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Women's alcohol consumption during the restriction phases of the COVID-19 pandemic in Brazil: a phone-based survey

Divane de Vargas^{1*}, Erika Gisseth León Ramírez¹, José Adelmo da Silva Filho¹, Ana Vitória Correa Lima¹, Dionasson Altivo Marques¹, Rosa Jacinto Volpato¹, Lucas Cardoso dos Santos¹ and Caroline Figueira Pereira¹

Abstract

Background Women were more prone to consuming alcohol as a coping mechanism for COVID-19 pandemic stressors than men. Worldwide evidence shows increased consumption during the social restriction phases, adversely impacting women's health. The study aimed to describe women's alcohol use throughout the restriction phases of the COVID-19 pandemic in São Paulo, Brazil.

Method A cross-sectional self-report survey was conducted by telephone with women who sought primary health care services. The sample comprised 3252 women, and 1308 (40%) reported consuming alcohol. The independent variable was the timing of the COVID-19 pandemic's restriction phases. The AUDIT-C was used as a measurement instrument. The covariates included sociodemographic factors, lifestyle characteristics, and outcomes related to COVID-19 infection. Univariate and bivariate models were used for analysis. A negative binomial distribution with zero inflation was used for the AUDIT-C score as the outcome variable in the entire sample.

Findings Women's alcohol consumption during the COVID-19 restriction phase was compatible with moderate-risk use 3.5 (SD = 2.9). Binge drinking was observed in 41.8% of the participants. Alcohol consumption was 28.9% higher in the transition phase of social restriction than in the restriction and flexibilization phases. Hospitalization for COVID-19 and losing a loved one due to COVID-19 were associated with alcohol consumption.

Conclusions Women presented a moderate-risk pattern of alcohol use. This consumption was higher during the restriction phase of the pandemic in South America's largest city. Therefore, this study provides critical reflections on women's patterns of alcohol consumption. It reveals this population's social and clinical vulnerability, which might be considered in future health policies and programs.

Keywords Alcohol, Alcohol consumption, COVID-19, Women, Lockdown, Social distancing

*Correspondence: Divane de Vargas vargas@usp.br ¹University of São Paulo, Av. Dr. Eneas Carvalho de Aguiar, 419 - Cerqueira César, São Paulo 05403-000, SP, Brazil



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Background

Studies from the early stages of the Corona Virus Disease 2019 (COVID-19) pandemic in the Americas suggest an increase in mental health events such as anxiety, depression, and insomnia [1–8] and its correlation with high levels of alcohol consumption at the population level [9, 10]. Evidence indicates that these patterns were more prevalent in women. Furthermore, it suggests that they were more prone to consuming alcohol to cope with COVID-19 stressors than men [11–18]. Furthermore, women who reported heavy episodic drinking before the pandemic tended to increase their use during this phase [19–22].

Worldwide data indicate that alcohol consumption increased during the pandemic, adversely affecting women's physical, psychological, and social conditions [23]. A study conducted in the United Kingdom and Australia found that COVID-19 was associated with increased high-risk alcohol consumption among women who felt anxious, depressed, or fearful. To respond to these symptoms, they stocked alcohol in their homes. This behavior led to higher scores on the Alcohol Use Disorders Identification Test-C (AUDIT-C), reflecting a loss of paid jobs [14]. A German study reported that 23% of women increased their alcohol consumption during the second wave of the COVID-19 pandemic, with fluctuations in anxiety contributing to this increase [24]. Women's alcohol consumption at the beginning of the pandemic restriction period was also related to familial and social conflicts, psychological suffering, and increased vulnerability to intimate partner violence; these issues were influenced by multiple factors, such as unemployment, lack of income, and time spent living at home with their aggressor [25]. Miller et al.'s [26] research in Uganda showed that almost half of the women investigated were experiencing domestic violence, with reports of increased aggression during the restriction phase. They were more likely to consume dangerous amounts of alcohol than women who did not report experiencing violence [26].

