

Effectiveness of a web-based intervention in reducing binge drinking among nightclub patrons

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ABSTRACT

OBJECTIVE: To evaluate the effectiveness of a web-based intervention in reducing binge drinking among nightclub patrons after six months.

METHODS: We carried out a website survey with probabilistic sample in 31 nightclubs in the city of São Paulo, Brazil, which originated a randomized controlled trial with 1,057 participants. Those classified as problem drinkers (n = 465) using the Alcohol Use Disorders Identification Test were randomized into two study groups – intervention and control. The web-based intervention consisted of exposing the participants to a normative feedback screen about their alcohol consumption, characterizing the risks associated with amount consumed, money spent on drinks, drinking and driving, risk classification of Alcohol Use Disorders Identification Test, and tips to reduce damage.

RESULTS: There was a significant reduction in the practice of binge drinking in the week estimated at 38% among participants in the intervention group after six months ($p < 0.05$). However, there was no significant reduction in the outcomes when we analyzed the intervention and control groups and at baseline and after sixth months, simultaneously.

CONCLUSIONS: We cannot conclude that digital tools reduce the pattern of binge drinking among party goers in São Paulo. More studies are needed with this methodology because of its attractiveness to this type of group, given the privacy and speed that personalized information is transmitted.

DESCRIPTORS: Binge Drinking, prevention & control. Internet. Evaluation of the Efficacy-Effectiveness of Interventions. Randomized Controlled Trial.

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INTRODUCTION

Nightclubs are an important place for leisure and entertainment for young persons¹. They are an environment where changes in social patterns are tolerated and pleasure is stimulated² and, together with the abusive alcohol consumption, they contribute with the increased risk exposure of nightclub patrons, such as physical or sexual violence³, aggressions, and conduct violations⁴. Binge drinking (BD)⁵ is common in nightclubs, which can be defined as the consumption of at least four doses of alcohol in a single occasion for women and five doses for men⁶. This practice can increase the chance of harmful consequences from alcohol abuse⁷, as it is associated with higher chances of sexual abuse, suicide attempts, unprotected sex, unwanted pregnancies, drunkenness, falls, accidents, and inflammatory diseases⁸.

In order to reduce the consumption of alcohol and other drugs, recent web-based interventions (i.e., offered over the Internet) have been tested in developed countries, especially among young persons or students^{9,10}, using personalized normative feedback messages^{11,12}. Personalized messages address educational information about alcohol use, personal messages about the drinking profile of participants, risk factors and harmful consequences, costs associated with consumption, comparisons with other profiles, and tips for harm reduction^{13,14}, by confronting individual consumption with population consumption or by providing ways on how to change behavior¹⁵. The advantage of this type of tool is that it can be used on a large scale because it is easy to access and has a low cost¹⁶, besides respecting the privacy of participants¹⁷.

International studies have shown a significant reduction in the practice of BD in university students after six months of personalized normative feedback via the Internet^{18,19}. Kypri et al. have observed a significant reduction of 11% in the total volume of alcohol consumed after six months, reducing personal, sexual, and legal problems related to alcohol, and a significant reduction of 19% in relation to academic problems, such as failure to perform tasks because of alcohol consumption^{20,21}.

Although Brazil has broad Internet access²², web-based interventions aimed at reducing alcohol abuse in the population have been used only recently²³, even though it is clear that this type of tool must be implemented in the country following adaptations that take into account cultural differences²⁴. Therefore, the introduction of interventions among party goers to reduce problems related to BD is a necessary and promising field of activity²⁵, which makes this an innovative study. Thus, the objective of this study was to evaluate the effectiveness of a web-based intervention in reducing the practice of BD and its lack of control among nightclub patrons after six months.

