



ORIGINALES

Accidents and their association with the consumption of alcoholic beverages

Acidentes de trânsito e sua associação com o consumo de bebidas alcoólicas
Accidentes de tránsito y su asociación con el consumo de bebidas alcohólicas

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ABSTRACT:

Introduction: Traffic accidents are a serious public health problem in Brazil, and its main risk factors are: alcohol consumption, driving without National Driver's License (NDL) and use of illicit drugs or drugs.

Objective: To evaluate the traffic accidents at the pre-hospital level and factors associated with the consumption of alcoholic beverages.

Materials and Methods: Descriptive, analytical study of a quantitative nature, with secondary data, collected from prehospital care records. The records of 1,264 traffic accidents were analyzed. The binary logistic regression was used, with a result expressed by the odds ratio. The study assumed a confidence level of 95% and significance of 5%. The intervals and confidence for proportion assumed the binomial distribution. We used the program Stata 12.0.

Results: It was observed that traffic accidents had a higher incidence in males, who had a mean age of 31.2 years, with the majority of drivers being involved, with the highest occurrence in the urban area, at night and in the late week. The chances of involvement in accidents increased when the victim was under the effect of alcohol at the time of the occurrence.

Conclusion: The aforementioned results can support new discussions and guide actions and behaviors on prehospital care, in order to implement good practices in traffic, public policy execution and population awareness, aiming to reduce the consequences of accidents.

Key words: Traffic accidents; Risk factors; Binge Drinking

RESUMO:

Introdução: Os acidentes de trânsito constituem-se como grave problema de saúde pública no Brasil, e seus principais fatores de risco são: consumo de álcool, condução sem Carteira Nacional de Habilitação (CNH) e uso de drogas ilícitas ou medicamentos.

Objetivo: Avaliar os acidentes de trânsito em nível pré-hospitalar e fatores associados ao consumo de bebidas alcoólicas.

Materiais e Métodos: Estudo descritivo, analítico de natureza quantitativa, com dados secundários, coletados a partir das fichas de atendimento pré-hospitalar. Analisaram-se os registros 1.264 de acidentes de trânsito. Utilizou-se a Regressão logística binária com resultado expresso pelo *odds ratio*. O estudo assumiu o nível de confiança de 95% e significância de 5%. Os intervalos e confiança para proporção assumiram a distribuição binomial. Utilizou-se o programa *Stata 12.0*.

Resultados: Observou-se que os acidentes de trânsito tiveram maior incidência em indivíduos do sexo masculino, que possuíam em média 31,2 anos de idade, sendo a maioria condutora dos veículos envolvidos, com maior ocorrência na zona urbana, em período noturno e nos finais de semana. As chances de envolvimento em acidentes elevaram-se quando a vítima estava sob efeito do álcool no momento da ocorrência.

Considerações Finais: Os resultados citados podem subsidiar novas discussões e orientar ações e condutas sobre o atendimento pré-hospitalar, afim de implementar boas práticas no trânsito, execução de políticas públicas e conscientização da população, visando reduzir as consequências resultantes dos acidentes.

Palavras chave: Acidentes de Trânsito; Fatores de risco; Bebedeira.

RESUMEN:

Introducción: Los accidentes de tráfico constituyen un grave problema de salud pública en Brasil, y sus principales factores de riesgo son: consumo de alcohol, conducción sin Carnet Nacional de Habilitación (CNH) y uso de drogas ilícitas o medicamentos.

Objetivo: Evaluar los accidentes de tránsito a nivel prehospitalario y factores asociados al consumo de bebidas alcohólicas.

Materiales y Métodos: Estudio descriptivo, analítico de naturaleza cuantitativa, con datos secundarios, recogidos a partir de las fichas de atención prehospitalaria. Se analizaron 1.264 registros de accidentes de tránsito. Se utilizó la Regresión logística binaria con el resultado expresado por el *odds ratio*. El estudio asumió el nivel de confianza del 95% y la significación del 5%. Los intervalos y la confianza para la proporción asumieron la distribución binomial. Se utilizó el programa *Stata 12.0*.