Previous studies have shown that the increase in alcohol consumption during the pandemic was similar between women and men and that it was associated with women's psychological distress, reinforcing that similar quantities of alcohol in women and men can cause greater adverse effects in women [11]. Another study of 33 countries in the Americas and Caribbean evaluated the association between behaviors related to alcohol use during the COVID-19 pandemic. It revealed that women also experienced more anxiety symptoms during the pandemic than men [9]. In Brazil, the first phase of COVID-19 social restrictions was marked by alcohol consumption, reported by 17.6% of a sample of 45,161 individuals, of which 53.6% were women, with no difference by sex. This result demonstrates that women consumed alcohol as much as men did [1].

Evidence suggests that alcohol consumption increased during the pandemic, reinforcing the need to monitor the different consumption patterns in the population, particularly among women, who have historically been more vulnerable due to physiological and social factors, a situation that was exacerbated during the pandemic. Thus, studies that directly analyze alcohol consumption among women are essential for informing the development of preventive actions and improving care for women who use alcohol and other drugs.

Given this, the present study aimed to describe alcohol consumption by female users of primary health care services during the three restriction phases of the COVID-19 pandemic in São Paulo, Brazil.

Methodology

Scenario: COVID-19 restrictions in São Paulo, Brazil

Brazil is one of the countries most affected by the pandemic, ranking second in the number of deaths from COVID-19 worldwide [27], with more than 34.397.205 million confirmed cases and 683.622 confirmed deaths as of August 31, 2022. São Paulo, the most populous state in Brazil, has the highest incidence of infections (5.635.140) [28]. Throughout the pandemic, officials across Brazil established a set of restrictions on social distancing, masking, and other aspects of public life. Restrictions vary by state and city, according to the epidemiological situation. For example, in São Paulo, officials established the "São Paulo's plan," which classified the restriction measures into three phases: Phase 1 (Red - Restriction): Maximum Alert - Contamination Phase, with release only for essential services such as health facilities, gas station, pharmacies, and supermarket; Phase 2 (Orange -Transition): Control - attention phase, with controlled releases with day time working limitation; and Phase 3 (Yellow): Flexibilization - Controlled phase, with greater freedom of daily activities.

The restriction phases represent the first four months from the second year of the pandemic (January to April 2021), with higher restrictions than those in the other phases. Over the next six months, these measures gradually decreased. This period was designated as the transition phase (May to October 2021). Finally, during the months before the second year of the pandemic, the restriction measures were gradually suspended, giving rise to the flexibilization phase (November 2021 to March 2022).

Data and sampling

Individual data were obtained from a cross-sectional phone-based multicenter study that collected alcohol consumption information during the three restriction phases of the COVID-19 pandemic among Brazilian women who sought health care at Primary Health Care (PHC) facilities in São Paulo City and fulfilled the eligibility criteria, including women aged 18 years or older who had an appointment scheduled at a PHC facility and spoke Portuguese sufficiently well to understand the interviewer's questions. Women who showed noticeable signs of mental confusion, intoxication by psychoactive substances, or difficulty understanding during the telephone call were excluded. Participants were selected using nonprobability convenience sampling, also known as accidental sampling, in which members of the target population with certain characteristics were included. Thus, only the sampling units available at the time of data collection were approached, and only women who met the inclusion and exclusion criteria were included in the sample [29]. The data were collected between November 2020 and March 2022.

Measures

As the primary outcome (dependent variable), participants were asked about their patterns of alcohol use, considering the frequency of drinking, quantity of alcohol per occasion, and frequency of heavy episodic drinking (four drinks or more on a single occasion) (dependent variable) in the three months before phone contact, using the simplified AUDIT-C, validated for use in Brazil [30]. The pattern of alcohol use classification for women was as follows: 0-2: low risk; 3-5: moderate risk; 6-7: high risk; and 8-12: severe risk. The AUDIT-C score was used as the discrete dependent variable. Additionally, as a secondary outcome (dependent variable), participants were asked about their alcohol use before and after the COVID-19 restrictions were implemented, their beverage preferences, and the number of standard drinks consumed. The respondents' sociodemographic, clinical, and lifestyle information was obtained through a nine-question form (independent variable). The participants were also asked about their reasons for PHC appointment, COVID-19 infection status, prior hospitalization for COVID-19 treatment, and loss of family members/close friends due to COVID-19 infection. Data were collected and managed using forms from the Research Electronic Data Capture (REDCap) electronic data capture tool. The average length of the telephone interviews was 15 min.

