






## ORIGINAL ARTICLE

# FACTORS ASSOCIATED WITH ALCOHOL USE IN A REPRESENTATIVE SAMPLE OF ADOLESCENTS IN BRAZIL

### HIGHLIGHTS

1. Smoking in adolescents was associated with alcohol use.
2. Teenagers with smoking parents are more likely to consume alcohol.
3. Having friends who drink was associated with alcohol use.
4. Being a man was a protector for alcohol consumption.

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### ABSTRACT

**Objective:** To analyze the factors associated with alcohol use among Brazilian school adolescents. **Method:** This analytical cross-sectional study uses secondary data from the 2019 National School Health Survey edition conducted by the Brazilian Institute of Geography and Statistics. The research evaluated 125,123 adolescents through the application of a questionnaire. For the final model, multiple logistic regression was used. **Results:** Lifetime cigarette use was strongly associated with alcohol use (Odds Ratio=3.25; 95% Confidence Interval 2.28-4.62), followed by friends' alcohol use in the last 30 days (Odds Ratio=2.15; 95% Confidence Interval 1.52-3.05) and having parents who smoke (Odds Ratio=1.29; 95% Confidence Interval 1.13-1.48). **Conclusion:** Integrated actions and public policies involving young people and adolescents are important to ensure the health and well-being of healthy adults.

**KEYWORDS:** Adolescent; Students; Alcoholism; Underage Drinking; Cross-Sectional Studies.

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## INTRODUCTION

Adolescence is a vulnerable period of human development that encompasses the age range between 10 and 19 years<sup>1</sup>. Increased experimentation and risk behaviors, such as alcohol use, mark it<sup>2</sup>.

The results of school surveys indicate that alcohol use begins before the age of 15, and it is estimated that more than a quarter of adolescents between 15 and 19 years old (155 million) are alcohol consumers. In this age group, the prevalence rates of alcohol consumption are higher in European countries (43.8%) and the Americas (38.2%), respectively<sup>3</sup>.

In Brazil, the III National Survey on Drug Use by the Brazilian Population identified that about 2.3 million participants showed alcohol dependence in the last 12 months preceding the survey. Among these, 119 thousand dependents were teenagers aged 12 to 17<sup>4</sup>.

In Brazilian culture, alcohol is widely associated with leisure, events, and sports sponsorships. Furthermore, there is an overexposure of alcoholic beverages on social media, making them desirable and linked to social inclusion<sup>5</sup>.

Alcohol is the most used drug by teenagers due to easy access, constituting an important public health problem, ranging from low to heavy use<sup>6</sup>. Other aspects can also influence the consumption of alcoholic beverages during this period of life, such as social permissiveness, consumption habits among family members, and poor socioeconomic conditions<sup>7-8</sup>.

During adolescence, the brain structures responsible for temporal perception and impulse control are still maturing<sup>9</sup>. On the other hand, at this stage of development, there is a greater sensitivity to reward, a search for sensations, and a reduction in self-control, which brings the adolescent closer to the consumption of psychoactive substances<sup>10</sup>.

The early consumption of alcoholic beverages can increase the risk of dependence in adulthood and influence the experimentation of other psychoactive substances such as marijuana, cocaine, and inhalants<sup>11-12</sup>. This risky behavior can also affect mental health, with feelings of loneliness, sadness, insomnia, and suicidal ideation, potentially contributing to the occurrence of diseases associated with alcohol abuse<sup>11</sup>. Furthermore, it is considered a predictor of preventable harms such as accidents and violence<sup>13</sup>.

Brazil has been seeking to mitigate the harmful effects of alcohol use through public policies<sup>14</sup>. In 2019, the National Drug Policy was regulated, having as one of its guidelines the use of alcohol and other drugs as a problem concerning childhood, adolescence, and youth. This policy considers avoiding the initiation of use, as well as ensuring treatment, assistance, and care for users of psychoactive substances<sup>15</sup>. In this context, it is necessary to deepen the knowledge on this topic to contribute scientifically with analytical data that can guide public policies.

The factors associated with alcohol use among adolescents are an important indicator and strategic for improvements in the health of this population segment<sup>16</sup>, and there are still few studies in the literature that address this topic. The objective of this study was to analyze the factors associated with alcohol use among Brazilian school adolescents.

## METHOD

This analytical cross-sectional study uses secondary data from the National School Health Survey (PeNSE), fourth edition, conducted in 2019. PeNSE is a survey conducted with adolescent students from public and private schools who make up the Surveillance of Risk and Protection Factors for Health in Brazilian students. It was conducted by the Brazilian Institute of Geography and Statistics (IBGE) in partnership with the Ministry of Health and supported by the Ministry of Education. All information collected is anonymous and freely available to the public<sup>17</sup>.