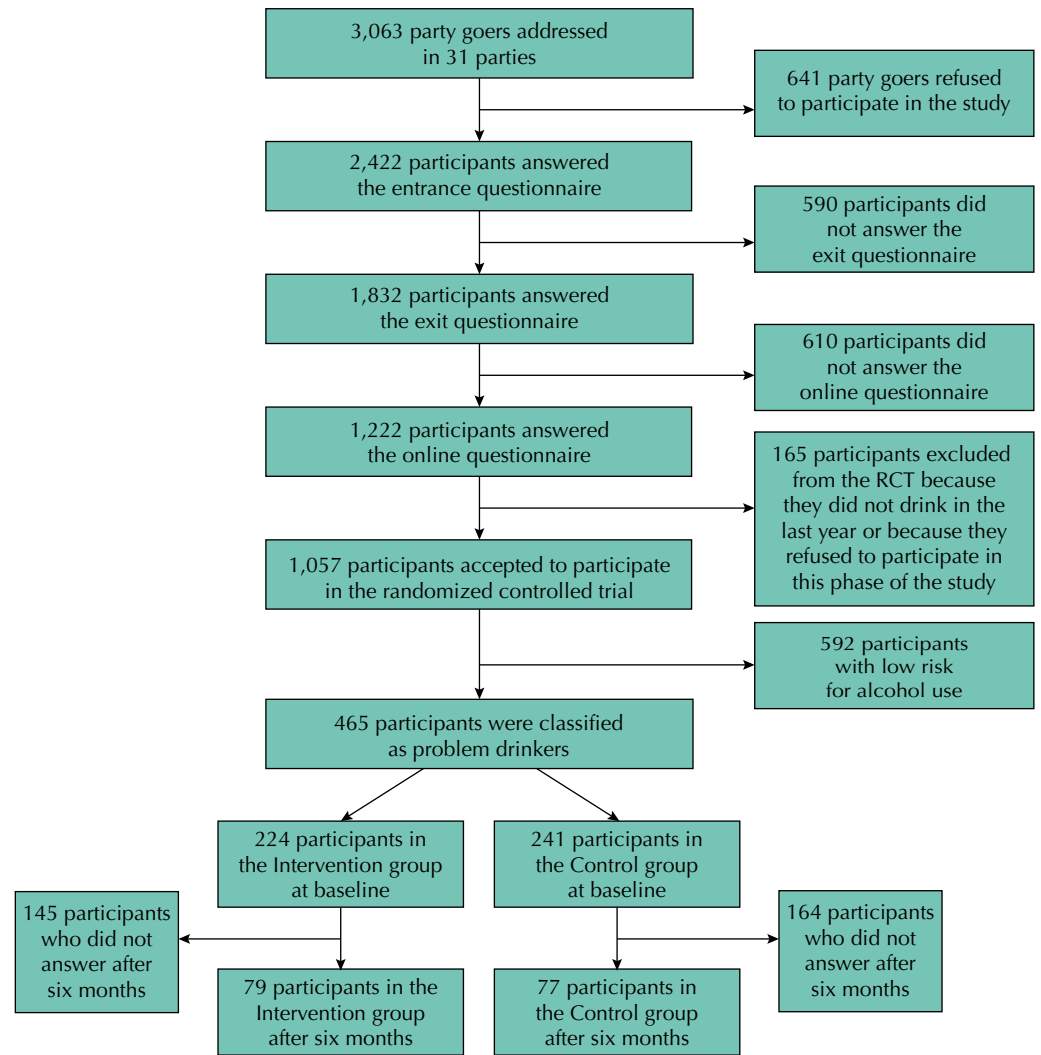
METHODS

Sample of the Website Survey

The data used in this study originated from a website survey²⁶ carried out to diagnose drug use and other risk behaviors among party goers in the city of São Paulo, Brazil, in 2013²⁷⁻²⁹. In this study, nightclubs were defined as any establishment that presented control of entry and exit, sale of alcoholic beverages, and dance floor. Details of the cross-sectional study are found in Sanchez et al.²⁸

Data Collection, Instruments, and Variables

Figure 1 shows the flowchart for recruiting nightclub patrons, data collection, and participation in the intervention, from the beginning of the website survey to the sixth month of follow-up. The individuals selected in the queues of nightclubs participated in the study in three stages²⁶: 1) in a face-to-face interview at the entrance and exit of the party,



RCT: randomized controlled trial

Figure 1. Flowchart for recruiting party goers and participation in the randomized controlled trial for the evaluation of a web-based intervention with normative feedback to reduce alcohol abuse. São Paulo, Brazil, 2013.

2) answering an online questionnaire the next day, and 3) participating in the randomized controlled trial (RCT).

We systematically approached 3,063 subjects in the queues to enter 31 parties, so that the last one of every three individuals was invited to participate in the project. The inclusion criteria were: intention to enter the party and being at least 18 years old. In the case of refusal, data on age and sex were recorded and the next person was approached. A total of 2,422 subjects agreed to participate in the study (acceptance of 79%), who answered an interview about sociodemographic variables, patterns of alcohol consumption, and risk behaviors in parties in the 12 months before the interview; we also measured the alcohol concentration in the exhaled air at the time of the interview using a breathalyzer.

At the exit of the nightclub, those who had been interviewed at the entrance (identified via a bracelet with a unique numerical code) were asked to answer a new interview. Then, we gave them a folder with information about participation in an online research.

On the day after recruitment, we sent the link of a post-party questionnaire, subdivided into two modules, by e-mail to the 1,833 participants of the exit interview. Of these, 1,222 accessed the questionnaire (acceptance of 67%). The questionnaire included questions regarding the risk behaviors of participants after leaving the nightclub, alcohol expenses, higher amount of

doses consumed, time of consumption, type of drink, and the evaluation of the Alcohol Use Disorders Identification Test (AUDIT), which has 10 questions producing a score ranging from zero to 40 that classifies the pattern of alcohol consumption into four risk levels (low risk use, risk use, harmful use, dependence).

The AUDIT has been developed by the World Health Organization (WHO) to identify the frequency, amount, and consequences of alcohol abuse³⁰. As an evaluation tool, the AUDIT has shown an increasing number of evidence of being a rapid and successful methodology to identify these standards³¹. In this study, we used AUDIT to identify patterns of alcohol consumption among party goers and to select them for an RCT for a web-based intervention with personalized normative feedback.

In this study, we analyzed the following outcome variables: binge drinking in the month (BD_{month}), binge drinking in the week (BD_{week}), and lack of control over drinking behavior (lack of control); the last two come from the AUDIT and the first one is an extra question.

