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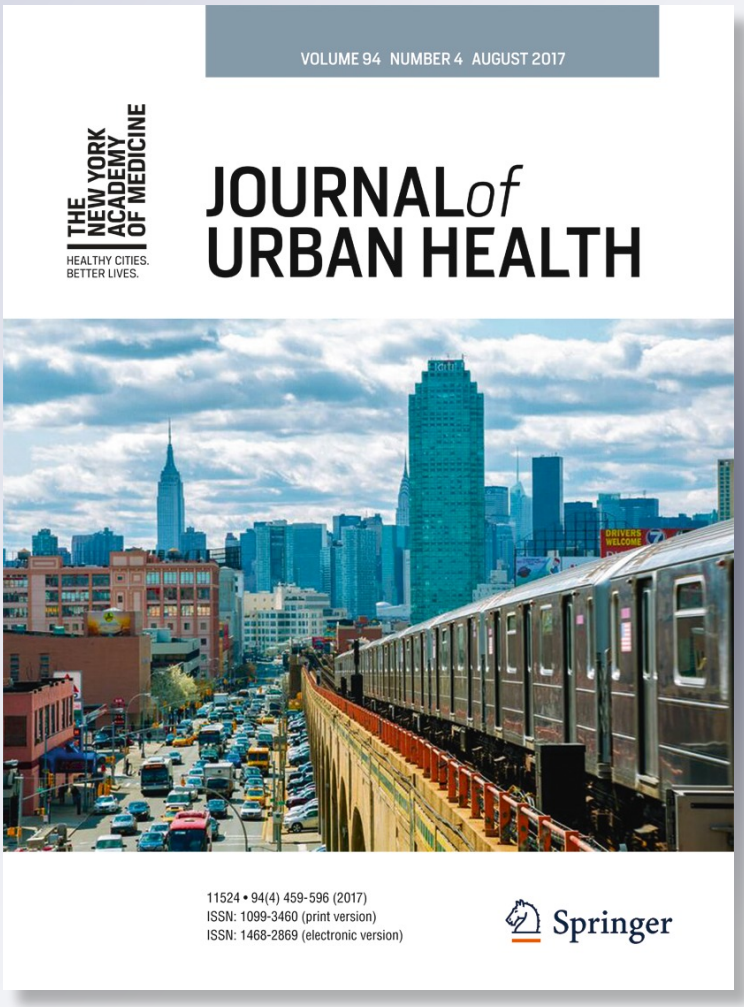
Journal of Urban Health
Bulletin of the New York Academy of Medicine

ISSN 1099-3460
Volume 94
Number 4

J Urban Health (2017) 94:549-562
DOI 10.1007/s11524-017-0149-y



Springer

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DOI 10.1007/s11524-017-0149-y

Environmental Factors Associated with Psychotropic Drug Use in Brazilian Nightclubs

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Published online: 8 May 2017

Abstract The purpose of this study was to identify environmental factors associated with patterns of psychotropic drug use in nightclubs. Mixed methods were used to investigate psychotropic drugs consumption among patrons of 31 nightclubs in São Paulo, Brazil. A total of 1822 patrons at the entrance and exit of the venues and 30 staff members of the nightclubs were interviewed. The observational data were collected through 307 h of observational research using a structured guide to register environmental measures. Psychotropic drug use in nightclubs was classified into three categories (1: no drugs; 2: legal drugs [e.g., alcohol and tobacco]; or 3: illicit drugs regardless of alcohol and tobacco use). Illicit drugs used were self-reported by patrons, and alcohol use was measured using a breathalyzer. The data were analyzed in clusters using correlated multinomial logistic regression models. The following environmental variables were associated with illicit drug use in nightclubs: all-you-can-drink service (adjusted odds ratio (aOR) = 11.84, 95%CI [4.06;34.57]) and light effects, such as laser and "disco lights" (aOR = 24.49, 95%CI [8.48;70.77]). The number of bouncers per capita × 100 and the presence of two or more dance floors were inversely associated with the use of illicit drugs (aOR = 0.26, 95%CI [0.11;0.65], and aOR = 0.13, 95%CI [0.06;0.29], respectively). Legal drug use was associated with all-you-can-drink service (aOR = 2.17, 95%CI [1.43;5.04]), the presence of two or more dance floors (aOR = 2.06, 95%CI [1.40;3.05]), and the number of bouncers per capita × 100 (aOR = 1.39, 95%CI [1.22;1.59]). These findings suggest that this is a multivariate phenomenon that would require an integrated approach involving the venue owners, staff members, patrons, local governments, and law enforcement agencies.

Keywords Mixed methods · Psychotropic drugs · Alcohol · Environmental factors · Nightclub · Brazil

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Introduction

Although alcohol and tobacco are the primary drugs used in the nightlife environment (i.e., nightclubs, bars, and pubs) [1, 2], illicit drugs are increasingly being used to intensify social experiences [3] and to facilitate a good time [4]. Patrons who attend nightclubs are more engaged in alcohol abuse and illicit drug use than other young groups in the general population [3]. Thus, in the last decade, nightclubs have become intensely studied,

and special attention has been given to environmental factors associated with drug use within these establishments, such as the type of nightclub (such as lesbian, gay, bisexual, and transsexual (LGBT)), the use of alcohol promotions, temperature, sound volume, crowding, and individual-level variables [5, 6].

Considering that the combination of drugs and the exciting "clubbing experience" distracts patrons from how these substances are affecting their health [7], the use of drugs in nightclubs is a major mental and physical health concern. Polydrug use [8], dehydration, violence [9], injuries [10], and risky sexual behavior [11] are known risk behaviors to which patrons are exposed during a night out. The increased concern regarding drug use and its association with environmental factors [6, 7] have led many countries to develop prevention programs to decrease intoxication-related harm among patrons of nightclubs and bars [7, 12]. As an example, positive results were observed in a randomized controlled trial of the "Safer Bars" intervention, which used a protocol based on observational evidence from bars [13]. This program was developed to minimize alcohol abuse, aggression, injuries, and other problems at licensed premises by identifying environmental factors that were believed to exacerbate such problems.

