

Road-traffic related Deaths in Accra Ghana: A 10-year Retrospective Autopsy Study at the Korle-Bu Teaching Hospital, Accra (2004–2013)

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Abstract

Background: Road Traffic Accident related (RTA) deaths are common in young Ghanaian adults and are therefore of public health concern. Reliable data on the categories of victims who are commonly involved and the patterns and outcomes RTA are limited in Ghana. The aim of this study was to describe the spectrum of road traffic related- deaths in Accra Ghana, the demographic characteristics of the victims and the immediate causes of death using a retrospective autopsy study.

Materials and methods: This was a retrospective autopsy study conducted in our institution from 1st January 2004 to 31st December 2013. The data was analysed using SPSS software (Version 23).

Results: During the period under review, 6.1% of all coroner autopsy performed in our institutions were RTA-related deaths. The younger age 20-29 years group, were commonly involved (22.2%) with male predominance (77.7%). The victims of RTA-related deaths were pedestrians (59.9%), passengers (19.3%), motor riders (8.7%), drivers (6.8%) cyclists (2.2%) and pillion riders (1.5%). The mean ages in years of these victims were: pedestrians (37.6), passengers (37.0), drivers (39.1), motor riders (32.0) pillion riders (31.7) and cyclists (37.2). The common immediate causes of deaths in all the victims were head injury, multiple bony and soft tissue injuries.

Conclusion: Approximately 6.1% of all coroner autopsies performed during the study period were RTA-related deaths, particularly the young male adults. The most affected victims were the pedestrian knockdowns, passengers and motor riders. Majority of the victims died of severe head injury and multiple bony and soft tissues injuries and died as a result of these injuries.

Keywords: Ghana; Road traffic accident; Autopsy; Death; Pedestrian; Pillion rider; Motor rider

Introduction

Road traffic-related deaths are deaths that normally result from injuries sustained in a road traffic accident (ICD-10 codes V01-V89). The incidence of these preventable deaths is found to be increasing globally, especially in the developing countries where accurate routine data are usually not available [1-5]. Studies have shown that males are common victims of RTA related deaths [2,4,6,7]. Mortalities from road traffic-related accidents commonly involved the younger productive age group (30-49 years) [4,8,9] mean age of 35 years [10].

The victims of road-traffic related deaths differ from study to study and the locality. Some studies found RTA among motor riders to be more common, [8,11,12] others found that passengers were more commonly affected, yet other workers found pedestrian knockdown as the common victims. Accurate data on the patterns of road traffic-related deaths in Ghana are limited. The aim of this study was to describe the pattern of road-traffic related deaths in Accra Ghana, the demographic characteristics and the immediate causes of death using a retrospective autopsy study.

Material and Methods

Study site

All data were obtained from the files of the Korle-Bu Teaching Hospital (KBTH) Mortuary, the largest mortuary in Ghana, where between 3,000 and 6,000 autopsies are performed each year. This mortuary receives cases from Korle-Bu Teaching hospital, the largest referral hospital in Ghana, as well as within the Accra Metropolis, neighbouring towns and Districts, and in special circumstances, from other regions across the country.

Study design

This was a retrospective autopsy study.

Data Collection and Analysis

All autopsy logbooks, autopsy sheets and hospital files were reviewed for the period from 1st January 2004 to 31st December 2013, and all cases of road traffic related deaths were recorded. Data were collected and cross-checked by two doctors, to prevent double entries.

For each case of RTA death, data were collected on the category of victim (road user), age and gender and the immediate cause of death.

The data were entered into a computerized spread sheet and analysed using SPSS software (Version 23). Frequency distributions and descriptive statistics were calculated for each variable. Given the descriptive nature of this study, no multivariate analyses were attempted.

Definitions

Underlying cause of death

The underlying cause of death is defined by the WHO as the disease or injury that initiated the train of morbid events leading directly to death or the circumstances of the accident or violence that produced the fatal injury (United Nations, 1991). The underlying cause of death is usually adopted as the cause for tabulation of mortality statistics as it is the most useful single cause for public health purposes.

Immediate cause of death

The disease, injury, or complication that directly precedes death, which is the ultimate consequence of the underlying cause of death.

Results

From 2004 to 2013, a total of 44,000 autopsies were performed at the Korle-Bu Teaching Hospital Mortuary, of which 36,080 (82.0%) were classified as coroner cases. Of this number of coroner cases 2,184 (6.1%) were deaths due to RTA. There were 1,695 (77.7%) males and 486 (22.3%) females.

