

## Research Article

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# Major Mediums to Accidents of Patients Reporting for Plain Radiograph Examinations at the Second Largest Public Hospital X-Ray Facility in the Northern Region, Ghana

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## Abstract

**Purpose:** The purpose of this study is to report the various mediums and demographic characteristics of accident patients who underwent plain radiograph examinations at the Tamale Regional Hospital (TRH) X-Ray Unit.

**Material and methods:** This is a retrospective record analysis of radiology request forms (RRFs) of patients who attended the TRH X-Ray facility due to histories of accidents such as RTA, falls, birth injury, and etcetera. A total of 444 RRFs were analysed, covering a one year period (October 2017 to October 2018). Data was processed with the Statistical Package for the Social Sciences (SPSS) version 21.0.

**Results:** Analysis of the 444 forms and outcome are as follows. Accident due to motorcycle accounted for 71.3% of patients' attendance. Falls, other motor vehicles, sports, foreign body ingestion, assault/robbery, gunshot/stabbing, birth injury, suicide, and snake bite occurred at 12.8%, 5.0%, 2.5%, 3.0%, 0.7%, 0.5%, 1.6%, 0.2%, and 0.2% respectively. Other mediums contributed 2.3%. In terms of gender males constituted 65.0% and females 35.0%. Patients between 18 and 45 years had the most accident encounters.

**Conclusion:** Motorcycle is the leading mode of accident in the Northern Region, influencing the foremost accident-related reason for plain X-Ray services. Preventive education must particularly target males and those in the most youthful age brackets.

**Keywords:** Accident; Injury; Mediums; Hospital attendance; Ghana

**Abbreviations:** TRH-Tamale Regional Hospital; RRFs-Radiology Request Forms; RTA-Road Traffic Accident; HIV/AIDS-Human Immune Virus/ Acquired Immune Deficiency Syndrome; LMIC-Low-Middle-income country; A&E-Accident and Emergency; ANC-Antenatal Clinic; SVD-Safe Vaginal Delivery; CS-Caesarean Section; DVLA-Drivers and Vehicle Licensing Authority

## 1. Introduction

Presently, accident contributes more than 5 million deaths annually (about 14000 deaths daily), representing 9% of the world's deaths and nearly 1.7 times the deaths combined from HIV/AIDS, tuberculosis and malaria. In addition, accident is responsible for an estimated 6% of all years lived with disability [1]. Incidence and casualty numbers may rise, particularly in developing countries if appropriate actions are not taken [2]. Accident is defined as an incidence that may occur either by the absence of predetermined intent or even if negligence is apparent [3]. The mediums of accident are numerous, and not limited to, but include; road traffic accident (RTA), falls, drowning, burns, poisoning, animal attack, fire arms, suicide and homicide [3]. Approximately, RTA contributes 24% of the 5 million global accident-related deaths. Drowning, burns, poisoning, suicide, homicide as well as war also contribute 7%, 5%, 4%, 16%, 10% and 2% respectively. Further, falls account for 14% while other mediums contribute 18%. Between 75% and 90% of these incidences except for falls occur in low-and middle-income countries (LMICs) comparing with developed countries [1]. However, no two continents or even countries of the same continent are exactly the same [4]. There are differences of population behaviours, risk factors of injuries, policy priorities [5], geographic locations, socio-economic statuses and political wills [6]. As a result solutions and approaches to issues may differ from continent to continent, or country to country. Therefore decisions of interventions is important to be based on local data/evidence or country-specific research [2, 6].

Unfortunately, despite the adverse impact and burden of accident especially in LMICs, not many studies have been conducted in Ghana to investigate the subject, particularly regarding mediums by which accidents occur. The few studies [7-11] available in Ghana have mainly focused on RTAs except the work by Mock et al. [5] which focused beyond RTA. However, Mock et al. [5] study was undertaken almost two decades ago. Considering the socio-economic, technological and environmental changes that might have taken place since the last two decades, it is probable the study findings/evidence may not reflect or represent the current status of accident incidences in Ghana. On the other hand, Mock et al. [5] research was carried out in southern Ghana using house-to-house interviews as data collection source whereas the current study is undertaken in the Northern Region with secondary data-source of radiology documents. Primarily, differences exist between Northern and Southern communities in Ghana, in areas of economy, social infrastructure and political belonging (i.e. poverty, illiteracy and poor social infrastructure is highest in the north than in the south).

With the studies referred earlier [7-11] to be limited to RTAs the sources of data for those studies were predominantly from police records, and few using hospital A&E records. Typically, many Ghanaian accident victims do not readily attend hospitals or police stations, except when incidence is life-threatening, or police report

needed for compensation claims, property repairs, and legal challenge. Thus, the use of data from only the police or A&E records potentially limit extrapolation and generalisation of those research findings, as significant proportion of patients/victims may have been underreported and incidence underestimated [2, 5]. Notwithstanding, in few parts of Ghana, particularly the North, victims of accident rather prefer attending traditional facilities (what is termed 'local care') for treatment over hospitals. Routinely, the local care providers (mainly bone setters) request plain radiograph for their clients before they commence any treatments. The TRH X-Ray Unit receives numerous of such requests, in addition to those from formal medical care facilities i.e. hospitals, clinics. In this regard the X-Ray Unit is most likely to provide a more representative data on accident victims since its records captures patients of both formal and informal setups. The current study seeks to report the various mediums that were responsible for patient accidents for which reason they were referred for plain radiograph at the TRH X-Ray Unit. The study outcome would be essential for suggesting remedial strategies for education and prevention of accident incidences in the Northern Region.