Resultados: Se observó que los accidentes de tránsito tuvieron mayor incidencia en individuos del sexo masculino, que tenían en promedio 31,2 años de edad, siendo la mayoría conductora de los vehículos involucrados, con mayor ocurrencia en la zona urbana, en período nocturno y en los días fines de semana. Las posibilidades de implicación en accidentes se elevaron cuando la víctima estaba bajo el efecto del alcohol en el momento de la ocurrencia.

Consideraciones finales: Los resultados citados pueden subsidiar nuevas discusiones y orientar acciones y conductas sobre la atención prehospitalaria, a fin de implementar buenas prácticas en el tránsito, ejecución de políticas públicas y concientización de la población, con el fin de reducir las consecuencias resultantes de los accidentes.

Palabras clave: Accidentes de Tráfico; Factores de riesgo; Bebedero.

INTRODUCTION

Traffic accidents account for about 1.24 million road deaths each year, accounting for the world's eighth-leading cause of death. However, the absence of laws regarding risk factors such as speed, driving, helmets, seat belts, and child restraint is a reality where only 7% of the world population has a specific legislation, corresponding to 28 countries ⁽¹⁾.

In Brazil, approximately 44,098 thousand people died due to traffic accidents in 2014 ⁽²⁾, with indirect costs estimated at R\$ 40.0 billion per year on highways and R\$ 10 billion in urban areas, leading to a fall in family income followed by an increase in hospital costs ⁽³⁾.

Also in 2014, the Northeast region of Brazil had the second highest mortality rate due to traffic accidents ⁽⁴⁾, and the state of Pernambuco, the 14th place in mortality rate in this regard in 2010 ⁽⁵⁾. In Petrolina, in the interior of the state, in 2013 the number of deaths due to traffic accidents was 105 deaths, ranking first in the category of external

causes of morbidity and mortality ⁽⁶⁾. In addition, from March 2015 to March 2016, 625 hospital admissions were reported for transport accidents ⁽⁷⁾.

Faced with social relevance and impacts on morbidity and mortality, the National Emergency Care Policy was created, instituting the mobile prehospital component through the implementation of the Mobile Emergency Care Service (SAMU 192) ⁽⁸⁾. Its function is to render care as well as transportation of the victim to a specialized health service and linked to the Unified Health System (UHS) ⁽⁹⁾.

The Prehospital Care Team (PCT) must be formed by specialized and agile professionals given the criticality of the interval between the occurrence of the injury, transportation and treatment, being determinant in the prognosis of the victims. In addition, some of these victims die on the way between the location of the event and the hospital, or in the first hours of the accident ⁽⁹⁾.

As an aid in dealing with emergencies, the Military Fire Brigade of Pernambuco (MFBP), which performs specific activities of a military firefighter and acts as a PCT service when triggered or necessary ⁽¹⁰⁾.

Among the main factors for the occurrence of traffic accidents are: alcohol consumption, driving without National Driver's License (NDL), use of illicit drugs or medicines. In addition, most publications highlight alcohol as being the major determinant for the occurrence of traffic accidents ⁽¹¹⁾. This substance is defined as a psychoactive drug acting in the depression of the Central Nervous System (CNS), resulting in reduced attention and modification of perceptions and behaviors ⁽¹²⁾.

Given the importance of the emergency and emergency area in the context of reducing morbidity and mortality, many studies discuss the occurrence of deaths due to traffic accidents. However, there are few researches that include non-fatal victims, and some authors emphasize the importance of the scientific approach in this regard ⁽¹³⁾.

In view of the above and aiming to improve the process of knowledge and implementation of practices, this study aimed to evaluate pre-hospital traffic accidents and factors associated with the consumption of alcoholic beverages.

