

ORIGINAL ARTICLE

## Classification of alcohol use disorders among nightclub patrons: associations between high-risk groups, sociodemographic factors and illicit drug use

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### Abstract

**Background:** Nightclubs are favorable environments for alcohol abuse and the use of other drugs among patrons. **Objective:** To identify patterns of alcohol use in a high-risk population and their relationship with sociodemographic factors and illicit drug use. **Methods:** A portal survey technique was used to recruit patrons in 31 nightclubs in the city of São Paulo, Brazil. A two stage sampling method allowed the selection of nightclubs and patrons within a nightclub. A total of 1057 patrons answered to a three stages-survey (nightclub entrance and exit face-to-face interviews and a day-after online questionnaire). Entrance survey offered information on sociodemographic data and history of drug use. The day-after survey used the *Alcohol Use Disorders Identifications Test* (AUDIT) that identified patterns of alcohol abuse disorders. Data were modeled using an ordered logit regression analysis, considering sample weights. **Results:** Almost half of the nightclub patrons presented any alcohol use disorder (AUDIT score  $\geq 8$ ). Being male (OR = 1.68; 95% CI = 1.09–2.60) and single (OR = 1.71; 95% CI = 1.05–2.76) increased the chances for more severe alcohol use disorders. Having a graduate degree (OR = 0.57; 95% CI = 0.38–0.87) and age  $\geq 35$  years (OR = 0.48; 95% CI = 0.27–0.85) decreased the chances of patrons' alcohol use disorders. The prevalence rates of past-year marijuana, cocaine and inhalants use increased with the increased level of alcohol use disorders. **Conclusions:** Patrons of nightclubs show higher prevalence rates for any alcohol use disorders than the general population. Patrons could benefit from governmental brief intervention or referral to treatment for alcohol used disorders disclosed in nightclubs.

### Keywords

Alcohol, Brazil, epidemiology, illicit drugs, nightclubs

### History

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### Introduction

Nightclubs are important places of leisure and entertainment for young people (1). However, they are also places where breaking social rules is tolerated and pharmacological pleasure is stimulated (2), which contributes to a higher exposure of patrons to risks behaviors (3). In recent years, nightlife study has emerged in the literature of drug abuse, specially investigating environmental and individual factors associated to risk behaviors that clearly occur inside these environments (4,5), suggesting interventions that can reduce the harm to which patrons are exposed to (6). Studies showed that people who attended nightclubs were more experienced with illegal drug use and binge drinking than other groups of the general population (7). Therefore, nightclubs are considered critical health settings since binge drinking and illicit drug use were

found to be associated with episodes of aggression (8), sexual risk behavior (9) and polydrug use in these venues (10).

Multicenter studies showed that the negative consequences of alcohol use patterns are strongly influenced both by sociodemographic factors as by cultural factors of each country investigated (11). On the nightlife scenario, the findings also point to important cultural differences in the patterns of alcohol and other drugs use among nightclub patrons, suggesting that although there is a belief that patrons are hard polydrug users, this is not always the identified reality (12). What can be observed, however, is that consumption patterns widely differ between countries (9,13); and within a country (14).

It is important to note that almost all the studies concerning nightlife events were carried out in developed countries (15) and showed high influence at the country level for prevalence and consequence (9), suggesting that culture and local policy are associated to the different scenarios described. Besides, what stands out is that almost all of these studies focus on the behaviors and consumption patterns practiced inside these establishments and its association with sociodemographic (4) and environmental factors (5) that favor

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risk behaviors in the venues. However, what has not been answered and appears as a gap in the literature is whether the abusive pattern of alcohol use that occurs inside these establishments (16) can be characterized effectively as an alcohol use disorder and whether it should be subject to the immediate need of treatment or brief intervention.

To screening patterns of harmful alcohol use and to facilitating early intervention in cases of abuse, the World Health Organization (WHO) has developed the Alcohol Use Disorder Identification Test (AUDIT) (17). AUDIT is a quick and successful evaluation tool to identify patterns of harmful alcohol use (18). It has not yet been used in the diagnosis of alcohol abuse among nightclub patrons, but it has been widely used as a screening test to determine the need for brief intervention and treatment among college students (19).

Considering that nightclubs are favorable environments for binge drinking and the use of other drugs among patrons, we hypothesized that nightclub patrons are a population with higher prevalence of alcohol use disorders (AUDIT defined) and that a high-risk group can be identified by their sociodemographic characteristics. Therefore, the aim of this study in Brazil was to identify patterns of alcohol use disorders in this high-risk population and their relationship with sociodemographic factors and illicit drug use, using a validated screening test for alcohol use disorders in a developing country.

