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Factors Associated with Pre-drinking Among Nightclub Patrons in the City of São Paulo

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Abstract — Aims: The aim of the study was to describe the phenomenon of pre-drinking (alcohol consumption before entering nightclubs or bars) and to identify factors associated with pre-drinking practices among patrons in the city of São Paulo, Brazil. **Methods:** Individual-level data were collected by a portal survey of 2422 patrons at the entrance and at the exit of 31 nightclubs. The nightclubs were selected by two-stage sampling using a probability proportional to the establishments' capacity in the first stage and a systematic sample of patrons in the second stage. Breath alcohol concentration (BrAC) was measured. Face-to-face interview identified pre-drinking characteristics and past-year risk behaviors. Analysis used sample weights to compensate for nightclubs or patrons that were possibly over- or under-represented. **Results:** Of the study participants, 41.3% (95% confidence interval (CI) = 33.7–49.3) engaged in pre-drinking on the night of the interview. Being male (odds ratio (OR) = 1.98, 95% CI = 1.45–2.71), past-year binge drinking (OR = 2.28, 95% CI = 1.70–3.07), previous episodes of severe effects from drunkenness (OR = 1.77, 95% CI = 1.40–2.22) and sexual risk behavior (OR = 1.67, 95% CI = 1.20–2.33) were associated with recent pre-drinking. Pre-drinking predicted higher BrACs at the nightclub exit. **Conclusion:** Pre-drinking is prevalent among nightclub patrons and associated with risk behaviors, and is associated with alcohol intoxication at nightclub exits. Environmental prevention strategies must consider pre-drinking as a potential risk factor for alcohol intoxication in nightclubs.

INTRODUCTION

Alcohol abuse among young people is associated with violence, traffic accidents, risky sexual behaviors (such as unsafe sex and sexually transmitted infections) and higher propensity to abuse other drugs. The problems related to alcohol use affect not only the user but also the entire community with damage resulting from acute intoxication and dependence itself (Babor *et al.*, 2010).

Pre-drinking (or pre-loading or pre-partying) is the consumption of alcohol in a private or common place before entering a nightclub, bar or party (Borsari *et al.*, 2007; DeJong *et al.*, 2010). This high-risk drinking activity has recently emerged as an area of concern among alcohol researchers studying college student populations. Motivations for pre-partying are generally strategic and associated with the goal of becoming intoxicated (DeJong *et al.*, 2010). Students report rapid drinking before an event as a way to lower social anxiety and save money (Wells *et al.*, 2009; DeJong *et al.*, 2010).

Pre-drinking (or pre-loading) has already been investigated by researchers from the USA and UK, particularly. The findings show that the consumption of alcohol prior to attending licensed premises seems to occur when patrons aim to save money and to facilitate peer and sexual interaction (Foster and Ferguson, 2014).

Although some authors suggest that pre-drinking is a way to save money, there is evidence that young people consume more drinks throughout the night when they practice pre-drinking, reaching higher levels of intoxication when compared with occasions when they do not practice pre-drinking (Pedersen and Labrie, 2007; Merrill *et al.*, 2013).

No epidemiological study has been published to our knowledge on alcohol consumption in nightclubs in Brazil, where the legal drinking age is 18 years and current policies allow drinking in public, including on streets and beaches and in parks. Such epidemiological data are needed to form the basis of policies aimed to decrease alcohol abuse in nightclubs and during nights out in an attempt to reduce alcohol intoxication, thereby decreasing violent episodes and other risk behaviors associated with alcohol. Accordingly, the present study aimed to describe the phenomenon of pre-drinking and to identify factors associated with pre-drinking among nightclub patrons in the city of São Paulo. The main hypothesis was that drinking prior to entering a nightclub does not lead to lower alcohol consumption in nightclubs but to higher BrAC levels at nightclub exits.

METHODS

Sampling

A portal survey was conducted at nightclubs in the city of São Paulo, and data were collected from nightclub patrons. São Paulo, the capital of the State of São Paulo, is located in the Southeast Region of Brazil. It has an estimated population of 11,016,703 inhabitants and is the largest city and the largest economy by gross domestic product in the southern hemisphere (IBGE, 2014). This study was a two-stage cluster sampling portal survey, defined as assessments occurring proximal to the entry point to a high-risk locale and immediately on exit, used to measure characteristics and behavior of attendees at an event of interest (Voas *et al.*, 2006). The first stage consisted of a systematic sample using probabilities proportional to the nightclubs' maximum capacity. The second stage was a systematic sampling of every third person in the entrance line of the nightclubs (Voas *et al.*, 2006). Data were collected during the first semester of 2013.