MATERIAL AND METHOD

Descriptive, analytical study of a quantitative and documentary nature. The information obtained came from prehospital care records of SAMU and CBMPE of the city of Petrolina, Pernambuco. The municipality has an estimated population of 326,017 inhabitants and a territorial area of 4.561.872 Km²⁽¹⁴⁾ and integrates the VIII Region of Health of the state according to the Regionalization Master Plan ⁽¹⁵⁾. This study is part of the research entitled "Trajectory of the Victims of Traffic Accident".

Data collection took place in the period from October 2016 to January 2017 in the operational bases of SAMU and MFBP; a total of 1,264 accident records were analyzed from June to December 2015. The variables of interest were: 1) sociodemographic (sex and age); 2) clinical and behavioral characteristics: Glasgow Coma Scale (GCS), alcohol intake, use of safety devices (helmet or belt) and condition of the victim (driver or passenger) and 3) related to the event: time between called and the PCT and between the PCT and hospital admission; mobile unit requested for service (SAMU or MFBP); place of occurrence (urban or rural area); type of land vehicle (bicycle, motorcycle, car, other) used by the victim and / or the other party involved (pedestrian, bicycle, motorcycle, car, others); occurrence of the accident at

the weekend (Friday, Saturday and Sunday / yes or no) and occurrence shift (day and night / morning, afternoon, night or early morning).

The variables were analyzed by means of frequency distribution in their absolute and relative values, for the categorical variables, with 95% confidence intervals for proportion, assuming binomial distribution. Measures of central tendency and dispersion were calculated for the numerical variables.

To evaluate the factors associated with the occurrence of traffic accidents in victims who used alcohol, binary logistic regression was applied. The crude odds ratio (OR) expressed the bivariate analysis and the variables whose p-values were less than 0.20 were included in the multivariate model. The adjusted OR was displayed from the multivariate analysis, being considered as an associated factor, the variables whose p values were lower than 0.05. The data were tabulated through Microsoft Office Excel 2013 and treated in the statistical program Stata 12.0.

The research complied with the terms established by Resolution 466/2012 of the National Health Council and was approved by the Research Ethics Committee of the University of Pernambuco - UPE under Opinion No. 1,680,141.

RESULTS

Among the files analyzed, victims had a mean age of 31.2 years (SD = 12.4, 95% CI = 30.5-31.9) and mean GCS score of 14.8 (SD = 1.4, 95% CI = 14.6-14.9). The majority were male (95% CI = 69.4-74.4) and alcohol use had an incidence of 11.4% (95% CI = 9.6-13.1) among those involved. Of the 558 files that provided information about the use of security devices, 82.6% used them (95% CI = 79.5-85.8); and, of the 525, they provided information on the condition of the victim, where 76.8% were drivers of the vehicle at the time of the accident (IC95% = 79.5-85.8). (Table 1).

Table 1 - Sociodemographic, clinical and behavioral characteristics of victims of traffic accidents attended at the prehospital level. Petrolina, 2015.

Variables	Average	SD	IC95%*	
Age	31.2	12.4	30.5	31.9
Glasgow Coma Scale	14.8	1.4	14.6	14.9
Variables	N	%	IC95%**	
Sex (n=1261)				
Female	354	28.1	25.6	30.6
Male	907	71.9	69.4	74.4
Victims of the use of alcohol (n=1264)				
Not drunk or not informed	1,120	88.6	86.9	90.4
Use of drinking	144	11.4	9.6	13.1
Use of helmet or seat belt (n=558)				
No	97	17.4	14.2	20.5
Yes	461	82.6	79.5	85.8

Victim as a conductor (n=525)				
No	122	23.2	19.6	26.9
Yes	403	76.8	73.1	80.4

* 95% confidence interval for the average

** 95% confidence interval for the proportion assuming the binomial distribution.

The waiting time between the PCT request and its arrival at the place of occurrence was 16.2 minutes (SD = 15.2, 95% CI = 15.3-17.1), and between prehospital care and admission to the hospital totaled 43.1 minutes (SD = 28.1, 95% CI = 41.4-44.7). Most of the requests were directed to SAMU, the urban area with the highest occurrence of events (76.1%). The motorcycle was the main vehicle used by the victims (83.6%), the other part involved the car (49.0%). The period of greatest occurrence was at weekends (52.3%), and at night (35.9%) (Table 2).