Students formed the sample from the selected classes aged between 13 and 17 who were enrolled and regularly attending school at the following geographical levels: Brazil, large regions, Federation units (UF), capital municipalities, and Federal District. The PeNSE<sup>17</sup> publication provides more information about the sampling process.

Between April and September 2019, data was collected through a self-administered questionnaire, which the students received instructions for filling out. Data were collected from 4,242 schools and 6,612 classes, with 189,857 enrolled students and 183,264 attending students. Out of 159,245 valid questionnaires received, 125,123 were analyzed.

For this study, the variables of alcohol use were analyzed. The dependent variable, lifetime alcohol use, was defined as having consumed alcohol at least once in a lifetime and was measured by asking students if they had ever consumed an alcoholic beverage in their lifetime. The answer options were yes or no.

The independent variables were: sex (man and woman); age (< 13; 13 to 15; 16 to 17; > 18); self-reported race (white; black; yellow; brown; indigenous); school year (elementary school; high school); lives with mother (yes; no); lives with father (yes; no); lifetime cigarette use (yes; no); lifetime hookah use (yes; no); lifetime electronic cigarette use (yes; no); mother, father, or guardian smokes (yes; no); in the last 30 days, a friend smoked in your presence (yes; no); mother, father, or guardian drinks alcohol (yes; no); in the last 30 days, a friend drank alcohol in your presence (yes; no); lifetime drug use (yes; no); age of first drug use (10 to 14 years;  $\geq$  15 years); in the last 30 days, a friend used drugs in your presence (yes; no).

The data from PeNSE 2019 was extracted from the official IBGE website and, later for analysis, was exported to the statistical software Statistical Package for the Social Sciences version 29.0 (SPSS ©). We calculated the distribution of frequencies (absolute frequency and relative frequency) and the respective 95% confidence interval (95% CI) for all variables. To verify the difference between the proportions, Pearson's  $\chi^2$  Test was used, where p-values  $\leq$  0.20 were included in the logistic regression model and subsequently the magnitudes were measured by the Odds Ratio (OR) with 95% CI.

The students who agreed with the Informed Consent Form (ICF), which was available on the first page of the questionnaire, participated in the research. The National Commission of Ethics approved the PeNSE in Research for Human Beings of the Ministry of Health (Opinion No. 3.249.268, April 8, 2019).

## RESULTS

In 2019, PeNSE evaluated 125,123 adolescents. Table 1 presents the prevalence of substance use among schoolchildren in 2019. It was observed that 31,331 (58.9%) reported alcohol use and 5,637 (10.6%) reported drug use in their lifetime. As for cigarettes and hookah, the prevalence of use at least once in a lifetime was 11,049 (20.7%) and 8,518 (16%), respectively. Regarding the experimentation of electronic cigarettes, 7,718 (14.5%) Brazilian students reported using them.

**Table 1** - Prevalence of substance use among students, according to PeNSE data. Rio de Janeiro, RJ, Brazil, 2021

Variables	n	%	CI (95%)
<b>Use of alcohol in life</b>			
No	21,896	41.1	40.7-41.6
Yes	31,331	58.9	58.4-59.3
<b>Drug use in life*</b>			
No	47,566	89.4	89.1-89.7
Yes	5,637	10.6	10.3-10.9
<b>Use of cigarettes in life</b>			
No	42,235	79.3	78.9-79.6
Yes	11,049	20.7	20.4-21.0
<b>Use of hookah in life</b>			
No	44,731	84	83.7-84.3
Yes	8,518	16	15.7-16.3
<b>Use of electronic cigarettes in life</b>			
No	45,527	85.5	85.2-85.8
Yes	7,718	14.5	14.2-14.8

\*Marijuana, cocaine, crack, poppers, amyl nitrite, ecstasy, oxi, MD, skunk, and others.

Source: Authors (2023).

The sociodemographic and behavioral characteristics for the use of alcohol and other drugs are described in Table 2. There is a high proportion of alcohol use among females, 16,356 (61.1%);  $p = <0.001$ , among individuals aged 13 to 15 years, 16,337 (50.1%);  $p = <0.001$ , with black race/color, 3,355 (61.4%);  $p = <0.001$ , elementary school students, 11,801 (46.6%);  $p = <0.001$ , and those who do not live with their mother, 5,095 (68.6%).