The BD_{month} refers to the following question (extra-AUDIT): “In the last four weeks, what was the highest amount of standard doses of alcohol you consumed on a single occasion?” This was an open question and we categorized the response of five or more doses as “yes” and the response of less than five as “no”.

The BD_{week} refers to question three of the AUDIT: “How often do you have five or more drinks on one occasion?”. We categorized as “yes” the response “Weekly” and “Daily or almost daily” and as “no” the response “Never”, “Less than monthly”, and “Monthly”. We highlight that we chose to use the option of five doses based on an average concentration of 12 g of ethanol per dose, following the original guidance of the AUDIT which presupposes 60 g of ethanol or more for this question. Thus, the dose options presented to the participant were 330 ml of beer (1 can; 4.7% ethanol / 130 ml wine; 12% ethanol / 40 ml distillate; 39% ethanol).

Lack of control over drinking behavior refers to question four of the AUDIT “How often during the last year have you found that you were not able to stop drinking once you had started?” We categorized as “yes” the responses “Less than monthly”, “Monthly”, “Weekly”, and “Daily or almost daily”, and as “no” the responses “Never”.

The sociodemographic data were taken from the initial database, that is, the one from the face-to-face interviews at the entrance of the nightclubs, as described in Santos et al.³² The sociodemographic adjustment variables used were: sex (male, female), age, and socioeconomic status, obtained from the Brazilian Association of Population Studies (ABEP, 2012)³³ (A = high, B = medium-high, C = average, D = medium-low, E = low; the C, D, and E classes were grouped because of the small amount of sample).

Randomized Controlled Trial Procedures

Of the 1,222 nightclub patrons who accessed the online questionnaire, a total of 1,057 had consumed alcohol in the last year and agreed to participate (acceptance of 86.5%) in the RCT. Allocation in the groups was randomized and stratified, performed on the website itself, using a stratified permuted block randomization algorithm, considering the following categories for each of the three randomization strata: 1) sex (female, male), 2) age group (18–24, 25–34, 35+), and 3) pattern of alcohol consumption (AUDIT classification in four categories, that is, 0–7, 8–14, 15–19, 20–40 points). At the end of the randomization, we obtained an intervention group with 515 (48.7%) participants and a control group with 542 (51.3%) participants.

After the initial evaluation, we applied the web-based intervention of personalized normative feedback, which followed the model adopted by Kypri et al.¹⁹ For the subjects of the intervention group, we exposed them to a customized normative feedback screen on the risks associated with alcohol consumption, consisting of four parts: 1) feedback on the level of alcohol consumed at the investigated moment with standardized information for

each risk level (organic and mental health, as well as social complications), 2) information on social norms with bar graphs of the percentage of Brazilians, in the same age group and sex, who reported drinking less alcohol, emphasizing how this behavior is atypical for the general population (data from the general population of the household survey on alcohol of 2006³⁴), 3) personalized estimate of financial expenses with alcohol per month and year, and 4) general information with data to minimize the adverse consequences of alcohol consumption. Participants of the control group received no intervention and only answered the questionnaire.

In this study, we included participants with scores greater than or equal to eight in the AUDIT, that is, those classified by the AUDIT as problem drinkers (AUDIT score ≥ 8). Of the 1,057 participants randomized in both groups, 465 (44.0%) met the inclusion criteria.

Six months after the initial response, all 465 participants were contacted by e-mail containing the link to a new questionnaire to be completed for a new evaluation. If they did not respond to the questionnaire within three days, we sent a new link, in addition to a SMS, informing them about the e-mail. After three e-mails sent without an answer, the participant was contacted by telephone and informed about the link sent. The logistics of sending e-mails, SMS, and later telephone calls was the same used in the different times of the study.

Statistical Analysis

Qualitative variables were described as number (n) and percentage (%), while quantitative variables were described as mean and standard deviation. We evaluated the association between qualitative variables using Pearson's chi-square test or Fisher's exact test when one or more expected values were less than five. The comparison of the quantitative variables according to a dichotomous qualitative variable was performed using Student's t-test.

We analyzed the outcome variables using generalized linear models with panel data using the "xtlogit" procedure (Stata/SE 13.1 for Windows – StataCorp). All models included group effect (intervention or control), time (baseline or six months of follow-up), and group-time interaction. The interaction term allowed us to evaluate the effect of the intervention between the two evaluations. The results were presented as crude odds ratio (OR_c) and respective 95% confidence interval (95%CI). In addition to this model, a new model was adjusted for each of the outcome variables, taking into account sex, age, and socioeconomic class, as well as the parameters already described. These results were expressed as adjusted odds ratios (OR_{adj}) and respective 95%CI. The predictors were considered as fixed factors in the models.

We compared the data on sex, age, socioeconomic class, AUDIT score at baseline, and allocation group among the participants who answered the six-month follow-up *versus* those who did not. This was done to verify if the data of the respondents remained homogeneous regarding the initial sample and to show whether the non-response to the follow-up was different according to the randomization group.

Participants were analyzed in the group for which they were randomized at baseline, in the so-called intention-to-treat (ITT) analysis. We also performed a reanalysis of the data using the Last Observation Carried Forward (LOCF) method; that is, for the participants who did not respond the six-month follow-up, we considered the response at baseline.

Throughout the statistical analysis, we adopted a significance level of 5%.

