Prevalence of smoking and its association with the use of other drugs among students in the Federal District of Brasília, Brazil*

Prevalência do tabagismo e associação com o uso de outras drogas entre escolares do Distrito Federal

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Abstract

Objective: To estimate the prevalence of smoking, as well as to determine the association between smoking and the use of other drugs, among middle and high school students in the Federal District of Brasília, Brazil. **Methods:** Epidemiological study involving a reference population of students in the District. Our sample comprised 2,661 students from 9 to 19 years of age, in all middle and high school grades. All participating students completed a standard questionnaire. Results were analyzed by gender and type of school (public or private). **Results:** The prevalence of smoking among students in the District was 10.5%. Smoking was found to be associated with the use of alcohol and other drugs. **Conclusions:** Smoking is a gateway to the use of other drugs.

Keywords: Smoking; Tobacco; Adolescent; Students; Alcohol drinking; Dependency (Psychology).

Resumo

Objetivo: Estimar a prevalência do tabagismo e sua associação com o uso de outras drogas entre escolares, do ensino fundamental e médio, do Distrito Federal (DF). **Métodos:** Estudo epidemiológico, tendo como população de referência escolares do DF. Nossa amostra consistiu de 2.661 alunos com idades entre 9 e 19 anos de todas as séries do ensino fundamental II e do ensino médio que responderam a um questionário padrão. Os resultados foram analisados por gênero e tipo de rede escolar. **Resultados:** A prevalência do tabagismo entre escolares do DF foi de 10,5%, sendo observada uma associação entre o uso do cigarro e o uso de álcool e outras drogas. **Conclusões:** O tabagismo é uma porta de entrada para o uso de outras drogas.

Descritores: Tabagismo; Tabaco; Adolescente; Estudantes; Consumo de bebidas alcoólicas; Dependência (Psicologia).

Introduction

Nicotine is a drug with psychostimulant properties[1,2] and can therefore cause dependence. It is widely used worldwide, and its use is considered a gateway to the use of other drugs.[3,4]

In a study involving adolescents in the United States, it was demonstrated that 33-50% of the those who experimented with cigarettes became nicotine-dependent over the course of their lifetime.[5]

However, it is known that over 80% of adult smokers initiated this habit before 18 years of age,[5,6] and that the mean age of smoking initiation is between 12 and 14 years of age.[7]

Adolescence is a stage of the development of biopsychosocial transition, that is, during this period, girls and boys develop sexual maturity and establish their identity as individuals in society; therefore, this is a time of exposure and vulnerability to experimentation with and

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use of drugs,[8,9] licit (alcohol and tobacco) and illicit. Due to this fact, the use of psychostimulant drugs in adolescence, particularly among school children, has piqued the interest of many researchers. Therefore, we understand that special attention should be given to this phase of life, focusing on preventive measures. In view of this fact, the objective of this study was to analyze the prevalence of smoking and its association with the use of other drugs among middle and high school students in the Federal District of Brasília (FDB), Brazil.

Methods

This was an epidemiological cross-section study, having middle and high school students in the FDB as the reference population. The study was carried out in the second semester of 2004, with middle school students (6th to 9th grades) and high school students (10th to 12th grades) in randomly selected public and private schools.

In order to calculate the sample size, we considered a sample error of 5%, a confidence level of 95% and an estimated prevalence of the use of cigarette in lifetime of 24.3%. This data was based on the study conducted by the *Centro Brasileiro de Informações sobre Drogas Psicotrópicas* (CEBRID, Brazilian Center for Information on Psychotropic Drugs), which determined that, in 1997, the lifetime use of tobacco among FDB students in the same grades as those of the present study was 24.3%.[10]

Subsequently, in accordance with the data of the State Secretary of Education of the Federal District, students were proportionally distributed according to private and public schools and according to grade.

After these pieces of information had been obtained, we randomly selected schools, and the questionnaires were applied in class by previously trained medical students of the University of Brasília. The students interviewed were informed of the purpose of the study, as well as that the questionnaire was anonymous and that participation was voluntary.

The survey was conducted by means of the application of a World Health Organization, previously validated, self-report questionnaire on tobacco use.

We applied 2,682 questionnaires, following the proportional distribution of students by grade and type of school (public or private). However, 21 students were excluded from the study, either for being out of the programmed age bracket or for returning the questionnaires unanswered. The final sample comprised 2,661 students.

The project was approved by the University of Brasília Research Ethics Committee.

