



MOTORCYCLE ACCIDENT VICTIMS WITH TRAUMA
VÍTIMAS DE ACIDENTES DE MOTO COM TRAUMATISMO
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ABSTRACT

Objective: to demonstrate the epidemiological profile of victims of motorcycle accidents with cranial trauma. **Method:** observational, descriptive, and retrospective study with a quantitative approach, with 124 victims of motorcycle accidents, from April 2010 to January 2014. Data were processed in EXCEL 2007 software program and presented in tables. **Results:** there was a predominance of males 102 (82%), 21-30 years old, 75 (60.48%) drunk, 16 (13%) for illicit drugs, 119 (96%) did not use a helmet and without a driver license. A score of Glasgow Coma Scale was considered mild 62 (50%); moderate 38 (31%) and severe 24 (19%). Of them, 90 (73%) were transferred, and 05 (4%) were dead. **Conclusion:** the lack of personal protective equipment, sex, age, use of alcohol and illicit drugs show the risk of accidents, therefore greater severity of temporary or permanent injuries. **Descriptors:** Traffic Accidents; Motorcycle Driver; Traumatic Brain Injury.

RESUMO

Objetivo: demonstrar o perfil epidemiológico das vítimas de acidentes motociclísticos com traumatismo crânioencefálico. **Método:** estudo observacional, descritivo e retrospectivo, com abordagem quantitativa, com 124 vítimas de acidentes motociclísticos, entre abril de 2010 a janeiro de 2014. Os dados foram processados no programa *software* EXCEL 2007 e apresentados em tabelas. **Resultados:** houve predominância do sexo masculino 102 (82%), de 21 a 30 anos, 75 (60,48%) alcoolizados, 16 (13%) por drogas ilícitas, 119 (96%) não utilizavam capacete e não eram habilitados. Escore da Escala de Coma de Glasgow considerado leve 62 (50%); moderado 38 (31%) e grave 24 (19%). Desses, 90 (73%) foram transferidas e cinco (4%) foram a óbito. **Conclusão:** a falta de equipamentos de proteção individual, sexo, idade, uso do álcool e drogas ilícitas sinalizam para o risco de acidentes, tendo como consequência maior gravidade das lesões temporárias ou definitivas. **Descritores:** Acidentes de Trânsito; Motociclistas; Traumatismo Crânioencefálico.

RESUMEN

Objetivo: demostrar el perfil epidemiológico de las víctimas de accidentes moto ciclísticos con traumatismo craneano encefálico. **Método:** estudio observacional, descriptivo y retrospectivo, con enfoque cuantitativo, con 124 víctimas de accidentes moto ciclísticos, entre abril de 2010 a enero de 2014. Los datos fueron procesados en el programa *software* EXCEL 2007 y presentados en cuadros. **Resultados:** hubo predominancia del sexo masculino, 102 (82%), de 21 a 30 años, 75 (60,48%) alcoholizados, 16 (13%) por drogas ilícitas, 119 (96%) no utilizaban casco y no eran habilitados. Puntuación de la Escala de Coma de Glasgow fue considerado leve 62 (50%); moderado 38 (31%) y grave 24 (19%). De esos, 90 (73%) fueron transferidos y 05 (4%) fueron a óbito. **Conclusión:** la falta de equipamientos de protección individual, sexo, edad, uso de alcohol y drogas ilícitas señalan el riesgo de accidentes, consecuentemente mayor gravedad de las lesiones temporarias o definitivas. **Descritores:** Accidentes de Tránsito; Motociclistas; Traumatismo Cráneo Encefálico.

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INTRODUCTION

The World Health Organization (WHO) considers Traumatic Brain Injury (TBI) as the main determinant of mortality and sequel in multiple trauma victims. These losses are not only limited to reducing the productivity of the individual or injuries that affect the lives of the victims, but to increased costs for health services and charges for public finance.¹ From 2008 to 2010, there was an increase of 7% in deaths from land transport and 23% of motorcycle deaths.²

In the world, traumatic injuries are the leading causes of deaths of people aged 5 to 44 years old, and they are 10% of all deaths. Because of the age distribution partners, the economic damage is huge. The TBIs are responsible for 75% to 97% of deaths from trauma in children. It is estimated about 6.2 million Europeans with at least one sequel to TBI.³

In Brazil, the data are not different and occurrences increase every year, becoming an unquestionable challenge for public policy managers, especially the leaders, and health professionals, considering that mainly affects the young and productive part of society.⁴ Driving drunk is to commit a crime, even not causing harm to others. The consumption of alcoholic beverages is considered as one of the main factors responsible for the high incidence of accidents with victims, approximately 70% of violent accidents with fatalities.

