# Alcohol and tobacco experimentation among adolescents of the Midwest Region/Brazil

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**Abstract** *This study aims to investigate the prevalence of alcohol and tobacco experimentation among adolescents of the Brazilian Midwest its association with sociodemographic factors. This is a cross-sectional study, with data from the National School Health Survey – PeNSE, carried out in 2015. The sample consisted of ninth-graders. The dependent variable was alcohol and tobacco experimentation at some point in life. A Poisson regression model was performed to identify the associated variables. The weighted estimated prevalence of alcohol and tobacco experimentation was 57.17% (95% CI: 56.20-58.14) and 22.38% (95% CI: 21.56-23.20), respectively. The prevalence of alcohol experimentation among females was higher than in males. However, regarding tobacco, males had a higher prevalence than females. Alcohol and tobacco experimentation was statistically significant with age. Public schools' administrative dependency showed a 23.99% higher prevalence than private schools concerning tobacco experimentation. We concluded that alcohol and tobacco experimentation was high among school adolescents and was shown to be associated with sociodemographic factors.*

**Key words** *Alcohol consumption, Tobacco, Adolescent*

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## Introduction

Adolescence is the stage of growth to reach human potential, characterized by profound physical, psychological and emotional changes. Decisions and habits can determine their health and well-being for life[1]. Globally, one out of every six individuals is a teenager, totaling 1.2 billion young people aged 10-19 years[2]. In 2015, Brazil had a population of 204.5 million people, of which approximately 34 million, or 17%, were adolescents and 8% of them were living in the Midwest[3].

This stage is critical for adolescents to opt for a healthy lifestyle, since it provides the build-up of habits and attitudes that will influence adulthood, with the ensuing consequences for the quality of life[4-6].

Some behaviors initiated at this stage, such as inadequate diet, sedentary lifestyle, alcohol and tobacco testing, are common risk factors for the development of major chronic noncommunicable diseases (NCDs). In Brazil, this group of diseases accounted for 72.7% of all deaths, especially cardiovascular diseases (30.4%), neoplasms (16.4%), respiratory diseases (6.0%), and diabetes (5.3%)[6,7].

The Brazilian Institute of Geography and Statistics (IBGE), in partnership with the Ministry of Health and Education, has carried out the National School Health Survey (PeNSE), in its third edition in 2015, which aims to know the factors related to the risks and health protection of Brazilian adolescents[8]. Thus, school is an essential institution for the monitoring of risk factors among adolescents, since it is a place where young people spend most of their lives. According to data from the 2015 National Household Sample Survey (PNAD), the access of the population aged 6-14 years and 15-17 years to school was 98.5% and 84.3%, respectively, showing the accessibility of this institution for the promotion of adolescent health[9,10].

Malta et al.[11] found that there was no difference in experimentation of alcoholic beverages of these young people in the two editions of PeNSE, at 71.4% in 2009 and 70.5% in 2012. Regarding tobacco use indicators, experimentation of cigarettes fell from 24.2% to 22.3%[11]. Considering that alcohol is the most consumed substance among young people at an earlier age, and smoking is highly dependent on adolescents, the relevance of this study to the monitoring of health risk behaviors in the lives of young people in the Midwest region is highlighted. This region has absorbed migratory flows from all over Brazil, people in search of jobs and better living conditions, whose expansion process directly influences the adolescents' lifestyle, since this territorial space appears in several studies with a large percentage of young people who have experimented alcohol and tobacco in their lives.

The hypothesis is that the experimentation of alcohol occurs mainly among females, and tobacco, with males, at increasingly early years. Therefore, this work may contribute to increasing the study and knowledge of the social determinants of behavior related to alcohol and tobacco experimentation in adolescents. The results can also be useful to highlight the risk behaviors and support the development of promotion and intervention activities in the population of students to improve the health of young people.

Using the secondary data of PeNSE 2015, this study aimed to estimate the prevalence of alcohol and tobacco experimentation among Brazilian ninth-graders in the Midwest region and its association with demographic and socioeconomic factors.

## Methods

This is a cross-sectional study that analyzed data from the third edition of PeNSE[8]. Data on adolescents from the Midwest region of Brazil were evaluated.

