Road Crashes: An Anthropic Pandemic, Case of the City of Lubumbashi

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Abstract

Introduction: Road traffic crashes are a significant public health challenge in view of the high morbidity and mortality for which they are responsible. **Objective:** This study aims to describe the frequency and profile of road traffic crashes in the city of Lubumbashi. **Methods:** A retrospective descriptive study was conducted between January 1, 2015 and December 31, 2017. Included are all cases of vehicles registered with the road safety police, involved in a traffic crash. The data were processed using SPSS version 23 software (SPSS, Armonk, NY). **Results:** The study focused on 3495 cases of road traffic crashes registered with the road traffic police service from January 1, 2015 to December 31, 2017. These crashes were caused mainly by male drivers (98.6%). January had a large number of road crashes (9.2%) followed by that of October (9.1%); with 17.9% of the cases, crashes were on a Sunday. In 10% of road crashes there were fatalities recorded. Night driving; driving downtown; the use of public transport vehicles as well as the fact of driving on a long straight road predisposed to fatal road crashes in Lubumbashi ($P < 0.05$). **Conclusions:** Roads are designed to allow human movement; however there is major risk of injury and death particularly in holiday months and at night. Awareness campaigns can be used as a tool to reduce the pandemic of life-threatening traffic accidents. Some health education channels like schools, churches, political parties, socio-cultural associations, trade unions can be useful for this purpose (road prevention).

Subject Areas

Public Health, Surgery & Surgical Specialties

1. Introduction

Globally, nearly 1.2 million people are killed in traffic crashes each year and twenty to fifty million are injured or disabled. These injured and disabled people make up 2.1% of the world's population. Low- and middle-income countries account for around 85% of all deaths [1] [2].

Trauma is among the most significant public health problems in the world, with an estimated 5.8 million deaths each year [3]. Although half of the trauma deaths occur at the scene, the remaining 50% is estimated to be potentially preventable if they have access to appropriate specialized care [4]. In Canada, they represent the main cause of death during the first four decades of life and a huge burden to society in terms of disability and economic costs, estimated at $19.8 billion per year [5].

There is hardly a day without the media publicising a case of a road crash in Lubumbashi. The investigation carried out in Lubumbashi in 2008 revealed that 57% of people died at the crash scene and this resulted from the absence of medical-rescue teams [6].

Also in Lubumbashi, a study conducted in 2014 on a comprehensive sample of 1915 traffic crash cases revealed that the majority (59%) of cases were caused by public transport vehicles driven by young adult males (89%) with an average age of 28, mainly due to ignorance of traffic laws (46.0%). These crashes mainly took place (52.9%) in the commune of Lubumbashi [7].

The costs of road crashes are enormous. Crashes cause as many crises for families either by the death of one of their own, or by long periods of hospital stay leaving the victim bedridden for a long time, with resulting loss of economic and social activity.

2. Methodology

This study was carried out in the city of Lubumbashi, utilising road traffic police data on road crashes registered at that division. It covers a three-year period, from January 1, 2015 to December 31, 2017.

The study was in form of an analytical cross-sectional study focusing on the traffic police register. The sampling was comprehensive, including all reported road crash cases.

The data were collected using a pro-forma data sheet. Data analysis was performed with SPSS version 23 software (SPSS, Armonk, NY). The prevalence ratio as well as the P-value was determined as the statistical assessment.

3. Results

Reports for a total of 3495 road crashes were identified in the database and as-

sessed. Most crashes were found to have male drivers and the results are shown in Table 1.

Male drivers are in the majority with 98.6% of cases compared to only 1.4% of female drivers.

While there was some variability in the incidence on a month-to-month basis, there were peaks in two of the months under review: January had the highest number of crashes (9.2%), followed closely by October (9.1%) (Figure 1).

Figure 2 shows the low fatality rate of 10%, while the vast majority of cases had no mortalities recorded (90%).

Collision between vehicles was the most frequent type of crash with 59.4% of the cases compared to 0.3% of the cases for the vehicle-object-pedestrian type. Interestingly pedestrians were the second most common crash type (Table 2).

Illegal manoeuvres (44.6%), excessive speeding (40.4%), drunk driving (7.4%), breaking road rules (3.4%), technical failure (2.9%) as well as place on the road or a vehicle abandoned on the public highway by its owner (1.3%) were the most common causes for motor vehicle crashes (Table 3).

