ORIGINAL ARTICLE

Prevalence, characteristics and factors associated with alcohol consumption among Peruvian university students during the early stage of the COVID-19 pandemic

William Cabanillas Rojas [1,2,a]; Yordanis Enríquez Canto [1,b]; Luis Menacho Alvirio [3,c]; Ricardo Murillo Ponte [1,d]; Giovani Díaz Gervasi [1,e]

1 Universidad Católica Sedes Sapientiae, School of Health Sciences. Lima, Peru.
2 Comisión Nacional para el Desarrollo y Vida sin Drogas (DEVIDA – National Commission for Development and Life Without Drugs). Lima, Peru.
3 Universidad Peruana Cayetano Heredia, Instituto de Medicina Tropical Alexander von Humboldt (Alexander von Humboldt Institute of Tropical Medicine). Lima, Peru.

[a] Psychologist, master's degree in Drug Dependence; [b] Biologist, PhD in Bioethics; [c] Physician, master's degree in Epidemiology; [d] Psychologist; [e] Psychologist, PhD in Psychology.

ABSTRACT

Objective: To identify the prevalence, characteristics and factors associated with alcohol consumption among university students in the Lima Metropolitan Area during the early stage of the COVID-19 pandemic in Peru, from March 16 to June 30, 2020. **Materials and methods:** A cross-sectional and analytical study was conducted using an online survey administered to 257 students. Descriptive analyses and logistic regressions were performed to determine odds ratios (OR) and their 95 % confidence intervals (95 % CI). The study evaluated the association between alcohol consumption and various sociodemographic, economic and health variables, as well as general and academic stress, fear of COVID-19, third-party provision of alcohol and perceived ease of access to alcohol. **Results:** A total of 43.6 % of respondents reported consuming alcohol between March and June 2020. Among these, 32.1 % engaged in binge drinking and 22.3 % experienced episodes of drunkenness. In addition to assessing alcohol consumption in the 12 months preceding the early stage of the lockdown, minimal differences were observed in alcohol consumption rates between men and women. During the lockdown, 43.8 % of the students reduced their alcohol consumption, while 46.4 % maintained their pre-lockdown consumption levels. Significant associations were found between alcohol consumption and high levels of general stress (aOR = 2.33; 95 % CI: 1.13-4.75), third-party provision of alcohol (aOR = 13.63; 95 % CI: 6.55–28.3) and perceived ease of access to alcohol (aOR = 4.49; 95 % CI: 1.96–10.3). **Conclusions:** During the early stage of the COVID-19 pandemic, alcohol consumption among university students was significantly associated with high levels of general stress, third-party provision of alcohol and perceived ease of access to alcohol. Despite lockdown restrictions, nearly half of the students maintained their pre-pandemic alcohol consumption levels. These findings highlight the need for targeted prevention and intervention strategies addressing alcohol consumption within the university setting.

Keywords: Alcohol-Related Disorders; COVID-19; Students; Quarantine; Stress, Psychological; Fear (Source: MeSH, NLM).

Copyright © 2024, Revista Horizonte Médico (Lima). A publication of Universidad de San Martín de Porres, Peru.

INTRODUCTION

Globally, many governments sought to curb the spread of SARS-CoV-2, the causative agent of COVID-19, by implementing restrictions on movement [1,2]. These included closing schools, universities and most commercial establishments, as well as limiting individuals' freedom to leave their homes. Since its emergence, COVID-19 has been recognized as having a negative impact on mental health and drug use [3,4]. In Peru, a national state of emergency and a mandatory lockdown were declared on March 15, 2020. The early stage of the pandemic was marked by 107 days of lockdown with strict restrictions on movement and social interaction. During this period, people could leave their homes only for essential purposes, such as purchasing basic necessities or attending priority jobs [5]. Fear of contracting the virus, the risk of infecting family members and loved ones, prolonged social isolation, fear of losing a family member, financial uncertainty and other anxieties increased significantly [5,6]. The onset of the mandatory lockdown coincided with the start of the first semester of the 2020 university academic year [6]. Universities responded by adjusting their academic calendars and

William Cabanillas Rojas; Yordanis Enríquez Canto; Luis Menacho Alvirio;
Ricardo Murillo Ponte; Giovani Díaz Gervasi

rapidly implementing online teaching strategies. This sudden transition created a stressful environment, compelling students to adapt quickly to new educational demands, reduced social interaction and decreased physical activity, while also facing growing concerns about the continuity of their studies amid the economic crisis [7,8]. Despite institutional efforts, university dropout rates in Peru during this period are estimated to have ranged between 13 % and 18 % [6]. Under such challenging circumstances, some students may have resorted to alcohol as a maladaptive coping strategy [1,5].

