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Mapping of traffic accidents assisted by SAMU in the metropolitan region of Grande Vitória, Espírito Santo

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ABSTRACT
A traffic accident (TA) is an unintentional and avoidable event that occurs on a public road, resulting from the imbalance between the traffic of vehicles and people, capable of causing physical and/or emotional injuries, with impacts on the domestic and social sphere. Therefore, it should be considered a health problem of wide magnitude, which may or may not be fatal (FERRAZ et al., 2012; WHO, 2018).

Keywords: Traffic accidents, SAMU.

1 INTRODUCTION

A traffic accident (TA) is an unintentional and avoidable event that occurs on a public road, resulting from the imbalance between the traffic of vehicles and people, capable of causing physical and/or emotional injuries, with impacts on the domestic and social sphere. Therefore, it should be considered a health problem of wide magnitude, which may or may not be fatal (FERRAZ et al., 2012; WHO, 2018).

There are multiple risk factors for the occurrence of OA. The human factor is one of the main ones, in addition to factors related to road infrastructure and vehicles. Insufficient compliance with traffic laws, distracted driving, driving under the influence of alcohol and other substances, excessive speed, and non-use of safety items are true aggressions to the road safety system (PAHO, 2019).

Worldwide, there are about 1.35 million deaths per year due to OA, that is, 3,700 people die in traffic per day around the world. Nevertheless, approximately 20 to 50 million people suffer non-fatal injuries, many resulting in disability, economic loss, family and state dependency. TAs are estimated to cost most countries 3% of their gross domestic product. The most vulnerable are pedestrians, cyclists

and motorcyclists, who live in low- and middle-income countries (WHO, 2018; PAHO, 2019).

OA in Brazil and other developing countries is a public health problem of great breadth and importance, which has had a strong impact on the morbidity and mortality of the population (IPEA, 2016). According to the Pan American Health Organization (2015), Brazil is one of the countries in the Americas with the highest mortality rate due to traffic accidents, 22.5/100,000 inhabitants, second only to Ecuador (27/100,000 inhabitants), Guyana (27.8/100,000 inhabitants), Venezuela (37.2/100,000 inhabitants) and the Dominican Republic (41.7/100,000 inhabitants).

Historically, Brazil has been developing strategies to confront OA. In 2010, it contributed directly to the Decade of Action for Road Safety, whose objective was to reduce deaths from road traffic accidents by 50% in ten years, and save five million lives. In 2011, it drafted and launched the National Pact for the Reduction of Traffic Accidents – A Pact for Life, and in 2018, it sanctioned Law No. 13,614, which created the National Plan for the Reduction of Traffic Deaths and Injuries (PNATRANS) (BRASIL, 2018a).

There is also the strengthening of the Brazilian national system of care for medical emergencies, through the initial implementation of the mobile pre-hospital component of the National Policy for Emergency Care, in 2003, the Mobile Emergency Care Service (SAMU 192), and of the other components of the Emergency Care Network, through the reformulation of the National Policy for Emergency Care (BRASIL, 2011b; O'DWYER et al., 2017).

SAMU 192, a sublime social program in Brazil, has as its main objective to reach victims early after an acute health problem has occurred, performing an initial stabilization and transfer to one of the components of the Emergency Care Network (SANTOS *et al*., 2019).

Therefore, public policies aimed at reducing both the total amount of OA and its severity should be valued, such as policies for the inspection and control of speed, licenses, and vehicle conditions, in addition to the implementation of those aimed at education and the improvement of road infrastructure (IPEA, 2015).

In view of the above, it is important to broaden the debate on OA, in order to qualify scientific knowledge and assist in the development of local public policies, impacting on the prevention of accidents and effective interventions. Thus, this chapter intends to present the factors associated with the type of traffic accident whose victims were assisted by SAMU 192 in Espírito Santo, as well as their spatial distribution.

2 PROCEDURE FOR DATA COLLECTION AND ANALYSIS

This is a quantitative cross-sectional observational study, carried out in the SAMU192 of Espírito Santo (ES), starting on January 1, 2015 and ending on December 31 of the same year, whose area of interest was the Metropolitan Region of Greater Vitória, Espírito Santo (RMGV-ES).

