

# Mortality Related to Accidents Involving Two-Wheeled Motorized Vehicles at Donka National Hospital

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## Abstract

Two-wheeled motorized road accidents are becoming increasingly frequent and are responsible for high mortality among a young and active population in developing countries. The objective of this study was to determine the mortality rate related to motorcycle accidents and to identify socio-demographic factors and accidental mechanisms. **Methodology:** This was a retrospective descriptive and analytical study involving 16,655 patients, including 312 deaths due to motorcycle accidents. The study took place from January 1, 2013 to December 31, 2017. Not all patients who died as a result of accidents involving equipment other than two motorized wheels were included in our study. The data were entered and analyzed using the Epi.info version software. For the comparison of qualitative data, we used Pearson's khi2. **Results:** We recorded 312 cases of death or 1.87% out of a total of 16,655 victims. Of the deceased victims, only 112 wore a protective helmet and 200 did not. The male predominance was clear ( $p < 0.0001$ ). Fatal accidents were more frequent among 4 pm and midnight ( $p < 0.0001$ ). **Conclusion:** This study shows that two-wheeled motor vehicle accident mortality is a public health problem. Gender, occupation and time of occurrence of the accidents were most common factors associated with mortality. The effective establishment of an emergency medical assistance service (SAMU) in Conakry could improve the pre-hospital care of these traumatised people.

## Keywords

Accident, Mortality, Motorcycle, Donka

## 1. Introduction

Long considered as a public health problem in developed countries, road acci-

dents are nowadays a real global scourge, due to the high number of victims due to the mechanization of all sectors of the economy, but also and especially because of the modernization of road traffic [1]. Motorcycling has been growing rapidly for several years. This success is due in large part to the practical and fun nature of this mode of transport, particularly in urban areas where traffic density heavily penalizes travel. Also, the motorcycle conveys strong images associated with escape and the pleasure of moving freely [2] [3]. According to WHO statistics, each year nearly 1.3 million people die on the world's roads and another 20 to 50 million are injured, some of whom are disabled for life. Of these deaths, 90% occur in emerging and developing countries, mainly among the most vulnerable road users, motorcyclists with 23% [4]. The associated risk factors for injury and death of a motorcyclist are young age, lack of protection (helmet), poor visibility of the motorcyclist and his motorcycle compared to other road users [5]. In the United States, in 2016, motorcyclists were involved in 27% of fatal road accidents [6]. In France, in 2016, according to the National Interministerial Observatory of Road Security (ONIRS), motorcyclists accounted for 17.6% of all road accident fatalities [7]. In Guinea, in 2016, the Guinean Observatory for Road Safety and Urban Mobility (GORSUM) reported 16,364 cases of road accidents between 2011 and 2014, causing the death of 2288 people and 5700 serious injuries, or 13.98% mortality. Of these deaths, 29% are attributable to two-wheeled motorized vehicles [8]. The increase in mortality due to the increasing frequency of motorcycle taxis in the city of Conakry and the rarity of previous studies in our context motivated this study, whose objectives were to: determine the mortality rate related to motorcycle accidents and identify socio-demographic factors and accidental mechanisms.

## 2. Material and Methods

This was a retrospective descriptive and analytical study involving 16,655 patients, including 312 deaths due to accidents involving two-wheeled motorized vehicles. The study took place from January 01, 2013 to December 31, 2017 in the forensic medicine unit in collaboration with the emergency department of the Donka National Hospital in Conakry. The forensic medicine unit is responsible for medical-legal consultation and the management of the remains. All the bodies benefited from the forensic doctor's expertise, some were received directly from the accident site, others via the emergency service (body depot). Not all patients who died as a result of accidents involving equipment other than two motorized wheels (personal vehicle, bus and truck) were included in our study. Our data were collected from medical records, death registers and individual survey sheets including questions on socio-demographic data (age, sex, socio-professional category) and accident characteristics (time, day of the week, month of occurrence and accident mechanism). The data were entered and analyzed using Epi.info software version 6. For the comparison of qualitative data, we used Pearson's  $\chi^2$ .

The data were entered and analyzed using Epi.info software version. 6 For the comparison of qualitative data, we used Pearson's khi2.

The insufficiency of information on certain files constitutes the main limitation of this study.

### 3. Results

We recorded 312 cases of death or 1.87% of a total of 16,655 victims of accidents involving two-wheeled motor vehicles. Of the 312 cases of death, only 112 wore a protective helmet and 200 did not. In the majority of cases, deaths occurred outside the hospital (either at the accident site or during transport to hospital) with 1.18% ( $n = 197/16,655$ ). In 0.47% of cases ( $n = 79/16,655$ ), death occurred in a hospital ward, in 0.22% of cases ( $n = 36/16,655$ ) death occurred on arrival in the emergency room.

All ages were concerned with extremes of 1 year and 76 years. The majority of the deceased victims 1.48% ( $247/16,655$ ) were between 15 and 44 years of age. The category of workers was the most concerned with 0.65% ( $108/16,655$ ). The male predominance was clear with a sex ratio M/F of 4, 26.