Bars and pubs in São Paulo typically differ from nightclubs in their physical space and the ability to control individual patrons at the venue entrance and exit. While nightclubs are indoor establishments with loud music and dance floors, bars and pubs usually have both outdoor and indoor areas without loud music and in most cases, do not have dance floors. Bars and pubs also usually lack a controlled entry/exit for patrons.

We defined 'nightclubs' as establishments that have controlled entry and exit of patrons, sell alcoholic beverages and have a dance floor. The nightclub frame list was created by an active search of magazines and guides specialized in leisure activities and the first ten pages resulting from a Google search using the following key words: 'São Paulo, Nightclubs and Discos' (in Portuguese). The final frame list consisted of 150 nightclubs that met the inclusion criteria; 40 nightclubs and their replacements were drawn from this frame list (Voas *et al.*, 2006). The replacements had the same capacity, were located in the same neighborhood and were subject to the same probability of selection as the original nightclub sampled. Some difficulties arose with this sampling method. First, the sample obtained could not reflect the original systematic sample that was proportional to the nightclubs' capacity. Second, replacements for moderate to large nightclubs were more difficult to obtain due to the lack of availability in a universe of 150 nightclubs in this kind of sampling. Fortunately, the sample of nightclubs still contained some moderate to larger clubs, the largest nightclubs agreed to participate, and smaller to moderate sized ones were easily replaced. Thus, the probability of a nightclub being selected had to be adjusted to reflect the original sampling scheme based on 40 nightclubs. Of the 40 original nightclubs selected for sampling, 31, including replacements, agreed to participate, resulting in an acceptance rate of 66%.

An adjustment factor for non-response was used by weighting the 31 nightclubs in order to make them equivalent to the 40 selected nightclubs. The adjustments were estimated by a logistic regression model with agreement to participate in the study as the dependent variable and establishment size as the explanatory variable. The nightclub (clusters) weights were equal to the inverse selection probability multiplied by the non-response adjustment factor.

A target sample size of 1600 patrons was calculated considering an absolute precision of 5% and a confidence interval of 95%, two-stage cluster sampling and a design effect of 2 (Lwanga and Lemeshow, 1991). Taking into account a possible refusal rate of 30% and a maximum loss to follow-up from the entrance to the exit of 40% (Clapp *et al.*, 2007), 2912 patrons were initially approached.

The refusal to participate at the entrance and in the follow-up was a 'guess' for the São Paulo population because it was the first survey carried out in nightclubs in Brazil but we had lower levels of refusal than expected (real data: 20% refusal rate and 25% loss to follow-up rate).

Post-stratification weights were used for the subjects. The individual weight was equal to the inverse selection probability multiplied by the adjustment factor for gender distribution in the nightclubs. Then, the final weight for each individual was computed as the product of the cluster weight and the individual weight.

Data collection and instruments

Patrons were systematically selected from the entrance lines of the nightclubs. The inclusion criteria were as follows: intention to enter the nightclub and being 18 years old or older. If the patron refused to participate, data on age and gender were registered and the next patron was approached. The patrons that agreed to participate answered an entrance and exit survey interview and completed a breathalyzer test after each interview (calibrated Draguer Alcotest 7410 plus). The patrons received a bracelet with a unique code to identify them at the nightclub exit. Seven field researchers used Samsung Galaxy tablets to collect the interview data, and data were sent to a central database in real time.

The questionnaires were developed based on the data collection instruments of The European Institute of Studies on Prevention (IREFREA) (IREFREA, 2007) and other research conducted in Europe (Hughes *et al.*, 2011a,b). The questionnaire used during the interviews at the entrance line was structured with closed questions addressing sociodemographic characteristics, pre-drinking (alcohol use before going to the nightclub), pre-drinking characteristics, drinking patterns, drug use and risk behaviors in nightclubs in the year prior to the survey. The exit questionnaire included questions about types of beverages and drugs consumed in the nightclub and risk behaviors in the nightclub. Per patron, the entrance interview took 10 min and the exit interview ~5 min, on average. The refusals from the participants were also included. We had a screen on the tablet to register refusals after patrons were approached to participate in the survey (Agreed to participate? Yes or no. If no, the tablet opened a window with 3 variables about the refusal). The variables registered for each refusal to participate at the entrance were: (a) gender (male/female); (b) apparent age group (18–24, 25–32, 33–40, + 40) and (c) evidence of alcoholic state (Perham scale). No gender or age differences were found among the refusals and acceptances to participate at the entrance ($p_{sex} = 0.945$, $p_{age} = 0.801$).

