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Liver health is overlooked by alcohol drinkers in Brazil

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HIGHLIGHTS

- Chronic excessive use of alcohol is an important risk factor for several health and social conditions.
- A cross-sectional survey was conducted to evaluate the frequency of consumption of alcoholic beverages and behaviors concerning liver diseases in Brazil.
- There is a high frequency of alcohol consumption, especially among young people and individuals from lower social classes, with frequent consumption among women.
- Despite the knowledge of its adverse impact on liver health, less than half of the Brazilians have been evaluated at least once for liver diseases.

ABSTRACT – Background – Chronic excessive use of alcohol is an important risk factor for several health and social conditions. **Methods** – A cross-sectional survey, in a sample representative of the Brazilian population,was conducted to evaluate the frequency of consumption of alcoholic beverages and behaviors concerning liver diseases. Participants were prospectively interviewed using a questionnaire regarding alcohol consumption and actions toward liver health. The study accepted at most one sampling error of ±2 percentage points and considered a 95% confidence interval. **Results –** One thousand nine hundred ninety-five subjects (1.048 women, mean age 44 years) from all Brazilian regions were interviewed. Most of the Brazilian subjects believe that alcohol abuse (63–87%) is the leading cause of cirrhosis and liver cancer, however, most responders (56%) had never been screened to assess liver damage related to alcohol consumption. A total of 55% of Brazilians drink alcoholic beverages. Among Brazilians who drink alcoholic beverages, 44% consume three or more drinks at a time, 11% consume more than 10 doses a day. Among those who consume 1 to 2 drinks a day, women (42%) consume more than men (32%) and more than the national average (37%). **Conclusion –** There is a high frequency of alcohol consumption, especially among young people, and individuals from lower social classes, with frequent consumption among women. Despite the knowledge of its adverse impact on liver health, less than half of the Brazilians have been evaluated at least once for liver disease. Education and prevention strategies need to be implemented to reduce theharmful use of alcohol.

Keywords – Harmful use of alcohol; prevention; cirrhosis.

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INTRODUCTION

More than 2 billion people around the world who report alcohol use and misuse are at an increased risk for alcohol-induced health and social damage[1,2]. According to the World Health Organization (WHO), harmful drinking is considered when alcohol use causes damage to physical or mental health, when there are adverse consequences, both for the consumer and for the society[2]. The harmful use of alcohol has been estimated to cause approximately 3.3 million deaths every year, corresponding to nearly 6% of all deaths globally[2]. Most of them were due to unintentional and intentional injuries and digestive diseases, particularly alcoholic hepatitis, cirrhosis and hepatocellular carcinoma (HCC)[1,2].

In Brazil, 30% to 41% of the population were shown todrink alcoholic beverages[3,4], particularly beer and spirits. Among Brazilian drinkers,18,8% to 19,2% of the subjects, in two population-based surveys[3,4] reported heavy episodic drinking (HED), which is associated with an increasedrisk for liver-related events[5]. Nowadays, cirrhosis is the leading cause of death attributed to harmful alcohol drinkingin Brazil[6].

Alcoholic liver disease accounts for 1.4% of total disability-adjusted life years in Brazil[7] and cirrhosis and/or HCC due to alcohol abuse is the second most common etiology of end-stage liver disease leading to liver transplantation[8]. In addition, even moderate consumption of alcohol has been associated with an increased risk for advanced fibrosis and cirrhosis or HCC in patients with other liver diseases such as hepatitis B and C and non-alcoholic fatty liver disease[5,9].

Recent data[10] have shown that most Brazilians believe that alcohol abuse is the leading cause of cirrhosis and liver cancer, but little is known about behaviors toward theprevention and screening of liver disease in current alcohol drinkers who are at increasedrisk for cirrhosis and HCC.

The purpose of this study was to evaluate public knowledge and ways of acting toward theprevention and screening of liver diseases in the Brazilian population according to alcohol drinking patterns.

METHODS

The Brazilian Liver Institute commanded to Data Folha Research Institute a cross-sectional survey about behaviors toward prevention and screening of liver disease in a sample representative of the Brazilian population older than 18 years. As previously described[11-14] the sample design was based on data from the National Household Sample Survey (PNAD) 2019 to be representative of the Brazilian population older than 18 years of age[3], including both genders and all socioeconomic and education levels[15]. The study was conducted between August 2nd to August 7th 2021, accepting at most one sampling error of ±2 percentage points and considering a 95% confidence interval. For 0.5% or lower estimates, zero was assumed. Sample bases lower than 30 cases were not considered for statistical analysis. The sampling method sought to select respondents at random, in order to better represent the Brazilian population, while keeping the characteristics of the defined extracts (region, type of municipality, gender and age).

