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Review of the Various Forms of Injuries on Drivers Involved in Road Traffic Accidents (RTA)

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Abstract

Background: About 80% of Road Traffic Accident (RTA) mortality is recorded in middle and low income countries such as Ghana. It is estimated that about 1.3 million people die yearly due to RTA. However, 20 to 50 million people sustain various forms of RTA injuries.

Aim: This study reviews the various postmortem-reported injuries sustained by vehicle drivers.

Methodology: This study is a retrospective review of various autopsy-diagnosed injuries of drivers involved in road traffic accidents. The extracted data were grouped according to age, sex and pathological diagnosis (injuries), and analyzed.

Results: A total of 127 cases were analyzed - 95.3% male and 4.7% female drivers. The highest driver incidence was between the ages of 30-39 years. There were 74 head injuries, 25 multiple organ injuries, 8 abdominal and neck injuries each, 2 haemorrhagic shock and 1 pelvic injury.

Conclusion: There is an increasing RTA mortality especially among drivers in Ghana. Most of the drivers involved in RTA die from head and multiple organ injuries.

Keywords: Drivers; Accident; Autopsy; Injuries

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Introduction

Road traffic accident incidence is increasing globally. It is expected that RTA will be trailing only ischaemic heart disease and unipolar major depression as the highest causes of mortality worldwide by 2020 [1]. Developing countries account for 72% of annual incidence worldwide. About 80% mortality is recorded in middle and low income countries such as Ghana [2,3]. Coleman [4] attributed RTA in Ghana to vehicle faults, bad road system and weak enforcement of regulations. Some studies have shown drivers errors as a cause of RTA [2,5,6].

There is high prevalence of RTA mortality among people below 30 years. It is estimated that about 1.3 million people die yearly due to RTA. However, 20 to 50 million people sustain various forms of RTA injuries [7]. Many studies have shown about 10:1 injuries to death incidence ration [8,9]. Pedestrians and motorists are at higher risk of sustaining injuries than vehicle drivers when involved in RTA. The various injuries sustained by drivers include head, abdomen, pelvic, extremities, neck and thoracic injuries [5,10,11].

Very little is known of the statistical prevalence of RTA in Ghana compared to other African countries such as Nigeria and Ethiopia [12]. This study reviews the various postmortem-reported injuries sustained by vehicle drivers. The epidemiologic findings of this study will contribute to statistical data on RTA in Ghana.

Materials and Methodology

This study is a retrospective review of various autopsy-diagnosed injuries of drivers involved in road traffic accidents. This study was conducted at the Department of Pathology, Komfo Anokye Teaching Hospital, Kumasi. The data was extracted from post mortem record books spanning from 2009 to 2014.

The extracted data were grouped according to age, sex and pathological diagnosis. RTA reported cases involving vehicle drivers were included in this study except those with incomplete or missing information on type of injury and cause of death.

The various injuries were broadly classified into; Head, Neck, Thoracic, Abdominal, Pelvic, Shock. Polytrauma. Head related injuries were grouped into Mild-to-Moderate and Severe Head injury, Basal skull fracture, crushed head injury, subdural and subarachnoid bleed. Neck related injuries were divided into Mild-to-Moderate and Severe neck injury, cervical spine injury with cord and neck fracture.

Mild, severe and crushed chest injuries and vascular tube rupture were sub divisions of thoracic related injuries. Rupture of the liver and spleen, as well as mesenteric arteries were the abdominal traumas identified.

Results

Road traffic accident trauma cases recorded between 2009 and 2014 were 1242. Only 145 drivers were involved, 18 had incomplete information and were excluded from this study, 127 cases were analyzed.

This study had 121 (95.3%) male and 6 (4.7%) female drivers in the ratio 20:1. The mean age is 39.17 (± 11.68), minimum and maximum age limit were 20 and 54 respectively with the highest incidence recorded between the ages 30 and 39 years **(Table 1)**.

The highest annual incidence was observed in 2014 with a frequency of 31 (24.4%) cases, followed closely by 2011 having 30 (23.6%). The lowest incidence was recorded in 2009 with 12 (9.4%) cases. There was a decrease from 2011 to 2013 and sharp increase in 2014 **(Table 1)**.

The most common trauma was head injury with 73 (58.3%) cases, followed by multiple organ injury (polytrauma) having 25 (19.7%) cases recorded. Pelvic injury had the least incidence with only one case representing 0.8% of all trauma cases **(Table 2 and Figure 1)**.

The various head-related trauma recorded showed the highest incidence of severe head injury with 42 cases (33.1%), followed by mild-to-moderate head injury with 17 cases (13.4%). Basal skull fracture had the least incidence with only 1 case (0.8%). Both subdural and subarachnoid bleed had 4 recorded cases each representing 3.1% each. Crushed head injury with evisceration of brain matter was present in 6 cases (4.7%) **(Table 3)**.

