ISSN: 2230-9926

Available online at http://www.journalijdr.com

IJDR

International Journal of Development Research
Vol. 11, Issue, 01, pp. 43439-43442, January, 2021
https://doi.org/10.37118/ijdr.20702.01.2021

RESEARCH ARTICLE OPEN ACCESS

PERFIL DOS ACIDENTES MOTOCICLÍSTICOS ATENDIDOS EM HOSPITAL DA REGIÃO SUL DE SÃO PAULO

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ARTICLE INFO

Article History:
Received 17th October, 2020
Received in revised form
29th November, 2020
Accepted 01st December, 2020
Published online 30th January, 2021

Key Words:
Accidents, traffic; Motorcycles; Risk factors.

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ABSTRACT

Objective: To identify the main causes of motorcycle accidents in the Southern Region of São Paulo. **Methods:** An observational and cross-sectional study, conducted from May to August 2017, applying a questionnaire to 115 motorcyclists and simultaneously analyzing the results with data from the Traffic Engineering Company. **Results:** In this study, 93.9% of the victims were men, of these 47% were between 20-29 years old, 91.3% wore a helmet, 76.5% were accompanied and 52.2% were in motorway lanes. It has been identified alcohol consumption by 18.3%, increased speed by 17.4%, and 14.8% of patients interviewed declared to have slept behind the wheel. The total of 13% patients assumed themselves to be the cause of accident and 3.5% of reckless driving. Car crashes at 64.3%, with 13.9% of accidents occurring at the early hours of Sunday, with lower limb fractures in 68.7% of patients and 63.5% on the right side. **Conclusion:** We concluded that driving a motorcycle accompanied and also while in the motorway lane are important risk factors for an accident to occur.

Citation: ***Ricardo Moutte de Freitas, Lucas Mascarenhas de Carvalho, Edgard dos Santos Pereira, Neil Ferreira Novo Yara Juliano and Jane de Eston Armond. 2021.*** "Perfil dos acidentes motociclísticos atendidos em hospital da região sul de são paulo", *International Journal of Development Research*, 11, (01), 43439-43442.

INTRODUCTION

Traffic accidents continue to be very frequent in emergency services in the Unified Health System hospitals. Some work on the subject has already been done in universities and hospital centers in the country, but none specifically about the Southern Region of the city of São Paulo, a place of great concentration of this accident, where is established the General Hospital(GH) a reputable hospital for this type of service. In 2014, a study by the Traffic Engineering Company (CET) revealed that the Southern Region is the place with the highest number of traffic accidents in São Paulo. This study also revealed that between twenty-five roads with a high number of accidents, many have as reference the GH. Another study conducted between January and May 2015, by the Mobile Emergency Care Service, confirmed the previous data, also indicating the Southern Region as the place with the highest concentration of traffic accidents.[1,2] Among traffic accidents, motorcyclists reveal some peculiarities, both because they have some specific traffic laws, being able to circulate in the middle of the motorway lanes, as well as the great exposure they present during an accident.[3,4] Therefore, this study is justified by the concern with the increasing number of motorcycle accidents victims. This event requires more information about the population involved, the accident circumstances and the associated risk factors. In order to substantiate the decision-making of the authorities for traffic-related problems, in order to minimize the frequency of accidents and their drastic consequences. Therefore, the objective of this study is to identify the main causes of motorcycle accidents in the Southern Region of São Paulo, with victims being treated at a reputable and a teaching hospital.

MATERIALS AND METHODS

From May to August 2017, a descriptive and analytical observational and cross-sectional study was conducted, applying a questionnaire to patients admitted at the GH Orthopedics Ward, a reputable hospital in the region for traffic

accidents. Therefore, 115 patients who agreed to participate were interviewed, initially signing the Terms of Consent, and soon after answering the questionnaire about the accident in which they were involved. Patients, who for some reason had difficulty answering questions or understanding the purpose of it, were excluded from the study. The results were analyzed and cross-checked with data provided by CET. Also, Cochran's G test was applied to compare the simultaneous presence of safety equipment and traffic conditions.[5]

RESULTS

From the 115 patients interviewed, 108 (93.9%) were male and seven (6.1%) female. Regarding age, five of them (4.3%) were under twenty years old, 54 (47%) had from twenty to twenty-nine years old, 31 (27%) from thirty to thirty-nine years old, and 25 (21.7%) were above forty years old.

