

BRIEF COMMUNICATION

**Alcohol use on premises of gas stations of Porto Alegre, Brazil:
pilot study**

Raquel De Boni^I; Daniela Benzano^{II}; Carl Leukefeld^{III}; Flavio Pechansky^{IV}

^IPsychiatrist, Master's degree

^{II}Statistician

^{III}PhD. Director, Center on Drug and Alcohol Research, University of Kentucky, Lexington, USA

^{IV}PhD. Director, Center on Drug and Alcohol Research, Universidade Federal do Rio Grande do Sul (UFRGS), Porto Alegre, RS, Brazil

[Correspondence](#)

ABSTRACT

INTRODUCTION: Alcohol use is a strong predictor of traffic accidents. This paper reports feasibility issues and preliminary data on blood alcohol concentration among youth who drink alcohol on gas station premises in Porto Alegre, Brazil. **METHOD:** It used cross-sectional design with a purposive sample stratified by age and gender. Data were collected through a self-administered questionnaire, and blood alcohol concentration was estimated with breath alcohol analyzers. **RESULTS:** Refusal rate was 13.7% and blood alcohol concentration over 0.06% was found in 35.5% (CI95% 24.3-47.9) of the sample. Almost 10% of those subjects (18% of the males) reported they would drive within 2 hours of their interview. **DISCUSSION:** We discuss the potential utilization of such measures as well as the need for studies on substance use among young Brazilian drivers.

Keywords: Alcohol drinking, traffic accidents, risk-taking behavior.

Introduction

The World Health Organization indicates that 1.2 million people die each year as a consequence of traffic accidents.¹ Most traffic-related deaths (90%) and 91,8% of the 38 million lost disability-adjusted life years occur in developing countries.^{1,2} Alcohol use is a strong predictor of traffic accidents. There is a linear correlation between increase in blood alcohol concentration (BAC) and risk for traffic accidents.³⁻⁵ Binge drinking (more than five drinks on a single occasion), gender and age are also strongly associated with traffic injuries.^{6,7}

In 2004, there were 35,674 known traffic-related deaths in Brazil.⁸ Even at this level of potential impact, few studies report on the association between alcohol use and traffic accidents in Brazilian drivers and passengers.^{9,10} Alcohol use is increasing in Brazil.¹¹ The city of Porto Alegre, Brazil's southernmost state capital, has a high prevalence of alcohol use in youth and has one of the highest rates of marijuana use in Brazil.¹² A current practice in the city is to drive to convenience stores inside gas stations with peers, and hang around drinking alcoholic beverages. These settings are well-lighted and have private security staff, which may be a reason for this behavior. There are no estimates on BAC levels or other risks for traffic accidents associated with drinking alcohol in such groups, and there are no studies about risk perception of driving under influence (DUI) among those youths.

This paper aims at describing feasibility issues and preliminary data analyses related to DUI among youth who drink alcoholic beverages on such basis. It is a pilot for a study on the association of risk perception for drinking and driving and BAC, which is inserted in a national study on alcohol and drug use in the Brazilian traffic, sponsored by the Brazilian government.

Method

A cross-sectional design with a purposive sample was used. The sample was obtained from four gas stations in Porto Alegre. The selection of sites used the eight Porto Alegre Health Secretariat regions. In each region two gas stations were selected: one was randomly selected and the other was matched after indication of the Union of gas station owners. That having more people at the time of interview was chosen. Owners of the selected gas stations were previously contacted to authorize data collection. None refused.

Sampling

The sample was stratified by age (under 21 years and over 21 years) and by gender. Data were collected on days and times reported in the literature which had the most fatal alcohol-related traffic accidents: Friday and Saturday, from 11:00 PM to 4:00 AM.¹³ All subjects were interviewed during May 2006. The survey was completed in two gas stations each night at the same time: from 11:00 PM to 12:00 PM and from 3:00 AM to 4:00 AM. Every hour, two males and two females, under and over 21 years, were interviewed for a total of 16 cases each day. Interviewers approached the first person they observed drinking an alcoholic beverage as they walked in the gas station, and then the second one until they had four interviews each hour.