Alcohol use is widely recognized as detrimental to both physical and mental health and remains one of the leading preventable causes of mortality worldwide [3,4,9]. Young adults, including university students, show the highest prevalence rates [9]. In Peru, epidemiological data indicate that nearly 68 % of university students consume alcohol annually, 21 % engage in harmful drinking and 9 % show signs of dependence [10]. Previous studies have reported that students often consume alcohol in response to stress [11,12]. Such patterns may be influenced by stressors like those encountered during the early stage of the pandemic. However, restrictions on social interaction and closure of usual drinking establishments, such as bars and nightclubs, may also have led to a decrease in consumption.

Recent evidence from the COVID-19 pandemic underscores the role of coping motives in alcohol use [13,14]. Among students who consume alcohol, coping motives have been found to predict higher consumption [2,15]. The pandemic has affected mental health and well-being globally, and the various emotional responses associated with it—referred to as "COVID stress syndrome" [16]—appear to contribute to increased substance use [16,17]. Likewise, specific fears related to COVID-19 infection have been linked to higher drug use [18]. For instance, students who reported increased tobacco and alcohol consumption during the pandemic had higher fear-of-COVID-19 scores [19]. Indeed, drinking alcohol as a maladaptive coping strategy for stress is particularly troubling among students and warrants serious concern. Individuals who attempt to regulate negative emotions through alcohol are at greater risk of developing problematic drinking patterns due to self-medication [2,15].

In summary, further evidence is needed to clarify the prevalence, characteristics and factors associated with alcohol consumption among university students during the early stage of the COVID-19 pandemic. Using cross-sectional data, the present study aimed to identify sociodemographic, contextual and psychological factors associated with alcohol use during the early stage of the lockdown (March-June 2020) among students at a university in Lima, Peru.

MATERIALS AND METHODS

Study design and population
This was an observational, cross-sectional study. The study population consisted of students from a private university in Lima with several campuses nationwide. Data were collected through an online survey administered to the participants between August and November 2020.

The sample size was calculated based on a population of 4,850 university students. A 95 % confidence level, a maximum margin of error of 3 % and an expected prevalence of binge drinking of 0.05 were assumed, with this rate representing the estimated frequency of the event of interest. Additionally, a 15 % anticipated rate of incomplete surveys was factored in, resulting in an adjusted sample size of 229. The final sample comprised 257 participants, selected through targeted sampling. Prior to enrollment, participants provided written informed consent.

Variables and measurements
An online survey was administered. Recruitment was conducted through the university's digital platforms and institutional student email accounts. Themed notices invited students to participate, explained the purpose of the study and directed interested individuals to the online informed consent form. Upon consent, participants were asked to provide an email address to verify that each response corresponded to a real person than an automated entry, thus minimizing duplication and impersonation.

The survey collected sociodemographic data and COVID-19-related information. Demographic variables included sex, age, household members and work-study status. COVID-19-related variables included frequency of leaving home during the lockdown, COVID-19 testing, COVID-19 diagnosis and close contact with a confirmed COVID-19 case. Concern about the economic impact of the pandemic was measured on a 5-point Likert scale ranging from 1 ("not at all concerned") to 5 ("very concerned"). Stress during the lockdown was assessed on a scale from 1 ("none") to 5 ("very high").

Fear of COVID-19 was measured using the validated Peruvian version of the Fear of COVID-19 Scale (FCV-19S), comprising seven items rated on a 5-point Likert scale from 1 ("strongly disagree") to 5 ("strongly agree"), with total scores ranging from 7 to 35 [20,21]. Academic stress was measured using the *Inventario SISCO del Estrés Académico* (SISCO Inventory of Academic Stress), which contains 31 items assessing three domains: stressors, symptoms and coping strategies. Responses were recorded on a 5-point Likert scale from 1 ("never") to 5 ("always") [22].

