Health profile of motorcycle deaths in the state of Paraná-Brazil

Perfil epidemiológico dos óbitos por motocicletas no estado do Paraná-Brasil
Perfil epidemiológico de las muertes en moto en el estado de Paraná-Brasil

RESUMO
Objetivo: Analisar os fatores associados para óbitos de motociclistas no estado do Paraná-Brasil, do ano de 2017 a 2019. Método: Trata-se de um estudo epidemiológico, transversal, analítico e retrospectivo, sobre as notificações dos casos de óbitos de motociclistas no estado do Paraná. Para análise foram calculadas medidas de frequência simples e relativas, posteriormente estimadas as medidas de associação por meio da Odds Ratio. Resultados: As características predominantes das vítimas eram ser de cor branca, ter 8 ou mais anos de estudo, não serem casadas e não irem a óbito em hospitais. Em contrapartida, as vítimas do sexo feminino apresentaram menor chance de irem a óbito quando tem menos de oito anos de estudo e de falecerem em locais que não sejam hospitais. Conclusão: Foi possível identificar as características dos motociclistas que foram a óbito, sendo necessário que a partir das informações apresentadas, os gestores do estado realizem medidas de prevenção para este agravio, predominantemente nos grupos mais vulneráveis deste evento.

DESCRIPTORES: Acidentes de Trânsito; Motocicletas; Perfil epidemiológico.

ABSTRACT
Objective: To analyze the factors associated with motorcyclist deaths in the state of Paraná-Brazil, from the year 2017 to 2019. Method: This is an epidemiological, cross-sectional, analytical, and retrospective study on the notifications of cases of deaths of motorcyclists in the state of Paraná. For analysis, simple and relative frequency measures were calculated, subsequently association measures were estimated by means of Odds Ratio. Results: The predominant characteristics of the victims were being white, having 8 or more years of schooling, being unmarried and not dying in hospitals. In contrast, female victims were less likely to die if they had less than 8 years of schooling and if they died in places other than hospitals. Conclusion: It was possible to identify the characteristics of the motorcyclists who died, and it is necessary that, based on the information presented, the state managers carry out prevention measures for this grievance, predominantly in the most vulnerable groups of this event.

DESCRIPTOR: Acidentes, Traffic; Motorcycles; Health Profile.

RESUMEN
Objetivo: Analizar los factores asociados a las muertes de motociclistas en el estado de Paraná-Brasil, desde el año 2017 hasta el 2019. Método: Se trata de un estudio epidemiológico, transversal, analítico y retrospectivo, sobre las notificaciones de casos de muertes de motociclistas en el estado de Paraná. Para el análisis se calcularon medidas de frecuencia simple y relativa, estimándose posteriormente las medidas de asociación mediante Odds Ratio. Resultados: Las características predominantes de las víctimas eran ser de raza blanca, tener 8 o más años de educación, ser soltero y no morir en hospitales. Por otro lado, las víctimas femeninas tenían menos probabilidades de morir cuando tenían menos de ocho años de escolarización y morían en lugares distintos de los hospitales. Conclusión: Ha sido posible identificar las características de los motociclistas que han sido víctimas, por lo que es necesario que, a partir de la información presentada, los gestores del estado tomen medidas de prevención de este problema, principalmente en los grupos más vulnerables de este evento.

DESCRIPTORES: Accidentes de tránsito; Motocicletas; Perfil Epidemiológico.

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1. INTRODUÇÃO

In the middle of the 21st century, our planet still suffers from a serious public health problem, which society of its great damages in ours still does not receive necessary attention, the Traffic Accidents.

The main causes of traffic accidents in the world are linked to the non-use of safety devices in vehicles, drug use and lack of attention when driving transport vehicles. Transport accidents can even mostly be considered predictable and avoidable, when public measures such as adequate road infrastructures are implemented.

According to the World Health Organization (WHO), it is estimated that as a result of traffic accidents, 1.3 million deaths occur and on average leave 20 to 50 million people with sequelae annually worldwide. However, in 49% of the cases with fatalities, the victims are pedestrians, cyclists and motorcyclists, due to the vulnerability faced by these groups that do not have traffic protection, while modern cars have more and more technology for safety.

