

CAUSAS ASSOCIADAS AOS ACIDENTES DE TRÂNSITO ENVOLVENDO MOTOCICLISTAS: REVISÃO INTEGRATIVA

CAUSES ASSOCIATED WITH TRAFFIC ACCIDENTS INVOLVING MOTORCYCLISTS: INTEGRATIVE REVIEW

CAUSAS ASOCIADAS A LOS ACCIDENTES DE TRÁNSITO QUE INVOLUCRAN A MOTOCICLISTAS: UNA REVISIÓN INTEGRADORA

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RESUMO

Objetivo: O presente estudo objetivou identificar na produção científica existente as causas associadas aos acidentes de trânsito envolvendo motociclistas. **Metodologia** Trata-se de uma revisão integrativa de literatura, a busca pelos artigos foi realizada em maio de 2015 na Biblioteca Virtual de Saúde (BVS-Bireme), pelas bases de dados: Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS) e portal da Scientific Eletronic Library Online (SCIELO), considerando as publicações disponíveis no período de 2009 a 2014. A busca pelas produções resultou inicialmente 114 produções e a partir do estabelecimento dos critérios de inclusão e exclusão, a revisão constituiu-se em 08 artigos. **Resultados:** Foram identificadas as seguintes categorias de análise temática: 'O pedestre e o crescimento da frota de motocicleta no Brasil', Perfil epidemiológico da vítima de acidente de trânsito envolvendo motocicleta' e 'Principais causas associadas aos acidentes de trânsito envolvendo motociclistas'. **Conclusão:** O estudo permite concluir que as principais causas associadas aos acidentes envolvendo motociclistas e motocicletas, foram o aumento da frota de motocicletas, as características individuais dos condutores, as condições locais do tráfego, a fadiga ao fim do dia e elevação do fluxo de veículos, a estrutura das vias, sinalização e iluminação, dia da semana e o horário da ocorrência, a falta de educação preventiva para o trânsito e o aumento do uso deste tipo de veículo para trabalho e lazer. Ressalta-se a necessidade de intervenções amplas, intersetoriais e multiprofissionais, que promovam um ambiente mais favorável para circulação de pessoas.

Descritores: Acidente de Trânsito; Motocicletas; Enfermagem.

ABSTRACT

Objective: The objective of this study was to identify the causes of traffic accidents which involve motorcyclists in scientific production. **Methodology:** This is an integrative review of literature, the search for articles was carried out in May 2015, in the Virtual Health Library (BVS-Bireme), by the databases: Latin American and Caribbean Literature in Health Sciences (LILACS) and portal of the Scientific Electronic Library Online (SCIELO), considering the publications available in the period from 2009 to 2014. The search for the productions initially resulted in 114 productions and from the establishment of inclusion and exclusion criteria, the revision constitutes in 8 articles. **Result:** The following categories of thematic analysis were identified: 'The pedestrian and motorcycle fleet growth in Brazil', Epidemiological profile of the victim of traffic accident which involves motorcycle' and 'Main causes associated with traffic accidents involving motorcyclists'. **Conclusion:** The study concludes that the main causes associated with accidents involving motorcyclists and motorcycles were the increase of the motorcycle fleet, the motorcyclists' individual characteristics, the local traffic conditions, the fatigue at the end of the day and the increase of the flow of vehicles, the structure of roads, signaling and lighting, day of the week and the time of occurrence, lack of preventive education for traffic and increased use of this type of vehicle for work and leisure. It is important to emphasize the need for broad, inter-sectoral and multi-professional interventions that promote a more favorable environment for the movement of people.

Descriptors: Traffic accident; Motorcycles; Nursing.