However, most of these studies were performed in developed countries [6], and few focused on environmental characteristics associated with illegal drug use [14]. Moreover, the consumption of psychotropic drugs in the nightlife context differs between countries [15, 16] and within an individual country [9]. Therefore, understanding these differences is necessary in order to support effective actions [7], as basic alterations to the environment can decrease substance-related harm [6].

São Paulo, the most populous city in Brazil and in the Southern Hemisphere, contains more than 11 million people [17]. The night entertainment market in this city accounts for US$770 million (R$2.4 billion) annually [18]. The market of nightclubs in Brazil is experiencing strong growth, which has attracted the attention of foreign franchises [19]. Despite the global importance of Brazilian night entertainment in the international context, to our knowledge, this is the first epidemiological study conducted in South America to evaluate drug use in nightclubs. Thus, the purpose of the present study was to identify environmental factors associated with the consumption of drugs in São Paulo nightclubs. From these results, it will be possible to develop interventions focused on harm reduction and support for planning public policies in these settings, inserting Brazil into the setting of this important scientific health discussion.

Method

Study Design and Sample Selection

A mixed-methods study was performed using quantitative and qualitative analysis methods over the following four independent stages of data collection: (1) patron entrance interviews, (2) patron exit interviews, (3) environmental data collected inside nightclubs (on the same night of the patron interviews), and (4) in-depth interviews conducted with staff members of the nightclubs. The following three sources of data were collected: (1) environmental data, (2) patron data, and (3) staff data. The first two sets of data (1 and 2) were obtained from a portal survey, and the third dataset (3) was obtained from a qualitative study.

Sampling of Nightclubs

This study used a two-stage cluster sampling portal survey, which is a form of intercept sampling specifically designed to capture at-risk individuals at the entrance to and exit from a locale with increased alcohol and other drug risk [20]. The first stage of data collection included a systematic sample of 40 nightclubs, with a probability of inclusion proportional to their maximum capacity. The second stage of data collection consisted of a systematic sampling of every third patron in the entrance line of the selected nightclubs. The creation of the nightclub frame list was previously described by Carlini et al. [21].

Of the 40 original nightclubs selected for sampling, 31 nightclubs, including 7 replacements, agreed to participate, resulting in an acceptance rate of 66%.

Sampling of Patrons

A total of 3063 patrons were recruited to answer questions in entrance and exit portal surveys. Of these, 2422 entrance interviews and 1822 exit interviews were considered for the final analyses. The criteria for inclusion of patrons in the study included the following: intention to enter the nightclub and age of 18 years or older. In accordance with the screening guidelines described by Perham et al. [22], no interview was conducted with

patrons showing signs of severe intoxication. If the patron refused to participate, data on age and gender were recorded, and the next patron in line was approached.

A sample size of 1600 patrons was calculated so that the prevalence of alcohol intoxication could be estimated within 5% (absolute precision) of the true value, which was set to 50% (maximum variance) with 95% confidence, two-stage cluster sampling and a design effect of 2 [23]. A refusal rate of 30% and a maximum rate of loss to follow-up from patron entrance to patron exit of 40% were assumed on the basis of a previous study by Clapp et al. [24]; thus, it was determined that 2912 patrons should initially be approached.

Instruments and Data Collection

Patron-Specific Instruments

The patrons who agreed to participate took entrance and exit surveys via a face-to-face interview as well as a breathalyzer test (Draguer Alcotest 7410 plus RS) after each interview. The participants received a bracelet with an exclusive code to identify them at the exit. Seven field researchers used Samsung Galaxy tablets to collect data from the interviews. In the case of refusal, the age and sex of the person were entered into the system. The entrance questionnaire investigated sociodemographic variables, pre-drinking patterns, drinking patterns, drug use, and risky behaviors in nightclubs in the year prior to the survey. The exit questionnaire investigated self-reported drug use (marijuana, ecstasy, ketamine, inhalants, cocaine, ecstasy, hallucinogens, amphetamines, benzodiazepines, and crack) and risky behaviors that patrons engaged in on that specific night within the venue.

Nightclub-Specific Instruments

For the observational generation of environmental data, a structured questionnaire based on the Kit for Assessment of Recreational Nightlife (KAReN) venue questionnaire [25] and the "Safer Bars" program [26] was used. The investigated variables are described below. The questionnaire was performed by two trained researchers over a total of 307 h of observational study (an average of 8:30 per nightclub).

Variables

Outcome Variable

The dependent variable was the use of psychotropic drugs inside the nightclub, which was classified into three categories (1: no drugs; 2: legal drug use [e.g., alcohol and/or tobacco]; or 3: illicit drug use with or without use of licit drugs). The use of tobacco, marijuana, ecstasy, ketamine, inhalants, cocaine, ecstasy, hallucinogens, amphetamines, benzodiazepines, and crack was self-reported. Alcohol consumption was measured using a breathalyzer, and any instance of BrAC $\geq$0.01 mg/L at the entrance or exit of the nightclub was considered a positive result.

Covariates

The sociodemographic explanatory variables included the following: gender (male, female), age (used as a continuous explanatory variable), employment status (employed, unemployed, student), marital status (married, single, other), education (post-graduate, university, high school, elementary school/no diploma/illiterate), religion (declare to have a religion, declare to not have a religion), and socioeconomic status, which was determined according to the Brazilian Population Studies Association score (Associação Brasileira de Empresas de Pesquisa [27] and classified as A (A1/A2), B (B1/B2), or C/D/E (class A is the highest, and class E is the lowest).

Pre-drinking (no/yes) was used as a covariate controlling individual behavior, and a positive result was defined a breathalyzer test finding of a BrAC $\geq$ 0.01 mg/L (milligram of ethanol per liter of breath) at the nightclub entrance.

The aspects of the nightclubs that were evaluated as explanatory variables were categorized into the following eight blocks.