One standardized structured questionnaire was elaborated. It was comprised ofquestions divided in two blocks including socioeconomic and demographic variables and specific overlapping questions regarding the research subject. Socioeconomic and demographic variables included were age, gender, the geographic region in Brazil where data were collected (North, Northeast, Southeast, Middle West or South); place of living (metropolitan areas of state capitals or small countryside towns); education level (up to elementary school, up to high school and higher education);being part of the economically active population (EAP) (yes or no) and social class according to average household income per month[15] in US dollars (USD): A/B, above 2286 USD; C, between 914 and 2286 USD and D/E, below 914 USD. US Dollar values were based on current rates as of January 2022.

The questions (Q) and possible answers (in parentheses) related to alcohol consumption were:

Q1: how often do you usually consume beverages that contain alcohol (1 time or less a month, 2-4 times a month, 1 time a week, 2-3 times a week, 4 or more times a week, never drink).

Q2: considering that a drink is equal to 40 mL of distilled or 85 mL of vermuth or liqueur or 140 mL of wine or 1 can or half a bottle of beer, when you drink, how many drinks do you normally consume on a typical day (one or two, three or four, five or six, seven to nine, ten or more, no definite amount depending on the occasion or don't know).

Q3: in your opinion, what are the main causes of cirrhosis and liver cancer (alcohol abuse, fatty liver, smoking, heredity, hepatitis B, hepatitis C, other causes).

Q4: have you ever a) been vaccinated with three doses of thehepatitis B vaccine? b) tested for hepatitis B virus ?, c) tested for hepatitis C virus?, d) done any laboratory or imaging test to assess your liver health? The possible answers were yes, no or do not know.

The average length of each interview was 15 minutes. They were randomly carried outface-to-face by non-healthcare workers hired and trained by the Datafolha Research Institute in public places using a tablet. Informed consent was obtained from all participants. Alcohol use was defined as the consumption of any dose of alcohol in the previous month, whereas frequent alcohol use was assumed in the presence of alcohol consumptionat least once per week. In order to help the self-reported estimation of the amount of drinks consumed in a typical day of alcohol use, a chart with the respective quantity of 14 g of pure per each type of beverage was designed to be shown to all subjects before their answers to Q2. In this respect, the use of 5 or more drinks of alcohol in a typical day was assumed as HED. This amount is roughly equivalent to the consumption of 60 g or more of alcohol per occasion irrespective of gender adopted by WHO to define HED.

All subjects were also informed about the topic of the survey as well as its importance to current knowledge and public health policies. All methods were carried out following relevant guidelines and regulations. Informed consent was obtained from all subjects before each interview.The study was approved by the Ethical Committee in Research of the ABC University Faculty of Medicine under the number 56648921.3.0000.0082.

Statistical analysis

In order to ensure that our sample was representative of the Brazilian population over 18, the data were weighted by demographics such as geographic region, gender as perceived by the interviewer, age, socioeconomic class and level of education[16]. Briefly, the sampling weight was performed in order to equalize the distribution of the sample with the distribution of the desired Brazilian population. Univariate analysis was tested using $\chi 2$ test or the Fisher exact probability test when appropriate. *P* values ≤ 0.05 were considered to be significant. For multiple comparisons between groups, *P* values were adjusted according to theBonferroni correction method. Statistical analyses were performed with weighted data using the Statistical Package for Social Sciences (SPSS Inc.,Chicago, IL, USA), version 21.0 for Windows.

RESULTS

One thousand nine hundred ninety-five subjects (1.048 women, mean age 44 years) from 129 cities from all Brazilian regions were interviewed. The demographic features of those participants are depicted in TABLE 1 and represent the Brazilian population over 18 years. As expected, most of the subjects were from the Southeast Region, the largest region in the country. Education level was up to high school in 67% of them. Most of them were part of the labor force, the economically active population (EAP) and from the C or D/E class (TABLE 1). The mean household income was 685 USD.