A total of 8 neck-related injuries were recorded. The highest peak incidence was cervical spine injury with cord involvement with 7 cases (5.5%). Mild neck injury was recorded only once (0.8%) **(Table 3)**.

Table 1 Year, sex and age distribution of medical factors.

	20-29 (%)	30-39 (%)	40-49 (%)	50-59 (%)	60-69 (%)	Total (%)
Year						
2009	-	4 (3.1)	3 (2.4)	4 (3.1)	1 (0.8)	**12 (9.4)**
2010	9 (7.1)	-	3 (2.4)	7 (5.5)	2 (1.6)	**21 (16.5)**
2011	10 (7.9)	9 (7.1)	6 (6.3)	5 (3.9)	-	**30 (23.6)**
2012	1 (0.8)	7 (5.5)	6 (6.3)	2 (1.6)	1 (0.8)	**17 (13.4)**
2013	1 (0.8)	5 (3.9)	4 (3.1)	6 (4.7)	-	**16 (12.6)**
2014	8 (6.3)	14 (11.0)	8 (6.3)	-	1 (0.8)	**31 (24.4)**
Total	**29 (22.8)**	**39 (30.7)**	**30 (23.6)**	**24 (18.9)**	**5 (3.9)**	**127 (100)**
Sex						
Male	28 (22.0)	39 (30.7)	26 (20.5)	23 (18.1)	5 (3.9)	**121 (95.3)**
Female	1	-	4 (3.1)	1 (0.8)	-	**6 (4.7)**
Total	**29 22.8)**	**39 (30.7)**	**30 (23.6)**	**24 (18.9)**	**5 (3.9)**	**127 (100)**

Table 2 Distribution of types of injuries sustained by drivers.

Type of Injury	Frequency	Percent
Head Injury	74	58.27
Neck Injury	8	6.3
Thoracic Injury	9	7.09
Abdominal Injury	8	6.3
Polytrauma	25	19.69
Haemorrhagic Shock	2	1.57
Pelvic Injury	1	0.79
Total	**127**	**100**

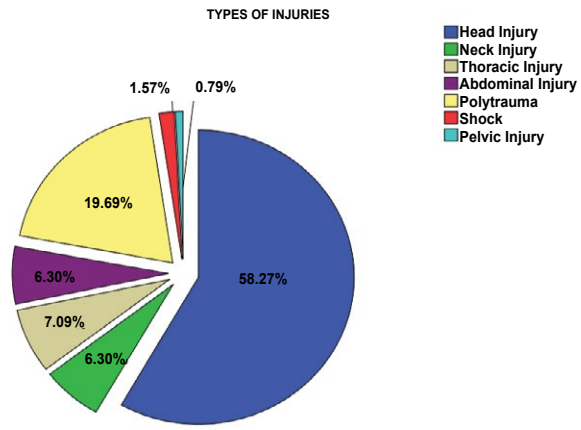

Figure 1 A chart showing incidence of the various injuries sustained by vehicular drivers.

Out of the 9 thoracic-related injuries, 5 (3.9%) of them were reported as severe chest injury, 3 (2.4%) as mild chest injuries and 1 (0.8%) was crushed chest injury. There were 25 cases (19.7%) of multiple organ injury or polytrauma, 7 abdominal injuries consisting of 5 liver rupture (3.9%), 2 spleen rupture (1.6%) and 1 mesenteric arteries injury (0.8%) **(Table 3)**.

The highest male drivers' incidence was between the ages of 30-39 with 39 cases while the highest annual male incidence was in 2014 with 31 cases. Highest female driver incidence was between 40-49 years. Both 2012 and 2010 recorded 2 female driver incidences each **(Table 1)**. There was no significance between sex and year (p=0.331) and sex and age (p=0.124). There was a

Table 3 Frequency distribution of injuries sustained by vehicle drivers.

Types of Injuries	Frequency	Percent	Valid Percent
Head Injury			
Mild-to Moderate Head Injury	17	13.4	23
Severe Head Injury	42	33.1	56.8
Basal skull Fracture	1	0.8	1.4
Crushed Head Injury	6	4.7	8.1
Subdural bleed	4	3.1	5.4
Subarachnoid bleed	4	3.1	5.4
Total	**74**	**58.3**	**100**
Neck Injury			
Cervical spine injury with cord transection	7	5.5	87.5
Neck Injury	1	0.8	12.5
Total	**8**	**6.3**	**100**
Thoracic Injury			
Severe Chest Injury	5	3.9	55.6
Crushed Chest Injury	1	0.8	11.1
Chest Injury	3	2.4	33.3
Total	**9**	**7.1**	**100**
Abdominal Injury			
Ruptured Liver	5	3.9	62.5
Ruptured Spleen	2	1.6	25
Ruptured mesenteric arteries	1	0.8	12.5
Total	**8**	**6.3**	**100**
Polytrauma			
Multiple organ injuries	25	19.7	
Shock			
Haemorrhagic shock	2	1.6	
Pelvic Injury			
Severe pelvic injury	1	0.8	

significance between age and year (p=0.004) of which the age range 30-39 had the highest annual incidence of 14 cases in 2014.