RESUMEN

Objetivo: El presente estudio objetivó identificar en la producción científica existente las causas asociadas a los accidentes de tránsito involucrando a los motociclistas. **Metodología:** Se trata de una revisión integrativa de literatura, la búsqueda por los artículos fue realizada en mayo de 2015 en la Biblioteca Virtual de Salud (BVS-Bireme), por las bases de datos: Literatura Latinoamericana y del Caribe en Ciencias de la Salud (LILACS) y el portal de Scientific Eletronic Library Online (SCIELO), considerando las publicaciones disponibles en el período de 2009 a 2014. La búsqueda por las producciones resultó inicialmente en 114 producciones y a partir del establecimiento de los criterios de inclusión y exclusión, la revisión se constituye en el 08 Artículos. **Resultados:** Se identificaron las siguientes categorías de análisis temático: 'El peatón y crecimiento de la flota de motocicleta en Brasil', Perfil epidemiológico de la víctima de accidente de tránsito involucrando motocicleta 'e' Principales causas asociadas a los accidentes de tránsito involucrando a los motociclistas'. **Conclusión:** El estudio permite concluir que las principales causas asociadas a los accidentes involucrados en motociclistas y motocicletas, fueron el aumento de la flota de motocicletas, las características individuales de los conductores, las condiciones locales del tráfico, la fatiga al final del día y la elevación del flujo de vehículos, La estructura de las vías, señalización e iluminación, día de la semana y el horario de la ocurrencia, la falta de educación preventiva para el tránsito y el aumento del uso de este tipo de vehículo para trabajo y ocio. Se resalta la necesidad de intervenciones amplias, intersectoriales y multiprofesionales, que promuevan un ambiente más favorable para la circulación de personas.

Descritores: Accidente de Tráfico; Motocicletas; Enfermería.

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How cite this article:

Jesus VF, Siqueira LG. Causes associated with traffic accidents involving motorcyclists: integrative review. Revista de Enfermagem do Centro-Oeste Mineiro. 2017;7:e1514. <https://doi.org/10.19175/recom.v7i0.1514>

INTRODUCTION

Traffic is vital to development; unfortunately, the lack of attention paid to the safety of this sector has led to unregulated development of transit systems, causing significant loss of life, health and wealth⁽¹⁾. In addition, traffic facilitates the movement of people and goods, improves access to education, health services, employment and economic markets. So an estimated 1.3 million people die every year from road traffic accidents, and 20 to 50 million people suffer from non-fatal injuries. Accidents have a devastating economic and social cost for both families and society⁽¹⁾.

For the development of this study, Traffic Accident⁽¹⁾ is considered as a collision or incident involving at least one vehicle in motion, traveling on a public road (or private, if people have access to it), collisions between two or more motor vehicles, between vehicles and pedestrians, between motor vehicles and animals or fixed obstacles, between road and rail vehicles, or involving only the motor vehicle. It should be noted that collisions between more than one vehicle are counted as just an accident when successive collisions occur within a short period. Injury⁽¹⁾ is considered as a physical damage resulting from the exposure of a human body to intolerable levels of energy. It can be a bodily injury resulting from exposure to excess energy or loss of function from the lack of vital elements. And accident⁽¹⁾ is considered as any event that causes an injured or dead person.

The accomplishment of this study is justified and it is relevant because the Brazilian people are dying more in accidents with terrestrial transport, especially when the vehicle is the motorcycle⁽²⁾, thus becoming a true epidemic of injuries and deaths in traffic. Data from the Mortality Information System⁽²⁾ reveal that only in 2010, 40,610 people were fatal victims of traffic accidents, 25% of them occurring on motorcycles. The consequences⁽³⁾ for victims of traffic accidents are numerous, such as: death, injuries and, sometimes, sequels for the rest of their lives, besides the emotional and financial impact of them, expenses with rehabilitation treatment, incapacity to work or even difficulty in carrying out the work for the deficiency acquired with the accidents.

In view of the above and recognizing the importance of knowing the causes associated with traffic accidents involving motorcyclists,

evidenced in the light of bibliographical research, as well as the need to update the scientific production, in order to deepen knowledge about the theme and the strengthening of the system, a literature review was carried out, looking for publications that presented the main causes associated to traffic accidents involving motorcyclists.