The majority of the Brazilians in the survey reported alcohol intake and 34% of them declared consumption of more than two drinks of alcohol in atypical day (TABLE 1). Likewise, frequent alcohol use reported by 32% of the subjects, accounting for more than half of the drinkers (TABLE 2). Alcohol abstainers were more frequently women and subjects with 60 or more years of age. They were more often from lower socioeconomic class or apart from the EAP with an educational level up to elementary school. Among those 55% subjects who were alcohol drinkers, 23% reported alcohol use one to four times per month, whereas 32% declared alcohol

consumption weekly (TABLE 2). In general, women and subjects with 60 or more years tended to drink alcohol less often when compared to their male or younger counterparts. Likewise, subjects with higher levels of education and from higher socioeconomic strata (classes A/B and C) tended also to drink more frequently when compared to subjects with lower levels of education and class D/E (TABLE 2).On a typical day, most of the alcohol drinkers referred either consumptionof up to 2 (37%) or three to four drinks (18%) of alcohol per day.Heavy episodic drinking was observedin 26% of them. Consumption of up to two drinks a day was more frequently reported by women, older subjects, people with either lower education level or higher education, people living in the South region, subjects apart from EAP or from socioeconomic class A/B or C. On the other hand, subjects from socioeconomic classes D/E and C and with lower education levels more frequently reported consumption of more than 10 drinks per day. Likewise, subjects who were part of EAP also reported consumption of higher daily doses of alcohol (5 to 9 drinks per day). In addition, HED tended to be more frequent in males and ih those subjects living in the countryside (TABLE 3).

Most of the interviewed subjects believed that alcohol abuse was the leading cause of cirrhosis and liver cancer irrespective of alcohol consumption or the amount of alcohol intake (FIGURE 1), but the assessment of liver health by laboratory or imaging evaluation was less frequently observed in alcohol drinkers when compared to alcohol abstainers (39% vs 44% of abstainers, $P<0.05$). No difference was noted in the frequency of hepatitis B vaccination or hepatitis B and C testing. However, lower frequencies of testing for hepatitis B (46% vs 54% of drinkers up to two doses of alcohol per day, $P<0.005$) and hepatitis C (38% vs 45% of drinkers up to two doses of alcohol per day, $P<0.005$) were observed in alcohol drinkers who consume two or more drinks per day when compared to their counterparts who consume up to two drinks per day. A liver evaluation was also less frequently recorded in those drinkers who consume more alcoholic beverages per day, but the difference was not significant (FIGURE 2).

TABLE 1. Demographic data of all participants (n=1995).

	All participants		
	Unweighted	Weighted (%)	
Gender			
Male	947	945	(47)
Female	1.048	1.050	(53)
Age (years)			
18 to 24	297	275	(14)
25 to 34	412	396	(20)
35 to 44	391	399	(20)
45 to 59	505	499	(25)
60 or more	390	427	(21)
Geographical region			
South	299	302	(15)
Southeast	848	873	(44)
Middle West	163	155	(8)
Northeast	524	510	(26)
North	161	155	(8)
Education level			
Elementary school	625	666	(33)
High school	964	889	(45)
Higher education	406	441	(22)
Socioeconomic class			
A/ B	493	487	(24)
C	965	935	(47)
D/ E	537	574	(29)
Place of living			
Metropolitan area of state capitals	877	832	(42)
Countryside small cities	1.118	1.163	(58)
EAP			
Yes	1.447	1.426	(71)
No	548	570	(29)
Alcohol consumption			
Yes	1.096	1.093	(55)
No	899	903	(45)
Alcohol consumption (drinks per day)			
Up to two	398	403	(20)
More than two	685	677	(34)

EAP: economically active population.

TABLE 2. Frequency of alcohol consumption according to demographics, socioeconomic class and level of education

	n	None	Once per month	2-4 times per month	Once per week	2 to 3 times per week	≥4 times per week
Total	1995	45	17	6	15	12	5
Gender							
Male	947	37	14	7	18*	17	8*
Female	1048	53*	19*	6	13	8	2
Age (years)							
18 to 24	297	33	18	10	19*	16	4
25 to 34	412	34	21	9	17*	15	5
35 to 44	391	41	19	5	16*	15	4
45 to 59	505	48	13	6	16*	10	6
60 or more	390	63*	13	3	9	7	4
Education level							
Elementary school	625	55*	11	5	13	10	6
High school	964	41	17*	7	18*	13	4
Higher education	406	38	23*	8	13	14	4
Place of living							
Metropolitan region of state capitals	877	44	19	6	15	12	4
Countryside	1118	46	15	6	15	13	5
Geographical region							
Southeast	848	43	18	6	13	14	5
South	299	39	16	5	21	14	5
Northeast	524	51	15	6	15	9	4
Middle West	163	48	15	8	14	9	5
North	161	46	16	8	17	10	3
EAP							
Yes	1447	40	17	7	17*	14*	5
No	548	59*	15	5	11	7	4
Socioeconomic class							
A/B	493	34	19	7	16	16*	7*
C	965	45	17	6	16	12	4
D/E	537	55*	14	6	13	8	4
Alcohol consumption							
Yes	1096	-	30	11	28	22	9
No	899	100	-	-	-	-	-
Alcohol consumption (drinks per day)							
1 to 2	398	-	41*	11	28	15	5
>2	685	-	24	12	28	27*	10*