The RMGV-ES is the main socioeconomic region of Espírito Santo, composed of seven municipalities, namely: Vitória, the state capital, Vila Velha, Serra, Cariacica, Guarapari, Viana and Fundão (ESPÍRITO SANTO, 2001).

The selection of the sample of 343 WA victims, who suffered a collision, a vehicle fall or being run over, occurred through the process of systematic random sampling, with a pre-established interval.

Data were collected through the analysis of the occurrence report of mobile pre-hospital care and the regulation system of SAMU 192 of ES, and tabulated from a *Microsoft Office Excel program*, version 2016, containing the following categorical information: gender; age group; period of the day; day of the week; municipality of occurrence; type of traffic accident; type of vehicle involved; severity of the victims; death at the scene; destination of the victims removed from the place of occurrence.

Emphasis was given to the profile of the applicant and the complexity of the injuries resulting from the TA, the response of the SAMU 192 by means of a TA in the RMGV-ES, as well as the spatial distribution of the TA and the type of vehicle with the greatest involvement in the accidents.

The level of severity of the victims was defined at the time of care, at the place of occurrence, through the assessment of the victims' organ failure, according to the q-SOFA (*Quick Sequential Organ Failure Assessment Score*). The criteria used are: systolic blood pressure ≤ 100 mmHg, respiratory rate ≥ 22/min, and altered mental status (Glasgow Coma Scale < 15). Each variable counts for one point in the score, so it ranges from 0 to 3 points. Two parameters were considered for this study: Lower Risk: q-SOFA 0; Highest Risk: q-SOFA 1, q-SOFA 2 or q-SOFA 3 (MIYAMOTO, 2018).

The information obtained was analyzed by means of simple descriptive statistics, with frequency calculations. The association between the independent variables of the study and the outcome (type of traffic accident: collision, vehicle fall, or being run over) was elaborated using the Chi-square test, or, if there was an expected frequency of less than five, Fisher's exact test. A significance level of 5% ($p < 0.05$) *was adopted*, *with* a 95% confidence interval (CI). The Chi-square Adjusted Residual (AR) was calculated for the variables with statistical significance ($p < 0.05$), considering a significant association between the category and the outcome when the AR was greater than 1.96, in absolute value.

To make maps of the spatial distribution of TA, the data collected were indexed to the digital maps of the municipalities of the RMGV-ES, acquired from the website of the Jones dos Santos Neves Institute (2019). The indexing between the tables and the maps was carried out by defining the geocode for each municipality, both in the database and in the digital maps. The software used for this purpose was QGIS: Free and Open Source Geographic Information System (GIS) (QGIS, 2017).

The maps were prepared by digital cartographic bases in shapefile format produced by the Brazilian Institute of Geography and Statistics (IBGE), Jones dos Santos Naves Institute (IJSN) and the National Department of Transport Infrastructure (DNIT). A choropleth map was produced to

present the critical municipalities for the occurrence of TA assisted by SAMU 192 in the RMGV-ES, and a set of three choropleth maps for the types of TA. The present study was approved by the Research Ethics Committee with Opinion No. 1,748,503 and Opinion No. 2,851,043, with the objective of improving the instruments for the elaboration of spatial distribution maps.

3 EPIDEMIOLOGICAL PROFILE OF OA VICTIMS ASSISTED BY SAMU 192

In an analysis of the profile of the 343 victims of OA assisted by SAMU 192, in the RMGV-ES, in 2015, it was identified that most of the victims were male (71%), aged between 20 and 59 years (83%), with a predominance between 20 and 29 years (35.6%), attended during the morning period (64%), on Friday (16%), mainly, in the municipalities of Vila Velha (25%) and Vitória (24%).

Most OA were due to collisions (60%), followed by vehicle falls (24%) and being run over (16%). Motorcycles were involved in most OA (59%), followed by automobiles (25%), bicycles (11%), buses (2%) and trucks (2%).

The majority of TA victims were classified as lower risk (79%), and it was observed that the vehicle that generated the most serious victims was the truck, with 43% of victims at higher risk.

According to mortality at the TA site during SAMU 192 care, 0.6% of deaths were recorded. The two deaths occurred in male victims, aged 30 to 39 years. One death was due to a collision between cars and the other was a collision with a truck.