Fatal accidents were more frequent among 4 pm and midnight with 1.03% ( $n = 171/16,655$ ), the difference observed was very significant ( $p < 0.001$ ). We did not find a relationship between days of the week and the occurrence of deaths ( $p = 0.227$ ). Our results also show that the month was not associated with the occurrence of deaths due to two-wheeled vehicles ( $p = 0.213$ ), the difference was statistically insignificant.

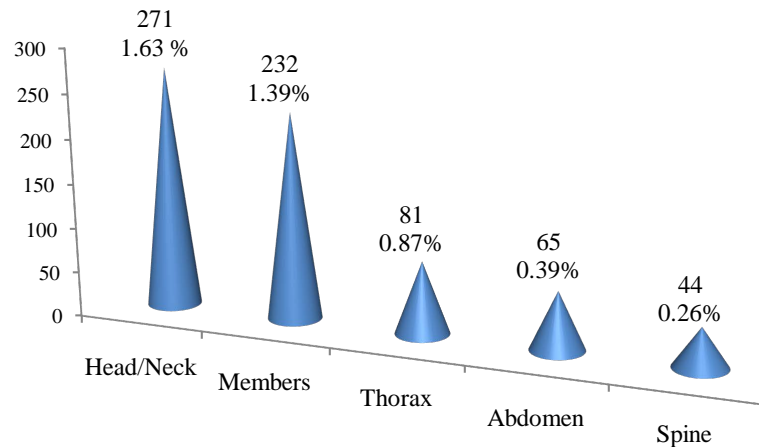
The most frequent accidental mechanism most frequently and most associated with death was motor-vehicle ( $p < 0.0001$ ) the statistical difference was highly significant.

Among the deceased victims (**Figure 1**), lesions were mainly found in the cephalic region (head and neck) with 1.63% ( $n = 271/16,655$ ).

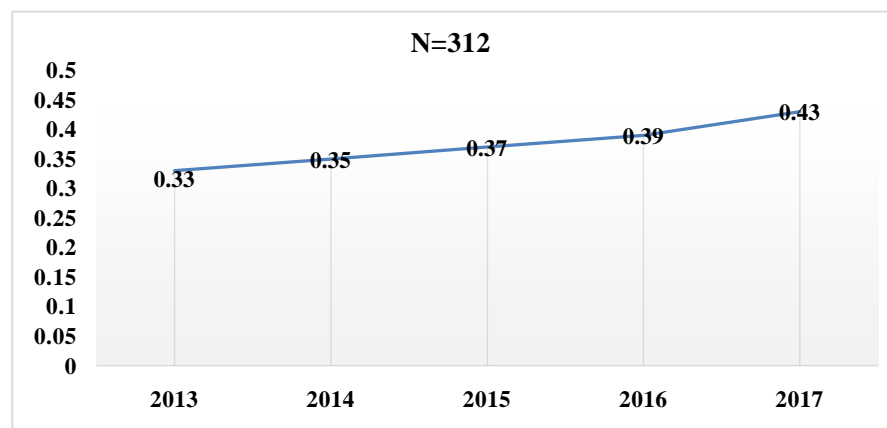
### 4. Discussion

This study shows that of the 16,655 victims of accidents involving two-wheeled motorized vehicles recorded during the study period, 312 or 1.87% had died. This mortality has increased steadily over the 5 years of study with an average annual increase of 0.22% (**Figure 2**).

All ages were concerned with extremes of 1 year and 76 years. The majority of victims (67.6%) were between 15 and 44 years of age (**Table 1**). For Bah M L *et al.* the mean age was 36.88 years with extremes of 3 and 85 years, patients aged 30 to 44 years were the most frequently encountered with a rate of 36.88%, followed by youth aged 15 to 29 years or 34.88% [9]. This youthful trend could be explained by the risky behaviour of young motorcyclists (speeding, alcohol or drug use, lack of helmets or permits, inexperienced, non-compliance with traffic lights [10] [11] [12] [13]). In our study, we observed that the male sex (**Table 1**), was more exposed to risk with a mortality rate of 1.52% compared to 0.35% for



**Figure 1.** Distribution of deceased victims of death by injury location.



**Figure 2.** Evolution of mortality by year.

the female sex ( $p < 0.0001$ ), the difference observed was statistically significant. This could be explained by the advent of motorcycle taxis, generally driven by men, as a new means of travel in our country, as in most countries of the subregion, as reported by many authors [9] [10] [13]. The breakdown by socio-professional (Table 1) category shows that the most concerned was that of workers with a mortality rate of 0.65%, the difference observed was statistically significant ( $p = 0.0228$ ). For many authors, the predominance among victims of accidents involving two-wheeled motorized vehicles among workers in the informal sector and pupils and students is explained by the explosion in the supply of low-cost motorcycles and the daytime activities requiring them to reach their workplace or study or home using these vehicles [10] [14].