The study population consisted of ninth-graders from the 26 capitals and the Federal District. A school sample was designed and selected for each geographic strata and was called allocation stratum, and each school was designated by cross-reference, from its administrative (public or private) dependency, and its size, measured by the number of classes, in order to estimate the proportion of 50%, with a 95% confidence level and an absolute error of three percentage points and a significance level of five percentage points. The students present on the day of data collection were invited to participate in the survey and answered a structured and self-administered questionnaire inserted in a smartphone. PeNSE methodology and primary results have been published[8].

In the Midwest region, 394 schools and 570 classes participated in the 2015 PeNSE, which had, at that date, 17,606 students enrolled in the 9th grade. On the day of the survey, 14,205 students were present and 14,180 responded on alcohol and tobacco experimentation[8].

A probabilistic sampling was used in the sample planning of the PeNSE survey, considering the two-stage sampling by conglomerates and stratified sampling methods. In the former, the primary and the secondary sample units were schools and classes of the selected schools, respectively. Then, classes were listed from two pieces of information: the number of students enrolled and the number of students who usually attended classes. Schools with less than 15 students in the desired grades were excluded from the register, since, although they represented about 20% of the institutions, they accounted for less than 3% of all enrolled students. Night-time classes were also eliminated, as they only reflected about 3% of this population[8].

In this study, we analyzed the dependent variables of alcohol and tobacco experimentation at some point in life. Demographic (gender, age (≤13; 14; ≥15 years), self-reported ethnicity/skin color) and socioeconomic data (maternal schooling, school administrative dependency: public or private) were considered as independent variables.

The conceptual model of analysis of this study was initially performed by estimating the weighted prevalence of alcohol and tobacco experimentation weights for each category of demographic and socioeconomic variables considered, with their respective 95% confidence intervals (95% CI). Then, a bivariate analysis was performed between the dependent variables and the independent variables, considering the prevalence ratio estimated by the simple Poisson regression model with robust variance, with their respective 95% confidence intervals (95% CI) and p-values. Subsequently, the variables with p<0.20 were tested in the multiple Poisson regression model with robust variance. Variables with p<0.05 remained in the final model. All statistical analyses were carried out as the Stata Version 14.0 program, using the survey (svy) module for complex samples, because they allowed incorporating the sample weights.

The 2015 PeNSE was approved by the National Research Ethics Committee, of the National Health Council, dated 30/03/2015[8].

## Results

The estimated prevalence and 95% confidence interval of the alcohol and tobacco experimentation was 57.17% (95% CI: 56.20-58.14) and 22.38% (95% CI: 21.56-23.20), respectively (data not shown in the table).

Table 1 shows the weighted prevalence of alcohol and tobacco experimentation weights for each category, by the demographic and socioeconomic variables considered in the study, with their respective 95% confidence intervals (95% CI) and sample size (n). In this table, we can observe a statistically significant difference between the prevalence of the categories of all variables and the two dependent variables under study, since most of the 95% confidence intervals are not intercepted.

Table 2 shows the weighted prevalence and the analyses of the robust Poisson regression models, with estimated prevalence ratios between alcohol experimentation and demographic and economic variables, with their respective confidence intervals, with the selection of the following variables for the multiple analysis: gender, age, maternal schooling and school administrative dependency. In the multiple analysis, variables such as gender, ethnicity/skin color and age remained associated with alcohol experimentation. We observed that females had a 9% higher prevalence of alcohol experimentation than males (p<0.001). White individuals showed a higher prevalence of alcohol experimentation compared to the indigenous population. This behavior was also statistically significant at ages 14 and 15 years or older compared to adolescents up to 13 years of age, with a prevalence ratio of 1.15 and 1.42, respectively (Table 3).

Table 4 shows the weighted results from the analysis of the robust simple Poisson regression models, with estimated prevalence ratios between the association of tobacco experimentation with the variables: gender, ethnicity/skin color, age, maternal schooling and school type; however, after analysis of the final multiple Poisson regression model, only the variables gender, age, ethnicity/skin color and school type remained statistically significant. The results show that, among adolescents that experimented tobacco, males showed a 15% higher prevalence than girls (p < 0.001). This behavior was also more frequent in the age group of 14 years or more, compared to those less than or equal to those aged 13. Individuals of indigenous, black and brown skin color had a higher prevalence of tobacco experimentation (30%, 17% and 15%, respectively) compared to white. The school type classified as public revealed a 14% higher prevalence ratio than private schools in tobacco experimentation (Table 5).