## Methods

### Sample

A portal survey was conducted at nightclubs in the city of São Paulo, and data were collected from nightclub patrons. This survey method (20) is designed to intercept and measure behaviors at the right moment when they occur, in this case, use of alcohol and other drugs in potentially risk individuals, at the entrance and exit of nightclubs. This study used a two-stage cluster sampling survey design (21). The first stage consisted of a systematic sample using a probability proportional to the maximum capacity (PPS) of nightclubs from São Paulo City. The PPS is an approach that improves accuracy to represent proportions within a population by concentrating sample on elements that have the greatest impact on population estimates (22). In our study, we have accessed nightclubs with maximum capacity of 150–4000 patrons per night, and PPS ensured that the most representative nightclubs were drawn. The second stage consisted of a systematic sampling of patrons in the entrance lines of the selected nightclubs (20).

For standardization, establishments that control client entry and exit, sell alcohol beverages, and have a dance floor were considered “nightclubs”. The list of establishments that met the inclusion criteria was created via an active search of magazines, guides specializing in day and night leisure activities, and the first 10 pages resulting from a Google search using the following keywords: “Bars, nightclubs, nightspots and discos of São Paulo” (in Portuguese). The final list consisted of 150 nightclubs, 40 of which were drawn (20).

A sample size of 1600 patrons was calculated so that the prevalence of alcohol intoxication in the exit of the nightclub

could be estimated to within 5 percentage points (absolute precision) of the true value set to 50% (maximum variance) with 95% confidence, with two-stage cluster sampling and a design effect of 2 (23). Taking into account a refusal rate of 30% and a maximum follow-up loss of 40% from patron entrance to patron exit, based on previous studies by Clapp et al. (21), it was determined that 2912 patrons should be initially approached.

The details on sample selection and sample weights calculated from non-response and post-stratification were previously published in Carlini et al. (24).

### Data collection and instruments

Patrons were selected from the entrance lines of the nightclubs and were enrolled in a three-stages survey: face-to-face interview at the nightclub entrance, face-to-face interview at the nightclub exit, and an online questionnaire on the next day, via the internet (20). At the nightclub entrance, participants took between 5 or 10 minutes to answer to the interview. At the exit, the interview took no more than 5 min. And, finally, the online survey demanded 8–10 min of their time.

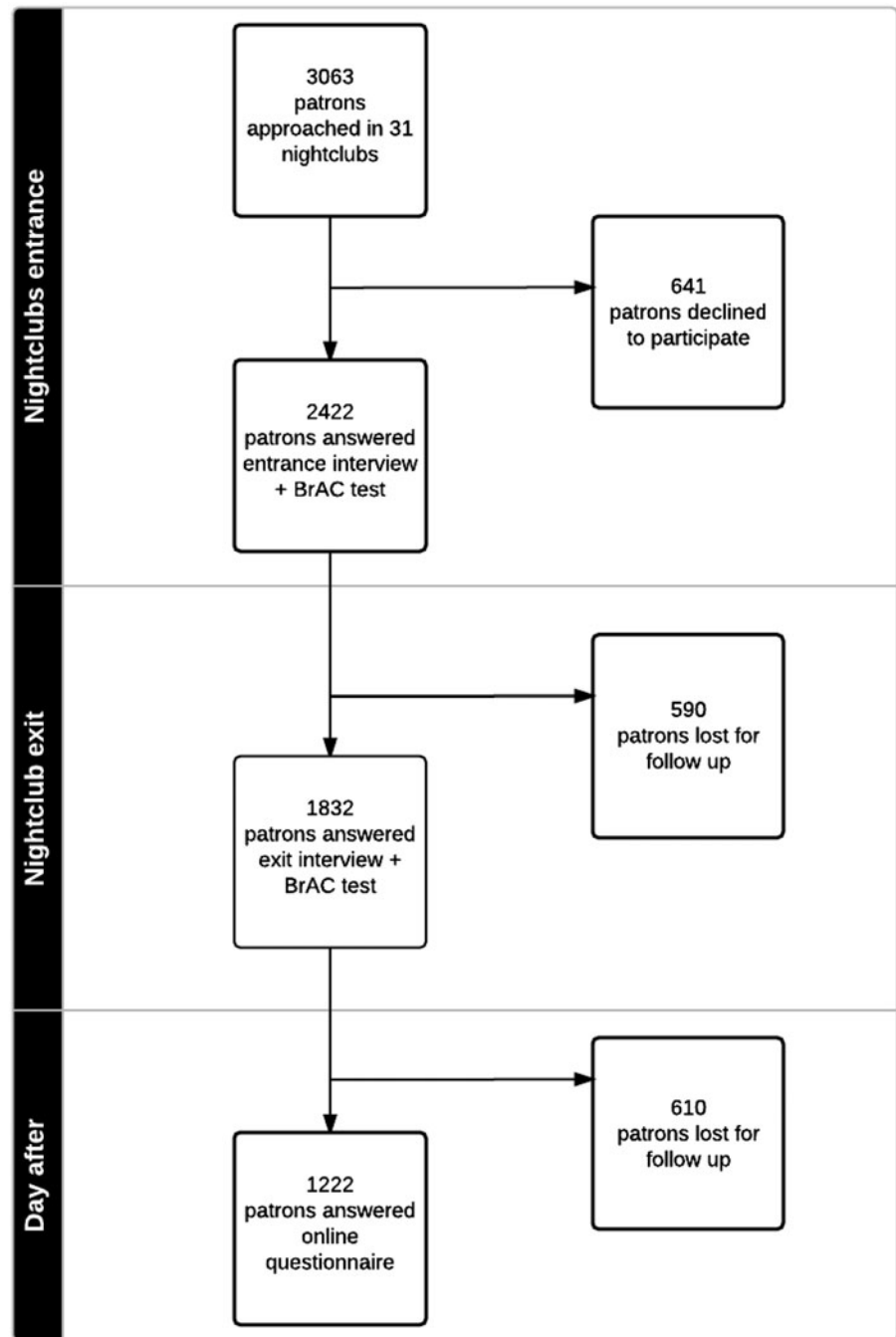
The first stage of data collection was performed in the entrance lines of 31 nightclubs that agreed to participate in the study (acceptance index of 66%, considering nightclubs’ replacements). Seven field interviewers entered the data from the nightclub entrance and exit interviews into Samsung Galaxy tablets, and the data were sent to a central database in real time. Patrons were chosen systematically in the entrance line of the nightclubs so that every third individual was invited to participate. The adopted inclusion criteria were the intention to enter the nightclub and being at least 18 years old. In the case of refusal, data on age and sex were registered, and the next person in the line was approached. Patrons who agreed to participate in this stage of the study answered an interview about sociodemographic variables, the practice of pre-drinking, alcohol use patterns, drug use, and other risk behaviors in nightclubs in the past 12 months prior to the interview. Patrons also had their breath alcohol concentrations measured at the time of the interview by means of a breathalyzer (Draguer Alcotest 7410 plus RS), and each patron received a bracelet with a unique numeric code for identification at the time of nightclub exit.