Third-party provision of alcohol during the lockdown was assessed with a dichotomous (yes/no) question. Perceived ease of access to alcohol was measured with three response options: "It would be easy for me," "It would be difficult for me" and "I would not be able to get it." Alcohol use was assessed by asking about consumption in the 12 months preceding, during and after the lockdown, using dichotomous questions (yes/no). Episodes of drunkenness during the lockdown were also assessed with a dichotomous question (yes/no). Binge drinking in the two weeks prior to the survey was measured by asking about the frequency of consuming ≥ 5 drinks (men) or ≥ 4 drinks (women) on a single occasion.

Statistical analysis

Data were processed and analyzed using Stata 15.1. For the descriptive analysis, categorical variables were reported as frequencies and percentages, and numerical variables as means and standard deviations. The Kolmogorov-Smirnov test was applied to assess the normality of the age variable ($p > 0.05$) in the comparison groups, and homogeneity of variances was verified using Levene's test. When these assumptions were met, the chi-square test was used for group comparisons. Logistic regression analysis was conducted to estimate odds ratios (OR) with 95 % confidence intervals (95 % CI). A crude analysis was carried out for each study variable, with alcohol consumption during the lockdown as the dependent variable. Independent variables with $p < 0.05$ in the crude analysis were subsequently included in a multivariate logistic regression model to obtain adjusted ORs.

Ethical considerations

The study was approved by the Research Ethics Committee of Universidad Católica Sedes Sapientiae (registration No. CE- 650). Participants' rights were fully respected and written informed consent was obtained. All data were anonymized to ensure confidentiality.

RESULTS

Participant characteristics

A total of 257 university students were included in the analysis. The mean age was 23.80 years (SD = 6.21), and most participants were female (75.09 %). Slightly more than half (51.41 %) were in the first half of their university studies. In addition, 14.91 % had tested positive for COVID-19 at some point before the survey, and 54.69 % had had close contact with a confirmed COVID-19 case. Moreover, 24.12 % reported high levels of fear of COVID-19. During the early stage of the lockdown, nearly half of the participants (48.63 %) reported a moderate to high frequency of leaving home (ranging from weekly to daily).

Regarding psychological and contextual factors, 19.06 % of respondents reported experiencing domestic conflict, and 68.09 % expressed high concern about the negative economic impact of the pandemic. Overall, 40.85 % of students had high levels of general stress and 64.59 % moderate levels of academic stress. In addition, 40.46 % indicated third-party provision of alcohol during the early stage of the lockdown, while 57.19 % reported perceived ease of access to alcohol during the same period. Additional results are presented in Table 1.

Table 1. Sociodemographic characteristics and descriptive statistics of variables related to COVID-19, third-party provision of alcohol and perceived ease of access to alcohol during the early stage of the pandemic (n = 257)

Characteristics	n	%
Sex		
Male	64	24.90
Female	193	75.09
Age (Mean = 23.80; SD = 6.21)		
18-25	187	72.76
≥ 26	70	27.24
Work–study status		
Study only	202	78.59
Both work and study	55	21.41
COVID-19		
COVID-19 diagnosis	27	14.91
COVID-19 testing	55	30.38
Close contact with a confirmed COVID-19 case	99	54.69
Fear of COVID-19		
Low	195	75.87
High	62	24.12
Frequency of leaving home		
Low	132	51.36
Moderate	67	26.07
High	58	22.56

William Cabanillas Rojas; Yordanis Enríquez Canto; Luis Menacho Alvirio;
Ricardo Murillo Ponte; Giovani Díaz Gervasi

Characteristics	*n*	%
Domestic conflict		
None or low	208	80.93
High	49	19.06
Concern about the economic impact		
None or low	82	31.90
High	175	68.09
General stress		
Low	152	59.14
High	105	40.85
Academic stress		
Mild	64	24.90
Moderate	166	64.59
Severe	27	10.51
Third-party provision of alcohol		
Yes	104	40.46
No	153	59.53
Perceived ease of access to alcohol		
Not applicable (did not seek alcohol)	88	34.24
Difficult access	22	8.56
Easy access	147	57.19

Prevalence and characteristics of alcohol consumption during the early stage of the lockdown

Of the total respondents, 63.42 % reported consuming alcohol in the 12 months preceding the onset of the mandatory lockdown. Between March 16 and June 30, 2020, 43.58 % reported consuming at least one type of alcoholic beverage, with a higher prevalence among men (51.56 %) compared with women (40.93 %). Additionally, 22.18 % reported episodes of drunkenness during this period. Following the end of the lockdown (July–November 2020), 33.85 % of the participants reported alcohol consumption, while 32.30 % reported binge drinking in the two weeks prior to the survey. Apart from alcohol consumption in the 12 months preceding the early stage of the lockdown, differences between men and women in alcohol use were minimal (Table 2).