The ages of RTA victims ranged from 0.17 to 95 years, with a mean age of 37.0 years (SD=18.8) and a modal age group of 20-29 years [466 (22.2%)]. About 58.7% of the victims were less than 40 years of age (Figure 1).

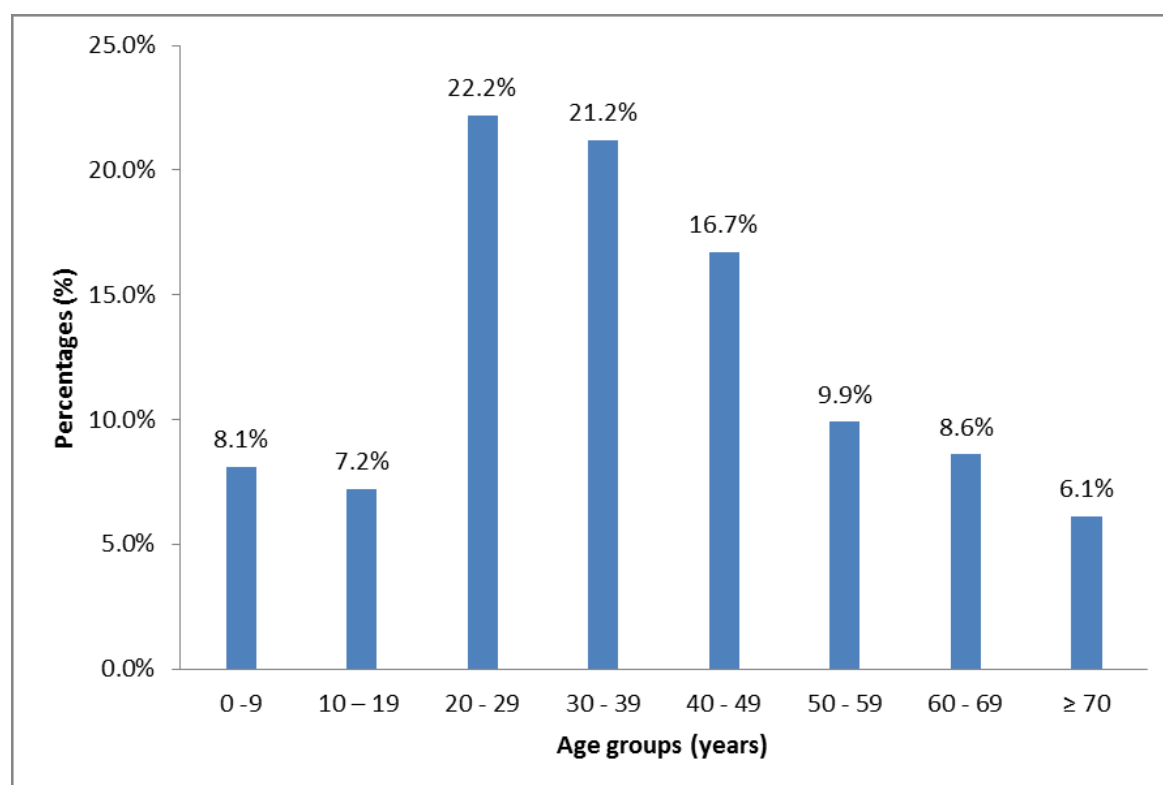


Figure 1: Age characteristics of deaths due to RTA at the KBTH (2004–2013).

The annual incidence of RTA related deaths has a gradual growth, but a closer look at the figures show that there is the potential for

deaths involving motor rider and pillion rider RTAs to rise with the coming years (Table 1).

Victim (n/%)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Pedestrian knockdowns	101 (7.7)	154 (11.8)	174 (13.3)	131 (10.0)	108 (8.1)	130 (10.0)	127 (9.7)	133 (10.2)	152 (11.7)	97 (7.4)
Passengers	50 (11.9)	53 (12.6)	29 (6.9)	42 (10.0)	42 (10.0)	58 (13.8)	35 (8.3)	34 (8.1)	35 (8.3)	42 (10.0)
Drivers	18 (12.1)	25 (16.8)	13 (8.7)	10 (6.7)	8 (5.4)	10 (6.7)	14 (9.4)	19 (12.8)	15 (10.1)	17 (11.4)

