

Breathalyzer test: results and refusals to take the test of drivers intercepted under the DUI Spot-Check Campaign in Rio de Janeiro

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Abstract *This paper involved a cross-sectional study that evaluated the results and refusals to take the breathalyzer test among drivers intercepted by the Driving Under the Influence (DUI) Spot-Check Campaign (Operação Lei Seca) in the capital of Rio de Janeiro and Baixada Fluminense. It was conducted using data provided by the State Government which were collected from drivers intercepted in the months of December 2013 and January 2014. Descriptive analysis was conducted of the sample and of the association between gender, age and location variables with the result of the breathalyzer test and refusal to take the test using a logistic regression model. Of the 4756 (100%) drivers intercepted, 59 (1.2%) failed the breathalyzer test and 229 (4.8%) refused to take it. Only the location of interception variable was statistically significant with greater chances of failing (OR = 4.01) and refusal to take the test (OR = 5.14) among drivers intercepted in the Baixada Fluminense. Systematic monitoring actions taken by the DUI Spot-Check Campaign that have occurred for longer in the capital appear to have a positive impact on the drinking and driving behavior of drivers.*

Key words *Alcohol drinking, Accidents traffic, Toxicity tests, Public policies, Law enforcement*

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Introduction

With the increase in the number of motor vehicles, particularly in developing countries, the number of traffic accidents has increased sharply, with alcohol consumption being one of the main causes¹, since there is a linear correlation between increased alcohol consumption and the occurrence of accidents of this type²⁻⁵.

The importance of this connection in terms of public health led several developed countries to adopt measures that have proved to be successful to reduce morbidity and mortality on the roads. In the United States and Europe, there was a reduction of traffic accidents with the adoption of preventive measures, such as reducing the availability of alcoholic beverages, surveillance in sobriety checkpoints with unrestricted powers to apply the breathalyzer test and suspension of the licenses of those caught driving under the influence above the legal limits¹⁻⁶.

As a preventive measure for the control of traffic accidents, on June 19, 2008, Brazil enacted Law 11.705⁷, the Driving Under the Influence (DUI) Spot-Check Campaign, which amended the Brazilian Highway Code (CTB) to prohibit the consumption of alcohol by motor vehicle drivers subjecting them to penalties such as imprisonment, fines, suspension of the right to drive and seizure of the vehicle if caught driving under the influence. On December 20, 2012, Law 12.760⁸ was enacted, which made the DUI Spot-Check Campaign tougher by imposing zero tolerance on drivers who imbibed alcohol, increasing the amount of the fine and admitting witness testimony or other means to prove intoxication.

Since March 2009, the Government of the State of Rio de Janeiro has conducted the DUI Spot-Check Campaign⁹, stopping drivers on heavily used public roads of the capital, metropolitan area and Baixada Fluminense to monitor compliance with the CTB standards. It should be stressed that the risk of death from traffic accidents after the enactment of the DUI Spot-Check Campaign decreased the standard mortality rate for this type of accident in Brazil by 7.4%, dropping from 18.7 per 100,000 to 17.3 per 100 000 inhabitants. This reduction was also observed in Rio de Janeiro (32.5%), where the reduction in risk of death in the male population residing in the state capital was 64.4%¹⁰.

Considering that some factors about the drinking and driving phenomenon and the characteristics of drivers who adopt such behavior nowadays are still unclear and that only two stud-

ies^{11,12} were conducted for this purpose after the enactment of the DUI Spot-Check Campaign, this study sought to evaluate the results and refusals to take the breathalyzer test of drivers intercepted in the DUI Spot-Check Campaign in the Baixada Fluminense and the capital of the State of Rio de Janeiro.

Methods

This is a cross-sectional study conducted on the basis of data provided by the Government of the State of Rio de Janeiro conducted by agents of the Military Police and the Highway Department with motor vehicle drivers intercepted during the DUI Spot-Check Campaign between 10 p.m. and 3 a.m. on Thursdays, Fridays, Saturdays and Sundays in the months of December 2013 and January 2014. The data (date and place of interception, gender, age and income or refusal to take the breathalyzer test) were recorded on forms used by agents of the DUI Spot-Check Campaign and they were provided anonymously, being compiled in the database for conducting this study.

Four thousand seven hundred and fifty-six cars, motorcycles and utility vehicles, that constitute the non-probabilistic sample of the study, were intercepted while circulating on public roads in neighborhoods in the southern part of the capital of the State of Rio de Janeiro (Humaitá, Gávea and Lagoa) and municipalities of the Baixada Fluminense (São João de Meriti, Nova Iguaçu and Duque de Caxias). The interception did not follow systematic criteria and was conducted randomly by police, who informed the drivers about the changes in the CTB after the DUI Spot-Check Campaign, requesting that the breathalyzer test be taken and presentation of the Vehicle Registration and Licensing Certificate and the Brazilian Driver's License.