their educational studies but didn't complete it. No motorcyclists with higher education or any completed technical course were identified. It was also observed that the highest frequency of accidents 64.3%, occurred between a motorcycle and a car, and secondly, accidents between two motorcycles with 13.9%, followed by pedestrian accidents with 4.4%, and truck accidents with 3.5%. Accidents involving other vehicles or under distinct circumstances, add up to the remaining 13.9%. Concerning the weekday and time of the accident, it was found that Mondays had 12.2% of occurrences, Tuesdays 8.7%, Wednesdays 6.1%, Thursdays 9.6%, Fridays 25.2%, Saturdays 30.4%, and Sundays with 7.8%. Regarding the schedule, 6.1% occurred in the morning, 13.9% in the afternoon, 47.8% at night and 32.2% during the night. The highest frequency of accidents was in the early hours of Saturday to Sunday with 16 (13.9%) occurrences, followed by Friday night with 15 (13%), and on Saturday nights with 14 (12.2%).

Table 1. Presence or absence of equipment or circumstances at the time of the accident

Answers	The victim was accompanied	Helmet use	Onmotorw aylanes	Alcoholcon sumption	The victimwassleepy	High speed	Recklessdrivi ng	Causedacci dent
Yes	*88*	*105*	*60*	*21*	*17*	*20*	*4*	*15*
%	*76.5*	*91.3*	*52.2*	*18.3*	*14.8*	*17.4*	*3.5*	*13*

Cochran's G test was applied with G = 54.45 (p <0.0001), for better analysis of results.

Tabela 2. Drivers gender and age, studies found in the literature used for comparison

Author	Location	Date	Males	Age
Montenegro et al[4]	Distrito Federal	1996 - 2007	94.3%	20 - 29 years (49.5%)
Rezende Neta et al[6]	Teresina - PI	2009	76.13%	21 - 30 years (40%)
Schoeller et al[7]	Santa Catarina	2000 - 2010	81.59%	No data
Felix et al[8]	Sinop - MT	2012	61.3%	22 - 28 years (28.7%)
Barbosa et al[9]	Sousa - PB	2010	73.5%	21 - 30 years (32.8%)
Tavares et al[10]	Aracajú - SE	2006	82.7%	No data
Sado et el[11]	Goiânia - GO	2007	91%	19 - 30 years (54.9%)
Oliveira et al[12]	Maringá - PR	1999	86.57%	23 - 32 years (37.31%)
CEInfo[13]	São Paulo - SP	2011	94.91%	20 - 29 years (49%)
Gomes et al[14]	Teresina - PI	2010	88.4%	15 - 24 years (47.7%)
Santos et al[15]	Teresina - PI	2006	85.81%	15 - 24% years (36.05%)
Legay et al[16]	Rio Branco - AC, Vitória - ES and Palmas -TO	2007	79.3%	20 - 24 years (28.4%)
Koizumi et al[17]	São Paulo - SP	1982	79.99%	15 - 24 years (52.77%)
Miki et al[18]	São Paulo - SP	2008 - 2009	85%	Averageof 30 years

Table 3. Alcohol consumption or not, studies found in the literature used for comparison

Author	Location	Date	Alcohol%
Rezende Neta et al[6]	Teresina - PI	2009	12%
Barbosa et al[9]	Sousa - PB	2010	28.6%
Tavares et al[10]	Aracajú - SE	2006	14.6%
Santos et al[15]	Teresina - PI	2006	32.8%
Legay et al[16]	Rio Branco - AC, Vitória - ES and Palmas -TO	2007	18.1%

Table 4. Accident collision types, studies found in the literature used for comparison

Author	Location	Date	Vehicle
Montenegro et al[4]	*Distrito Federal*	*1996 - 2007*	*Car 39.7%*
Rezende Neta et al[6]	*Teresina - PI*	*2009*	*Falls 58% andCars 23%*
Barbosa et al[9]	*Sousa - PB*	*2010*	*Motorcycle 41.2%*
Miki et al[18]	*São Paulo - SP*	*2008 - 2009*	*Cars 45.4% andMotorcycle 43.3%*

Also, in this study, many professional occupations have been observed, highlighting the fact that 24 (20.9%) motorcyclists were unemployed. Their level of education was also verified of these, two patients (1.7%) didn't finish Elementary School I, and two (1.7%) have; 14 of them (12.2%) didn't finish Elementary School II, and 41 (35.7%) have; 24 (20.9%) didn't graduate from High School and 27 (23.5%) have. Regarding graduating in College, five (4.3%) patients declared to start