Motor riders	14 (7.4)	6 (3.2)	19 (10.1)	18 (9.5)	14 (7.4)	16 (8.5)	19 (10.1)	19 (10.1)	29 (15.3)	35 (18.5)
Pillion riders	0 (0.0)	2 (6.1)	0 (0.0)	1 (3.0)	1 (3.0)	1 (3.0)	1 (3.0)	5 (15.2)	11 (33.3)	11 (33.3)
Cyclists	3 (6.1)	4 (8.2)	5 (10.2)	5 (10.2)	4 (8.2)	5 (10.2)	10 (20.4)	3 (6.1)	7 (14.3)	3 (6.1)
By-standers	0 (0.0)	4 (17.4)	0 (0.0)	2 (8.7)	2 (8.7)	4 (17.4)	4 (17.4)	3 (13)	2 (8.7)	2 (8.7)
Fall from a moving vehicles	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	8 (72.7)	0 (0.0)	0 (0.0)	3 (27.3)	0 (0.0)	0 (0.0)
Total	186	248	240	211	187	224	210	216	251	207

Table 1: Annual distribution of victims of road traffic accident in Accra Ghana (2004 -2013).

Majority of the victims were pedestrians (59.9%), followed by passengers (19.3%) and motor (8.7%). The categories of victims of road traffic accidents (2004–2013) that had autopsy performed (Figure 2).