In Brazil, the injured are configured a public health problem of great magnitude with a strong impact on morbidity and mortality of the population. The TBI is highlighted when considering the dead and wounded, as one of the most frequent injuries.¹ Accidents involving motorcyclists have been increasingly reported and seen every day, not only in big cities but areas with fewer inhabitants, including in rural areas. In Brazil, 2011 represented a record manufacturing and sales of motorcycles, mopeds, scooters, bicycles and Similar, highlighting the northeast region.⁵

Victims who survive TBI may have impairment or disability that are permanent, interfering with the performance of their functions.¹ The diagnosis of lesions is made from the physical examination, radiological tests, CT scans, surgery, and by the Scale Glasgow Coma (GCS), which measures the level of awareness of victims with neurological trauma, such victims with mild, moderate and severe TBI. Major injuries involving the head and neck, face, chest,

abdomen, limbs, pelvis and external surfaces were identified.

The protocol for evaluation and treatment for the group of patients with TBI is considered controversial.⁶ For a long time the TBI was classified as mild when presenting score between 15 and 13 in the GCS; moderate with a score of 12-9; and severe if the presented score of the level of consciousness below 9. Currently, victims with GCS score in equal to 13 were included as having moderate trauma, due to present prognosis and risk of intracranial lesions similar to those presented by patients suffering from moderate trauma. Thus, the interpretation of the scale changes to 15-14 in mild TBI, 13-9 in moderate TBI and 8-3 in severe TBI.⁷

The disabilities resulting from TBI are presented, which can be divided into three categories: **physical, cognitive and emotional/behavioral**. **Physical disabilities** are diverse and may be motor, visual, and tactile, among others. **Cognitive disabilities** often include problems with memory, attention, and learning. **Behavioral/emotional disabilities** are, loss of self-confidence, decreased motivation, self-control difficulties, most represented by irritability and aggression.^{8,9}

The TBI should be seen as an aggravation of modern society, occurring throughout the country and at all ages affecting men and women. It is defined as any injury resulting from an external trauma that results in abnormalities of the skull such as fractures or lacerations of the scalp as well as the functional impairment of the meninges, brain or their vessels, resulting in brain, momentary or permanent change, cognitive or functional nature.¹⁰

It is indispensable knowledge of the concept of the pathophysiological mechanisms of brain injury in the TBI for the establishment of appropriate clinical and therapeutic surgical measures before the emergency pictures, which involve rapid and fundamental decisions.¹¹

For the severity rating of the TBI, the Glasgow Coma Scale (GCS) is used, allowing the professional constant evaluation of possible changes in neurological function, but also as a strong prognostic indicator in traumatic and non-traumatic disease, allowing early detection of the worsening of the clinical picture and planning the actions that may be required. CT can be disregarded for victims presenting GCS¹⁵, and who do not present any risk factors such as a headache,

seizures, signs of traumatic injury above the clavicle, memory changes.¹²

Given the above, the objectives of the study are:

- To demonstrate the epidemiological profile of victims of motorcycle accidents with encephalic skull injuries.
- To identify the population according to the external cause of victims of motorcycle accidents with encephalic skull injuries.
- To check the use of personal protective equipment for the victims of motorcycle accidents with encephalic skull injuries.

METHODOLOGY

Observational, descriptive and retrospective study with a quantitative approach, developed in a Joint Health Unit, located in the municipality of Jaçanã/RN. It is a small unit with 20 beds for hospitalized patients in wards, pediatrics, delivery room and care emergency room.

The universe studied were 124 patients admitted to the care emergency room in the retrospective period from April 2010 to January 2014. The sample included all patients admitted who were victims of motorcycle accidents that were diagnosed with Traumatic Brain Injury.

For greater homogenization of the research the following inclusion criteria have been established: victims of motorcycle accidents, of both sexes, aged 0-80 years old and clinical diagnosis of TBI.

An instrument with two different times was built to achieve the study objectives: the first presenting the characterization of victims of motorcycle accidents emphasizing the socio-demographic data such as date and day of the event (Monday to Sunday), time of service, shift (morning, afternoon, evening), sex, age of the victim, from their admission to Health Mixed Unit in Jaçanã/RN.

