

## TRAUMATIC BRAIN INJURY: PROFILE OF PATIENTS ADMITTED IN A PUBLIC HOSPITAL FROM TERESINA CITY

Trauma cranioencefálico: perfil dos pacientes atendidos em um hospital público de Teresina

Trauma cranioencefálico: perfil de los pacientes atendidos en un hospital público de *Teresina*

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### ABSTRACT

**Objective:** This study meant to identifying the traumatic brain injury patients' profile in a public hospital of *Teresina* city, *Piauí* State, Brazil. **Methods:** It is a descriptive-exploratory, retrospective and documental study with a quantitative approach, which was performed in a public hospital from *Teresina* city. Data collection took place from September 2016 to January 2017 by researching medical records based on a developed form. **Results:** Considering the total number of traumatic brain injury hospitalizations, 5.67% were mild, 92.67% were moderate, and 1.67% were severe injuries. There was a predominance of single males within the age group from 19 to 29 years old, holding at most elementary school education. According to the study results, 19.33% of the patients died. **Conclusion:** It was concluded that the traumatic brain injury patients' profile is characterized by a predominance of single males within the age group from 19 to 29 years old, holding at most elementary school education.

**Descriptors:** Traumatic brain injury, nursing, health.

### RESUMO:

**Objetivo:** Identificar o perfil dos pacientes acometidos com traumatismo cranioencefálico atendidas em um hospital público de Teresina. **Método:** Estudo descritivo, exploratório, retrospectivo, documental de abordagem quantitativa realizado em um hospital público de Teresina-PI. Os dados foram coletados no período set/out/ de 2016 e janeiro de 2017 por meio de pesquisa nos prontuários através do formulário elaborado pelas pesquisadoras. **Resultados:** Registraram-se 1603 internações com o diagnóstico de traumatismo

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cranioencefálico destes, 5,67% tiveram traumatismo cranioencefálico leve, 92,67% moderado e 1,67% grave. Houve predomínio da faixa etária de 18 a 29 anos, sexo masculino, solteiro e o ensino fundamental. Nesta busca, 19,33% dos pacientes foram a óbito. **Conclusão:** Conclui-se que o perfil do paciente acometido por trauma cranioencefálico, no hospital estudado, é caracterizado por um predomínio do sexo masculino com uma faixa etária de 19 a 29 anos, solteiros e com escolaridade de até o ensino fundamental.

**Descritores:** Trauma Craniano; Enfermagem; Saúde.

## RESUMEN

**Objetivo:** identificar el perfil de los pacientes acometidos con traumatismo craneoencefálico atendidos en un hospital público de Teresina. **Método:** Estudio descriptivo, exploratorio, retrospectivo, documental de abordaje cuantitativo realizado en un hospital público de Teresina-PI. Los datos fueron recolectados en el período set / out / de 2016 y enero de 2017 por medio de investigación en los prontuarios a través del formulario elaborado por las investigadoras. **Resultados:** Se registraron 1603 internaciones con el diagnóstico de traumatismo craneoencefálico de éstos, 5,67% tuvieron traumatismo craneoencefálico leve, 92,67% moderado y 1,67% grave. Se observó predominio del grupo de edad de 18 a 29 años, sexo masculino, soltero y la enseñanza fundamental. En esta búsqueda, el 19,33% de los pacientes fueron a muerte. **Conclusión:** Se concluye que el perfil del paciente acometido por trauma craneoencefálico, en el hospital estudiado, se caracteriza por un predominio del sexo masculino con una franja etaria de 19 a 29 años, solteros y con escolaridad de hasta la enseñanza fundamental.