Interviewers

Ten interviewers were trained: two psychologists, one psychiatry resident and seven undergraduate medical students. Interviewers always went out in pairs (male and female). They wore T-shirts identifying the study and introduced themselves to the gas station security staff before interviewing subjects. Interviewers were about the same age and education of subjects interviewed, and approached subjects from the opposite gender, aiming to decrease refusal rates.

Inclusion criteria

Inclusion criteria were: 1) being at least 15 years old; 2) drinking an alcoholic beverage; and 3) being a driver or a passenger in a car.

Measures

Demographic data, substance use and traffic risk behaviors were obtained with a self-administered questionnaire which took about 5 minutes. The questionnaire included questions from demographics and some risk behavior for DUI and traffic accidents quoted in the international literature (previous DUI accident, being a DUI passenger, and use of marijuana).^{14,15}

BAC was estimated with alcohol breath concentration measured by two conventional and previously calibrated alcohol analyzers (ALCO SENSOR and ALCO-SENSOR IV, Intoximeters, Inc.). Interviewers were trained to use them. The measure was obtained after the questionnaire, when subjects would have stayed at least 15 minutes without drinking or smoke. This procedure aimed to estimate accurate BAC and not only alcohol present in the mouth.

Informed consent

Ethical aspects were thoroughly discussed with the Institutional Review Board (IRB) of Hospital de Clínicas de Porto Alegre, where the study was sited. Some of the resolutions are described next. No information that could identify research subjects was collected, ensuring anonymity regarding potential legal issues. Drivers with BAC over the legal limit (0.06% in Brazil) were told that a peer who had not been drinking should drive. Alternative transportation (taxi tokens) was offered using a pre-established agreement with a local taxi company. The study purpose and confidentiality were explained to each potential subject, and each subject was asked to sign a consent form after the study procedures were explained.

Data analysis

Data were analyzed using SPSS 14.0. Gender comparisons were made using chi-square tests for categorical variables; Student's *t* test was used for symmetrical continuous variables, and Mann-Whitney's U test was used for asymmetrical continuous variables. Significance level was set at 0.05.

Results

Seventy-three potential subjects were approached by the interviewers. Ten (13.7%) refused to participate, with no significant differences between male and female refusals. One was excluded for data inconsistency in the questionnaire. There were no significant differences in demographic characteristics between males and females, except for income: 60% of the men had income over five times the monthly minimum wage in Brazil (about US\$ 150), and 54% of women were in the range of one to five times the monthly minimum wage ($p < 0.006$). Mean age was 22.7 (± 5.0), average schooling years was 13 (± 3.0 years), 75.8% had a job and 43.5% had a steady partner.

BAC over 0.06% was found in 35.5% (CI95% 24.3-47.9) of the sample. Almost 10% of those subjects (18% of the males) reported they would drive within 2 hours of their interview, as can be seen in [Table 1](#). No one changed drivers or used a taxi, as suggested by the interviewers.

Table 1 - Risk factors for traffic accidents stratified by gender

	Men	Women	Total	OR (95% CI)
BAC ($\geq 0.06\%$)	11 (32.7%)	11 (33.7%)	22 (30.0%)	1.57 (0.52-4.97)
BAC < 0.06%	15 (45.9%)	17 (52.3%)	32 (43.5%)	2.59 (0.97-6.89)
Thought alcoholic drink in the past 24h	21 (63.6%)	22 (67.3%)	43 (58.4%)	0.59 (0.22-1.56)
Used alcohol (past 24h)	12 (36.4%)	13 (39.7%)	25 (33.9%)	4.71 (1.19-18.60)
Used alcohol (past 72h)	13 (39.7%)	14 (42.4%)	27 (36.7%)	
Used alcohol (past 120h)	20 (60.6%)	18 (54.3%)	38 (51.4%)	
Intended to drive in the next 2h	15 (45.9%)	5 (15.2%)	20 (27.2%)	4.41 (1.25-14.28) [†]
Previous DUI accident	7 (21.2%)	2 (6.1%)	9 (12.2%)	3.20 (0.76-13.68)
Previous accident as passenger of DUI driver	6 (18.2%)	6 (18.2%)	12 (16.2%)	1.20 (0.42-3.22)
OR: Odds Ratio; CI: Confidence Interval				
OR: Odds Ratio; CI: Confidence Interval				
† Effect size				
† $p < 0.05$				
Chi-square for categorical variables; Mann-Whitney U test for asymmetric variables.				

