

## Epidemiologia e Serviços de Saúde



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# Heavy drinking in Brazil: results from the 2013 National Health Survey

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## Abstract:

**Objective:** to describe the prevalence of heavy drinking in the Brazilian population, according to sociodemographic and health-related characteristics, in 2013. **Methods:** a descriptive study was conducted with National Health Survey (PNS) data regarding heavy drinking in the 30 days prior to interview, among individuals aged  $\geq 18$  years. Prevalence and 95% confidence intervals (95%CI) were estimated. **Results:** overall prevalence was 13.7% (95%CI 13.1; 14.2%). It was higher among men (21.6%; 95%CI 20.7; 22.5%) compared to women (6.6%; 95%CI 6.1; 7.1%). Higher prevalence was found among young adults (18-29 years: 18.8%; 95%CI 17.5; 20.0%), those with black skin color (16.6%; 95%CI 14.9; 18.4%), occasional smokers (35.2%; 95%CI 30.4; 40.0%), individuals who rated their health as good or very good (15.6%; 95%CI 14.9, 16.3%) and with no reported morbidities. **Conclusion:** prevalence of heavy drinking showed notable differences according to sociodemographic and health-related characteristics.

**Key words:** Alcohol Intoxication; Health Surveys; Epidemiology, Descriptive.

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## Introduction

Heavy drinking is causally related to more than 200 kinds of diseases and injuries. Cancer, cirrhosis and mental and behavioral disorders are frequently associated with alcohol use. However, an important proportion of the burden of disease attributable to alcohol is due to intentional and non-intentional injuries, including that resulting from traffic accidents, violence and suicide. Recently, it was demonstrated that alcohol is causally related to communicable diseases, such as tuberculosis, HIV/aids and pneumonia.<sup>1,2</sup>

According to the World Health Organization (WHO), in 2012, 5.1% of the global burden of diseases were attributed to alcohol consumption, which corresponds to 139 million disability-adjusted life years (DALY). Moreover, each year, approximately 3.3 million deaths occur globally as a result of abusive alcohol consumption, which accounts for 5.9% of the total deaths. The majority of fatal injuries due to alcohol consumption occurs in relatively young age groups. Among individuals aged 20 to 39 years, approximately 25% of all deaths are attributed to alcohol.<sup>1</sup>

*Each year, approximately 3.3 million deaths occur globally as a result of abusive alcohol consumption, which accounts for 5.9% of the total deaths.*

The consumption of 60 grams or more of neat alcohol (six or more doses of drinks in most countries) on a single occasion, at least once a month, is known in international literature as heavy episodic drinking (HED). This type of consumption generally provokes acute alcohol intoxication, which is the main cause of alcohol related problems in the population – such as alcohol poisoning, accidents and violence –, and may generate severe consequences, even for people who have a relatively low level of consumption.<sup>1</sup>

In 2010, HED prevalence worldwide was estimated at 7.5% in the total population aged 15 or more, being higher in Europe (16.5%) and the Americas (13.7%). Among people in this age group who reported alcohol consumption, HED prevalence was 16.0% and was again higher in Europe (22.9%) and the Americas (22.0%).<sup>1</sup>

The Chronic Disease Risk and Protective Factors Telephone Surveillance Survey (Vigitel) has been con-

ducted in the Brazilian state capitals and Federal District since 2006. It monitors the prevalence of heavy drinking every year, defining heavy drinking as consuming five or more doses of alcoholic drinks (for men) or four or more doses (for women) on one single occasion, at least once in the last 30 days. In 2013, the survey revealed prevalence of 16.4% (95%CI 15.7; 17.0%) in the population aged 18 or more.<sup>3</sup>

Apart from the health consequences, heavy drinking causes important social and economic losses to individuals and to society as a whole. A review study estimated that the costs associated to alcohol abuse surpass 1% of the gross domestic product (GDP) of high and medium-income countries.<sup>4</sup>

Therefore, there is an evident need for studies that may reveal the magnitude of heavy drinking in the Brazilian population. Furthermore, population-based information has the advantage of obtaining disaggregated indicators for specific groups of the population.

This article aims to describe the prevalence of heavy drinking in the Brazilian population, according to social demographic and health-related characteristics in 2013.

## Methods

A descriptive study was conducted with data from the 2013 National Health Survey (PNS) held by the Brazilian Institute of Geography and Statistics (IBGE).