Ethics

The study was approved by the Research Ethics Committee of the Universidade Federal de São Paulo (Process 21477), conducted in 2013 and 2014 and registered in the REBEC (Brazilian Registries of Clinical Trials, Ministry of Health), as RBR-35bkzc.

RESULTS

Of the 1,832 nightclub patrons invited to respond to the online questionnaire sent by e-mail, 610 (33.3%) did not respond (Figure 1). Of this total, 1,057 (86.5%) accepted to participate in the RCT, of which 465 (44.0%) had an AUDIT score greater than or equal to eight – “problem drinkers” – and were then randomized into two groups: intervention (n = 224) and control (n = 241).

Thus, 465 patrons (44.0%, 95%CI 41.0–47.0) were classified as “problem drinkers”. Of these, 344 (74.0%, 95%CI 69.7–77.9) and 256 (55.2%, 95%CI 50.5–59.7) individuals responded “yes” for BD_{month} and BD_{week} , respectively. Approximately 50% of these problem drinkers reported a lack of control over drinking behavior (n = 231, 95%CI 45.1–54.4).

According to Table 1, the intervention and control groups were homogeneous regarding the variables of age (p = 0.237), sex (p = 0.099), ABEP socioeconomic status (p = 0.852), and AUDIT score (p = 0.332).

At the six-month follow-up, we obtained the response of 79 (50.6%) participants from the intervention group and 77 (49.4%) participants from the control group. Table 2 shows the attrition results of the sociodemographic data, AUDIT score at baseline, and allocation group among these 156 respondents *versus* nonresponders. There was no statistically significant difference between participants who answered the questionnaire after six months *versus* nonresponders.

Table 3 presents the summary measures for the outcomes evaluated at baseline and after six months of follow-up, according to group. We can observe that there was no significant difference between the two groups in either of the two moments of evaluation. We also observed no significant effect of the intervention after six months of follow-up in any of the evaluated outcomes. However, the OR of the intervention effect at six months for the outcomes evaluated are less than 1, showing that the intervention group presented a decrease in BD_{month} , BD_{week} , and lack of control when compared to the control group.

Table 1. Distribution of the 465 participants according to group, sociodemographic data, and AUDIT score at baseline.

Variable	Total (n = 465)		Group				t	p
			Intervention (n = 224)		Control (n = 241)			
	n	%	n	%	n	%		
Age (years)							-1.265	0.237
Average (SD)	24.7	(6.0)	24.3	(5.7)	25.0	(6.2)		
Minimum-Maximum	18–55		18–50		18–55			
Sex							2.729	0.099
Male	300	64.5	136	60.7	164	68.0		
Female	165	35.5	88	39.3	77	32.0		
ABEP							3.744	0.852
A	139	29.9	68	30.4	71	29.5		
B	261	56.1	123	54.9	138	57.2		
C, D, or E	65	14.0	33	14.7	32	13.3		
AUDIT score							-1.050	0.332
Average (SD)	12.6	(4.1)	12.4	(4.0)	12.8	(4.2)		
Minimum-Maximum	8–33		8–27		8–33			
AUDIT							0.940	0.639
Risk use	333	71.6	164	73.2	169	70.1		
Harmful use	100	21.5	47	21.0	53	22.0		
Dependence	32	6.9	13	5.8	19	7.9		

SD: standard deviation; t: chi-square value or t-test; ABEP: Brazilian Association of Population Studies; AUDIT: Alcohol Use Disorders Identification Test

Table 2. Distribution of 465 party goers according to the response to the six months of follow-up.

Variable	Total (n = 465)		Participants (n = 156)		Losses (n = 309)		t	p
	N	%	n	%	n	%		
	Group							
Intervention	224	48.2	79	50.6	145	46.9		
Control	241	51.8	77	49.4	164	53.1		
Age (years)							0.171	0.865
Average (SD)	24.7 (6.0)		24.7 (5.4)		24.6 (6.2)			
Minimum-Maximum	18–55		18–50		18–55			
Sex							0.005	0.942
Male	300	64.5	101	64.7	199	64.4		
Female	165	35.5	55	35.3	110	35.6		
ABEP							0.954	0.621
A	139	29.9	51	32.7	88	28.5		
B	261	56.1	85	54.5	176	57.0		
C, D, or E	65	14.0	20	12.8	45	14.5		
Initial AUDIT _{score}							-0.678	0.542
Average (SD)	12.6 (4.1)		12.4 (4.1)		12.7 (4.1)			
Minimum-Maximum	8–33		8–27		8–33			
Initial _{AUDIT}							0.111	0.940
Risk use	333	71.6	113	72.5	220	71.2		
Harmful use	100	21.5	33	21.1	67	21.7		
Dependence	32	6.9	10	6.4	22	7.1		

SD: standard deviation; t: chi-square value or t-test; ABEP: Brazilian Association of Population Studies; Initial AUDIT: Initial Alcohol Use Disorders Identification Test