(1) *Venue Entrance*: presence of a consumption fee (a mandatory value charged to enter the venue that patrons can use to purchase alcoholic beverages but cannot otherwise recoup); identity checking, a queue, entrance of a minor

(<18 years old), and individual inspections to determine whether patrons are carrying weapons or drugs (no/yes).

(2) *Beverages and food*: an all-you-can-drink service in which patrons pay a fixed value at the entrance, allowing them completely unrestricted alcohol consumption inside the establishment, an alcohol discount, food availability, and presence of a water fountain (no/yes).
(3) *Type of Nightclub*: LGBT nightclub (no/yes).
(4) *Physical Environment*: presence of a designated smoking area; a specific area for sexual relations—some clubs host a darkened room that patrons can use for casual sex; three or more bars; two or more dance floors; and big screens or televisions (no/yes).
(5) *Atmospheric Characteristics*: humidity (%), temperature (°C) as measured using a commercial thermohygrometer (INSTRUTHERM HT, model 270), and sound volume (dB) as measured using a decibel meter (INSTRUTHERM DEC, model 490) were used as continuous explanatory variables, considering the mean obtained from three different spaces in a given venue—bar, lounge, and dance floor.
(6) *Health Conditions*: crowding, i.e., the amount of space in the venue (none, enough space or a bit crowded but easy to move; crowded and difficult to move; or crowded and almost or completely impossible to move), cleanliness (no: sticky floor, filled wastebaskets, garbage on tables or seats, or very dirty floor due to vomit, broken glass or spilled drinks; yes: very clean, maintained clean, moderately clean).
(7) *Illumination*: dark (no/yes), semi-dark (no/yes), light (no/yes), and light effects (such as laser and disco lights) (no/yes).
(8) *Venue Security*: insufficient coverage (no/yes), partial coverage (no/yes), complete coverage (no/yes), and number of bouncers per capita × 100.

Statistical Analyses

Descriptive and inferential statistics of the sampled patrons and nightclubs were computed using survey weight estimates.

Weights for nightclubs, patrons within a nightclub and overall patrons were calculated using the study design and the study population counts. Post-stratification weights were calculated using information about the sex of all patrons at each nightclub. Nonparticipation adjustment rates for the nightclub weights were also computed to adjust their probability of selection [23]. Weighted data were analyzed considering that the patrons were nested within a venue (cluster) through correlated multinomial logistic regression models using sociodemographic factors, pre-drinking, and general venue characteristics as explanatory variables.

First, models of the crude associations between each characteristic and drug use category were fitted. Then, models of the associations between the outcome and all predictor variables of each block were fitted. Characteristics with $p < 0.20$ in the models for a given block were used to build a final model. Explanatory variables with $p < 0.05$ composed the final model. Coefficients are presented in terms of the odds ratio (OR) or adjusted OR (aOR) and 95% confidence interval (95%CI) to facilitate interpretation. Models were estimated using STATA 13 software [28].

Qualitative Study

Staff Sampling

Staff members were contacted during the observational research inside the nightclubs, and a semi-structured interview [29] was scheduled for another day. The first interviewees identified other possible participants, thereby using the snowball technique [30] to compose the sample. Different chains of interviewees were recruited while aiming to include the largest possible number of job types in the sample satisfying the proposed inclusion criteria, including the following staff members: eight bouncers, six bartenders, five managers, three waiters, two firefighters (responsible for providing first aid to intoxicated patrons), two DJs, one promoter, one hostess, one cashier, and one bathroom cleaner.

The sample size for the qualitative portion of the study was 30 staff members; this sample size was adequate to cover the main topics of interest. The interviewees' responses became redundant when no new information was obtained from further data [30].

Qualitative Instruments

For the qualitative interviews with members, we used the following two instruments: (1) a guide composed of 31 previously standardized questions focusing on the four main axes—(a) abuse of alcohol, (b) illicit drugs, (c) risky sexual behavior, and (d) violence (for this study, we analyzed axes 1 and 2); (2) in-depth interviews based on the topic guide, which were used to perform a detailed exploration of staff member perspectives and experiences using a flexible and responsive approach [31]. Additional questions were produced to clarify specific topics that were relevant to this study.

Content Analysis

We used the content analysis technique described by Bardin [32] as a theoretical framework. The interviews were grouped into major themes (i.e., portions in agreement with each thematic axis) as well as into thematic reports [32]. Thematic analyses were conducted through the following four steps: immersion, coding, categorization, and generation of topics. Data from the interviews were analyzed by three researchers to ensure consistency and coherence in the analysis [31]. In this stage, NVivo-10 computer software was used to provide increased consistency in data analysis and to facilitate the storage of materials as well as organization and codification of the notes [33]. In cases of inconsistency among researchers during the categorization process, discussions were held with a fourth researcher to validate the finding as proposed by Patton [30]. The themes identified were analyzed in order to provide meaning via the emic approach.

Results

Quantitative Results

The demographic characteristics and pre-drinking status of the patrons are presented in Table 1. The majority of the sample was composed of men (60.7%). The mean age of the patrons was 25.0 years (SD = 0.91); according to the ABEP index, more than half of the patrons belonged to a medium socioeconomic status (52.4%) and were university students (58.9%). Most of the patrons reported having a religion (67.5%) and being single (89.8%). Pre-drinking behavior was identified in 34.3% (SE = 3.85%) of the patrons.

The environmental characteristics that were hypothesized to be associated with drinking behavior and use of illicit drugs inside the venue are presented in Table 2. Alcohol discounts were offered by 37% of the nightclubs, and 10% of the venues offered all-you-can-drink services.

The prevalence of psychotropic drug use by patrons in the 31 nightclubs is presented in the ternary plot (Fig. 1). Three nightclubs stood out by presenting contrasting results. Nightclub 27 presented the highest consumption of only legal drugs by patrons (approximately 95%). The second highest prevalence of illicit drug use was reported in nightclub 21 (approximately 48%). This nightclub had the lowest percentage of only legal drug use (18%). The highest percentage of nondrug use was identified in nightclub 17 (approximately 67%), and the percentage of legal drug consumption was approximately 33%.