The majority of victims (87%) were transferred to public hospitals in the region. When analyzing OA caused by motorcycles, the prevalence of male victims (79%) is recorded, with a predominance between 20 and 29 years of age (43%). Most of the victims had injuries in multiple body segments (70%), abrasions (49%), with fractures (19%), and exposed in 21% of the cases. They were in a less severe situation (80%) and there was no record of death. Alcohol use was suspected in 7% of the victims.

It was identified that 97% of the victims of accidents involving motorcycles received some type of procedure in the pre-hospital environment, during their initial evaluation, by the SAMU 192 team. Regarding the airway, 95% of the victims received pulse oximetry, clearance maneuvers, oxygen therapy and/or oropharyngeal cannula, and only 2% received advanced tracheal intubation procedures. Regarding circulation, 84% of the victims received peripheral venous access. 73% of the victims were immobilized with a cervical collar, long board and/or limb immobilization, and 2% received pelvic immobilization and/or use of the *Kendrick Extrication Device - KED.*

Table 1 shows the factors associated with the type of traffic accident ($p < 0.001$): age group, type of vehicle, and severity of the victims. The age group of 60 to 79 years and ≥ 80 years was associated with being run over and the age group from 20 to 59 years was associated with collision. The automobile, truck and bus were associated with being run over, the automobile with the collision,

and the bicycle and motorcycle with the fall of a moving vehicle. A lower risk of severity of the victims was associated with collision and a higher risk of severity was associated with being run over.

Table 1. Univariate Analysis of Factors Associated with the Type of Traffic Accident: Hit-and-Run, Collision and Vehicle Fall, in the RMGV-ES, in 2015.

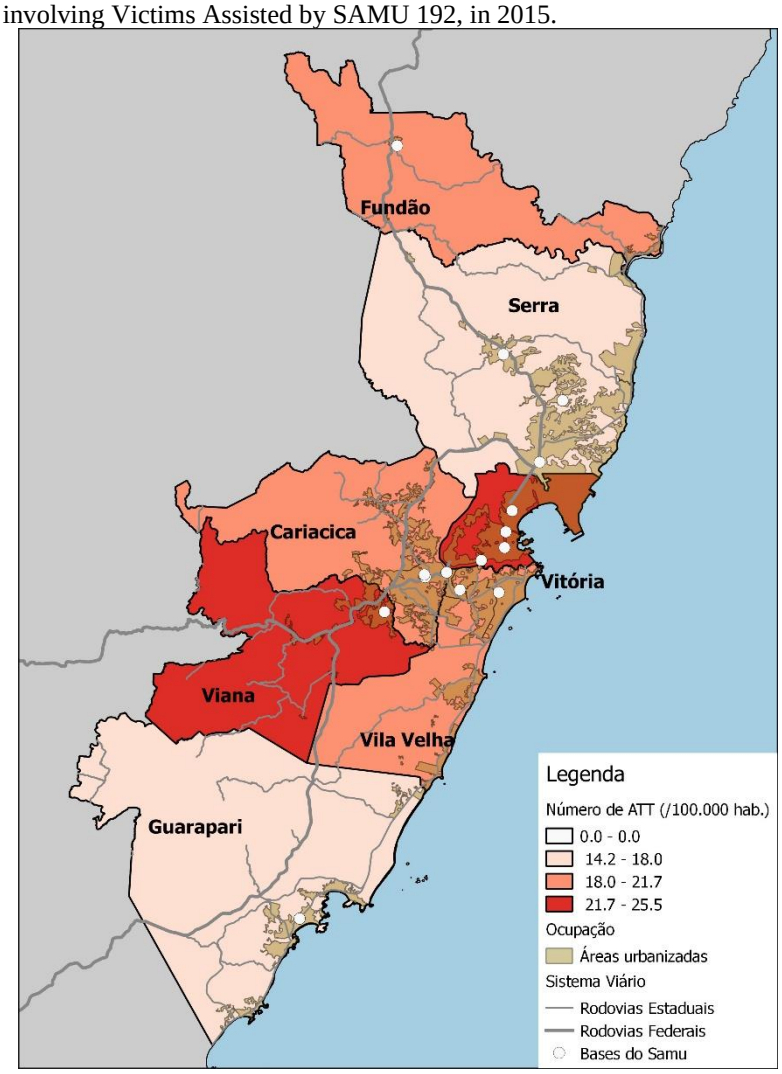
		Hit		Collision		Vehicle Crash		
Variable	Categories	n	%	n	%	n	%	p
Sex	Female	20	36%	55	27%	23	28%	0,373
	Male	35	64%	150	73%	60	72%	
	1 a 9	0	0%	3	1,5%	1	1,2	
							%	**0,001**
Belt								
Age	10 a 19	6	11%	20	10%	11	13%	
(years)	20 a 59	38	69%	**177***	86%	70	84%	
	60 a 79	**10***	18%	5	2%	1	1%	
	≥ 80	**1***	2%	0	0%	0	0%	
Time of day	Morning	35	71%	106	62%	46	64%	0,452
	Nocturne	14	29%	66	38%	26	36%	
	Sunday	5	9%	32	16%	15	18%	
	Fourth	13	24%	21	10%	8	10%	
Sema Day	Fifth Saturday	4 8	7% 15%	30 33	15% 16%	10 10	12% 12%	0,262
on	Second	4	7%	27	13%	14	17%	
	Friday	11	20%	31	15%	14	17%	
	Tuesday	10	18%	31	15%	12	14%	
	Cariacica	11	20%	39	19%	21	25%	
	Fundão	0	0%	2	1%	1	1%	
Municíp	Guarapari	1	2%	9	4%	7	8%	
This is the de								0,436
Occurrence	Saw	11	20%	35	17%	19	23%	
it								