PNS is the broadest study ever undertaken on the health status of the Brazilian population. It is a unique household survey, formulated in order to collect information regarding the health status of the Brazilian population. It is part of the IBGE Integrated Household Surveys System (SIPD) and it draws from the Master Sample of the Continuous Brazilian National Household Sample Survey (PNAD).<sup>5,6</sup>

Random cluster sampling was conducted in three stages. The first stage involved stratification of the primary units which comprised census tracts or groups of tracts. In the second stage, households were selected, and in the third, a household resident aged 18 or more was randomly selected. Data was collected in 62,986 households.<sup>5</sup>

The data were collected by trained interviewers, with the support of Personal Digital Assistance (PDA) handheld computers, programmed for critical processing variables. More information about PNS may be obtained in other publications.<sup>5,7</sup>

In this study, heavy drinking, defined as the ingestion of five or more doses of alcoholic drinks for men and four or more doses for women, on one single occasion, in the 30 days prior to the interview,<sup>3</sup> was investigated based on the following questions: a) “In the last 30 days, did you consume five or more doses of alcoholic drinks on one single occasion?”, for men, and b) “In the last 30 days, did you consume four or more doses of alcoholic drinks on one single occasion?” for women. If the answer was “yes” to these questions, this was considered to be heavy drinking, regardless of the number of times it happened. One dose of alcoholic drink is equivalent to a can of beer, a glass of wine or a dose of *cachaça*, whisky or any other liquor.

The total number of individuals in the sample was considered to be the denominator when calculating prevalences. Outcome prevalences were calculated according to sex (male and female) and total, for the following variables: age group (18 to 29, 30 to 39, 40 to 49, 50 to 59, 60 to 69, 70 years old or more); education level (no schooling and incomplete primary school, complete primary school and incomplete secondary school, complete secondary school and incomplete higher education, complete higher education); skin color (white, black, brown, yellow, indigenous); smoking (daily smokers, occasional smokers, non-smokers); self-perception of health condition (very good or good, regular, bad or very bad); household location (urban, rural); region of residence in Brazil (North, Northeast, Southeast, South, Central-West), and state of residence.

Prevalence according to the presence or absence of the following self-referred morbidities was also calculated, based on prior medical diagnosis: hypertension, diabetes, high cholesterol, cerebrovascular accident or stroke, asthma (or asthmatic bronchitis), arthritis or rheumatism, work-related musculoskeletal disorders (WRMD), depression, lung diseases (pulmonary emphysema, chronic bronchitis or chronic obstructive pulmonary disease – COPD), cancer and chronic kidney disease.

The number of heavy drinking episodes reported by the respondents in the 30 days prior to the interview was investigated through the following question: “On how many days of the month did this happen?” For this variable, the frequencies of the answers were calculated (1, 2, 3, 4, 5, 6, 7 or more days), according to sex and region.

The analyses were performed using Stata 12.0. For the calculation of the prevalences and their respective 95% confidence interval, specific procedures for the

analysis of data derived from complex sampling designs were applied, using Stata’s survey function, with weight, groups and sampling units definition.

PNS was approved by the National Research Ethics Commission (CONEP), Report No. 328,159, dated June 26, 2013.

## Results

PNS surveyed 60,202 people aged 18 or more, 48.3% of whom were male and 51.7% female.

Prevalence of heavy drinking at least once in the 30 days prior to the interview was 13.7% (95%CI 13.1; 14.2%). Prevalence was higher among men (21.6%; 95% CI 20.7; 22.5%) when compared to women (6.6%; 95%CI 6.1; 7.1%) (Table 1).

Considering men and women together, there was a reduction in heavy drinking as age increased. Higher prevalences were observed among young adults (in the 18 to 29 age group: 18.8%; 95%CI 17.5; 20.0%; and in the 30 to 39 age group: 17.8%; 95%CI 16.6; 18.9%) when compared to older individuals. Higher prevalences were also found among people with black skin color (16.6%; 95%CI 14.9; 18.4%), compared to those with white skin color (12.4%; 95%CI 11.7; 13.2%). Among people with brown skin, prevalence was 14.4% (95%CI 13.7; 15.1%), and among the indigenous it was 12.6% (95%CI 7.7; 17.5). With regard to education level, lower prevalence was found among individuals with no schooling or with incomplete primary school education (11.1%; 95%CI 10.5; 11.8%), when compared to those with higher education levels. Higher prevalences were observed among occasional smokers (35.2%; 95%CI 30.4; 40.0%), compared to daily smokers (27.4%; 95%CI 25.6; 29.2%), and both had higher prevalences than non-smokers (11.1%; 95%CI 10.6; 11.6%). (Table 1).

Overall, heavy drinking prevalence was lower among individuals who reported having the morbidities mentioned above, comparing to those who did not report them. Notwithstanding, there was no significant difference among individuals reporting and not reporting having asthma or lung diseases (Table 1).