METHODS

It is an Integrative Review study⁽⁴⁾, in which the search for the articles was carried out using the following descriptors "traffic accidents, motorcycles, nursing", explored through the Boolean operator 'AND', in the Virtual Library of Health, in the following databases: Latin American and Caribbean Literature in Health Sciences (LILACS) and portal of Scientific Electronic Library Online (SCIELO). This search occurred from May to July 2015, based on the survey and reading of the articles, guided by the following question: what are the causes associated with traffic accidents involving motorcyclists in Brazil?

The period of article publication was from 2009 to 2014, so the initial starting point was the search for productions, considering the following inclusion criteria: articles that approach the researched topic, with free online availability of the text in its entirety, in the Portuguese language, published in LILACS and SCIELO databases, in periodicals which are Qualis A1 to B4. It should be noted that duplicate articles were counted only once. For access to the full text, the following resources were used: link which is available directly in the selected database, search on the portal of the periodical in which the article was published, search on the Capes portal. The search for the productions initially resulted in the following numbers, in the mentioned databases: 106 articles/scientific productions in LILACS and 08 in SCIELO, totaling 114 productions. Finally, based on the establishment of the inclusion and exclusion criteria, the corpus of this review consisted of only 8 articles which are available both in the LILACS and in SCIELO database, because they addressed the theme of this research.

To carry out this study, the following steps were followed: establishment of the theme and objectives of the review, selection of articles, definition of inclusion and exclusion criteria, determination of the information to be extracted

from the articles selected, interpretation of the articles and presentation of the review. The material analysis stage was performed by reading and constructing the synoptic table. For the construction of the table, the following variables were extracted: number, database or portal, author (s), title, periodical, year, objective, research design and conclusions. Afterwards, the content analysis was developed by categorization proposed by Bardin⁽⁵⁾. And, later, in the interpretation phase of the results, the convergences and divergences existing in the light of different authors were observed. Regarding the ethical aspects, it is emphasized that the author's precepts and the citations of the authors of the publications that constituted the sample were respected.

RESULTS AND DISCUSSION

In the present integrative review, we analyzed nine articles that included the guiding question and the inclusion and the exclusion criteria, and they were analyzed in their entirety in order to characterize, to interpret and to discuss them. Initially, the articles selected will be

presented and characterized by means of the Synoptic Table, which will present the main results found in the selected articles through thematic categories that guided the production of knowledge about the causes associated to traffic accidents involving motorcyclists, according to the databases searched.

Among the nine (09) articles selected and analyzed, five (5) publications were found in Revista Caderno de Saúde Pública; Two (2) articles in the Brazilian Journal of Epidemiology and two (2) articles in the Revista Ciência e Saúde Coletiva. As for the year of publication, three articles were found in 2011 and five in 2013. The number of authors per article varied between two (2) and six (6), and there were no repetition of authors in the publications. In relation to the research design, five (5) articles were characterized as descriptive studies, one (1) as a cross-sectional study, one (1) temporal study and one (1) ecological study of the population base. Regarding the origin of the studies, it was identified that two (2) studies are from the state of Pernambuco and only one (1) in the states of Acre, Ceará, Paraná and Central-West region as shown in Table 1.

Table 1. Bibliographical sources included in the integrative review, according to the database consulted, author(s), title, periodical, year, objectives of study, research design and synthesis of conclusions.

