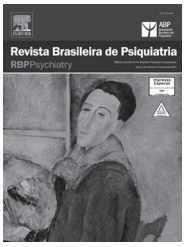
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ORIGINAL ARTICLE

Predictors of positive Blood Alcohol Concentration (BAC) in a sample of Brazilian drivers

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DESCRIPTORS
Epidemiology;
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Alcohol;
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Abstract
Objective: To verify the frequency of positive Blood Alcohol Concentration (BAC) among drivers and to examine associated factors in a cross-sectional study of Brazilian state capitals. *Methods:* 3,398 drivers were approached on highways crossing all 27 Brazilian capitals from 12 p.m. to 12 a.m. (Fridays and Saturdays). They were breathalyzed and data on their driving characteristics and alcohol consumption were collected. Multivariate logistic regression following a hierarchical conceptual framework was used to evaluate associated factors. *Results:* The overall weighted prevalence of positive BAC (> 0.1 mg/L) was 4.2%. The multivariate analysis showed that education up to 8 years (OR = 2.0; 95% CI: 1.4-3.0), age > 30 years (OR = 2.6; 95% CI: 1.8-3.8), type of vehicle (cars: OR = 3.0; 95% CI: 1.7-5.1; motorcycles: OR = 3.7; 95% CI: 2.1-6.4), binge drinking (OR = 1.7; 95% CI: 1.3-2.4), having been breathalyzed before (OR = 2.6; 95% CI: 1.8-3.7), and purpose of the trip (coming from a party: OR = 1.9; 95% CI: 1.3-3.0; leisure trip: OR = 1.7; 95% CI: 1.32.4; driving after 8 p.m.: OR = 1.7; 95% CI: 1.3-2.3) were independently associated with DUI. *Conclusion:* Study findings suggest that selected external environmental factors, such as socioeconomic and demographic characteristics as well as personal characteristics like alcohol consumption and the relationship between drinking and driving were associated with positive BAC among Brazilian drivers. Results can help to inform drinking and driving policy and preventive approaches.

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DESCRITORES:
Epidemiologia;
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Trânsito.

Preditores de alcoolemia positiva em uma amostra de motoristas brasileiros

Resumo
Objetivo: Verificar a frequência de alcoolemia positiva entre os motoristas e examinar fatores associados em um estudo transversal nas capitais brasileiras. *Métodos:* 3.398 motoristas foram abordados em rodovias que atravessam todas as 27 capitais brasileiras nos horários entre 12:00 e 00:00 (sextas e sábados). Eles realizaram o teste do etilômetro e foram coletados dados sobre suas características de condução e consumo de álcool. Para avaliar os fatores associados, foi realizada uma regressão logística multivariável seguindo um quadro conceitual hierárquico. *Resultados:* A prevalência de alcoolemia positiva (> 0,1 mg/L) foi de 4,2%. A regressão logística múltipla mostrou que educação (até 8 anos de estudo: OR = 2,0; IC 95%: 1,4-3,0), idade (> 30 anos: OR = 2,6; IC 95%: 1,8-3,8), tipo de veículo (dirigir um carro: OR = 3,0; IC 95%: 1,7-5,1; conduzir uma motocicleta: OR = 3,7; IC 95%: 2,1-6,4), consumo excessivo de álcool (OR = 1,7; IC 95%: 1,3-2,4), ter realizado o teste do etilômetro anteriormente (OR = 2,6; IC 95%: 1,8-3,7), e a finalidade da viagem (retorno de uma festa: OR = 1,9; IC 95%:1,3-3,0; viagem de lazer: OR = 1,7; IC 95%: 1,3-2,4; e estar dirigindo após as 20 horas: OR = 1,7; IC 95%: 1,3-2,3) foram independentemente associados com o dirigir sob influência de álcool. *Conclusão:* Os resultados sugerem que fatores ambientais externos selecionados, tais como características socioeconômicas e demográficas, bem como características pessoais, como o consumo de álcool e comportamento em relação a beber e dirigir, foram associados com alcoolemia positiva entre os motoristas brasileiros. Os resultados podem ajudar a orientar políticas em relação a beber e dirigir e abordagens preventivas.