Table 2. Alcohol consumption and its association with sex among university students before, during and after the early stage of the COVID-19 pandemic (*n* = 257)

Alcohol consumption	Total *n* (%)	Men *n* (%)	Women *n* (%)	*p*
Alcohol consumption during the early stage of the lockdown (March–June 2020)	112 (43.58)	33 (51.56)	79 (40.93)	0.137
Drunkenness during the early stage of the lockdown	25 (22.18)	7 (21.77)	18 (22.22)	0.855
Alcohol consumption in the 12 months preceding the early stage of the lockdown	163 (63.42)	48 (75.00)	115 (59.40)	0.027
Alcohol consumption after the early stage of the lockdown (July–November 2020)	87 (33.85)	27 (42.74)	60 (31.05)	0.104
Binge drinking in the two weeks prior to the survey	36 (32.30)	11 (33.87)	25 (31.05)	0.862

Note: *p* indicates the value obtained from the chi-square test assessing the difference between men and women.

Among university students who reported alcohol use during the early stage of the lockdown, 43.75 % indicated a decrease in consumption, while 46.43 % stated that their consumption remained unchanged compared with the pre-lockdown period. Distilled spirits were the most frequently consumed beverage (36.61 %), and small shops were the most common place of purchase (47.32 %), in violation of the prevailing restrictions. The most frequently cited reason for consumption was relaxation or mood enhancement, reported by 52.68 % of the participants (Table 3).

Table 3. Characteristics of alcohol consumption among university students during the early stage of the lockdown (*n* = 112)

Characteristics	*n*	%
Comparison of alcohol consumption with the pre-lockdown period		
Decreased	49	43.75
Unchanged	52	46.43
Increased	11	9.82
Most frequently consumed beverage		
Wine	36	32.14
Beer	35	31.25
Distilled spirits (straight or mixed)	41	36.61
Place of purchase		
Convenience stores/small shops	53	47.32
Supermarkets	27	24.11
Other	32	28.57
Reason for consumption		
Celebrating special occasions	53	47.32
Relaxation or mood enhancement	59	52.68

During the early stage of the lockdown, the most common settings for alcohol consumption were at home with household members, in small gatherings and alone. Less frequently, consumption occurred on the street or in other public spaces. Regarding the source of alcohol, more than half of the students reported buying alcoholic beverages within their district. Notably, a considerable rate of students did not purchase alcoholic beverages because they already had them at home. Additionally, half of the respondents reported being unaware of any change in the price of alcoholic beverages (Table 4).

Table 4. Settings of alcohol consumption and source of alcohol during the early stage of the lockdown (*n* = 112)

Variable	*n*	%
Settings of alcohol consumption (multiple responses)		
At home with household members	83	74.11
In small gatherings	34	30.36
Alone	33	29.46
Alone via video call	20	17.86
With others via video call	17	15.18
At house parties	8	7.14
On the street/public spaces	3	2.68
Source of alcohol (multiple responses)		
Stores within the participant's district	71	63.39
Stores outside the participant's district	10	8.93
Home delivery based on information found on platforms such as Facebook, Twitter, Instagram, among others	7	6.25

William Cabanillas Rojas; Yordanis Enríquez Canto; Luis Menacho Alvirio;
Ricardo Murillo Ponte; Giovani Díaz Gervasi

Variable	n	%
Home delivery based on information provided by a friend or acquaintance	7	6.25
Already at home; consumed alcohol already stored prior to the lockdown	40	35.71
Price change		
Unknown	56	50.00
No change	29	25.89
Price increased	19	16.96
Price decreased	8	7.14

Logistic regression analysis (Table 5) indicated that university students with high levels of general stress were more likely to consume alcohol during the early stage of the pandemic compared to those reporting low levels of general stress (adjusted OR [aOR] = 2.33; 95 % CI: 1.13-4.75; p = 0.021). Likewise, the likelihood of alcohol use was significantly higher among participants who reported third-party provision of alcohol (aOR = 13.63; 95 % CI: 6.55-28.30; p < 0.001) and those who perceived ease of access to alcohol (aOR = 4.49; 95 % CI: 1.96-10.30; p < 0.001). In contrast, a high frequency of leaving home during the lockdown (crude OR [cOR] = 2.18; 95 % CI: 1.51-4.08; p = 0.015) and the perception of difficult access to alcoholic beverages (cOR = 3.62; 95 % CI: 1.25-10.40; p = 0.017) were significant in the crude model but lost significance in the adjusted model.