Variables

The outcome variable for the statistical analysis was pre-drinking, which was defined by the questionnaire as 'drinking before entering the nightclub' (0 = no, 1 = yes). Pre-drinkers were interviewed about where drinking took place prior to entry into the nightclub. The possible answers were: residence, streets, bars, gas station, restaurant and others. Patrons that reported no pre-drinking but showed a positive BrAC (3% of the sample) were excluded from the analysis. Binge drinking (or alcohol intoxication) was defined as BrAC ≥ 0.38 mg/l, which corresponds to a blood alcohol concentration of 0.08% (mean concentration for a binge drinking episode) (Haffner *et al.*, 2003; NIAAA, 2004). The following aspects of the individuals were evaluated as explanatory variables: sociodemographic characteristics (age, gender, socioeconomic status (SES), education, occupation and religion); history of binge drinking (past year and past month); drug use on the day of the interview (tobacco and illicit drugs—any marijuana, cocaine, ecstasy, crack, inhalants, ketamine, methamphetamine, other amphetamines, benzodiazepines or hallucinogens); practices and risk behaviors in the last year associated with alcohol use (driving while intoxicated; riding with a drunk driver; involved in accidents because of alcohol; engaging in fights; blacking out, fainting or entering coma because of alcohol intoxication; sexual risk behaviors, such as not remembering if sex was consensual, having sex under the influence of alcohol, not using condoms and regretting the relationship).

SES was evaluated as indexed in relation to a highly Brazilian standardized survey assessment of SES known as the Associação Brasileira de Empresas de Pesquisa (Brazilian Association of Research Agencies) index. This index (ABEP, 2012) is based on the education level of the head of the

household, possession of various types of household goods (e.g. television sets) and the number of housekeepers. This scale was used to sort participants into standardized subgroups labeled A–E (where A was the highest economic strata).

To facilitate the interpretation and improve the accuracy of estimates in the regression models, some categories with low frequencies were grouped. Thus, for the SES variable, the C, D and E classes were grouped; for the occupation variable, 'unemployed' and 'retired' were grouped; for the age variable, the category '42 years or more' was created and for the education variable, 'elementary school' and 'no diploma' were grouped in the same category. To reduce the number of independent variables two new binary variables were created with combinations of original variables. 'Severe effects of intoxication' were present when there was at least one positive answer to one of the following: blacking out, fainting or entering coma because of alcohol intoxication. 'Sexual risk behavior' indicates that there was at least one positive answer to the following four variables: not remembering if sex was consensual, having sex under the influence of alcohol, not using condoms or regretting the relationship.

Data analysis

Data were analyzed using Stata software version 12 (StataCorp, College Station, TX, USA). We computed weights for nightclubs, 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, 59% men and 41% women). Non-participation adjustment rates for the nightclub weights were also calculated. Descriptive and inferential statistics of the sampled patrons and nightclubs were computed using survey weight estimates.

BrAC data measured at the entrance and exit of the nightclubs were described and compared by the chi-square test or Student's *t*-test (for alcoholic variable dosing in mg/l). For this analysis, we considered both the total respondents and only those who reported pre-drinking on the night of the interview. Pre-drinkers and non-pre-drinkers were compared with regards to sociodemographic characteristics, history of binge drinking, drug use on the day of the interview and risk behaviors in the last year. The chi-square test was used for all comparisons. In order to identify the main factors associated with pre-drinking, logistic regression models were adjusted using pre-drinking as the dependent variable. The independent variables were the same as those used in the comparisons between pre-drinkers and non-pre-drinkers, except those observed after entry into the nightclubs. In the first step, the variables were analyzed separately by univariate logistic regression models. Then, we set up a multiple logistic regression model in which variables with $P < 0.20$ in the univariate analysis were included. From an initial multivariate model, variables without statistical significance ($P > 0.05$) were excluded stepwise to reach a final model with only the significant variables. The results were presented as odds ratios (OR) and 95% confidence intervals (95% CI). In all multivariate analyses, the demographic variables (gender, age and social class) remained in the models as control variables.

The study was approved by the Ethics Committee of the Federal University of São Paulo.

RESULTS

A total of 3063 patrons of the 31 nightclubs were recruited to answer questions in an entrance and exit portal survey. 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 (1822 with breathalyzer result).

Reasons for missed exit 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%).

Of the 2422 respondents, the majority (60.7%, 95% CI = 48.2–71.9) were male. When asked about pre-drinking practices on the day of the interview, 41.3% ($n = 1074$, 95% CI = 33.7–49.3) reported having drunk alcohol before going out to the nightclub that day. The demographic data for the sample are presented in Table 1. According to this table, there are statistically significant differences between pre-drinkers and non-pre-drinkers regarding to gender ($P < 0.001$) and social class ($P = 0.017$). Pre-drinkers group presented greater percentage of men and higher social class when compared with non-pre-drinkers.

No gender or age differences were found among the refusals and acceptances to participate at the entrance ($p_{sex} = 0.945$) or among the acceptances and losses to follow up at the exit ($p_{age} = 0.953$; $p_{sex} = 0.809$).

