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Federal University of Rio de Janeiro State

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## RESEARCH

### Acidentes de trajeto com motocicletas entre trabalhadores de uma indústria têxtil

Road accidents with motorcycles among workers of a textile industry

Accidentes in itinere envolvendo motocicletas entre los trabajadores de una industria textil

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#### ABSTRACT

**Objective:** To identify the profile of victims of road accidents with involvement of motorcycles among workers of a textile industry in the Rio Grande do Norte State. **Method:** This is a cross-sectional and descriptive study, with data collected from medical records and registrations from the company itself in the period from 2008 to 2009. **Results:** It has unveiled 81 cases of accidents with workers involving motorcycles, of which 62% were males, with higher incidence between 22 and 25 years; 69% needed removal equal to or less than 15 days; when the removal time was greater than 15 days, the average was 274,3 days; 71% suffered injuries on the lower and upper limbs. **Conclusion:** The recognition of these characteristics is useful to subsidize strategies for preventing motorcycle accidents and improving the reference emergency service. **Descriptors:** Accidents occupational, Accidents traffic, Textile industry.

#### RESUMO

**Objetivo:** Identificar o perfil das vítimas de acidentes de trajeto com envolvimento de motocicletas entre trabalhadores de uma indústria têxtil do Rio Grande do Norte. **Método:** Estudo transversal, descritivo, com dados coletados nos prontuários e registros da própria indústria no período de 2008 a 2009. **Resultados:** 81 casos de acidentes com trabalhadores envolvendo motocicletas, dos quais 62% eram do sexo masculino, com maior incidência entre 22 e 25 anos; 69% necessitaram de afastamento igual ou inferior a 15 dias; quando o afastamento foi superior a 15 dias, a média foi de 274,3 dias; 71% sofreram lesões em membros inferiores e superiores. **Conclusão:** O reconhecimento dessas características é útil para subsidiar estratégias de prevenção dos acidentes de motos e o aprimoramento do serviço de referência em emergência. **Descritores:** Acidentes de trabalho, Acidentes de trânsito, Indústria têxtil.

#### RESUMEN

**Objetivo:** Identificar el perfil de las víctimas de accidentes *in itinere* con envolvimento de motocicletas entre trabajadores de una industria textil en el Estado de Rio Grande do Norte. **Métodos:** Estudio descriptivo, transversal, con datos recogidos en archivos médicos y registros de la propia industria en el período comprendido entre 2008 y 2009. **Resultados:** 81 casos de accidentes con trabajadores envolvendo motocicletas, de los cuales 62% eran hombres, con mayor incidencia entre 22 y 25 años; 69% necesitaron de alejamiento igual o inferior a 15 días; Cuando el alejamiento fue mayor que 15 días, el promedio fue de 274,3 días; 71% han sufrido lesiones en los miembros inferiores y superiores. **Conclusión:** El reconocimiento de estas características es útil para respaldar estrategias de prevención de accidentes de motocicletas y la optimización del servicio de referencia en emergencia. **Descriptor:** Accidentes de trabajo, Accidentes de tráfico, Industria textil.

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## INTRODUCTION

**O**ccupational accident (OA) is the one that occurs by means of the exercise of work for a company, which causes bodily or functional dysfunction and that might result in death or loss/decreased capacity for working activities, whether it is permanent or temporary.<sup>1</sup>

Brazil has the highest rates of lethality and mortality due to OA, when compared with other Latin American countries. Among the OA occurrences, it should be highlighted the road accidents, which account for an annual loss of 105 million reais with traffic-related accidents, whether through production loss, medical and legal costs, social security, material losses, insurance expenses, costs involving medical emergencies and rescues, among others.<sup>2</sup> In addition to these, the costs unable of being measured are also present, which are represented by the pain and suffering of the victims of these events and their family members, who occasionally need to fight against prejudice and exclusion by society, due to the fact that they became unproductive for the labor market.