	Viana	4	7%	9	4%	4	5%	
	Vila Velha	14	25%	60	29%	12	15%	
	Victory	14	25%	51	25%	19	23%	
Type of Vehicle Involved	Automotive	**22***	40%	**60***	30%	5	6%	
	l							
	Bicycle Truck	2 **4***	2% 7%	19 3	9% 2%	**19*** 0	23% 0%	**0,001**
	Motorcycle	24	44%	120	59%	**58***	70%	
	Bus	**4***	7%	3	2%	1	1%	
Pregnancy and Victims	Highest risk minor	**24*** 31	44% 56%	36 **169***	18% 82%	13 70	16% 84%	**0,001**
	risk							
Death	No Yes	49 1	98% 2%	194 1	99% 1%	82 0	100% 0%	0,346
	H. Private	1	2%	11	6%	5	7%	
Destiny	H. Public	43	83%	126	70%	46	60%	
that	UPA	1	2%	6	3%	7	24%	0,114
Victims								
	IS	7	13%	36	20%	18	9%	

Source: Prepared by the author
* Residue set

According to the spatial distribution of traffic accidents whose victims were assisted by SAMU 192 of the RMGV-ES, in 2015, according to the population base of the municipalities, this year, it was found that the Rate of Traffic Accidents Assisted by SAMU per 100 thousand inhabitants was more representative in the municipalities of Vitória and Viana: 21.7 to 25.5 TA/100 thousand inhabitants (Figure 1).