Higher heavy drinking prevalence was observed as self-rated health improved. Among people who rated their health as bad or very bad, prevalence was 6.6% (95%CI 5.3%; 7.8%), whereas among those who rated their health as good or very good it was 15.6% (95%CI 14.9%; 16.3%).

**Table 1 –Heavy drinking prevalence in the 30 days prior to the interview among people aged 18 or more, according to social demographic and health characteristics. National Health Survey, Brazil, 2013**

	Male			Female			Total			
	%	95%CI *		%	95%CI *		%	95%CI *		
<b>Age groups (years)</b>										
18 to 29	27.2	25.3	29.2	10.5	9.2	11.7	18.8	17.5	20.0	
30 to 39	27.4	25.4	29.3	9.0	7.8	10.3	17.8	16.6	18.9	
40 to 49	22.4	20.4	24.3	6.4	5.5	7.3	13.7	12.7	14.8	
50 to 59	17.4	15.4	19.3	3.8	3.1	4.6	10.3	9.3	11.4	
60 to 69	11.0	9.0	13.1	2.0	1.2	2.7	5.9	5.0	6.9	
70 or more	4.1	2.6	5.6	0.4	0.2	0.6	2.0	1.4	2.7	
<b>Education level</b>										
no schooling and incomplete primary school	18.9	17.6	20.2	3.9	3.5	4.4	11.1	10.5	11.8	
complete primary school and incomplete secondary school	23.3	21.0	25.6	8.3	6.9	9.7	15.8	14.4	17.2	
complete secondary school and incomplete higher education	23.5	21.9	25.2	8.3	7.4	9.2	15.4	14.4	16.3	
complete higher education	23.1	20.2	25.9	7.9	6.7	9.2	14.3	12.8	15.8	
<b>Skin Color</b>										
White	20.3	18.9	21.7	5.6	5.0	6.3	12.4	11.7	13.2	
Black	26.0	22.9	29.2	8.3	6.8	9.8	16.6	14.9	18.4	
Brown	17.9	10.6	25.3	6.3	3.4	9.2	11.2	7.6	14.8	
Yellow	22.1	20.9	23.3	7.4	6.6	8.1	14.4	13.7	15.1	
Indigenous	23.3	12.9	33.6	5.0	2.1	7.9	12.6	7.7	17.5	
<b>Smoking</b>										
Daily smoker	35.1	32.4	37.8	15.8	13.8	17.8	27.4	25.6	29.2	
Occasional smoker	44.6	38.2	51.0	18.5	13.2	23.8	35.2	30.4	40.0	
Non-smoker	18.1	17.2	19.1	5.4	4.9	5.9	11.1	10.6	11.6	
<b>Hypertension</b>										
Yes	16.5	14.7	18.3	3.5	2.9	4.1	8.7	7.9	9.6	
No**	22.5	21.5	23.6	7.5	6.9	8.1	14.7	14.1	15.4	
<b>Diabetes</b>										
Yes	11.2	8.6	13.8	2.2	1.4	3.0	5.9	4.7	7.0	
No**	21.4	20.4	22.4	6.8	6.3	7.3	13.4	12.8	14.0	
<b>High Cholesterol</b>										
Yes	20.6	17.5	23.7	4.5	3.7	5.3	10.3	9.1	11.6	
No	20.5	19.5	21.6	6.7	6.2	7.3	13.1	12.5	13.7	
<b>Stroke</b>										
Yes	9.5	3.6	15.4	2.6	1.1	4.2	6.1	3.0	9.2	
No	21.8	20.8	22.7	6.6	6.2	7.1	13.8	13.2	14.3	
<b>Asthma or asthmatic bronchitis</b>										
Yes	22.5	18.0	27.0	5.8	4.2	7.3	12.2	10.1	14.3	
No	21.5	20.6	22.5	6.6	6.2	7.1	13.7	13.2	14.3	
<b>Arthritis or rheumatism</b>										
Yes	14.5	10.0	18.9	3.3	2.3	4.4	6.2	4.8	7.6	
No	21.8	20.9	22.8	6.9	6.4	7.4	14.2	13.6	14.7	
<b>Work-related musculoskeletal disorders</b>										
Yes	29.1	20.0	38.2	9.0	5.9	12.1	14.9	11.3	18.4	
No	21.5	20.5	22.4	6.5	6.0	7.0	13.6	13.1	14.1	
<b>Depression</b>										
Yes	17.8	13.4	22.2	5.6	4.4	6.8	8.6	7.2	10.0	
No	21.7	20.8	22.7	6.7	6.2	7.2	14.1	13.5	14.6	
<b>Lung diseases</b>										
Yes	19.4	13.3	25.6	3.4	1.5	5.2	10.8	7.7	13.9	
No	21.6	20.7	22.5	6.7	6.2	7.1	13.7	13.2	14.2	