*P value <0.05 vs other groups; EAP: economically active population.

TABLE 3. Alcohol consumption (drinks per typical day) according to demographics, socioeconomic class and level of education.

n	n	≤2	3-4	5-6	7-9	≥ 10	Undefined	Do not know
Total	1083	37	18	10	5	11	18	1
Gender								
Male	591	32	18	11	6	14	17	1
Female	492	42*	18	9	4	7	18	2
Age (years)								
18 to 24	195	34	19	10	6	11	20	1
25 to 34	266	33	19	11	5	12	19	1
35 to 44	225	29	19	12	6	13	20	1
45 to 59	253	41	15	11	5	11	15	2
60 or more	144	52*	18	5	2	5	17	1
Education level								
Elementary school	274	38	16	9	4	16*	17	1
High School	558	33*	20	10*	6	10	20	1
Higher education	251	43	17	12	5	6	16	1
Place of living								
Metropolitan region of state capitals	493	38	19	12*	4	11	15	1
Countryside	590	36	18	9	6*	10	20*	1
Geographical region								
Southeast	479	39	20	11	5	8	15	1
South	173	48*	20	9	2	8	10	3
Northeast	259	27	14	10	5	14	29	1
Middle West	87	31	21	15	5	16	11	1
North	85	31	12	9	10	16	22	-
EAP								
Yes	1447	34	18	11*	6*	11	18	1
No	548	46*	17	7	2	9	17	1
Socioeconomic class								
A/B	318	37*	24*	13	5	6	12	2
C	529	40*	17	9	4	10*	20*	1
D/E	236	31	13	10	6	18*	21*	1

*P value <0.05 vs other groups; EAP: economically active population.