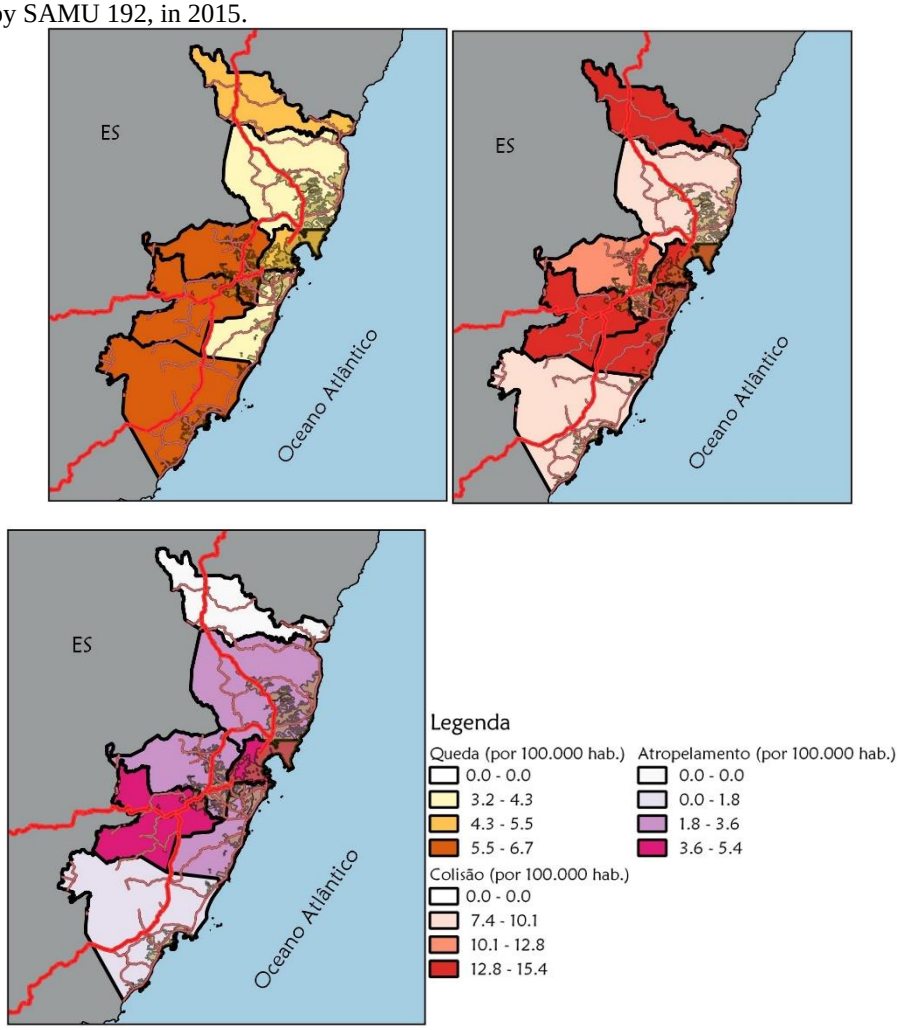
Figure 1 - Map of Critical Municipalities for the Occurrence of Traffic Accidents in the Metropolitan Region of Greater Vitória, Espírito Santo, involving Victims Assisted by SAMU 192, in 2015.



Source: Prepared by Wagner Carrupt Machado and organized by the author.

From the analysis of the spatial distribution of the types of traffic accidents assisted by SAMU 192 of the RMGV-ES, in 2015, according to the population base of the municipalities, it was found that the Traffic Accident Rate according to the Type of Accident per 100 thousand inhabitants (Figure 2), was presented as follows: Collision Rate prevailed in Fundão, Vitória, Vila Velha and Viana (Rate 12.8 to 15.4 Collisions/100 thousand inhabitants); Rate of Falling Vehicles in Motion prevailed in the municipalities of Cariacica, Viana and Guarapari (Rate 5.5 to 6.7 Falls of Vehicles/100 thousand inhabitants); Pedestrian Collision Rate prevailed in Vitória and Viana (Rate 3.6 to 5.4 Pedestrian Collisions/100 thousand inhabitants).

Figure 2 - Maps of the Types of Traffic Accidents in the Metropolitan Region of Greater Vitória, Espírito Santo, Involving Victims Assisted by SAMU 192, in 2015.



Source: Prepared by Wagner Carrupt Machado and organized by the author.

4 DISCUSSION

Men were markedly involved in traffic accidents assisted by SAMU 192, in the RMGV-ES, in 2015. In Brazil, several studies have also reported the association of males with OA (CAVALCANTE *et al*., 2015; NUNES, ISTENHARTE, JÚNIOR, 2016; ARAÚJO *et al*., 2017; DANTAS *et al*., 2018; WATANABE *et al*., 2018), and motorcycles have been reported as the main vehicle involved in these occurrences, similar to the study in question. Sampaio *et al*. (2019), studied 2,365 men assisted by SAMU 192 due to OA, recording a high rate of motorcycle accidents (40.89%).

The higher prevalence of OA in males is due to the aggressive characteristics of the gender, the pleasure of excessive speed, a striking factor of the most severe occurrences, and alcohol consumption (CAVALCANTE *et al*., 2015; SANTOS et al. 2019).