The results were analyzed according to gender and type of school. For the statistical analysis, the following descriptive measurements were taken: mean, standard deviation, prevalence ratio and the chi-square test. The predetermined level of significance as set at $p < 0.05$, and the sample variability of the prevalence ratios was evaluated using a 95% CI. For these calculations, we used the software Statistical Package for the Social Sciences, version 10.0 (SPSS Inc., Chicago, IL, USA).

Results

The analysis of the data was conduct only with students in the 9-19 year age bracket, and the mean age was 14.5 ± 2.3 years.

The prevalence of smoking in the schools in the FDB was 10.5%; 9.9% for males and 11.0% for females ($p > 0.05$). When dividing by type of school, 11.5% of the students in private

Table 1 - Prevalence of smoking among students in the Federal District of Brasília, Brazil, by gender and type of school.

Gender	Private school, n (%)		Total, n	OR	95% CI	p
	Smokers	Nonsmokers				
Male	21 (9.5)	201 (90.5)	222	0.94	0.57-1.54	> 0.05
Female	33 (13.4)	213 (85.6)	246	1.32	0.87-1.99	> 0.05
	Public school, n (%)					
Male	100 (10.0)	897 (90.0)	997	1.07	0.65-1.75	> 0.05
Female	121 (10.5)	1,030 (89.5)	1.151	0.76	0.50-1.15	> 0.05

Table 2 - Association between smoking and the use of alcohol among students in the Federal District of Brasília, Brazil, by gender.

Gender	Use of alcohol	Smoking, n (%)		OR	95% CI	p
		Yes	No			
Male	Yes	97 (80.2)	234 (22.6)	13.8	8.63-22.08	< 0.0001
	No	24 (19.8)	799 (77.4)			
	Total	121	1.033			
Female	Yes	110 (73.8)	224 (19.2)	11.87	8.01-17.59	< 0.0001
	No	39 (26.2)	943 (80.8)			
	Total	149	1.167			

schools smoked, as did 10.3% of the students in public schools (p > 0.05). However, when stratifying by gender and type of school (Table 1) we found a smoking prevalence for males of 9.5% in private schools and 10.5% in public schools; for females, that was 13.4% in private schools and 10.5% in public schools. Although females had a tendency to smoke more, mainly in private schools (OR = 1.32; 95% CI: 0.87-1.99), no statistically significant difference was found between males and females (p > 0.05).

When evaluating the association of student smoking with the use of alcohol, we observed that 76.5% of those who smoked also consumed alcoholic beverages. The chance for students who smoked to also consume alcoholic beverages was approximately 12 times greater than was that for those who did not smoke (OR = 12.4; 95% CI: 9.2-16.7).

However, when stratified by gender, 80.2% of male students and 73.8% of female students who smoked were found to also consume alcoholic beverages. The chance for students who smoked to also consume alcoholic beverages was approximately 14 times greater for males and 12 times greater for females, respectively, than was that for those who did not smoke (Table 2).

In contrast, when stratified by type of school, 73.6% of the private school students who smoked were found to also consume alcohol, compared with 77.2% of those in public schools, that is, the chance that students who smoked would also consume alcoholic beverages was, in private schools and public schools, respectively, approximately 8 times greater and 14 times greater than was that for those who did not smoke (Table 3).

We also observed an association between smoking and illicit drug use. The prevalence of illicit drug use among students who smoked was 24.2%, and it was greater among boys (32.5%) than it was among girls (16.3%). This difference was statistically significant (p < 0.03).

In other words, the chance that students who smoked would also use illicit drugs was approximately 17 times greater (OR = 16.96; 95% CI: 11.12-25.87) than was that for those who did not smoke. When stratified by gender (Table 4), the chance that male and female students who smoked would also use illicit drugs was, respectively, approximately 20 times and 14 times greater than was that for nonsmoking students.

When stratifying the students by private and public schools (Table 5), we observed that private

Table 3 - Association between smoking and the use of alcohol among students in the Federal District of Brasília, Brazil, by type of school.

Type of school	Use of alcohol	Smoking, n (%)		OR	95% CI	p
		Yes	No			
Private	Yes	39 (73.6)	102 (25.6)	8.11	4.23-15.55	< 0.0001
	No	14 (26.4)	297 (74.4)			
	Total	53	399			
Public	Yes	169 (77.2)	358 (19.8)	13.72	9.8-19.2	< 0.0001
	No	50 (22.8)	1,453 (80.2)			
	Total	219	1.811			

Table 4 - Association between smoking and the use of illicit drugs among students in the Federal District of Brasília, Brazil, distributed by gender.