At the time of nightclub exit, participating patrons – identified by their bracelets – were approached once more and invited to answer another interview regarding the use of alcohol, illicit drugs and other risk behaviors they could have engaged in inside the nightclub.

At the end of the exit interview, breath alcohol concentration was measured once more. Additionally, a project folder containing information regarding the post-nightclub questionnaire that would be sent by e-mail the next day was handed to the participants.

On the day after the nightclub interview, the link to the online post-nightclub questionnaire was sent by e-mail to the interviewees who had answered the interview in the entrance line of the nightclub 12 hours before. The first module consisted of questions regarding patron risk behaviors after exiting the nightclub, and the second module consisted of questions from the AUDIT.

Figure 1. Flowchart for patron's recruitment and data collection in three time points, São Paulo, Brazil, 2013.



A flowchart of the three steps described at this manuscript and number of participants is presented as Figure 1.

The analyses of this manuscript were based on data collected at two stages of the project and by means of two instruments. Specifically, sociodemographic data and data on the history of drug use were collected during the portal survey at the entrance of the nightclubs, whereas AUDIT information was collected the day after the nightclub interview by means of a self-administered on-line questionnaire that was accessed via the individualized link sent to the participants by e-mail.

### Variables

For statistical analysis, the outcome variable ‘‘Classification of alcohol use disorders’’, obtained from the patrons’ score in

the 10-item AUDIT, was used to describe the profile of alcohol abusers in São Paulo nightclubs and the associated factors. Specifically, AUDIT scores of 0–7 were determined as low risk, 8–14 as risk, 15–19 as harmful alcohol use, and 20–40 as alcohol dependence (25).

Sociodemographic variables, collected at the nightclub entrances in face-to-face interviews, were evaluated as explanatory variables and included (i) ‘‘Sex’’ (male; female); (ii) ‘‘Age range’’ (18–24 years; 25–34 years; 35–44 years; 45 years and above); (iii) ‘‘Occupation’’ (formal employment; informal employment; exclusively studying; unemployed, seeking work; unemployed, not seeking work; retired); (iv) ‘‘Marital status’’ (single; married/stable relationship; separated/divorced/widowed); (v) ‘‘Education level’’ (none to incomplete high school; complete high school; higher

education; graduate degree); and (vi) “Socioeconomic status” (A; B; C; D/E). In the variable “Education level”, patrons were distributed according to their highest degree. The variable “Socioeconomic status” was obtained according to the Brazilian Population Studies Association (Associação Brasileira de Estudos Populacionais – ABEP, 2012), and strata were classified into A = high; B = upper-middle, C = middle, D = lower-middle, E = low. Strata D and E were grouped.

The variables of illicit drug use – “Marijuana”, “Cocaine”, “Ecstasy”, “Crack”, “Inhalants”, “Ketamine”, “Methamphetamine”, “Other amphetamines”, “Tranquilizers” and “Hallucinogens” – refer to the consumption of these drugs in the past 12 months, coded as dichotomous variable (yes/no).