These habits are true aggressions to the road safety system (PAHO, 2019). The confrontation is historic. In 2015, the Pan American Health Organization (PAHO) published the Report on Road Safety in the Region of the Americas, with a record of 150,000 deaths resulting from traffic accidents in the Americas, with an average mortality rate of 16.1/100,000 inhabitants, with fifteen countries in

the Americas having rates higher than the regional average, with the following as the most vulnerable users: pedestrians, cyclists and motorcyclists (PAN AMERICAN HEALTH ORGANIZATION, 2015).

Among the guidelines for road safety, there was a need to strengthen legislation on one or more of the main risk factors: speeding, driving under the influence of alcohol, not wearing helmets for motorcyclists, seat belts and child restraint devices.

However, more progress is needed. In this context, the *World Health Organization (WHO)* and the United Nations leveraged global actions to promote Road Safety worldwide, based on five pillars: Road Safety Management; Road Infrastructure; Vehicle Safety; User Safety and Awareness; and Accident Response (BRASIL, 2018a).

Regarding the age group, there was a predominance of OA between 20 and 29 years of age, with a decrease in accidents from the age of 30 years. This characteristic is reproduced in all regions of Brazil (ARAÚJO *et al*., 2017; MACÊDO, OLIVEIRA, 2012; NUNES ISTENHARTE, JÚNIOR, 2016; WATANABE *et al*., 2018).

Young adults are more prone to traffic accidents due to the more impulsive and impetuous behavior characteristic of their age, in addition to inexperience in traffic. The search for new emotions associated with drug abuse promotes an environment conducive to disrespect for traffic laws, contributing to a higher prevalence of traffic accidents and death in this age group. The early loss of life determines a high economic and financial cost for society, in addition to traumas for families and friends (DALL'OGLIO, SODRÉ, 2021).

The number of visits to WA victims was higher in the morning (64%). According to studies, in the SAMU of the Northeast, 59.8% of the accidents occurred in the morning, in the North 63% and in the South region, 50.3% (MENDONÇA, SILVA, CASTRO, 2017; MACÊDO; OLIVEIRA, 2012; WATANABE *et al*., 2018).

According to Freitas and Nóra (2012) and Santos *et al*. (2019), the predominance of OA in a given period may be related to factors such as the time of entry and exit from work, school, delivery services, passenger transportation, and recreational activities.

This information can provide subsidies for the analysis of the resizing of the resources of SAMU 192 of the RMGV-ES. In accordance with the *Save LIVES* Program, this fact will also help hospital emergency management, as both services must work in an integrated way to qualify assistance to victims (WHO, 2017).

Added to this information is the more intense record of OA during Fridays, data corroborated by the SAMU of the Northeast, which identified 16.2% of accidents on this day of the week (MENDONÇA, SILVA, CASTRO, 2017).

Most OA were due to collisions (60%), followed by vehicle falls (24%) and being run over

(16%). The data converge with the study by Soares *et al*. (2018), which recorded a predominance of collisions (76%). According to the authors, being run over occurred in 3.02% of the accidents, leaving 561 dead and 959 seriously injured.

Motorcycles were involved in most OA (59%), followed by automobiles (25%), bicycles (11%), buses (2%) and trucks (2%).

When analyzing OA caused by motorcycles, male victims prevail (79%) between 20 and 29 years old (43%). The victims had lesions in multiple body segments (70%); abrasion-type lesions (49%); with fractures (19%), being exposed in 21% of cases; in a less severe situation (80%) and there was no record of death, with the use of alcoholic beverages suspected in 7% of the occurrences; information congruent with the study by Dantas *et al.* (2019) and Silva, Rocha, Lopes (2019).

Silva *et al*. (2018), recorded 64 victims of motorcycle accidents, and most of the victims had received pre-hospital care from SAMU 192 (35.9%). Death during hospitalization was recorded in 4.7% of the injured persons.

Historical records justify these findings, as they show that from the 1990s onwards the federal government encouraged the manufacture and consumption of motorcycles. The vehicles began to be used to transport people, goods, work and leisure, given the ease of acquisition due to the low costs and their versatility. The fleet increased from 1.5 million in 1990 to 17 million vehicles at the end of 2012, all in the name of social inclusion (VASCONCELLOS, 2013).