[Table 1 - Click to enlarge](#)

There were no significant differences in traffic accident risk behaviors between youths who were under 21 years and over 21. Also, there were only eight subjects who were under 18 years old (12.9%), which is the legal drinking age in Brazil: seven of them bought alcoholic beverages in the gas station, but no one was planning to drive in the 2 hours after the interview.

Discussion

Data on risk behaviors related to traffic accidents are limited in Brazil, and there are no published studies about BAC among youth who drink at gas stations, where the combination of alcohol and driving is almost unavoidable. It is important to note in this study that only subjects who were obviously drinking inside or around a car were interviewed. Subjects around the age of 22 have the highest traffic accident death rate in Brazil.¹ In addition, most subjects of our sample were college students, who typically have high rates on binge drinking and drunk driving.¹⁶

Even in this pilot study, the prevalence of BAC over the legal limit was alarming. Specifically, almost half of the males had a BAC over the legal limit, and more than 1/3 of those with illegal BAC were planning to drive in the next 2 hours, which suggests a 7 to 570 higher chance of being killed in a single-vehicle crash.⁴ This data is in accordance with recent data from Duailib et al., who found BAC over the legal limit prevalence of 19.4% in Brazilian drivers from Diadema.¹⁷ Marijuana use was also very high, which increases risk of an accident,^{18,19} and was possibly underreported. Since none of the drivers accepted the offer of a taxi ride, this may mean that subjects from this sample may have little perception of the risks of drinking and driving, which can certainly be decreased by their level of blood alcohol. The public health reason for the fact that none accepted preventive measures is perhaps due to the fact that there is limited law enforcement in Brazil, and that the Brazilian society has a very tolerant attitude towards alcohol consumption, which is empowered by strong commercial advertising.²⁰ This could also help explain the high number of teenagers under the legal drinking age with a positive BAC who purchased alcohol at a convenience store. On this topic, this pilot has showed that researches must discuss with the IRB about the procedures to adopt when approaching an underage person who is drinking, since there was no previous rule to deal with this situation.

The results of this pilot study demonstrate that this kind of study is feasible in Brazil. The refusal rate was quite low, considering that many subjects had BAC over the legal limit and were planning to drive. This low rate of refusal can be explained by the fact that subjects were informally approached, using the same language of the youth. Interviewers were polite and trained to develop rapport in clinical interviews. They were about the same age and from the same social stratus of the subjects. Previous contact with gas station owners also made data collection more possible, since data collectors had already been recognized by security guards before starting their interviews.

There are limitations in the study that must be addressed in the future: 1) small sample size; 2) purposive sample; and 3) questions were self-reported except for BAC. Additional studies are suggested to examine underage drinking and to develop targeted intervention.

This study generates landmarks for a larger set of projects that aim at evaluating substance use in drivers who drink alcoholic beverages in pubs, restaurants and paid parking in Porto Alegre and other Brazilian cities, already supported for funding by the Brazilian government. This will increase external validity and will generate training materials to be used in the future.

We declare no competing interests in this paper.

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 **Correspondence:**

Centro de Pesquisa em Alcool e Drogas, UFRGS
Rua Ramiro Barcelos, 2350/2201-F
CEP 90035-903, Porto Alegre, RS, Brazil
Tel.: (51) 3330.5813
E-mail: raqueldeboni@msn.com

Received September 20, 2007.
Accepted November 20, 2007.

Financial support: Fundação de Incentivo a Pesquisa (FIPE), Hospital de Clínicas de Porto Alegre, and University of Kentucky.

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Sociedade de Psiquiatria do Rio Grande do Sul

Av. Ipiranga, 5311/202
90610-001 Porto Alegre RS Brasil
Tel./Fax: +55 51 [3024-4846](tel:+555130244846)

 e-Mail

revista@aprs.org.br