Original Article

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Inequalities in alcohol consumption and cell phone use while driving motor vehicles

Desigualdades no consumo de álcool e uso de celular durante a direção de veículos motorizados

Desigualdades en el consumo de alcohol y uso del teléfono celular durante la conducción de vehículos motorizados

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ABSTRACT

Objective: To evaluate social inequalities of Brazilians in alcohol consumption and cell phone use while driving motor vehicles.

Methods: Cross-sectional study conducted with people who drive (n=23,474) in 2019. The outcomes adopted were cell phone use and alcohol consumption while driving, associated with the variables gender, age group, skin color, education and macro-region of housing and analyzed using the slope index of inequality using logistic regression.

Results: The inequalities related to alcohol consumption and driving were identified in adults with brown skin color (7.8) linked to the North region (6.8). As for cell phone use while driving, they were higher for the younger age group (19.4) and individuals with higher education (27.1).

Conclusion: Cell phone use and alcohol consumption while driving motor vehicles have social inequalities regarding the age group and education, and skin color and macro-region respectively.

Keywords: Socioeconomic factors. Ethnic inequality. Distracted driving. Driving under the influence. Cell phone. Alcohol drinking.

RESUMO

Objetivo: Avaliar as desigualdades sociais de brasileiros (as) no consumo de bebida alcoólica e uso de celular durante a direção de veículos motorizados.

Métodos: estudo transversal realizado com pessoas que dirigiam (n=23.474) em 2019. Os desfechos adotados foram o uso de celular e consumo de bebida alcoólica durante a direção, associado as variáveis sexo, faixa etária, cor da pele, escolaridade e macrorregião de moradia e analisadas através dos índices *slope index of inequality* a partir de regressão logística.

Resultados: as desigualdades relacionadas ao uso de álcool e direção as desigualdades foram identificadas em adultos de cor da pele parda (7,8) vinculados a Região Norte (6,8). Quanto ao uso de celular na direção foram maiores para faixa etária mais jovem (19,4) e indivíduos com maior escolaridade (27,1).

Conclusão: uso de celular e consumo de álcool na direção de veículos motorizados possui desigualdades sociais referente a faixa etária e escolaridade, e a cor de pele e macrorregião respectivamente.

Palavras-chave: Fatores socioeconômicos. Iniquidade étnica. Direção distraída. Dirigir sob a influência. Telefone celular. Consumo de bebidas alcoólicas.

RESUMEN

Objetivo: Evaluar las desigualdades sociales de brasileños en el consumo de alcohol y el uso de teléfono celular durante la conducción de vehículos motorizados.

Métodos: Estudio transversal realizado con personas que condujeron (n=23.474) en 2019. Los resultados adoptados fueron el uso de teléfonos celulares y el consumo de alcohol durante la conducción, asociados a las variables sexo, grupo de edad, color de piel, educación y macrorregión de residencia. Las desigualdades se analizaron mediante el *slope index of inequality* y regresión logística.

Resultados: Las desigualdades relacionadas con el consumo de alcohol y la conducción como desigualdades se identificaron en adultos de piel morena (7,8) vinculados a la región Norte (6,8). En cuanto a uso de teléfonos celulares en la conducción fueron mayores para el grupo de edad más joven (19,4), y obligatorias con la educación superior (27,1).

Conclusión: El uso de teléfonos celulares y el consumo de alcohol en la dirección de vehículos motorizados tiene desigualdades sociales en cuanto a edad y educación, color de piel y región geográfica respectivamente.

Palabras clave: Factores socioeconómicos. Inequidad étnica. Conducción distraída. Conducir bajo la influencia. Teléfono celular. Consumo de bebidas alcohólicas.

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INTRODUCTION

The use of licit drugs, especially alcohol, has generated concern among several health authorities, since it causes a multitude of damages not only to the individual consumer, but also to the groups that surround him/her[1].

Alcohol consumption in general and its respective harm associated with vehicular driving is responsible for a significant number of deaths worldwide, with a higher percentage among men than among women, and a highlight of the increase in abusive consumption in young women; on the other hand, against this situation, it is also considerable important advances in several countries in the incorporation of policies to reduce alcohol abuse[1].

In Brazil, research conducted in state capitals and the Federal District with people aged 18 years old or over shows that the average prevalence of alcohol consumption in the last 30 days reached approximately 18%, being higher for men (26%) than for women (11%)[2]. In turn, strengthening these data, the World Health Organization (WHO) report indicated that in Brazilian territory the use of alcohol is considerably associated with deaths from liver cirrhosis (69.5% – 42.6%) and traffic accidents. (36.7% – 23%) in men and women, respectively[1].