Multivariate analysis by logistic regression showed that the following factors were significantly associated with fatal road crashes: Night driving (aPR = 2.3; 95% CI [1.8 - 2.9] and $p \leq 0.05$); driving in the city centre (aPR = 1.9; 95% CI [1.5 - 2.6] and $p \leq 0.05$); (APR = 2.3; 95% CI [1.8 - 2.9] and $p \leq 0.05$); occupancy of a public transport vehicle (aPR = 2.0; 95% CI = [1.4 - 2.8] and $p \leq 0.05$) as well as driving on long straight roads (aPR = 1.5; 95% CI = [1.1 - 1.9] and $p = 0.003$). However, excessive speed and weekend-driving, which had been risk factors after the bivariate analysis, were not significantly associated with fatal road crashes after the multivariate analysis (Table 4).

Table 1. Motor vehicle crash and driver's gender.

Sex	Frequency	Percentage
Female	48	1.4
Male	3447	98.6
Total	3495	100.0

Table 2. Representation of road crashes by causes.

Causes of road crashes	Frequency	Percentage
Illegal manoeuvres	1558	44.6
Alcohol	258	7.4
Technical failure	102	2.9
Place on the road	44	1.3
Lack of Respect for road rules	120	3.4
Excessive speed	1413	40.4
Total	3495	100.0

Table 3. Representation of road accidents by type of accident.

Type of crash	Frequency	Percentage
Collision between vehicles	2075	59.4
Vehicle-object	273	7.8
Vehicle alone	298	8.5
Vehicle-object-pedestrian	11	0.3
Vehicle-pedestrian	838	24.0
Total	3495	100.0

Table 4. Determinants of fatal motor vehicle crash accidents in the city of Lubumbashi after logistic regression.

Variables	Coefficient	STD	Wald	dof	P	aPR	aPR Confidence interval (95%)	
Night driving (Yes/No)	0.838	0.130	41.309	1	<0.05	2.313	1.791	2.987
Downtown (Yes/No)	0.685	0.137	25.090	1	<0.05	1.983	1.517	2.593
Driver's age (<18/>45 years)	−2.767	0.505	30.063	1	<0.05	0.063	0.023	0.169
Driver's age (18 to 45 years/>45 years)	−0.083	0.159	0.270	1	0.603	0.921	0.675	1.257
Excessive Speeding (Yes/No)	−0.314	0.117	7.171	1	0.007	0.730	0.580	0.919
Weekend (Yes/No)	−1.085	0.127	72.622	1	<0.05	0.338	0.263	0.434
Public transport	0.726	0.154	22.320	1	<0.05	2.067	1.529	2.793
Private	0.697	0.169	17.089	1	<0.05	2.008	1.443	2.795
Straight path	0.375	0.126	8.872	1	<0.05	1.455	1.137	1.861
Constant	**1.566**	**0.234**	**44.804**	**1**	**<0.05**	*****	*****	*****
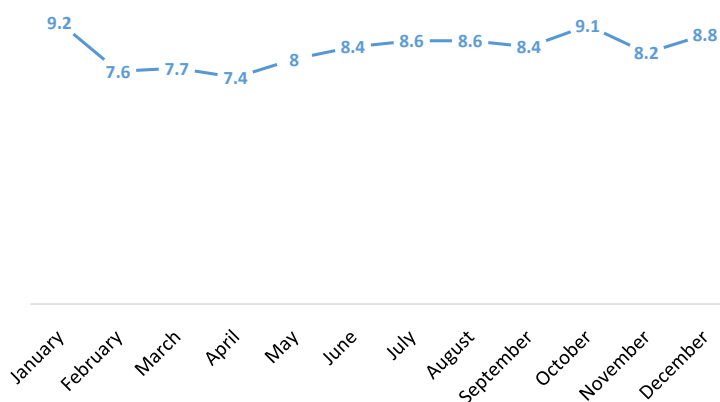
Figure 1. Annual trend in road accidents.
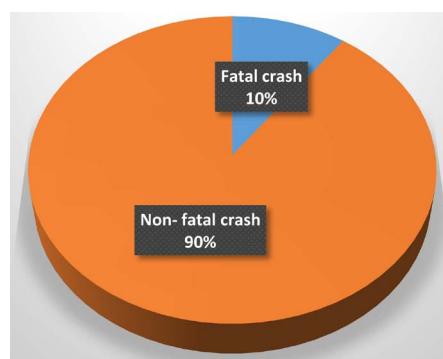
Figure 2. Distribution of accidents by type.

4. Discussion

This study examined the crash data for three years in the Lubumbashi city using police crash data. Spatial and demographic growth has not spared the city of Lubumbashi where this study was conducted [6]. The total number of motor vehicles continues to multiply and grow, and hardly a day goes by without the media reporting on a motor vehicle crash in Lubumbashi.

