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Drinking and driving in southeastern Brazil: Results from a roadside survey study ☆

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HIGHLIGHTS

- A roadside survey study on drinking and driving and alcohol consumption in Brazil.
- The breathalyzer test was positive for 24.6% of the drivers.
- Drinking weekly is an increased risk of positive breathalyzer.
- The data show that drinking and driving is relatively common in Brazil.

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ABSTRACT

Objective: The objective of this study is to present data from a roadside survey study on drinking and driving and alcohol consumption in southeastern Brazil.
Methods: A cross-sectional roadside survey study using a questionnaire and breathalyzer data is the method used to determine the prevalence of drinking and driving and to examine whether socio-demographic characteristics and drivers' behavior, attitude and alcohol consumption predicted positive blood alcohol content (BAC). The data were gathered from 2005 to 2007 through roadside surveys conducted on high volume public roads in four cities in southeastern Brazil. A total of 4182 randomly selected drivers took part in the research. Of these drivers, 3488 (83.4%) completed the questionnaire and agreed to take a breath test.
Results: Overall, 24.6% of drivers had a detectable blood alcohol concentration (BAC) and 15.9% had a BAC above the legal limit (0.6 g/l) at the time of the study. Logistic regression controlling for locale (city), sex, age and marital status was used to predict whether each driver would present a positive breath test. Socio-demographic characteristics, driving behaviors and attitudes, and alcohol consumption patterns were included as predictors. These analyses indicated that those who believed drinking and driving was a serious offense were about two-thirds as likely to have a positive breath test, and that drivers reporting a pattern of regular alcohol use were three times as likely to have a positive breath test.
Conclusions: These findings indicate that drinking and driving is relatively common in Brazil, and that it occurs considerably more frequently than similar surveys suggest, is the case in other countries.

1. Introduction

In January of 1998, the adoption of a new National Traffic Code reduced the allowable blood alcohol concentration (BAC) for drivers throughout Brazil from 0.8 to 0.6 g/l. As a result of this legislation, driving under the influence of alcohol (DUI) became an offense subject to fines, license suspension, and possible imprisonment (Ministério das Cidades, 1997). This change attracted considerable media attention and the consequences of DUI became an important topic for magazine and newspaper articles nationally (Noto, Pinsky, & Mastroianni, 2006). In June, 2008 (after this survey was completed) a new traffic law was enacted that reduced the legal limit of BAC from 0.6 g/l to 0.2 g/l (Law 11.705 popularly known as the "Dry Law"). This new law establishes that the driver with BAC between 0.3 g/l is subject to administrative penalties, such as fines, suspension of the license for 12 months and the annotation of 7 points in the file (severe offense). For alcohol concentration of 0.6 g/l, the law also provides for the arrest of the driver who, criminally prosecuted, can be sentenced from six months to three years in prison (Departamento Nacional de Trânsito —

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DENATRAN, 2008). A survey based on telephone interviews' data provided by VIGITEL (a monitoring system of Risk Factors and Protection against Chronic Diseases maintained by the Brazilian Ministry of Health) shows that the frequency of adults who drove after drinking an excessive amount of alcoholic beverages dropped from 2.2% to 0.9% in the first two months after the law was enacted, and increased again to 2.8% in 2009 (Moura, Malta, Neto, Penna, & Temporão, 2009).

Despite these changes, enforcement of DUI laws in Brazil remains inconsistent. According to data from the Brazilian Ministry of Health, the number of traffic accidents increased 24% between 2002 and 2010 and 40,610 people died in traffic crashes in Brazil in 2010 (Ministério da Saúde, 2011). These data indicate a very high rate of crashes since there were fewer than 65 million cars in Brazil at that time (Departamento Nacional de Trânsito — DENATRAN, 2010). In comparison, in the U.S., one of the most motorized countries in the world, the number of registered vehicles totaled approximately 250 million in 2010 and the number of casualties in traffic crashes was 32,310 (National Highway Traffic Safety Administration (NHTSA), 2012; Research, Innovative Technology Administration — RITA, 2012).