Table 3 presents the multinomial logistic regression models for the association of psychotropic drug use inside the venue with environmental characteristics, adjusted for patron sociodemographic variables and pre-drinking status.

The final multinomial logistic regression model showed that two sociodemographic variables had a significant association with psychotropic drug use inside the venue, using no drug use as the reference for the analysis. Male gender was positively associated with the use of illicit drugs (aOR = 3.59, 95%CI [1.59;8.11], $p = 0.002$) but not with legal drug use (aOR = 1.04, 95%CI [0.62;1.74], $p = 0.887$). In contrast, age was a protective factor for alcohol use—an increase in age of 1 year results in a 3% decrease in the odds of alcohol use (aOR = 0.97, 95%CI [0.95;0.98], $p < 0.001$) but was not a significant factor related to the use of illicit drugs (aOR = 0.97, 95%CI [0.91;1.03], $p = 0.283$). Pre-drinking behavior was positively associated with legal (aOR = 9.27, 95%CI [6.22;13.81], $p < 0.001$) and illicit drug use (aOR = 4.01, 95%CI [2.17;7.39], $p < 0.001$).

The only environmental factor positively associated with alcohol and/or tobacco use and illicit drug use inside the nightclub was all-you-can-drink

Table 1 Sociodemographic characteristics of patrons interviewed at nightclub exit, $N = 1822$ patrons, São Paulo, Brazil

Patrons	Variables	Sample, *n*	Unweighted, % (SE)	Weighted, wt% (SE)
Total		1822	100	100
Demographic characteristics				
Sex	Male	1111	60.98 (1.14)	60.71 (5.89)
	Female	711	39.02 (1.14)	39.29 (5.89)
Age (years)				
	Mean (SE)	1822	26.37 (0.15)	25.03 (0.91)
Employment status	Unemployed	144	7.90 (0.63)	8.24 (1.04)
	Student	208	11.42 (0.75)	11.40 (2.64)
	Employed	1470	80.68 (0.93)	80.37 (2.28)
Social class	A	482	26.45 (1.03)	25.92 (4.0)
	B	1013	55.60 (1.16)	52.42 (1.69)
	C/D/E	327	17.95 (0.90)	21.65 (3.81)
Education	Elementary education	46	2.53 (0.37)	3.11 (0.60)
	High School	480	26.34 (1.03)	31.08 (5.07)
	University	1130	62.02 (1.14)	58.92 (4.49)
	Postgraduate	66	9.11 (0.67)	6.89 (1.4)
Marital status	Married	147	8.07 (0.64)	6.91 (1.93)
	Single	1589	87.21 (0.78)	89.96 (2.16)
	Other	86	47.72 (0.50)	3.13 (0.66)
Religion	Yes	1170	64.22 (1.12)	67.57 (2.75)
Patrons' behavior	Pre-drinking[a]	683	37.49 (1.13)	34.33 (3.85)

SE standard error

[a] Yes category

[b] A = higher/E = lower

service (aOR = 2.17, 95%CI [1.43; 5.04], $p = 0.002$, and aOR = 11.84, 95%CI [4.06;34.57], $p < 0.001$, respectively). The presence of two or more dance floors was positively associated with legal drug use (aOR = 2.06, 95%CI [1.40;3.05], $p < 0.001$) but was inversely associated with illicit drug use (aOR = 0.13, 95%CI [0.06;0.29], $p < 0.001$). The same pattern was observed for the number of security professionals per capita × 100, which showed a positive association with the use of legal drugs (aOR = 1.39, 95%CI [1.22;1.59], $p < 0.001$) but an inversely association with illicit drug use (aOR = 0.26, 95%CI [0.11;0.65], $p = 0.004$). The presence of light effects was only statistically significantly associated with the use of illicit drugs (aOR = 24.49, 95%CI [8.48;70.77], $p < 0.001$).

Nonresponses in the exit interview stemmed from different reasons: refusal to participate ($n = 12$, 2.1%), inability to answer due to severe intoxication ($n = 67$, 11.3%), and loss to follow-up ($n = 511$, 86.6%). There were no statistically significant differences in the sex ($\chi^2 = 0.02$, $p = 0.889$) or pre-drinking status ($\chi^2 = 0.88$, $p = 0.355$) distributions or in the mean age ($t = 0.11$, $p = 0.917$) between the participants who were interviewed at both time points (entrance and exit) and those who were interviewed at the entrance but not at the exit.

Qualitative Results

The interviewees had a shared perception that the all-you-can-drink was the most harmful practice promoting alcohol consumption. The low price of this service facilitated heavy alcohol consumption, and the supply of adulterated (mixing very cheap products with "good" products) or falsified beverages further increased alcohol intoxication by patrons. It appeared that there was a series of factors facilitating drug use that was

Table 2 Environmental characteristics observed in the 31 nightclubs randomly selected in São Paulo