Gender	Use of illicit drugs	Smoking, n (%)		OR	95% CI	p
		Yes	No			
Male	Yes	39 (32.5)	23 (2.3)	20.14	11.47-35.36	< 0.0001
	No	81 (67.5)	962 (97.7)			
	Total	120	985			
Female	Yes	24 (16.3)	15 (1.3)	14.36	7.37-28.11	< 0.0001
	No	123 (83.7)	1,104 (98.7)			
	Total	147	1,119			

school students who smoked presented an 8 times greater chance of also using illicit drugs than did nonsmoking students; in the public schools, this chance was 21 times greater.

We also observed that the association between smoking and alcohol/drug use by adolescent students is greater in public schools than in private schools.

Discussion

In this study, the prevalence of smoking in students in the FDB was 10.5%, and 16.5% of the students interviewed reported having experimented with cigarettes at least once in their lifetime. The mean age of experimentation was 12.3 ± 2.5 years, and there was no significant difference between genders ($p > 0.05$).

Due to the fact that tobacco is a licit drug and socially acceptable, it is considered the cornerstone, and usually produces a multiplying effect for the use of other psychostimulant drugs.[11,12]

Studies have already shown the physiological base of the association of tobacco with the compulsion for the use of other drugs, principally alcohol.[13] This association is explained by the fact that the substances (ethanol and nicotine) stimulate the same dopaminergic receptors in the brain, which can generate the urge and compulsion of one drug for the other one.[14]

However, smoking is a public health problem and the principal avoidable cause of death and damage to health. Prevention of its use must be a priority in any intervention strategy.

Epidemiological studies guide us in the monitoring and evolution of the smoking prevalence among adolescents over time, and can be of great help in guiding us in relation to the efficacy of the strategies used.

However, the comparison of these results is not always possible due to the differences in methodological design, in addition to the use of different questionnaires in each study.

In Brazil, the importance of the studies conducted annually since 1987 by CEBRID are worthy of note, and the last study was conducted in 2004. This last study[15] showed that 23.7% of the students in middle and high school in public schools in Brazil have experimented with some psychotropic drug (except for tobacco and alcohol). As for the use of tobacco and alcohol in the lifetime, the prevalences were respectively 24.9% and 65.2%.

In the same study, 3.6% of the students in Brasília, Brazil, reported having used some

Table 5 - Association between smoking and the use of illicit drugs in students in the Federal District of Brasília, Brazil, distributed by type of school.

Type of school	Use of illicit drugs	Smoking, n (%)		OR	95% CI	p
		Yes	No			
Private school	Yes	10 (18.5)	11 (2.8)	7.91	3.18-19.69	< 0.0001
	No	44 (81.5)	383 (97.2)			
	Total	54	394			
Public school	Yes	55 (25.6)	28 (1.6)	20.78	12.82-33.69	< 0.0001
	No	160 (74.4)	1,693 (98.4)			
	Total	215	1.721			

psychotropic drug (except for tobacco and alcohol) frequently (6 times or more in one month) of heavily (20 times or more in one month), and 17.1% of the students had already experimented with cigarettes.

In other studies conducted in Brazil, it is observed that the prevalence of smoking among students can be similar or different from those found in this study. In a study with high school students of public and private schools in Belém, in the state of Pará, the prevalence of smoking was 11%.[16] In Gravataí, in the state of Rio Grande do Sul, researchers found a prevalence of 16.9% and 2.4% for the use of tobacco and other drugs, respectively, in 8th grade students in public schools.[17] However, in Santa Maria, in the state of Rio Grande do Sul, the smoking prevalence in high school students in state schools was 18,5%.[18]

In Mexico, one group of authors[19] has conducted studies on smoking among adolescents aged 12 to 17 years since 1988. The last study (2002) showed a prevalence of 10.1% in the urban area, and the difference between genders was 15.4% in males and 4.8% in females. It was observed that smoking among teenagers is associated with the use of alcohol and illicit drugs.

In conclusion, we can state that the prevalence of smoking among students in the FDB is decreasing, although it still presents high levels. We also observed a strong association between smoking and the use of alcohol and other drugs, especially among students in public schools. These data confirm that smoking is a gateway to the use of other drugs, and the fight against it should guide policies of prevention of experimentation and drug use, principally among students.

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