



Original Article

Profile of Motorcycle Victims from the Emergency Service of a University Hospital

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ABSTRACT

Objective: Epidemiological survey of motorcycle accidents occurring in a city with over one million inhabitants and treated at university hospital of reference between the months of July and November 2010. **Methods:** Cross sectional study using structured interview (standardized form) to document the data collection: age, gender, income, using time and capacity of the motorcycle. **Results:** From 114 cases, it was observed that the profile of the victim of motorcycle accident treated at this hospital is a young person, male, possessing a driver's license for less than five years, with a monthly income average around one thousand reais (local currency), owner of a motorcycle with low capacity (less than 150 cc) and low educational attainment. The accidents occurred predominantly in the urban area, in the afternoons and one third of them were considered work-related accidents, death generated in 3 per cent of cases and open fractures in 11 per cent of them. **Conclusion:** The incidence of motorcycle accidents involved mainly young men with little experience in traffic and low level of education.

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Introduction

Road transportation systems have become a crucial aspect of modernity and have revolutionized contemporary social relations and economic systems. However, road transportation is increasingly associated with traffic accidents and premature death, as well as with physical and psychological impairment of those who suffer an accident. Losses are not limited to a reduction in work productivity or to physical trauma that affects victims' lives. In addition, costs associated with health services and tax increases to publicly finance these services are also important issues.

In developing countries, rapid and unplanned urbanization aggravates the situation. Because of the lack of appropriate infrastructure and regulatory framework in cities, there has been an exponential increase in the number of traffic accidents, which is even more worrisome. Statistics indicate that 30,000 people die annually in traffic accidents in Brazil; of these deaths, 44% of the victims are aged between 20 and 39 years, and 82% are men.¹

As in other Latin American countries, there is an increasing urgency to curb this trend in Brazil. The government has exerted immense efforts to develop and implement road safety education campaigns. In this context, Brazil has a traffic code that has resulted in 5,000 fewer traffic-related deaths per year.¹

However, due to the increasing number of motorcycle accidents in the country, especially in urban centers, a need exists for studies that focus on the epidemiological profile of those individuals who had such accidents to provide better emergency service and to help the government apply effective educational and inspection measures.

According to the Departamento de Informática do Sistema Único de Saúde (the Computer Department of the Brazilian Unified Health System), Datasus, traffic accidents are the sixth leading cause of hospital stays and second leading cause of general death in Brazil, generating a cost of approximately R\$ 5 billion per year.

This study aimed to identify the profile of motorcycle accident victims who were treated at a reference trauma center between July and November 2010 in a city of one million inhabitants.

Methods

A cross-sectional study was conducted in a regional reference emergency center of a university hospital that treats motorcycle accident victims in a city of approximately one million inhabitants.

The sample included 114 victims who were treated from July to November 2010.

Motorcycle operators and passengers who were victims of accidents and were treated in the emergency center during this period were included in the study. Patients with other injuries caused by motorcycles, but not involving traffic accidents, such as accidental burns or falls off motorcycles when not moving, were not included in the study.

Personal data were collected prospectively and consecutively from patients or their relatives using a standardized form, and data were stored and statistically analyzed. The medical and nursing team in charge of treating the victims provided information to the researchers about the victims' admittance to the hospital.

The following variables were analyzed: age, sex, monthly income, educational level, experience with motorcycles, motorcycle cylinder capacity, and circumstances of the accidents, including work accidents.

This study was previously approved by the Research Ethics Committee of the institution mentioned (Protocol no. 946/10).

Results

The survey showed that most of the 114 accident victims were young, having a mean age of 28 years and ranging from 13 to 69 years; 103 (90.3%) were male, 11 were female, and the average time for having a driver's license was 4.5 years.

Regarding educational level, 57.8% of the accident victims completed only a middle school education (14% did not complete middle school). Concerning the accident circumstances, 31% (35 events) accidents were characterized as work-related (accident took place while the victim was going to work or when he/she was working). Average monthly income of the victims was R\$ 1,008.00.