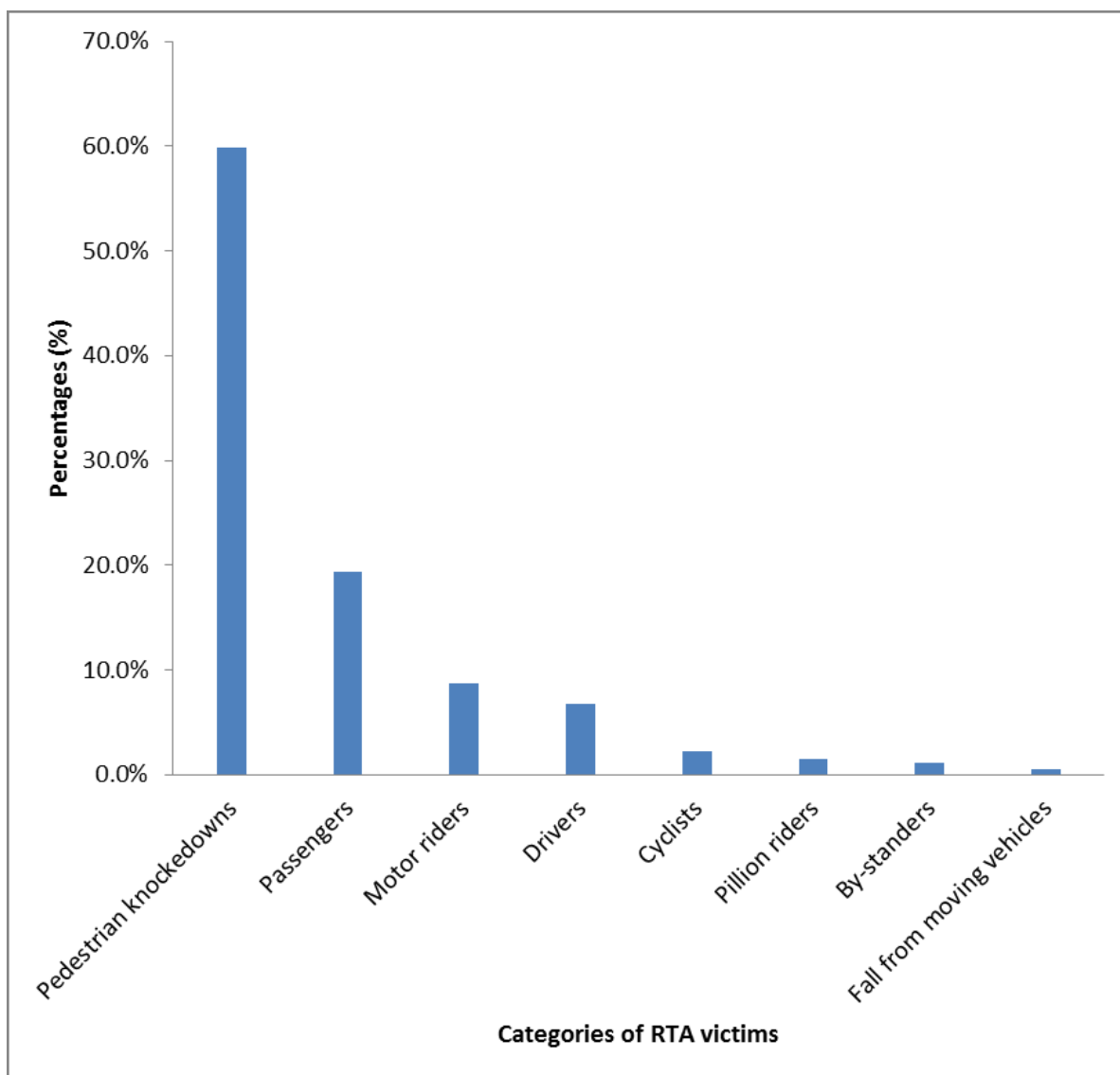


Figure 2: The categories of victims of road traffic accidents (2004–2013) that had autopsy performed.

Pedestrian Knockdowns

modal age group of 20-29 years (18.4%). About 10.9% of the victims were less than 10 years old, (Table 2).

The ages of pedestrians who died through RTA ranged from 2 to 94 years with a mean age of 37.6 (SD=20.8) years, median age (35.0) and a

Age (years)	0-9 (n/%)	10-19 (n/%)	20-29 (n/%)	30-39 (n/%)	40-49 (n/%)	50-59 (n/%)	60-69 (n/%)	≥70 (n/%)
Pedestrian knockdowns	138 (10.9)	113 (8.9)	234 (18.4)	229 (17.3)	189 (14.9)	135 (10.6)	131 (10.3)	110 (8.7)
Passengers	22 (5.4)	21 (2.0)	97 (23.8)	107 (26.2)	72 (17.6)	45 (11.0)	32 (7.0)	12 (2.9)
Drivers	0 (0.0)	5 (3.4)	21 (15.6)	41 (30.4)	48 (35.6)	12 (8.9)	5 (3.4)	3 (2.2)
Motor riders	0 (0.0)	4 (2.4)	83 (49.1)	45 (26.6)	24 (14.2)	5 (3.0)	8 (4.2)	0 (0.0)
Pillion riders	0 (0.0)	2 (6.5)	9 (29.0)	15 (48.6)	4 (12.9)	1 (3.2)	0 (0.0)	0 (0.0)
Cyclists	0 (0.0)	5 (10.9)	15 (32.6)	11 (23.9)	1 (2.2)	9 (19.6)	3 (6.5)	2 (4.3)
By-standers	2 (8.7)	3 (13.0)	7 (30.4)	4 (17.4)	7 (30.4)	0 (0.0)	0 (0.0)	0 (0.0)
Others	2 (18.2)	1 (9.1)	0 (0.0)	2 (18.2)	5 (45.5)	0 (0.0)	1 (9.1)	0 (0.0)

Table 2: The age distribution of road traffic deaths in Accra, Ghana (2004-2013).

The great majority were males (72.9%) (Table 3).

Victim/Gender	Male (n/%)	Female (n/%)
Pedestrian knockdowns	948 (77.1)	352 (27.9)
Passengers	311 (74.0)	109 (26.0)
Drivers	144 (96.6)	5 (3.4)
Motor riders	184 (97.4)	5 (2.6)
Pillion riders	29 (87.9)	4 (12.1)
Cyclists	48 (98.0)	1 (2.0)
By-standers	17 (73.9)	6 (26.1)
Fall from vehicles	11 (100.0)	0 (0.0)
Total	1,692 (100.0)	482 (100.0)

Table 3: Gender differences in road traffic related deaths for which autopsy was performed (2004–2013) at the KBTH.

About 44.8% of the pedestrians died of severe head injury (Table 4).

Immediate cause of death	Head Injury (n/%)	Multiple injuries (n/%)	Spinal injury (n/%)	Chest injury (n/%)	Ruptured Liver (n/%)	Ruptured bowel (n/%)	Ruptured Spleen (n/%)	Pelvic Injury (n/%)	Carotid Artery injury (n/%)
Pedestrian knockdowns	584 (44.8)	458 (35.1)	55 (4.2)	43 (3.3)	46 (3.5)	16 (1.2)	47 (3.6)	43 (3.5)	10 (0.7)
Passengers	165 (39.3)	113 (27.0)	48 (11.5)	23 (5.5)	20 (4.8)	6 (1.4)	12 (2.9)	25 (6.0)	8 (1.9)
Drivers	52 (34.9)	45 (30.2)	17 (11.4)	6 (4.0)	6 (4.0)	1 (0.7)	3 (2.0)	15 (10.1)	4 (2.7)
Motor riders	100 (52.9)	50 (26.5)	18 (9.5)	6 (3.2)	3 (1.6)	2 (1.1)	4 (2.1)	4 (2.1)	2 (1.1)
Pillion riders	17 (51.5)	10 (30.3)	2 (6.1)	1 (3.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (3.0)	2 (6.1)
Cyclists	24 (49.0)	12 (24.5)	2 (4.1)	3 (6.1)	1 (2.0)	0 (0.0)	2 (4.1)	5 (10.2)	0 (0.0)