The pre-drinking characteristics are shown in Table 2. We observed that pre-drinking was more frequent after 7 pm, and that beer was the most consumed beverage followed by vodka.

Among the respondents who reported pre-drinking ($n = 1074$), the mean BrAC at the entrance was 0.23 mg/l (95% CI = 0.19–0.27) compared with 0.00 mg/l among the non-pre-drinkers. At the nightclub exits, a higher mean BrAC was identified among pre-drinkers ($P < 0.001$); the mean BrAC was 0.34 mg/l (95% CI = 0.29–0.40) compared with 0.17 mg/l (95% CI = 0.11–0.40) of the non-pre-drinkers. Comparing the increase in BrAC concentration in the exit of the nightclub, no differences were found between the two groups ($P = 0.766$).

Among the pre-drinkers, 22.8% ($n = 1060$, 95% CI = 17.9–28.6) showed binge drinking dosing (BrAC ≥ 0.38 mg/l) at the nightclub entrance, and 44.3% ($n = 373$, 95% CI = 36.0–53.0) showed this dosage at the nightclub exit. On the other hand, 21.9% of the non-pre-drinkers ($n = 180$, 95% CI = 13.5–33.6) presented binge drinking BrAC level (≥0.38 mg/l) at the time of nightclub exit. The prevalence of binge drinking BrAC at the nightclub exit was significantly higher among pre-drinkers ($P < 0.001$), when compared with non-pre-drinkers.

Table 3 shows a comparison between pre-drinkers and non-pre-drinkers in relation to risk behaviors. We observed that binge drinking and intention to get drunk when going out to clubs were more frequent in the pre-drinking group ($P < 0.001$), as well as using tobacco, marijuana and cocaine ($P < 0.05$). Drunk driving, riding with a drunk driver, suffering an accident, not remembering what happened the night before, getting involved in fights, severe effects from drunkenness and variables related to sexual risk behavior were also associated with pre-drinking behavior ($P < 0.05$).

Table 4 shows the logistic regression results that identify factors associated with pre-drinking. The probability of practicing pre-drinking was higher among men (OR = 1.98, 95% CI = 1.45–2.71), smokers (OR = 1.64, 95% CI = 1.00–2.70,

Table 1. Distribution of sociodemographic factors according to pre-drinking practices on the night of the survey, São Paulo 2013

	Pre-drinking									
	Yes			No			Total			
	n = 1074			*n* = 1348			*n* = 2422			
Variables	*n*	Wgt%	95% CI	*n*	Wgt%	95% CI	*n*	Wgt%	95% CI	*P*
Gender										<0.001
Female	319	27.6	18.9–38.3	627	47.5	34.7–60.7	946	39.3	28.1–51.7	
Male	755	72.4	61.6–81.1	721	52.5	39.2–65.3	1476	60.7	48.2–71.9	
Age group (years)										0.409
18–25	619	61.0	49.5–71.5	738	64.0	52.0–74.6	1357	62.8	51.9–72.6	
26–33	302	26.8	19.8–35.0	383	23.6	16.9–31.9	685	24.9	18.9–32.2	
34–41	104	8.3	5.4–12.6	148	7.5	5.1–10.8	252	7.9	5.4–11.1	
42–49	40	3.2	1.2–8.2	56	3.3	1.8–5.8	96	3.2	1.6–6.4	
≥50	9	0.6	0.2–1.8	23	1.5	0.3–7.2	32	1.1	0.2–4.8	
Occupation										0.132
Employed	868	80.3	73.0–86.0	1082	79.6	74.2–84.1	1950	79.9	74.5–84.4	
Student	132	13.9	8.3–22.2	146	10.5	5.9–17.8	278	11.9	7.2–18.9	
Unemployed	71	5.7	3.6–9.0	114	9.6	6.9–13.0	185	8.0	6.1–10.4	
Retired	1	0.1	0.0–0.8	3	0.3	0.0–2.4	4	0.2	0.0–1.2	
Living status										0.366
Family of origin	711	65.6	56.1–74.0	911	70.6	63.1–77.1	1622	68.6	60.7–75.5	
Own family	75	7.9	4.2–14.3	98	6.4	3.0–13.0	173	7.0	3.7–13.1	
Alone	191	16.5	12.2–21.9	225	14.7	9.8–21.3	416	15.4	11.3–20.7	
Other	91	9.8	7.2–13.3	106	8.2	6.0–11.1	197	8.9	6.9–11.4	
Marital status										0.215
Single	962	90.9	85.3–94.5	1162	89.8	82.9–94.1	2124	90.2	84.2–94.2	
Married	74	7.1	3.7–13.0	109	6.6	3.7–11.4	183	6.8	3.8–11.7	
Other	31	1.9	1.0–3.6	68	3.6	2.0–6.2	99	2.9	1.8–4.6	
Ethnicity										0.377
White	774	72.1	65.8–77.7	929	67.8	59.5–75.2	1703	69.6	63.2–75.4	
Brown	173	17.3	12.6–23.3	256	21.5	14.9–30.1	429	19.8	14.4–26.5	
Black	79	7.3	5.1–10.4	105	7.7	5.4–10.8	184	7.5	5.6–10.0	
Other	38	3.2	2.2–4.6	41	2.9	1.6–5.0	79	3.0	2.0–4.5	
Social class										0.017
A	325	30.5	22.9–39.3	313	22.5	16.0–30.5	638	25.8	19.0–33.9	
B	579	51.3	46.0–56.5	782	55.3	51.3–59.2	1361	53.6	50.5–56.8	
C/D/E	170	18.2	13.3–24.3	253	22.2	15.6–30.6	423	20.6	15.0–27.5	
Education										0.144
Postgraduate	80	7.0	3.9–12.1	123	7.0	4.1–11.6	203	7.0	4.2–11.5	
University	334	28.0	22.2–34.7	383	24.4	18.4–31.6	717	25.9	20.5–32.1	
High School	585	57.7	51.3–63.8	751	60.9	52.7–68.5	1336	59.6	53.0–65.8	
Elementary Education	56	6.1	3.4–10.7	71	7.5	4.6–11.9	127	6.9	4.3–11.1	
No diploma	6	1.0	0.2–5.2	5	0.1	0.0–0.5	11	0.5	0.1–1.8	
Religion	654	66.4	60.6–71.7	932	71.8	65.6–77.2	1586	69.6	64.0–74.5	0.060