Assessing annual incidence against the various types of RTA trauma was statistically insignificant (p=0.08). Head injury had the highest annual incidence with 25 cases in 2014, followed by 2011 with 17 cases. There was statistical insignificance for trauma and sex (0.89) and trauma and age (0.704). Descriptive analysis showed a significance between head injury and year (p=0.020). Thoracic and neck-related injuries were found in only males.

Discussion

The driver-mortality RTA accounted for 6.9% of all RTA cases. This slightly differs from that of Jha et al. [11] in South India with 10% prevalence. Seid et al. [2] reported 6.5% incidence. The male dominating prevalence of 95.3% mortality for present study is in accordance with findings by Moafian et al. [13] with 97.5% male prevalence.

Drivers between the ages of 30 and 39 sustained more injuries than any other age range in this study. Bener [8] recorded high prevalence between 10 to 40 years whiles the modal age range of Jha et al. [11] was from 20 to 49 years. The least age range incidence was from 60 to 69 years accounting for 3.9% of all injury cases. Jha et al. [11] finding is in accordance with our findings, attributing less mobility by drivers from 60 years and above as the reason for low prevalence. Most of the injury incidence occurred in 2014 with 24.4% cases. This finding confirms increased RTA projections made by Coleman [4] in his study in Ghana. Atubi [14] also reported increasing incidence of RTA injuries on drivers.

The nature of road fatalities is linked with the manner of collision [2,5]. Among the types of injuries recorded, head injuries were at the pinnacle accounting for 58.27% of all injuries. Seid et al. [2] also recorded 50.4% head injuries, Kual et al. [5] recorded 55.62% secondary impact head injury. Most head injuries were severe (33.1%), followed by mild-to-moderate head injuries (13.4%). Six drivers (4.7%) suffered crushed head injuries with evisceration of brain matter while 1 driver (0.8%) had basal skull fracture. Seid et al. [2] showed contrasting finding of 56.03, 19.23 and 24.14% for mild, moderate and severe head injuries respectively. There was an account of subdural and subarachnoid bleed occurring in 4 drivers each (3.1%). High incidence (>5.0%) of subdural and subarachnoid bleed among drivers has been reported in many studies [2,5]. The high incidence of head injuries questions the enforcement of the use of seatbelts by vehicle users especially the drivers.

Neck injuries composed 6.3% of all injuries with most of them having spinal cord involvement (5.5%). The remaining neck injury reported was mild (0.8% each). Neck and head injuries reported in this study marked 64.6%, antipodal to the finding of Kual et al. [5] (19.86%).

Thoracic injury is very common in most RTA injury studies. An incidence of 7.09% thoracic injuries were observed among the drivers. Severe chest injury (3.9%) was more prevailing over mild (2.4%) and crushed chest (0.8%) injuries. Synonymous findings are seen in many studies [2,5].

Eight drivers (6.3%) suffered abdominal injuries. Studies in Addis Ababa [2] reported 12 (5.2%) abdominal injury incidence while Kual et al. [5] recorded 103 cases (14.82%). Abdominal injuries comprised of rupture of the spleen and liver, having incidence of 2 (1.6%) and 4 (3.1%) respectively. Intra-abdominal bleed occurred in 1 of the drivers. Kual et al. [5] recorded 11.34 and 19.81% rupture of the spleen and liver respectively, marginally deviating from that of this study.

Pelvic injuries are mostly rare in most RTA injury studies, accounted for 0.79% of all recorded injuries in this study. Haemorrhagic shock was identified among 2 drivers (1.57%) while 25 (19.69%) of them suffered polytrauma or multiple organ injuries. Eke et al. [15] antithetically recorded 93.5% multiple organ injuries. Kual et al. [5] also recorded high incidence of multiple organ injuries which is polar to our finding.

Conclusion

It is evident that there is an increasing mortality especially among drivers in Ghana. Most of the drivers sustained head and multiple organ injuries. Some injuries sustained by the drivers could have been prevented by use of seatbelts. This is a wake-up call for the road users and law enforcement bodies in the country to ensure the safety of drivers and passengers by ensuring the strict adherence to road rule and regulation especially the use of seat-belt.

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