Introduction

Acording to recent studies, since the beginning of the 80's, Brazilian traffic accidents have been the second highest cause of death in the country.[1] For example, in 2004, 35,460 individuals died in Brazilian traffic accidents,[2] and a report provided by the Brazilian Confederation of Municipalities suggests that a number of deaths of up to 55,024 was obtained in 2009, according to the system responsible for administering the obligatory insurance to be paid in the case of a crash fatality (DPVAT).[3] It has been evident that the relative risk of involvement in fatal crashes increases with alcohol use.[4,5] In the United States, most driving under the influence (DUI) is alcohol-related with rates for alcohol almost three times higher than rates for driving under the influence of illicit drugs (13.2% versus 4.3%, respectively),[6] which makes drinking while driving in the U.S. a major public health problem.[7] In 2008, a new law was passed in Brazil, requiring that all drivers involved in traffic accidents who are under suspicion of driving under the influence must submit to an alcohol breath test, clinical exam, or any other test that would certify the driver's alcohol use status.[8] Breath alcohol analysis is the most frequently used test worldwide and is accepted forensically.[9,10] It has been used for more than 75 years and in connection with traffic enforcement for about 65 years.[11] According to Cherpitel, drivers who report drinking within six hours before an injury are most likely to be intoxicated and/or to have a positive Blood Alcohol Concentration (BAC) at the time of admission to an emergency room.[12] Age and other risk factors also influence the risks of alcohol-related traffic accidents. For example, risk increases when drivers are under 40, when driving at night, driving on less traveled roads,[13] and among drivers who engage in heavy and/or binge drinking.[14] International studies have clearly demonstrated this type of association. Caetano et al.[7] reported that those who drank and drove in the U.S. were more likely to be men, not married, to drink more alcohol and to be more alcohol dependent than drinkers who did not engage in alcohol-impaired driving. In fact, a minority of males and very few females were classified as persistent risky drivers. Among males, factors that predicted at least one or more alcohol-related outcomes included personality traits like low constraint (i.e. low scores of control, harm avoidance, and traditionalism) and aggressive behavior in addition to *cannabis* dependence.[15]

Although these risk factors and patterns are well established in most developed countries, little is known about this reality in Brazil. Of the few data available, numbers are quite impressive: a cross-sectional analysis of 845 drivers in sobriety checkpoints on weekends in the city of São Paulo in 2007 showed a prevalence of positive BAC of 21.9%, typically among young single males.[16] Another sobriety checkpoint study with 579 drivers on major roads in the city of Belo Horizonte on weekends found 38% of BAC+.[17] Pechansky et al.[18] found a reported prevalence of DUI of 34.7% on respondents of a household survey about alcohol use in a representative sample of Brazilian adults. Regarding victims of fatal accidents, de Carvalho et al.[19] found 42.3% of BAC+ (above 0.6 g/L) among 357 drivers in São Paulo.

Since most studies have been conducted in the northern hemisphere, and studies in Brazil have been mostly conducted in specific situations, such as sobriety checkpoints, there is still a paucity of data with regard to the trends of risky behavior associated with drunk driving in the whole country, which precludes the appropriate comparison of policy and enforcement actions between Brazil and other countries. Policymakers and highway police have no information on

alcohol use and traffic risks in Brazil in order to attempt to reduce DUI-related accidents. Therefore, the purpose of this study was to determine the frequency of positive BAC among Brazilian drivers, and to examine associated factors in this first nationwide roadside survey.