### Statistical analysis

We computed weights for nightclubs, weights for patrons within a nightclub and overall patron weights. Post-stratification adjustments were made using the information about the sex of all customers present at each nightclub (a total of 23,100 patrons were present in the 31 nightclubs on the days of data collection, with 59% men and 41% women). Non-participation adjustment rates for the nightclub weights were also calculated and described in details in Carlini et al. (24).

Descriptive comparative analysis of the distribution of sociodemographic variables and illicit drug use by classification of alcohol use according to AUDIT was performed by means of the Chi-squared test, considering the complex structure in the sampling plan. An ordered logit regression model, which consists of a logistic regression for polytomous ordinal responses, was used to evaluate the simultaneous effect of sociodemographic variables on the classification of alcohol use. According to Wooldridge (26), the ordered logit serves to construct a model in which each individual’s level of real consumption (non-observable or latent variable) is classified into one of the risk levels (low risk, risk, harmful, and dependence), the probability of which depends on their sociodemographic profile.

Analyses were performed using SPSS 20.0 and Stata 12 statistics software, considering the structure of the sampling plan.

### Ethics

This study was approved by the Research Ethics Committee of the Federal University of São Paulo (Nr. 21477) and was conducted in 2013. No financial compensation was provided to the participants, as it is not allowed in Brazil, as designated by the National Health Council, at the Resolution 196/96, which deals with regulatory guidelines and standards for research involving human subjects. Before beginning the interview, selected patrons were informed about the objectives of the study and were invited to participate.

They were told that it was a scientific study about alcohol and drug use among nightclub patrons in the city of São Paulo, carried out by UNIFESP and that their participation would allow researchers and policy makers to understand the nightlife scenario and risk exposure. The anonymity and confidentiality of their answers were ensured, and no personal

data other than first name, e-mail address and phone number was asked, as requested by Ethics Committee, to guarantee data protection, given the sensitive nature of the questions and the information of illicit behaviors. Then, it was explained that if they agreed to participate in the study, they would be contacted in three moments: entrance of the nightclub (face-to-face interview), exit (face-to-face interview) and on the day after (online interview). Also they were told that they would be asked to use a breathalyzer in the entrance and exit of the nightclub, so researchers could collect data on alcohol use. To avoid potential coercion they were clearly told that: “You are not obligated to participate and if you decide not to participate, nothing will happen to you. Your participation is voluntary and you can withdraw from the study at any time”.

Individuals with significant signs of severe intoxication, according to the screening guidelines described by Perham et al. (27), were not interviewed in the entrance or exit of the nightclub to avoid potential coercion.

On the day-after survey the participants read the consent term at the website and opted, again, to participate or not by clicking their option in the screen. All the procedures were approved by the Federal University of São Paulo Ethics Committee after the principal investigator have complied with the recommendations and requirements of Brazilian legislation for research in humans subjects. Details about the study protocol can be found at [www.baladacomciencia.com.br](http://www.baladacomciencia.com.br).

### Results

A total of 3063 patrons of the 31 nightclubs were recruited to answer questions in the entrance and exit portal surveys. An entrance acceptance rate of 80% generated a sample of 2422 of completed entrance interviews and a follow-up rate of 76%, representing 1832 complete exit interviews (Figure 1). Individuals with significant signs of severe intoxication, according to the screening guidelines described by Perham et al. (27), were not interviewed in the entrance ( $n = 16$ ) or exit ( $n = 67$ ). At the exit survey, reasons for missed interviews were refusal to participate ( $n = 12$ , 2.1%), inability to respond because of severe intoxication ( $n = 67$ , 11.3%) and loss to follow-up ( $n = 511$ , 86.6%), defined as those participants who answered to the nightclub entrance questionnaire but left the establishment without being identified by the field interviewers.

Of the 1832 patrons who answered the exit survey the exit about continuing the study the next day, 1222 (67%) answered the first module of the online post-nightclub questionnaire (post-nightclub behavior) 24 h after nightclub data collection (Figure 1), of which 1057 (58%) fully answered the second module (AUDIT).

Table 1 shows the distribution of the interviewed nightclub patrons according to sociodemographic variables and the classification of alcohol use. Approximately 57% of the patrons were classified as low-risk alcohol use. All the others were classified in at least one of the three levels of alcohol use disorders (harmful, hazardous or dependence).

Of all interviewed patrons, 53.6% were male, 56.5% had formal employment, 53.9% had completed high school education, and 57.4% belonged to socioeconomic stratum B.



Table 1. Distribution of nightclub patrons according to sociodemographic variables and the classification of alcohol use disorder ( $n = 1057$ ). São Paulo, 2013.