Drivers who had a negative breath test result (≤ 0.04 mg of alcohol/L of breath) were not given any administrative or criminal sanctions relating to drinking and driving behavior. In cases with a positive test result (≥ 0.05 mg of alcohol/L of breath), the Brazilian Driver's License was seized and a fine applied with suspension of the right to drive for 12 months. Drivers whose test results were ≥ 0.34 mg of alcohol/L of breath were detained in flagrante delicto. In the event of refusal to take the breathalyzer test, the Brazilian Driver's License was seized and the vehicle apprehended until the appearance of another sober driver holding a valid license.

The variables analyzed were sex, age, location, results of the breathalyzer test and refusals to take it. A breakdown was made of changes in the age variable – classified into three age brackets (18 to 25 years, 26 to 59 years and 60 years and over); the location variable – classified as capital (Gávea, Humaitá and Lagoa) and the Baixada Fluminense (São João de Meriti Nova Iguaçu and Duque de Caxias); and the result of the breathalyzer test – classified as negative (zero mg of alcohol/L of breath) or positive (≥ 0.01 mg of alcohol/L of breath).

Descriptive analysis of the sample and the association between gender, age and location variables with the breathalyzer test results and refusals to take it were then conducted using the chi-square test, and subsequently a multiple logistic regression model, adopting a level of 0.05 for statistical significance. Analyses were made using R version 3.1.1. statistical software. The diagnosis for adjustment of the logistic model was based on the deviance reduction criteria in comparison with the null model.

This study complied with the ethical recommendations of National Health Council Resolution No. 466/12¹³ and was approved by the Ethics Committee in Research of the Anna Nery Nursing School/São Francisco de Assis Teaching Hospital of the Federal University of Rio de Janeiro.

Results

The sample revealed a predominance of male drivers (83.6%), concentrated in the 26 to 59-year bracket (78.5%) and intercepted predominantly in the capital (68%). Of the 4756 (100%) drivers intercepted, 59 (1.2%) had a positive result in the breathalyzer test and 229 (4.8%) refused to take it (Table 1).

With respect to the results of the breathalyzer test and refusals to take it, only the location variable proved to be statistically significant in both bivariate (Table 2) and multivariate analysis, where a greater chance of positive results and refusals to take the test among the drivers intercepted in Baixada Fluminense (OR = 4.01 and OR = 5.14, respectively) (Table 3) were observed.

Discussion

Only 1.2% of drivers intercepted in the DUI Spot-Check Campaign in the capital of Rio de Janeiro and Baixada Fluminense had a positive re-

Table 1. Demographic characteristics, location and breathalyzer test results of intercepted drivers. Capital and Baixada Fluminense, Rio de Janeiro, Brazil, 2013-2014 (N = 4756).

Variable	n	%
Sex*		
Female	781	16.4
Male	3970	83.6
Age bracket		
18-25 years	759	16.0
26-59 years	3735	78.5
60 years or more	262	5.5
Location		
Capital	3235	68.0
Baixada Fluminense	1521	32.0
Breathalyzer		
Positive	59	1.2
Negative	4468	94.0
Refusals	229	4.8

*Those without information excluded.

sult in the breathalyzer test. Although the agents responsible for the DUI Spot-Check Campaign selected thoroughfares of high density traffic considered strategic for the installation of interception points, noting possible diversion routes for drivers, the chances are that slightly higher positive results in the breathalyzer test would be observed if there were no tools available on social networks or other means by which drivers can obtain information about the locations of the interception points, such as smartphone apps. This is because those individuals driving under the influence may have changed path to avoid interception after consulting one of these sources. In addition, it is possible that some of the 229 (4.8%) drivers who refused to take the breathalyzer test were driving under the influence and refused to take it, “escaped” more severe penalties contained in the CTB and consequently decreased the frequency of positive results in the breathalyzer test.

When describing the results of the breathalyzer test among drivers intercepted by the DUI Spot-Check Campaign in the capital of the State of Rio de Janeiro in 2010, a study using similar methodology to this one found 3.1% of positive tests and 1.1% of refusals¹¹. It is possible that the frequency of positive results in the breathalyzer test found by this study in the capital of the State of Rio de Janeiro was 4.4 times lower (Table 2)

Table 2. Results and refusal to take the breathalyzer test, according to sex, age and location of interception. Capital and Baixada Fluminense, Rio de Janeiro, Brazil, 2013-2014 (N = 4756).

