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Alcohol use in self-isolation during the COVID-19 pandemic: A cross-sectional survey in Brazil

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ABSTRACT

Objectives: To assess alcohol use and perceived change in alcohol consumption (before and during the pandemic) in Brazilians during the COVID-19 pandemic, its correlates, and association with depressive, anxiety and co-occurring depressive and anxiety symptoms (D&A).

Methods: This is a cross-sectional study comprising 992 individuals in self-isolation.

A self-reported questionnaire was used to assess whether participants were drinking during self-isolation and whether they changed their drinking behavior (drinking less, more, or no change) from before to during the pandemic. D&A symptoms were assessed using the Beck Depression and Anxiety Inventories (BDI and BAI).

Results: A total of 68.5% of participants reported alcohol consumption during the pandemic, and 22.7% of these reported increased alcohol use. Smoking was positively associated with alcohol consumption during the pandemic. Alcohol consumption was associated with anxiety (OR=1.40, 95% CI 1.06 – 1.85, $p<0.01$) and D&A (OR=1.38, 95% CI 1.02 – 1.87, $p=0.033$) symptoms.

Conclusions: Drinking during self-isolation was prevalent and associated with risk factors for alcohol use disorders. The long-term effects of high drinking rates and increased consumption should be proactively monitored and assessed.

Key words: alcohol; COVID-19; depression; anxiety

Introduction

The COVID-19 pandemic has caused an unprecedented global health crisis with consequences stemming not only from the morbidity and mortality of the virus, but also from preventive strategies.¹ Social distancing measures have been implemented worldwide to reduce infection transmission, generating considerable disruption in people's

routine and psychological well-being.² In this scenario, changes in alcohol consumption are expected and may have consequences for the pandemic management and the population's mental health.³

Studies from previous global crises showed no changes in alcohol use in the overall population.^{4,5} Notwithstanding, this appearance of stability occurred at the expense of decreased use among some populations while more vulnerable subgroups increased their use of alcohol.⁴ Therefore, changes in the demographic profile of problem drinkers were observed. Additionally, countries can be affected differently. After the 2008 Great recession, problem drinking increased significantly more among less educated men in the US, whereas in Spain highly educated women were more affected.^{4,6} Overall, anxiety and depressive symptoms mediated drinking behavior.⁴

So far, studies conducted during the COVID-19 pandemic have shown both increase and decrease in alcohol use, which can vary according to environmental, societal, and individual factors, including psychological distress.^{4,7-9} Environmental and societal factors, such as lack of social events and peer pressure for drinking have been associated with decreased use,^{10,11} whereas increased use has been associated with some individual factors, such as stress and loneliness.⁷⁻¹³ Additionally, higher age, higher income and unemployment have also been associated with increased drinking.^{9,13}

A study conducted by The Pan-American Health Organization (PAHO) identified a reduction in heavy drinking, except among individuals with anxiety symptoms, in which this behavior increased.¹⁴ However, their results comprised all countries from Latin America and the Caribbean and, except for an early descriptive data,¹² little is known about the Brazilian population's drinking behavior during self-isolation. Therefore, our aims were to: 1) assess alcohol use and changes during self-isolation in Brazil; 2) assess the demographic correlates of alcohol use and changes; and 3) assess the associations of

alcohol use and changes with depressive, anxiety and co-occurring depressive and anxiety symptoms. We hypothesize that drinking behavior would be associated with socioeconomic status, sex, age, clinical or psychiatric morbidity and psychiatric symptoms.

Methods

Recruiting and inclusion criteria

This study data are derived from an online survey, and the methods are described elsewhere.¹⁵ Individuals (≥ 18 years) living in Brazil and in self-isolation (staying at home and leaving home for essential activities only, such as buying food or medicine or visiting a physician) due to the COVID-19 pandemic, who agreed to participate in the survey were eligible. In Brazil, social distancing measures started in March 2020 and were heterogeneous across states and cities, with self-isolation being a voluntary act. Data was collected between 05th of April and 11th of May 2020.