Sociodemographic variables	Classification of alcohol use disorder									
	Low risk <sup>a</sup>		Risk <sup>b</sup>		Harmful		Dependence <sup>d</sup>		Total	
	wg%	<i>n</i>	wg%	<i>n</i>	wg%	<i>n</i>	wg%	<i>n</i>	wg%	<i>n</i>
Sex										
Male	48.3	307	59.1	210	63.9	69	64.0	21	53.6	607
Female	51.7	284	40.9	124	36.1	31	36.0	11	46.4	450
$F(2,60) = 2.27; p = 0.112$										
Age range										
18–24 years	44.3	262	57.8	199	60.7	60	56.9	18	50.4	539
25–34 years	38.4	224	35.6	115	29.7	30	34.7	10	36.6	379
35–44 years	14.3	89	3.3	11	9.6	10	8.3	4	10.3	114
45 years and above	2.9	16	3.3	9	0.0	0	0.0	0	2.7	25
$F(4,129) = 2.53; p = 0.040$										
Occupation										
Formal employment	57.5	343	54.4	183	53.5	52	66.2	20	56.5	598
Informal employment	24.8	142	18.7	64	22.4	24	19.9	6	22.5	236
Exclusively studying	11.1	63	19.4	59	15.6	17	12.3	5	14.1	144
Unemployed, seeking work	4.2	25	4.7	18	6.6	5	1.6	1	4.5	49
Unemployed, not seeking work	2.1	15	2.8	10	1.9	2	0.0	0	2.3	27
Retired	0.3	2	0.0	0	0.0	0	0.0	0	0.2	2
$F(8,246) = 1.05; p = 0.400$										
Marital status										
Single	86.7	511	93.5	313	95.9	95	94.4	29	89.9	948
Married/stable relationship	8.5	53	4.4	15	3.4	4	3.4	2	6.6	74
Separated/divorced/widowed	4.8	25	2.0	5	0.7	1	2.2	1	3.5	32
$F(5,148) = 3.11; p = 0.011$										
Education level										
None to incomplete high school	2.6	16	2.1	7	2.3	3	3.8	2	2.5	28
Complete high school	49.5	291	58.9	195	63.9	59	54.4	19	53.9	564
Complete higher education	35.7	204	31.7	103	29.1	32	35.1	8	33.8	347
Graduate degree	12.2	71	7.2	26	4.7	5	6.6	3	9.8	105
$F(6,176) = 1.41; p = 0.215$										
Socioeconomic status (SES)										
A	27.8	149	28.0	96	27.3	30	45.3	14	28.4	289
B	57.5	348	57.8	190	61.1	58	42.4	13	57.4	609
C	14.0	88	13.0	45	11.6	12	12.3	5	13.4	150
D/E	0.7	6	1.3	3	0.0	0	0.0	0	0.8	9
$F(5,157) = 0.78; p = 0.57$										
Total*	56.6	591	31.1	334	9.1	100	3.2	32	100.0	1057

\*wg%, weighted prevalence considering sample weights; <sup>a</sup>AUDIT score between 0 and 7; <sup>b</sup>AUDIT score between 8 and 14; <sup>c</sup>AUDIT score between 15 and 19; <sup>d</sup>AUDIT score between 20 and 40; SES (A = high; B = upper-middle, C = middle, D = lower-middle, E = low).

Further, according to Table 1, only the AUDIT classification, age range ( $p = 0.040$ ) and marital status ( $p = 0.011$ ) were associated. Notably, there was a lower prevalence of singles in the group of low-risk use (86.7%) compared to the other groups (above 93%). With regard to age range, there were more patrons aged 35 years and above in the group of low-risk use (17.3%) compared to the other groups (below 10%).

According to Table 2, there was an association between the classification of alcohol use and the use of illicit drugs. Of note, the use of marijuana, cocaine and inhalants increased with increased severity of the alcohol use pattern. Thus, patrons classified as “low-risk alcohol use” exhibited a lower percentage of use of the above drugs compared to individuals with consumption patterns classified as risk, harmful or dependence.

As observed in Table 3, the variables sex ( $p = 0.020$ ), age range ( $p = 0.014$ ), marital status ( $p = 0.031$ ) and education level ( $p = 0.011$ ) remained in the final model. Patrons aged 35 years and above were 52% less likely to have higher alcohol use disorders levels than younger individuals. Furthermore,

individuals with a graduate degree had 43% lower chance to exhibit more problematic alcohol use than individuals with lower education levels. Additionally, men exhibited 1.68 times higher chances for problematic alcohol use than women, and singles had a 71% higher chance for problematic alcohol use than individuals who were married, in a stable relationship, separated, widowed or divorced.

Figure 2 shows that the factors “male” (sex) and “single” (marital status) were risk factors and that the factors “35 years and above” (age range) and “graduate degree” (education level) were protective factors for a high-risk pattern of alcohol use. Therefore, the individuals at highest risk (male, single, below 35 years of age, and with no graduate degree) had a 45.9% chance of belonging to the category of low-risk use and a 37.1% chance of belonging to the category of high-risk use. Patrons with a low-risk profile (female, non-single, 35 years of age and above, and with a graduate degree) had an 89.8% chance of belonging to the category low-risk use and, consequently, only an 8.2% chance of belonging to the category high-risk use.