**Descritores:** Traumatismos Craneocerebrales; Enfermería; Salud.

## INTRODUCTION

Traumatic Brain Injury (TBI) is one of the main public health problems nowadays, being one of the most important causes of death, as well as physical, mental and neurological disabilities. Such condition deteriorates the quality of life and is surpassed only by stroke.<sup>1</sup>

TBI is any aggression of traumatic order that causes anatomical injury or functional impairment of the scalp, skull, meninges, and encephalon or its vessels.<sup>2</sup> It can be classified as mild, moderate and severe according to the Glasgow coma scale, in which it is accepted worldwide since it establishes a simple method to evaluate the criteria for neurological conditions. It is necessary to apply this scale throughout the follow-up treatment.<sup>3</sup>

In terms of gender, the incidence of TBI is more frequent among men and may cause significant changes in certain risk situations. Among the causes of TBI, the most frequent are those directly involved in traffic accidents, followed by physical aggression, falls, and firearm injuries.<sup>2</sup>

The dominant cause of mortality and morbidity among young adults today is car crashes, even though both the number and severity of TBIs in the last 10 years in developed countries there have been decreased due to increased road and occupational safety. It is assumed that by 2020 TBI will become one of the main causes of death and could be considered a silent epidemic.<sup>4</sup>

Mechanical traumas have left irreversible sequelae in thousands of people in Brazil, especially in relation to traffic accidents. Death from traffic accidents increased mostly in the Northeast and North Regions. The *Piauí* State, which ranked 20th in 2001 with a rate of 15.3 deaths per 100,000 citizens, then moved to fourth place in 2011.<sup>5</sup>

Based on the large number of accidents that occur daily and analyzing the occurrence of deaths by TBI due to external causes, a study is necessary to identify the TBI victims' profile. The study is very important for developing an effective understanding of how health care professionals, especially nurses, should approach and inform TBI patients.

Bearing in mind the aforementioned, this study targeted at identifying the TBI patients' profile admitted in a public hospital from *Teresina* city, *Piauí* State, Brazil.

## METHODS

It is a descriptive-exploratory, retrospective and documental study with a quantitative approach, which was performed in a public hospital known for trauma assistance referral and located in *Teresina* city, *Piauí* State, Brazil. The study was carried out from September to October 2016, and in January 2017. The study population consisted of TBI victims admitted to the reference hospital in 2015. The sample was comprised of 300 patient records from a total of 1,603 records, having a margin of error of 5% with 95% confidence level.

The medical records of TBI patients aged 18 years old or older and admitted to the reference hospital from January to December 2015. The records of patients without TBI or records with incomplete data were excluded.

The TBI patient records from January 2015 to December 2015 were selected using a form developed by the researchers. After that, a database was created using Microsoft Excel, which was later imported into the Statistical Package for the Social Science (SPSS) for statistical analysis.

The ethical aspects of this study are in line with those presented in Resolution No. 466/2012 from the National Health Council of Brazil. This research was approved by the Research Ethics Committee under the *Certificado de Apresentação para Apreciação Ética* (CAAE) [Certificate of Presentation for Ethical Appreciation] No. 58232616.0.0000.5210 and Legal Opinion No. 1.709.526 on August 31<sup>st</sup>, 2016.

## RESULTS

The collected data were organized in tables and graphs. **Table 1** shows the distribution of the 300 participants according to sociodemographic characteristics. The results revealed that there was a relatively high incidence of TBI in males (80.67%). Also, 37.67% of the TBI patients were in the 18-29 age group, 36.33% had at most elementary school education, 45.33% were single, and 38.33% were

married. No data about schooling were found in 36% of the patient records.

**Table 1** - Patients' sociodemographic profile (n=300). Teresina city, Piauí State, Brazil, 2015.

		No.	%
Gender	Male	242	80.67
	Female	58	19.33
Age group	18  ---- 30	113	37.67
	30  ---- 40	75	25.00
	40  ---- 50	43	14.33
	50  ---- 60	30	10.00
	60 or more	39	13.00
Education	illiterate	17	5.67
	Elementary school	109	36.33
	High school	54	18.00
	Higher Education	6	2.00
	Incomplete Higher Education	6	2.00
	Uninformed	108	36.00
Marital status	Single	136	45.33
	Married	115	38.33
	Divorced	11	3.67
	Widower	12	4.00
	Concubinage	21	7.00
	Ignored	5	1.67

Source: *Serviço de Arquivo Médico e Estatística (SAME)* [Medical Archive and Statistics Service], *Hospital de Urgência de Teresina (HUT)*, 2016/2017.