Table 2 - Attendance, temporal and spatial characteristics of victims of traffic accidents attended at prehospital level. Petrolina, 2015.

Variables	Average	SD	IC95%*	
Average time between calling and PCT	16.2	15.2	15.3	17.1
Mean time between PCT and hospital admission	43.1	28.1	41.4	44.7
	N	%	IC95%**	
PCT (n=1263)				
MFBP	358	28.4	25.9	30.8
SAMU	905	71.7	69.2	74.1
Accident zone (n=1254)				
Rural	300	23.9	21.6	26.3
Urban	954	76.1	73.7	78.4
Victims vehicle (n=1241)				
Motorbike	1,037	83.6	81.5	85.6
Car	89	7.2	5.7	8.6
Pedestrian	58	4.7	3.5	5.8
Bicycle	36	2.9	2.0	3.8
Others	21	1.7	1.0	2.4
The other vehicle involved (n=871)				
Motorbike	195	22.4	19.6	25.2
Car	427	49.0	45.7	52.4
Pedestrian	4	0.5	0.0	0.9
Bicycle	14	1.6	0.8	2.4
Animal	228	26.2	23.3	29.1
Others	3	0.3	0.0	0.7
Accident occurring during the weekend (n=1264)				
No	603	47.7	44.9	50.5
Yes	661	52.3	49.5	55.1
Time of the accident (n=1245)				
Morning	317	25.5	23.0	27.9

Afternoon	379	30.4	27.9	33.0
Night	447	35.9	33.2	38.6
Dawn	102	8.2	6.7	9.7

* 95% confidence interval for the average

** 95% confidence interval for the proportion assuming the binomial distribution.

In the multivariate analysis, the factors that maintained association with the occurrence of traffic accident and alcoholic beverage use were sex, age, period of the week, shift and zone of occurrence.

Men were twice as likely to suffer an accident while drinking alcohol (adjusted OR = 2.45; p-value = 0.001; 95% CI = 1.46-4.11); (OR = 1.02, p-value = 0.001, 95% CI = 1.01-1.03), the risk of involvement in alcohol-related accidents increased by one year. for the week period, the odds of occurrence were twice as high on weekends (adjusted OR = 2.53, p-value = 0.000, 95% CI = 1.67-3.83); for the shift, the nighttime period increased by twice the probability (adjusted OR = 2.08, p-value = 0.000, 95% CI = 1.42-3.06); (OR = 0.65, p-value = 0.044, 95% CI = 0.43-0.99), and the urban area presented a lower chance of occurrence of traffic accidents with alcoholic beverage intake.

Table 3 - Bivariate and multivariate analysis of the association of traffic accidents in victims who drank alcohol. Petrolina, 2015.

Variables	Raw OR	p-value	CI95%		adjusted OR	p-value	CI95%	
Sex								
Male	2.79	0.000	1.69	4.60	2.45	0.001	1.46	4.11
Female	1.00				1.00			
Age	1.02	0.007	1.00	1.03	1.02	0.001	1.01	1.03
Weekend								
Yes	2.73	0.000	1.86	4.02	2.53	0.000	1.67	3.83
No					1.00			
Shift								
Night	2.27	0.000	1.58	3.25	2.08	0.000	1.42	3.06
Day					1.00			
Accident zone								
Urban	0.47	0.000	0.32	0.68	0.65	0.044	0.43	0.99
Rural					1.00			
Type of vehicle								
Motorbike	1.00							
Car	1.17	0.631	0.62	2.21				
Pedestrian	0.71	0.469	0.28	1.81				

Bicycle	0.44	0.265	0.10	1.86				
Others	0.79	0.753	0.18	3.43				

OR – Oddsratio.