Traffic accidents constitute a big problem for public health in Brazil, with a strong impact on the rates of morbidity and mortality of the population, since the Brazilian transportation system prioritizes the highways and the use of private cars, without providing adequate infrastructure and due to having few resources for dealing with traffic violations and rules, especially when they involve motorcycle accidents.<sup>3</sup>

Motorcyclists have prominence among the victims of accidents in the country, since the use of these motorized vehicles as means of transportation and work has been increasing in a fast and considerable manner.<sup>3-4</sup> This is because motorcycle is a small and agile type of vehicle, which allows circumvent the heavy traffic of cities, and is found at affordable prices, including with easiness of low-interest financing.

Motorcycle accidents increased and continue to increase at a large scale, because, every day, the streets are overcrowded, the recklessness in traffic has been strengthened, associated with the use and abuse of licit and illicit drugs, which is a factor that has worsened the current scenario and contributed to increased statistical indexes. In Brazil, these indexes have grown by approximately 35%, rising from 121.849 in 2003 to 164.522 accidents involving victims in 2005, thereby also increasing the number of deaths from 2.825 in 2003 to 3.307 in 2005, aged 18 to 29 years.<sup>5</sup> In 2008, 200.449 motorcycle accidents involving victims were registered; however, these data refer only to reported events. National information regarding deaths in 2010 show that 40.610 deaths were registered as a result of traffic accidents, of which 25% are related to motorcycles.<sup>3,5</sup>

In the Santa Catarina State, in the city of Joinville, in 2006, of 5.277 registered traffic accidents, with regard to motorcycles, there were 14 deaths in the accident site itself, despite there were other deaths that occurred during transportation, admission or even after this latest procedure, which should also have been considered as a result of



accidents.<sup>2</sup> Of the entirety of these traffic accidents, 58,61% corresponded to motorcycle-related accidents; whereas in 2008 there were 5.384 accidents, with 61,34% involving motorcyclists. In the Minas Gerais State, in 2010, there were 3.674 deaths, with 16,7% related to motorcycles. In the São Paulo State, in 2010, of 252.351 claims paid in accordance with the profiles of the victims, 153.341 were for people injured due to motorcycle-related crashes; in 2011, of 366.356 claims paid, 239.082 were targeted to the people injured from accidents involving motorcycles.<sup>6-7</sup>

The Rio Grande do Norte State experiences an epidemic of motorcycle accidents, because 42% of traffic accidents occurred in the above mentioned State are due to these vehicles, which might be characterized as the third highest rate in the Brazilian Northeast. This region has the largest consumer market and, in 2011, purchased 35% of all motorcycles in the country; the distribution in the states highlights that the majority is in the hinterland's cities, with 63,14% of the fleet. The city of Natal holds 23,67% and Mossoró, second largest city of the Rio Grande do Norte State, has 14,19%.<sup>2,6</sup> Every three days, a person dies because of problems with motorcycle accidents on the perimeter between the metropolitan region of Natal and the *Mato Grande* region. Proportionally, more people die in these regions than in the metropolitan regions of São Paulo and Rio de Janeiro, since they are the most populous metropolis in the Brazilian territory.<sup>2,6</sup>

Most deaths have occurred among young people in productive age, mainly because the motorcycle is a means of transportation that challenges the freedom, causes the release of adrenaline, thereby leading to acts of recklessness, which are factors constantly sought by younger people.<sup>4-8</sup> Therefore, one should observe that the reality of the growth of these accidents have been witnessed in several states of the country, which draws the attention of the authorities to develop prevention strategies on emergency basis, thereby determining the motorcycle accident as an epidemic and a public health problem.<sup>3-8</sup>

All these evidences denote the importance of the present investigation, which appears to contribute to the production of subsidies for understanding this reality, especially in the Rio Grande do Norte State, where there is an evident shortage of studies and concrete attitudes, when it is known that workers are mostly penalized, due to their life and working conditions.