Table 2. Patron distribution by drug use (in the past 12 months) according to the classification of alcohol use disorder ( $n = 1057$ ). Odds ratio estimates for the ordered logit model. São Paulo, 2013.

Illicit drugs	Classification of alcohol use disorder										OR*	<i>p</i>
	Low risk <sup>a</sup>		Risk <sup>b</sup>		Harmful <sup>c</sup>		Dependence <sup>d</sup>		Total			
	wg%	<i>n</i>	wg%	<i>n</i>	wg%	<i>n</i>	wg%	<i>n</i>	wg%	<i>n</i>		
Marijuana												
No	78.6	459	50.7	172	48.3	51	41.5	15	66.0	697	1.00	
Yes	21.4	129	49.3	161	51.7	49	58.5	17	34.0	356	2.64	<0.001
F(3.83) = 31.67; <i>p</i> < 0.001												
Cocaine												
No	97.5	569	91.3	300	88.7	88	78.3	24	94.2	981	1.00	
Yes	2.5	20	8.7	32	11.3	12	21.7	8	5.8	72	2.42	<0.001
F(3.81) = 8.26; <i>p</i> < 0.001												
Ecstasy												
No	92.2	536	86.2	287	83.4	84	78.5	24	89.1	931	1.00	
Yes	7.8	53	13.8	46	16.6	16	21.5	8	10.9	123	0.80	0.363
F(3.81) = 4.9; <i>p</i> = 0.005												
Crack												
No	99.9	588	99.8	327	99.4	99	98.3	31	99.8	1,045	1.00	
Yes	0.1	1	0.2	1	0.6	1	1.7	1	0.2	4	4.38	0.305
F(2.58) = 3.04; <i>p</i> = 0.057												
Inhalants												
No	94.3	555	85.7	277	74.2	75	82.5	27	89.4	934	1.00	
Yes	5.7	34	14.3	56	25.8	25	17.5	5	10.6	120	1.78	0.042
F(2.60) = 9.77; <i>p</i> < 0.001												
Ketamine												
No	98.0	571	98.3	324	94.9	95	93.1	30	97.6	1,020	1.00	
Yes	2.0	17	1.7	8	5.1	5	6.9	2	2.4	32	0.40	0.103
F(3.79) = 2.67; <i>p</i> = 0.061												
Methamphetamine												
No	99.0	582	97.4	324	94.4	95	97.8	31	98.0	1,032	1.00	
Yes	1.0	7	2.6	9	5.6	5	2.2	1	2.0	22	1.33	0.103
F(3.85) = 4.18; <i>p</i> = 0.009												
Other amphetamines												
No	98.2	579	98.0	325	94.2	95	93.5	30	97.6	1,029	1.00	
Yes	1.8	9	2.0	8	5.8	5	6.5	2	2.4	24	1.42	0.463
F(2.62) = 2.6; <i>p</i> = 0.081												
Tranquilizers												
No	96.3	566	96.6	322	88.4	91	98.3	31	95.7	1,010	1.00	
Yes	3.7	23	3.4	10	11.6	9	1.7	1	4.3	43	1.89	0.069
F(2.71) = 3.38; <i>p</i> = 0.032												
Hallucinogens												
No	92.5	548	83.2	280	79.4	84	79.9	25	88.0	937	1.00	
Yes	7.5	40	16.8	52	20.6	16	20.1	7	12.0	115	1.14	0.469
F(2.72) = 9.11; <i>p</i> < 0.001												

\*OR adjusted simultaneously for all the listed variables; <sup>a</sup>AUDIT score between 0 and 7; <sup>b</sup>AUDIT score between 8 and 14; <sup>c</sup>AUDIT score between 15 and 19; <sup>d</sup>AUDIT score between 20 and 40.

## Discussion

The results presented here are part of the first epidemiological survey in Brazil on patterns of alcohol, drug use and risk behaviors at nightclubs. This complex study was designed with multi-stage data collection and used multiple instruments and technologies. The results exhibited in this manuscript address the association of sociodemographic factors and illicit drug use with the classification of alcohol use disorders in nightclub patrons. High-risk groups in respect to alcohol abuse were identified, suggesting that half of this group needs urgent brief intervention or regular treatment, according to the guidelines of WHO for AUDIT screening (17).

The main findings of this study include the 43.4% prevalence of patrons with alcohol use-related disorders (AUDIT score  $\geq 8$ ), the lower prevalence of single individuals in the low-risk consumption group in respect to the other groups, the higher prevalence of individuals aged 35 years and above in the group of low-risk consumption, male sex and

single marital status as risk factors, graduate degree and age above 35 years as protective factors, and the relevant association between alcohol use and illicit drug use in the past year (i.e. marijuana, cocaine, ecstasy, inhalants, methamphetamines, tranquilizers and hallucinogens).