In the second phase, it was emphasized the description of the physical examination with

possible injuries observed by the health team and through service records used to the unit, highlighting as important factor the victim's level of consciousness, which was assessed by the Glasgow Coma Scale (GCS), and behaviors to victims of motorcycle accidents.

The data from the service records had the items: if the patient was under the influence of alcohol and illicit drugs with simple answer of "yes" or "no"; If he was using helmet; if he has driver license; what types of trauma (TBI, excoriations, bruises, sunken skull, bleeding, burns, abrasions and bulging, dislocations and fractures), what was the affected body part (head/neck, chest, abdomen, upper and lower limbs), classification trauma according to the score of Glasgow Coma Scale (mild, moderate, severe) and ending with the clinical evolution highlighting (high, transfer, death and others).

Data collection was performed daily in the period from January to March 2014. The data were stored in Microsoft Excel, version 2010 and the results tabulated in tables. The statistical analysis was through descriptive techniques, demonstrated by absolute and percentage frequencies. Sequentially, the data were analyzed based on the relevant literature.

The research project was submitted to the Ethics and Research Committee, and only began after its approval, CAAE: 22297313.0.0000.5182.

RESULTS

The research was conducted from the records of care for victims of motorcycle accidents between 2010-2014, totaling 124 records, arising from affected attendances with trauma encephalic skull, in the Joint Health Unit of Jaçanã, Rio Grande do Norte.

Table 1. Distribution of socio-demographic victims of motorcycle accidents, with Traumatic brain injury, between 2010-2014, according to the days of the week, shift, gender, and age (n=124). Jaçanã (RN), 2014

Variables	n = 124	
Days of the week	n	%
Monday	15	12,1
Tuesday	10	8,1
Wednesday	11	8,8
Thursday	09	7,3
Friday	10	8,1
Saturday	23	18,5
Sunday	46	37,1
Shift of the Day		
Morning	22	17,8
Afternoon	49	39,5
Night	53	42,7
Gender		
Male	102	82,3
Female	22	17,7
Age group		
From zero to 10 years old	04	3,2
From 11 to 20 years old	21	17,0
From 21 to 30 years old	39	31,4
From 31 to 40 years old	28	22,6
From 41 to 50 years old	16	13,0
From 51 to 60 years old	10	8,0
From 61 to 70 years old	04	3,2
Older than 71 yeras old	02	1,6
Total	124	100

Accident rates occurring in the days of the week indicate a high number of casualties from the weekend, highlighting Friday with a quantity of 10 (8, 07%) victims, and greater concentration on Saturdays 23 (18, 54%), and especially on Sunday 46 (37, 10%).

Regarding the shift of the day, it was observed that the night prevailed over the other with 53 (42, 74%); followed in the afternoon with 49 (39, 51%) and 22 (17, 74%) victims in the morning.

Table 1 shows that out of the 124 victims affected by motorcycle accidents with TBI, 22 (18%) were female, and 102 (82%) were male.

Table 2. Distribution of the incidence of Traumatic brain injury on the victims of motorcycle accidents between 2010-2014, according to the influence of alcohol, under the influence of illegal drugs, helmet use, and Driver License (n=124). Jaçanã (RN), 2014

Variables	n = 124			
	Yes		No	
	n	%	n	%
Under the influence of alcohol	75	60,5	49	39,5
Under the influence of drugs	16	13,0	108	87,0
Helmet use	05	4,0	119	96,0
Have Driver License (CNH)	05	4,0	119	96,0

The presence of alcohol was revealed in 75 (60, 48%) and 49 (39, 52%) did not show clinical signs of intoxication. There was a score of 16 (13%) victims who showed clinical signs of being under the influence of illicit drugs and 108 (87%) showed no such symptoms, as shown in Table 2.

Only 05 (4%) victims were using a helmet at the time of the accident; however a score of 119 (96%) was not using the Personal Protective Equipment (PPE).

The ratio of male/females is equivalent to 4,6:1.

Young men were found more with 39 (31, 45%) victims aged between 21 and 30 years old, 28 (22, 58%) of 31 to 40 years, 21 (16,93%) between 11 to 20 years, 12 (12, 90%) of 41 to 50 years, 10 (8, 07%) between 51 to 60 years old, there were two age groups with 4 (3, 22%) for victims from 0 to 10 years old and between 61 to 70 years old.

It is shown that only 05 (4%) victims had a driver license while 119 (96%) did not have, which is considered a very aggravating factor for the occurrence of motorcycle accidents.