After initial treatment, 26.3% of the victims needed to stay in the hospital, 43.8% were discharged, 2.6% died, and 24.5% were sent to the orthopedics ambulatory center for follow-up. Regarding the diagnoses, 47.3% suffered some type of fracture, 24% of which were open fractures. Of the open fractures, 93% occurred in the lower extremities (93%), which represented 11.4% of all patients treated. Deaths were primarily caused by neurological trauma and visceral lesions in patients who entered the emergency room mainly at night (66%). Most of the motorcycles involved in these accidents (81.5%) had capacities of 150 cc or less.

Most of the accidents occurred on Friday, followed by Sunday and Monday (Fig. 1). Most accidents occurred in the afternoon

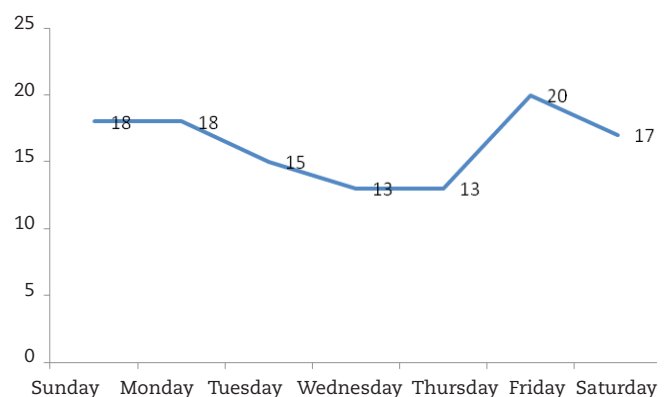


Fig. 1 – Number of accidents, broken down by day of the week.

(56 occurrences). Thirty-nine cases were registered as occurring at night, followed by 29 accidents during the morning.

The Emergency Room of the Orthopedics and Traumatology Service was the place of the first treatment for 60% of the victims, and 40% of them were admitted to the emergency area of the hospital. In 97% of cases, the accident occurred within the city's urban area.

Causes of accidents were as follows: 55.2% of the cases were collisions with another vehicle, 38.6% were motorcycle falls, 5.2% were due to running over, and 0.8% were of unknown cause.

Discussion

An epidemiological study in the analyzed region indicated that between 1995 and 2000, there was a 209% increase in the number of deaths in traffic accidents involving motorcycles. The increase of vehicles registered in the city cannot completely explain this drastic increase in deaths among motorcycle operators and passengers. More research aimed at determining the reasons and circumstances of these occurrences is needed.

According to the World Health Organization,⁴ motorcycle operators are 34% more likely to die in traffic accidents than drivers of other vehicles, and they present one of the highest traffic-related death rates in the world and are eight times more likely to become injured in these situations.¹ The risk of trauma and possibly death has been associated with the driver's young age. These data are supported by our research, which found that patients who were involved in motorcycle accidents had a mean age of 28 years, and of these patients, 53.5% had moderate to severe lesions that required specific orthopedic treatment (hospital stay or ambulatory follow-up).

A study from the University of Padova,⁵ Italy, showed that more driving experience led to less risky situations faced by drivers. Our study corroborated these results, as the average time with a motorcycle license was 4.5 years. The prevalence of accidents within the city (97%), with 31% considered to be occupational (work-related) incidents, shows that drivers are more likely to be involved in accidents when they are within an urban area and are not working. Low cylinder capacity of the motorcycles may be related to the driver's low income, to the ease with which the vehicle can be purchased and to the apparent ease with which drivers can navigate around traffic jams in Brazil.