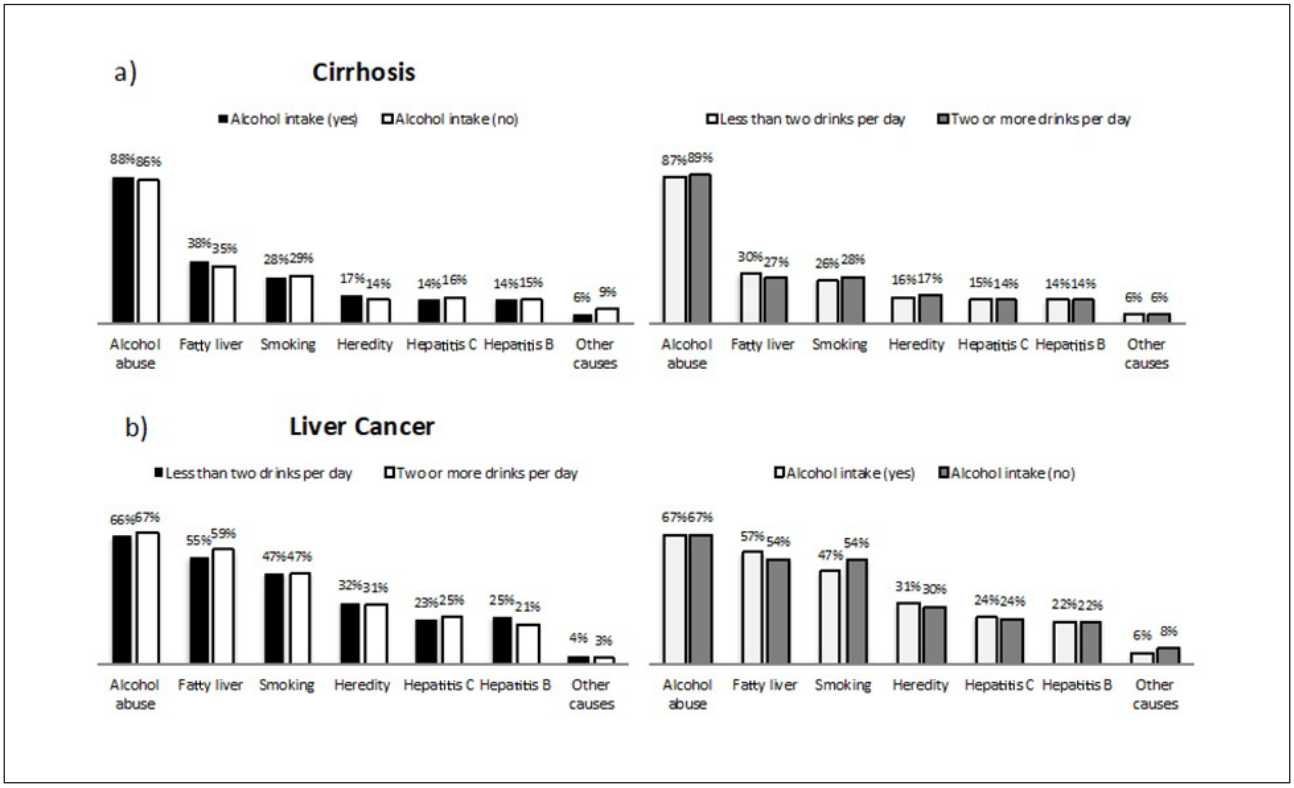

FIGURE 1. Beliefs of the general population regarding causes of a) cirrhosis and b) liver cancer according to alcohol intake and number of alcoholic drinks per day.