Regarding traffic victims, motorcyclists stand out, who choose motorcycles as a means of transport, due to financial and time savings through this vehicle, whether or not they use it as a means of locomotion to generate income like motoboy, however, this vehicle can be highly dangerous, and according to DATASUS data, from 2010 to 2019, 118,198 drivers of these vehicles died, with the highest number of cases in the Northeast and then in the Southeast of Brazil.

Despite the great damage already caused by the morbidity and mortality of TA in our society, studies point to an even more tragic future scenario, as TAs have a growing trend following this disease on the planet. Among the causes that caused this phenomenon is the increase in the human population inhabiting urban areas, which will total 70% in the year 2050.

Given the seriousness of the consequences caused by TA, it is necessary to study their characteristics, so that specific measures are created in order to contain them over the years, such as through advanced driver assistance systems, autonomous driving systems and traffic control systems, due to the fact that, on average, 67% of the TA are the result of human errors, being variable according to each population studied.

Therefore, understanding the characteristics of motorcycle victims is essential for the development of more specific measures of intervention, prevention and public policies for this population. In this sense, it is possible that the current lack of knowledge of these victims in the state of Paraná-Brazil reflects the lack of effective measures of education, evaluation and inspection of the same and, consequently, allowing the increase of statistics for collisions and traffic deaths in the following years and decades.

Due to the lack of studies on the mortality of motorcyclists in traffic in the state of Paraná-PR, there was a need to identify the characteristics that determine this condition. In view of this, this study aimed to analyze the factors associated with death of motorcyclists in the state of Paraná-BRAZIL, from 2017 to 2019.

METHOD

This is an epidemiological, analytical, cross-sectional and retrospective study, through the analysis of secondary data, on the notifications of death cases of motorcyclists in the state of Paraná, the period of time analyzed was from the year 2017 to 2019, corresponding to the last 3 years of motorcycle deaths, available in the system,
in order to present a current overview of the profile of deaths.

This type of research was chosen to determine the distribution of deaths, according to the place and its characteristics, and to be able to determine the existence of an association between the variables for deaths from motorcycle accidents. 13

Death data were obtained from the Mortality Information System (MIS), made available by DATASUS. The MIS is a national epidemiological surveillance system, whose objective is to capture mortality data for all instances of the health system. The system’s entry document is the Death Certificate (DC), standardized throughout the national territory. 14

For the selection of deaths, the International Classification of Diseases (ICD) was used, under codes V20 to V29, which refer to deaths with motorcycles. The ICD is the basis for identifying health trends and statistics around the world and contains nearly 55,000 unique codes for injuries, illnesses and causes of death. The document provides a common language that allows healthcare professionals to share healthcare information at a global level. 15

Information was collected on the number of deaths distributed in the 22 health regions of the state of Paraná-Brazil, the sociodemographic variables (gender, age group, color/race, education and marital status) and on the place of death, being presented in categories and later dichotomized to enable the implementation of inferential statistical analyses, when necessary.

The 22 health regions of the state of Paraná were presented, corresponding to all of the state; The gender of the victims was presented as female and male; The age group of the victims was presented as less than 1 year old, 1 to 4 years old, 5 to 9 years old, 10 to 14 years old, 15 to 19 years old, 20 to 29 years old, 30 to 39 years old, 40 to 49 years old, 50 to 59 years old, 60 to 69 years old, 70 to 79 years old, 80 years old and more, being later categorized as 0 to 19 years old, 20 to 59 years old, > 60 years old; Color/race was presented as white, black, yellow, brown, indigenous, being categorized as non-white and white; Schooling was presented as none, 1 to 3 years, 4 to 7 years, 8 to 11 years, 12 years and over, 1 to 8 years, 9 to 11 years, being further categorized into < 8 years of schooling and > 8 years of schooling; The marital status was presented as single, married, widowed, legally separated and other, being categorized as unmarried and married; The place of occurrence was presented as hospital, other health establishment, home, public road and others, being categorized in other places and hospital.

The dependent variables were male and female. The independent variables were the Health Regions (HR), the sociodemographic variables and the place of death.

For analysis, data were tabulated in an Excel spreadsheet and simple and relative frequency measures were calculated. Subsequently, measures of association were estimated using the Odds Ratio and statistical tests were performed using Pearson's Chi-square and Fisher's exact test when frequencies were less than 6 units. For all analyses, a confidence interval of 95% and a significance level of 5% were considered, performed with the aid of Epi-info software version 7.2.3.1.