The prevalence of 43.4% of alcohol use-related disorders detected in this study is significantly higher compared to the 18.4% found in the general population, as measured in a study conducted with the use of AUDIT in South Brazil (28). This difference in the prevalence of alcohol use-related disorders could be explained by the profile of nightclub patrons, who are usually identified as the high-risk population for alcohol abuse because they are more exposed to alcohol and illicit drug use, and by the higher permissiveness of both the establishments and the culture in respect to abusive consumption (13,29–31).

In the extreme of alcohol use-related disorders is the alcohol dependence, whose prevalence found in the present

Table 3. Odds ratio estimates and 95% confidence intervals (95% CI) of the full and final model of the ordered logit regression for the association of alcohol use disorder (AUDIT) and sociodemographic data from 1057 nightclub patrons interviewed in São Paulo, 2013.

Variables	Full model					Final model				
	Odds ratio	Standard error	<i>t</i>	<i>p</i>	95% CI	Odds ratio	Standard error	<i>t</i>	<i>p</i>	95% CI
Sex										
Male	1.73	0.35	2.67	0.012	1.14–2.63	1.68	0.36	2.45	0.020	1.09–2.60
Female	Ref	–	–	–	–	Ref	–	–	–	–
Age range										
18–24 years	1.25	0.23	1.21	0.236	0.86–1.84	1.00	–	–	ns	–
25–34 years	Ref	–	–	–	–	Ref	–	–	–	–
35 years and above	0.55	0.18	–1.84	0.076	0.28–1.07	0.48	0.13	–2.61	0.014	0.27–0.85
Occupation										
Formal employment/retired	Ref	–	–	–	–	–	–	–	–	–
Informal employment	0.86	0.11	–1.11	0.275	0.66–1.13	–	–	–	–	–
Exclusively studying	1.26	0.29	1.00	0.325	0.79–2.01	–	–	–	–	–
Unemployed, seeking work	1.24	0.39	0.67	0.507	0.65–2.37	–	–	–	–	–
Unemployed, not seeking work	1.03	0.40	0.08	0.938	0.47–2.27	–	–	–	–	–
Marital status										
Single	1.48	0.46	1.28	0.212	0.79–2.79	1.71	0.40	2.26	0.031	1.05–2.76
Married/stable relationship	Ref	–	–	–	–	Ref	–	–	–	–
Separated/divorced/widowed	0.94	0.43	–0.15	0.885	0.37–2.38	1.00	–	–	ns	–
Education level										
None to incomplete high school	0.71	0.33	–0.75	0.456	0.28–1.81	1.00	–	–	ns	–
Complete high school	Ref	–	–	–	–	Ref	–	–	–	–
Complete higher education	0.92	0.17	–0.43	0.667	0.64–1.34	1.00	–	–	ns	–
Graduate degree	0.61	0.15	–1.94	0.062	0.37–1.03	0.57	0.12	–2.70	0.011	0.38–0.87
Socioeconomic status (SES)										
A	1.07	0.16	0.47	0.641	0.79–1.46	–	–	–	–	–
B	Ref	–	–	–	–	–	–	–	–	–
C	0.81	0.20	–0.87	0.393	0.49–1.33	–	–	–	–	–
D/E	1.08	0.45	0.19	0.852	0.46–2.55	–	–	–	–	–

SES: A = high; B = upper-middle, C = middle, D = lower-middle, E = low.

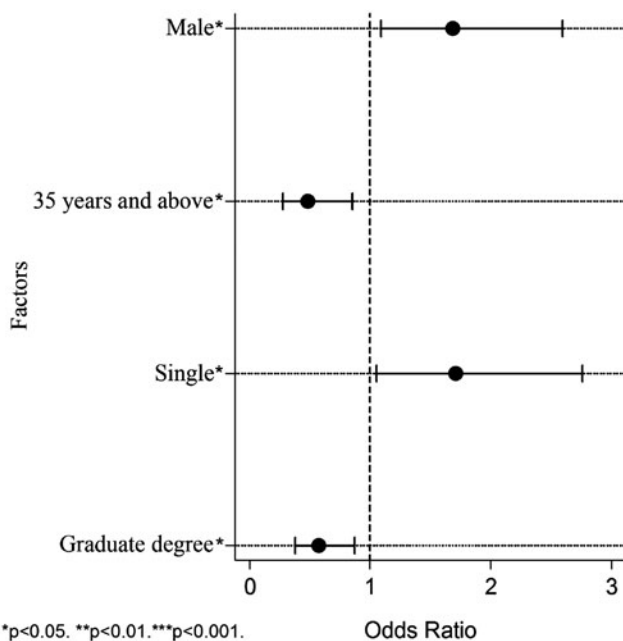


Figure 2. Graphic view of the odds ratios and 95% confidence intervals in the final ordered logit model with alcohol use disorder (AUDIT) as the outcome variable and sociodemographic variables as the explanatory variables among 1057 nightclub patrons in São Paulo City, 2013.

study was 3.2%. Even though the prevalence of alcohol dependence was below that of the general population, which is 9% according to the First National Survey on patterns of alcohol consumption in the Brazilian population (32), the

higher percentage of young adults in the sample, who are known to exhibit a very low prevalence of dependence, must be considered. Specifically, alcohol dependence has a long latency and is thus usually detected at more advanced ages (33). However, it is important to notice that most of the Brazilian general population surveys used screening test different from AUDIT (such as HABLAS or SAMSHA household questionnaires), what limit most comparisons.