The association of alcohol consumption with driving results in an important risk factor for traffic accidents[3–4], being between two (2.6) to four (4.6) times higher, depending on the blood alcohol level of the driver, when compared to the sober driver[5].

Another risky behavior while driving is the cell phone[6], which can also contribute to driver's distraction and make the driver lose focus on frontal look[7]. As well, the risk of crash increases when the driver is dedicated to a secondary task such as looking outside, typing text messages or talking on the cell phone[8].

With a view to also modify this risk situation while driving, the United Nations proposed an ambitious post-2015 development agenda with the creation of 17 Sustainable Development Goals (SDG) and 169 goals to eradicate poverty, promote prosperity and well-being for everyone[9]. One of these goals is to ensure healthy lives and promote well-being, with the goal of halving the global number of traffic deaths and injuries by 2020 and strengthening the prevention and treatment of substance use problems, including the harmful use of alcohol.

Finally, alcohol consumption and cell phone use are two risk behaviors associated with driving; understanding this problem from the perspective of inequality is the challenge proposed in this study, having as a research problem: what are the social inequalities in alcohol consumption and cell phone use while driving?

In view of the above, the present study aims to evaluate inequalities in alcohol consumption and cell phone use while driving motor vehicles by Brazilians living in Brazilian capitals and the Federal District.

METHODS

This is a cross-sectional population-based study with theoretical support in the references of inequalities and inequities in health[10]. The research was conducted with adults aged 18 years or more based on the Surveillance of Risk Factors and Protection for Chronic Diseases by Telephone Survey (*Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico* – VIGITEL) developed between January and December 2019 in all Brazilian state capitals and in Federal District[2].

VIGITEL integrates a system of risk factors for chronic non-communicable diseases of the Ministry of Health, which since 2006, describes the annual evolution of some indicators, among which the alcohol abuse and driving a motor vehicle after consumption of any amount of alcoholic beverages[2].

The sampling procedure was carried out by draw of 197,600 telephone lines distributed in all regions of Brazil. Next, one of the adults living on the eligible telephone lines was randomly selected, totaling 52,443 interviews. Refusals were observed in 2% of lines eligible to participate in the monitoring system. Exclusion criteria are households without a telephone line and non-active and non-residential telephone lines. More details about the selection process can be found in the VIGITEL report[2].

For the present study, people who drove motor vehicles (n=23,474) were included. The outcomes studied were: cell phone use in the last 30 days while driving a vehicle (yes, no), and driving after alcohol consumption regardless of the amount, considering the following response options: always, sometimes, almost never and never. Subsequently, this variable was categorized into "yes" and "no", considering "never" in the "no" category, and the others in the "yes" category.

Demographic, economic, racial, and geographic characteristics were included as independent variables in the present study. Demographic characteristics included were gender (male; female) and age group (collected in complete

years and categorized as 18-24; 25-39; 40-59; ≥60) of interviewees. Education in complete years (0-4; 5-8; 9-11; ≥12) was analyzed as an economic characteristic, due to the lack of information on income in VIGITEL. Information on skin color (white; black; brown) was included as a racial characteristic, and the macro-region of residence (North; Northeast; Midwest; Southeast; South) was included as a geographic characteristic.

The associations between the independent variables and the outcomes were evaluated using Pearson's chi-square test for heterogeneity, when the independent variables were nominal, and, for linear trend, when the variables were ordinal, using a 5% significance level and 95% confidence interval.

Furthermore, formal analyses of demographic, racial, economic, and geographic inequalities in the prevalence of alcohol consumption and cell phone use while driving were evaluated considering, respectively, age group, skin color, education level and macro-region of residence of interviewees.

To measure these inequalities, it was used the Slope index of inequality (SII), which represents a measure of absolute inequality obtained from the logistic regression between the dependent variables (alcohol consumption and cell phone use) and the independent variables studied, that is, education, skin color and macro-region of residence. The coefficient has percentage points as its unit of measurement and is a complex and weighted measure of inequality that represents the absolute difference in the estimated values of a health indicator between the most favored and the most disadvantaged. If there is no inequality, the coefficient assumes the value zero.

The SII allows to calculate the difference in the prevalence of outcomes between the extreme groups of the stratification variable (more favored versus less favored), considering the sample size in each subgroup of the independent variable[10]. Positive values in the SII indicate the prevalence of the higher outcome in the most favored group and negative values indicate the prevalence of the higher outcome in the less favored group. To illustrate the inequalities, equiplots were presented.