Title of articles and Nº	Database	Author	Objective of study	Study Characteristics	Synthesis of conclusions
1 Emergency Mobile Response Service: an observatory of ground transportation accidents at the local level.	Scielo/ Lilacs	Amanda PSC Wayner VS, Maria LCL	Objective: to describe the profile of the victims by ground transportation accident and to identify the areas of risk for these occurrences, based on the demand of SAMU in Olinda, allowing a reflection on the potential of this source as an observatory for ground transportation accident at the local level.	Descriptive study.	The fragility and the volume of pedestrians and motorcyclists who are victims of ground transportation accident reinforce arguments about the need for broad interventions to promote a favorable environment for the movement of people.
2. Accidents between motorcycles: analysis of cases In the state of Paraná between July 2010 and June 2011.	Scielo/ Lilacs	Andrey RCG, Rosângela C	Objective: to analyze the profile of traffic accidents involving two or more motorcycles, comparing them with the other types of TA, based on data from the State of Paraná for a period of one year.	Exploratory, cross-sectional study, descriptive type.	The analyzes carried out should provoke reflection, since the use of motorcycles has increased considerably.

3 Motorcycle Accidents in the Municipality of Rio Branco: Characterization and trends.	<i>Scielo/Lilacs</i>	Greiciane SR, Néia S	Objective To identify the amount of the motorcycle / car fleet and to calculate the rate of traffic accident victims with motorcycles and automobiles for comparison purposes, in addition to establishing the profile of motorcyclists involved in accidents in the municipality of Rio Branco.	Epidemiological descriptive and transversal type.	It is very important the implementation of measures, taking into account aspects related to the user and the vehicle, regarding safety, inspections, among others. Another relevant point is the alarming increase in the number of motorcycles compared to automobiles; Not only as an instrument of easy access and for driving effectiveness, motorcycles have become a veritable avalanche of problems to health services.
4 Accidents with motorcyclists: comparison between the years 1998 and 2010. Londrina, PR, Brazil.	<i>Scielo/Lilacs</i>	Flávia LS, Selma MA, Flávio HMS, Christiane LBL	Objective: To compare characteristics of motorcycle accidents and victims treated by prehospital care services.	Cross-sectional study. Londrina, PR.	Changes in accident and victim profiles were observed in the period. Despite the absolute and relative increase of victims of motorcycle accidents, there was a lesser proportional severity of these accidents.
5 Road, man and vehicle: risk factors associated with the severity of traffic accidents.	<i>Scielo/Lilacs</i>	Rosa LFA, José GBF, José UB, Francismeire BM, Marinila CMM, Kellyanne AS	Objective: To analyze the characteristics of the victims, routes and vehicles involved in traffic accidents and the risk factors for accidents with death.	Cohort.	Traffic accident promotion and prevention actions should focus on accidents involving two-wheeled vehicles, which most often involve a single, unqualified male person, at night time, on weekends, and on major roadways speeds.
6 Spatial study of mortality due to motorcycle accidents in Pernambuco.	<i>Scielo/Lilacs</i>	Paul HNVS, Maria LCL, Rafael SM, Wayner VS, Amanda PSC	Objective: To analyze the spatial distribution of mortality due to motorcycle accidents in the state of Pernambuco.	Ecological of population-based.	The risk of dying from a motorcycle accident is greater in conglomerate areas in regions outside the metropolitan axis, suggesting intervention measures that consider the context of economic, social and cultural development.
7 Mortality of motorcyclists in transportation accidents in the Federal District, 1996 to 2007.	<i>Scielo/Lilacs</i>	Marli M SM, Elisabeth CD, Rogério RP, Andréia FN	Objective: To describe sociodemographic characteristics and to analyze the temporal trend of the mortality of motorcyclists traumatized in transport accidents.	Exploratory study of temporal series.	The mortality rate of motorcyclists due to transport accidents has increased significantly. This increase is explained only in part by the increase in the motorcycle fleet. The individual characteristics of the motorcyclists, as well as the local traffic conditions, need to be investigated for preventive policy planning.
8 Mortality due to motorcycle accidents in Brazil: temporal trend analysis, 1996-2009.	<i>Scielo/Lilacs</i>	Evandro TM, Antonio FB, Marco AP	Objective: To analyze the trend of mortality due to motorcycle accidents in Brazil.	Descriptive	There was a large increase in mortality rates by motorcycle accident across Brazil during the period, mainly in the Northeastern States.
9 Traffic accidents in Belo Horizonte: what three different sources of information reveals, 2008 to 2010.	<i>Scielo</i>	Lúcia M M MP, Eliane D G, Eliane de F D, Amélia A de L F, Waleska T C.	Objective: To analyze the contribution of three different sources of information in the description of traffic accidents in Belo Horizonte.	Exploratory	Despite the incompleteness of the records, it was possible to characterize as main factors associated with accidents the elderly pedestrians, motorcyclists, alcohol use and speeding. The study demonstrated the complementarity of the three data sources with their different objectives and revealed important aspects of the chain of events related to accidents and traffic victims, from their occurrence to the eventual fatal evolution, providing relevant information on the magnitude of the problem to guide strategies.