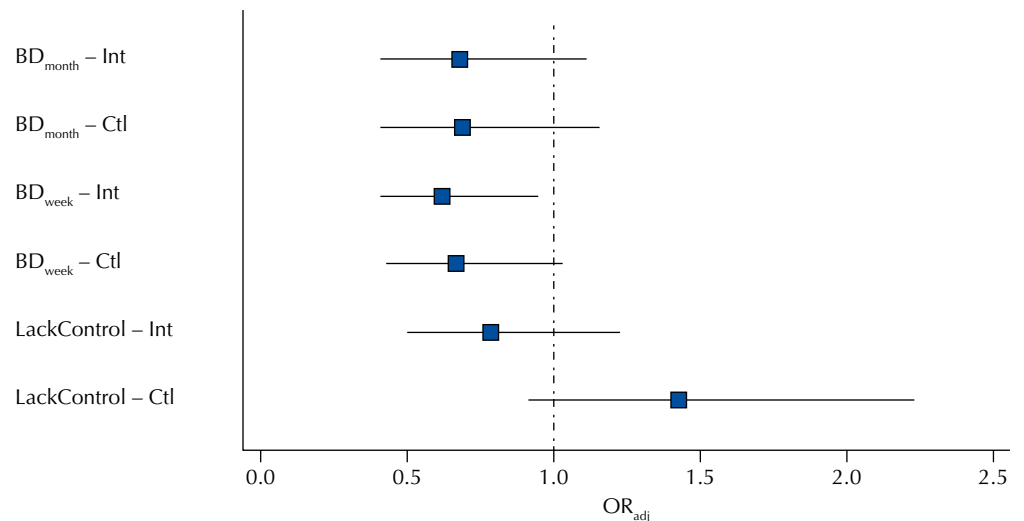
Table 3. Comparisons between groups in both times and intervention effect in six months (group and time interaction) for ITT and LOCF analysis.

Variable	Groups						Comparison between groups ^a				Intervention effect in six months ^b			
	Intervention (n = 224)			Control (n = 241)			OR _c ^a		OR _{adj} ^b		OR _c ^a		OR _{adj} ^b	
	n	%	95%CI	n	%	95%CI	OR _c ^a	95%CI	OR _{adj} ^b	95%CI	OR _c ^a	P	OR _{adj} ^b	P
Intention-to-treat – ITT														
BD _{month}														
Baseline	161	71.9	66.0–77.8	183	75.9	70.5–81.3	0.81	0.53–1.23	0.79	0.52–1.20	0.97	0.930	0.98	0.959
Six months	51	63.9	53.3–73.8	54	69	59.0–79.0	0.78	0.41–1.49	0.77	0.40–1.48	(0.48–1.94)		(0.49–1.98)	
BD _{week}														
Baseline	119	53.4	46.5–59.9	137	56.8	50.6–63.1	0.87	0.60–1.25	0.91	0.63–1.31	0.92	0.795	0.92	0.794
Six months	32	41.8	31.8–51.8	34	47.2	37.0–57.4	0.80	0.45–1.44	0.84	0.46–1.51	(0.52–1.66)		(0.51–1.67)	
Lack of control														
Baseline	111	49.8	43.2–56.3	120	49.8	43.5–56.1	0.99	0.69–1.44	1.01	0.69–1.45	0.56	0.062	0.55	0.058
Six months	35	43.9	33.6–54.2	49	58.4	48.1–68.7	0.56	0.30–1.01	0.55	0.30–1.01	(0.30–1.03)		(0.30–1.02)	
Last Observation Carried Forward – LOCF														
BD _{month}														
Baseline	161	71.9	66.0–77.8	183	75.9	70.5–81.3	0.81	0.53–1.23	0.79	0.52–1.20	0.98	0.901	0.99	0.928
Six months	161	68.3	62.2–74.4	183	73	67.4–78.6	0.80	0.53–1.19	0.78	0.52–1.16	(0.75–1.29)		(0.74–1.31)	
BD _{week}														
Baseline	119	53.4	46.8–59.9	137	56.8	50.6–63.1	0.87	0.60–1.25	0.91	0.62–1.31	0.94	0.591	0.94	0.580
Six months	111	49.8	43.2–56.3	132	54.8	48.5–61.0	0.82	0.57–1.18	0.85	0.59–1.23	(0.76–1.17)		(0.75–1.17)	
Lack of control														
Baseline	111	49.8	43.2–56.3	120	49.8	43.5–56.1	0.99	0.69–1.44	1.00	0.69–1.45	0.90	0.352	0.90	0.352
Six months	106	47.5	41.0–54.1	121	50.2	43.9–56.5	0.90	0.62–1.29	0.90	0.62–1.30	(0.72–1.12)		(0.71–1.13)	

ITT: intention-to-treat analysis; LOCF: last observation carried forward; BD_{month}: binge drinking in the month; BD_{week}: binge drinking in the week

^a Reference: control group.

^b Generalized linear model with Stata xtlogit procedure adjusted by group effect, time, group*time, sex, age, and ABEP. Reference: control group.