Alcohol consumption use and increase during the pandemic (outcome)

Alcohol consumption was assessed with two questions: “do you drink alcoholic beverages?” and, “now that you are in self-isolation, do you consider that: you are drinking more, drinking less or drinking the same amount”.

Demographic correlates

Demographic data were collected, as well as days in self-isolation, current smoking and self-reported previous diagnosis of chronic physical diseases and psychiatric disorders.

Mental health assessment

Depressive symptoms were assessed with Beck Depression Inventory (BDI),¹⁶ anxiety symptoms were assessed with Beck Anxiety Inventory (BAI).¹⁷ The cutoffs used were: $BDI > 9$ = prevalent depressive symptoms,¹⁶ $BAI > 7$ = prevalent anxiety symptoms,¹⁷ and $BDI > 9 + BAI > 7$ = prevalent co-occurring depressive and anxiety (D&A) symptoms.

Statistical Analysis

Descriptive data were shown using mean (standard deviation), or median and interquartile range (IQR) for continuous variables. Categorical variables were shown as absolute frequencies (%). Logistic regression models were used to evaluate the correlates of alcohol consumption, increase in alcohol consumption (before and during the self-isolation period), and the associations between alcohol consumption (yes x no) or increase in alcohol use (using “drinking the same amount” plus “drinking less” as reference group) and symptoms of depression, anxiety, or D&A. The models tested were adjusted for age, sex, ethnicity, marital status, employment, family income and household inhabitants. Results from the logistic regression models were presented as odds ratios (ORs). Statistical significance was set at $p < 0.05$. The statistical analysis was performed with SPSS version 22.0 (IBM Corporation).

Ethical considerations

The study was approved by the Federal University of Santa Maria Research Ethics Committee and by the National Commission of Ethics in Research [CONEP] (30.244.620.1.0000.5346).

Results

Demographic data and other descriptive analyses were detailed in table 1.