Method

Design and sampling

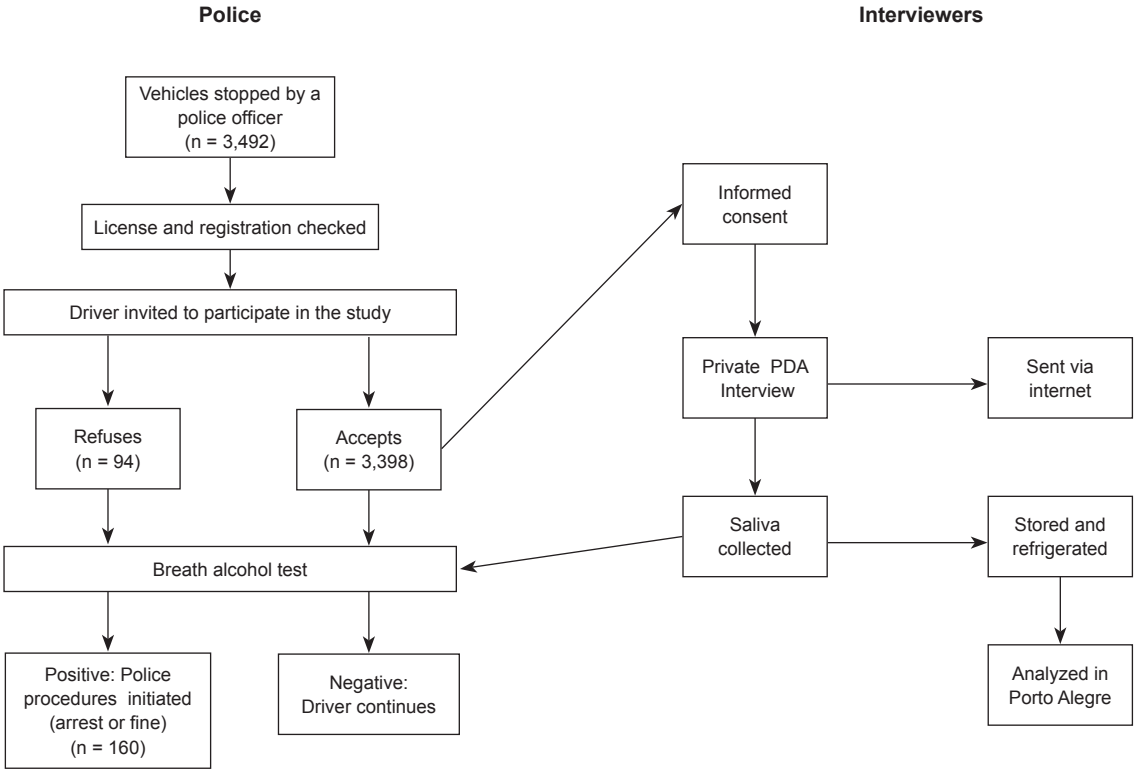
We designed a roadside survey with the sample selected from federal highways that intersect in major metropolitan areas in each of the 27 Brazilian state capitals. Data collection sites were selected with no more than 50 km from the geographical center of each state capital city. The sample was stratified by the type of vehicle - automobile, motorcycle, bus and truck - with random selection in proportion to the fleet size of each state.[1] Sample size was estimated to the least prevalent outcome, since data were collected for drug use as well (not analyzed in this study). For example, a 6% prevalence for amphetamine use among truck drivers – which, by a 2% error margin and with a 95% confidence interval (CI) yielded a minimum sample of 542 truck drivers. It is important to report that 3,492 drivers were asked to participate, and 3,398 agreed to participate (97%) of the study; proportions were kept in the sampling design (51.1% for cars, 10.1% for buses, 9.9% for trucks, and 28.9% for motorcycles).

1 drivers in each state and the number of vehicles.

Data collection

Data were collected between August 8, 2008, and September 26, 2009. Eight data collectors were trained using roadside data collection procedures developed by the Pacific Institute for Research and Evaluation (2007) and adapted for use in Brazil[20] after pilot testing and rigorous training. A senior federal police officer and three senior members of the federal highway patrol were co-trained, since these officers were responsible for consistent data collection approaches for each highway stopping point. Additional training for local police officers was scheduled at each state capital highway police station.