	Male			Female			Total		
	%	95%CI *		%	95%CI *		%	95%CI *	
<b>Cancer</b>									
Yes	9.5	4.2	14.8	3.9	1.5	6.4	6.2	3.6	8.8
No	21.8	20.8	22.7	6.6	6.2	7.1	13.8	13.3	14.3
<b>Chronic kidney disease</b>									
Yes	9.9	5.6	14.1	7.1	3.9	10.3	8.3	5.8	10.9
No	21.7	20.8	22.7	6.6	6.1	7.1	13.7	13.2	14.3
<b>Self-rated health</b>									
Very good or good	23.5	22.3	24.6	7.8	7.1	8.4	15.6	14.9	16.3
Regular	18.3	16.7	19.8	4.8	4.2	5.5	10.5	9.7	11.2
Bad or very bad	11.3	8.7	13.9	3.6	2.5	4.6	6.6	5.3	7.8
<b>Region</b>									
North	23.1	20.8	25.4	5.7	4.9	6.5	14.2	12.9	15.4
Northeast	25.5	24.0	27.0	6.8	6.0	7.7	15.6	14.8	16.4
Southeast	19.9	18.2	21.5	6.6	5.8	7.5	12.8	11.9	13.7
South	17.6	15.6	19.6	5.2	4.2	6.2	11.1	10.0	12.2
Central-West	24.0	22.0	25.9	9.0	7.9	10.2	16.2	15.0	17.3
<b>Area of Residence</b>									
Urban	22.3	21.3	23.4	7.1	6.6	7.7	14.2	13.6	14.8
Rural	17.3	15.4	19.1	2.9	2.2	3.5	10.3	9.2	11.3
<b>Brazil</b>	<b>21.6</b>	<b>20.7</b>	<b>22.5</b>	<b>6.6</b>	<b>6.1</b>	<b>7.1</b>	<b>13.7</b>	<b>13.1</b>	<b>14.2</b>

\* 95% Confidence interval.

\*\*\*"No" or "only during pregnancy", for women.

Regarding the country's regions, the most expressive prevalences were found in the Central-West (16.2%; 15.0; 17.3%) and Northeast (15.6%; 95%CI 14.8; 16.4%), whereas the lowest prevalence was found in the South (11.1%; 10.0; 12.2%). Higher prevalences were found among urban area residents (14.2%; 95%CI 13.6; 14.8%), when compared to rural area residents (10.3%; 95%CI 9.2; 11.3%) (Table 1).

The states with the highest prevalence of heavy drinking were Bahia (18.9; 95%CI 16.8; 20.9), Mato Grosso do Sul (18.4; 95%CI 16.1; 20.6) and Amapá (17.6; 95%CI 14.6; 20.6). Those with the lowest rates were Paraná (10.6; 95%CI 8.9; 12.2), Paraíba (10.9; 95%CI 9.3; 12.5) and Roraima (13.4; 95%CI 11.3; 15.6), followed by Rio Grande do Sul and Santa Catarina (Figure 1).

Noticeably higher prevalences among men were found in all the states, being close to 30% in Bahia (29.4; 95%CI 25.6; 33.2), Rio Grande do Norte (28.7; 95%CI 24.7; 32.7), Piauí (28.5; 95%CI 24.5; 32.5) and Mato Grosso do Sul (27.7; 95%CI 23.7; 31.6) (Figure 2).

Among individuals who reported heavy drinking in the 30 days prior to the interview, 47.3% reported having drunk up to twice that month, 44.6% of whom were men and 55.0% were women (Figure 3).

## Discussion

Heavy drinking prevalence in the Brazilian population was 13.7% (95%CI 13.1; 14.2%). It was 3.3 times higher among men than among women. Higher prevalences were also found among young adults, those with black or indigenous skin color, smokers and people who evaluated their health as good or very good. Lower prevalences were observed among individuals with no schooling or incomplete primary school education and among those who reported having morbidities. With regard to place of residence, more significant prevalences were found among residents of urban areas and in the Central-Western and Northeastern regions, while the South had lower prevalences.