% Wgt: weighted percent.

$P = 0.051$), those with a history of binge drinking (OR = 2.28,95% CI = 1.70–3.07, $P < 0.001$), those who reported severe effects from drunkenness (OR = 1.77, 95% CI = 1.40–2.22, $P < 0.001$) and sexual risk behavior (OR = 1.67, 95% CI = 1.20–2.33, $P = 0.004$), showing that individuals who reported previous episodes (last 12 months) were more likely to practice pre-drinking.

When the group of patrons that reported pre-drinking in a bar ($n = 335$) was compared with the group that reported pre-drinking in other places ($n = 739$) for all the variables presented in Tables 2 and 3, we found that the 'pre-drinking in a bar' group showed a higher frequency of beer consumption (OR = 2.51, 95% CI 1.54;4.10, $P = 0.001$) and a lower frequency of vodka consumption (OR = 0.56, 95% CI 0.34;0.92, $P = 0.025$). Pre-drinking in a bar was also associated to regretted a sexual intercourse because of alcohol after leaving a club, in the past year (OR = 1.78, 95% CI 1.12;2.83, $P = 0.017$; data not show in table).

DISCUSSION

This study was the first epidemiological survey on patterns of alcohol and other drug use at nightclubs in Brazil. Almost half of the sample reported pre-drinking on the day of the interview. This behavior usually occurs at home or on streets. The main reasons given for this practice were to 'reduce social anxiety when arriving at a later event' and to 'save money'. At the nightclub exit, those who engaged in pre-drinking had a higher BrAC compared with patrons who did not engage in pre-drinking. In general, risk behaviors were more frequent among pre-drinkers. The factors associated with pre-drinking were gender (male), recent tobacco use, history of binge drinking, severe effects from drunkenness (fainting, coma, blackout) and sexual risk behavior in the past 12 months.

Researches show that nightclubs and bars are places of choice for the practice of binge drinking not only among young adults but also among adolescents (Laranjeira *et al.*,

Table 2. Pre-drinking characteristics among the 1074 respondents who reported pre-drinking on the day of the interview, São Paulo, 2013

Features of pre-drinking on the day of the interview	*n*	Wgt%	95% CI
Time started drinking before the nightclub			
Before 1 pm	62	6.4	4.6–8.7
From 1 to 7 pm	155	14.8	10.0–21.4
After 7 pm	846	78.8	72.3–84.0
Type of beverages at pre-drinking event			
Beer	677	59.5	53.6–65.0
Vodka	349	32.7	26.8–39.2
Energy	104	10.9	7.4–15.7
Whiskey	85	8.6	5.8–12.7
Wine	75	5.9	4.3–8.1
Cachaça	61	6.0	3.8–9.0
Tequila	39	4.1	2.6–6.4
Mixtures	38	4.0	2.5–6.1
Ice	32	3.3	1.9–5.4
Other	82	8.9	6.7–11.8
Food consumption at pre-drinking event	668	63.3	58.3–68.1
Motive to practice pre-drinking			
Reduce social anxiety when arriving at a later event	374	39.0	35.3–42.9
Save money	321	31.7	25.7–38.4
Other	355	29.2	23.4–35.8
Amount spent on alcohol at pre-drinking event			
R$ 0	256	28.1	25.0–31.5
R$ 1 – 15	296	31.2	26.5–36.3
R$ 15 – 50	342	32.6	28.4–37.1
> R$ 50	89	8.0	5.5–11.6
Location of pre-drinking event			
Residence	308	33.0	27.1–39.4
Streets	319	30.7	23.3–39.3
Bar	335	26.5	21.5–32.1
Gas station	47	5.5	3.2–9.4
Restaurant	43	3.2	2.2–4.5
Other	62	4.6	2.7–7.8