In general, motorcycle users are more exposed to a greater number of risks when compared to other individuals; their vulnerability has been demonstrated by the number of accidents involving this type of vehicle; regarding the impact of motorcycle accidents, unequal shock with larger vehicles constitutes a constant occurrence. Motorcyclists do not have the structure of a vehicle to protect them, thereby absorbing all the impact energy and being commonly thrown out to several meters of distance.<sup>9</sup> Accidents involving motorcycles are endowed with greater severity than those occurred with other vehicles, due to the fragility and exposure, both of the driver and of the individual carried on the back side.<sup>8</sup>

Traffic accidents involving motorcycles have two distinct characteristics: when in moments of leisure are linked to transgression, while in work-related situations are related to precarious working conditions, which promote stress and inability of the driver to act with poise and tranquility. As for the time of highest risk for accidents, the time interval between 5 P.M. and 11 P.M. was the most dangerous; such period might be related both to

rides related to leisure activities and to the end of the workday, since this period denotes weariness, intellectual and physical exhaustion, decreased street lighting and increased alcohol intake.<sup>10</sup>

The textile industry has wide repercussion in various productive chains, such as, for example, cotton farming, machinery, petrochemistry and clothing. The activity encompasses four operation areas, which are composed of spinning, weaving, knitting and finishing. The Brazil stands out as the fifth largest textile producer in the world, due to, among other factors, its self-sufficiency in producing cotton. In the Northeast region, the Rio Grande do Norte is one of four states with greater expressiveness in that branch, thereby obtaining the second largest number of employment links in the production of textiles. The textile industries are concentrated in the metropolitan region of Natal, which emphasizes the need for vehicles to make trips, and the means of transportation are usually motorcycles.

On one hand, it is agreed that unequal distribution of income is one of the reasons for people making use of this low-cost vehicle to the detriment of a safer one.<sup>11</sup> On the other hand, the motorcycles fleet of the country has doubled from 2001 to 2005 and, after 1990's, was reconfigured as a working vehicle, initially used to transport goods and, more recently, used in passenger transportation (motorcycle-taxi), i.e., different from that conception of use for sport and leisure.<sup>11</sup>

By considering the risks to which the individuals are exposed in the traffic, upon recognizing the relevance of this type of accident, the lack of concern on the part of administrators regarding their notification and the dissatisfaction of individuals on the topic at stake, the authors sought to analyze the road accidents, with involvement of motorcycles, occurred with workers of a textile industry, given the important economic representation that this sector has for the State and for the country at large, and its essential to perform studies related to the health of workers who feed this industrial sector.

In light of the foregoing, the present study was aimed at describing the profile of textile workers injured during trips with motorcycles, according to age, gender, place of injury, sequels and removal time resulting from accident-related events.

## METHOD

This is a descriptive and cross-sectional study, with data referring to 2008 and 2009, collected from records of a textile industry in the Rio Grande do Norte State, located in the Northeast region of Brazil.

For the present investigation, the records of all workers (81) victims of accident involving motorcycles working in the above mentioned industry were examined. The data were obtained from the reading of printed records of the company itself, thereby seeking registrations related to OA. The study was based on data of those subjects involved,

specifically in road accidents, thereby searching for age, gender, place of injury and removal time resulting from accident-related events.

For the year 2008, it was found a total of 206 occurrences of road accidents among the textile workers, of which 31 were related to motorcycles; in relation to 2009, it was obtained a total of 233 occurrences of road accidents, with 50 being associated with this type of vehicle. It was obtained a total of 81 records that met the selection criteria, and they were thoroughly read from the extraction of the questions pertaining to the study objective.

The data collection was conducted between the months of August to October 2010, through the use of a structured form, in which the following variables were extracted: gender, place of injury, removal time, rehabilitation and sequel. The project was approved by the Research Ethics Committee from the Federal University of Rio Grande do Norte, under the Protocol nº 028/07 and the CAAE nº 0819.0.000.294-07.

## RESULTS AND DISCUSSION

The male gender represents the majority of the surveyed cases (68%), with indexes of 51,16% (2008) and 68% (2009). Most of the workers were males in the company under study.

Their age group ranged from 18 to 41 years old, with the highest incidence between 22 and 25 years. The majority of injured workers during trips with motorcycles needed less than 15 days of removal; however, in case of referrals to the medical expertise, it has generated long periods of absenteeism.

Of the 206 workers injured in 2008, 31 had involvement with motorcycles, which corresponds to 15%. Of these 31 individuals, three did not need removals (10%), 20 had removals less than or equal to 15 days (65%) and eight needed removals greater than 15 days, thereby being referred to the medical expertise (26%).