**Table 1.** Prevalence# and 95% confidence interval# of alcohol and tobacco experimentation, by demographic and socioeconomic variables of ninth-graders in the Brazilian Midwest region. PeNSE 2015.

| Independent variables | Alcohol Experimentation | 95% CI[#] | Tobacco Experimentation[#] | 95% CI[#] |
|---|---|---|---|---|
| Gender | (n = 14,152) | | (n = 14,156) | |
| Female | 58.93 | 57.56 – 60.28 | 20.11 | 19.03 – 21.23 |
| Male | 55.38 | 53.99 – 56.76- | 24.69 | 23.50 – 25.92 |
| Ethnicity/skin color | (n = 14,137) | | (n = 14,141) | |
| Brown | 58.24 | 56.80 – 59.67 | 23.11 | 21.91 – 24.36 |
| White | 56.44 | 54.77 – 58.09 | 19.87 | 18.57 – 21.23 |
| Black | 56.39 | 53.44 – 59.29 | 25.19 | 22.74 – 27.81 |
| Yellow | 58.24 | 53.77 – 62.58 | 21.13 | 17.70 – 25.02 |
| Indigenous | 51.03 | 46.02 – 56.01 | 29.17 | 24.83 – 33.92 |
| Age (years) | (n = 14,152) | | (n = 14,156) | |
| ≤ 13 | 47.66 | 45.14 – 50.19 | 14.63 | 12.92 – 16.53 |
| 14 | 54.78 | 53.50 – 56.06 | 18.95 | 17.96 – 19.98 |
| ≥ 15 | 67.06 | 65.25 – 68.83 | 33.64 | 31.88 – 35.44 |
| Maternal schooling | (n = 10,839) | | (n = 10,843) | |
| Primary school | 58.36 | 56.65 – 60.04 | 24.20 | 22.76 – 25.69 |
| Secondary school | 58.53 | 56.55 – 60.48 | 21.63 | 20.03 – 23.32 |
| Higher education | 55.37 | 53.19 – 57.54 | 18.90 | 17.25 – 20.67 |
| School type | (n = 14,156) | | (n = 14,156) | |
| Public | 57.69 | 56.61 – 58.77 | 23.28 | 22.37 – 24.22 |
| Private | 54.27 | 52.15 – 56.37 | 17.35 | 15.80 – 19.02 |

**95% CI[#]:** 95% confidence interval, with weighted data. n = sample size by demographic and socioeconomic variables. [#]: Weighted values.

## Discussion

In this study, the results confirmed the magnitude of this investigation regarding the experimentation of alcohol and tobacco among students from the Midwest region. Thus, research involving young schoolchildren can provide subsidies for the structuring of health promotion and disease prevention public policies.

The World Health Organization (WHO) reveals that individuals aged 10-19 years have health problems due to alcohol and tobacco consumption because this reduces self-control and increases risk behaviors[5]. The analysis of data from national and international studies shows the need for monitoring and coping with young people's alcohol consumption. In Brazil, the Study of Cardiovascular Risks in Adolescents (ERICA) detected that one-fifth of the adolescents interviewed had consumed alcoholic beverages in the 30 days before the interview[12]. In the United States, a youth risk behavior survey through the Youth Risk Behavior Survey (YRBS) in 2015 showed an estimated prevalence of 63.2% lifetime experience and 32.8% in the last 30 days[13].

In a cross-sectional study conducted in Brazil, the relationship between school problems and the use of alcohol, tobacco and illicit drugs was verified. At the time, it was identified that alcohol consumption is associated with repetition, lack of concentration, low grades, desire to drop out of school and feeling bored in the school environment. These adolescents showed higher patterns of behavioral risk, generating school losses[14].

The data of this study indicate that the prevalence in females is significantly higher than in males for the experimentation of alcoholic beverage at some point in life whose results are in agreement with previous studies[15,16], and this was also found in the national samples of PeNSE 2009 and 2012[11,17,18].

The same result was observed in Argentina[19] and the United Kingdom[20]. However, in the study Health Behavior in School-Aged Children (HBSC), it was observed that, among adolescents aged 11 and 13 years, no difference was found in weekly consumption between genders, but, at the age of 15 years, alcohol consumption is higher in boys[21].