Source: SCIELO/LILACS (2009 to 2015).

When analyzing the articles of this review, the following categories of analysis about the researched topic were defined.

The pedestrian and the growth of the motorcycle fleet in Brazil

By evidencing the actions of information utilization, it was possible to identify in this category of analysis that the vulnerability of pedestrians and motorcyclists in relation to the traffic accident were approached by the results of all the articles raised for the research. Article 1 deals with the fact that the fragility and the volume of pedestrians and motorcyclists who are victims of traffic accidents require the need for wide-ranging inter-sectoral and multi-professional interventions to promote a more favorable environment for the movement of people.

Article 3 shows that there is an alarming increase in the number of motorcycles compared to motorcyclists; not only as an instrument of easy access and for effectiveness in driving, the motorcycle has become a veritable avalanche of problems to the health services⁽⁷⁾. In article 2, although there is an exploratory and timely approach to the increasing volume of fleet, it allows for reflection on the causes of traffic accidents involving motorcyclists in Brazil, as the authors state in their findings that despite the risks, both for the pedestrian and the motorcyclist, that motorcycles have been used more and more for both work and leisure⁽⁸⁾.

Article 6 emphasizes that the volume of pedestrians and motorcyclists increases the risk of dying from a motorcycle accident, especially in areas of larger conglomerate and in regions outside the metropolitan region, thus it suggests intervention measures that consider the context of economic, social and cultural development⁽⁹⁾. Article 7 also ratifies this idea that the mortality rate of motorcyclists due to transport accidents has increased significantly⁽¹⁰⁾.

Article 8 confirms that the rapid expansion of the fleet, the expressive increase in mortality rates in all regions and states, especially in the North, Northeast and Center-West of the Country, accompany the proportion of the population that has left the poverty line⁽¹¹⁾. The analysis of article 5 highlights the need to carry out more studies related to the characteristics of victims of traffic accidents with motorcyclists in order to develop actions to promote and to

prevent accidents involving two-wheeled vehicles, which involve most often one person⁽¹²⁾.

Epidemiological profile of the victims of traffic accidents involving motorcyclists

When reading and analyzing the articles, it is worth noting that in all the publications consulted, the epidemiological profile of the victims of traffic accidents involving motorcyclists, independent of the type of study and the region surveyed, was addressed. The analysis of the articles allows inferring that the victim of a traffic accident as described in article 3 is the male, represented by a rate of 89.8%, compared to the female sex, which is around 9.7%.

Regarding the age criterion, it is relevant to consider that the age group of 20 to 29 years-old and the group of 30 to 39 have a higher risk, but the age group with the greatest evidence in absolute numbers was 20 to 24 years-old. In relation to the time when the accidents occur, it is emphasized that the period of greater incidence is the evening⁽⁷⁾.

Article 2 also confirms the predominance of males in relation to females, as well as the age of the victims, it was possible to note that the number of victims is much higher in the age group between 20 and 29 years-old, they're a type of lower severity⁽⁸⁾. Data of article 1 also describes, by means of numbers, the predominance of males and young adults in the age group of 20 to 39 years-old, facts that resemble several studies⁽⁶⁾.