**Table 2** shows the victims' TBI degree according to gender, age, marital status, education, types of pre-hospital transports, patient's condition, and vehicle used. According to the results, 80.67% of the patients were male and most of them (80.58%) had moderate TBI. Mild TBI affected 82.35% of the male victims.

Concerning the patients' education level, it was observed that 36.69% of the patients who had until elementary school education were affected by moderate TBI. There was a predominance of moderate TBI in the 18-29 age group (37.41%). Regarding the marital status, there was a predominance of single patients suffering from moderate TBI (45.32%).

Observing the pre-hospital transports, it was observed that the vehicles from the *Serviço de Atendimento Móvel de Urgência (SAMU)* [Mobile Emergency Care Service] were the most used (50%). There was a preponderance of this transportation in patients with all levels of TBI: 58.82% of the mild TBI patients, 49.28% of the moderate TBI patients, and 60% of the severe TBI patients. Considering the condition of the patients at the time of the accident, 63.67% of them were riders, most of them affected by moderate TBI (65.47%).

When considering all cases in relation to the vehicle used, motorcycles were the most present (75.00%), being the most prevalent vehicle in all degrees of TBI. It was also observed that information about the use of seat belt and helmet were not found.

**Table 2** - Degree of TBI according to gender, age, marital status, education, types of pre-hospital transports, patient's condition and vehicle used (n=300). Teresina city, Piauí State, Brazil, 2015.

		Degree of TBI							
		Mild		Moderate		Severe		Total	
		No.	%	No.	%	No.	%	No.	%
Gender	Male	14	82.35	224	80.58	4	80.00	242	80.67
	Female	3	17.65	54	19.42	1	20.00	58	19.33
Age group	18  ---- 30	6	35.29	104	37.41	3	60.00	113	37.67
	30  ---- 40	3	17.65	72	25.90	-	-	75	25.00
	40  ---- 50	5	29.41	37	13.31	1	20.00	43	14.33
	50  ---- 60	1	5.88	28	10.07	1	20.00	30	10.00
	60 or more	2	11.76	37	13.31	-	-	39	13.00
Education	Illiterate	2	11.76	15	5.40	-	-	17	5.67
	Elementary School	7	41.18	102	36.69	-	-	109	36.33
	High School	4	23.53	47	16.91	3	60.00	54	18.00
	Complete Higher Education	-	-	6	2.16	-	-	6	2.00
	Incomplete Higher Education	1	5.88	5	1.80	-	-	6	2.00
	Uninformed	3	17.65	103	37.05	2	40.00	108	36.00

		Degree of TBI							
		Mild		Moderate		Severe		Total	
		No.	%	No.	%	No.	%	No.	%
Marital status	Single	8	47.06	126	45.32	2	40.00	136	45.33
	Married	7	41.18	106	38.13	2	40.00	115	38.33
	Divorced	1	5.88	10	3.60	-	-	11	3.67
	Widower	-	-	12	4.32	-	-	12	4.00
	Concubinage	1	5.88	19	6.83	1	20.00	21	7.00
	Ignored	-	-	5	1.80	-	-	5	1.67
Transportation	SAMU	10	58.82	137	49.28	3	60.00	150	50.00
	Firefighters	-	-	6	2.16	-	-	6	2.00
	Does not apply	-	-	-	-	-	-	-	-
	Ignored	-	-	-	-	-	-	-	-
	Other	7	41.18	135	48.56	2	40.00	144	48.00
Patient condition	Pedestrian	10	58.82	35	12.59	-	-	45	15.00
	Motorcyclist	6	35.29	182	65.47	3	60.00	191	63.67
	Passenger	-	-	21	7.55	-	-	21	7.00
	Cyclist	-	-	2	.72	-	-	2	.67
	Driver	-	-	18	6.47	-	-	18	6.00
	Does not apply	1	5.88	20	7.19	2	40.00	23	7.67
	Ignored	-	-	-	-	-	-	-	-
	Other	-	-	-	-	-	-	-	-
Vehicle involved	Bicycle	-	-	1	.36	-	-	1	.33
	Motorcycle	15	88.24	207	74.46	3	60.00	225	75.00
	Car	-	-	50	17.99	-	-	50	16.67
	Truck	-	-	-	-	-	-	-	-
	Bus	1	5.88	-	-	-	-	1	.33
	Train	-	-	-	-	-	-	-	-
	Cart	-	-	-	-	-	-	-	-
	Does not apply	1	5.88	20	7.19	2	40.00	23	7.67
	Ignored	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	