The prevalence found by PNS for the Brazilian population was slightly lower than that found by Vigitel in 2013 for the same 27 cities, namely 16.4% (95%CI 15.7; 17.0%). Like our study, Vigitel also revealed a higher heavy drinking prevalence among men (24.2%; 95%CI 23.0; 25.4%) when compared to women (9.7%; 95%CI 9.0; 10.4%).<sup>8</sup> The differences between sexes concerning the pattern and the consequences regarding heavy drinking are widely recognized and reflect the global pattern. The higher burden among men is



largely explained by the fact that, when compared to women, they are less abstemious and consume alcohol more often and in larger quantities.<sup>1</sup>

In 2010, average total *per capita* neat alcohol consumption in the world was 21.2L for men and 8.9L for women. 7.6% of total deaths among men in 2012 were due to alcohol, and 4.0% among women. Men have also shown a greater proportion of the burden of diseases related to alcohol in comparison to women – with 7.4% and 2.3% of the DALY total, respectively.<sup>1</sup>

It is important to point out that, although the alcohol consumption is higher among men, there are evidences that women are more vulnerable to the harm caused by alcohol. Such vulnerability is an important concern for public health policies, given that the use of alcohol is increasing among women and also due to the fact that alcohol consumption during pregnancy may cause fetal alcohol syndrome.<sup>9,10</sup>

The higher frequency of heavy drinking among younger people observed in the study also reflects the global pattern and is similar to the Vigitel results. Worldwide, in 2010, the estimated prevalence of heavy drinking was 11.7% in the population between 15 and 19 years old, in comparison to 7.5% in the total of the population aged 15 or more (WHO, 2014). According to Vigitel 2013, higher prevalences were found in the 18 to 24 age group (19.0%; 95%CI 17.1; 20.8%) and the 25 to 34 age group (22.7%; 95%CI 21.0; 24.3%).<sup>3</sup>

The finding of higher prevalence in the population with higher education was also consistent with the results of Vigitel: heavy drinking prevalence was 19.7% (95%CI 18.4; 21.0%) in the population with 12 years or more of study, in comparison to 12.8% (95%CI 11.7; 14.0) among those with 0 to 8 years of study. The pattern of higher heavy drinking observed in the Northern and Northeastern regions was also consistent with those of Vigitel 2013, which revealed higher prevalences in the cities of Salvador, São Luiz, Aracaju and Cuiabá.<sup>3</sup>

Surveys and studies with secondary mortality data, especially in developed countries, suggest that there are more alcohol consumers, more occasions for consumption and more consumers with low risk consumption patterns in higher socio-economic groups, whereas the abstention is higher in less privileged social groups. However, individuals with lower socio-economic status are more vulnerable to suffering the problems and consequences of heavy drinking.<sup>11</sup>

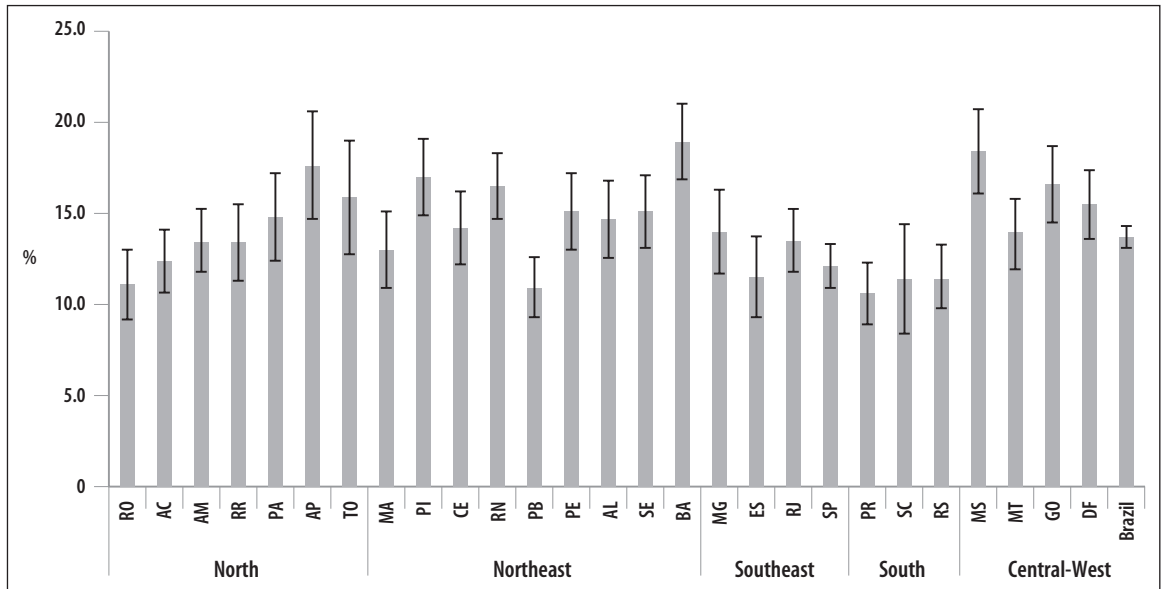
Besides Vigitel, other studies conducted in Brazil have shown similar findings to the present study. Yet, direct comparison is not possible because the information on alcohol consumption varies greatly regarding measures, and methods of data collection.<sup>12</sup>