Nightclubs	Variable	Sample, *n*	Unweighted, % (SE)	Weighted, % (SE)
Total		31	100	100
Venue entrance	Consumption fee[c]	15	48.39 (9.12)	52.32 (10.40)
	Identity checking[a]	19	61.29 (8.89)	62.52 (9.76)
	Queue[a]	22	70.97 (8.29)	62.48 (10.82)
	Minors (<18 years old)[a]	9	29.03 (8.29)	34.33 (10.78)
	Inspection	25	80.65 (7.21)	83.67 (6.63)
Beverages and food	"All-you-can-drink-service"[a]	4	12.90 (6.12)	9.97 (5.00)
	Alcohol discounts[a]	10	32.26 (8.53)	37.21 (10.30)
	Food availability[a]	13	41.94 (9.01)	35.79 (9.54)
	Water fountain availability[a]	4	12.90 (6.12)	9.87 (5.09)
Type of nightclub	LGBT[a]	9	29.03 (8.29)	29.33 (9.42)
Physical environment	Reserved area for smokers[a]	25	80.65 (7.21)	82.74 (7.03)
	Reserved area for sexual relations[a,b]	4	12.90 (6.12)	8.89 (4.56)
	Three or more bars[a]	12	38.71 (8.89)	29.55 (8.56)
	Two or more dance floors[a]	9	29.03 (8.29)	31.81 (10.69)
	Big screen or TV[a]	23	74.19 (7.99)	70.59 (10.39)
General characteristics	Humidity (%, mean SE)	31	70.60 (1.50)	69.18 (2.32)
	Temperature (°C, mean SE)	31	23.40 (0.47)	23.20 (0.39)
	Sound (dB, mean SE)	31	96.88 (1.21)	97.17 (1.47)
Health conditions	Crowding[a]	16	51.61 (9.12)	46.63 (10.36)
	Cleanliness[a]	20	64.52 (8.74)	68.99 (9.19)
Illumination	Dark[a]	7	22.58 (7.63)	25.15 (9.18)
	Semi-dark[a]	19	61.29 (8.89)	59.75 (10.25)
	Light[a]	5	16.13 (6.72)	15.10 (7.20)
	Light effects[a]	12	38.71 (8.89)	34.74 (9.68)
Venue security	Number of bouncers per capita[a] 100 (mean, SE)	31	1.95 (0.21)	2.16 (0.25)
	Coverage			
	Insufficient coverage	6	19.35 (7.21)	13.13 (5.51)
	Partial coverage	5	16.13 (6.72)	12.44 (5.63)
	Complete coverage	20	64.52 (8.74)	74.43 (7.75)

SE standard error

[a] Yes category

[b] Specific area for sexual relations (some clubs host a darkened room that patrons can use for casual sex)

[c] Patrons pay a more expensive entrance fee (usually double the price of the regular fee) and then consume the total amount of money spent at the entrance in beverages. Once the total amount is paid, any money not consumed through beverages will not be refunded

exacerbated by the lack of emergency services for those who required assistance for their intoxication.

"I receive order to put poor or falsified labels in the bottle of nice labels, this is very normal in all-you-can-drink (…) Patrons drink until the last drop of alcohol, poor alcohol, which is dangerous and worst when they mixture other drugs which is frequent, mainly inhalants and marihuana (…) There is no ambulance for the serious cases of intoxication **Bartender with 8 years of experience.**

"I'm responsible for buying the alcoholic beverages and there are no original or good labels in all-you-can-drink (...) People are extremely drunk - much more than in other types of alcohol promotions

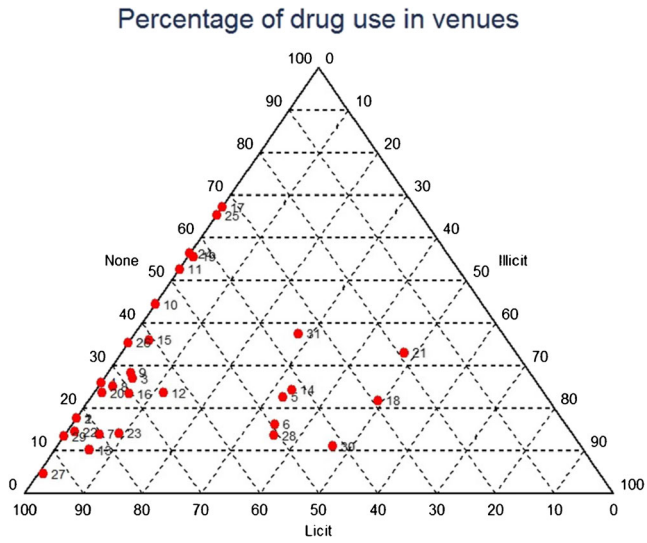

Fig. 1 Ternary plot presenting the percentage of drug use by patrons in a sample of 31 nightclubs

(…) It's very expensive to pay for an ambulance, obligatory just in big events, and the staff members has a lot of problems with so many drunk people" **Manager with 22 years of experience.**

Before the multinomial models were fitted, the researchers evaluated the association of light effects with drug use inside the venue. The qualitative analyses showed that light effects were presented mainly in nightclubs with electronic music. According to our interviewees, the presence of intermittent light effects in combination with the repetitive beat of the music boosted the effects of drugs that the patrons planned to use.

Similarly to all-you-can drink service, a series of factors facilitating drug use that was exacerbated by the lack of emergency services for those requiring assistance due to their intoxication.

"The use of illicit drugs mainly ecstasy, LSD are part of the cultural scene level of electronic music (…) The light effects, the beat of the sound are special to patrons who attend these nightclub, they want to use these drugs in these setting to boosting their experience (…) There is no staff member with pharmacological knowing to know what to do in the cases of intoxication of drugs like ecstasy, LSD and ketamine, for example **DJ with 20 years of experience.**

"The intense light effect in electronic venues is essential since there is an "interaction" with the effects of drugs such as LSD and ecstasy (…) They mix these drugs with alcohol and sometimes faint (...) We avoid calling to the ambulance for not expose the use of illicit drugs inside the venue" **Fire man (responsible to the first aid) with 12 years of experience.**

Analysis of the number of bouncers per capita showed that the bouncers were not there to restrain the use of alcohol; however, they ultimately constrained the use of illicit drugs by patrons. The qualitative data still showed that nightclubs with more bouncers usually are places where are worried with drunk patrons and violence which can explain the quantitative data about the positive association between bouncers and use of alcohol.