**Table 2.** Alcohol experimentation prevalence and prevalence ratio, by demographic and socioeconomic variables of ninth-graders in the Brazilian Midwest region. PeNSE 2015.

| Independent variables | PR** | 95% CI** | P-Value |
|---|---|---|---|
| Gender | | | |
| Female | 1.06 | 1.03 – 1.10 | < 0.001* |
| Male | 1.00 | - | - |
| Ethnicity/skin color | | | |
| Brown | 1.14 | 1.03 – 1.26 | 0.010* |
| White | 1.11 | 0.99 – 1.22 | 0.054 |
| Black | 1.10 | 0.99 – 1.23 | 0.078 |
| Yellow | 1.14 | 1.01 – 1.29 | 0.037* |
| Indigenous | 1.00 | - | - |
| Age (years) | | | |
| ≤ 13 | 1.00 | - | - |
| 14 | 1.15 | 1.09 – 1.22 | < 0.001* |
| ≥ 15 | 1.41 | 1.33 – 1.49 | < 0.001* |
| Maternal schooling | | | |
| Primary school | 1.05 | 1.01 – 1.11 | 0.035* |
| Secondary school | 1.06 | 1.01 – 1.11 | 0.036* |
| Higher education | 1.00 | - | - |
| School type | | | |
| Public | 1.06 | 1.02 - 1.11 | 0.006* |
| Private | 1.00 | - | - |

**PR:** Prevalence ratio estimated by the simple robust Poisson regression model. 95% CI: 95% confidence interval. *: significant at a level of 5%. **: Prevalence and 95% confidence intervals (95% CI) estimated under sample weights.

**Table 3.** Variables of the final model and prevalence ratio adjusted by multiple Robust Poisson regression (PRa), associated with alcohol experimentation, with their respective 95% confidence intervals (CI) and P-Value, Midwest region, Brazil, 2015.

| Variable | Category | PRa*** | 95% CI*** | P-Value |
|---|---|---|---|---|
| Gender | Female | 1.09 | 1.05 - 1.13 | < 0.001* |
| | Male | 1.00 | - | - |
| Ethnicity/skin color | Brown | 1.17 | 1.05 – 1.29 | 0.003 |
| | White | 1.41 | 1.03 – 1.27 | 0.012 |
| | Black | 1.12 | 0.99 – 1.25 | 0.054 |
| | Yellow | 1.15 | 1.02 – 1.30 | 0.028 |
| | Indigenous | 1.00 | - | - |
| Age (years) | ≤ 13 | 1.00 | - | - |
| | 14 | 1.15 | 1.09 - 1.22 | < 0.001* |
| | ≥ 15 | 1.42 | 1.34 - 1.51 | < 0.001* |

PRa: prevalence ratio adjusted by the multiple robust Poisson regression model with selection of variables through the Backward method 95% CI: 95% confidence interval. *: significant at a level of 5%. n = 14,137.

***: Prevalence and 95% confidence intervals (95% CI) adjusted by sample weights.

Adolescents who reported having used alcohol at least once in their life are in a critical situation and this represents a risk factor, since it compromises the physical and mental health of young women, who are constantly exposed to episodes of violence, such as fights and accidents in addition to the acquisition of chronic diseases, according to a report by the United Nations Children's Fund[22].

A literature review on the subject confirms the results of the final model, showing a relationship between experimentation of alcohol and the

**Table 4.** Tobacco experimentation prevalence and prevalence ratio, by demographic and socioeconomic variables of ninth-graders in the Brazilian Midwest region. PeNSE 2015.

| Independent variables | PR** | 95% CI** | P-Value |
|---|---|---|---|
| Gender | | | |
| Male | 1.23 | 1.14 – 1.32 | < 0.001* |
| Female | 1.00 | - | - |
| Ethnicity/skin color | | | |
| Indigenous | 1.47 | 1.24 – 1.74 | < 0.001* |
| Black | 1.27 | 1.12 – 1.43 | < 0.001* |
| Brown | 1.16 | 1.07 – 1.27 | 0.001 |
| Yellow | 1.06 | 0.88 – 1.28 | 0.517 |
| White | 1.00 | - | - |
| Age (years) | | | |
| ≤ 13 | 1.00 | - | - |
| 14 | 1.29 | 1.13 – 1.48 | < 0.001* |
| ≥ 15 | 2.30 | 2.01 – 2.63 | < 0.001* |
| Maternal schooling | | | |
| Primary school | 1.28 | 1.15 – 1.43 | < 0.001* |
| Secondary school | 1.14 | 1.02 – 1.29 | 0.025* |
| Higher education | 1.00 | - | - |
| School type | | | |
| Public | 1.34 | 1.21 – 1.48 | < 0.001* |
| Private | 1.00 | - | - |

**PR:** Prevalence ratio estimated by the simple robust Poisson regression model. 95% CI: 95% confidence interval. *: significant at a level of 5%. **: Prevalence and 95% confidence intervals (95% CI) estimated under sample weights.