Table 3. Distribution of the incidence of Traumatic brain injury on the victims of motorcycle accidents between 2010-2014, according to other types of trauma, most affected body region, classification of trauma through the Glasgow Coma Scale and clinical outcome (n=124). Jaçanã (RN), 2014.

Variables	n = 124	
	n	%
Other types of trauma		
Traumatic Brain Injury - TBI	124	100
Sunken skull	15	12,1
Abrasions and bulging	05	4,0
Escoriations	109	87,9
Fracture	53	42,7
Bruises	19	15,3
Bleeding	13	10,5
Dislocations	39	31,5
Burns	05	4,0
Most affected body part		
Head/neck	124	100
Chest*	11	8,9
Abdomen	03	2,4
Upper limbs*	78	62,9
Lower limbs*	71	57,2
Classification of trauma through Glasgow Coma Scale		
Mild	62	50,0
Moderate	38	31,0
Severe	24	19,0
Clinical evolution		
Transference to other Hospital	90	73,0
Observation	23	19,0
Hospital discharge	06	5,0
Death	05	4,0

*Body region most affected in several victims.

Table 3 it revealed that many of these victims, in addition to TBI, were also affected by other problems, such as abrasions with 109 (87, 90%), common throughout body area; as well as fractures 53 (42.75%); dislocation with 39 (31,45%) victims; presence of bruises in 19 (15, 32%). An important factor was the presence of sunken skull with a total of 15 (12,10%) victims; hemorrhages 13 (10.48%); and low scores for abrasion and bulging with 05 (4, 03%) victims and burn with 04 (3, 22%).

The study finds that besides the head being the region affected in all 124 victims (100%), the Upper and Lower Limbs should be highlighted with a score of 78 (62, 10%) and 71 (57, 25%), respectively. The chest had a score of 11 (8, 87%) victims and the abdomen with 03 (2, 41%) victims. It is worth noting that in this study, these segments were the most affected in several victims.

There was a mild Glasgow score on 62 (50%) victims; moderate Glasgow in 38 victims (31%) and severe Glasgow in 24 (19%) of the victims. Also in this sense, there was a large number of victims with Moderate and Severe Glasgow score due to not using a helmet at the time of the accident.

The clinical evolution of the victims was characterized by the transfer of 90 (73%) victims; others were under observation with 23 (18%) victims; 06 (5%) discharged, and 05 (4%) dead, according to the attendance papers.

DISCUSSION

As for the distribution of victims according to the day of the week, authors¹³ emphasized that Saturday was the day that had the highest alcohol intake (50%) which can be connected to a higher severity. Over the weekend, there is possible a more exaggerated alcohol consumption, what motivates speeding, performing risky maneuvers, distraction, and failure to comply with safety standards, factors that contributed to the occurrence and the most serious injuries.¹⁴

Study¹⁵ conducted in Teresina/PI found accident victims records on weekends, which predominated: Sunday with 955 cases (25%); Saturdays with 779 (20%); Friday with 518 (14%).

The aggravating factors in the accidents were: physical fatigue, charges, accumulated pressures during the day, anxiety, concerns, climate influences and any other vulnerable factor.¹¹ There was a score of 39% of victims with accidents during the morning and early morning, followed by afternoon and evening with 29% to 32%.¹⁵

Corroborating the gender, study of 60 victims of motorcycle accidents reveals that 40 (66.7%) were male, and 20 (33.3%) were feminine.¹⁶ Gender was shown in another study with an index even more crucial to the

male population, with 88.4% of cases of accidents caused by motorcycles.¹⁷

Study with 87 assistant records for victims of accidents involving motorcycles attended the Health Rescue Service of the municipality of Guaratinguetá/SP reveals that 77% (67) were male, and 23% (20) were female.¹⁸ A study shows that male is the most affected and the most discussed age range was from 21 to 40 years old.¹⁹ Research²⁰ held in Fortaleza showed a superiority of 98% male. The superiority of the male victims has been confirmed as a factor of greater exposure in the transit, and to the more aggressive male behavior when it comes to traffic and socio-cultural issues. The male predominance is attributed to the occurrence of men having their first contact with motorcycles even when minor.

The study showed the age group 21-30 years old (42.7%).¹⁸ The age factor is determinative in victims of motorcycle accidents that have TBI. Therefore, they are young people under 18 years old using motorcycle as a means of transportation, without qualification, in a town in the interior of Rio Grande do Norte.