Data were collected on Fridays and Saturdays from 12 p.m. to 12 a.m. on each individual day. Regional, local, and national holidays were excluded. The data collection approach is presented in Figure 1. Specifically, each selected vehicle was stopped by a uniformed police officer. After drivers were given project fliers, which included information about safe driving, officers invited the driver to participate in the study. Drivers who agreed were interviewed, after informed consent, in a parking area away from the road. After the interview, the police officer breathalyzed each driver. If a police officer found a reason to keep the driver from driving (suspended driver's license, not driving a registered vehicle, or intoxication), appropriate police procedures were followed.



PDA: Personal Digital Assistant.

Figure 1 Data collection procedures.

Inclusion Criteria

We included drivers 18 years of age and older who consented to participate in the study.

Measures

Study measures were adapted from U.S. National Highway Traffic Safety Administration questionnaires.[21] Data were collected using Personal Digital Assistants (PDAs). Data included demographics, vehicle information and recent alcohol consumption. Data were immediately transmitted to an encrypted webpage that was only accessible to the investigators. Blood Alcohol Concentration (BAC) was estimated from breath samples obtained using Alco-Sensor IV (Intoximeters, Inc) digital devices which were calibrated by the Brazilian Institute for Metrics, Normatization, and Industrial Quality (INMETRO). Any positive reading (different from zero) in the breath analyzer was considered as a positive BAC. This is in consonance with the current Brazilian law of 2008,[8] which considers any alcohol level reading as a traffic offense.

Statistical Analyses

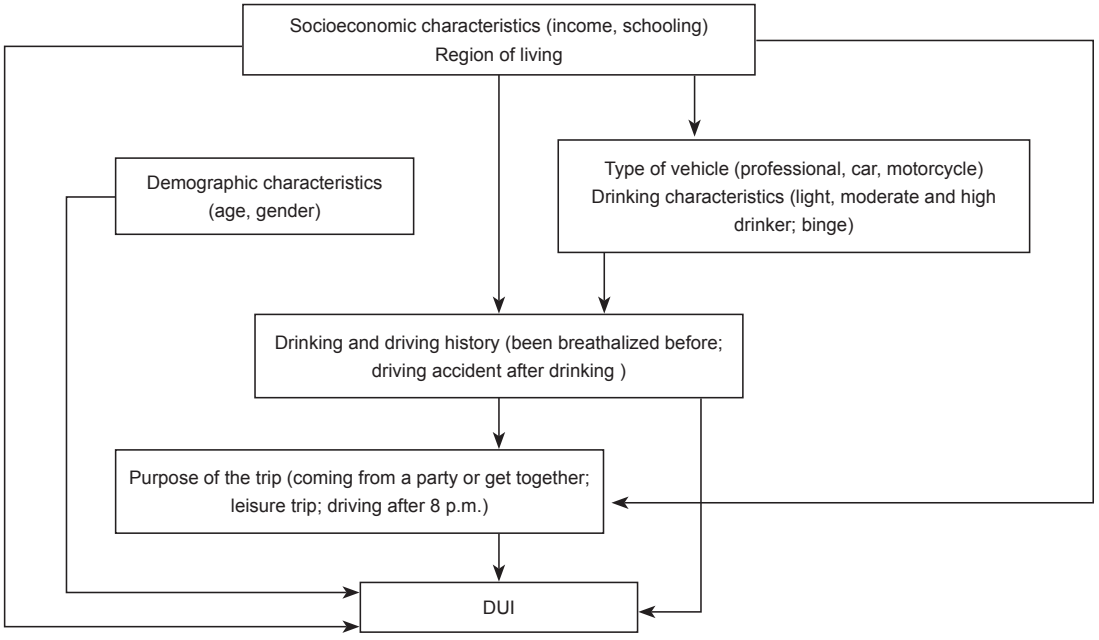
Multivariable analysis was performed (Multiple logistic regression) followed a conceptual framework, which allowed for the adjustment for potential confounding variables. The primary outcome variable of concern was *Driving Under the Influence* (DUI), defined as any positive BAC reading (different from zero), to comply with the Brazilian new traffic law, and/or any reported drinking in the six hours prior to the interview.