In the present study, men had a 68% higher chance of using alcohol than women, a value that was lower than that reported for the general population of South Brazil (28), where men had a 218% higher chance of using alcohol than women. This finding suggests that female nightclub patrons have a consumption profile more similar to that of men and less similar to that of the general female population.

The risk factors for alcohol use detected among nightclub patrons in the present study are also compatible with international findings on the general population, where a higher degree of alcohol use was associated with single marital status, male sex, and younger population (34,35).

The high prevalence of illicit drug use among nightclub patrons suggests that this group is more exposed to the physical and legal consequences of substance use, thus exceeding all prevalence values reported in representative studies of the Brazilian population (36). Furthermore, the use of illicit drugs was associated with high-risk profiles of alcohol use. This finding is in agreement with a study conducted in Australia, where individuals with alcohol use-related disorders were 15 times more prone to abusing other

drugs compared to the young adult population with no alcohol use-related disorders (37).

The results of the present study on nightclub patrons are alarming and indicate that they are, in fact, a high-risk group for drug use. Our results point to a group that present a high level of any alcohol use disorder that need clinical treatment or brief intervention, depending on the gravity of the identified disorder. An example that has demonstrated important results among college alcohol abusers in Australia, New Zealand and United Kingdom was the online social norms interventions to reduce abusive alcohol use (19,38). The same is true for brief intervention and referral for treatment among young adults in emergency department (39) and adolescents in schools (40). The Brazilian government, through the National Secretariat of Drug Policies (SENAD), maintains a free public service hot line (VIVA-VOZ<sup>1</sup>) that offers screening and brief intervention for alcohol and drug use throughout the Brazilian territory and reports, for each location, a closer address for public treatment to alcohol abuse and dependence. This service is little known among potential customers and certainly deserves to be better publicized in nightclubs. Therefore, it is essential that nightclubs in Brazil provide posters, boards or flyers publicizing these existing governmental free services.

Moreover, public intervention policies specifically aimed at this population will be necessary to control the consequences related to alcohol and illicit drug abuse, such as risky sexual behavior (higher risks of unprotected sex and sexual violence), physical violence related to drug use, drunk driving, and individual harmful consequences (for example, alcohol intoxication and impairment of daily activities). According to Calafat et al. (41), there are several types of intervention strategies that can contribute to the reduction of alcohol and other drug use in nightclubs, such as the implementation of nightclub staff training programs, the control of nightclub opening hours and capacity, community interventions, improvements of the inside and outside environments, the control of operating licenses, and programs to fight drunk driving.

The implementation of staff training programs (including bartenders, security staff and managers) with the objective of reducing alcohol sales to clients who are visibly drunk and to reduce the practice of hostile and aggressive behavior by the staff contribute to lower alcohol use and violence incidence, both inside and outside nightclubs (41–43). Furthermore, the association between longer nightclub opening hours and increased alcohol use and associated problems has also been observed (44). Other interventions that must be considered include the stronger supervision of the abidance of operating licenses, the improvement of the environment (e.g. controlling the sound volume, selling food on the premises, and reducing the cost of water) and improvements made by the State regarding transportation and illumination (41).

Even though this work is a pioneer study in Brazil, a developing country marked by great damage due to alcohol abuse by its population, it has limitations that must be pointed

out: (i) the sample loss rate over the different stages of data collection; (ii) the small number of cases of crack, ketamine and other amphetamine use, which might be responsible for the absence of significance in the association of illicit drug use with the classification of alcohol use; (iii) the impossibility to deduce a causality in the association between drug use and alcohol consumption classification since it is a cross-sectional survey; and (iv) the comparability limitation of AUDIT scores: while some authors evaluate alcohol use by quantifying the ingested amounts, others use classification instruments, such as the CAGE questionnaire and the DSM-IV, which ultimately limits the comparability of the results with the AUDIT screening test.

The use of epidemiological data from representative population studies is of fundamental importance for targeting public intervention policies. However, it is important to note the importance of not only enforcing these policies but also heavily policing the measures implemented to combat the consequences of alcohol use. The implementation of education policies for the population in general and for the nightclub patron population specifically and the stronger enforcement of drunk driving prevention programs must also be considered.

### Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this paper.

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<sup>1</sup>For details of VIVA-VOZ, see the website at: <http://www.servicos.gov.br/repositorioServico/servico-nacional-de-orientacoes-e-informacoes-sobre-a-prevencao-ao-uso-de-drogas-2013-vivavoz-132>



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