Another relevant data cited in article 9 was the predominance of elderly people as fatal victims and/or with greater severity of the injuries and complications resulting from this type of accident, but they are usually in pedestrian situations, being more vulnerable to the impact, as well as the prevalence of fatal black/brown victims and low schooling, being directly associated with social determinants⁽¹³⁾.

Referring to fatal victims, article 9 mentions the large number of fatal victims still at the site of the accident, mostly due to polytrauma, and in relation to hospitalizations as severity of these accidents. It points out the injuries as well as polytrauma as major causes, encompassing high hospitalization rates and hospital overcrowding, in addition to significantly raising public costs and expenditures⁽¹³⁾.

Main causes associated with traffic accidents involving motorcyclists

In this study it is essential to highlight the determining causes and/or characteristics that involved motorcyclists in traffic accidents. It should be pointed out that Article 2 points out that fatigue at the end of the day and elevation of vehicle flow as one of the factors that could increase the number of accidents and victims⁽⁸⁾. The structure of the roads, such as signs and lighting, the day of the week and the time of occurrence were related by article 5 as factors associated with traffic accidents with motorcycles, as well as their relationship with the severity of traffic accidents⁽¹²⁾.

Article 7 also reports in its results that the factors conditioning to the increase in the motorcycle fleet, as well as the individual characteristics of the drivers, the local traffic conditions⁽¹⁰⁾ and deficits in traffic education, were highlighted as causes associated with traffic accidents involving motorcyclists. Article 3 reaffirms that the alarming growth in the number of motorcycles, compared to automobile, not only as an instrument of easy access and effectiveness in motorcycle driving, has become a veritable avalanche of problems for health services⁽⁷⁾.

Article 7 refers to the significant increase in the mortality rate, identifies that the increase is explained only in parts by the increase of the fleet of motorcycles, but is also described by several studies, with other causes associated with accidents such as the individual characteristics of drivers, As well as local traffic conditions and the need for better traffic education for both driver and pedestrians and all studies emphasize that these factors need to be investigated for the planning of preventive policies (10).

Article 9 shows that one of the main causes of traffic accidents is intrinsically associated with the use of psychoactive substance, mainly alcohol and/or other illicit drugs, a high incidence in young and males was observed, with a high prevalence on weekends. Another factor that predisposes to the high number of accidents involving motorcycles is the increasing number of these as a means and work tool, because it is a cheaper means of transportation for acquisition and a more accessible value for sustainability and maintenance, so motorcycles are more in circulation and, consequently, more vulnerable to the accident, making them responsible for most of the trampling⁽¹³⁾.

CONCLUSIONS

With the scientific production on the subject, it was possible to realize that there is an alarming increase in the number of motorcycles compared to automobiles, not only as an instrument of easy access and by the effectiveness in the conducts the motorcycle comes along the time, becoming a veritable avalanche of problems to the health services. The review of the publications also made it possible to understand that the increase in the number of accidents, as well as the causes associated with traffic accidents involving motorcyclists, is only partially explained by the increase in the motorcycle fleet, since it was possible to identify other causes as well as the individual characteristics of motorcyclists, local traffic conditions, traffic education, which need to be investigated for the planning of preventive policies.

This revision makes it clear that such a problem arises from the rapid expansion of the fleet. There is a significant increase in mortality rates in all regions and states, especially in the North, Northeast and Midwest of the country. This increase accompanies growth of the fleet of vehicles and the proportion of the population that has left the poverty line. Considering that the male sex is the most involved, especially in the age groups of 20 to 29 years-old and 30 to 39 they have a higher risk, but the age group with the most evidence in absolute numbers was 20 to 24 years-old. Therefore, it is concluded that the causes associated with motorcycle accidents include the significant increase in the number of traffic accidents.

It is necessary to use public policies and inter-sectoral work, in several areas, such as bibliographic background, research, assertive and point interventions, education and awareness campaigns, training of motorcyclists and also pedestrians, efficient supervision, among other actions, seeking accident prevention measures, be it in whatever sphere, for the motorcycle accident and life promotion.