In order to assess which variables were associated with DUI, a hierarchical model was developed. This framework posits that characteristics of the external environment (socioeconomic and demographic characteristics) and personal characteristics influence the outcomes. The model introduces personal characteristics as intermediate independent variables which would, in turn, influence DUI. Variables were grouped into a hierarchy of categories which included socioeconomic, demographic and personal characteristics such as type of vehicle, drinking characteristics, drinking and driving history, and purpose of the trip (leisure or work). A hierarchical block design approach was used in the logistic regression to determine the separate contribution of the different blocks of independent variables on the outcome. Socioeconomic characteristics represented the distal determinants of DUI (First level), followed by demographic characteristics and type of vehicle/drinking characteristics. The Second level was drinking and driving history. The most proximal level was the purpose of the specific trip (Figure 2).

Initially, the hierarchical approach included univariate regressions that examined the measures of effect for each studied variable in respect to the study outcome. Subsequently, multivariate logistic regressions were carried out for each level, using a stepwise backward method. Variables were selected to be kept in the subsequent hierarchical levels if their p values were < 0.20 after adjustment for confounders within their own level and after adjustment for hierarchically superior variables. In other words, only variables with a $p < 0.20$ in the previous models were added in the final, fully adjusted model. All statistical analyses were performed using the SPSS 16.0 (SPSS Inc., Illinois, U.S.A.) software for statistical analysis.

Ethics

The study was fully approved by the Institutional review board of Hospital das Clínicas de Porto Alegre before initiation.



DUI: Driving Under the Influence.

Figure 2 Hierarchical Model for analysis.

Results

A total of 3,398 drivers participated in the study, of which 163 (4.2%) had a positive BAC. When data were weighted, based on the representative proportions of each vehicle in the appropriate state, the overall prevalence found was slightly lower – 4.8%. The combined proportion of drivers who either had a positive BAC or reported drinking in the six hours prior to data collection was 7.4%.

Almost all study participants (94.3%) were male. Age ranged from 18 to 80 years (median age: 36 years - interquartile range: 28-45) with a median family income of U$1,208 (range: U$714 – U$2,307). Truck and bus drivers reported the lowest median monthly income at U$824 and U$659, respectively, as well as the lowest education levels, with 59.9% of truck drivers and 53.3% of bus drivers reporting they had completed elementary school. Demographic characteristics are shown in Table 1, in addition to a positive or negative breath alcohol test and time since last alcohol drink.

Results of the logistic regression analysis are shown in Table 2. In the univariate logistic regression model, less education, geographic region [Level 1], age [Level 2], type of vehicle (car and motorcycle), binge drinking [Level 3], having been breathalyzed before [Level 4], and purpose of trip – returning from a party, leisure travel and trips after 8 p.m. [Level 5] were significantly associated with DUI. After the multivariate analysis, education up to 8 years [Odds Ratio (OR): 2.0; 95% Confidence Interval (CI): 1.4-3.0], age > 30 years (OR = 2.6; 95% CI = 1.8-3.8), type of vehicle (car: OR = 3.0; 95% CI = 1.7-5.1; motorcycle: OR = 3.7; 95% CI = 2.1-6.4), binge drinking (OR = 1.7; 95% CI = 1.3-2.4), been breathalyzed before (OR = 2.6; 95% CI = 1.8-3.7), and purpose of the trip (coming from a party: OR = 1.9; 95% CI = 1.3-3.0; leisure trip: OR = 1.7; 95% CI = 1.3-2.4; driving after 8 p.m.: OR = 1.7; 95% CI = 1.3-2.3) remained independently associated with DUI, even after adjusting for potential confounders.