Table 5. Factors associated with alcohol consumption during the early stage of the COVID-19 pandemic among university students

Variable	Crude OR (95 % CI)	p	Adjusted OR* (95 % CI)	p
Sex				
Female	1.00	-	-	-
Male	1.54 (0.87-2.71)	0.139	0.86 (0.38-1.91)	0.708
Stage of university studies				
First half	1.00	-	-	-
Second half	1.03 (0.63-1.69)	0.895	1.18 (0.59-2.94)	0.633
Age				
16-25	1.00	-	-	-
≥ 26	0.75 (0.43-1.32)	0.323	1.30 (0.58-2.94)	0.524
Work—study status				
Study only	1.00	-	-	-
Both work and study	0.91 (0.49-1.66)	0.766	0.47 (0.20-1.10)	0.082
Fear of COVID-19				
Low	1.00	-	-	-
High	1.29 (0.73-2.29)	0.381	0.97 (0.43-2.22)	0.951
Change in work situation				
No	1.00	-	-	-
Yes	0.69 (0.42-1.12)	0.138	0.70 (0.36-1.38)	0.310
Frequency of leaving home				
Low	1.00	-	-	-
Moderate	0.98 (0.53-1.78)	0.936	0.55 (0.24-1.20)	0.167
High	2.18 (1.16-4.08)	0.015	1.39 (0.59-3.32)	0.451
Domestic conflict				
None or low	1.00	-	-	-
High	0.96 (0.51-1.80)	0.910	0.52 (0.21-1.20)	0.146

Prevalence, characteristics and factors associated with alcohol consumption among
Peruvian university students during the early stage of the COVID-19 pandemic

Variable	Crude OR (95% CI)	p	Adjusted OR* (95% CI)	p
Concern about the economic impact				
None or low	1.00	-	-	-
High	1.32 (0.77-2.24)	0.314	1.27 (0.59-2.79)	0.536
General stress				
Low	1.00	-	-	-
High	2.23 (1.35-3.72)	0.002	2.33 (1.13-4.75)	0.021
Academic stress				
Mild	1.00	-	-	-
Moderate	1.35 (0.75-2.42)	0.317	0.48 (0.20-1.10)	0.104
Severe	0.92 (0.36-2.32)	0.856	0.31 (0.07-1.37)	0.123
Third-party provision of alcohol				
No	1.00	-	-	-
Yes	18.75 (9.92-35.40)	< 0.001	13.63 (6.55-28.30)	< 0.001
Perceived ease of access to alcohol				
Not applicable (did not seek alcohol)	1.00	-	-	-
Difficult access	3.62 (1.25-10.40)	0.017	2.88 (0.82-10.10)	0.098
Easy access	10.59 (5.29-21.20)	< 0.001	4.49 (1.96-10.30)	< 0.001

OR: odds ratio; 95 % CI: 95 % confidence interval. *OR adjusted for sex, education, age, employment status, frequency of leaving home, level of general stress, third-party provision of alcohol and perceived ease of access to alcohol.

DISCUSSION

During the early stage of the COVID-19 pandemic, four in ten university students reported high levels of general stress, and six in ten reported moderate levels of academic stress. Approximately one-third of the participants experienced high levels of fear of COVID-19 and concern about the economic impact of the pandemic. These findings reflect the substantial effects of the pandemic on students' health, finances, social life and academic performance [1,2,5]. Comparable results have been reported in both national and international studies [5-7], which found moderate levels of academic stress (37.8 %) and fear of COVID-19 (63.6 %) [5,19,20]. In Peru, the strict regulations imposed during the early stage of the pandemic likely intensified students' feelings of isolation, fear and uncertainty, fostering a highly stressful environment [1,17,23].