Lower limb fractures were more frequent in 68.7% of cases and upper limb fractures with 31.3%. No patients with spinal or hip fractures were observed. The most affected was the right side with 63.5% of occurrences and the left with the remaining 36.5%. The most common fractures was the tibial shaft with 27 (23.5%) occurrences, followed by the femoral with 22 (19.1%), and eight (7%) with ankle fractures. From the 115 interviewed, only 18 (15.7%) declared that the

Table 6. Fracture location, studies found in the literature used for comparison

Author	Location	Date	Frature location
Rezende Neta et al[6]	*Teresina – PI*	*2009*	*MMII 36% and MMSS 23%*
Barbosa et al[9]	*Sousa – PB*	*2010*	*Head 43%, MMII 38.6% and MMSS 25.6%*
Tavares et al[10]	*Aracajú - SE*	*2006*	*MMII 39.89% and MMSS 38.96%*
Sado et el[11]	*Goiânia - GO*	*2007*	*MMII 67.3% and MMSS 23.5%*
Oliveira et al[12]	*Maringá - PR*	*1999*	*MMII 59.7%*
Miki et al[18]	*São Paulo - SP*	*2008 - 2009*	*MMII 75.5% and MMSS 24.5%*

accident occurred during work, and 97 (84.3%) during a non-work related period. Regarding work permits, 17 (14.8%) patients stated that they were registered, and 98 (85.2%) declared they were not. From the total of injured, nine (7.8%) stated they received payment after deliveries and 106 (92.2%) did not. Only 12 motorcyclists interviewed, knew how many deliveries they made daily, the average estimated was 17.3 per day. Regarding the hours worked, only 13 patients declared the amount of hours they actually worked per day, with an average of 8.2 hours. And lastly, only 17 motorcyclists declared to be coming or going from delivery, in this case, ten (58.8%) reported being on their way to make a delivery and the remaining seven (41.2%) returning from it.

DISCUSSION

As for the sex and age of motorcyclists, Table 2[4-18] shows all the studies in the literature. The study reveals that most of the drivers were male (93.9%), between 20 and 29 years old (47%). Data according to the literature, reinforce the higher risk among young men and the need for prevention in this group. Regarding their professional occupations, many were mentioned but with none standing out above others, highlighting only a high rate of unemployed (20.9%). None of the studies conducted presents data on the injured occupations. Analyzing the motorcyclists' level of education, it appears that most interviewed didn't even start high school (51.3%), and none have completed a higher education or any technical course. Result also verified in Gomes et al.[14] research, carried out in Teresina-PI, in 2010, and Santos et al.[15] in Teresina-PI, in 2006. In this way, it can be affirmed that the level of education is very low for patients who need this type of treatment in a public hospital. Initially, Table 1 reveals eight circumstances related to the driver´s condition at the time of the accident or to the accident itself, and their results are individually discussed below. The first circumstance reveals if the driver was alone or accompanied at the time of the accident. From the 115 motorcyclists interviewed, 88 (76.5%) declared to be accompanied, therefore, more than 3/4 of the specimen. The remaining 27 (23.5%) declared they were alone. This may be one of the most remarkable results of this study since usually, the majority of motorcyclists' drives without being accompanied by another person. Therefore, some questions arise from this data. Does being accompanied increase the possibility of an accident? Does the companion weight make driving more difficult? Could the companion's behavior be related to the increase of accidents? Are motorcyclists more accompanied on weekends, when these accidents are more frequent? There is no data in the literature regarding whether or not a motorcyclist was accompanied and, therefore, whether if this is a risk factor for the traffic accident occurrence. The high result of this question reveals an important risk factor for these accidents and the need for better understanding due to its high prevalence. The second circumstance reveals whether or not motorcyclists wore helmets at the moment of collision.

From the total interviewed, 105 (91.3%) claimed to use it and only 10 (8.7%) did not. Similar results to those found in the studies performed by Rezende Neta et al.[6] in Teresina-PI, in 2009, Tavares et al.[10] in Aracajú - SE, in 2006 and Gomes et al.[14] in Teresina-PI, in 2010. Despite the high percentage of motorcyclists wearing a helmet at the time of the accident, there are still drivers who don't use it even knowing its importance in relation to their safety. The third circumstance reveals the accident´s exact location. From 115 occurrences, 60 (52.2%) drivers declared to be in the motorway lane, and 55 (47.8%) were not, this implies that more than half were in the motorway lane at the time of the accident. The issue initially raised by us is believed to be a more vulnerable place for an accident to occur, and no work in the literature researched this matter. Therefore, once again, the importance of investigating this aspect, since studies show the high prevalence among injured and also, remembering the fact that initially, before being declined by the Executive Power, the new 1998 Brazilian Traffic Code, prohibited the presence of motorcycles in this area due to the greatest danger of an accident.[3,4] The fourth circumstance reveals alcohol consumption or not by the driver. Its use was confirmed by 21 (18.3%) of the motorcyclists, while 94 (81.7%) declared they did not. This result is in agreement with other studies presented below in Table 3,[6,9,10,15,16]unfortunately, alcohol proves to be still an important risk factor for traffic accidents. The fifth circumstance reveals whether the patient was sleepy during the accident. In 17 (14.8%) cases sleepiness was reported and in 98 (85.2%) it was not mentioned. This result is very significant because most accidents happen in the evenings and late nights on weekends. No literature study has researched this matter.