The research did not require approval from the University Research Ethics Committee, as it is a public domain database, according to Resolution 466/12 of the National Health Council.

RESULTS

2095 death notifications were analyzed, resulting from motorcycle accidents from 2017 to 2019, in the state of Paraná-Brazil. Among the Health Regions (RS), those with the highest number of fatal cases caused by motorcycles were the 2nd RS (20.38%), followed by the 17th RS (9.64%) and the 15th RS (9.12%).

When comparing the risk of accidents between the sexes, there were no statistically significant results (p<0.05). Mortality in women was predominant in the 2nd RS (n=41), 15th RS (n=22) and 17th (n=19). While men died mainly in the 2nd RS (n=386), 17th (n=183) and 15th (n=169). And, the lowest numbers of dea-
ths in women were in the 6th RS (n=1) and 18th RS (n=2), while men had lower rates in the 4th RS (n=19) and 6th RS (n=27).
When analyzing the sociodemographic variables, a predominance of victims between 20 and 59 years of age (82.67%) can be observed, in both genders. When performing the statistical test, it was found that women have a 78% lower chance of being killed by motorcycles, when they are 60 years of age or older (OR= 0.22; CI= 0.07-0.72; p= 0.0103).
Regarding the race/color of the motorcyclists, white victims predominated (78.81%). Regarding education, there was a predominance of victims with > 8 years of schooling (61.19%), when the statistical test was performed, it was observed that women with less than 8 years of schooling are 34% less likely to die in motorcycle accidents compared to men (OR= 0.66; CI= 0.49-0.89; p= 0.0087).
Regarding marital status, there was a predominance of unmarried victims (73.60%), with results that show the same in both sexes (female=9.21%; male=64.39%).
Related to the place of death, most were in other places (55.85%), however, compared to the sexes, women died predominantly in hospitals (6.54%), and were 39% less likely to die in other places (OR=0.61; CI=0.47-0.80; p=0.003).

**DISCUSSION**

In the present study, a predominance of male victims was obtained, and similar results were found in a study carried out in the city of Maringá-PR, in a study car-

<table>
<thead>
<tr>
<th>Variable</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
<th>OR</th>
<th>IC</th>
<th>p</th>
</tr>
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<td>10</td>
<td>38</td>
<td>48</td>
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<td>84</td>
<td>4.01</td>
<td>0.35</td>
<td>0.0380</td>
</tr>
<tr>
<td>4th RS Itaré</td>
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<td>19</td>
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<td>58</td>
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<td>9th RS Foz do Iguaçu</td>
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<td>12th RS Umuarama</td>
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<td>80</td>
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<td>93</td>
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<td>18th RS Cornélio Procópio</td>
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<td>38</td>
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<td>19th RS Jacarezinho</td>
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<td>1.09</td>
<td>0.888</td>
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<td>39</td>
<td>41</td>
<td>1.96</td>
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</tbody>
</table>

*OR= Odds ratio  
**IC= Confidence Interval of 95%  
***p= Descriptive level for Pearson’s Ch-Square Test  
§= Descriptive level for Fisher’s Exact Test  
Table 2 - Sociodemographic variables of deaths from motorcycle accidents in the state of Paraná-Brazil, from 2017 to 2019.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Female</th>
<th></th>
<th>Male</th>
<th></th>
<th>Total</th>
<th></th>
<th>OR</th>
<th>IC</th>
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<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
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<td>Age group</td>
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<td></td>
<td></td>
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<tr>
<td>0 to 19 years</td>
<td>33</td>
<td>1,58</td>
<td>234</td>
<td>11,17</td>
<td>267</td>
<td>12,74</td>
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<td>(0,70-1,54)</td>
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<td>20 to 59 years</td>
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<td>1518</td>
<td>72,46</td>
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<td>(0,88-1,85)</td>
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<td>&gt; 60 years</td>
<td>3</td>
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<td>93</td>
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<td>96</td>
<td>4,58</td>
<td>0,22</td>
<td>(0,07-0,72)</td>
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<td>Color/race</td>
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<td></td>
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<tr>
<td>Not White</td>
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<td>380</td>
<td>18,14</td>
<td>423</td>
<td>20,19</td>
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<td>(0,56-1,13)</td>
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<td>White</td>
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<td>Ignored</td>
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<td>19</td>
<td>0,91</td>
<td>21</td>
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<tr>
<td>&lt; 8 years of study</td>
<td>68</td>
<td>3,25</td>
<td>663</td>
<td>31,65</td>
<td>731</td>
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<td>(0,49-0,89)</td>
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<tr>
<td>&gt; 8 years of study</td>
<td>171</td>
<td>8,16</td>
<td>1,111</td>
<td>53,03</td>
<td>1282</td>
<td>61,19</td>
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</tr>
<tr>
<td>Ignored</td>
<td>11</td>
<td>0,53</td>
<td>71</td>
<td>3,39</td>
<td>82</td>
<td>3,91</td>
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<td>Marital Status</td>
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<td>Not married</td>
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<td>(0,49-0,89)</td>
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<td>8,16</td>
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<td>53,03</td>
<td>1282</td>
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<td>Place of occurrence</td>
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<td>1,170</td>
<td>55,85</td>
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<td>(0,47-0,80)</td>
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<td>Hospital</td>
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<td>788</td>
<td>37,61</td>
<td>925</td>
<td>44,15</td>
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</table>