**Table 2** - Sociodemographic characteristics for alcohol use, according to PeNSE data. Rio de Janeiro, RJ, Brazil, 2021

Variables	Use of alcohol in life			p
	Total	Yes	No	
	(n =53,227) N	(n =31,331) n (%)	(n =21,896) n (%)	
<b>Sex</b>				
Male	26,278	14,865 (56.6)	11,413 (43.4)	<0.001
Female	26,773	16,356 (61.1)	10,417 (38.9)	
<b>Age group</b>				
13 to 15 years old	32,668	16,337 (50.1)	16,291 (49.9)	<0.001
16 or 17 years old	16,734	12,083 (72.2)	46.51 (27.8)	
18 years old or older	3,645	2,759 (75.7)	886 (24.3)	
<b>Race/color</b>				
White	15,011	8,543 (56.9)	6,468 (43.1)	<0.001
Black	5,464	3,355 (61.4)	2,109 (38.6)	
Yellow	1,847	1,103 (59.7)	744 (40.3)	
Brown	27,741	16,531 (59.6)	11,210 (40.4)	
Indigenous	1,715	882 (51.4)	833 (48.6)	
<b>School year</b>				
Elementary School	25,350	11,801 (46.6)	13,549 (53.4)	<0.001
High School	27,858	19,524 (70.1)	8,334 (29.9)	
<b>Lives with the mother</b>				
No	7,431	5,095 (68.6)	2,336 (31.4)	<0.001
Yes	45,777	26,227 (57.3)	19,550 (3.0)	

Source: Authors (2023).

Among the behavioral aspects for alcohol use presented in Table 3, the use of drugs in life stands out, 5,457 (97.0%);  $p = <0.001$ , the age for first drug use between the age group of 10 to 14 years, 2,724 (95.8%);  $p = <0.001$ , the use of drugs by a friend in the presence of the student in the last 30 days, 6,286 (87.3%);  $p = <0.001$ , cigarette use in life, 10,333 (93.8%);  $p = <0.001$ , hookah use in life, 7,790 (91.6%);  $p = <0.001$ , electronic cigarette use in life, 7,143 (92.7%);  $p = <0.001$ , the use of cigarettes by a friend in the presence of the student in the last 30 days, 10,134 (79.5%);  $p = <0.001$  and the use of cigarettes by guardians, 927 (72.5%);  $p = <0.001$ .

**Table 3** - Behavioral characteristics for alcohol use, according to PeNSE data. Rio de Janeiro, RJ, Brazil, 2021

Variables	Use of alcohol in life			p
	Total	Yes	No	
	(n =53,227)	(n =31,331)	(n =21,896)	
	n	n (%)	n (%)	
<b>Drug use in life*</b>				
No	47,505	25,804 (54.3)	21,701 (45.7)	<0.001
Yes	5,628	5,457 (97)	171 (3.0)	
<b>Age of first drug use</b>				
10 to 14 years	2,843	2,724 (95.8)	119 (4.2)	< 0.001
≥ 15 years	2,737	2,694 (98.4)	43 (1.6)	
<b>A friend used drugs in the presence of the student in the last 30 days</b>				
No	45,926	24,982 (54.4)	20,944 (45.6)	<0.001
Yes	7,197	6,286 (87.3)	911 (12.7)	
<b>Use of cigarettes in life</b>				
No	42,171	20,975 (49.7)	21,196 (50.3)	<0.001
Yes	11,021	10,333 (93.8)	688 (6.2)	
<b>Use of hookah in life</b>				
No	44,661	23,506 (52.6)	21,155 (47.4)	<0.001
Yes	8,500	7,790 (91.6)	710 (8.4)	
<b>Use of electronic cigarettes in life</b>				
No	45,463	24,156 (53.1)	21,307 (46.9)	<0.001
Yes	7,702	7,143 (92.7)	559 (7.3)	
<b>Some friend smoked in the presence of the student in the last 30 days</b>				
No	40,425	21,167 (52.4)	19,258 (47.6)	<0.001
Yes	12,745	10,134 (79.5)	2,611 (20.5)	
<b>Father and mother who smoke</b>				
None of them	42,572	24,224 (56.9)	18,348 (43.1)	<0.001
Father or male guardian	5,685	3,781 (66.5)	1,904 (33.5)	
Mother or female guardian	2,567	1,800 (70.1)	767 (29.9)	
Both	1,279	927 (72.5)	352 (27.5)	
I don't know	1,063	572 (53.8)	491 (46.2)	

\*Marijuana, cocaine, crack, glue, poppers, amyl nitrite, ecstasy, oxi, MD, skunk, and others.

Source: Authors (2023).

Table 4 shows that lifetime cigarette use was the variable most strongly associated with alcohol use, as adolescents who smoked were three times more likely to use alcohol. Still, the use of alcohol by friends in the presence of the student in the last 30 days, as well as having a father and mother who smoke, were significantly associated with alcohol use.