% Wgt: weighted percent.

2007; Beets *et al.*, 2009; Sanchez *et al.*, 2011). This practice is a dangerous pattern of alcohol consumption and its associated with physical aggression, risky sexual behavior, sexual violence (Livingston *et al.*, 2007; Bellis *et al.*, 2008; Kelley-Baker *et al.*, 2008) and mortality (Leifman, 2002) at nightclubs and bars, which is why it is considered to be a public health concern. In this nightclub scenario it was possible in our study to identify the behavior of pre-drinking—drinking before entering the establishment. Pre-drinking studies usually describe pre-drinking in nightlife environment in city centers not in the entrance lines of nightclubs. Nightclubs represent a specific sub-genre of the pre-drinking research and people who attend nightclubs may not be typical of other types of pre-drinking.

Pre-drinking appears to be a widespread behavior in different countries, not only among São Paulo nightclub patrons. International researchers have demonstrated that pre-drinking is a common behavior among young people (Foster and Ferguson, 2014). In the USA, Paves *et al.* (2012) reported that 52.0% of college students have engaged in pre-drinking. In Europe, a survey of bar and nightclub patrons between 18 and 35 years of age revealed that 57.6% had practiced pre-drinking on the day of the interview (Hughes *et al.*, 2008).

According to our results, pre-drinking usually occurs in places with low control (houses and streets), which facilitates the ingestion of large amounts of alcohol over a short period. This behavior can cause the person to become intoxicated rapidly, facilitating various risk behaviors, such as violence, drinking and driving under the influence of alcohol (Borsari *et al.*, 2007), and episodes of drunkenness effects such as blackouts (Pedersen and Labrie, 2007).

Comparing the average entrance and exit BrAC among pre-drinkers, there was a relative increase at the exit. Those who participated in pre-drinking events had higher BrAC levels at the nightclub exit. This result is similar to that found by Barry *et al.* (2013) among customers at a bar in the USA. This study investigated the association between pre-drinking and blood alcohol concentration; the results pointed to the fact that pre-drinkers had higher alcohol consumption during the night in the bars and, therefore, higher blood alcohol concentration values when compared with non-pre-drinkers.

According to research from European countries and the USA, pre-drinking is associated with higher alcohol consumption in bars and nightclubs (Pedersen and Labrie, 2007; Read *et al.*, 2010), higher blood alcohol concentration levels (Borsari *et al.*, 2007; Read *et al.*, 2010), and more alcohol-related problems, such as blackouts, hangovers, vomiting (DeJong *et al.*, 2010), slurred speech, and decreased motor coordination and risk perception (Borsari *et al.*, 2007; Kenney *et al.*, 2010), which can influence the individual to use other types of drugs (Pedersen and Labrie, 2007; Zamboanga *et al.*, 2010).

In the present study, the chance of pre-drinking was found higher among men. This result corroborates previous studies by Zamboanga *et al.* (2011), whose survey in the USA with students also showed an association between pre-drinking and male gender. However, other authors have found no gender differences in pre-drinking (Reed *et al.*, 2011). In Brazil, hazardous patterns of alcohol use are more prevalent among men (Laranjeira *et al.*, 2010). On the other hand, a study among undergraduate students in the Netherlands (Otten *et al.*, 2014) claims that self-control failure in bars leads to increased alcohol intake in males and decreased levels of alcohol intake in females. However, in the present study, this effect of loss of impulse control (due to pre-drinking event) in males does not seem to have happened and cannot corroborate this theory.

Regarding the binge concentration level, the present study showed that there is more binge drinking in nightclubs among pre-drinkers when compared with non-pre-drinkers; there were statistically significant differences in binge drinking BrAC at the nightclub exit. This result generates the hypothesis that pre-drinking may be a predictor of higher BrAC levels at venue exits and, consequently, risk behaviors such as drinking and driving (Labhart *et al.*, 2013), unprotected sexual intercourse (Bellis *et al.*, 2008), and violent behavior (Zamboanga *et al.*, 2011; Wahl *et al.*, 2013) may be more prevalent and harmful among pre-drinkers.