Table 1. Sample characteristics: overall and stratified by alcohol consumption

	Category	Overall N=992* (%)	Alcohol consumption		Change in alcohol consumption**		
			Yes N=683 (68.9%)	No N=309 (31.1%)	Less N= 222 (32.5%)	More N=155 (22.7%)	No change N=305 (44.7%)
Sex	Women	713 (72.2)	478 (67)	235 (33.0)	140 (29.3)	114 (23.8)	224 (49.6)
	Men	274 (27.8)	201 (73.4)	73 (26.6)	80 (40)	40 (20)	80 (40)
Age	18-24 years	140 (14.1)	103 (73.6)	37 (26.4)	51 (49.5)	15 (14.6)	37 (35.9)
	25-34 years	381 (38.4)	267 (70.1)	114 (29.9)	89 (33.3)	66 (24.7)	112 (41.9)
	35-44 years	248 (25.0)	177 (71.4)	71 (28.6)	51 (28.8)	49 (27.7)	77 (43.5)
	45-54 years	121 (12.2)	79 (65.3)	42 (34.7)	20 (25.3)	18 (22.8)	41 (51.9)
	≥ 55-64 years	102 (10.3)	57 (55.9)	45 (44.1)	11 (19.6)	7 (12.5)	38 (67.9)
Ethnicity	White	756 (76.4)	533 (70.5)	223 (29.5)	161 (30.3)	123 (23.1)	248 (46.6)
	Non-White	233 (23.6)	147 (63.1)	86 (36.9)	60 (40.8)	32 (21.8)	55 (37.4)
Marital Status	Married	420 (42.8)	284 (67.6)	136 (32.4)	70 (24.7)	68 (24.0)	145 (51.2)
	No partner	562 (57.2)	393 (69.9)	169 (30.1)	149 (37.9)	87 (22.1)	157 (39.9)
Employment	Regular	551 (55.6)	368 (66.8)	183 (33.2)	106 (28.9)	90 (24.5)	171 (46.6)
	Unemployed	45 (4.5)	27 (60.0)	18 (40.0)	11 (40.7)	4 (14.8)	12 (44.4)
	Non-regular	395 (39.9)	287 (72.7)	108 (27.3)	104 (36.2)	61 (21.3)	122 (42.5)
Monthly household income***	<U\$231	34 (3.4)	22 (64.7)	12 (35.3)	9 (40.9)	7 (31.8)	6 (27.3)
	U\$232-U\$1,595	518 (52.3)	343 (66.2)	175 (33.8)	135 (39.4)	65 (19.0)	143 (41.7)
	U\$1,596-U\$2,079	150 (15.1)	109 (72.7)	41 (27.3)	30 (27.5)	28 (25.7)	51 (46.8)
	>U\$2,080	289 (29.2)	208 (72.0)	81 (28.0)	47 (22.7)	55 (26.6)	105 (50.7)
Household inhabitants	1	143 (14.4)	101 (71.1)	41 (28.9)	32 (301.7)	26 (25.7)	43 (42.6)
	2	335 (33.7)	236 (70.9)	97 (29.1)	66 (28)	61 (25.8)	109 (46.2)
	3	267 (26.8)	179 (67.3)	87 (32.7)	62 (34.6)	35 (19.6)	82 (45.8)
	4	185 (18.6)	127 (68.6)	58 (31.4)	45 (35.7)	26 (20.6)	55 (43.7)
	5 or more	65 (6.5)	39 (60.0)	26 (40.0)	16 (41)	7 (17.9)	16 (41)
Current smoking	No	941 (94.9)	643 (68.3)	298 (31.7)	212 (33)	141 (22)	289 (45)
	Yes	51 (5.1)	40 (78.4)	11 (21.6)	10 (25)	14 (35)	16 (40)
Day in self-isolation	Median (IQR)	28.00 (8.0)	28.00 (8.0)	28.00 (9.0)	28.00 (7.75)	25.00 (10.0)	28.00 (6.0)
Self-reported previous diagnoses of physical conditions	No	61 (6.1)	44 (72.1)	17 (27.9)	17 (38.6)	13 (29.5)	14 (31.8)
	Yes	931 (93.9)	639 (68.6)	292 (31.4)	205 (32.1)	142 (22.3)	291 (45.6)
Self-reported previous diagnoses of psychiatric conditions	No	595 (60.0)	420 (70.6)	175 (29.4)	144 (27.7)	93 (17.9)	282 (54.3)
	Yes	397 (40.0)	263 (66.2)	134 (33.8)	99 (37.6)	62 (23.6)	102 (38.8)
BAI	Median (IQR)	6.00 (11.0)	7.00 (11.0)	5.00 (10.0)	7.00 (11.0)	7.00 (10.0)	6.00 (9.0)
BDI	Median (IQR)	9.00 (10.0)	9.00 (9.0)	8.00 (10.0)	10.00 (9.0)	9.00 (9.0)	8.00 (9.0)

Abbreviations: BAI=Beck Anxiety Inventory; BDI=Beck Depression Inventory; IQR=Interquartile range.

* Total sample with available data. Number of cases can be different for each variable due to missing cases (minimum=927)

** Includes only those who reported alcohol consumption

*** Approximate values based on the 9th of January 2021 exchange rate

Prevalence of alcohol consumption during the pandemics and its correlates

A total of 683 (68.9%) of participants reported alcohol consumption whilst self-isolating (during self-isolation). Smoking was significantly associated with higher alcohol consumption (OR=2.1, 95%CI 1.05 – 4.41, $p=0.03$). Being ≥ 55 versus 18-24 years old (OR=0.34, 95% CI 0.18 – 0.66, $p<0.01$) and having a monthly household income ranging from U\$232-U\$1,595 (OR=0.53, 95% CI 0.39 – 0.83, $p<0.01$) were negatively associated with alcohol consumption during self-isolation (see table 2).