**Table 4** - Factors associated with alcohol use among Brazilian adolescents. Rio de Janeiro, RJ, Brazil, 2021

Variables	Adjusted OR	95% CI	$\beta$	p-value
<b>Sex</b>				
Male	0.55	0.39-0.78	-0.6	0.001
<b>Age of first drug use</b>				
$\geq 15$ years	1.86	1.21-2.86	0.62	0.004
<b>Use of cigarettes in life</b>				
	3.25	2.28-4.62	1.18	<0.001
<b>Use of hookah in life</b>				
	1.8	1.21-2.67	0.59	0.003
<b>Use of electronic cigarettes in life</b>				
	1.6	1.07-2.37	0.47	0.021
<b>Some friend drank alcoholic beverages in the presence of the student in the last 30 days</b>				
	2.15	1.52-3.05	0.77	<0.001
<b>Father and mother who smoke</b>				
	1.29	1.13-1.48	0.26	<0.001

Source: Authors (2023).

## DISCUSSION

This study investigated the association with alcohol use in a population sample of Brazilian schoolchildren aged between 13 and 17 years. In the analysis, in the adjusted model, the results of PeNSE 2019 indicated that older students ( $\geq 15$  years), who use cigarettes, hookah, or electronic cigarettes, with parents who smoke and friends who drank in the last 30 days were more likely to use alcohol. Being male was a protective factor for alcohol experimentation among Brazilian schoolchildren.

Among the determinants associated with alcohol consumption by adolescents are the ties with friends who drink. Other studies provide strong evidence supporting that the peer group (friends) is an important factor in the likelihood of alcohol use by adolescents<sup>18</sup>. Therefore, any primary prevention strategy regarding alcohol use by Brazilian students must consider peer networks.

The difference in the proportion between students who lived with their mothers was not statistically significant in the final model compared to those who did not live with their families. It is worth noting that other research has found different results, confirming the hypothesis of the family's influence as a protective role in alcohol use during adolescence<sup>19-20</sup>. Living with both parents or the mother in a welcoming and safe environment could play a protective role. However, these studies also showed that the existence of family conflicts was associated with an increase in alcohol consumption among young people<sup>20</sup>.

The results of this study corroborated that being a male student was protective for alcohol consumption. Throughout history, there has been a difference in the patterns of alcohol consumption between male and female adolescents, as it previously prevailed among males. However, in recent years, both in Brazil and in other countries, there has been a significant increase in heavy alcohol consumption (binge drinking -  $\geq 60$ ml of pure alcohol on at least one occasion per month) among young women<sup>21-22</sup>. A possible explanation for this phenomenon may be related to the changes of the last decades, such as female independence, the pursuit of equality, and social achievements driven by participation in the labor market, which contribute to the culture of social drinking. On the other hand,

there is an additional concern since women are more susceptible to the effects of alcohol due to lower tolerance, higher fat content, lower body water content, and the small amount of enzymes responsible for alcohol metabolism<sup>23</sup>.

The findings of this study indicate that the experimentation with cigarettes, hookah, and the use of electronic cigarettes by Brazilian students was associated with alcohol use, also highlighting that adolescents whose parents smoked had a higher chance of experimentation and consumption in the last 30 days. Another study that compared PeNSE data from 2015 to 2019 identified that smoked tobacco indicators remained stable during this period. However, it found a high prevalence of experimentation with products such as hookah and electronic cigarettes<sup>24</sup>. Global research data has shown that in low- and middle-income countries, at least 50 million adult smokers started smoking before the age of 15, posing a higher subsequent risk of death and a significant public health problem<sup>25</sup>.

Some limitations of the results of this study should be considered. The impossibility of making causal inferences due to the study's cross-sectional design stands out among these. However, the data from PeNSE 2019 does not represent all Brazilian adolescents, as it was obtained only from school students. Furthermore, as the students used a self-reported questionnaire, information bias may occur, leading to underreporting or overestimating the data. However, the questionnaire was based on validated international surveys, such as the Health Behaviour in School-Aged Children, the Youth Risk Behavior Surveillance System, and the Global School-Based Student Health Survey. The potentiality of the study is to use representative data from Brazilian students aged 13 to 17, including schools in Indigenous areas and hard-to-reach places.

## CONCLUSION OR FINAL CONSIDERATIONS

From this study, it was possible to identify the factors associated with alcohol use by adolescents. Thus, cigarette use in life, alcohol use by friends in the presence of the student, and having parents who smoke were the variables most strongly associated with alcohol consumption.

These findings show that interventions on this public health issue cannot be restricted to adolescents, and it is necessary to include their social groups and living environments.

Finally, it is worth noting that one of the goals agreed upon in the WHO's 2030 Agenda is to reduce alcohol consumption by 10%. However, this study observed that the use of alcohol is increasingly early and influential among adolescents. In this sense, integrated actions and public policies involving young people and adolescents are important to ensure the health and well-being of healthy adults.

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