There is a predominance of young people among the victims of accidents caused by motorcycle, citing as key factors inexperience in driving, impulsivity characteristic of this phase of life, and the consumption of alcohol and other drugs associated with poor supervision. On the impact of alcohol on mortality in traffic accidents, it was observed that 66.6% of motorcycle fall victims had blood alcohol concentration.^{11,13,21}

The study shows that 89.1% of motorcycle accident victims had no alcohol on the breath, so did not use alcohol before driving, but claim that drinking alcohol is an aggravating factor for transit accidents.¹⁸ It could say that alcohol is the substance that modifies the behavior concerning attitudes made by motorcycle drivers, and these violent attitudes are identified by the use of illicit drugs such as cocaine, amphetamines, barbiturates that can motivate attitudes and violent behavior, with an inadequate level of consciousness.

The effects of drugs on performance of drivers are already quite known, and there are several studies that can be found in the literature on the prevalence of drug use by drivers who were killed or injured in traffic occurrence.²²

Victims related in this study did not use the helmet. This personal protective equipment minimizes the injury in case of accidents with

TBI. Currently riding motorcycle without helmet use is considered very serious offense, by Article 244 of the Brazilian Traffic Code, with the penalty fine and suspension of the right to drive and as administrative measure to take the driver license.¹⁷

A study in Guaratinguetá/SP with 87 victims revealed that the use of "helmet" mandatory safety equipment was used by 86% of victims.¹⁸ Authors¹⁷ emphasize that in developed and developing countries, there a resistance to the legislation for the use of mandatory use of a helmet.

The condition of the driver does not have the driver license is considered a crime subject to trial and sentence of 6 months to 1 year of imprisonment by the Brazilian Traffic Code. The National Traffic Department - DENATRAN,²³ considered very serious offense is driving a vehicle without a license, penalizing with fines, whose value is multiplied by three, and vehicle capture. Even with a severe law, the deficiency in supervision makes room for the break of those standards, and, most people move around the city even without the National Driver License.¹⁶

Studies^{24,25} also confirmed that the lower limbs (53.9%), upper limbs (41.1%), and cephalic segment (3.1%) are the most affected areas. Another study in a city in São Paulo showed lesions in the lower limbs with a significant percentage of 44.9%, in which it considered being the most damaged area in accidents, then the upper limbs with 30.5%, and other types more affected lesions such as abrasions, dislocations and abrasive high frequency injuries in both lower and upper limbs.²⁶

Accidents in addition to causing the death of hundreds of Brazilians leave permanent sequels, and bring impacts to the victim's life and their families. It is estimated that for every death due to cranial trauma, three individuals remain with definitive sequels.¹⁶

TBI is classified as mild, moderate and severe by GCS, and is it the parameter currently most used worldwide to assess the level of consciousness since it has among its main advantages, a set of very simple physical examination to be done.^{27,28}

Regarding the occurrence of victims with death, data revealed in this study a score of 05 (4%) deaths, a high rate compared to study²⁹ conducted in Sorocaba/SP with a percentage of 1%, thus showing that the morbidity is and should be more worrying.

It is necessary for an awareness campaign aimed at society in general, but especially for

people using this transport, which is essential and immediate to the adoption of social, educative measures to ensure the proper behavior of individuals in transit, aimed at reducing and preventing accidents.¹⁵

The care for rehabilitation can deal with an aspect that involves costly procedures, absorbing significant portions of the financial resources of health. There is evidence of the increasing number of motorcycle accidents with victims who are treated in urgent and emergency services. Given this scenario, there is an urgent need to implement public policies for the prevention of accidents and the prevention of health.¹⁴

CONCLUSION

This study demonstrated a growing public health problem in the municipality of Jaçanã-RN, which is motorcycle accidents. The deficiency in the road structure, the difficulty of monitoring the possession of driver license, use of personal protective equipment (PPE) such as helmets, gloves, boots and appropriate clothing, and the use of alcohol and other illicit drugs by motorcyclists are contributing to the high rates of mortality, especially the young adults of this municipality.

It is believed that the high number of cases of TBI by motorcycle accidents, distinct in this study point to the urgent need for stricter supervision of violations by competent authorities and by public education policies in traffic so that data may be minimized as soon as possible.

Thus, this study may alert the relevant authorities and contribute in some way to the reduction of motorcycle accidents that these diseases do not continue to affect young people, and they do not come to present consequently severe sequels and do not lose their lives.

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Submission: 2015/02/18

Accepted: 2016/04/05

Publishing: 2016/05/01

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