REFERENCES

1. Organização Mundial da Saúde. Sistemas de dados: um manual de segurança viária para gestores e profissionais da área. Brasília, D. F.: Organização Pan-Americana da Saúde; 2012 [acesso em 5 maio 2015]. Disponível em: http://apps.who.int/iris/bitstream/10665/44256/3/9789275717110_por.pdf?ua=1&ua=1

2. Ministério da Saúde (BR). Sistema de informações de mortalidade – SIM datasus 2010 [acesso em 10 jun 2015]. Disponível em: <http://www2.datasus.gov.br/DATASUS/index.php?area=0203>
3. Oliveira NLB, Souza RMC. Fatores associados ao óbito de motociclistas nas ocorrências. Rev Esc Enferm USP 2012;46(6):1379-86. <https://doi.org/10.1590/S0080-62342012000600014>
4. Mendes KDS, Silveira RCCP, Galvão CM. Revisão integrativa: método de pesquisa para a incorporação de evidências na saúde e na enfermagem. Texto Contexto Enferm. 2008;17(4):758-64. <https://doi.org/10.1590/S0104-07072008000400018>
5. Bardin L. Análise de conteúdo. Lisboa: Edições 70; 2009.
6. Cabral APS, Souza WV, Lima MLC. Serviço de Atendimento Móvel de Urgência: um observatório dos acidentes de transportes terrestre em nível local. Rev Bras Epidemiol. 2011;14(1):3-14. <https://doi.org/10.1590/S1415-790X2011000100001>
7. Rocha GS, Schor N. Acidentes de motocicleta no município de Rio Branco: caracterização e tendências. Cienc Saúde Coletiva. 2013;18(3):721-31. <https://doi.org/10.1590/S1413-81232013000300018>
8. Golias ARC, Caetano R. Acidentes entre motocicletas: análise dos casos ocorridos no estado do Paraná entre julho de 2010 e junho de 2011. Cienc Saúde Coletiva. 2013;18(5):1235-46. <https://doi.org/10.1590/S1413-81232013000500008>
9. Silva PHNV, Lima MLC, Moreira RS, Souza WV, Cabral APS. Estudo espacial da mortalidade por acidentes de motocicleta em Pernambuco. Rev Saúde Pública. 2011;45(2):409-15. <https://doi.org/10.1590/S0034-89102011005000010>
10. Montenegro MMS, Duarte EC, Prado RR, Nascimento AF. Mortalidade de motociclistas em acidentes de transporte no Distrito Federal, 1996 a 2007. Rev Saúde Pública. 2011;45(3):529-38. <https://doi.org/10.1590/S0034-89102011000300011>
11. Martins ET, Boing AF, Peres MA. Mortalidade por acidentes de motocicleta no Brasil: análise de tendência temporal, 1996-2009. Rev Saúde Pública. 2013;47(5):931-41. <https://doi.org/10.1590/S0034-8910.2013047004227>
12. Almeida RLF, Bezerra Filho JG, Braga JU, Magalhães FB, Macedo MCM, Silva KA. Via, homem e veículo: fatores de risco associados à gravidade dos acidentes de trânsito. Rev Saúde Pública. 2013;47(4):718-31. <https://doi.org/10.1590/S0034-8910.2013047003657>
13. Paixão LMMM, Gontijo ED, Drumond EF, Friche AAL, Caiaffa WT. Acidentes de trânsito em Belo Horizonte: o que revelam três diferentes fontes de informações, 2008 a 2010. Rev Bras Epidemiol. 2015;18(1):108-22. <https://doi.org/10.1590/1980-5497201500010009>

Note: Completion of course work, to obtain title of Graduate in Family Health, from the Postgraduate course at Faculdades Unidas do Norte de Minas – FUNORTE- MG.

Received in: 30/08/2016

Final version resubmitted on: 25/09/2017

Approved in: 26/09/2017

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