The analytical process was supported by the statistical program Stata, version 12.1, and was considered the complex sampling process of VIGITEL, assigning weights to the individuals studied using the svy command.

VIGITEL was approved by the National Commission on Ethics in Research for Human Beings of the Ministry of Health (CAAE: 65610017.1.0000.0008). Free and Informed Consent was obtained verbally at the time of the telephone call.

RESULTS

Among the 23,474 individuals who reported driving motor vehicles,10,968 answered the question about driving after drinking alcohol. As for the question about cell phone use and driving, there were 23,177 respondents. Driving after alcohol consumption and using a cell phone while driving was present in 23.5% (95%CI 21.8-25.2) and 20.3% (95%CI 19.2-21.4) of individuals respondents, respectively.

Table 1 presents the characteristics of the study participants and the prevalence of alcohol consumption and cell phone use associated with driving according to sociodemographic and regional variables. It is observed that most participants were male (64.2%), aged 30 to 49 years old (44%) and white skin color (49.1%). The proportion of participants who drove motor vehicles after alcohol consumption was significantly higher among males (26.9% vs 15.7%, p<0.001), aged 30 to 39 years (p<0.005) and living in the North of the country (p=0.008).

Regarding cell phone use while driving, there was a predominance of young people aged between 18 and 29 years (p<0.001), white skin color (p=0.039), with 12 years of education or more (p<0.001) and residents of the Midwest and North regions (p=0.003) (Table 1).

Formal analyses of economic, racial, and geographic inequalities can be observed in Table 2 and oungrated through the equiplots in Figure 1, based on absolute measures of the prevalence of alcohol consumption and cell phone use associated with driving, show that alcohol consumption and driving was more concentrated in brown-skinned individuals and in those residing in the North of the country.

Regarding cell phone use and driving, this behavior was more concentrated in oung individuals, oung, more educated and living in the North Region.

In the age group variable, the difference between the extreme groups of inequality (oung vs. Elderly) was 19.4 percentage points (p<0.001). Regarding education level, the difference between the extreme groups (less educated vs more educated) was 27.1 percentage points (p<0.001).

Table 1 – Prevalence of driving with alcohol consumption or cell phone use according to gender, age group, skin color, education, and macro-region of residence of Brazilians studied. Brazil, 2019

Variables	Total	Alcohol consumption and driving			Cell phone use and driving		
	%	%	CI95%	p-value*	%	CI95%	p-value*
Gender				<0.001			0.121
Male	64.2	26.9	24.6-29.1		20.9	19.4-22.4	
Female	35.8	15.7	13.6-17.8		19.2	17.6-20.8	
Age group				0.005			<0.001
18 to 29 years	27.5	21.9	18.5-25.4		25.6	22.9-28.4	
30 to 39 years	24.9	27.8	24.0-31.6		23.4	21.1-25.7	
40 to 49 years	19.1	23.9	20.7-27.2		21.8	19.4-24.2	
50 to 59 years	15.6	22.9	19.0-26.9		13.9	11.8-15.9	
60 or more	12.9	17.3	14.6-19.9		8.2	6.8-9.7	
Skin color				0.062			0.039
White	49.1	21.9	19.5-24.3		22.1	20.4-23.8	
Black	9.4	21.6	15.5-27.8		18.7	14.6-22.8	
Brown	41.5	26.4	23.6-29.2		19.1	17.4-20.7	
Education level				0.293			<0.001
0 to 4	6.2	19.1	12.2-26.1		7.4	3.8-11.1	
5 to 8	11.3	26.0	19.4-32.7		11.0	8.2-13.7	
9 to 11	34.6	21.9	19.0-24.7		17.0	15.1-18.9	
12 or more	47.9	24.5	22.2-26.8		26.5	24.8-28.1	
Macro-region				0.008			0.003
North	10.0	29.3	26.0-32.5		20.0	18.1-21.8	
Northeast	21.9	23.5	21.1-25.9		22.2	20.7-23.8	
Midwest	15.7	27.1	24.0-30.3		23.4	21.2-25.6	
Southeast	42.6	21.1	17.7-24.5		18.3	16.0-20.6	

Table 1 – Cont.

Variables	Total	Alcohol consumption and driving			Cell phone use and driving		
	%	%	CI95%	p-value*	%	CI95%	p-value*
South	9.8	22.7	19.4-26.0		19.9	17.6-22.2	
Total		**20.3**	**19.2-21.4**		**23.5**	**21.8-25.2**	

Source: VIGITEL data, 2019.
*Pearson's Chi-square test.