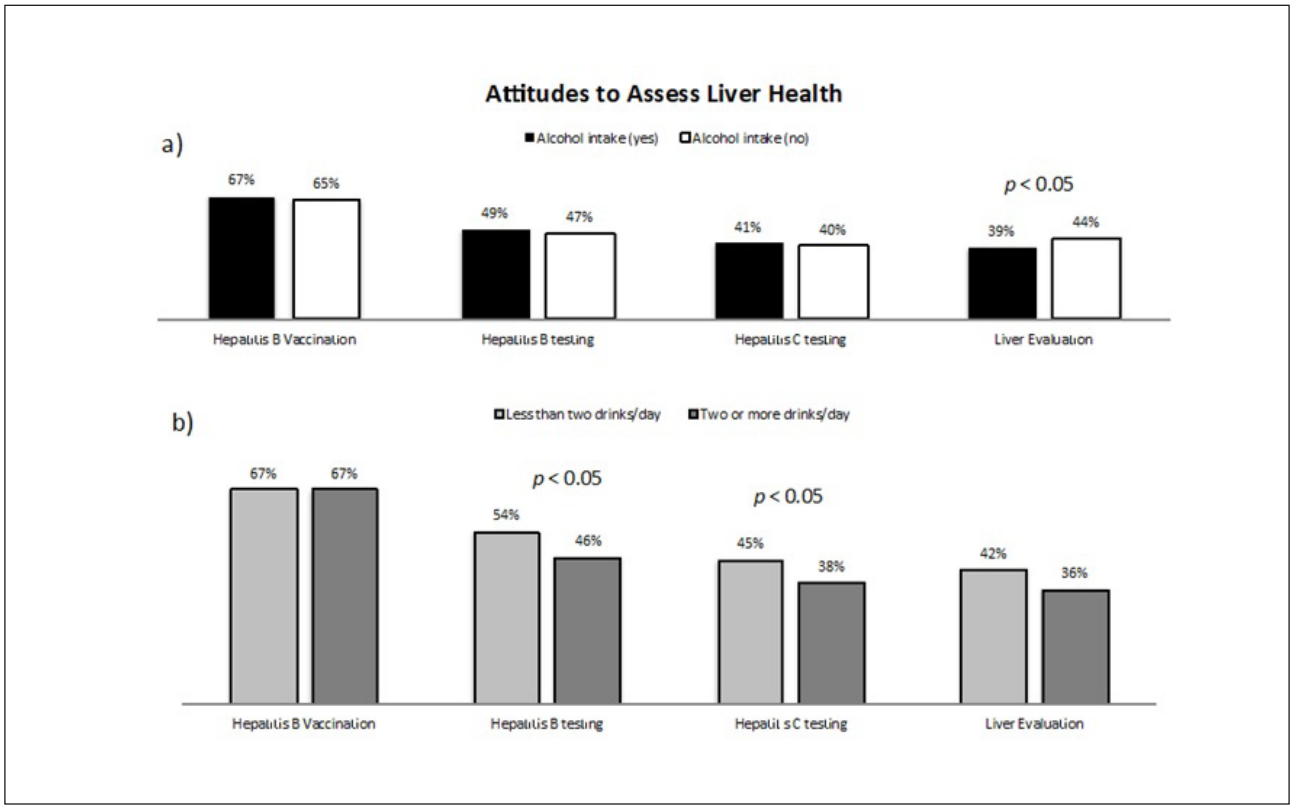

FIGURE 2. Attitudes of the general population regarding assessment of liver health according to a) alcohol intake and b) number of alcoholic drinks /day.

DISCUSSION

The present study revealed that more than half of the Brazilians were current drinkers. Frequent drinking and HED were reported, respectively, by one third and one fourth of alcohol users. In general, women and older people, as well as individuals with lower income and/or education level were more frequently abstainers. On the other hand, light to moderate alcohol consumption, defined as the consumption of up to two drinks per day,was observed in approximately half of the current drinkers. As previously reported[3,4], this consumption pattern was more frequently observed in women and older subjects and also in people with either lower education level and/or income probably due to lower alcohol affordability. However, it is worth to mention that, in the present study, people apart from the EAP or from underprivileged socioeconomic classes reported the higher amounts of alcohol drinking on a typical day.

Using our methodology, it was not possible to assess adequately the frequency of risky drinkers in the present cohort based in the amount and frequency of alcohol intake per week according to gender, but the estimated frequency of alcohol use and HED was higher when compared to other population based surveys previously reported in Brazil, the Surveillance System of Risk and Protection Factors for Chronic Diseases by Telephone Survey (Vigitel) and the National Household Sample Survey (PNAD) sponsored by the Brazilian Institute for Geography and Statistics (IBGE). Vigitel and PNAD surveys defined alcohol abuse as HED using different criteria. As recommended by the National Institute of Alcohol Abuse and Alcoholism (NIAAA), Vigitel has defined HED as theconsumption of five or more drinks for men (equivalent to 60 g of pure alcohol) or four or more drinks for women (equivalent to 48 g of pure alcohol) in about 2 hours, whereas PNAD used the same criteria used in the present study for the definition of HED. Using those aforentioned criteria, alcohol use and abuse were reported by 41.1% and 18.8% and 30% and 19.2% of the subjects, respectively by Vigitel and PNAD investigators in 2019[3,4]. Higher frequencies of alcohol use and HED were encountered in the present study, which may reflect the different methodology presently employed or alternatively the increase in alcohol consumption observed both in Brazil and in other countries severely hit by the COVID-19 pandemic in in the last 2 to 3 years[17,18].

As previously reported[10], most of the subjects in the present cohortwere aware that alcohol could lead to cirrhosis and liver cancer. Still, only half of those subjects who reported alcohol intake have evaluated at least once their liver health, including hepatitis B and C testing or laboratory or imaging evaluation of liver health. It is important to highlight that hepatitis B vaccination and hepatitis B and C testing is offered free of charge to the Brazilian population at risk according to the Braziliangovernment plan for theelimination of viral hepatitis and several mass media campaigns have been launched to encourage the general population to perform hepatitis C testing for disease elimination. Our data showed that viral hepatitis testing was lower than expected in those subjects with moderate to severe use of alcohol.On the contrary, hepatitis B vaccination was not affected by alcohol consumption, maybe due to the fact that it is usually performed at birth in Brazil. Interestingly, despite the fact that most Brazilians attributedthe occurrence of cirrhosis and HCC to harmful alcohol drinking, they were much less concerned about their liver health when compared to their counterparts who do not drink or use alcohol in lower amounts. This is not different from the behavior observed in subjects at risk of other diseases such as type 2 diabetes and arterial hypertension, emphasizing the unmet need of providing awareness properly for alcohol users[19,20]. In this regard, otherreports also have shown that harmful alcohol consumption can significantly compromise adherence to antiretroviral therapy among people living with HIV[21].

It is worth mentioning that other authors, like us, have also demonstrated vulnerability related to alcohol in specific populations such as women and young people, which is still little known among the general population, highlighting the need for preventive and educational measures, such as targeted campaigns[22,23].