Discussion

This is the first Brazilian study to provide survey data from a nationwide sample of drivers, yielding a high estimated positive BAC level overall, and a higher estimate of recent alcohol consumption, if BAC and self report were combined for analysis. The prevalence of positive BAC was elevated in the sample studied, considering the conservative methodology utilized. However, the limits for positive BAC in Brazil are quite low, and therefore, these findings have their comparability limited with international findings. Recent data show

Table 1 Demographic characteristics of the study sample stratified by positive alcohol test

Variable		Positive BAC n = 160	Negative BAC and drank six hours or less n = 109	Drank alcohol in the last year with negative BAC n = 2,146	Abstainers n = 972	p-value
Mean age (sd)		38.6 (10.3)[a,b]	39.2 (10.7)[a]	36.3 (11.1)[b]	38.9 (11.7)[a]	< 0.001
Male gender n(%)		159 (99.4)	100 (91.7)	2028 (94.5)	908 (93.4)	0.014
Type of vehicle n(%)	Professional (trucks, buses)	19 (11.9)	9 (8.3)	423 (19.7)	227 (23.4)	< 0.001
	Cars	84 (52.5)	64 (58.7)	1111 (51.8)	471 (48.5)	
	Motorcycles	57 (35.6)	36 (33.0)	610 (28.5)	274 (28.2)	
Schooling (years) Mean(sd)	≥ 12	29 (18.1)	36 (33.0)	636 (29.7)	197 (20.3)	< 0.001
	8 to 11	65 (40.6)	39 (35.8)	907 (42.3)	421 (43.3)	
	< 8	66 (41.2)	34 (31.2)	599 (28.0)	354 (36.4)	
Monthly income n(%)	< 1300	44 (30.3)	25 (23.4)	488 (24.3)	246 (27.2)	< 0.001
	1,300-2,200	41 (28.3)	27 (25.2)	487 (24.2)	254 (28.1)	
	2,200-4,200	28 (19.3)	30 (28.0)	468 (23.3)	230 (25.5)	
	≥ 4,200	32 (22.1)	25 (23.4)	568 (28.2)	173 (19.2)	
Purpose of trip n(%)	Work	62 (38.8)	42 (38.5)	1134 (52.8)	539 (55.5)	< 0.001
	Leisure or other	98 (61.2)	67 (61.5)	1012 (47.2)	433 (44.5)	
Going to n(%)	Own or someone's house, school, work, church, store or shopping mall	145 (94.8)	99 (90.8)	1876 (92.5)	864 (93.2)	0.560
	Restaurant, bar, club, gas station, hotel	8 (5.2)	10 (9.2)	153 (7.5)	63 (6.8)	
Coming from n(%)	Own or someone's house, school, work, church, store or shopping mall	126 (87.5)	85 (84.2)	1820 (91.1)	828 (91.2)	0.057
	Restaurant, bar, club, gas station, hotel	18 (12.5)	16 (15.8)	178 (8.9)	80 (8.8)	

10 cases were not classified: 1 refused to answer the questionnaire, 6 had negative BAC, and 3 had drunk alcohol in the last year but had negative BAC.

Table 2 Crude and adjusted odds ratio and 95% confidence interval of the variables associated with DUI

Socioeconomic characteristics	Crude OR	p	Adjusted OR	p
Monthly family income (US dollars)				
≥ 4,200	1	0.248	-	-
2,200 – 4,200	1.2 (0.8-1.8)			
1,300 – 2,200	1.4 (0.9-2.0)			
< 1,300	1.4 (1.0-2.1)			
Schooling (years)				
≥ 12	1	0.009	1	
8 to 11	1.1 (0.8-1.5)		1.3 (0.9-1.8)	0.238
< 8	1.6 (1.2-2.2)		2.0 (1.4-3.0)	< 0.001
Region				
South, Southeast	1			
North, Northwest, Midwest	1.4 (1.1-1.8)	0.017	1.2 (0.9-1.7)	0.170
Demographic characteristics				
Age > 30 years	1.9 (1.4-2.6)	< 0.001	2.6 (1.8-3.8)	< 0.001
Male Gender	1.5 (0.8-2.8)	0.257	-	-
Type of vehicle and drinking characteristics				
Type of vehicle				
Professional	1	< 0.001	1	
Car	2.2 (1.4-3.5)		3.0 (1.7-5.1)	< 0.001
Motorcycle	2.5 (1.6-4.0)		3.7 (2.1-6.4)	< 0.001
Drinker				
Light	1	0.293	-	-
Moderate	1.3 (0.9-1.8)			
High	1.1 (0.7-1.8)			
Binge	1.7 (1.3-2.3)	< 0.001	1.7 (1.3-2.4)	0.001
Drinking and driving history				
Been breathalized before	2.3 (1.6-3.2)	< 0.001	2.6 (1.8-3.7)	< 0.001
Driving accident after drinking	0.9 (0.5-1.7)	0.801	-	-
Purpose of trip				
Coming from a party or get together	1.6 (1.1-2.4)	0.016	1.9 (1.3-3.0)	0.002
Leisure trip	1.9 (1.4-2.4)	< 0.001	1.7 (1.3-2.4)	0.001
After 8 p.m.	1.7 (1.2-2.1)	< 0.001	1.7 (1.3-2.3)	< 0.001