BD_{month}: episode of binge drinking in the last thirty days (month); BD_{week}: episode of binge drinking in the last seven days (week); Int: Intervention; Ctl: Control; LackControl: Lack of control over drinking behavior (lack of control); OR_{adj}: odds ratio obtained by generalized linear model with Stat xtlogit procedure adjusted by group, time, group*time, sex, age, and socioeconomic class. The OR values represented have as reference the baseline (moment 0)

Figure 2. Forest plot for the comparison of intragroup proportion changes, comparing baseline (0) and six months of follow-up, for each outcome evaluated. (n = 465)

In addition, we can note a marginally significant result ($p = 0.058$) for the intervention effect in reducing the prevalence of lack of control over drinking behavior (OR_{adj} = 0.55, 95%CI 0.30–1.02). However, when data are imputed via LOCF, there is no trend of significance for the intervention effect on lack of control over drinking.

Figure 2 shows the comparison of the time outcomes for each group evaluated. There was a significant effect of the intervention group for BD_{week}, that is, we observed a reduction of 38% ($p = 0.026$) in the sixth month of follow-up in the practice of binge drinking in the week, after adjusting for sex, age, and socioeconomic class, when compared to baseline; for the control group, no significant effect was observed ($p = 0.062$) for this same outcome.

DISCUSSION

The results presented here are part of the first epidemiologic research in Brazil on risk behavior in parties in the city of São Paulo, Brazil. The study investigated the effect of an online intervention after six months to reduce the practice of BD among nightclub patrons. The main finding was the reduction in 38% of the report of BD_{week} after six months of exposure to the intervention. The group of problem drinkers accounted for 44% of the respondents in the parties of the city and, therefore, require immediate intervention or treatment³⁰. The results also showed that most subjects who chose to participate in the RCT were male (64.5%) and belonged to the socioeconomic classes A or B (86%). Average age was 24.7 years.

The sociodemographic data of the participants of the intervention corroborate the data of Siliquini et al.⁷, who have found a proportion of 67.9% of men, aged between 20 and 24 years, and with high education level, suggesting good socioeconomic class, in nightclubs in six European countries. Another Brazilian study, conducted in Belo Horizonte, State of Minas Gerais, with 913 persons who had left leisure environments such as bars and parties, has found a population of 80% of males, aged between 18 and 30 years, and with a family income greater than eight minimum wages³⁵.

Web-based interventions based on custom normative feedback are most commonly applied to college students¹³. Kypri et al.¹⁹, in a study with 2,435 New Zealand university students who were problem drinkers according to the AUDIT classification, have found a reduction of 9%

in the frequency of drinking, 6% in the drinking amount, and 14% in the volume consumed after six months of exposure to a web-based intervention of personalized normative feedback. On the other hand, in a systematic review, Foxcroft et al.³⁶ have evaluated 66 studies seeking to determine the reduction of the harmful consequences of alcohol abuse in students from normative feedback. There were no significant benefits associated with interventions with social norms in this population, but the authors emphasize the difficulty of comparing these studies given the heterogeneity of design³⁶.

In the city of Curitiba, in State of Paraná, a study with a university population comparing web-based interventions with non-computerized interventions (based on motivational interviews) has found more positive results in web-based interventions in the reduction of alcohol use, recommending this alternative to personal interviews, since they are easily accessed by students and cover a greater number of participants²⁴.

This type of tool seems to have positive effects when analyzing the general population. In a systematic review, Tait and Christensen⁹ have analyzed fourteen studies ($n = 7,082$) regarding online interventions for young persons with problem drinking and they have found a reduction of 12% in the amount of alcohol consumed, 35% in the frequency of BD, and 57% in the negative consequences of alcohol use in the different studies. In Brazil, Andrade et al.²³ have also analyzed digital tools in the general population in a study with 929 participants. The authors emphasize that, despite the relatively low adherence to the study, alcohol consumption can be reduced after six weeks in 62.5% of the users with harmful alcohol consumption, emphasizing the advantage of the tools being available to remote populations and at any time of the day.

The main advantage of the use of digital tools is their accessibility, especially among young university students¹⁶, a population that largely makes up the scenario of parties in São Paulo³², besides their cost-effectiveness and practicality¹⁵. For Simon-Arndt et al., who have applied the same type of intervention in US seamen, another great advantage of the method was the privacy provided by the Internet when compared to face-to-face actions¹⁷.

In this study, there was a significant reduction in the practice of BD in the week estimated at 38% among participants in the intervention group after six months, not observed in the control group. However, when evaluating the effect of the program (group-time interaction), the results for BD are not significant and the reduction in the lack of control is marginally significant, even though all odds ratios show a protective trend for the intervention. The more severe option, from a statistical point of view, of using the LOCF approach, considering that the losses maintained their baseline consumption pattern, suggests that there is no intervention effect in any of the evaluated outcomes. Thus, we cannot categorically state that said intervention is effective in this scenario, since we had a complete loss of significance when we included the losses in the analyses from the worst possible scenario (no change).

Among the limitations of this study, we can mention the rate of loss of subjects at the different stages, the difficulty of access to the Internet of some party goers, limiting the amplitude of the RCT, and the impossibility of comparing our results with other studies, given the unprecedented nature of the use of web-based interventions among nightclub patrons. Another limitation is related to the adaptation of the criterion of BD for women, since in this study, we considered as BD five or more doses for both sexes, while several studies choose to reduce the amount to four doses for women. Even with these limitations, the innovative nature of this study is reinforced in Brazil, a country marked by great damages from the abuse of alcohol by the population.

