismo em adolescentes. *Adolesc Latinoam.* 1998;1(3): 163-9.
 23. Simons-Morton B, Crump AD, Hayne DL, Saylor KE, Eitel P, Yu K. Psychosocial, school, and parent factors associated with recent smoking among early-adolescent boys and girls. *Prev Med.* 1999;28(2):138-48.