The sixth circumstance reveals whether the patient was within or above the permitted speed limit. According to responses, 20 (17.4%) patients declared to be above the permitted speed limit, and 95 (82.6%) claimed to be driving within the allowed range. No studies were found with data on the speed of drivers at the time of the accident, failing to correlate with the results of this study. The seventh circumstance reveals whether the driver was being reckless or not at the time of the accident. From the total interviewed, only 4 (3.5%) drivers accused themselves as reckless and 111 (96.5%) declared they were not. No studies in the literature were found discussing this matter. Lastly, the eighth circumstance reveals whether the patient considers himself to be the cause or victim of the accident. From the total interviewed, 15 (13%) motorcyclists declared to consider themselves as being the cause of the accident and 100 (87%) as victims. There are no studies in the literature evaluating the driver´s culpability. Regarding the vehicles involved the highest frequency was cars (64.3%), followed by other motorcycles (13.9%), pedestrians (4.4%) and trucks (3.5%). None of the patients interviewed mentioned an accident against cyclists. Accidents involving other types of transport vehicles or that happened differently from the possibilities raised in the questionnaire have been responsible

for other incidents (13.9%). These data are following the literature, as can be observed below in Table 4.[4,6,9,18] Regarding the time and day of the week, it was found that motorcycle accidents occur in higher numbers on Saturdays (30.4%) and Fridays (25.2%), especially at night time (47.8%), and early hours (32.2%). The most frequent periods were in the early hours of Saturday to Sunday (13.9%), followed by Friday night (13%), and Saturday night (12.2%). The studies assessed also validate this result with the vast majority of accidents, occurring more frequently at night times and on Sundays, as revealed below in Table 5.[4,5,9,10,13,15,17] There was a predominance of lower limb fractures (68.7%), mainly affecting the right side (63.5%). The tibial shaft fracture was the most frequent (23.5%), followed by the femoral (19.1%), and ankle (7%) fractures. We found six studies with data on fracture location, but difficult to correlate due to the structural difference among hospitals. For example, hospitals with neuro or spine surgery services, also had patients with head and spine trauma. However, there is a higher prevalence of the lower limb in relation to the upper limb, as revealed below in Table 6.[6,9,10,11,12,18] Concerning their professional occupations, most declared that the accident did not occur during their work period (84.3%), and also many motorcyclists were not registered (85.2%), and didn't even receive payment after deliveries (92.2%). Only a few of the interviewed were able to answer how many deliveries they made per day, the number of hours worked, or whether they were going or coming back from delivery, therefore, making these data inconclusive. Only Sadoet al.[11] research, carried out in Goiânia- GO, in 2007, discussed this aspect, revealing that accidents occurred at leisure times with 79.5%, and during work with only 12.3%. The study performed by Sexton et al.[19], presents other aspects that may also relate to motorcycle accidents, such as the driver's experience, the motorcycle´s engine type, the mileage at the time of the accident, and whether if the driver in the previous year have driven or if they kept the motorcycle unused. These aspects were not evaluated in this study. Lastly, after analyzing all results we can say that the study confirms much of the data already presented in the literature. However, two of these turned out to be very high and may, therefore, be directly linked to the causality of accidents. The number of accidents in which motorcyclists were accompanied is very significant, as well as the number of accidents that occurred in motorway lanes.

Conclusion: Driving a motorcycle while being accompanied or in the corridors between lanes were the main risk factors observed in this research, mainly because there are no laws or preventive actions for these aspects, being the responsible causes for most motorcycle accidents in this region. The research performed also recognized that these accidents affect a larger number of young, low-educated men, being more frequent at night and in an hourly hour on weekends, having limited relations with work duties.

Conflitct of Interest: The authors declare that there are no conflicts of interests.

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