By standers	9 (39.1)	9 (39.1)	2 (8.7)	1 (4.3)	2 (8.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Fall from vehicles	6 (54.5)	1 (9.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)		0 (0.0)

Table 4: Immediate cause of deaths in RTA victims in Accra, Ghana (2004 – 2013).

Passengers

The ages of passengers who died through RTA ranged from 0.17 to 95 years with a mean age of 37.0 (SD=16.7) years, median age (35.0) and a modal age group of 30-39 years (26.2%), (Table 2). The great majority were males (74.0%), (Table 3). About 39.1% died of severe head injury, followed by 27.0% who died of multiple tissue injuries (Table 4).

Drivers

The ages of drivers who died from RTA ranged from 17 to 94 years with a mean age of 39.1 (SD=12.5) years, median age (39.0) and a modal age group of 40-49 years (35.6%) (Table 2). The great majority were males (96.6%) (Table 3). About 34.9% died of severe head injury followed closely by 30.2% who died of multiple bony and soft tissue injuries. A significant number died of spinal (11.4%) and pelvic injuries (10.1%) (Table 4).

Motor riders

The ages of motor riders who died through RTA ranged from 14 to 69 years with a mean age of 32 (SD=10.8) years, median age (29.5) and a modal age group of 20-29 years (49.1%) (Table 2). The great majority were males (94.4%) (Table 3). More than half (52.9%) of the motor riders died of severe head injury followed multiple bony and soft tissues injuries (26.5%) (Table 4).

Pillion riders

The ages of pillion rider who died from RTA ranged from 15 to 94 years with a mean age of 31.7 (SD=9.8) years, median age (32.0) and a modal age group of 30-39 years (48.4%) (Table 2). The great majority were males (87.9%) (Table 3). About 51.5% died of severe head injury followed by 30.3% who died of multiple bony and soft tissues injuries. None of the pillion riders died of ruptured liver, spleen or blunt abdominal injuries (Table 4).

Discussion

This study found that a significant proportion (6.1%) of preventable deaths in Ghanaian for which autopsy was performed in our institution was related to road-traffic accident, especially in the recent years. The high proportions of RTA related deaths in this study may be attributed to the fact that in recent times, Accra the national capital of Ghana, has seen massive increased inflow of vehicles, pedestrians and hawkers on the roads. This is coupled with the fact that there is indiscipline on the part of road users, a pattern that is similar in most major cities in Africa and globally [1-4].

The authors strongly believe that the 6.1% RTA related-deaths among coroner autopsies is under-estimation, judging from that fact most RTA fatalities are not reported, have no autopsy done and hence are not captured in our autopsy statistics. Given the fact that under reporting of RTAs has been a major limitation of routine official data

sets in developing countries, the authors would like to recommend routine autopsy of RTA deaths in all teaching, regional and district hospitals in Ghana to serve as a source of data for our health sector mortality statistics, as it is practiced in other developed countries.⁵ This will improve the accuracy and reliability of RTA mortality data in Ghana.

The great majority of the victims were males (77.7%). This large gender disparity in RTA related-deaths in this study is supported by previous studies [2,4,6,7]. The study also found that RTA related deaths were common in the younger age groups (mean age=37.0 years), with as many as 58.7% being younger than 40 years of age. Road traffic accident related-deaths commonly involved the younger productive age group in both the developed and developing countries [4,8,9,10]. The age pattern of RTA deaths in this current study is in keeping with global statistics.

The spectrum of RTA related deaths in descending order in this study were: pedestrian knockdown, passengers, drivers, motor riders, pillion riders and cyclists. This pattern of deaths differs from studies that found motor riders as the commonly involved victim [8,11,12]. The current finding also differs from studies that found passenger as the most venerable victim [2,10]. Furthermore, our findings disagree with a study that reported that the commonly affected victims of RTA related mortality were drivers [5]. The current study however supports studies that found pedestrians as the common victims of RTA deaths [13-16].