Of the 233 road accidents of 2009, 50 involved motorcycles (21%), eight (16%) did not require removal, 36 generated removals less than or equal to 15 days (72%) and six (12%) required removals greater than 15 days, and they were referred to the medical expertise. In general, 69% of the accidents required a removal less than or equal to 15 days, 17% required a removal greater than 15 days and 14% did not require removal.

Concerning the cases referred to the medical expertise, of those who required more than 15 days of withdrawal, in 2008, the average number of days of removal is 262,5, with one worker that still remains removed; while, in 2009, the average number of days of removal is in 290 days, with three situations in which the victims remain removed and undergoing treatment. In total, the average of days of removal for the most severe cases in the two surveyed years reaches 274,3 days.

It can be argued that these long periods of removals have generated and remain generating high costs, not only for the social security, but also for workers and their family members, and these expenses are not always possible to be quantified.



By taking into account the 14 workers that were considered as severe cases, who needed more than 15 days of withdrawal and were referred to the medical expertise, the injuries mainly occurred on upper and lower limbs. In 2008, six had injuries on the upper and lower limbs (75%) and two had injuries only on the upper limbs (25%). In the year 2009, four had their upper and lower limbs affected (67%), one had lesions involving only the lower limbs (17%) and another one was affected both on the upper and on the lower limbs, in addition to its pelvic region (17%).

The profile of the victims of road accidents with involvement of motorcycles in the textile industries' workers in the Rio Grande do Norte showed that they were mostly young adults and males. The results relating to the predominance of males among young victims in traffic accidents confirm the findings of several studies.<sup>6-10</sup>

In the city of Feira de Santana, Bahia State, 267 workers who used motorcycles were studied. This survey showed a predominance of males (99,3%), with average age of 37,4 years (standard deviation = 8,2 years), ranging from 21 to 62 years. In the city of Salvador, among 53 interviewed workers, who were motorcycles' users, there was almost absolute predominance of males, blacks/browns, with completed High School, married, with children, with ages ranging from 30 and 38 years, with nine of them aged less than 30 years and six aged above than 38.<sup>12</sup>

Accidents involving motorcycles take place in several countries. A study conducted in Shanghai, China, investigated the incidence of alcohol consumption in the fatal traffic occurrences, by analyzing 803 individuals killed in road accidents during the period from 2009 to 2011. Of which, the vast majority of involved drivers were males, aged from 40 to 49 and motorcyclists.<sup>13</sup> In Thailand, information collected during the period from 2001 to 2004, focusing on 17.538 injuries coded as occupational and 129 work-related deaths, showed that the mortality from traffic accidents was significantly higher when the seat belts or motorcycle helmets were not used, regardless if they were or not related to working activities.<sup>14</sup>

Probably, the male predominance is due to the greater exposure of men in traffic, who are socially and culturally influenced to assume greater risks when driving vehicles.<sup>12</sup> This is a fact corroborated in a study held with the aim at analyzing the impact of the *Lei Seca* (Dry Law) in the number of individuals who were victims of traffic accidents in the period from 2007 and 2009. The results revealed that there was a prevalence of young adult males, mostly victims of hit-and-run and accidents involving motorcycles in the two studied periods.<sup>15</sup>

Such data, associated with other outcomes of the literature<sup>13-15</sup> indicate this stratum of the population as an important target for health promotion measures, which have the purpose of developing preventive lifestyles in traffic.

As indicated in a study performed in the city of Fortaleza, the most affected age group is the one ranging from 18 to 29 years, with prevalence between 22 and 25 years. This young class, when starting to drive motorcycles, constitutes a population at risk, probably due to inexperience in driving vehicles, due to the characteristic impulsivity of this age group and the combination of other factors, such as alcohol, drugs and the poor supervision in the State.<sup>8</sup>

One can observe an increased frequency of road accidents involving motorcycles, which in 2008 was 15% and in 2009 was 21%. This growth is being seen throughout the country in the last few decades, and the increased number of vehicles in circulation, the disorganized traffic flow, the general deficiency of supervision, the vehicle conditions, the users' behavior and the impunity of transgressors are factors that corroborate this growth.<sup>16</sup>

In the United States, accidents involving motorcycles have also reaped lives; therefore, the legislative action is an important evidence-based resource, with low cost, to promote safety and reduce such accidents, by obliging the use of helmets, in order to reduce the rates of morbidity and mortality among injured people.<sup>17</sup>

In reference to the removal time, in the period between the two surveyed years, the majority of workers (69%) needed a removal equal to or less than 15 days. In the investigated literature, on average, the removal period was 15,8 days.<sup>4,13</sup> This research has demonstrated that 17% of accident victims needed more than 15 days and 11% did not require removal. It is worth highlighting that there are few cases in which it was not necessary to remove an employee from the service, which highlights the fragility of this type of transportation and emphasizes the rate of morbidity of motorcycle-related accidents and their interference in daily and working activities.

