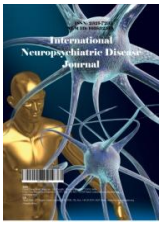

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Epidemiological Analysis of Hospitalizations for Head Trauma in Hospitals of Belém do Pará, Between 2015 and 2019

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Authors' contributions

This work was carried out in collaboration among all the authors. The author LGO designed the study and performed the statistical analysis. The authors NIFM, COCP, BSCC, ITA and AGFG wrote the first draft of the manuscript and administered the bibliographical research. The authors MJA and FLPR collaborated with the bibliographic research and normatization of the study. All authors read and approved the final manuscript.

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ABSTRACT

Objective: The study aimed to describe the epidemiology of cases of hospitalization due to TBI in Belém/PA, between 2015 and 2019.
Methodology: This is a descriptive epidemiological study, with a retrospective approach, whose data were obtained through consultation in the Notifiable Diseases Information System.
Results: Were 2.103 cases were reported, of which (75, 3%) were male, 80,7% without race/color information, coming largely from the emergency department, with predominance of admission to a Municipal Emergency Hospital (78, 2%).

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Conclusion: The high incidence of TBI in certain groups, associated with the present need to carry out complete care records, reinforces the need for health information, serving as an epidemiological basis and for the management of services. Therefore, it is extremely important to know the possible causes and act in the planning and elaboration of strategies that aim to prevent the numerous cases of TBI.

Keywords: Epidemiology; hospitalizations; traumatic brain injury.

1. INTRODUCTION

Traumatic brain injury (TBI) is the result of anatomical changes in the scalp, brain or blood vessels usually resulting from an external physical impact on the head region, another possible cause consists of sudden movements of acceleration and deceleration of the head that generate abnormal movements of brain tissue within the cranial box [1,2].

After the occurrence of external impact, inflammatory, metabolic and neurochemical processes occur, although they usually manifest immediately after trauma, they may take hours or days to result in symptomatological conditions that encourage the search for assistance (MAGALHÃES et al, 2017). Post-trauma events include impaired cerebral blood flow, increased intracranial pressure, increased blood-brain barrier permeability, increased oxidative stress, and release of excitatory neurotransmitters, and cell death [3]. Brain dysfunctions occur in varying degrees of severity, possibly fatal or when the individual survives trauma, there is a probability of physical disabilities [4].

By significantly increasing death rates worldwide, it is recognized as a public health problem. In the United States it is the third most frequent cause of death reaching about 1.7 million individuals annually, of which 52,000 progress to deaths [5]. The latest epidemiological data in Brazil show that TBI occurs in the proportion of 26.2 to 39.3 per 100,000 inhabitants being responsible for half a million hospitalizations per year and 75 to 100,000 deaths, and despite the importance of its study few studies report on the epidemiological situation in the northern region of the country [6].

When the individual can survive the TBI, it usually presents a drastic reduction in their quality of life, since, in addition to behavioral and cognitive disorders, the sequelae can encompass a set of motor deficits that make it impossible to practice daily activities, making it necessary for the presence of a caregiver [2].

In view of the above, considering the high rates of morbidity and mortality caused by the TBI and the few studies conducted in the Northern region of the country, the present study aimed to perform an epidemiological analysis of hospitalizations for head trauma in hospitals in Belém do Pará between 2015 and 2019.

2. METHODOLOGY

This is a descriptive epidemiological study, with a retrospective approach, whose data were obtained through consultation with SINAN databases (Information System of Notifiable Diseases) made available by the Department of Informatics of the Unified Health System (DATASUS), at the e-mail address (http://www.datasus.gov.br), which was accessed on 03/18/2020.

The study population consisted of all cases of patients hospitalized due to head trauma, of both gender and any age group, diagnosed and registered from January 2015 to December 2019.

The research collected data on gender, age group, color/race, character of hospitalizations and from the data obtained in DATASUS, new tables were constructed through the Microsoft Office Excel 2007 program.

Because it is a public domain bank, it was not necessary to submit the project to the Research Ethics Committee, according to resolution 510 of April 7, 2016, research using publicly accessible information, pursuant to Law No. 12,527 of November 18, 2011 [7,8].

3. RESULTS AND DISCUSSION

Table 1 shows the total number of cases diagnosed with head trauma from January 2015 to December 2019, which totaled 2,103 cases, most of which were male 1,584, representing 75.3% of the total number of cases. The most frequent age group was between 20 and 29 years of age, in 21.9% and the lowest frequency were the lowest of one year with 2%.