Studies decades ago have shown that pedestrians involved in in RTA are at an increased great risk of being severely injured [17-19]. In this autopsy study, we found that most RTA related mortalities involved pedestrian knockdowns particularly the youth. This is in contrast to a study in Greece that found older pedestrian knockdowns to be the usual victims [20]. This however is in agreement with studies in other parts of the world [13,14,21,22]. The male predominance in this study differs from Reith et al. [22] in Germany which found the female pedestrians as the common victims of RTA related-deaths. The great majority of pedestrians died from severe head injuries, multiple bony and multiple soft tissue damage. This is in accordance with other studies [14,19,20,22,23].

The risk of dying as a young passenger from RTA has been reported in African countries such as Kenya [24]. Young adults, particularly the males in this study were the commonest group of passengers (car occupants) who died from RTA (74.0%). Like the pedestrians, most passengers involved in RTA mostly died of severe head and multiple soft tissue and bony injuries [14,20,24].

Drivers who died through road traffic accidents in this study were older than the other categories of victims; almost all were males. Male dominance in road traffic fatalities in Ghana may be due to the fact that men spend substantially more time in moving vehicles than women. Men are also more likely to be employed as drivers and mechanics of cars and trucks, including drivers of long haul vehicles which may mean spending several days and nights in the vehicle. Males, therefore, have a higher risk of being exposed RTAs than

women. About 35.0% of the drivers died from severe head injury. This differs from a study from Greece that found haemorrhage as the common immediate cause of death in drivers involved in RTA fatalities [20], but is supported by studies from Africa [24].

In this retrospective autopsy study, 8.7% of RTA mortalities were motor riders commonly the young adults and almost all being males. For the past 5 to 10 years, there has been an increased patronage of motor cycles as a quick means of transport within Accra and the surrounding districts and towns. The greater involvement of young Ghanaians, particularly younger males, in motorcycle crashes as in this current study is that males are more likely to purchase motors for commercial purposes popularly referred to as *okada*. Secondly, males are more likely to ride without a helmet and also males are commonly employed as dispatch riders for industries. Therefore males have greater exposure to the risks of motorcycling and the associated fatalities. The great proportion of young males involved in RTA mortality in this current study supports the findings of other studies [20,24,25].

Furthermore, our findings may suggest that unlicensed riders particularly among young riders could be a common practice in Accra, Ghana and thus RTA motor deaths will continue to rise with the coming years unless strict adherence to traffic regulations and the appropriate punishment are implemented to regularize the use of motorcycles in Ghana. This trend is similar to the study by Norlen et al. [26]. The current study found that approximately 79.0% of the immediate cause of death in motor riders was due to severe head injury coupled with multiple bony and soft tissue injuries. This is similar to the findings of other studies [20,24,27,28].

In this study, RTA-related deaths as pillion riders were commoner in younger victims and especially in males. The age and gender characteristics of pillion riders in this current study support the study by Akaateba et al. [24] in Ghana, who found that most pillion riders without helmets were young males. The study by Swaroop et al. [27] in India concluded that RTA deaths were commoner in male pillion riders. Studies on RTA pillion riders have also found that most of the victims died from severe head injuries and multiple bony and soft tissue damage. Our findings are in accord with other studies [28].

Conclusions

Approximately 6.1% of all coroner autopsies performed during the study period were RTA-related deaths, particularly the young male adults. The most affected victims were the pedestrian knockdowns, passengers and motor riders. Majority of the victims died of severe head injury and multiple bony and soft tissues injuries and died as a result of these injuries.

Recommendations/Suggestions

- Road traffic regulations should be part of all sectors of education in Ghana.
- Wearing of helmet by the motor rider and the pillion rider should be enforced and supervise by the road traffic unit of the Ghana police service.
- The road network/design should make provisions for pedestrians, especially the zebra crossing.
- Traffic offenders should be punished by the law court.
- The driving and vehicle licensing authority (DVLA) should ensure that only qualify drivers and vehicles are put on the road.

Competing Interest

The authors declare that they have no competing interests.

Author's contributions

EMD and JBD conceptualized the study. EMD and SN compiled and entered the data. JBD and EMD analysed the data. EMD and SN drafted the manuscript. EMD, JBD, SN and ABA read, edited and approved the final manuscript.

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