**Table 5.** Variables of the final model and prevalence ratio adjusted by multiple Robust Poisson regression (PRa), associated with tobacco experimentation, with their respective 95% confidence intervals (CI) and P-Value, Midwest region, Brazil, 2015.

| Variable | Category | PRa*** | 95% CI*** | P-Value |
|---|---|---|---|---|
| Gender | Male | 1.15 | (1.07; 1.24) | < 0.001* |
| | Female | 1.00 | - | - |
| Age (years) | ≤ 13 | 1.00 | - | - |
| | 14 | 1.26 | 1.10 - 1.44 | 0.001* |
| | ≥ 15 | 2.16 | 1.90 - 2.50 | < 0.001* |
| Ethnicity/skin color | Indigenous | 1.30 | 1.10 – 1.54 | 0.003* |
| | Black | 1.17 | 1.03 – 1.31 | 0.012* |
| | Brown | 1.15 | 1.05 – 1.25 | 0.002* |
| | Yellow | 1.04 | 0.87 – 1.26 | 0.646 |
| | White | 1.00 | - | - |
| School type | Public | 1.14 | 1.03; 1.27 | 0.0011* |
| | Private | 1.00 | - | - |

PRa: prevalence ratio adjusted by the multiple robust Poisson regression model with selection of variables through the Backward method 95% CI: 95% confidence interval. *: significant at a level of 5%. n = 14141. ***: Prevalence and 95% confidence intervals (95% CI) adjusted by sample weights.

variables white ethnicity/skin color[16]. This work showed that alcohol experimentation at age 15 or more is 42% more likely than in those aged 13 years or less, revealing adherence of new users over time. TAVARES et al.[23], studying young people aged up to 21 years in a district of Portugal

found that the majority, about 92%, had experimented alcohol, highlighting the increasing prevalence of alcohol consumption throughout life.

The First National Survey of Alcohol and Drugs, conducted in 2005-2006 identified that 14 years is the mean age of alcoholic beverage experimentation[24]. Similar results were found in previous studies[15,17,25-27]. According to the Sixth National Survey on Psychotropic Drug Use among Primary and Secondary School students in public and private networks of the 26 capitals of Brazilian states, most adolescents had already consumed alcoholic beverages at least once in their lifetime age group[28].

The study conducted at the Center for Alcohol and Drug Psychosocial Care of Cuiabá with adolescents in the age group 14-17 years showed an early onset of alcohol consumption by young people[29]. This was also observed in the European Community and part of the American continent, and at the age of 11, 1% declared to be a weekly user. At age 13 and 15, 3% and 14%, respectively, of young people with weekly consumption of alcoholic beverages[21] were found.

Alcohol consumption is a risk behavior that usually begins at early ages, at dangerous or harmful levels, which may extend into adulthood, generating illnesses and family disorders[30]. Even with the existence of the law prohibiting the sale and consumption of alcoholic beverages for children under 18, early alcohol intake by adolescents is a matter of concern. Distillate experimentation at this stage is associated with risk behaviors. It increases the probability of involvement in accidents and is strongly related to violent death, school underperformance and learning difficulties[31,32].

Another public health problem is tobacco use, whose experimentation is a preponderant factor for the teenager to become an active smoker. In Brazil, a Student Tobacco Use Survey (Vigescola) was carried out and evidenced a high prevalence of tobacco experimentation among adolescents. Moreover, this is associated with the search for identity and space in the adult world, which occurs mainly in this life stage[33].

In Brazil, tobacco use prevalence in the population in 1997 was 32.7%, and 14.8% in 2011, and this is probably due to marketing control, school educational activities and the restricted consumption in public and work places[34].