The findings obtained in Table 1 are similar to the results found in other studies conducted in several brazilian capitals; where the predominance of males ranged from 80.9% to 92.2% of the population [9,10,11,12,13].

According to data from the Ministry of Health Intracranial Trauma was the leading cause of hospitalization among men due to consequences of external causes, with an increase in its incidence in 2015 compared to 2009 [14].

Among the possible justifications for the discrepancy between genders are the social behavior of risk; violence; the abusive use of alcoholic beverages; non-compliance with traffic safety standards; greater number of work activities outside the home, among others; making them more vulnerable to the causal factors of the TBI [2,9,12].

Moreover, another point to be analyzed in this study is the higher prevalence of young adults (20 to 39 years), corresponding to approximately 39% of cases. Thus, in addition to the factors mentioned above, other points should be observed, such as the use of licit and illicit drugs, which when combined with aggressive and reckless behaviors, can lead to homicides, traffic accidents, and increased mortality [2,15,16].

It is noteworthy that the present study was conducted with the data provided from the capital and that the same information cannot be generalized, since the epidemiological profile is influenced by the sociocultural, economic and demographic reality of each region.

Table 2 shows the lack of information related to the color/race of the reported patients, where 80.7% (1699/2103) of the data were not filled out. Although fundamental to the health network, the difficulty in obtaining complete data in the information system is a reality in other locations.

Santos et al. [17] point out that despite their relevance, many health services such as urgent and emergency services have difficulties in performing the records of care provided, such as patients who are victims of TBI. It also emphasizes the need for managers to establish strategies with the team to minimize such conditions.

Health information is the basis for epidemiology and consequently for service management. Through the data, such as that presented by SINAN it is possible to monitor the progress of national and local strategic indicators; evaluate and implement health care models; adopt objective measures for the prevention, diagnosis

Table 1. Distribution of cases of TCE according to age group and gender, in the city of Belém, Pará, Brazil, from 2015 to 2019

Age group (years)	Population		Sex			
	Examined	%	Male	%	Female	%
< 1	42	2,0	23	54,8	19	45,2
1 a 9	207	9,8	118	57,0	89	43,0
10 a 19	224	10,7	171	76,3	53	23,7
20 a 29	461	21,9	380	82,4	81	17,6
30 a 39	359	17,1	302	84,1	57	15,9
40 a 49	246	11,7	196	79,7	50	20,3
50 a 59	195	9,3	148	75,9	47	24,1
60 ≥	369	17,5	246	66,7	123	33,3
Total	**2103**	**100,0**	**1584**	**75,3**	**519**	**24,7**

Source: Available at http://tabnet.datasus.gov.br/cgi/deftohtm.exe?sih/cnv/nipa.def accessed at 18/03/2020

Table 2. Cases reported of TCE by sex and color/race, in the city of Belém, Pará, Brazil, from 2015 to 2019

Sexo (N)	Branca	%	Preta	%	Parda	%	Sem informação	%
MASC (1584)	8	0,5	2	0,1	293	18,4	1281	80,8
FEM (519)	3	0,5	-	-	98	18,8	418	80,5
Total (2103)	**11**	**0,5**	**2**	**0,1**	**391**	**18,5**	**1699**	**80,7**

Source: Available at http://tabnet.datasus.gov.br/cgi/deftohtm.exe?sih/cnv/nipa.def. accessed at: 18/03/2020

and early treatment of diseases and injuries; as well as guiding promotion and prevention actions for the population [18].

In this context, the sensitization of health professionals, and all those responsible, is essential for the complete and quality of medical records and notification forms. This allows all the information provided to also serve as a source of research and reference base for detailed and specific studies, such as epidemiological survey for characterisation of people and risk factors [2].

Hospitalizations due to the nature of care due to TBI were classified as elective, urgent and for other reasons. Table 3 illustrates that the most frequent age group was between 20 and 29 years of age, in 459 cases and that the highest cases of hospitalizations reported were as a matter of urgency (2087/2103).

It is associated with a greater number of emergency hospitalizations compared to elective hospitalizations with the high degree of morbidity and mortality of this event, being one of the most frequent causes of mortality worldwide with an important impact on quality of life [2,19].

Therefore, the recommendations are that all patients with TBI be referred to a unit with emergency and emergency services where there are technological structures and qualified professionals for appropriate evaluation and treatment. Elective hospitalizations, although in small quantities, can be justified by cases in which the lesion initially does not cause changes in normality [20].