Statistical analyses

R Version 4.0.2 and statistical software were used for statistical analysis. A Shapiro test was performed, which allowed us to verify that the sample had a non-normal distribution. The Brunner-Munzel (Generalized Wilcoxon) test was used to analyze the relationship between AUDIT-C (discrete variable) and clinical, lifestyle, and COVID-19 infection variables (dichotomous variables). The Kruskal-Wallis rank-sum test was used to evaluate the relationship between the AUDIT-C score (discrete variable) and sociodemographic variables, type of drink before and during the pandemic, and self-perception of alcohol use (dichotomous variable). A negative binomial GLM was used to model a univariate analysis, with the AUDIT-C score considered as the dependent variable, measured as a discrete count outcome. The variables included in the model were pandemic phase, family income, marital status, age, educational level, and employment status according to the results of the bivariate prior models (p < 0.05) (Table 1) and clinical significance. The effect of the independent variable on the dependent variable was evaluated using the Incidence Rate Ratio (IRR). The IRR represents the change in the dependent variable in terms of a percentage increase or decrease, determined by the IRR as either above or below 1, respectively. It allows the use of a percentage to explain the increase or increment in dependent variables, even if the variable is numeric [31].

Ethical approval and consent to Participate

This study was approved by the São Paulo University School of Nursing Ethics Review Board (24461219.9.0000.5392/2019). Furthermore, verbal informed consent was obtained from all participants, which was recorded. The verbal informed consent procedure was approved by the São Paulo University School of Nursing Ethics Review Board. Participation was voluntary, and participants were informed that they could withdraw from the study at any time. All methods used in this study followed Ethics Review Board guidelines and regulations.

Results

Sample descriptive statistics

We contacted 5858 women who had a PHC appointment in São Paulo, and 3252 agreed to participate in this study. The mean age was 46.8 ± 16.3 years, with nearly half having a monthly household income between U\$251.83 and U\$503.66 (47.4%), followed by 27.4% with an income of less than U\$251.83, and 22.7% with an income between U\$503.66 and U\$1,259.15. Regarding education, 38.9% had completed high school, 17.6% had incomplete elementary education, 11.8% had completed higher education, and 10.7% had completed elementary school. Table 2 shows that the highest percentages of women were self-declared as white (42.8%), single (33.8%), had completed secondary education (38.9%), and worked as domestic workers (41.8%).

Mental health conditions were self-reported by 47.3% of participants: generalized anxiety disorder (24.8%), depression (18.9%), bipolar affective disorder (1.7%), personality disorder (1.2%), and schizophrenia (0.5%).

Table 1 Clinical, lifestyle, and the COVID-19 infection aspects and AUDIT C score. Brazil, 2022

Variable		n	%	Mean AUDIT	SD	<i>p</i> -value ^a
Physical activity						< 0.001
	No	2078	64.3	2.29	2.8	
	Yes	1150	35.6	1.68	2.4	
	No response ^b	24	0.7			
Hypertension						< 0.001
	No	2266	70.2	2.31	2.8	
	Yes	961	29.7	1.46	2.3	
	No response ^b	25	0.7			
Diabetes						< 0.001
	No	2580	79.9	2.18	2.8	
	Yes	647	20.0	1.57	2.3	
	No response ^b	25	0.7			
Hospitalization due COVID-19						< 0.001
	No	2144	87.2	1.99	2.7	
	Yes	314	12.7	0.92	2.1	
	No response ^b	794	24.42			
ICU need						< 0.001
	No	1947	93.1	1.77	2.6	
	Yes	144	6.8	0.69	1.8	
	No response ^b	1161	35.7			
Loss of Family/close friends due COVID-19						0.02
	No	1508	66.76	1.53	2.5	
	Yes	751	33.2	1.87	2.7	
	No response ^b	993	30.5			

^aBrunner-Munzel test

Note: AUDIT-C = Alcohol Use Disorders Identification Test-Concise; SD = standard deviation

^bThe percentages presented excluded participants with no response from the variables