Table 2. Correlates of alcohol consumption during self-isolation

	B	SE	Sig.	OR	95% C.I. for OR	
					Lower	Upper
Men x women	.300	.166	.071	1.350	.975	1.868
Ethnicity						
Non-white vs white	-.267	.166	.109	.766	.552	1.061
Marital Status						
No partner vs Married	.070	.176	.693	1.072	.759	1.514
Monthly household income						
<U\$231 x >U\$2,080	-.808	.448	.071	.446	.185	1.072
U\$232-U\$1,595 x >U\$2,080	-.562	.191	.003	.570	.392	.829
U\$1,596-U\$2,079 x >U\$2,080	-.197	.237	.406	.822	.517	1.306
Household inhabitants						
1 x 5 or more	.649	.345	.060	1.913	.974	3.759
2 x 5 or more	.473	.299	.113	1.605	.894	2.884
3 x 5 or more	.244	.298	.414	1.276	.711	2.290
4 x 5 or more	.271	.312	.386	1.311	.711	2.419
Smoking x non-smoking	.771	.365	.034	2.163	1.058	4.419
Lifetime psychiatric disorder Yes x no	.178	.148	.228	1.195	.895	1.596
Lifetime physical disorder Yes x no	.000	.314	.999	1.000	.540	1.850
Age						
25-34 x 18-24 years	-.173	.246	.482	.841	.519	1.362
35-44 x 18-24 years	-.178	.290	.540	.837	.474	1.477
45-54 x 18-24 years	-.453	.322	.160	.636	.338	1.196

> 55 x 18-24 years	-1.063	.334	.001	.345	.180	.664
Employment						
Non-regular/unknown x regular	.334	.176	.057	1.397	.990	1.972
Unemployed x regular	-.107	.346	.757	.898	.456	1.771

Key: Significant *p*-values are represented in bold; SE= standard error; CI=confidence interval; regular payment includes

employed, retired and military; non-regular/unknown payment includes students, self-employed and housewives

Odds of those who referred alcohol consumption versus those that referred no alcohol consumption (reference)

Changes on alcohol consumption in self-isolation (before and during) and correlates

A total of 155 (22.7%) participants reported an increase in alcohol consumption, whereas 265 (32.5%) reported a reduction. Smoking was associated with an increase in alcohol consumption (OR=2.4, 95%CI 1.23 – 4.76, *p*=0.01) (see table 3). A household income ranging from U\$232-U\$1,595 was associated with a lower risk of an increase (OR=0.54, 95% CI 0.34 – 0.86, *p*<0.01) in alcohol consumption.

Table 3. Correlates of more alcohol consumption on self-isolation (pre to during)

	B	SE	Sig.	OR	95% C.I. for OR	
					Lower	Upper
Men x women	-.279	.211	.187	.757	.500	1.145
Ethnicity						
Non-white vs white	-.033	.226	.883	.967	.621	1.507
Marital Status						
No partner vs Married	.026	.226	.909	1.026	.659	1.597
Monthly household income						
<U\$231 x >U\$2,080	.336	.512	.511	1.399	.513	3.815
U\$232-U\$1,595 x >U\$2,080	-.617	.236	.009	.539	.340	.856
U\$1,596-U\$2,079 x >U\$2,080	-.239	.275	.385	.787	.459	1.350
Household inhabitants						
1 x 5 or more	.674	.490	.169	1.963	.752	5.125
2 x 5 or more	.657	.442	.138	1.928	.810	4.590
3 x 5 or more	.148	.455	.745	1.160	.475	2.831
4 x 5 or more	.341	.468	.466	1.407	.562	3.521
Smoking x non-smoking	.881	.346	.011	2.414	1.226	4.757

Lifetime psychiatric disorder						
Yes x no	-.032	.189	.867	.969	.669	1.403
Lifetime physical condition						
Yes x no	.321	.352	.362	1.379	.691	2.750
Age						
25-34 x 18-24 years	.522	.336	.120	1.685	.873	3.255
35-44 x 18-24 years	.591	.380	.119	1.806	.858	3.800
45-54 x 18-24 years	.507	.428	.236	1.660	.718	3.838
> 55 x 18-24 years	-.495	.518	.339	.609	.221	1.684
Employment						
Non-regular/unknown x regular	.084	.218	.701	1.087	.709	1.666
Unemployed x regular	-.676	.537	.208	.509	.178	1.456

Key: Significant *p*-values are represented in bold; SE= standard error; CI=confidence interval; regular payment includes employed, retired and military; non-regular/unknown payment includes students, self-employed and housewives

Odds of those who referred consuming more alcohol consumption versus those that referred less or no change in alcohol consumption (reference).