Source: DATASUS, 2022.

ried out in the state of Alagoas and in a study carried out in the Federal District. Among the factors that cause the largest number of male victims is related to the greater aggressiveness of these drivers and early contact with motorcycles by these users, who drive this type of vehicle even before reaching the mandatory age of 18 years. Other factors that may explain this discrepancy between the sexes are that men use this type of vehicle more, and women are more aware of driving motorcycles.

Another predominant characteristic of the victims was white race/color, with opposite results being obtained in a study in the state of Bahia that evaluated the profile of victims hospitalized and in a study carried out with data from assistance to accident involving motorcyclists, in the Federal District and in 24 Brazilian capitals. Regarding the predominance of higher education of the victims, there were similar results, however, opposite results in a study carried out in a hospital in the city of Imperatriz-MA. The higher level of education among the victims in the study can be explained by the fact that most victims are white and adults. According to the Brazilian Yearbook of Basic Education, in the state of Paraná, the population aged 20 to 29 years of age white in 2020 had an average of 12.5 years of study, in addition, for every 100 young people, 69 manage to complete high school by the age of 19 in the state.

Unmarried victims were more susceptible to accidents, with greater exposure at night, in public environments and greater drug consumption. While married people tend to spend a greater proportion of their time at home and at work, exposing themselves less to the risk of accidents.

Among the victims of traffic accidents, the female sex deserves to be highlighted, due to several factors, among them due to their physical and behavioral characteristics, which make them more vulnerable in multiple aspects, to the great damage produced in society with its morbidity and mortality as a result of accidents, since these women are often providers and caregivers of their families.

As for the relationship of the highest proportion of female victims dying in hospitals, it may be related to safe motorcycle driving practices, such as the proper use of safety equipment such as a helmet, preventing death from occurring immediately at the scene of the accident in cases of serious collisions.

Regarding the ignored data from the research, training on the correct completion of the Death Certificate should be
carried out for the health professionals who perform it, in order to make them aware of its importance for the population, as it is through it that data are supplied to the MIS, informing the population in quantitative terms about the deaths present in our society." 

CONCLUSION

From the present study, it was possible to identify the characteristics of motorcyclists who died in the state of Paraná, during the period studied, and it was found that the main characteristics of the victims were being white, having eight or more years of schooling, not being married and not dying in hospitals. On the other hand, female victims were less likely to die when they have less than eight years of schooling and to die in places other than hospitals.

In view of this information presented, it is necessary for state managers to carry out preventive measures for this disease, predominantly in the most vulnerable groups of this event, preventing the growth of the number of victims from these accidents, due to the serious consequences suffered in society.

In our society, it should also be encouraged to carry out studies in the area of health, with the objectives of promoting, preventing and recovering victims, in order to reduce the consequences of traffic accidents, from specific measures, because only through such measures will it guarantee the reduction of the number of victims and generate lower expenses for the government, allowing a better quality of life for the population.

In the study, the main limitation was the disarticulation of the systems that record traffic accidents, causing the results to deviate from the real dimension of the accidents that occurred and, consequently, showing only a vestige of the serious problem present in our population.

REFERENCES