Source: SAME, HUT, 2016/2017.

**Table 3** shows the patients' need for surgery, the reason for discharge and hospitalization time. It was observed that 71.67% of the patients did not undergo surgery and 67.33% were discharged due to improved condition. Concerning the hospitalization time, an average of 8 days was observed, with a maximum time of 181 days and a minimum of 1 day of hospitalization per patient.

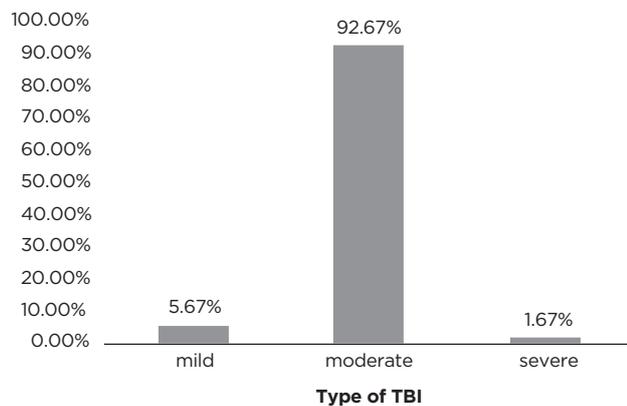
**Table 3** - Patient's need for surgery, the reason for discharge and length of stay (n=300). Teresina city, Piauí State, Brazil, 2015.

		No.	%	Average	Maximum	Minimum
Need for surgery	Yes	85	28.33			
	No	215	71.67			
Reason for discharge	Improved condition	202	67.33			
	Death	58	19.33			
	Transference	35	11.67			
	Evasion	5	1.67			
Hospitalization period (days)				8	181	1

Source: SAME, HUT, 2016/2017.

**Figure 1** describes the occurrence of TBI in patients. There was a predominance of moderate TBI (92.67%), followed by mild TBI (5.67%).

**Figure 1** - TBI severity degree among the patients. Teresina city, Piauí State, Brazil, 2016/2017.



Source: SAME, HUT, 2016/2017.

## DISCUSSION

**Table 1** showed a profile of young male patients in productive age, which is in line with several studies. One of these studies showed that, of the total number of victims, 31.45% were young men in the 21-30 age group.<sup>6</sup> The low percentage of women affected by TBI found in this study can be attributed to the fact that men are more exposed to TBI risk factors.<sup>7</sup>

There was a predominance of single patients, followed by married patients. This is supported by a study in which most of the patients were also single (74.8%).<sup>8</sup> Given the predominance of single and young patients, they end up being the most affected victims in traffic accidents because they are immature, abuse illegal substances, and don't follow traffic laws.<sup>9</sup>

According to this study's results, most patients had at most elementary school education. This is in good agreement with another study in which most patients were

people who had less than 8 years of study.<sup>10</sup> In another study, the percentage of people having elementary school and incomplete high school was the same (32.3%).<sup>8</sup>

It was possible to extract information on the degree of TBI by analyzing **Table 2**. There was a predominance of moderate TBI according to the variables gender, age group, marital status and education, contrasting with the results from **Table 1**.