More studies are needed to evaluate this and other methodologies that reduce the prevalence and consequences of alcohol abuse, given the impossibility to reach a conclusion about the effectiveness of web-based intervention tools in reducing BD among nightclub patrons.

REFERENCES

1. Calafat A, Koller M; Comisión de las Comunidades Europeas. Enjoying the nightlife in Europe: the role of moderation. Palma de Mallorca: IREFREA; 2003.
2. Graham K, Bernards S, Osgood DW, Wells S. Bad nights or bad bars? Multi-level analysis of environmental predictors of aggression in late-night large-capacity bars and clubs. *Addiction*. 2006;101(11):1569-80. <https://doi.org/10.1111/j.1360-0443.2006.01608.x>
3. Reingle J, Thombs DL, Weiler RM, Dodd VJ, O'Mara R, Pokorny SB. An exploratory study of bar and nightclub expectancies. *J Am Coll Health*. 2009;57(6):629-38. <https://doi.org/10.3200/JACH.57.6.629-638>
4. Demant J, Heinskou MB. Taking a chance: sex, alcohol and acquaintance rape. *Young*. 2011;19(4):397-415. <https://doi.org/10.1177/110330881101900403>
5. Calafat A, Blay NT, Hughes K, Bellis M, Juan M, Duch M, Kokkevi A. Nightlife young risk behaviours in Mediterranean versus other European cities: are stereotypes true? *Eur J Public Health*. 2011;21(3):311-5. <https://doi.org/10.1093/eurpub/ckq141>
6. National Institute of Alcohol Abuse and Alcoholism. NIAAA Council approves definition of binge drinking. *NIAAA Newslett*. 2004 Winter [cited 2017 Jul 3];(3):3. Available from: https://pubs.niaaa.nih.gov/publications/Newsletter/winter2004/Newsletter_Number3.pdf
7. Siliquini R, Colombo A, Berchiolla P, Bert F, TEND-D Group. Binge drinking and psychoactive drug use in a cohort of European youths. *J Public Health Res*. 2012;1(1):83-8. <https://doi.org/10.4081/jphr.2012.e15>
8. Naimi TS, Brewer RD, Mokdad A, Denny C, Serdula MK, Marks JS. Binge drinking among US adults. *JAMA*. 2003;289(1):70-5. <https://doi.org/10.1001/jama.289.1.70>
9. Tait RJ, Christensen H. Internet-based interventions for young people with problematic substance use: a systematic review. *Med J Aust*. 2010 [cited 2017 Jul 3];192(11 Suppl):S15-21. Available from: https://www.mja.com.au/system/files/issues/192_11_070610/tai10832_fm.pdf
10. Rooke S, Thorsteinsson E, Karpin A, Copeland J, Allsop D. Computer-delivered interventions for alcohol and tobacco use: a meta-analysis. *Addiction*. 2010;105(8):1381-90. <https://doi.org/10.1111/j.1360-0443.2010.02975.x>
11. Kypri K, Langley JD. Perceived social norms and their relation to university student drinking. *J Stud Alcohol*. 2003;64(6):829-34. <https://doi.org/10.15288/jsa.2003.64.829>
12. McAlaney J, Bewick B, Hughes C. The international development of the 'Social Norms' approach to drug education and prevention. *Drugs (Abingdon Engl)*. 2011;18(2):81-9. <https://doi.org/10.3109/0968787631003610977>
13. Walters ST, Neighbors C. Feedback interventions for college alcohol misuse: what, why and for whom? *Addict Behav*. 2005;30(6):1168-82. <https://doi.org/10.1016/j.addbeh.2004.12.005>
14. Palfai TP, Winter M, Lu J, Rosenbloom D, Saitz R. Personalized feedback as a universal prevention approach for college drinking: a randomized trial of an e-mail linked universal web-based alcohol intervention. *J Prim Prev*. 2014;35(2):75-84. <https://doi.org/10.1007/s10935-013-0337-9>
15. Riper H, Straten A, Keuken M, Smit F, Schippers G, Cuijpers P. Curbing problem drinking with personalized-feedback interventions: a meta-analysis. *Am J Prev Med*. 2009;36(3):247-55. <https://doi.org/10.1016/j.amepre.2008.10.016>
16. White A, Kavanagh D, Stallman H, Klein B, Kay-Lambkin F, Proudfoot J, et al. Online alcohol interventions: a systematic review. *J Med Internet Res*. 2010;12(5):e62. <https://doi.org/10.2196/jmir.1479>
17. Simon-Arndt CM, Hurtado SL, Patriarca-Troyk LA. Acceptance of web-based personalized feedback: user ratings of an alcohol misuse prevention program targeting U.S. Marines. *Health Commun*. 2006;20(1):13-22. https://doi.org/10.1207/s15327027hc2001_2
18. Lewis MA, Patrick ME, Litt DM, Atkins DC, Kim T, Blayney JA, et al. Randomized controlled trial of a web-delivered personalized normative feedback intervention to reduce alcohol-related risky sexual behavior among college students. *J Consult Clin Psychol*. 2014;82(3):429-40. <https://doi.org/10.1037/a0035550>
19. Kypri K, Hallett J, Howat P, McManus A, Maycock B, Bowe S, Horton NJ. Randomized controlled trial of proactive web-based alcohol screening and brief intervention for university students. *Arch Intern Med*. 2009;169(16):1508-14. <https://doi.org/10.1001/archinternmed.2009.249>