"Our simple presence restricts patrons from using illicit drugs (…) I work in different nightclubs, and my colleagues and I have never received an order to tell patrons to stop drinking even when they are almost fainting (…) If they are causing trouble (patrons) - because are very drunk - we just kick them out" **Bouncer with 12 years of experience.**

"We have patrons that enjoy to get completely drunk and the manager have to hire more bouncers to avoid problems like fights among them (…) They are ordered to avoid problems but not to make them stop drinking". **Cashier with 9 years of experience.**

Discussion and Conclusion

The results showed that different environmental factors are associated with the consumption of drugs by patrons inside nightclub venues. The use of legal drugs was positively associated with the following three

Table 3 Multinomial logistic regression models for the association between psychotropic drug use and behavior, and demographic and environmental nightclub characteristics (n = 1822 interviewees in 31 nightclubs)

		Bivariate						Block						Final model					
		Psychotropic drug use						Psychotropic drug use						Psychotropic drug use					
		Licit drugs			Illicit drugs			Licit drugs			Illicit drugs			Licit drugs			Illicit drugs		
Block	Variable	OR	95%CI	p	OR	95%CI	p	aOR	95%CI	p	aOR	95%CI	p	aOR	95%CI	p	aOR	95%CI	p
Behavior	Pre-drinking[a]																		
	No	1			1			1			1			1			1		
	Yes	8.31	[5.61; 12.32]	<0.001	5.77	[2.47; 3.48]	<0.001	8.62	[5.98;12.42]	<0.001	4.90	[2.22;10.83]	<0.001	9.27	[6.22; 13.81]	<0.001	4.01	[2.17; 7.39]	<0.001
Demographics	Sex																		
	Female	1																	
	Male	1.35	[0.73; 2.50]	0.336	3.91	[1.73; 8.83]	0.001	1.08	[0.60; 1.93]	0.806	3.65	[1.76;7.58]	0.001	1.04	[0.62; 1.74]	0.887	3.59	[1.59; 8.11]	0.002
	Age (years)	0.97	[0.94; 0.99]	0.015	0.96	[0.90; 1.03]	0.284	0.95	[0.94; 0.97]	<0.001	0.94	[0.88; 0.99]	0.045						
	Employment status																		
	Unemployed	1			1			1			1								
	Student	1.18	[0.48; 2.92]	0.714	1.15	[0.26; 5.09]	0.854												
	Employed	0.93	[0.48; 1.78]	0.816	0.97	[0.52; 1.81]	0.934												
	Social class																		
	A[b]	1			1														
	B	0.89	[0.66; 1.20]	0.453	1.07	[0.57; 2.00]	0.829	1.05	[0.72;1.53]	0.808	1.22	[0.67;2.22]	0.507						
	C/D/E	0.52	[0.33; 0.83]	0.006	0.70	[0.22; 2.22]	0.550	0.56	[0.32;0.99]	0.045	0.79	[0.28;2.27]	0.661						
	Education																		
	Elementary education	1			1														
	Postgraduate	0.51	[0.17; 1.49]	0.218	3.33	[0.30; 36.51]	0.324	0.49	[0.10;2.34]	0.372	3.28	[0.45;23.63]	0.239						
	University	0.50	[0.16; 1.58]	0.238	2.92	[0.35; 24.58]	0.324	0.41	[0.08; 2.13]	0.287	2.92	[0.23;36.43]	0.406						
	High school	0.51	[0.15; 1.71]	0.272	2.98	[0.57; 15.47]	0.194	0.61	[0.12;3.08]	0.547	4.86	[0.40; 59.77]	0.217						
	Marital status																		
	Married	1			1														
	Single	1.10	[0.49; 2.47]	0.820	1.21	[0.48; 3.07]	0.683												
	Other	0.57	[0.32; 1.01]	0.052	0.12	[0.01; 0.91]	0.041												
	Religion																		
	No	1			1			1			1								
	Yes	0.60	[0.41; 0.87]	0.006	0.50	[0.28; 0.89]	0.019	0.68	[0.44;1.03]	0.068	0.56	[0.33;0.95]	0.031						
Venue entrance	Consumption fee[a,c]	1.82	[1.16; 2.86]	0.009	1.73	[0.40; 7.58]	0.466												
	Identity checking[a]	1.54	[0.81; 2.91]	0.186	4.18	[0.76; 23.08]	0.101												
	Queue[a]	1.94	[1.16; 3.25]	0.012	18.79	[2.92; 120.97]	0.002	1.94	[1.16; 3.25]	0.012	18.79	[2.92; 120.97]	0.002						
	Minors (<18 years old)[a]	0.83	[0.43; 1.58]	0.566	0.39	[0.06; 2.55]	0.327												
	Inspection	1.34	[0.61; 2.90]	0.465	1.26	[0.27;5.80]	0.767												
Beverages and food	All-you-can-drink service[a]	2.76	[1.32; 5.79]	0.007	6.16	[2.30; 16;51]	<0.001	4.12	[2.69; 6.30]	<0.001	7.71	[1.46; 40.54]	0.016	2.17	[1.43; 5.04]	0.002	11.84	[4.06; 34.57]	<0.001
	Alcohol discounts[a]	1.29	[0.76;2.21]	0.347	0.37	[0.09;1.57]	0.177	1.83	[1.14; 2.95]	0.012	0.95	[0.22; 4.16]	0.944						
	Food availability[a]	0.62	[0.37;1.04]	0.071	0.75	[0.17; 3.34]	0.708	0.49	[0.33; 0.74]	0.001	0.53	[0.17; 1.66]	0.274						
	Water fountain availability[a]	1.16	[0.61;2.20]	0.653	4.97	[1.76; 14.05]	0.002	1.67	[1.03; 2.70]	0.037	5.91	[1.72; 20.28]	0.005						
Type of nightclub	LGBT[a]	1.15	[0.68; 1.96]	0.597	1.73	[0.41; 7.20]	0.453												
Physical environment	Reserved area for smokers[a]	1.66	[1.04;2.66]	0.034	1.29	[0.23;7.16]	0.771												
	Reserved area for sexual intercourse[a,d]	1.40	[0.61; 3.21]	0.423	3.46	[1.27; 9.41]	0.015												
	Three or more bars[a]	0.76	[0.44; 1.29]	0.306	0.78	[0.18; 3.39]	0.740												

Table 3 (continued)