The findings indicate that pre-drinking is associated with previous risky behaviors, such as illicit drug use in nightclubs and sexual risk behaviors, suggesting risk-taking behavior among this group of patrons (Marshall, 2014).

According to Babor and Caetano (2005), Brazil has failed to introduce evidence-based public policy for alcohol control. To reduce the consequences associated with pre-drinking, such as the use of other drugs, drinking and driving, and sexual risk behaviors, it is important to implement public policies in Brazil that have already been implemented in several

Table 3. Risk behaviors practiced by 2422 survey respondents in the nightclubs of São Paulo, 2013

	Pre-drinking						
	Yes ($n = 1074$)			No ($n = 1348$)			
Risk behaviors	*n*	Wgt%	95% CI	*n*	Wgt%	95% CI	*P*
Practice of binge drinking							
Past year	875	81.9	77.8–85.5	767	57.7	52.3–62.9	<0.001
Past month	730	66.6	60.9–71.8	525	39.3	32.5–46.6	<0.001
Intention to get drunk when going to a club							<0.001
Never	318	29.0	22.0–37.1	760	55.0	44.7–64.9	
Seldom	167	17.3	14.0–21.3	230	16.8	13.9–20.0	
Sometimes	206	18.9	16.4–21.8	190	14.4	10.7–19.0	
Always	275	25.1	20.2–30.7	100	8.8	5.1–14.5	
In most cases	106	9.5	6.2–14.3	65	4.9	3.0–7.9	
In the last year (after leaving a club)							
Drove car/motorcycle under the influence of alcohol	397	35.7	31.3–40.3	340	21.0	15.5–27.9	0.001
Suffered an accident while driving	32	8.4	5.3–13.1	17	7.2	3.0–16.2	0.724
Rode with a drunk driver	654	61.0	55.9–65.8	722	51.7	47.3–56.1	<0.001
Had an accident	46	7.6	5.1–11.1	25	3.3	1.4–7.6	0.019
Suffered other types of accidents because of drinking	98	10.0	7.6–13.1	77	5.0	3.6–6.7	0.002
Got into fights in the club	141	14.0	10.8–17.9	120	8.6	5.7–12.8	0.037
Did not remember what happened the night before	512	49.3	44.4–54.2	392	29.3	23.6–35.8	<0.001
Passed out due to alcohol	100	9.2	6.1–13.5	89	7.2	6.0–8.6	0.222
Had an alcoholic coma	32	3.0	1.8–4.9	22	2.1	0.9–4.8	0.448
Did not remember if sex was consensual	61	5.7	3.9–8.3	43	3.1	2.0–4.8	0.050
Had sex under the influence of alcohol	661	60.6	52.0–68.5	533	36.0	29.9–42.5	<0.001
Did not use a condom during sexual intercourse	297	25.9	21.8–30.3	212	15.0	12.5–18.1	0.001
Regretted a sexual intercourse because of alcohol	235	22.7	19.4–26.3	174	12.7	10.4–15.3	<0.001
Use of other drugs previous to entering the night club							
Marijuana	144	11.4	6.5–19.2	85	5.2	2.8–9.5	0.019
Cocaine	32	2.7	1.5–4.9	11	0.9	0.3–2.8	0.033
Ecstasy	8	0.6	0.2–1.7	14	0.7	0.3–1.8	0.675
Tobacco	416	32.9	24.9–42.0	261	18.8	14.5–24.0	0.003
Crack	1	0.0	0.0–0.4	1	0	0.0–0.1	0.363
Inhalants	8	0.8	0.3–2.0	12	0.8	0.2–3.6	0.988
Ketamine	7	0.8	0.2–3.5	9	0.7	0.2–2.7	0.513
Methamphetamine	3	0.1	0.0–0.7	4	0.2	0.0–0.8	0.537
Amphetamines	2	0.1	0.0–0.6	3	0.2	0.0–0.7	0.658
Benzodiazepines	8	0.4	0.1–1.0	8	0.6	0.2–1.8	0.402
Hallucinogens	12	0.6	0.3–1.4	12	0.7	0.3–1.6	0.694

% Wgt: weighted percent.

developed countries. Multicomponent nightclub interventions such as staff training and public policy such as responsible serving (control of alcohol sales to people who are already intoxicated), intense supervision of drinking and driving in areas with a high concentration of bars and clubs and taxation can reduce alcohol intoxication harm (Calafat *et al.*, 2009). Considering that part of the sample reported engaging in pre-drinking to save money, the strategy of minimum price and increasing taxation, which would increase the prices of alcoholic beverages in nightclubs and premises, would be a potential solution in reducing total alcohol intake (Babor *et al.*, 2010). Paradoxically, in this sample we found a trend of significance ($P = 0.077$) for a higher prevalence of pre-drinking among the socioeconomically higher strata patrons, which would reduce the impact of economic measures.