Variable	Breathalyzer		p-value	Refusals		p-value
	Positive n (%)	Negative n (%)		Yes n (%)	No n (%)	
Sex						
Female	12(1.6)	741(98.4)	0.555	28(3.6)	753(96.4)	0.100
Male	47(1.2)	3723(98.8)		200(5.0)	3770(95.0)	
Age Bracket						
18-25 years	09(1.2)	709(98.8)	0.976	41(5.4)	718(94.6)	0.563
26-59 years	47(1.3)	3510(98.7)		178(4.8)	3557(95.2)	
60 years or more	03(1.2)	249(98.8)		10(3.8)	252(96.2)	
Location						
Capital	23(0.7)	3140(99.3)	0.004	72(2.2)	3163(97.8)	< 0.001
Baixada Fluminense	36(2.6)	1328(97.4)		157(10.3)	1364(89.7)	

Table 3. Crude and adjusted associations between gender, age and interception location and a positive result and refusals to take the breathalyzer test. Capital and Baixada Fluminense, Rio de Janeiro, Brazil, 2013-2014.

Variable	Positive Breathalyzer		Refusals	
	Gross OR (IC 95%)	Adjusted OR (IC 95%)	Gross OR (IC 95%)	Adjusted OR (IC 95%)
Sex				
Female	1.0	1.0	1.0	1.0
Male	0.78(0.41-1.48)	0.60(0.31-1.15)	1.43(0.95-2.14)	1.05(0.69-1.58)
Age Bracket				
18-25 years	1.06(0.28-3.93)	0.69(0.18-2.61)	1.44(0.71-2.92)	0.85(0.41-1.76)
26-59 years	1.11(0.34-3.60)	0.83(0.25-2.71)	1.26(0.66-2.40)	0.85(0.44-1.66)
60 years or more	1.0	1.0	1.0	1.0
Location				
Capital	1.0	1.0	1.0	1.0
Baixada Fluminense	3.70(2.18-6.26)	4.01(2.33-6.88)	5.12(3.84-6.83)	5.14(3.83-6.89)

than those reported by the latter due to longer exposure time to the DUI Spot-Check Campaign and its monitoring activities, as it was conducted five years after its enactment and four years after the launch of the DUI Spot-Check Campaign in Rio de Janeiro. However, the frequency of refusals to take the breathalyzer test found in this study is twice (Table 2) that found in the latter. Probably this is due to the fact that at the time of data collection, if the individual was driving a vehicle under the influence of alcohol, refusal to take the breathalyzer test involved a lesser penalty than a positive test result.

A study conducted in Belo Horizonte found 15% of positive breathalyzer tests among drivers intercepted at sobriety checkpoints in 2009, one

year after the enactment of the DUI Spot-Check Campaign¹². It should be stressed that in addition to the fact that the sample of drivers of this study was random, the interception of vehicles had educational rather than punitive purposes. Thus, drivers were persuaded to take the breathalyzer test with the assurance that they would not suffer any punishment and that the results would not be passed onto the police, whose involvement was limited to ensuring the safety in traffic of the team of researchers and the drivers themselves.

Drivers intercepted in Baixada Fluminense have higher chances of positive test results (OR = 4.01) and refusals to take the breathalyzer test (OR = 5.14) in comparison with those intercepted in the capital of Rio de Janeiro. These results

suggest that less exposure in terms of years of drivers of the Baixada Fluminense to the DUI Spot-Check Campaign increases the chance of non-compliance with the law, since the DUI Spot-Check Campaign in the Baixada Fluminense only began in 2012, three years after it was launched in the capital of Rio de Janeiro.

Therefore, although the Brazilian population has significantly reduced its drinking and driving behavior¹⁴, we believe it is the systematic actions of the enforcement of the CTB rules, represented here by the DUI Spot-Check Campaign, which positively influence this behavior in the capital of Rio de Janeiro, which has the lowest indices of driving under the influence in Brazil¹⁵.

In this context, it is important to stress the need for discussion of the importance of establishing legal restriction policies and measures for alcohol consumption and driving. It is crucial that this debate should involve government, legislative, health and education professionals, society, families in general and young people in order to enhance public policies¹⁶.

Among the limitations of this study, the following stand out: the sample is of the non-probabilistic type, which does not permit inferring a trend for the entire population of Rio de Janeiro; arbitrary interception of drivers influenced by the police custom of approaching “suspicious vehicles,” reflected in the high proportion of male drivers (83.6%) and; conducting the study with data for only two months of the DUI Spot-Check Campaign, which makes it impossible to analyze the seasonality of events, especially because in the months of December and January there are many holidays and collective company vacations, when individuals tend to consume (more) alcoholic drinks. Even with these limitations, it is emphasized that the results presented here help to fill an important lacuna on the drinking and driving phenomenon nowadays. It also suggests a possible positive influence of systematic enforcement actions taken by the DUI Spot-Check Campaign since 2009 on the drinking and driving behavior of drivers from the capital of Rio de Janeiro.

Collaborations

RT Jomar analyzed the data and drafted and organized the article. DO Ramos analyzed the data and drafted and revised the article. AMM Abreu decided on and outlined the research and revised the article.

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