[a] the total daily amount of alcohol was converted into standard doses of alcohol –drivers were classified as 1) **light** – less than 3 doses per week; 2) **moderate** – between 3-14 doses/week for man and 3-7 doses/week for woman and; 3) **heavy** – more than 2 doses/day for men and more than 1 dose/day for women.[22]

* Binge (episodic consumption of alcohol) was assessed by the following question: "in the last year, did you drink more than 5 doses (men) or 4 doses (women) in just one occasion?"[23]

that alcohol remains by far the number one psychoactive substance found in European roads. On a European level, alcohol is estimated to be used by 3.48% of the drivers.[24] Some previous studies have also collected data on weekend nights. However, the comparison with findings of the current study is limited by the differences in times of data collection. While previous studies collected data between 10 p.m. and 3 a.m.,[17,20] we collected data between 12 p.m. to 12 a.m. As for the United States, a cross-sectional study conducted in 2007 in 300 locations across the contiguous U.S. on weekend nights and Fridays during the day (primarily of weekend nighttime drivers, but also with drivers on Friday daytimes) showed a prevalence of 12.4% of positive BACs in 9,413 drivers surveyed.[25]

Our findings include a positive association between BACs of drivers with less education and those above the age of 30, as a previous Brazilian study has estimated.[18] Our data corroborate a Finnish study, in which drunk driving was

associated with low education.[26] A U.S. study has reported the opposite: an association between higher levels of education and a higher risk of drinking and driving.[27] Age deserves further discussion here, since underage drinking is associated with high risk of injury.[28,29] However, it should be noted that the present study is a sample of all drivers on federal highways, not those involved in traffic accidents. A U.S. study that examined alcohol-related relative risk of driver involvement in fatal crashes by age and gender as a function of BAC[30] found that, with only very few exceptions, older drivers had lower risk of being fatally injured in a single-vehicle crash than younger drivers, as did women in the same age range. In addition, a Finnish study[31] concluded that, for young adult males, drunk driving was part of a generally riskier driving style, while among middle-aged males, drunk-driving was more related to a risky lifestyle associated with drinking problems. In this study, 94.3% of the drivers were male. In Brazil, men had around 70% of driver licenses, however there is no information on how many drivers who cross federal highways are male; it would be difficult to infer if this is a typical situation in highways.[32]

In this study, motorcycle and car drivers were more positively associated with DUI when compared to bus and truck drivers. The association of DUI and type of vehicle is poorly studied worldwide, and comparison with international data is still quite challenging. In the present study, possible reasons include the idea that motorcycle and car drivers had higher levels of education, which has been constantly associated with DUI.[27] Moreover, professional drivers, particularly bus drivers, are closely monitored by Brazilian transportation companies, and truck drivers usually avoid high alcohol use while driving, since this goes against their wish to be awake and drive for further hours. In Europe, truck drivers have low prevalences of positive BAC as well,[33] but legislation and enforcement may be the main reason for the difference, which is not the current Brazilian scenario. We believe this may help explain the differences found between groups.