The first national survey on patterns of alcohol consumption, carried out in 2005-2006, revealed that one fourth of the Brazilian adult population ( $\geq 18$  years) consumed alcohol – very frequently (6%) or frequently (19%) – and 29% of this group usually consumed five units or more (38% among men and 17% among women).<sup>13</sup> In accordance to our study, that survey revealed that consumption of high quantities of alcohol was higher in the Central-Western and Northeastern regions, as well as among residents of urban areas, state capital cities and metropolitan regions.<sup>14</sup>

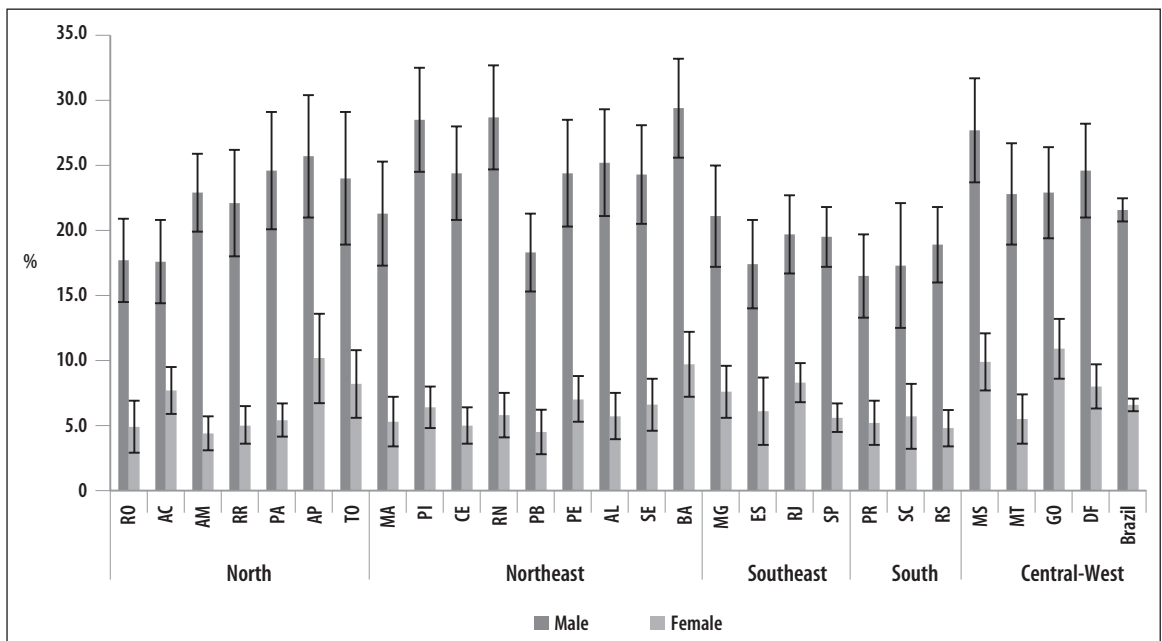
A population-based national survey, on sexual behavior and perceptions on HIV/AIDS, carried out in 2005, also investigated alcohol consumption.<sup>15</sup> 5,040 individuals aged 16 to 65 years old were interviewed. Alcohol use was reported by 86.7% of the interviewees and regular use by 18%. Like our study, higher frequencies of regular use and consumption of alcoholic drinks were observed among individuals with black or indigenous skin color. Possible explanations include individual factors, environmental characteristics, as well as historical and cultural factors.<sup>16</sup> The stress generated by racism was also raised as an explanation for higher alcohol consumption among Black people.<sup>17,18</sup>

The São Paulo State Health Survey (*Inquérito de Saúde no Estado de São Paulo – ISA-SP*), a cross-sectional household survey conducted in 2001-2002 with 1,646 adults aged 20 to 59 years old living in one of four regions of São Paulo State, also showed results in line with our study. That survey defined heavy drinking as 30 and 24 grams or more of ethanol per day for males and females, respectively. Heavy drinking prevalence was high – 52.9% among men and 26.8% among women – and strongly associated with smoking. Furthermore, it was higher in the younger age groups, for both men and women. Among men, heavy drinking occurred more among those with more schooling. Among women, it was associated with having a university degree and the absence of a partner.<sup>19</sup>