During the early stage of the lockdown, approximately half of the students reported alcohol consumption, with higher prevalence among men, although consumption among women was also significant. This trend is consistent with findings from another study in the Andean subregion, which reported prevalence rates of 52 % in men and 41 % in women between March and June 2020 [24]. Nonetheless, the prevalence during the lockdown was lower than in the year preceding the pandemic; indeed, four in ten students reported a decrease in alcohol consumption compared with pre-lockdown levels. Similar trends have been observed in other studies [8,9,15]. The reduction in alcohol use may be explained by limited access

during the lockdown, due to the closure of bars and nightclubs, as well as restrictions on social gatherings—settings that students often identify as key social drinking environments [8,15]. However, during the lockdown, students reported purchasing alcohol mainly from convenience stores, small shops and supermarkets. Prices did not appear to increase [25], and no specific regulations restricted alcohol sales, which made access relatively easy [25]. Even so, this accessibility did not lead to increased consumption, despite the stressful conditions of the lockdown [1,6,26].

The drinking environments reported suggest that social (e.g., drinking to socialize) and conformity motives (e.g., drinking to avoid rejection from friends and classmates) may have played a less prominent role in alcohol use during this period [2,5]. Instead, most respondents indicated drinking primarily for relaxation and mood enhancement, consistent with other studies highlighting the predominance of coping motives during the early stage of the pandemic [13,15]. These motives appear to have been decisive in shaping drinking behavior during the lockdown [2,11].

Furthermore, one-third of the participants reported binge drinking, a figure comparable to findings in both university student and non-student populations. For example, Fruehwirth et al. reported binge drinking prevalence of 35.5 % before the pandemic and 24.6 % in June-July 2020, associated with reduced perceived social support from friends and social distancing [25]. Similarly, Grossman et al. reported a prevalence

William Cabanillas Rojas; Yordanis Enríquez Canto; Luis Menacho Alvirio;
Ricardo Murillo Ponte; Giovani Díaz Gervasi

of 34.1 % in the adult population during the early months of the pandemic, linked to COVID-19-related stress [27]. Although the present study did not assess pre-lockdown binge drinking, previous research suggests that its prevalence may have been higher. For instance, Sotelo found a rate of 54.71 % among university students in Lima Metropolitan Area in 2018 [28]. The prevalence of binge drinking observed during the pandemic is concerning, given its well-documented negative consequences, including alcohol poisoning, academic problems, violence and unprotected sexual activity [3,5,26].

Stress was identified as a contributing factor to alcohol use [11,12]. Socioeconomic conditions and social isolation during the lockdown created a context of high cognitive and emotional stress that encouraged alcohol use [1,6,7]. Alcohol consumption appears to have served as a maladaptive coping strategy for managing stress during this period [2]. Previous studies have reported that alcohol-related problems were more frequent among stressed university students during the early weeks of the pandemic [1]. In contrast to other research linking academic stress to alcohol use [12,25], our findings indicate that academic stressors were not significant in explaining alcohol consumption during the lockdown, possibly because interpersonal and socioeconomic stressors were more prevalent during the period of mandatory restrictions on movement. This is consistent with evidence showing that social stressors are strongly associated with alcohol use [15].

Our results also indicate that the third-party provision of alcohol and perceived ease of access to alcohol were significant predictors of consumption during the lockdown. Despite restrictions on movement, participants reported obtaining alcohol at home and from nearby small shops. This finding aligns with an Argentine study in which home delivery and store purchases were the main sources of alcohol during the lockdown [29]. Given the restrictions on social interaction, alcohol consumption likely occurred primarily at home with household members. The research suggests that parental drinking influences students' positive expectancies toward alcohol [1,9,15]. Perceived parental approval of drinking is also a relevant factor that may foster a permissive environment [1,2,9]. In this context, it is plausible that stress, alcohol availability and family influence collectively contributed to alcohol use during the lockdown [1,7,30].

This study addresses a public health issue of considerable importance for the prevention of alcohol-related disorders particularly in the university population. Notable strengths include the timeliness of the data collection during the early stage of the COVID-19 pandemic—a period of marked uncertainty and stress that may have influenced students' drinking patterns—and the inclusion of diverse sociodemographic, economic, health and psychological variables, enabling a comprehensive and multidimensional analysis of factors associated with alcohol use.

However, certain limitations must be acknowledged. First, the cross-sectional design precludes the assessment of temporal relationships between variables, limiting understanding of the long-term impact of alcohol use during the pandemic. Second, alcohol consumption data were collected retrospectively, which may be subject to recall bias. Third, the self-selected non-random sampling limits the generalizability of the findings to the broader Peruvian university population. Finally, although the analysis considered several factors associated with alcohol use during the pandemic, the model is not exhaustive and does not account for all possible risk factors.