In this study, we found that the time range from 4:00 pm to 00:00 am (Table 2). Strongly associated with the occurrence of deaths due to two-wheeled vehicles ( $p < 0.0001$ ). This could be explained by the fact that this is the moment when all workers return home, but also and above all the moments when vigilance and reactivity decrease after the working day. We also observed that mortality from two-wheeled vehicles was seasonally variable. The months of June to

**Table 1.** Distribution of deceased victims by socio-demographic characteristics.

Parametes	Deceased		Not deceased		<i>p</i> -value
	Nb	%	Nb	%	
<b>Age group</b>					
≤14 ans	32	0.19	1676	10.10	<i>p</i> = 0.2202
15 - 29 ans	129	0.77	6757	41.34	
30 - 44 ans	86	0.52	4505	27.56	
45 - 59 ans	36	0.22	1886	11.32	
60 - 74 ans	22	0.13	1152	6.91	
≥74 ans	7	0.04	367	2.20	
<b>Sex</b>					
Male	253	1.52	13,252	81	<i>p</i> < 0.0001
Female	59	0.35	3091	19	
<b>Profession</b>					
Workers	108	0.65	5658	34.62	<i>p</i> = 0.0228
Students and students	87	0.52	4556	27.88	
Trader/Merchands	32	0.19	677	10.26	
Officials	24	0.14	1256	7.69	
Military	21	0.13	1099	6.73	
Housewives	19	0.11	997	6.10	
Cultivators	12	0.07	629	3.85	
Others	9	0.05	480	2.88	

**Table 2.** Distribution of deceased victims by circumstances.

Parameters	Deceased		Not deceased		<i>p</i> -value
	Nb	%	Nb	%	
<b>Hours</b>					
16 h - 00 h	171	1.03	8957	54.81	<i>p</i> < 0.0001
8 h - 16 h	77	0.46	4033	24.68	
00 h - 8 h	64	0.38	3353	20.51	
<b>Days</b>					
Monday	40	0.24	2095	12.82	<i>p</i> = 0.2270
Tuesday	37	0.22	1938	11.86	
Wednesday	32	0.19	1677	10.26	
Thursday	39	0.23	2043	12.50	
Friday	50	0.30	2619	16.03	
Saturday	66	0.40	3457	21.15	
Sunday	48	0.29	2514	15.38	
<b>Months</b>					
June-September	98	0.59	5133	31.41	<i>p</i> = 0.2133
October-December	83	0.50	4348	26.60	
April-June	73	0.44	3824	23.39	
January-March	58	0.34	3038	18.60	

**Table 3.** Distribution of deceased victims by accidental mechanism.

Circumstances	Deceased		Not Deceased		<i>p</i> -value
	Nb	%	Nb	%	
Motorcycle/Auto	179	1.07	9376	56.30	<i>p</i> < 0.0001
Motorcycle/Motorcycle	72	0.43	3771	22.64	
Motorcycle/Pedestrian	34	0.20	1781	10.70	
Motorcycle only	16	0.09	838	5.03	
Motorcycle/Bicycle	11	0.06	577	3.46	

September were the most affected by deaths (0.52%), however, the difference observed was not statistically significant ( $p = 0.2133$ ). This period corresponds to the summer school holidays with their procession of intense juvenile recreational activities on the one hand, and on the other hand the poor state of the cycle paths associated with heavy winter rainfall could explain it [10].

The accidental motor-vehicle mechanism (Table 3) was strongly associated with death ( $p < 0.0001$ ), the statistical difference was highly significant. According to some data in the literature, the motor-vehicle mechanism is predominant [9] [15] [16]. This predominance of fatal cases in motorcycle accidents could be explained on the one hand by the collision force that is to the detriment of motorcyclists, and on the other hand by the fact that these 2 means of transport are the most commonly used in our context.

Regarding helmet use, we found that motorcyclists who did not wear helmets were 1.5 times more likely to die than those who did ( $p < 0.0001$ ); OR = 1.47 [1.16 - 1.85]. This low proportion of motorcycle users wearing helmets could be explained on the one hand by poor enforcement of road safety legislation in our country, and on the other hand with poor information about users on the importance of wearing helmets. They often think that they should wear a helmet to avoid police control and not for their own safety. In France, the ORSFC (Fr-CTE Regional Health Organization) in 2003 and ACEM (Association of European Motorcycle Manufacturers) in 2008 reported helmet use at around 100% and 90.4% respectively [15] [17]. Concerning the location of the lesions (Figure 1), the cephalic region (head and neck) was the most affected with 1.63%, followed by the limbs with 1.14%. This type of tissue damage demonstrates, on the one hand, the failure of motorcyclists to wear helmets and, on the other hand, the high velocity at which these accidents occur [10]. Helmet use reduces mortality and serious injuries after an accident [18] [19] [20].

In the majority of cases (1.18%), deaths occurred outside the hospital (either at the accident site or during transport to the hospital). Most of the studies on road traffic accidents that have been carried out in low- and middle-income countries in the world have been carried out in a number of countries.

## 5. Conclusion

Two-wheeled motorized road accidents are becoming increasingly frequent and

are responsible for high mortality among a young working population in developing countries. The regression of this phenomenon requires the implementation of a prevention policy through awareness campaigns on compliance with road traffic regulations, the wearing of protective helmets on the one hand, and on the other hand, through the effective implementation of an emergency medical assistance service (SAMU) in Conakry for the pre-hospital care of traumatised people.

### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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