It was determined that male drivers were more likely to be involved in crashes, however no statistically significant association between gender and the occurrence of fatal road crashes was observed. This observation is similar to that reported in 2019 by Mekonnen and Moges in Ethiopia (98.9% of drivers were male) [8]. In the present study, this predominance of male drivers could be partly explained by the difference in numbers between male and female drivers, but also by the risk-taking behaviour of men behind the wheel and on the handlebars (speeding, driving during night hours, etc.) [7].

In Lubumbashi, in 10.18% of cases the crashes were fatal. These results are higher than those found in 2011 and 2012 [7] in the same city where the proportions of fatal crashes were 6.4% in 2011 and 4.73% in 2012.

It was also observed that January experienced a higher number of road crashes (9.2%) followed by that of October (9.1%) than the other months. January is the main holiday period in the Democratic Republic of the Congo (January the 1st: New Year's Day; January 4th: independence martyrs day, while the 16th and 17th is National heroes assassination commemoration: Laurent Desiré Kabila and Patrice Emery Lumumba). The lack of, or a reduced number of road traffic officers compared to the working days of the week may explain our results.

The month of October corresponds to the start of the academic year at local universities and this increases the flow of road traffic, because each public transport vehicle seeks to maximize revenue. Ilunga Kandolo *et al.* in a study conducted in Lubumbashi between 2011 and 2012 found a peak for the two series in November [7]. Kafando found results in Burkina Faso similar to those of the study by Ilunga *et al.* [9]. In Saudi Arabia, in Qassim city, the monthly distribution of road accidents shows a high rate in December while the lowest rate is observed in March with 13.1% and 5.8% respectively [10]. Other authors have found that in India the month of May and that of June had a higher rate of road crashes than the other months [11] with 94.5% of motor vehicle crashes.

In the South African Republic, the month with the highest fatality rate is December (11.2%), again related to increased travel in the holiday period. The lowest rates are reported for January and February, at only 6.0% and 5.0% [12]. In contrast, the European road safety observatory indicates that there are more road crashes in August from 2007 to 2016 [13].

Collision between vehicles was the most frequent type of crash with 59.4% of all reported cases compared to 0.3% of cases for the vehicle-object-pedestrian type. These results are different from those found in Lubumbashi in 2011 and 2012 [7] and in Qassim in Saudi Arabia [10] where the crash of a vehicle into a

solid object was in the majority. The new study findings are even at odds with international reports, such as from India, where collision between vehicles is the most common type of accident [14] with 80.7% of reported cases.

The Irish road authority indicates that the single vehicle and pedestrian represented 27.6%, the single vehicle only 10.6% while two or more vehicle collisions had 61.8% [15].

Multivariate analysis showed that the following factors were significantly associated with fatal road crashes: Night driving (aPR = 2.3; 95% CI [1.8 - 2.9] and $p \leq 0.05$); driving in the city center (PRa = 1.9; 95% CI [1.5 - 2.6] and $p \leq 0.05$); (aPR = 2.3; 95% CI [1.8 - 2.9] and $p \leq 0.05$); use of public transport vehicles (aPR = 2.0; 95% CI = [1.4 - 2.8] and $p \leq 0.05$) as well as driving on a long straight road (aPR = 1.5; 95% CI = [1.1 - 1.9] and p = 0.003). Drivers whose age is less than 18 years had less risk of fatal road crash than others ($p < 0.05$).

However, speeding and driving over the weekend as risk factors in the bivariate analysis, were no longer significantly associated with fatal road crashes in the multivariate analysis.

Regarding the age of the driver, findings from local traffic police in the City of Palermo, one of the six most populated cities in Italy, indicated that an accident between two drivers aged 24 years or younger, 45 - 54 and 65 years and older were more likely to be involved in a crash with a slight or serious injury than those aged 25- 44 and 55 - 64 years [16].

In Ireland, 77.9% of the road crashes occur on a straight road [15].

In Côte d'Ivoire [17] however, excessive speed is the main cause of fatalities (OR = 5.3; $p \leq 0.05$) followed by breaking other road rules, in particular overloading and dangerous parking (OR = 4, 9 vs 2.5; $p \leq 0.05$). In Iran, especially in the South of Kerman city, over speed (OR = 1.90; 95% CI = 1.40 - 2.50; $p < 0.001$) and deviation to the left lane (OR = 2.20; 95% CI = 1.70 - 2.90; p-value < 0.001) were more likely to lead to death than drowsiness and inattention to the front [18].

5. Conclusion

Road crashes are a preventable real public health problem. Every road user has to strictly respect rules of conduct to contribute to the reduction of morbidity as well as mortality linked to this phenomenon which is often caused by human factors (Anthropic).

Approved

This study was approved by the medical ethics committee of the University of Lubumbashi under the number: Unilu/CEM/079/2018.

Conflicts of Interest

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

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