A population-based cross-sectional study, conducted in Campinas-SP, in 2003, in which 515 individuals aged 14 years old or more were interviewed, revealed that

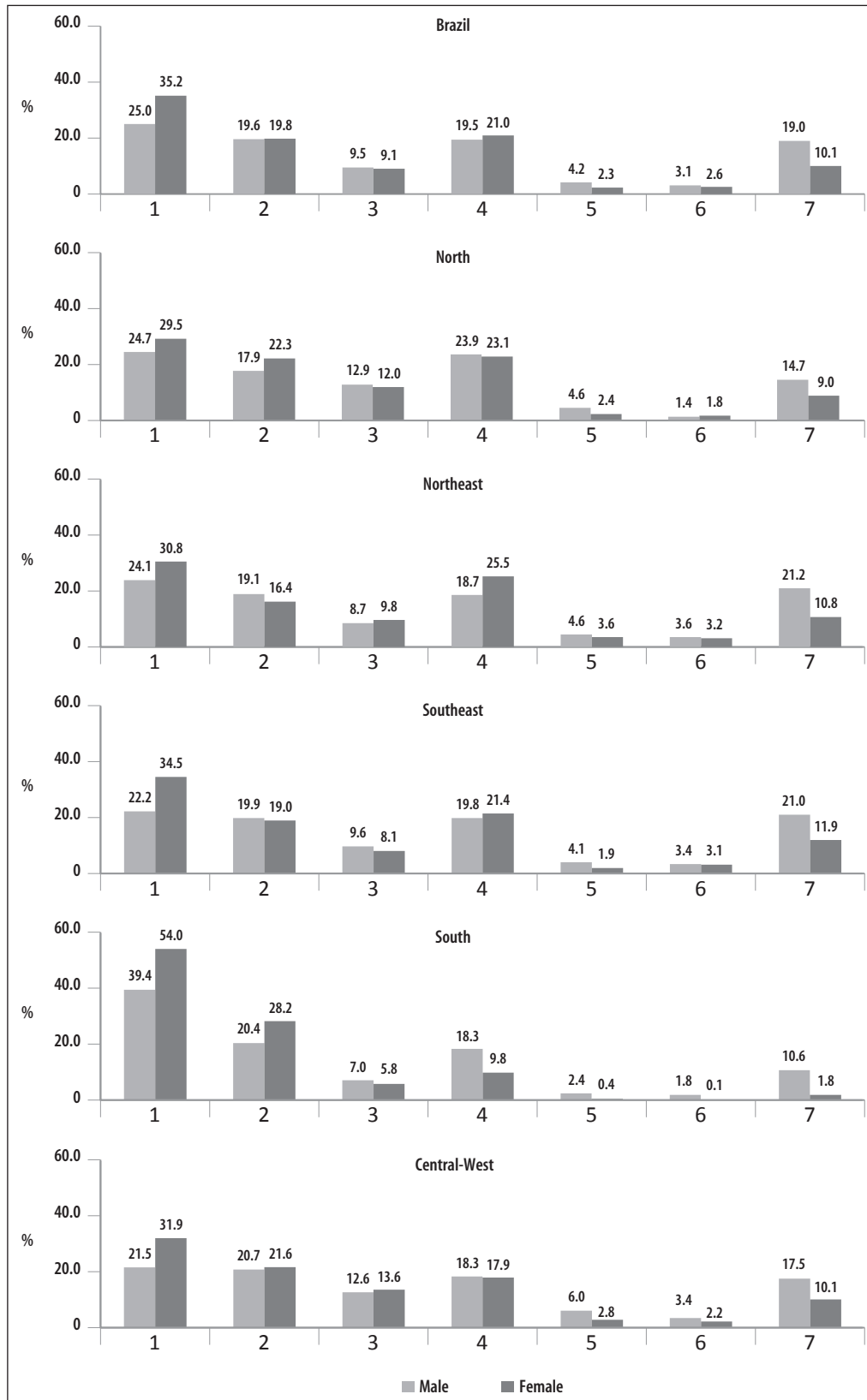


**Figure 1 – Heavy drinking prevalence (%) in the 30 days prior to the interview, among people aged 18 or more, according to State of residence. National Health Survey, Brazil, 2013**



**Figure 2 – Heavy drinking prevalence (%) in the 30 days prior to the interview, among people aged 18 or more, according to sex and State of residence. National Health Survey, Brazil, 2013**





**Figure 3 – Frequency (%) of the number of episodes of heavy drinking among the respondents who reported having consumed alcohol in the 30 days prior to the interview, according to sex and country region. National Health Survey, Brazil, 2013**

12.4% consumed alcoholic drinks twice or more a week, 7.5% drank five or more doses on typical days and 3.7% consumed six or more doses per week or per day. Consumption was higher among men and individuals with higher education.<sup>20</sup>

The present study also found higher heavy drinking prevalence among individuals with better health status. This was expected, since individuals with diagnosed diseases may be more aware about the need for caring for their health, which includes avoiding heavy drinking. They may also have received medical advice not to consume alcohol, or may take medication that interacts with alcohol. Nonetheless, there was no significant difference in heavy drinking among individuals with or without asthma or lung diseases diagnosis. More studies are needed to elucidate the relation between heavy drinking and health status.