Until the late 1990s, data about drinking and driving in Brazil were mainly based on a small number of studies conducted in the northeastern part of the country (Nery Filho, Medina, Melcope, & Oliveira, 1997) and from one study of trauma-related deaths in São Paulo (Carlini-Cotrim & Matta Chasin, 2000). Duailibi, Pinsky and Laranjeira (2007), evaluated the prevalence of drinking and driving in Diadema, Brazil using a roadside survey methodology incorporating active and passive alcohol breath testing in 2007. The breathalyzers proved easy to apply and are reliable, without bias, showing similar results in both instruments. Duailibi, Pinsky and Laranjeira found that 23.7% of drivers had a detectable level of alcohol in their blood. This compares with drinking and driving rates of 8.1% among nighttime drivers in roadside surveys in British Columbia, Canada (Beirness & Beasley, 2010) and of 12.4% among weekend nighttime drivers in the United States (Lacey et al., 2009). In a Norwegian roadside survey, 4.5% of drivers tested positive for either alcohol or drugs (Gjerde et al., 2008). A Belgian roadside survey found that 3.3% of drivers had a BAC exceeding the legal limit (>0.5 g/l) (Vanlaar, 2005). In one of the few roadside survey studies undertaken in a developing country, it was found that 5.5% of drivers in Thailand had a positive BAC (Ingsathit et al., 2009). A recent Brazilian national survey study using in-home interviews also suggests a relatively high prevalence of drinking and driving (Pechansky et al., 2009). The average self-reported prevalence of DUI in that study was 34.7%–42.5% among males, and 9.2% among females. Drinking and driving was associated with being male, having a previous drinking and driving-related crash, reporting excessive alcohol consumption in the last year, and holding an unfavorable opinion about public policies related to drinking and driving.

Considering the need for additional information on DUI in Brazil, this study presents breath test and questionnaire data gathered from randomly selected drivers at roadside surveys in four cities in southeastern Brazil. We document the prevalence of persons driving above the legal limit (0.6 g/l at the time of the study), as well as those driving with a detectable positive blood alcohol concentration (BAC), which would be in violation of Law 11.705/2008 ("Dry Law"). In addition, we analyzed social–economic, attitudinal, and behavioral predictors of a positive BAC.

2. Methods

2.1. Overview

Data were collected in four cities (locale) in southeastern Brazil (Belo Horizonte, Diadema, São Paulo, and Vitória) using a roadside survey methodology modeled after similar surveys undertaken in the United States and Canada (Beirness & Beasley, 2009; Lacey et al., 2009; Voas, Wells, Lestina, Williams, & Greene, 1998). The data were obtained through self-report questionnaires and breath tests. Interviewer observations of driver behavior were also obtained. In each city, a trained health professional organized the survey, implementing standardized methods and procedures according to established protocols.

2.2. Survey procedures

Each day of the survey, ten trained interviewers were in the field at each site for data collection. Two of these interviewers were specially trained to administer the breath tests and were dedicated exclusively to collecting those data. Vehicles were randomly selected from the flow of traffic; every fifth passing vehicle was stopped by a uniformed police officer and directed into the survey area. We surveyed only drivers of private motor vehicles, including motorcycles. Commercial vehicles (e.g., taxis, busses, and delivery vehicles) were excluded. Once each vehicle was stopped, a traffic officer evaluated traffic safety conditions, as well as the safety of the research team, supervisors, coordinators and support personnel involved in the study. After confirming safety, the traffic officer left the area and an interviewer informed the drivers that they were being stopped as part of a voluntary research project on traffic safety. Drivers were then asked to complete a brief questionnaire and provide a breath test. Those drivers who agreed to participate in the study were asked to sign a consent form and were given an educational brochure on drinking and driving.

2.3. Study sites

Survey sites in each city were selected after consulting with local authorities regarding appropriate locations (e.g., strategic roadways, sufficient traffic, and appropriate areas adjacent to the roadway for the survey). A recent U.S. national roadside survey used a similar approach in identifying appropriate survey sites (Lacey et al., 2009). Data collection occurred as follows: Diadema — Friday and Saturday nights from 10 pm to 3 am and Sunday afternoons (3 pm to 7 pm) between February 2005 and February 2006; Belo Horizonte — Friday and Saturday nights from 10 pm to 3 am during the first two weeks of December 2005 and 2006, respectively; Vitória — Thursday, Friday and Saturday nights from 10 pm to 4 am, from December 2005 to May 2006; and São Paulo — Friday and Saturday nights from 10 pm to 3 am from December 2006 to March 2007.

2.4. Sample

A total of 4767 vehicles/drivers were approached to participate in the study and 4182 drivers (87.7%) completed the questionnaire. Of these participants, 83.4% (3488) agreed to either an active or passive breath test (Table 1). For the active breath test, each driver was required to exhale directly into the device (model ABI alcohawk-Q3 Innovations, LLC) for 5 s. For the passive breath test (PAS-IV Passive Alcohol Sensor-Sniffer-PAS Systems International, Inc. PAS), the air surrounding the driver was sampled using a suction pump, without requiring the driver to exhale directly into the device. Breath test procedures followed the guidelines provided by the manufacturers.

Table 1
Number of participants per city in a given phase of the survey.

City	Drivers addressed	Agreed to participate in the study by answering the questionnaire N (%)	Agreed to undergo the active and/or passive breathalyzer N (%)
Diadema	1000	908 (90.8)	845 (84.5)
Belo Horizonte	990	913 (92.2)	579 (58.5)
Vitória	592	490 (82.8)	444 (75.0)
São Paulo	2185	1871 (85.6)	1620 (74.1)
Total	4767	4182 (87.7)	3488 (83.4)