DISCUSSION

Traffic accidents are indicated as multiple events and have three primary causes for their occurrence: those related to human failures, being the most prevalent alcoholic beverage intake, vehicle defects and environmental factors. They correspond to a high incidence of morbidity and mortality, which can cause irreversible damage to their victims, as well as high costs to the economy and health services ^(16,17,18,12).

Generally, such occurrences involve individuals with ages ranging from 18 to 29 years, with a directly proportional increase in age and a decrease in the chances of accidents ^(12,19,20).

This research was represented mostly by young adults, corroborating with results from other studies ^(17,18), including a regional survey where the age between 20 and 39 years was prevalent among those involved ⁽⁵⁾.

Males were prevalent among registered victims, a fact commonly observed in the current literature ^(17,16,12,20). Men are likely to be at greater risk for sociocultural gender-related issues such as excessive speed, risky maneuvers, and alcohol consumption ^(16,17,19).

With regard to the severity of occurrences involving the neurological system, the victims classified as light trauma predominated, similar to other studies ^(16,19). The use of a helmet or seat belt may have contributed to the lower neurological severity of the sample analyzed. Through the registry of an efficient evaluation by the professional, through the GCS, with a score ranging from 3 to 15 points, it is possible to identify the neurological pattern and estimate its prognosis ^(16, 21).

One of the main reasons for the occurrence of traffic accidents in Brazil is the ingestion of alcohol associated with the driving of the vehicle ^(16,18,12). The results of this research corroborated with such evidence, where the number of victims who had ingested alcoholic beverage was significant. As a preventive measure for accidents of this nature, in 2008 Law No. 11,705, known as "Dried Law" was passed, establishing a zero alcohol intake limit for drivers ^(22, 12).

Safety devices (seat belts and helmets) are mandatory items according to the Brazilian Traffic Code - BTC ⁽²³⁾, aiming greater protection to those who use vehicles for locomotion. This study showed that most of the victims used these items at the time of the accident, similar to research that reaffirmed their importance in reducing the chances of serious injuries and / or deaths ^(18,24). An additional data from this research refers to the condition of the victim at the moment of the occurrence, the majority of which was conducive of the vehicle, as well as results of other studies ^(12,20,13).

The time between the arrival of the rescue after the communication of the occurrence is called time-response, represents an essential factor in the prehospital care and one of the main indicators of the efficiency of this service, since each minute anticipated in the care, reduces the risk of sequelae and of hospital expenses in the continuation of treatment of the injured patient ⁽²⁰⁾.

Although there is no current literature data regarding the ideal average time between call and PCT, this study revealed an average time of 16.2 minutes, and it is not

possible to classify it as an ideal time, since in Brazil there is no legislation that determines the response timeout. In contrast, the American regiment established a maximum time of 10 minutes for urban and 30 for rural areas; in London and Montreal advocate calls made in up to 14 and 10 minutes respectively ⁽²⁵⁾.

The prehospital care is performed through the partnership between SAMU and the Fire Department, whose performance differs as to the type and complexity of the occurrences. At SAMU, it is the type of clinical assistance for the victims, while for the Fire Department the assistance of trauma (26). Similar to studies performed in other regions, the PCT most requested to provide care in this research was the SAMU ⁽¹⁸⁾.

Regarding the area of the occurrences, they were predominantly urban areas, such prevalence may be related to the fact that the road system (condition of roads, signs and public lighting) and urban planning do not follow the growth of the vehicle fleet, increasing the vulnerability of people to to suffer a traffic accident ^(27,28).