Table 4 shows that of the 2,103 cases reported in Belém, from 2015 to 2019, the hospital with the highest number of hospitalization TBI was the Mario Pinotti Municipal Emergency Hospital with 1,646 cases were reported, followed by the Ordem Terceira Hospital with 191 cases.

In view of the predominance of public hospitals in Table 4 and the fact that only one public hospital also concentrates more than half of the hospitalizations. The TBI is characterized as a public health problem [21]. because it has a high socioeconomic impact due to expenses directly related to the health of the individual, which was quantified at US$70,960,000 in average annual cost of hospital expenses with this population in a study that evaluated cases of head injury in Brazil between 2008 and 2012 [5].

Table 3. Hospitalizations due to TCE by age group and character of care, in the city of Belém, Pará, Brazil, from 2015 to 2019

Age Group 1	Elective	Urgency	Other external causes	Total
< 1 year	-	42	-	42
1 to 9 years	-	207	-	207
10 to 19 years	2	222	-	222
20 to 29 years old	2	459	-	461
30 to 39 years old	5	354	-	359
40 to 49 years old	1	245	-	246
50 to 59 years old	-	195	-	195
>60 years old	5	363	1	369
Total	**15**	**2087**	**1**	**2103**

Source: Available at http://tabnet.datasus.gov.br/cgi/deftohtm.exe?sih/cnv/nipa.def accessed at 18/03/2020

Table 4. Hospitalizations diagnosed by TCE by health establishment and year of care, in the city of Belém, Pará, Brazil, from 2015 to 2019

Establishment	2015	2016	2017	2018	2019	Total
D Luiz I Hospital	7	15	17	13	6	58
Ophir Loyola Hospital	13	-	2	3	8	26
Mario Pinotti Municipal Emergency Hospital	185	272	527	403	259	1646
Ordem Terceira Hospital	20	34	41	48	48	191
Hpsm Dr. Humberto Maradei Pereira	6	3	3	-	1	13
Santa Casa De Misericórdia Do Pará	1	-	-	-	4	5
Clinic of the Injured	2	61	67	22	8	160
Galileu State Public Hospital	3	-	-	1	-	4
Total	**208**	**385**	**657**	**490**	**334**	**2103**

Source: Available at http://tabnet.datasus.gov.br/cgi/deftohtm.exe?sih/cnv/nipa.def accessed at 18/03/2020

4. CONCLUSION

Based on the data presented, we can affirm that there is consensus in the international literature that TBI constitutes a serious public health problem, representing a high risk of mortality and potential to lead to physical disabilities for all age groups, social groups and races.

Often, occurrences of Cases of TBI can follow from preventable causes, such as risky social behaviors. This scenario could be different, especially in young male adults, if there was greater adoption of prevention measures, such as the use of personal protective equipment in the workplace if it poses any risk to it; avoid association of alcohol use and driving of vehicles; traffic regulations, among others.

It is important to highlight that hospitalization for long periods, complex surgeries and high technological density disposition are necessary resources for monitoring and good prognosis in almost 100% of cases of TBI, being indispensable. However, these can also be a serious injury to the public treasury, which will need to have large investments to maintain them.

The results of this research are alarming: the number of cases is significantly higher in people aged 20 to 39 years, male. This may reflect a harsh reality and a worrying development, as it comprises an economically active age and many of these victims may be the main providers of their families' livelihoods. And, although the possibility of death is ruled out, the TBI's are constantly responsible for leading the victim to sensory-motor disabilities, which in turn can severely compromise the performance of daily activities, work skills and well-being of the people who develop them, being able, furthermore, to lead them to an early retirement.

Another important data is the concentration of approximately 80% of hospitalizations being in a single emergency hospital, which is not necessarily a reference in trauma, therefore, it also receives diseases of other natures besides traumatic. Therefore, a possible overload of this hospital with cases of TBI would make it impossible to provide care and care for a number of other health problems.

Due to what has been exposed, we consider that studies on the epidemiology of trauma in Belém, as well as in other cities of the State, it is of paramount importance to establish a correlation between possible causes and, from this, to act in the planning and elaboration of strategies that propose to prevent the numerous cases of head trauma, in order to optimize human resources, technological and financial that are widely employed in their treatment, for other areas that still lack investment.

CONSENT

As per international standard or university standard written patient consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

To submit the project to the Research Ethics Committee, according to resolution 510 of April 7, 2016, research using publicly accessible information, pursuant to Law No. 12,527 of November 18, 2011 (BRAZIL, 2011; BRAZIL, 2016).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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