In the YRBS analysis of data from 1991 to 2015, in the United States, a decreased in the prevalence of consumption is noted, both concerning tobacco experimentation in the lifetime and use in the last 30 days; however, the data found are still high. In 2015, the estimated prevalence was 32.3% of experimentation in the lifetime and 10.8% in the last 30 days[35]. These are higher rates than those in Brazil, where a Special Tobacco Use Survey was conducted with students aged 15-24 years, showing that cigarette experimentation among adolescents reached 14.8% for both genders[36].

This investigation emphasizes that the highest prevalence of tobacco experimentation occurred in boys and these results show the adolescent's behavior towards tobacco use, and that increased, worldwide, from the twentieth century, associated with the idea of masculinity, strength, and power, influenced by advertisements that conveyed the image of success[37]. Concerning gender, the results corroborate several previous studies and point out that being male is a predominant factor for tobacco experimentation[20,27,38-41].

In the analysis carried out in Poland, it was observed that among the adolescents interviewed, those who were male were more likely to experiment with tobacco compared to females, and this increased with age in these individuals[42]. However, in the study by Figueiredo et al.[43] and Fernandes et al.[44], no significant differences were found regarding tobacco experimentation by gender.

In this study, it was verified that the prevalence of adolescents who have already experimented with tobacco increased with age, as observed with alcohol experimentation. This significant association between tobacco experimentation and increasing age among adolescents is in agreement with several previous studies[41,45-48], and it was also verified that tobacco use supremacy increases worldwide with age among adolescents, especially in the range 13-15 years[49].

Early initiation of tobacco use is a prognostic factor for illness and should be addressed. The earlier the tobacco dependency is established, the higher the risk of premature death, and the difference, in some years, after the onset of tobacco use can almost double the risk of harm to health, with significant repercussions in terms of years of life lost to society[36,50].

In the national analysis of the 2012 PeNSE data, it was verified that the probability of tobacco experimentation increased with age and that one in five adolescents had previously experimented with tobacco, and the highest probability is found among working students, confirming that, being in social handicap, marked by child labor, may have a higher likelihood of experimenting with tobacco[51].

In the HBSC study, conducted in 43 countries, no significant differences were observed at 11 years between genders. However, at ages 13 and 15 years, a significant difference was found and the prevalence was higher in men or women, according to the country analyzed[49].

Concerning ethnicity/skin color, the results of the final model corroborate the previous studies and show that being indigenous and being black and brown are factors that increase the probability of tobacco experimentation among young people[40].

Literature publications on the subject corroborate this assertion, showing that young people from public schools are more easily related to tobacco experimentation[43,52,53]. The Malta et al.[54] study detected a higher risk of tobacco use among public school students, whose work showed also that not having friends favors tobacco use.

The WHO considers tobacco and alcohol consumption as risk factors that must be addressed and classified as high priority, given the high number of premature deaths and disabilities worldwide[55,56]. Alcohol use is currently three times more widespread than tobacco use among adolescents, whose subjects are exposed to various health risk situations, making it imperative to monitor the risk factors and protection to which young people are exposed[15].

The Vigescola also found that most students bought tobacco freely[33]. These results point out the need for targeted interventions to this population group, as well as the empowerment of the population for the deregulation of the sale of cigarettes and the like for those under 18 years of age[34].

Among the limitations of the study are restrictions arising from the access profile of the adolescents' schools, since the methodology does not include students with a late entry in the institution. Also, it is limited to students with regular attendance at school, thus excluding adolescents outside the educational system. Because it is a cross-sectional study, the associations observed do not necessarily have a cause-and-effect relationship, so it is not possible to identify the harm caused by the use of these substances for the study population. However, the increased consumption of these substances can lead to limitations that will interfere in the quality of life of these individuals[8].

Thus, we can conclude that alcohol and tobacco experimentation among adolescent students was associated with sociodemographic factors. These behaviors in adolescence have implications for the well-being and health of individuals throughout life, due to the increased risk of developing chronic non-communicable diseases. As adolescence is so marked by transformations and exposure to various health risk situations, the results of this work show the relevance of implementing public health and education policies through health promotion and disease prevention actions to avoid the increase of typically built-in behavioral factors.

## Collaborations

EAO Freitas participated in the design of the study, data analysis and paper drafting. MSAS Martins supervised the study and participated in the paper's review. MM Espinosa participated in the statistical analysis of the data and paper's review.

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