According to data from the Ministry of Infrastructure, the number of motorcycles on the highways has been gradually increasing. There has been an increase of more than 1 million motorcycles per year since 2010. In 2018, the motorcycle fleet was 27 million vehicles (BRASIL, 2019; BRAZIL, 2018).

The Motorcycle Motorization Rate in Brazil increased from approximately 7 motorcycles/100,000 inhabitants in 2008 to 13 motorcycles/100,000 inhabitants in 2018. In the RMGV-ES, the rate is 9 motorcycles/100 thousand inhabitants. These data reinforce the concept of detriment to public transport, resulting in high socio-economic-environmental costs (RODRIGUES; AZEVEDO; RIBEIRO, 2019).

The low stability of motorcycles, their greater sensitivity to the texture of road surfaces, and the difficulty in being seen by other vehicles can contribute to the occurrence of accidents, while the lack of protection of the motorcyclist's body can cause more serious injuries (VICROADS, 2008).

The study by Vasconcellos (2013) records the impact on victims of motorcycle accidents. Family dynamics were affected (84%) and there was a need for help from others (94%), and someone stopped working to help the victim (18%).

According to the proposed study, the assisted TA victims had in their a lower risk of death (79%). According to the *WHO* , OA are mainly responsible for non-fatal injuries, and therefore lower

risk, worldwide. In Brazil, the Ministry of Transport, Ports and Civil Aviation (MPTA) reported that the number of uninjured and non-fatal victims of OA in the period from 2010 to 2017 decreased by 15.3% (WHO, 2018; BRAZIL, 2018b).

The number of OA involving non-fatal victims was significant for victims with minor injuries compared to those with serious injuries. A total of 12,895 injuries were recorded, of which 78% were lightly injured and 22% were seriously injured (BRASIL, 2018b).

It was observed in the study that, according to collisions, the number of more serious victims resulting from motorcycle accidents exceeds the number of more serious victims of automobiles. This fact is compatible with the characteristics of motorcycles: fast vehicles, i.e., with greater energy involved in accidents, absence of protection mechanisms, among others (WHO, 2011a; VICROADS, 2008).

It is also noted that due to being run over, the number of more serious victims was mainly due to being run over by a car, since this type of vehicle has greater mass, therefore, greater energy, compared to motorcycles.

In the analysis of the profile of the victims according to mortality at the TA site during SAMU 192 care, 0.6% of deaths due to TA were recorded. The two deaths occurred in male victims, aged 30 to 39 years. One death was due to a collision between cars and the other was a collision with a truck.

According to the Ministry of Transport, Ports and Civil Aviation, between 2010 and 2017, in Brazil, there was a significant decrease in deaths. In the Southeast region, the decrease in deaths was 35.8%, in the Northeast 26.4%, in the Midwest 24.9%, in the South 22.6%, and in the North 14.9% (BRASIL, 2018b).

In Espírito Santo, according to information from the State Department of Health (2019), the mortality rate due to OA also suffered a significant reduction, from approximately 30 deaths/100,000 inhabitants in 2008 to 19 deaths/100,000 inhabitants in 2018.

According to the study, the victims assisted by SAMU 192 were, in their predominance (87%), transferred to public hospitals in the region. For Andrade and Jorge (2017), there is a great financial impact of the public sector due to hospital admissions due to TA in hospitals of the Unified Health System.

This information is in line with data from the Department of Informatics of the Unified Health System (DATASUS). In April 2010, there were 103 hospitalizations, with an average length of stay of 8.6 days, and a total cost of R$143,786.88. In April 2020, there were 327 hospitalizations, an increase of 217.5% in ten years; with an average stay of 6.0 days, and a total cost of R$332,225.63. If we consider a cost estimate for 2020, based on the cost of April/2020, we will have an annual cost of hospitalization, resulting from TA in the RMGV-ES of approximately 4 million reais (BRASIL, 2019).

According to the spatial distribution of traffic accidents, it was found that the Rate of Traffic

Accidents Assisted by SAMU per 100 thousand inhabitants was more representative in the municipalities of Vitória and Viana.

Vitória is the capital of the state, the great economic, social and cultural center, which causes displacement of part of the residents of other municipalities for work, study, leisure, triggering a significant increase in people and vehicles on the city's roads, impacting urban mobility with consequent damage to road safety, especially for pedestrians, cyclists and motorcyclists.