The most important limitation of our study is the self-reported nature of our data. The quantification of alcohol consumption is not easy. It is well-known that self-reported alcohol use tends to be underestimated and the authors can not rule out the occurrence of response bias in the present study. Our

questionnaire was applied anonymously by non-healthcare workers and this certainly contributed to minimize a social desirability bias. Privacy and confidentiality were guaranteed for participants.

Instead of promoting just large scale abstinence, it would be much more feasible to encourage those subjects with harmful use of alcohol at risk for liver disease to seek healthcare assistance to be screened for alcohol-related liver disease as well as other liver related or unrelated disorders which can be aggravated by alcohol drinking. Screening for alcohol use disorders and community-based counseling services should be provided to ensure adequate harm reduction opportunities, including early diagnosis of alcohol-related diseases, treatment adherence and improving of quality of life.

CONCLUSION

In summary, this study is one of the few population-based surveys regarding alcohol consumption in Brazil. There is a high frequency of alcohol consumption, especially among young people, and individuals from lower social classes, with frequent consumption among women. Our results indicate that most Brazilians attribute the occurrence of cirrhosis and liver cancer to alcohol abuse, but despite the knowledge of its adverse impact on liver health, less than half of the Brazilians have been evaluated at least once for liver disease. Abusive alcohol drinkers are precisely the ones who usually neglect to assess their liver health. Education and prevention strategies need to be implemented to reduce the harmful use of alcohol.

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Authors' contribution

Codes L: study design planning, text writing and review. Bittencourt PL: study design planning, text writing and review. Mussi FC and Ferraz MLG: text writing, review and suggestions. Thibes M:data collection and analyses. Andrade AG: text writing and review. All the authors made substantial contributions to the conception and design of the study.

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RESUMO – Contexto – O uso crônico e excessivo de álcool é um importante fator de risco para diversos problemas sociais e de saúde. **Métodos** – Foi realizado um estudo transversal, numa amostra representativa da população brasileira, para avaliar a frequência do consumo de bebidas alcoólicas e comportamentos relativos às doenças hepáticas. Participantes foram entrevistados, prospectivamente, com um questionário sobre consumo de álcool e ações voltadas à saúde do fígado. O estudo aceitou erro amostral máximo de ±2 pontos percentuais e considerou intervalo de confiança de 95%. **Resultado**s – Foram entrevistados 1995 indivíduos (1.048 mulheres, média de idade de 44 anos) de todas as regiões brasileiras. A maioria dos brasileiros (63–87%) acredita que o abuso de álcool é a principal causa de cirrose e câncer de fígado, no entanto, a maioria dos participantes (56%) nunca havia sido examinado para avaliar danos hepáticos relacionados ao consumo excessivo de álcool. Um total de 55% dos brasileiros consomem bebidas alcoólicas. Entre os brasileiros que consomem bebidas alcoólicas, 44% consomem três ou mais doses por vez, 11% consomem mais de 10 doses por dia. Entre aqueles que consomem 1 a 2 doses por dia, as mulheres (42%) consomem mais que os homens (32%) e mais que a média nacional (37%). **Conclusão –** Há elevada frequência de consumo de álcool, principalmente entre jovens e indivíduos de classes sociais mais baixas, com consumo frequente entre mulheres. Apesar do conhecimento sobre o impacto adverso na saúde do fígado, menos da metade dos brasileiros foram avaliados, em pelo menos uma ocasião, para doença hepática. Estratégias de educação e prevenção precisam ser implementadas para reduzir o uso nocivo do álcool.

Palavras-chave – Uso nocivo de álcool; prevenção; cirrose.