20. Kypri K, Langley JD, Saunders JB, Cashell-Smith ML, Herbison P. Randomized controlled trial of web-based alcohol screening and brief intervention in primary care. *Arch Intern Med*. 2008;168(5):530-6. <https://doi.org/10.1001/archinternmed.2007.109>
21. Kypri K, Saunders JB, Williams SM, McGee RO, Langley JD, Cashell-Smith ML, et al. Web-based screening and brief intervention for hazardous drinking: a double-blind randomized controlled trial. *Addiction*. 2004;99(11):1410-7. <https://doi.org/10.1111/j.1360-0443.2004.00847.x>
22. Instituto Brasileiro de Geografia e Estatística. Pesquisa Nacional por Amostra de Domicílios 2014. Rio de Janeiro: IBGE; 2014 [cited 2017 Jul 3]. Available from: <http://www.ibge.gov.br/home/estatistica/populacao/trabalhoerendimento/pnad2014/default.shtm>
23. Andrade AL, Lacerda RB, Gomide HP, Ronzani TM, Sartes LM, Martins LF, et al. Web-based self-help intervention reduces alcohol consumption in both heavy-drinking and dependent alcohol users: a pilot study. *Addict Behav*. 2016;63:63-71. <https://doi.org/10.1016/j.addbeh.2016.06.027>
24. Christoff AO, Boerngen-Lacerda R. Reducing substance involvement in college students: a three-arm parallel-group randomized controlled trial of a computer-based intervention. *Addict Behav*. 2015;45:164-71. <https://doi.org/10.1016/j.addbeh.2015.01.019>
25. Warpenius K, Holmila M, Mustonen H. Effects of a community intervention to reduce the serving of alcohol to intoxicated patrons. *Addiction*. 2010;105(6):1032-40. <https://doi.org/10.1111/j.1360-0443.2009.02873.x>
26. Voas RB, Furr-Holden D, Lauer E, Bright K, Johnson MB, Miller B. Portal surveys of time-out drinking locations: a tool for studying binge drinking and AOD use. *Eval Rev*. 2006;30(1):44-65. <https://doi.org/10.1177/0193841X05277285>
27. Carlini C, Andreoni S, Martins SS, Benjamin M, Sanudo A, Sanchez ZM. Environmental characteristics associated with alcohol intoxication among patrons in Brazilian nightclubs. *Drug Alcohol Rev*. 2014;33(4):358-66. <https://doi.org/10.1111/dar.12155>
28. Sanchez ZM, Ribeiro KJ, Wagner GA. Binge drinking associations with patrons' risk behaviors and alcohol effects after leaving a nightclub: sex differences in the "Balada com Ciência" Portal Survey Study in Brazil. *PLoS One*. 2015;10(8):e0133646. <https://doi.org/10.1371/journal.pone.0133646>
29. Santos R, Baldin Y, Carlini CM, Sanchez ZM. Classification of alcohol use disorders among nightclub patrons: associations between high-risk groups, sociodemographic factors and illicit drug use. *Am J Drug Alcohol Abuse*. 2015;41(5):433-41. <https://doi.org/10.3109/00952990.2015.1050497>
30. Babor TF, Higgins-Biddle JC, Saunders JB, Monteiro MG. AUDIT: The Alcohol Use Disorders Identification Test: Guidelines for Use in Primary Care. 2.ed. Geneva: WHO Department of Mental Health and Substance Dependence; 2001 [cited 2017 Jul 14]. Available from: http://apps.who.int/iris/bitstream/10665/67205/1/WHO_MSD_MSB_01.6a.pdf
31. Reinert DF, Allen JP. The alcohol use disorders identification test: an update of research findings. *Alcohol Clin Exp Res*. 2007;31(2):185-99. <https://doi.org/10.1111/j.1530-0277.2006.00295.x>
32. Santos MGR, Paes AT, Sanudo A, Sanchez ZM. Factors associated with pre-drinking among nightclub patrons in the city of São Paulo. *Alcohol Alcohol*. 2015;50(1):95-102. <https://doi.org/10.1093/alcalc/agu055>
33. Associação Brasileira de Empresas de Pesquisa. Critério de Classificação Econômica no Brasil. Rio de Janeiro: ABEP; 2012.
34. Laranjeira R, Pinsky I, Sanches M, Zaleski M, Caetano R. Alcohol use patterns among Brazilian adults. *Rev Bras Psiquiatr*. 2010;32(3):231-41. <https://doi.org/10.1590/S1516-44462009005000012>
35. Campos VR, Salgado R, Rocha MC, Duailibi S, Laranjeira R. Prevalência do beber e dirigir em Belo Horizonte, Minas Gerais, Brasil. *Cad Saude Publica*. 2008;24(4):829-34. <https://doi.org/10.1590/S0102-311X2008000400013>
36. Foxcroft DR, Moreira MT, Almeida Santimano NM, Smith LA. Social norms information for alcohol misuse in university and college students. *Cochrane Database Syst Rev*. 2015;(12):CD006748. <https://doi.org/10.1002/14651858.CD006748.pub4>

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