Binge drinking has been associated with different types of problems and high disease burden.[34,35] In this study, binge drinking was positively associated with DUI, as expected. In addition, drivers who had been previously breathalyzed were associated with the analyzed outcomes, suggesting that a previous history of alcohol abuse may increase the odds of DUI among Brazilian drivers, since these drivers could have presented risk driving behavior before, which lead to potential situations where breath tests might had been previously obtained. However, drivers with prior convictions for driving while alcohol impaired are overrepresented among drivers in fatal crashes in different studies. For example, a U.S. study reported that drivers convicted of alcohol-impaired who were driving during the previous 3 years were 1.8 times as likely to be in fatal crashes as drivers with no prior convictions and were about 4 times as likely to be in a fatal crash in which the driver had a high BAC.[36] In 2008, only 8 percent of drivers in fatal crashes with high BACs had prior alcohol-impaired driving convictions. The actual incidence of previous convictions could be higher, because information on convictions was only available for the 3 years prior. In addition, some alcohol-related offenses are not included in driver records because selected court programs remove or defer convictions if a person attends an educational program. However, most alcohol-impaired fatal crashes do not involve drivers with a long history of multiple alcohol convictions.[37]

The current findings of this study must be seen under some methodological limitations: first, the study was conducted in federal highways only, and in close geographical proximity with the state capitals, preventing us from generalizing the findings to other roads or other geographic regions other than the metropolitan surroundings of state capitals. Another aspect that can bias these results is that higher prevalences may be found in urban metropolitan areas.[38] Also, although data were collected in days when typically prevalences of DUI are high, we purposefully collected data in a fashion that excluded holidays and the major concentration of alcohol consumption (from midnight to 6 a.m.). Hazardous driving is strongly associated with drinking and driving, and this was confirmed in our sample. However, it is possible that the rate was underestimated, since drivers were interviewed only on Fridays and Saturdays from noon to midnight, and holidays were excluded. Consequently, our data may be more conservative than findings from other studies, and the aforementioned limitations prevent generalizing the findings for the whole population of drivers in the country.

There are several knowledge gaps about drinking and driving in Brazil. The current study only presents a "snapshot", and must be observed under a specific perspective. One of the possibilities for the findings of higher prevalence of BAC in Brazilian drivers, compared to other countries, may lie on the fact that there may be cultural differences regarding the use of alcohol and the permissiveness of alcohol consumption in the national environment. The low perception of punishment may underlie the expressed behavior of high alcohol consumption associated with risk exposure.[39] Additional research could focus on alcohol policy changes, patterns of drinking, and drinking and driving trends. For example, a Brazilian study using national data from 2006 to 2009 showed that binge drinking decreased in the month after implementation of a 2008 national DUI law but increased two months later.[40] In order to understand changes in general alcohol policies on drinking and driving fatalities and non-fatal injuries in Brazil, additional research is needed which is important for public health and public safety. For example, understanding the impact of changing policies on reducing drinking and driving in an environment where other risk factors for traffic accidents are high could better inform prevention and education initiatives. It seems that the limited enforcement of existing policies is a major barrier to health and safety which can be overcome with additional resources along with political commitment and public support.

Brazil must react to the increasing change provided by the growth of its economy, increasing motorization, and an upsurge of middle-class in the country, which are a result of positive economic growth, but will ultimately reflect on increased use of cars, streets, roads and highways. We understand that the provision of sound scientific information to the policymaker is one of the potential ways to generate momentum to formulate change in the policies of DUI in the country. A combination of systematic data collection and review by different sectors of the scientific community, as well as governmental sectors, is at the root of potential changes either in enforcement, legislation, or other mechanisms that

intend to curtail the spread of accidents related to drinking and driving. We were able to show that it is feasible to collect such type of data, and that there are specific risk groups that should deserve priority of attention regarding public policies. Of course, it is to the choice of the policymaker to define what priorities should generate the change agenda, but it is clear that risky driving related to alcohol is of utmost importance for prevention on Brazilian roads right now.

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Author Contribution

FP, PCAVD and RB designed the study, wrote and reviewed the final manuscript; CL provided overall consultation for the project design and sample development, as well as reviewing the different English versions. RB supervised data collection, and reviewed methodological issues; LVD, DB, MCB and JH designed the analytical model and prepared results and tables; FK and DF reviewed the literature and prepared bibliographic references. All the authors approved the final version of the manuscript.

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