Associations of alcohol consumption and changes of alcohol consumption with depressive, anxiety and co-occurring depressive and anxiety symptoms

Alcohol consumption during the self-isolation was associated with anxiety (OR=1.40, 95% CI 1.06 – 1.85, $p<0.01$) and D&A symptoms (OR=1.38, 95% CI 1.02 – 1.87, $p=0.033$) even after adjusting for confounding factors (OR=1.52, 95% CI 1.13-2.05, $p=0.006$ and OR=1.48, 95% CI 1.07-2.04, $p=0.018$, respectively) in logistic regression models. We found no association between psychiatric symptoms and drinking more (see table 4).

Table 4. Cross-sectional logistic associations of prevalent mental health symptoms with alcohol use during COVID-19 pandemic in 2020 in Brazil

	Crude				Adj. 1				Adj. 2			
	OR	95% CI		p	OR	95% CI		p	OR	95% CI		p
Alcohol use*												
Depression	1.16	0.88	1.53	0.280	1.14	0.85	1.52	0.149	1.25	0.92	1.68	0.149
Anxiety	1.40	1.06	1.85	0.016	1.40	1.05	1.87	0.020	1.52	1.13	2.05	0.006
Depression and anxiety	1.38	1.02	1.87	0.033	1.35	0.99	1.84	0.057	1.48	1.07	2.04	0.018
More alcohol use**												
Depression	1.18	0.84	1.68	0.341	1.19	0.83	1.71	0.351	1.32	0.90	1.93	0.149
Anxiety	1.11	0.78	1.56	0.572	1.10	0.77	1.58	0.596	1.23	0.85	1.79	0.276
Depression and anxiety	1.18	0.82	1.69	0.373	1.19	0.82	1.73	0.143	1.34	0.90	1.99	0.143

Abbreviations: CI=confidence interval; OR=odds ratio.

*Odds of those who referred alcohol consumption versus those that referred no alcohol consumption (reference; N=976) having prevalent depressive symptoms (BDI>9), anxiety symptoms (BAI>7), or co-occurring depression and anxiety symptoms (BDI>9 & BAI>7).

** Odds of those who referred more alcohol consumption versus those that referred less or no change in alcohol consumption (reference; N=860) having prevalent depressive symptoms (BDI>9), anxiety symptoms (BAI>7), or co-occurring depression and anxiety symptoms (BDI>9 & BAI>7).

The models presented are: crude, with no adjustments; Adjusted 1 (Adj. 1). adjusted for age and sex; and Adjusted 2 (Adj. 2). adjusted for age, sex, ethnicity, marital status, employment, family income and living status.

Discussion

We found that 68.5% of our participants reported drinking during the pandemic and, from those, 22.7% increased and 32.5% decreased their alcohol consumption. Smoking was positively associated with both drinking and increased drinking. Middle-aged adults were at a lower risk of drinking, whereas average income was associated with both lower risk of drinking and of increased drinking. Importantly, drinking was associated with anxiety and co-occurring depression and anxiety.