Table 2 Sociodemographic characterization of the participants. Braz

Variable		n	%	Mean	SD	<i>p</i> -value ^a
				AUDIT-C		
Self-reported Race						0.548
	White	1375	42.8	2.22	2.8	
	Yellow	54	1.6	1.86	2.8	
	Indigenous	13	0.4	2.56	3.0	
	Brown	1276	39.7	1.99	2.6	
	Black	490	15.2	1.94	2.5	
	No response ^b	44	1.3			
Marital status						< 0.001
	Single	1096	33.8	2.40	2.9	
	Live together	599	18.5	2.05	2.8	
	Married	901	27.8	1.71	2.4	
	Divorced	386	11.9	1.97	2.6	
	Widower	252	7.7	1.49	2.5	
	No response ^b	18	0.5			
Employment						< 0.001
	Retired	504	15.5	0.93	1.7	
	Unemployed	1314	40.6	1.97	2.8	
	Employed	1354	41.8	2.44	2.8	
	Student	60	1.8	2.79	3.0	
	No response ^b	20	0.6			

^aKruskal-Wallis test / ^bThe percentages presented excluded participants with no response from the variables (missing)

Note: AUDIT-C = Alcohol Use Disorders Identification Test-Concise; SD = standard deviation

Systemic arterial hypertension and diabetes mellitus were reported by 29.7% and 20.0%, respectively, and non-performance of physical activity by 64.3%; 12.7% required hospitalization, of which 6.8% were admitted to an intensive care unit (ICU); 33.2% reported the loss of a family member/close friend due to COVID-19 (Table 1). Mental health diagnoses (generalized anxiety disorder, depression, bipolar affective disorder, schizophrenia, and personality disorder) and COVID-19 infection were not significant.

Alcohol use in the pandemic

Among all participants, 1,308 (40.2%) reported consuming alcohol, and the average AUDIT-C score in the sample was 3.5 (SD = 2.9), indicating moderate risk alcohol use classification during the pandemic. However, sociodemographic, clinical, and lifestyle variables had lower mean AUDIT-C scores.

The most consumed alcoholic beverage type before (64.1%) and during the pandemic (54.9%) was beer. Participants reported that their consumption did not change during all evaluated phases of the pandemic (45.3%). However, the highest averages in the AUDIT-C score were among women who consumed distilled beverages before (3.56 ± 3.3) and during the pandemic (4.3 ± 3.3) . Their self-perception was that their consumption increased (4.9 ± 3.4) during the pandemic (Table 3).

Alcohol use during the pandemic was observed in three phases according to the intensity of social restrictions: flexibilization (n = 268/8.2%), transition (n = 1434/44.10%), and restriction (n = 1550/47.6%). This study found that the AUDIT-C score decreased in the more restricted phase (1.70/SD = 2.50) and gradually increased with the flexibilization of the restriction measures toward COVID-19 (2.8/SD = 2.8), moving closer to a higher risk rating on AUDIT-C (Fig. 1).

Table 4 illustrates the frequency, amount, and excessive consumption of alcohol. It shows that 58.3% of the women had not consumed alcohol in the last three months before the interview. Moreover, among those who consumed alcohol, the majority (n = 497/21.8%) consume monthly or less, consuming two or three drinks per occasion (n = 375 /39.5%). In addition, more than half of the women (58.1%) did not consume excessive alcohol, and among those who reported excessive consumption, the practice was less than once a month (14.3%) or weekly (14.2%).

Alcohol consumption and associated factors on three pandemic phases

Higher AUDIT-C scores were associated with being single, studying (Table 2), and losing close friends/relatives because of COVID-19 (Table 1). Furthermore, women with higher family income and higher education levels had the highest AUDIT-C scores. However, practicing physical activity, having a diagnosis of hypertension or diabetes, and the need for hospitalization due to COVID-19 were associated with lower alcohol consumption (Table 1). Additionally, age was negatively correlated with AUDIT-C values.