The SAMU vehicles were the pre-hospital transportation used by the majority of victims to reach urgency and emergency units regardless of the degrees of TBI. This result contrasts with another in which the hospital ambulance was the most used transportation (60.81% of the participants).<sup>10</sup> In another study, the SAMU vehicles were the second most used pre-hospital transportation (11% of the participants), and vehicles from the *Serviço Integrado de Atendimento ao Trauma e Emergência* (SIATE) [Trauma and Emergency Care Integrated Service] were used by most of the patients (75%).<sup>11</sup> Silva, Galvão and Muraro (2016) showed that the transports most used by victims to reach urgency and emergency units were private (48.5%) and SAMU (34.4%) vehicles, respectively.<sup>12</sup>

Riders are the most prevalent victims and motorcycles are present in most accidents. Moderate TBI was prevalent in these variables. A study pointed out that motorcycle accidents are the main cause of TBI in 44.55% of cases.<sup>2</sup> Another study on TBI caused by car collision and alcoholism in Piauí State, Brazil, showed that the majority of the car crash victims were male (94.5%).<sup>13</sup>

Most patients were not submitted to surgery in this study, which corroborated with the findings reported on the literature. A study showed that 71.29% of the patients did not require surgical intervention, while 28.71% received surgical treatment.<sup>2</sup> However, other study reported that 80.3% of the patients were submitted to surgery.<sup>14</sup>

Most TBI victims were discharged from the hospital due to their improved condition, followed by those who died. This fact can be confirmed from a study in which 47.3% of the patients were discharged due to improved conditions,

followed by those who were transferred (31.4%).<sup>15</sup> There was a mortality rate of 19.1% among hospitalized patients.

The data regarding the hospitalization time in this study were not consistent with the literature. According to a study, most patients (40.1%) remained hospitalized for 2 to 7 days, with an average time of 15.9 days.<sup>15</sup> This contrasts with another study, in which the average hospitalization time was 52 days for rehabilitation.<sup>8</sup>

No information concerning the variable use of seat belt and use of helmet were present on the form from the SAMU of *Teresina* city or on medical records of the patients from *Timon* city, *Maranhão* State, Brazil. Using the seat belt reduces by 40% to 60% the occurrence of both severe TBI and mortality. Wearing a helmet reduces mortality by 30%. The existence of new protection methods such as airbag and abs brake system may decrease the occurrence of facial injuries, as well as promote a significant reduction in mortality from TBI.<sup>16</sup>

Helmets are an indispensable piece of equipment for the motorcyclists' safety as they reduce the risk and severity of head injury by about 72% and the probability of death by up to 39%.<sup>17</sup> As can be seen in **Figure 1**, there was a predominance of moderate TBI (92.67%), differing from the results reported on the literature. A study revealed that 20% of the victims had mild TBI, 25.05% had moderate TBI and 54.2% had severe TBI according to the Glasgow coma scale.<sup>18</sup>

## CONCLUSIONS

According to this study's results, the profile of the TBI patients is characterized by a predominance of single males within the age group from 19 to 29 years old, holding at most elementary school education.

Motorcycle crashes were the main cause of all types of TBI. The most used pre-hospital transportation was the SAMU vehicle, being prevalent in all levels of TBI. Most patients were discharged due to their improved condition followed by those who died. The average patients' hospitalization time was 8 days, with a predominance of patients with moderate TBI followed by those with mild TBI.

It was possible to observe difficulties in filling out the patients' admission form, which is of paramount importance for analyzing their profile. This data can be used by professionals for more objective and faster decision making.

As a limitation of this study, no information about the use of seat belt and helmet by the TBI victims were recorded by the SAMU of either *Teresina* or *Timon* city.

This study meant to informing about the degrees of TBI and making society aware of a large number of hospital admissions due to automobile accidents, in addition to the need for implementing preventive measures.

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