With respect to the type of vehicle used by victims of traffic accidents, motorcycles represent the most dangerous form of motor vehicle because of the greater vulnerability of its occupants ⁽¹⁸⁾. The motorbike, as in other researches, was the most used transport for the victims ^(17,18,26). This fact may be related to the low cost for fuel consumption and consumption, and is commonly used as a vehicle for family and work transportation ⁽¹³⁾. With regard to the other party involved, automobiles led the number of occurrences, given in other surveys ^(18,26).

As the weekend is the period with the greatest number of traffic accidents in this research, there may be a relation with less road surveillance, greater occurrence of festive events and greater consumption of alcoholic beverages, contributing not only to the occurrence of accidents, but also to the worsening of them ^(16,19,18,20,13).

Regarding the shift, accidents occurred predominantly at night time. Such circumstance can be explained by the visibility limited to the reach of the headlights associated with poor lighting of the roadways, the use of dark clothing by pedestrians, physical stress and fatigue accumulated throughout the day, greater use of alcohol or other drugs, disrespect of signaling and less supervision ^(18,19,13), reflecting the need for supervisory strategies that are beyond business hours ⁽²⁰⁾.

Alcohol use is the third most important risk factor for disabling sequelae and deaths in individuals of productive age in the world ⁽²⁹⁾. The chances of being involved in traffic accidents are enhanced by the ingestion of alcohol ^(12,11). This association, coupled with the characteristics of drivers, has led to studies in several countries ⁽²⁹⁾.

The fact that this research has shown that the occurrence of a traffic accident on the effect of alcohol was greater with male victims can be explained by sociocultural issues that lead to the violation of traffic laws such as driving at high speed ^(17,16,30,29).

Age is another relevant factor in the association of alcohol intake and vehicle driving ^(16,19,12,24,29,30,20), where there are prevalence of individuals considered young. However, there is a lack of information in the literature about this association with the occurrence of traffic accidents. This study revealed that involvement in accidents was prevalent among individuals with a mean age of 31.2 years. Generally young drivers exhibit impulsive behavior characteristic of this stage of life, underestimating their abilities and the risks of dangerous driving, especially under the influence of alcoholic beverages ^(16,19,30,20).

The chances of occurrence of traffic accidents under the influence of alcohol were higher for the victims who were traveling on weekends and during the night, a fact that was registered predominantly in current research, suggesting a relation between free

traffic, low supervision and displacement for activities of recreation. It is assumed that the factors that predispose to higher alcohol intake and its relation with traffic accidents are also contributing to the predominant occurrences in rural ways^(16,19,20,30,13).

Regarding the multivariate association of the type of vehicle used by the victim with the occurrence of the traffic accident under the influence of alcohol, there was no statistical significance inferring that the occurrence of accidents under alcoholic influence does not depend on the type of vehicle involved.

The use of secondary databases with inadequate or insufficient completion of some variables limited the analysis of important aspects of this research as: condition of the victim at the time of the occurrence (whether driver or passenger); information on the use of safety equipment by the victims involved in the accidents, and on the ingestion of alcohol by the driver of the vehicles involved. In addition, it was not possible to collect information on the level of consciousness of the victims in the MFBP 's attendance record since it did not contain the GCS registration item at the time of the PCT.

CONCLUSION

Traffic accidents are indicated as multiple and complex events, of great repercussion and consequences, being necessary the use of prevention methods directed to the educational actions, of inspection and improvement of the safety conditions of the urban roads and highways, being this the way available to minimize the incidence of this phenomenon.

This research revealed a profile of the victims with predominance for males, with a mean age of 31.2 years, the majority being the driver of the vehicles involved. In the records of the occurrences, assessments of the level of consciousness of low gravity and use of safety devices predominated. Most accidents occurred in urban areas, on weekends and at night. The factors associated with traffic accidents in alcoholic victims were age, sex, rural area, weekends and night shift.

The aforementioned results can support new discussions and guide actions and behaviors on prehospital care, both for the professionals involved on the importance of correct completion of the records, and for the purposes of implementing good traffic practices, public policy execution and awareness population, in order to reduce the consequences of accidents.

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