Table 3 Association between AUDIT C score and characteristics of alcohol use, type of drink before and during the pandemic, and self-perception of alcohol use. Brazil, 2022

Variable		n	%	Mean AUDIT	SD	<i>p</i> -value ^a , ^b
Alcohol use						< 0.001 ^a
	No	1950	59.9	0.64	1.4	
	Yes	1308	40.0	3.54	2.9	
Type of drink before pandemic						0.005
	No use	33	2.7	2.65	2.7	
	Beer	763	64.1	3.20	2.9	
	Cocktail	34	2.8	2.84	2.9	
	Distilled	82	6.9	3.56	3.3	
	Wine	277	23.3	2.39	2.3	
Type of drink during pandemic						< 0.001
	No use	149	13.1	0.53	1.2	
	Beer	615	54.0	3.53	2.9	
	Cocktail	43	3.7	2.61	2.6	
	Distilled	70	6.1	4.39	3.3	
	Wine	260	22.8	2.77	2.4	
Self-perception of alcohol use during pandemic						< 0.001
	Increased	181	14.9	4.91	3.4	
	Decreased	482	39.7	2.31	2.5	
	No Change	551	45.3	2.85	2.5	

Brunner-Munzel^a test and Kruskal-Wallis test^b

Note: AUDIT-C = Alcohol Use Disorders Identification Test-Concise; SD = standard deviation



Phase

Fig. 1 Box plot graph with relation between AUDIT-C and the pandemic phases

Table 4Frequency, amount, and excessive consumptionof alcohol three months prior to the interview, according toAUDIT-C classification. Brazil, 2022

Variable		n	%
Frequency of alcohol use			
	Never	1329	58.3
	Monthly or less	497	21.8
	2–4 times per month	334	14.6
	2–3 times per week	89	3.9
	4 or more times per week	29	1.2
Quantity of alcohol doses use			
	0–1	252	26.5
	2–3	375	39.5
	4–5	164	17.3
	6–7	68	7.1
	8 or more	89	9.3
Binge drinking ^a			
	Never	551	58.1
	Less than once per month	136	14.3
	Monthly	111	11.7
	Weekly	135	14.2
	Every day or almost everyday	14	1.4

^aBinge drinking = four drinks or more on a single occasion

Table 5 shows the negative binomial generalized linear model results based on the variables social transition stage, age, physical activity, and AUDIT C score.

AUDIT C score was 49% higher in the transition than in the social flexibilization phase (CI = 1.27-1.74; p < 0.01). Higher household income increased the AUDIT-C score by 28% (CI = 1.16-1.41; p < 0.001); the higher the age, the lower the AUDIT-C score. Finally, exercise influenced the reduction of the AUDIT-C score by 17% (CI = 0.70-0.97; p 0.02) (Table 5).

Compared to single women, married women showed a greater reduction in alcohol consumption, with a 14% decrease. Being unemployed was associated with a 10% decrease in the AUDIT C score, and being a student was associated with a 9% decrease. Finally, hypertension was associated with a 22% decrease in the AUDIT-C score (Table 5).

Discussion

This study describes women's alcohol consumption and drinking occasion characteristics throughout the three phases of lockdown restrictions due to the COVID-19 pandemic in São Paulo, Brazil. The results suggest that women had a moderate risk pattern for alcohol consumption. Most women reported not consuming alcohol three months before the interview; those who consumed alcohol did so monthly or less. We also found that the AUDIT-C score decreased during the restriction phase

Variable	IRR	Lower Cl	Upper Cl	<i>p</i> - value
Phase [Ref: Restriction]	1			
Phase [Transition]	1.49	1.27	1.74	< 0.001
Phase [Flexibilization]	1.58	1.21	2.08	< 0.001
Age	0.99	0.98	0.99	0.003
Educational level	1.02	0.98	1.07	0.249
Family income	1.28	1.16	1.41	< 0.001
Marital status [Ref: single]	1			
Marital status [Live together]	0.86	0.79	1.04	0.133
Marital status [Married]	0.77	0.63	0.94	0.009
Marital status [Divorced]	0.98	0.76	1.27	0.909
Marital status [Widower]	0.96	0.65	1.44	0.860
Employment status [Ref:	1			
Employment]				
Employment status [Retired]	0.59	0.43	0.81	0.001
Employment status	0.90	0.77	1.06	0.230
[Unemployment]				
Employment status [Student]	0.91	0.56	1.52	0.713
Hypertension [Ref: No]	1			
Hypertension [Yes]	0.78	0.65	0.94	0.013
Diabetes [Ref: No]	1			
Diabetes [Yes]	1.00	0.81	1.24	0.970
Physical activity [Ref: No]	1			
Physical activity [Yes]	0.83	0.70	0.97	0.022

Table 5Negative binomial - generalized linear model of AUDIT-C score. Brazil, 2022

Note: IRR = Incidence Rate Ratio, CI = Confidence Interval, Ref = reference

Model: AUDIT-C score, Phase, Age, Educational level, Family income, Marital status, Employment status, Hypertension, Diabetes, Physical activity

and gradually increased during the transition and easing phases.