Population-based household surveys have been frequently conducted to study alcohol and drug consumption.<sup>15</sup> Once methodological precautions are taken and their limitations are recognized, there is little likelihood of these surveys having biases that invalidate comparisons and contrasts. The main limitation of this study refers to the measurement of heavy drinking. PNS asked about the number of doses, without specifically measuring the quantity of alcohol consumed (in grams) based on its concentration in each type of drink consumed. It is known that there are important variations regarding the amount of alcohol in each drink unit and this reduces the accuracy of the evaluation of the amount of alcohol consumed.<sup>12</sup> Furthermore, the strategy of evaluating consumption only from respondent self-reporting possibly results in information bias, due to individuals omitting that they are heavy drinkers,<sup>12,19</sup> which possibly results in underestimation of prevalences. Nevertheless, self-referred information on alcohol consumption is considered a trustworthy and valid approach.<sup>21</sup>

Alcohol has remained a relatively low priority in public policies, including health policies, despite the elevated social, health and economic burden associated with its harmful consumption.<sup>1</sup> This is true, especially in Brazil, where important smoking control policies have made progress, whilst there has been little evolution in policies related to the reduction of heavy drinking, in spite of recognizing that public policies constitute the most successful strategies to face this problem.

One successful example is the “*Lei Seca*” (Law No. 11,705/2008 – which prohibits alcohol consumption before driving)<sup>22</sup> and which resulted in the reduction of deaths by traffic accidents one year after coming into force, although its enforcement is not uniform throughout the national territory.<sup>23</sup>

The objectives of the Strategic Action Plan to Combat Chronic Non-communicable Diseases (NCDs) in Brazil, 2011-2022, include the “Reduction of prevalence of harmful alcohol consumption, from 18% (2011) to 12% (2022)”.<sup>24</sup> The reduction of alcohol consumption is a public health priority, given that it impacts on the reduction of diseases, such as cancer, cardiovascular diseases, liver diseases and mental disorders (including depression), as well as accidents and violence.

Globally speaking, in 2012 the World Health Assembly approved a reduction goal of 25% in premature mortality owing to NCDs between the years of 2015 and 2025, with specific goals to be reached worldwide relating to the four main NCD risk factors: smoking, harmful use of alcohol, unhealthy diets and physical inactivity. With this in mind, a political change is expected as well as greater awareness on the need to combat harmful alcohol consumption.<sup>1</sup>

Achieving the goal of reducing heavy drinking mainly relies on regulatory measures adopted by governments, as well as confronting the power of alcohol industries and other associated industries.<sup>1,25</sup> In Brazil, however, encouraging alcohol consumption is facilitated by free market prices and is socially accepted. Therefore, industries find increasing support to defend their commercial interests, which are nearly always in conflict with public health interests.<sup>25</sup>

An example is the fact that the beer, despite its alcohol content, is framed by Brazilian taxation legislation in the category of cold drinks, the same as some non-alcoholic drinks – such as isotonic and soft drinks and flavoured water.<sup>26</sup> Going against evidence, the legislation is clearly more favourable to the industry, to the detriment of public health. The Brazilian Beer Industry Association, which represents the country's biggest beer producers, announced that the new model of taxation is benefitting company investments. In 2014 they produced 14,147 billion liters of beer, corresponding to an increase of 5% in relation to 2013. This sector was responsible for 3% of the Brazilian GDP in 2014.<sup>27</sup>

Due to high heavy drinking prevalence among the Brazilian population, as proven in this study, immediate progress with public policies intended to confront it is needed. There is solid evidence that alcohol consumption in among population may be reduced in a cost-effective way through simple interventions, especially actions to make alcohol more expensive and less available.<sup>1,2,3</sup>

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## Authors' Contributions

Garcia LP and Freitas LRS contributed to the conception and design of the manuscript, data analysis, drafting and critical review of its intellectual content .

Both the authors approved the final version of the manuscript and declared being responsible for all aspects of the work, assuring its accuracy and integrity.

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