The main limitation of this study was the acceptance rate (66%) of the sampled nightclubs, which may have compromised the inclusion of certain categories of patrons. The 76% follow-up rate shows that a portion of the entrance sample was lost; however, to minimize the bias, nightclub and patrons lost were corrected by weighting. Our hypothesis is that patrons who were drunk were more likely to leave the establishment without participating in the exit interview. Thus, the number of non-intoxicated patrons may be overestimated. Another limitation is that the BrAC was only measured 2 two times for each patron. Thus, some of the participants may have engaged in binge drinking earlier in the night but stopped to drink a few hours before leaving the nightclub, and because of blood clearance their binge drinking was not detected at the nightclub exit.

Despite limitations, this study has several strengths. The most important strength is that this study is the first epidemiological study of pre-drinking in a developing country. The second strength is the acceptance rate of patrons at the entrance (80%) of nightclubs in one of largest cities in the world and the largest city in the South Hemisphere.

This study was the first epidemiological survey on patterns of alcohol and other drug use at nightclubs in Brazil. The main findings corroborate with Hughes *et al.* (2008) showing that the participants who engaged in pre-drinking reported significantly higher total alcohol consumption over the night than those non-pre-drinkers. In both studies, we can conclude that the pre-drinking behavior is not a substitute for consumption in nightclubs or bars, but an additional load, since pre-drinkers

Table 4. Factors associated with pre-drinking—results of the reduced regression models ($n = 2422$) and complete multiple logistic regression models

	Univariate analysis			Multivariate analysis		
Variables	cOR	95% CI	*P*	aOR	95% CI	*P*
Male	2.38	1.65–3.43	<0.001	1.98	1.45–2.71	<0.001
Age (years)						
18–25	1.00	–	–	1.00	–	–
26–33	1.19	0.78–1.81	0.410	1.24	0.79–1.96	0.329
34–41	1.17	0.75–1.80	0.474	1.46	0.93–2.28	0.092
≥42	0.83	0.52–1.33	0.434	1.20	0.71–2.00	0.477
Social Class						
A	1.67	1.10–2.51	0.017	1.39	0.96–2.02	0.077
B	1.14	0.78–1.65	0.479	1.05	0.71–1.55	0.799
C/D/E	1.00	–	–	1.00	–	–
Occupation						
Works	1.00	–	–	–	–	–
Only studies	1.31	0.80–2.15	0.269	–	–	–
Unemployed/retired	0.58	0.32–1.05	0.071	–	–	–
Religion (yes/no)	0.78	0.59–1.01	0.060	–	–	–
Binge drinking in the past 12 months (yes/no)	3.32	2.52–4.37	<0.001	2.28	1.70–3.07	<0.001
Tobacco use (that day) (yes/no)	2.12	1.30–3.44	0.004	1.64	1.00–2.70	0.051
Illicit drug use (that day)[a] (yes/no)	2.10	1.18–3.71	0.013	–	–	–
Risk behaviors in the past 12 months						
Drove drunk (yes/no)	2.08	1.49–2.88	<0.001	–	–	–
Rode with a drunk driver (yes/no)	1.45	1.25–1.69	<0.001	–	–	–
Suffered an accident as a result of drunkenness (yes/no)	2.13	1.33–3.40	0.003	–	–	–
Got into fights (yes/no)	1.72	1.03–2.85	0.039	–	–	–
Severe effects of drunkenness [b] (yes/no)	2.34	1.82–2.98	<0.001	1.77	1.40–2.22	<0.001
Sexual risk behavior[c] (yes/no)	2.92	2.18–3.89	<0.001	1.67	1.20–2.33	0.004

cOR, crude odds ratio; aOR, adjusted odds ratio.
[a]Marijuana, cocaine, ecstasy, crack, inhalants, ketamine, methamphetamine, other amphetamines, benzodiazepines or hallucinogens.
[b]Blackout, fainting, coma because of alcohol intoxication.
[c]Did not remember if the sex was consensual, had sex under the influence of alcohol, did not use condoms and regretted the relationship.

drank similar amounts at the venues when compared to those non-pre-drinkers. In the UK, measures to deal with drunkenness and related problems are focused on nightlife environments, such as clubs, pubs, streets and bars.

Since it is a first study in South America, the results on the practice of pre-drinking in the city of São Paulo, should contribute to target-specific Brazilian public policies for this sample. However, we point out to the importance of tracking the whole nightlife environment in future research and breaking down the findings about risk behavior even further.

Because the study was a cross-sectional survey, the factors analyzed might be associated with pre-drinking, but it is not possible to establish causal relations.

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