Garcia-Cerde et al. (2020) found similar prevalence of drinking during quarantine in Latin American and the Caribbean countries.¹⁴ Their pre-pandemic prevalence of drinkers and binge drinking were also similar to those found in Brazil. More specifically, the prevalence of alcohol drinkers in Brazil was 66.4%, among which 38.4% reported binge drinking.¹⁸ Additionally, 20% of binge drinkers consume 56% of all the country's alcoholic beverages.¹⁹ The distribution of drinkers between age groups and sex in our sample was also similar to that found in a national survey, except that we found a higher prevalence among women (59% x 67%).¹⁸ Considering that the alcohol consumption in our sample resembled that of the Brazilian or Latin American and the Caribbean populations, the prevalence of those who drink or increased its use during isolation is worrisome. Alcohol consumption is related to a higher risk of infection and complications from respiratory viruses, and increase in interpersonal violence, reasons why the World Health Organization (WHO) recommended restrictions to its access during lock down.²⁰ COVID-19 pandemic has brought financial insecurity and, consequently, a great psychological burden, especially to the working age population. Previous studies on economic crisis and alcohol use have shown that people with lower income reduce their drinking due to loss of resources, whereas the opposite occurs among those with higher incomes, in which the economic factor may be overlaid by drinking as a coping strategy.²¹

In fact, higher income was associated with heavy drinking episodes during the pandemic in the PAHO study.¹⁴ However, we found that middle, but not low income was associated with a lower risk of alcohol use before and during the pandemic. This result could have been a consequence of the small number of low-income individuals in our sample, although the availability of very cheap alcoholic beverages in Brazil should not be ignored. Since alcohol consumption increases the risk of infection and complications of COVID-19,³ reducing consumption among the poorest could mitigate the damage to this population, which has been most severely affected by the pandemic.²²

Additionally, our middle-class sample was comprised predominantly of young adults. They may have a lower risk of drinking due to parenting responsibilities, starting a working career, or because they prefer to drink in social occasions. Nevertheless, we did not find an association between young adults and drinking before or during self-isolation. Notably, anxiety and co-occurring D&A symptoms were associated with drinking even after controlling for other covariates. These psychiatric comorbidities have been associated with higher risk for alcohol use disorders (AUD), faster progression of AUD, and a greater need for hospitalization for both AUD and comorbid psychiatric disorder.^{23,24}

Quarantine, depression and drinking to cope were independently and positively associated with AUD symptoms three years after the epidemic of SARS in China.²⁵

Psychological distress due to social isolation, fear of contamination, grief and financial insecurity have been associated with quarantines^{2,26} and may lead to alcohol use as a coping strategy.³ In that sense, drinking to self-medicate negative emotions may have prevented some individuals to reduce their drinking during this period of less environmental stimuli (i.e. public places and events associated with drinking). However, psychiatric symptoms can also be a consequence of alcohol use. Neurobiological studies

have found overlaps in the neural circuitry of both substance use disorders and depression and anxiety disorders.²⁷ Anyhow, because an increase in anxiety and depressive symptoms have been associated with the current pandemic,^{2,28} careful assessment of alcohol use among individuals with these symptoms is imperative.

We found no association between psychiatric symptoms and increased alcohol use. One possible explanation is that individuals with anxiety and D&A symptoms already had high use of alcohol before the pandemic.

Not surprisingly, we have found that smoking was associated with both alcohol use and increased use. The combination of nicotine and alcohol is highly comorbid and is associated with cross-reinforcement in the reward system as well as with cross-tolerance, enhancing the risk of hazardous drinking.^{23,29}

Our study has some limitations. First, **because we used secondary data from another study¹⁵**, we did not use validated scales for AUD. Also, alcohol consumption or even increasing alcohol consumption *per se* **does** not mean hazardous drinking. However, our findings of drinking being associated with known risk factors for AUD is worrisome and should encourage further investigation. Moreover, we have found that those **individuals who have been** drinking are more likely to present anxiety and co-occurring D&A, which points to the need for targeting individuals with psychiatric symptoms. Another limitation is that the study sample is not representative **of the** Brazilian population. Women were overrepresented and most participants were from the Southern and Southeast regions of Brazil. **Additionally, low-income population and smokers were underrepresented.** Finally, this is a cross-sectional study and causal relationships cannot be inferred, and memory bias might play a role.

In conclusion, drinking during self-isolation was prevalent, varied across demographic subgroups and associated with higher risk of smoking and anxiety and D&A symptoms.

The long-term effects of increased consumption can have implications for the public health. Therefore, it should be monitored and assessed, as both smoking and psychiatric symptoms have been associated with AUD.

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Conflict of Interest

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