REFERENCES

1. European Association for the Study of the Liver -EASL Clinical Practice Guidelines: Management of alcohol-related liver disease. J Hepatol. 2018;69:154-81.
2. World Health Organization. Global Status Report on Alcohol and Health. Geneva, Switzerland: World Health Organization; 2018 [Internet]. Available from: https://www.who.int/publications/i/item/9789241565639
3. IBGE. Pesquisa Nacional de Saúde - PNS 2019. Rio de Janeiro: IBGE. 2020 [Internet]. Available from: https://www.ibge.gov.br/estatisticas/sociais/saude/9160-pesquisa-nacional-de-saude
4. Brasil (2019). Ministério da Saúde. Secretaria de VigilânciaemSaúde. Vigitel Brasil 2018: vigilância de fatores de risco e proteçãoparadoenças-crônicasporinquéritotelefônico. Brasília: Ministério da Saúde. 2019.
5. Åberg F, Helenius-Hietala J, Puukka P, Jula A. Binge drinking and the risk of liverevents: a population basedcohort study. Liver Int. 2017;37: 1373-81.
6. CISA - Álcool e a Saúde do Brasileiros - Panorama 2022 [Internet].Available from:https://cisa.org.br/biblioteca/downloads/artigo/item/356-panorama2022
7. de Carvalho JR, Villela-Nogueira CA, Perez RM, Portugal FB, Flor LS, Campos MR, et al.Burden of chronic viral hepatitis and liver cirrhosis in Brazil-the Brazilian Global Burden of Disease Study. Ann Hepatol. 2017;16:893-900.doi: 10.5604/01.3001.0010.5280.
8. Bittencourt PL, Farias AQ, Couto CA. Liver transplantation in Brazil. Liver Transpl. 2016;22:1254-8.
9. Lucey MR. Alcohol-associated cirrhosis. Clin Liver Dis. 2019;23:115-26.
10. Bittencourt PL, Codes L, Ferraz MLG. Public knowledge and attitudes toward liver diseases and liver cancer in the Brazilian population. Lancet Reg Health Am. 2023;23:100531. doi: 10.1016/j.lana.2023.100531.
11. Bittencourt LR, Santos-Silva R, Taddei JA, Andersen ML, Mello MT, Tufik S. Sleep complaints in the adult Brazilian population: A national survey based on screening questions. J Clin Sleep Med. 2009;5:459-63.
12. Hirotsu C, Bittencourt L, Garbuio S, Andersen ML, &Tufik S. Sleep complaints in the Brazilian population: Impact of socioeconomic factors. Sleep Science. 2014;73:135142.
13. Spizzirri G, Eufrásio R, Lima MCP, Nunes HRC, Kreukeus BPC, Steensma TD et al. Proportion of people identified as transgender and non-binary gender in Brazil. Sci Rep. 2021;11:2240. doi: 10.1038/s41598-021-81411-4.
14. Bittencourt PL, Codes L, Hyppolito EB, Cesar HF, Moura-Neto JA, Ferraz MLG. Attitudes of the Brazilian population toward organ donation in Brazil. Kidney Int Rep. 2022;7:2737-40. doi:10.1016/j.ekir.2022.09.009.
15. Associação Brasileira de Empresas de Pesquisa. Critério de Classificação Econômica Brasil. 2018. [Internet]. Available from: https://www.abep.org/criterio-brasil.
16. Kish L. Survey Sampling. John Wiley, Sons Inc, New York 1965.
17. Valente JY,Sohi I,Garcia-Cerde R,Monteiro MG, Sanchez Z M. What is associated with the increased frequency of heavy episodic drinking during the COVID-19 pandemic? Data from the PAHO regional web-based survey. Drug Alcohol Depend. 2021;221:108621.doi: 10.1016/j.drugalcdep.2021.108621.
18. Souza TC, Oliveira LA, Daniel MM, Ferreira LG, Della Lucia CM, Liboredo JC, et al. Lifestyle and eating habits before and during COVID-19 quarantine in Brazil. Public Health Nutrition. 2022;25:65-75.
19. Lu W, Pikhart H, Tamosiunas A,Kubinova R,Capkova N,Malyutina S,et al. Prevalence, awareness, treatment and control of hypertension, diabetes and hypercholesterolemia, and associated risk factors in the Czech Republic, Russia, Poland and Lithuania: a cross-sectional study. BMC Public Health. 2022;22883. doi: 10.1186/s12889-022-13260-3.
20. Gulayin PE, Irazola V, Gutierrez L, Elorriaga N, Lanas F, Mores N, et al. Association between drinking patterns and cardiovascular risk: a population-based study in the Southern Cone of Latin America. J Public Health (Oxf).2020;42:107-17
21. Hendershot CS, Stoner SA, Pantalone DW, Simoni JM. Alcohol use and antiretroviral adherence: review and metaanalysis. J Acquir Immune Defic Syndr. 2009;52:180-202. doi: 10.1097/QAI.0b013e3181b18b6e.
22. Cabé N, Cabé J. Women's vulnerability to alcohol and its impact on health. Rev Infirm. 2023;72:19-21.. doi: 10.1016/j.revinf.2023.10.006.
23. Vander Haegen M, Etienne AM, Quertemont É. Alcohol consumption during the COVID-19 pandemic among French-speaking Belgian students: uncertainty and psychological distress. Rev Med Liege. 2024;79:73-9.