Currently, faced with the challenge of bringing balance between the modernization of the city, with a view to expanding development, and the maintenance of urban mobility, with road safety, Vitória is undergoing a reurbanization project with investments in infrastructure, such as construction of bike paths, paving of roads, macro drainage works, which should impact the reduction of the TA Rate in the coming years (CHELUJE, 2019; SILVEIRA, 2020).

Viana, on the other hand, also had a high rate of TA/100,000 inhabitants, despite the low population density. Unlike Vitória, Viana does not receive a transitory increase in people or vehicles with a view to local permanence, however, there is a movement of passage through the municipality in search of other destinations. To explain this fact, the presence of BR-101 and BR-262, which connect the RMGV-ES to other regions of the state and the country, such as Belo Horizonte and Rio de Janeiro, increasing municipal traffic (INSTITUTO JONES DOS SANTOS NEVES, 2018).

Recently, the loop that connects BR-101 to BR-262, in Viana, was completed as part of the BR-101 duplication plan, bringing improvements to local road safety (BOREM, 2020). Another important action for road safety in Viana was the authorization of the DMV/ES so that the Municipal Guard of the municipality could act as a traffic agent, increasing the number of personnel in the actions of inspection and education of local traffic, combating infractions of the Brazilian Traffic Code, in addition to providing a more humanized and safe traffic, to preserve life and combat violence (ESTEVES et al., 2020). Thus, strategies that aim to reduce the OA rate in the municipality are recorded.

Finally, after individually analyzing the spatial distribution of each type of OA and its victims, who received help from SAMU 192, we can make some considerations about the RMGV-ES: in general, it was verified that each municipality has its peculiarities in relation to the types of traffic accidents, however, they have in plurality the involvement of adults, males, during the morning, whose victims resulted from accidents involving the motorcycle vehicle, being less severe, being transported to the Public Hospitals of the local Urgency and Emergency Network, except for those who progressed to death, still in the pre-hospital environment.

In summary, these data should help the management of coping with SAMU 192 of the RMGV-ES through traffic accidents, considering the relationship between the trauma mechanism and the potential injuries developed by the victims, therefore, favoring training directed to the most frequent

injuries in a collision, vehicle fall or being run over.

The main limitation of the present study is the difficulty of collecting data in the printed police reports of SAMU 192 in ES. In addition, this is a cross-sectional study, which does not allow us to affirm cause-effect relationships between the associated variables. However, it stands out for its originality and potential for improvements to local public policies.

5 FINAL THOUGHTS

Traffic accidents should be considered as a pandemic, mainly caused by man's inappropriate behavior in traffic. Therefore, they are subject to changes, which are necessary to combat this global public health problem, which primarily affects the vulnerable in traffic: pedestrians, cyclists and motorcyclists.

In 2015, Brazil had the fifth highest traffic fatality rate in the Americas. However, over the last decade, we have observed a reduction in traffic deaths in our country. However, we are far from reaching the goal of zero traffic deaths. We will need a joint effort of drivers and pedestrians, politicians and non-governmental institutions, frontline professionals and researchers, to change the reality of traffic in the country.

Through this study, we observed fundamental information for the strengthening of public health policies. RMGV-ES, a young region of Brazil, has an Urgency and Emergency Network in the implementation phase. SAMU 192, a recent instrument for the protection of life, is an important component of the Network, which needs to advance at the state level. Adult men, vulnerable to traffic incidents, need protection against this pandemic. The motorcycle, a vehicle of access to the middle and lower social classes, should not become the preferred means of transportation for our population.

Therefore, it is emphasized that more robust studies, using information from SAMU, and following the victims in the hospital environment, until discharge or death, should permeate the researchers. There is also a need to develop a true unified database, which contains information from various sectors of society, sometimes working in isolation, weakening the process of knowledge and, therefore, evidence-based decision-making. In addition, there is the need to use geoprocessing for the proper mapping of risk areas, the implementation of an Intelligent Transport System, the valorization of public transport, the elaboration of rigid traffic laws that can be enforced and monitored, vehicles with greater safety devices for the driver, passengers and pedestrians, as guiding elements of public policies. Only in this way will we achieve efficiency and effectiveness in results.

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