		Bivariate						Block						Final model					
		Psychotropic drug use						Psychotropic drug use						Psychotropic drug use					
		Licit drugs			Illicit drugs			Licit drugs			Illicit drugs			Licit drugs			Illicit drugs		
Block	Variable	OR	95%CI	*p*	OR	95%CI	*p*	aOR	95%CI	*p*	aOR	95%CI	*p*	aOR	95%CI	*p*	aOR	95%CI	*p*
	Two or more dance floors[a]	2.05	[1.27; 3.29]	0.003	2.64	[0.71; 9.87]	0.148	2.05	[1.27; 3.29]	0.003	2.64	[0.71; 9.87]	0.148	2.06	[1.40; 3.05]	<0.001	0.13	[0.06; 0.29]	<0.001
	Big screen or TV[a]	0.63	[0.35; 1.14]	0.129	0.55	[0.12; 2.47]	0.439												
Atmosphere characteristics	Humidity (%)	1.01	[0.97; 1.05]	0.589	1.11	[1.03; 1.19]	0.008	1.01	[0.97; 1.05]	0.589	1.11	[1.03; 1.19]	0.008						
	Temperature (°C)	1.03	[0.92; 1.14]	0.612	1.17	[0.96; 1.43]	0.125												
	Sound (dB)	0.99	[0.93; 1.05]	0.783	1.01	[0.89; 1.15]	0.844												
Health conditions	Crowding[a]	0.90	[0.48; 1.69]	0.740	0.68	[0.18; 2.56]	0.57												
	Cleanliness[a]	0.77	[0.42;1.42]	0.401	0.27	[0.06; 1.25]	0.093												
Illumination	Dark	1			1			1			1								
	Semi-dark[a]	0.71	[0.44; 1.17]	0.181	0.30	[0.07; 1.25]	0.098	1			1								
	Light[a]	0.44	[0.21; 0.90]	0.024	0.01	[0.01; 0.03]	<0.001	0.70	[0.31;1.57]	0.389	0.03	[0.01;0.30]	0.002						
	Light effects[a]	1.59	[0.94; 2.70]	0.084	8.50	[2.15; 33.61]	0.002	1.54	[0.88;2.69]	0.130	7.74	[1.85;32.38]	0.005	0.87	[0.59; 1.27]	0.474	24.49	[8.48; 70.77]	<0.001
Venue security	Number of bouncers per capita[a] 100	1.35	[1.04; 1.74]	0.023	0.49	[0.18; 1.36]	0.172	1.34	[1.04;1.74]	0.026	0.45	[0.16;1.23]	0.120	1.39	[1.22; 1.59]	<0.001	0.26	[0.11; 0.65]	0.004
	Coverage																		
	Insufficient coverage	1			1			1			1								
	Partial coverage	1.78	[0.66; 4.83]	0.255	3.02	[0.45; 20.34]	0.255	1.15	[0.51;2.57]	0.741	3.24	[1.17;9.03]	0.024						
	Complete coverage	1.54	[0.77; 3.06]	0.219	1.52	[0.20; 11.44]	0.683	1			1								

[a] Yes category

[b] A = higher/E = lower

[c] Patrons pay a more expensive entrance fee (usually double the price of the regular fee) and then consume the total amount of money spent at the entrance in beverages. Once the total amount is paid, any money not consumed through beverages will not be refunded

[d] Specific area for sexual relations (some clubs host a darkened room that patrons can use for casual sex)

environmental factors: all-you-can-drink service, the presence of two or more dance floors, and the number of bouncers per capita × 100. All-you-can-drink service and light effects were positively associated with illicit drug use, whereas the number of bouncers per capita × 100 and the presence of two or more dance floors were inversely associated with the use of illicit drugs.

Among all variables analyzed in the multinomial logistic regression models, only one environmental factor was positively associated with use of both licit and illicit drugs by patrons: all-you-can-drink service. According to Thombs et al. [34], because patrons pay a fixed value at the entrance for unrestricted alcohol consumption, all-you-can-drink service boosts patron intoxication compared with other types of alcohol promotions. We noted by the qualitative data that Brazil has weak control of alcohol sales and failure in health surveillance policies. Nightclubs can sell alcohol for a "bargain" price, which is what happens at locations offering all-you-can-drink service. Furthermore, Brazil has an unregulated market in which it is legal to serve alcohol to intoxicated patrons [35]. Once there are no public policies to avoid, there is no effective enforcement to restrain these practices that appear to be more harmful in countries such as Brazil than in countries with regulated markets [36].

Another important issue that warrants attention is that Brazilian nightclubs operate without limited closing hours, thereby increasing customer exposure to alcohol and other drugs. These factors appear to be related to ill-conceived Brazilian legislation that has failed to address basic issues, such as alcohol control and the monitoring of nightclubs. With regard to the association of all-you-can-drink service with the use of illicit drugs, the qualitative data analyses showed that patrons attending all-you-can-drink nightclubs were more inclined to use other drugs; because one of the main pharmacological effects of alcohol is impairment of judgment [37], patrons were more likely to participate in other risky behaviors, such as the use of illicit drugs. Another widespread perception is that these high-risk environments facilitate further risky behavior by attracting individuals and groups who are interested in engaging in such behavior (synergy between the drinking venues and their customers that sustains these practices).

In contrast with these results, 30% of patrons reported not using any drugs. Because the venues were selected from a probabilistic sample, different profiles of establishments were given an opportunity to participate in this study. These data corroborate other studies that have shown that it is not possible to homogenize clubbers with respect to the use of alcohol and other drugs [38] and that patrons have different motivations for nightclubbing that extend beyond intoxication [38, 39]. This evidence still corroborates our observation that certain nightclubs attract patrons who are more interested in enjoying a low-risk evening with good dancing, moderate drinking, and conversation. These nightclubs deserve more attention because they can inform the development of harm reduction polices focused on this population. These results contribute to a greater understanding of the Sao Paulo nightclub scene, and this understanding is essential in order to generate different interventions for drug use that respect the different profiles of patrons.