Despite these limitations, the findings open several future research directions. For example, further studies could examine the relationship between alcohol consumption and mental health among university students during health crises. Additionally, identifying protective factors—such as social support, self-efficacy, resilience and adaptive coping strategies—that may reduce or prevent alcohol use in this population represents a promising direction for future work.

In conclusion, this study provides estimates of the prevalence, characteristics and factors associated with alcohol consumption during the early stage of the COVID-19 pandemic among Peruvian university students. Alcohol use during the lockdown was lower than in the pre-pandemic period, but a substantial proportion of students exhibited problematic drinking patterns. Continuous monitoring of these behaviors is needed to understand the pandemic long-term impact on student health. The results make a significant contribution to the literature on the factors associated with alcohol consumption during the early stage of the pandemic, underscoring the influence of stress, third-party provision of alcohol and perceived ease of access as critical factors.

BIBLIOGRAPHIC REFERENCES

1. Flaudias V, Zerhouni O, Pereira B, Cherpitel CJ, Boudesseul J, De Chazeron I, et al. The early impact of the COVID-19 lockdown on stress and addictive behaviors in an alcohol-consuming student population in France. Front Psychiatry [Internet]. 2021;12:628631.
2. Mohr CD, Umemoto SK, Rounds TW, Bouleh P, Arpin SN. Drinking to cope in the COVID-19 era: an investigation among college students. J Stud Alcohol Drugs [Internet]. 2021;82(2):178-87.
3. Holmes EA, O'Connor RC, Perry VH, Tracey I, Wessely S, Arseneault L, et al. Multidisciplinary research priorities for the COVID-19 pandemic: a call for action for mental health science. Lancet Psychiatry [Internet]. 2020;7(6):547-60.
4. Volkow ND. Collision of the COVID-19 and addiction epidemics. Ann Intern Med [Internet]. 2020;173(1):61-2.
5. Graupensperger S, Cadigan JM, Einberger C, Lee CM. Multifaceted COVID-19-related stressors and associations with indices of mental health, well-being, and substance use among young adults. Int J Ment Health Addict [Internet]. 2023;21(1):418-31.

6. Estrada Araoz EG, Mamani Roque M, Gallegos Ramos NA, Mamani Uchasara HJ, Zuloaga Araoz MC. Estrés académico en estudiantes universitarios peruanos en tiempos de la pandemia del COVID-19. Arch Venez Farmacol Ter [Internet]. 2021;40(1):88-93.

7. Achdut N, Refaeli T. Unemployment and psychological distress among young people during the COVID-19 pandemic: psychological resources and risk factors. Int J Environ Res Public Health. 2020;17(19):7163.

8. Browning MHEM, Larson LR, Sharaievska I, Rigolon A, McAnirlin O, Mullenbach L, et al. Psychological impacts from COVID-19 among university students: risk factors across seven states in the United States. PLoS One [Internet]. 2021;16(1):e0245327.

9. Davoren MP, Demant J, Shiely F, Perry IJ. Alcohol consumption among university students in Ireland and the United Kingdom from 2002 to 2014: a systematic review. BMC Public Health [Internet]. 2016;16(1):173.

10. Oficina de las Naciones Unidas contra la Droga y el Delito. III Estudio epidemiológico andino sobre consumo de drogas en la población universitaria, Informe Regional, 2016 [Internet]. Lima: UNODC; 2017. Available from: https://www.unodc.org/documents/peruandecuador/Informes/Otros/Informe_Universitario_Regional.pdf

11. Corbin WR, Farmer NM, Nolen-Hoekesma S. Relations among stress, coping strategies, coping motives, alcohol consumption and related problems: a mediated moderation model. Addict Behav [Internet]. 2013;38(4):1912-9.

12. Metzger IW, Blevins C, Calhoun CD, Ritchwood TD, Gilmore AK, Stewart R, et al. An examination of the impact of maladaptive coping on the association between stressor type and alcohol use in college. J Am Coll Health [Internet]. 2017;65(8):534-41.

13. Irizar P, Jones A, Christiansen P, Goodwin L, Gage SH, Roberts C, et al. Longitudinal associations with alcohol consumption during the first COVID-19 lockdown: associations with mood, drinking motives, context of drinking, and mental health. Drug Alcohol Depend [Internet]. 2021;226:108913.