The highest AUDIT-C scores were observed during the flexibilization phase. During this phase, some restrictions were lifted, leading to the reopening of malls, stores, parks, and restaurants. As the restrictions were eased, people started to attend small social gatherings, such as barbecues or family meetings. This trend may have contributed to the increased alcohol consumption. In contrast, the lowest AUDIT-C scores were observed during the restriction phase when only essential establishments were opened. Moreover, there was limited access to some products owing to a lack of supply and low purchasing power. All these factors influenced alcohol consumption during the most severe COVID-19 restriction phase.

The results showed that physical activity, hypertension, diabetes, and hospitalization due to COVID-19 were associated with low AUDIT-C scores in all phases. Physical activity is a practical mechanism for dealing with stress related to COVID-19, improving mental health symptoms, providing treatment for patients with chronic diseases such as hypertension and diabetes, and improving blood pressure and blood glucose levels [32].

These results diverge from those of other studies [32, 33] regarding the greater presence of anxiety and depressive disorders among women. However, the findings regarding the practice of regular exercise were similar.

These findings corroborate the results presented in studies on the effects of COVID-19 on mental health [23]. Previous research has identified a significant prevalence of depression and anxiety owing to excessive deaths and overload in hospitals and morgues. Furthermore, the pandemic's impediment to attending funerals to say goodbye to loved ones hastened the onset of psychological distress [26, 33, 34].

Participants who reported a mental health diagnosis (generalized anxiety disorders, depression, bipolar disorders, schizophrenia, or personality disorders) scored higher than those who did not. Alcohol consumption is considered a maladaptive coping mechanism. It numbs individuals as they self-medicate, and functions as a way of dealing with boredom and loneliness [33]. We can also consider grieving as a factor contributing to increased alcohol consumption. Women who reported losing a relative or loved one due to COVID-19 scored higher on the AUDIT-C. Losing a loved one and dealing with that loss can be challenging for many people, especially during a pandemic, when many do not feel safe or fear exposing themselves and contracting the virus.

Our study suggests that mental health issues due to COVID-19 may affect alcohol consumption. Alcohol use was lower in participants who reported hospitalization and required intensive care. This trend may reflect COVID-19's clinical complications that contraindicated alcohol use. Much information regarding the impact of the restrictions imposed by COVID-19 on a population's mental health is available. However, the effects of infection, mourning, and intensive care on mental health remain unclear. These phenomena can cause future episodes of major depression, post-traumatic stress disorder, and other psychiatric conditions [34], possibly associated with increased alcohol consumption.

In our study, 42% of participants reported alcohol use during the COVID-19 pandemic, with AUDIT-C scores consistent with moderate-risk drinking. Similar results have been reported for female populations in other countries [14, 26]. The increase in alcohol consumption among women during the pandemic may reflect social isolation, increased domestic responsibilities, and childcare, as well as work-related activities [35, 36], along with other duties typically associated with women's roles as caregivers for family members.

Several studies have focused on the first year of the pandemic, showing increased consumption among women at the beginning of the health crisis, which was marked by restrictions and social isolation [35–38]. However, in the long term, women maintained high levels of

alcohol consumption [18]. This finding deserves attention, considering that social isolation can have mediumand long-term consequences on mental health. Despite participants' perceptions of consumption before and during the pandemic, regardless of whether they maintained or reduced their alcohol consumption, binge drinking was observed in almost half of the participants. They reported alcohol consumption, with a predominance of monthly and weekly frequency reductions during the pandemic period. These results were consistent with those of previous studies [26, 36, 38, 39].

Previous studies have shown that women with drinking behavior and psychological distress before the COVID-19 pandemic reported an increase in alcohol consumption and intensification of anxiety and depressive symptoms. Therefore, joint efforts and behavioral interventions should be conducted to prevent alcohol use disorders [16–18, 26, 35].