An epidemiological study about motorcycle accidents in the city of São Paulo reported 166 deaths; 64 (38.5%) victims died at the scene of the accident, 7 (4.2%) died on the way to the hospital, and 95 (57.2%) died at the hospital. Regarding survival time, immediate deaths and those that took place within 24 hours of the accident were due to skull fracture, internal trauma, and neck or trunk fracture. These patients often experienced multiple traumas, with an average of four lesions per dead patient.^{6,7}

Our research showed evidence of a predominance of lesions on the extremities, with 24% of the fractures classified as open fractures; of those open fractures, 93% were located on the lower extremities. Almost half of the injured victims

suffered fractures (47.3%), showing high morbidity in motorcycle accidents. The vulnerability of the motorcycle user is evident because this type of vehicle does not offer the same protection as a four-wheel vehicle. During a collision, the motorcycle driver absorbs all of the energy generated by impact with the road, other objects or other vehicles. Consequently, accidents frequently cause severe lesions and sometimes severe multiple traumas and death. In our study, the causes of deaths were similar to those reported in the study conducted in São Paulo: traumatic brain injuries and internal traumas; furthermore, the average age of patients who died was 23 years and 4 months, and all of the victims who died were male. Altogether, these findings reveal that this group (economically active young men with low educational attainment) is more prone to be involved in motorcycle accidents that result in death.

According to the *Institute of Injury Prevention and Control* in Taiwan,⁸ laws that mandate the use of helmets and that enforce legal limits on blood alcohol concentration and speed limits in traffic are effective in reducing deaths.

A survey conducted by Hospital de Clínicas at USP in Ribeirão Preto⁹ showed that from 1 p.m. to 6 p.m., victims involved in motorcycle accidents who are admitted to the hospital generally have trauma, especially during weekends. At dawn, however, the cases are more complex. Similar to these findings, in the present study, we found that most accidents occurred in the afternoon (49.1%), predominantly on Friday. Of the three deaths that we studied, two occurred at night.

Motorcycle accidents are a known risk. A better understanding of this risk as well as the profile of those injured allows us to develop strategies to make decisions and implement actions to decrease the number and severity of accidents. Traffic management and operational authorities, as well as healthcare professionals, are the primary individuals in charge of implementing these changes.

In this study, the profile of a patient involved in a motorcycle accident is as follows: young male, low educational attainment, holder of a driver's license for less than five years, average monthly income of one thousand reais per month and using a motorcycle with low cylinder capacity. The accidents occurred mainly in urban areas in the afternoon, and one third of the accidents were work-related. Deaths occurred in 2.6% of cases, and open fractures occurred in 11% of cases.

Conclusion

Over the period of time investigated in this study, motorcycle accidents involved predominantly young men with little driving experience and low educational attainment.

Conflict of Interest

The authors have no conflict of interest to declare associated with this paper.

R E F E R E N C E S

1. Peden M., editor. Informe mundial sobre prevención de los traumatismos causados por el tránsito: resumen. Organización Mundial de La Salud: Ginebra; 2004.
2. Brasil. Ministério da Saúde. Datasus. Disponível em <http://www.datasus.gov.br> (Access on Nov 21st, 2011).
3. Queiroz MS, Oliveira, PCP. Acidentes de trânsito: uma visão qualitativa no município de Campinas, São Paulo, Brasil. Cad Saúde Pública. 2002;18(5):1179-87.
4. Peden MM. World report on road traffic injury prevention. Geneva: World Health Organization; 2004.
5. Vidotto G, Bastianelli A, Spoto A, Sergeys F. Enhancing hazard avoidance in teen-novice riders. Accid Anal Prev. 2011;43(1):247-52.
6. Koizumi MS. Padrão das lesões nas vítimas de acidentes de motocicleta. Rev Saude Publica. 1992;26(5):306-15.
7. Koizumi MS. Aspectos epidemiológicos dos acidentes de motocicleta no Município de São Paulo, 1982 [thesis]. São Paulo: Faculdade de Saúde Pública da USP; 1984.
8. Lin MR, Kraus JF. A review of risk factors and patterns of motorcycle injuries. Accid Anal Prev. 2009;41(4):710-22.
9. Perigo em duas rodas. Agência Fapesp. Disponível em: <http://agencia.fapesp.br/12443>. (Access on Aug 10th, 2010).