Table 2 – Absolute inequalities (Slope index of inequality) in the outcomes studied according to age group, skin color, education level and macro-region. Brazil, 2019

	Age group		
	Coefficient	Standard error	p-value*
Alcohol consumption and driving	-0.03	2.9	0.345
Cell phone use and driving	-19.4	2.0	<0.001
	Skin Color		
	Coefficient	Standard error	p-value*
Alcohol consumption and driving	7.8	3.3	0.019
Cell phone use and driving	-5.7	2.2	0.010
	Education level		
	Coefficient	Standard error	p-value*
Alcohol consumption and driving	3.6	3.6	0.319
Cell phone use and driving	27.1	2.4	<0.001
	Macro-region		
	Coefficient	Standard error	p-value*
Alcohol consumption and driving	-6.8	2.5	0.006
Cell phone use and driving	-4.4	1.7	0.009

Source: VIGITEL data, 2019.
* p-value derived from the Slope index of inequality (SII).

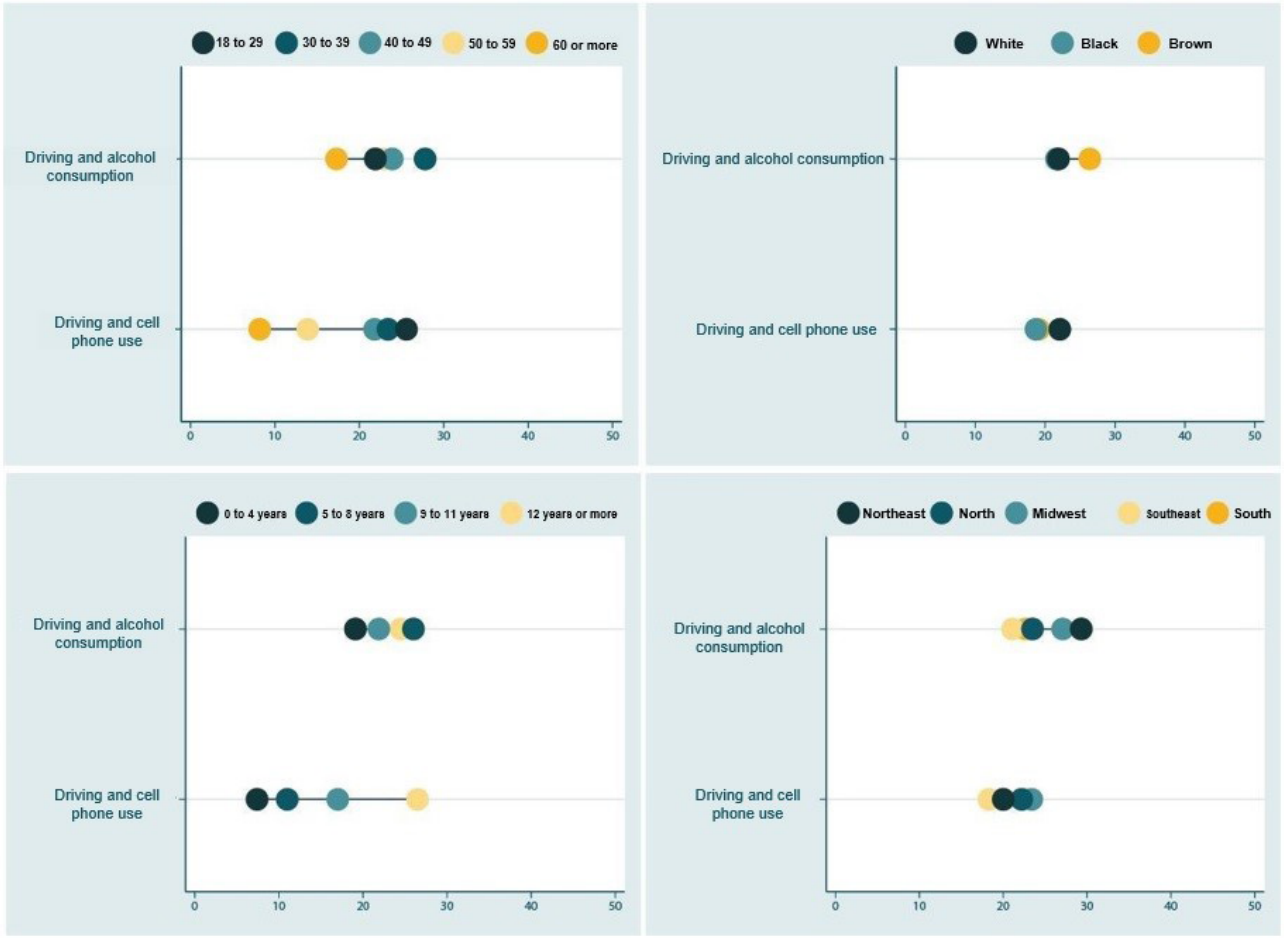

Figure 1 – Equiplots of alcohol consumption and cell phone use and driving according to age group, skin color, education level and geographic region of the Brazilians studied. Brazil, 2019
Source: VIGITEL data, 2019.