Several motivators have been associated with increased alcohol consumption among women, including the relief of emotional distress caused by COVID-19 [11, 36, 40], the occurrence of intimate partner violence [26], and the ease of storage [14, 39]. Higher levels of education and family income were associated with alcohol consumption in married women with relatively higher incomes, increasing the mean AUDIT-C score by 28%. This may be related to the loss of purchasing power during the most restrictive phases. A European study reported decreased alcohol consumption in low- and middle-income groups. Financial difficulties were highlighted as the main reason for these results. A decrease in alcohol consumption in the high-income population has also been reported due to socioeconomic insecurity caused by loss of income or employment [41].

Notably, alcohol consumption can change during a pandemic and throughout an individual's life. For example, our results showed that younger women had lower alcohol consumption scores. However, the current data underscore the need to track whether risky alcohol consumption behavior among women can be sustained over time. These data may favor implementing actions aimed at mitigating the negative effects of the COVID-19 pandemic on mental health and patterns of alcohol consumption among women seeking primary care services.

Limitations

Although our study found that some women reported suffering from mental disorders, it was not possible to determine whether they were diagnosed during or before the COVID-19 pandemic. If they were diagnosed before the pandemic, their symptoms would have worsened. In addition, answers about past drinking behavior and changes in frequency may be subject to memory bias; therefore, it should be noted that the interviews were conducted by phone, not self-administered, and participants may have felt uncomfortable reporting the true amount of alcohol consumed during the study period, potentially leading to an underestimation of alcohol consumption. In this regard, an in-depth investigation using alternative research methodologies could provide a more comprehensive understanding of alcohol use behavior in the female population, both during the pandemic and in the post-pandemic period.

Regarding the sampling method, convenience samples may be biased, because individuals who choose to participate in a study may not fully represent the population, making generalization impossible. Allied to this, it was a cross-sectional study; that is, the measurements were carried out at a time point during the pandemic; thus, our findings cannot clarify the seasonality of alcohol consumption.

Conclusion

Almost half the women in our study reported consuming alcohol, with an average AUDIT-C score corresponding to moderate-risk use. Furthermore, alcohol consumption was higher during the transition phase than during the relaxation phase. The COVID-19 pandemic has provided critical insights into women's alcohol consumption patterns, revealing their social and clinical vulnerabilities. These insights should be considered in future health policies and programs aimed at identifying and mitigating the harmful consequences of epidemics. This knowledge is crucial for supporting individuals directly affected by COVID-19, such as hospitalized individuals. Its implications for assessing alcohol consumption risk and formulating gender-sensitive strategies could be used to incorporate an understanding of women's needs in health systems, including primary health care settings.

Abbreviations

AUDIT-C	Alcohol Use Disorders Identification Test-C
COVID-19	Corona Virus Disease 2019
ICU	Intensive Care Unit
PHC	Primary Health Care
REDCap	Research Electronic Data Capture
SD	Standard deviation

Supplementary Information

The online version contains supplementary material available at https://doi.or g/10.1186/s12905-025-03552-2.

Supplementary Material 1

Supplementary Material 2

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Author contributions

DV Did the conceptualization, methodology, writing the original draft, revising, editing and obtaining funding. EGLR, CFP involved in formal analysis, data curation, methodology, writing the original draft. JAS, AVCL, DAM, RJV and LCS performed the writing of the original draft. All authors read and approved the final manuscript.

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Data availability

The data set supporting the conclusions of this article and the syntax used in the statistical analyses will be made available upon request from the corresponding author.

Declarations

Ethics approval and consent to participate

This study was approved by the São Paulo University School of Nursing Ethics Review Board (24461219.9.0000.5392/2019). Verbal informed consent was obtained from all participants, which was recorded. The verbal informed consent procedure was approved by the São Paulo University School of Nursing Ethics Review Board. Participation was voluntary, and participants were informed that they could withdraw from the study at any time. All methods used in this study were performed following the Ethics Review Board's guidelines and regulations.

Consent for publication

Not applicable. The manuscript does not include details, images, or videos relating to individual participants.

Competing interests

The authors declare no competing interests.

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