According to Macintyre and Homel [40], patrons in crowded nightclubs attempt to alleviate their discomfort (i.e., restricted space for movement and heat) by drinking more and faster. These results corroborate our study because the nightclubs with two or more dance floors were usually more crowded than the others and because the patrons of these nightclubs spent more time dancing. One of the consequences of this environment was that these patrons typically drank more [40]. The literature indicated that people who share the same space and have the same focus of attention typically exhibit group behavior [41], as is the case for heavy drinking [42]. Regarding the negative association of these venues with the use of illicit drugs, the survey showed that it was not the "small" size of the venue (maximum capacity of 500 patrons) per se that was associated with the use of illicit drugs. These establishments appear to be more permissive to the use of drugs because the attending patrons enjoyed electronic, hip-hop, and alternative (e.g., gothic) music, which was associated with the use of illicit drugs [43, 44].

Light effects were positively associated with illicit drug use and were negatively associated with the use of legal drugs. The qualitative data suggested that it was not light effects per se that was associated with illicit drug use because these light effects were mainly present in electronic nightclubs. It appears that similar to the situation in all-you-can-drink establishments, electronic nightclubs attracted patrons who were already interested in engaging in high-risk behavior and the environmental factor acted as a facilitator to enhance the effects of the drugs. According to the literature and our data, patrons

who attend this type of venue are more likely to use synthetic drugs and engage in polydrug use [44, 45] than patrons who attend other types of venues. The use of these drugs may be negatively associated with alcohol use. The pharmacological effects of certain synthetic drugs, such as ecstasy and ketamine, are potentially unsafe in combination with alcohol, as such behavior may lead to serious adverse effects such as overdosing [46]. Another major concern about this practice is that the effects of individual drugs are usually exacerbated by polydrug use, and these physiological adverse effects accumulate in the body [47].

According to the Pan-American Health Organization [48], Brazil has the highest rate of alcohol-attributable deaths among adolescents 15–19 years of age and has the fifth highest number of deaths directly associated with the consumption of alcohol in the American continents. In the city of São Paulo alone, the literature shows that homicides and fatal car accidents [49] occur mainly during the early hours of the weekends, indirectly indicating an association between alcohol consumption in bars, nightclubs, and parties and violent deaths in this city [50]. Many scientific studies have shown that deaths linked to alcohol consumption can be prevented by implementing public policies and interventions that reduce alcohol intake, including restrictions on product availability, increases in prices, and control of marketing and advertising [51].

The use of illegal drugs inside nightclub venues requires future studies. Nightclubs should address the use of illicit drugs because this practice can increase their vulnerability to official sanctions as well as legal problems for the patrons, staff, and owners. Some nightclubs are more permissive than others regarding the use of illicit drugs. Is this permissiveness a method used to gain the loyalty of patrons considering the profiles of certain nightclubs and patrons?

The variable "illicit drug" was created as a summary of illicit drugs (such as marijuana, cocaine, etc.) plus prescribed medicines illicit acquired, such as amphetamines and benzodiazepines obtained without a valid medical prescription. In Brazil, benzodiazepines and amphetamines are regulated and should be sold in pharmacies with a medical prescription (Law 10.409, January 11th 2002). That does not prevent them from being commercialized on the black market. Though, according to Brazilian Drug Law (Law 11.343, August 23th 2006), if the patron is caught with these prescribed medicines for personal use (to get high), acquired from the illegal market, there will be no punishment. However, when drugs such as marijuana, cocaine, crack, and ecstasy are seized with patrons, in small quantity for personal use, there will be administrative punishment, without the penalty of imprisonment.

This study has some limitations. The first limitation is the loss of participants from the exit interviews. Despite the good follow-up rate at the exit interviews (76%), we must consider that the number of alcoholic beverages consumed and illicit drugs used by patrons may be underestimated. We hypothesize that patrons who were very drunk and/or "high" on drugs were more likely to leave the establishment without completing the exit interview. Furthermore, the use of illicit drugs was self-reported, and patrons may have felt fearful about reporting their drug use because it is an "illegal behavior" with legal consequences. Another important point concerns ethical issues [24]; patrons who were clearly very "high and/or drunk" were not interviewed. Additionally, because this study was a cross-sectional survey, it was not possible to infer causation from the observed statistical associations.

Despite these limitations, this study has important strengths. To our knowledge, this is the first epidemiological survey of the association of environmental factors with the use of psychotropic drugs in nightclubs in Latin America. Furthermore, the use of mixed methods to triangulate data from three different sources strengthens the findings because these methods provide important additional qualitative data that is complementary to the quantitative results. On the other hand, a portion of the data collection occurred in a natural setting, which reduces the likelihood of memory bias by patrons. Finally, the use of biological measures of alcohol consumption improved the results for this outcome.

The results presented in this study may support governmental decisions regarding public health policies focused on this issue. The failure of Brazil to implement health surveillance policies related to these establishments increases the likelihood that patrons will participate in risky behaviors. Considering the different profiles of nightclubs and patrons, an integrated approach involving the venue owners, staff members, patrons, local governments, and law enforcement agencies appears to be the best approach for developing interventions focused on reducing the harm associated with drug use inside nightclubs while retaining their fun nature as a central feature of nightlife.

Acknowledgements Funding for this study was provided by *São Paulo State Research Support Fundation* (Fundação de

Amparo a Pesquisa do Estado de São Paulo – FAPESP), grant number 2011/51658-0, for Dr. Sanchez and 2012/21258-3, for PhD Canditate Carlini and the Brazilian National Council on Research (Conselho Nacional de Desenvolvimento Científico e Tecnológico, CNPq), grant number 483385/2011-5, for Dr. Sanchez. We thank all students and staff for their contributions to this research project and also the Department of Preventive Medicine and Brazilian Information Center on Psychotropic Drugs (CEBRID).

Compliance with Ethical Standards The Research Ethics Committee of the Universidade Federal de São Paulo (protocol 21,477) approved this study and recommended the verbal informed consent considering that the survey involved illicit behaviors practiced during data collection such as use of illicit drugs, driving under the influence, and physical and sexual aggression. Moreover, the request of a signature in a document containing personal data, breath alcohol concentration, and driving information could incriminate the participants by Brazilian driving law. The positive or negative answers for the informed consent were recorded in Samsung Galaxy tablets used for data collection and sent to a central database in real time.

Conflict of Interest All authors declare that they have no conflicts of interest.

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