14. McPhee MD, Keough MT, Rundle S, Heath LM, Wardell JD, Hendershot CS. Depression, environmental reward, coping motives and alcohol consumption during the COVID-19 pandemic. Front Psychiatry. 2020;11:574676.

15. Bollen Z, Pabst A, Creupelandt C, Fontesse S, Lannoy S, Pinon N, et al. Prior drinking motives predict alcohol consumption during the COVID-19 lockdown: a cross-sectional online survey among Belgian college students. Addict Behav [Internet]. 2021;115:106772.

16. Taylor S, Landry CA, Paluszek MM, Fergus TA, McKay D, Asmundson GJG. COVID stress syndrome: Concept, structure, and correlates. Depress Anxiety [Internet]. 2020;37(8):706-14.

17. Rodriguez LM, Litt DM, Stewart SH. Drinking to cope with the pandemic: The unique associations of COVID-19-related perceived threat and psychological distress to drinking behaviors in American men and women. Addict Behav [Internet]. 2020;110:106532.

18. McKay D, Asmundson GJG. COVID-19 stress and substance use: current issues and future preparations. J Anxiety Disord [Internet]. 2020;74:102274.

19. Gritsenko V, Skugarevsky O, Konstantinov V, Khamenka N, Marinova T, Reznik A, et al. COVID 19 fear, stress, anxiety, and substance use among Russian and Belarusian university students. Int J Ment Health Addict [Internet]. 2021;19(6):2362-8.

20. Huarcaya-Victoria J, Elera-Fitzcarrald C, Salvador-Carrillo J, Flores CJ. Psychometric properties of the Spanish version of the fear of COVID-19 scale in Peruvian medical students. Death Stud [Internet]. 2022;46(9):2273-2279.

21. Ahorsu DK, Lin C, Imani V, Saffari M, Griffiths MD, Pakpour AH. The fear of COVID-19 scale: development and initial validation. Int J Ment Health Addict [Internet]. 2022;20(3):1537-45.

22. Barranza Macias A. El Inventario SISCO del estrés académico. INED. 2007;(7):89-93.

23. Muyor-Rodríguez J, Caravaca-Sánchez F, Fernández-Prados JS. COVID-19 fear, resilience, social support, anxiety, and suicide among college students in Spain. Int J Environ Res Public Health. 2021;18(15):8156.

24. Organización Panamericana de la Salud. El consumo de alcohol durante la pandemia de COVID-19 en América Latina y el Caribe [Internet].

Washington D. C.: OPS; 2020. Available from: https://iris.paho.org/bitstream/handle/10665.2/53113/OPSNMHMHCOVID-19200042_spa.pdf?sequence=1&isAllowed=y C

25. Fruehwirth JC, Gorman BL, Perreira KM. The effect of social and stress-related factors on alcohol use among college students during the COVID-19 pandemic. J Adolesc Health. 2021;69(4):557-65.

26. Kuntsche E, Kuntsche S, Thrul J, Gmel G. Binge drinking: Health impact, prevalence, correlates and interventions. Psychol Health. 2017;32(8):976-1017.

27. Grossman ER, Benjamin-Neelon SE, Sonnenschein S. Alcohol consumption during the COVID-19 pandemic: a cross-sectional survey of US adults. Int J Environ Res Public Health. 2020;17(24):9189.

28. Sotelo Huerta FMG. Expectativas hacia consumo de alcohol y binge drinking en universitarios limeños [Undergraduate thesis]. [Lima]: Pontificia Universidad Católica del Perú; 2018. Retrieved from: https://tesis.pucp.edu.pe/repositorio/bitstream/handle/20.500.12404/13040/SOTELO_HUE %20RTA_EXPECTATIVA_HACIA_CONSUMO_DEL_ALCOHOL_Y_BINGE_DRINKING_EN_UNIVERSITARIOS_LIME %c3 %91OS.pdf?sequence=1&isAllowed=y

29. Conde K, Gimenez PV, Salomón T, Peltzer RI, Laspiur S, Cremonte M. Before and after the pandemic: alcohol consumption and related problems in Argentina. Rev Interam Psicol J Psychol. 2021;55(1):e1444.

30. Villanueva VJ, Motos P, Isorna M, Villanueva V, Blay P, Vásquez A. Impacto de las medidas de confinamiento durante la pandemia de COVID-19 en el consumo de riesgo de alcohol. Rev Esp Salud Pública. 2021;(95):e202101015.