The majority of lesions, in cases in which the removal was greater than 15 days, involved the upper and lower limbs. The areas with the highest proportion of sequels are the lower limbs, and most of the injured people had multiple traumas (polytrauma), followed by the trauma of the extremities. Polytrauma is considered a kind of injury with high mortality rate, and the motorcyclist, due to having its body exposed in a significant manner, becomes more susceptible to such damage. The higher incidence of lower limb injuries is usually due to frontal and lateral collisions, in which the driver is thrown out against the handlebars of the motorcycle, after this being sloped in forward direction.<sup>14-15</sup>

Despite it was not possible to observe the injuries in the cases in which removal was not necessary, or it was less than 15 days, the data are important as they reveal the high morbidity rate in severe cases, in which the removal period proved to be very higher, thereby reflecting economic and social losses that traffic accidents represent to society.<sup>15-17</sup>

It is important to associate results from other investigation with similar characteristics to this, in which it was observed that most accidents occurred in hinterland's areas, probably due to the poor supervision made in the most distant cities in relation to the state's capital, which culminates in a sense of freedom to drive a motorcycle, even without minimum safety conditions.<sup>11</sup> It is known that the textile industries are concentrated in metropolitan region of Natal and this would be factor for the non-use of safety equipment, as well as for the dangerous attitudes in traffic.

A review about occupational accidents indicated that, in Thailand, the traffic accidents are the most frequent cause of fatal work-related accidents;<sup>13</sup> in Shanghai, fatal accidents were related to alcohol consumption.<sup>14</sup>

In the last few years, the use of motorcycles has been modified, whether by cultural and socioeconomic factors or by the advantages of this type of vehicle in relation to automobiles; after all, they have a lower cost of acquisition and maintenance, a reduced size that facilitates their movement and parking, even in situations of traffic jam, besides their growing use as a means of perform working activities. These factors result in the



increased number of motorcycles in the country and, consequently, in the vulnerability and exposure to the risk of accidents of users, thereby turning them into prominent causes of disabilities and deaths.<sup>17</sup>

The high prevalence of accidents involving motorcyclists suggests that Natal also is going through a period of typical economic transition of great capitals of developing countries, with increase in the amount of vulnerable victims coming from the growing middle class that buys private and low cost motorized vehicles. The transportation technologies contribute to transform the social life, provide greater welfare, facilitate and reduce the travel time, and bring people together, but also drive other ones to death, thereby generating a high cost to society at large.

The economic movement of an area is directly associated with higher amount of accidents. It is important having an intersectoral and multidisciplinary gaze to understand that actions exclusively intended for education, supervision and engineering will not solve the problem of the traffic accident indexes. Specific and eventual actions aimed at changing the behavior of motorcyclists will produce little effect, since the traffic accident is not just related to driver's behavior, but also involves the environment and the market rules established by bosses and customers.

## CONCLUSION

The present study has identified the profile of victims of road accidents with involvement of motorcycles in workers of a textile industry in the Rio Grande do Norte State. The recognition of these characteristics might be useful to subsidize the planning of strategies for preventing motorcycle accidents and improving the reference emergency service in the Rio Grande do Norte.

The significant number of accidents involving young men requires the formulation of intersectoral public policies, extra-models of annual and commemorative campaigns, alluding to traffic issues, but that promote urban mobility. Partnerships among government entities, textile companies and drivers can promote actions of health education and good practices of defensive driving in traffic.

It is recommended that studies of road accidents with involvement of motorcycles are deepened and updated, in order to offer subsidies to minimize this problem, with actual possibility of bringing benefits to current society, to employees, to users of such vehicles and to all scholars and researchers who are interested in this topic and updating the research in this area.

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