DISCUSSION

The research evidenced inequalities regarding alcohol consumption and driving related to the North Region to the detriment of the Southeast Region, and to adults of brown skin color when compared to adults of black skin color.

There is no doubt that the topic of alcohol and driving has gained relevance in the last two decades, mainly due to the increase in the number of traffic accidents, configuring a public health problem, especially due to the global burden of disease and causing substantial health losses[11], which justifies the adoption by Brazil of several governmental measures in order to reduce this habit, such as the Prohibition Law (*Lei Seca*), adopted in 2008 and reformulated in 2013 for stricter criteria, with zero tolerance for the level of alcohol allowed in the body[12]. Also noteworthy is the National Health Promotion Policy (*Política Nacional de Promoção à Saúde* – PNPS), which aims to promote equity and improve conditions and way of living, reducing vulnerabilities and health risks[13]. And one of the priority themes of the PNPS is the reduction of morbidity and mortality due to the use of alcohol and the promotion of safe mobility, reducing deaths from traffic accidents.

It should be highlighted that the inequalities found regarding alcohol consumption and driving in the North Region and in those with brown skin color may be due to local cultural habits, less implementation of regulatory policies and even possible weaknesses in policing.

In another study, which analyzed data from VIGITEL between 2006 and 2013, showed that the prevalence of abusive alcohol consumption in Brazilian capitals is high, especially among men, among those with higher education and the younger ones[14].

A study conducted with data from the 2013 National Health Survey found that education level influences higher consumption of alcoholic beverages and also traffic accidents[3].

The practice of alcohol abuse and driving has reduced in Brazil, however the practice of driving after consuming any amount of alcohol is still high among men, younger adults (18 to 34 years old) and with higher education level[15].

In turn, inequalities in cell phone use and driving became clearer in younger and adults with higher education level, and their use, whether to read or send text messages while driving, is a risky behavior, and involves three classes of distractions: visual, physical and cognitive[16–17], resulting in an increase in the number of traffic accidents.

The younger public tends to have a low perception of risk, which can be evidenced by some behaviors, such as unprotected sexual practices, multiple intimate partners, exposure to several types of violence, use of illicit drugs, among others[18]. This association of risk behavior with the younger population can be explained by the strong predominance of virtuality that has come to overcome the daily lives of young people as a result of technological dissemination and the need for rites of passage that provide the affirmation of this public[18–19] which materializes in greater difficulties for young people to follow and obey rules. On the other hand, older people have greater experience, awareness of dangers and some do not deal well with technology.

Acting in the perspective of changing this scenario of inequality is complex, it requires an incorporation of the notion of risk, and this permeates the educational, cultural and subjectivity aspects of each one in the act of deciding and also the inclusion of public policies to reduce sociodemographic disparities.

There are already rules and laws for the relationship between alcohol and driving. There are also rules that prohibit talking on the cell phone while driving, however, this democratic reality of cell phones as a tool for the user, requires new normative, legal, and educational provisions with a view to drastically reduce use while driving.

CONCLUSION

This study showed important inequalities both in alcohol consumption and driving and in cell phone use and driving. The groups with greater inequalities and affected by the behavior of drinking and driving were individuals of brown skin color living in the North Region, in turn, the behavior of cell phone use while driving was more evident in young people, of white skin color, more educated and in the North Region.

Such findings can support policies for the prevention of these risk behaviors, especially in education measures and society's understanding of their harmful effects.

Some limitations of this study may be related to the self-report of behaviors "badly seen" by society, which can lead to a certain underestimation of the results, not fully revealing the reality, since in the Brazilian Traffic Code (*Código de Trânsito Brasileiro* – CTB) to drive under the influence of alcohol and/or to talk on the cell phone while driving the vehicle constitute infractions.

In addition, VIGITEL is restricted to individuals residing in the capitals of Brazilian states and the Federal District in households with a landline telephone, a service with lower coverage in the North and Northeast regions of the country. However, sample weights were assigned to allow statistical inference of the results for the estimated population for each municipality studied. Another situation to consider was the significant percentage of unknown information for the variable driving after alcohol consumption, which may be associated with the discomfort generated by the question and, consequently, the omission of the answer.

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