### **1.1 Background of the x-ray unit**

The TRH X-Ray Unit begun operations on 18<sup>th</sup> October 2017, with the equipment being the only digital X-Ray machine within the Northern Regional capital, Tamale. Due to the high image quality of the machine, many requesting practitioners both in the formal and informal practices (bone setters) prefer the facility for their clients, making the Unit a well patronised outlet.

## **2. Material and Methods**

The research was retrospective study undertaken at the X-Ray Unit of the TRH, covering the period October 2017 to October 2018. A total of 2,867 RRFs were initially scrutinised manually, and all accident-related history forms were identified for inclusion in keeping with the purpose of the study. Thus, request forms of non-accident clinical history were excluded (2,400). History of accident covered falls, motorcycle injury, other motor vehicles (car, bus and truck), foreign body impaction, suicide, gunshot/stabbing, birth injury, snake bite and sports among others. 467 RRFs qualified, however a further 23 forms were taken out (representing duplicate forms of patients who visited for follow-up radiographs to assess treatment progress) leaving 444 RRFs for the final analysis. The analysis of data was done with the Statistical Package for the Social Sciences (SPSS) version 21.0. Patient demographic data and means of accident were extracted and analysed. The outcome is summarised in numerical values and percentages, and presented in simple table formats. The research had the appropriate ethical approval. Names of patients were not recorded in data spread sheet to maintain patient anonymity and confidentiality.

## **3. Results**

444 patients RRFs were analysed for a period of 12 months from the X-Ray Unit records. Table 1 demonstrates etiologies of accident and gender distribution. Motorcycle was the most common cause of accidents, being accountable for 317 (71.3%) of patient attendance. Snake bite and suicide were uncommon source of accident, with each contributing 0.2%. There were 290 (65.0%) males and 154 (35.0%) females giving a ratio of 1.9:1. Table 2

shows mediums of accident and age contribution. The highest number of accidents (122; 27.4%) were recorded by patients within the age brackets of 26-35 years. Patients in the age range 6-11 and 12-17 years encountered the least frequencies of accidents.

Mediums	Males	Females	Total
Motorcycle	216 (48.6%)	101 (22.7%)	317 (71.3%)
Other vehicles	14 (3.2%)	8 (1.8%)	22 (5.0%)
Falls	27 (6.1%)	30 (6.7%)	57 (12.8%)
Other	8 (1.8%)	2 (0.5%)	10 (2.3%)
Sports	7 (1.6%)	4 (0.9%)	11 (2.5%)
Bone impaction	3 (0.7%)	2 (0.5%)	5 (1.2%)
Coin ingestion	4 (0.9%)	3 (0.7%)	7 (1.6%)
Glass ingestion	0 (0.0%)	1 (0.2%)	1 (0.2%)
Assault/robbery	2 (0.5%)	1 (0.2%)	3 (0.7%)
Birth injury	4 (0.9%)	3 (0.7%)	7 (1.6%)
Snake bite	1 (0.2%)	0 (0.0%)	1 (0.2%)
Gunshot/Stab	2 (0.5%)	0 (0.0%)	1 (0.5%)
Suicide	0 (0.0%)	1 (0.2%)	1 (0.2%)
<b>Total</b>	<b>290 (65.0%)</b>	<b>154 (35.0%)</b>	<b>444 (100.0%)</b>

**Table 1:** Mediums of accident and gender distribution (n=444).

Mediums	0-5	6-11	12-17	18-25	26-35	36-45	46-55	56-65	66≥	Total
Motorcycle	1 (0.2%)	3 (0.7%)	5 (1.1%)	59 (13.3%)	107 (24.1%)	68 (15.3%)	34 (7.7%)	25 (5.6%)	15 (3.4%)	317 (71.4%)
Other vehicles	0 (0.0%)	2 (0.5%)	0 (0.0%)	1 (0.2%)	9 (2.0%)	6 (1.4%)	3 (0.7%)	1 (0.2%)	0 (0.0%)	22 (5.0%)
Falls	13 (2.9%)	8 (1.8%)	1 (0.2%)	7 (1.6%)	3 (0.7%)	9 (2.0%)	4 (0.9%)	5 (1.1%)	7 (1.6%)	57 (12.8%)
Other	3 (0.7%)	0 (0.0%)	1 (0.2%)	0 (0.0%)	1 (0.2%)	3 (0.7%)	2 (0.5%)	0 (0.0%)	0 (0.0%)	10 (2.3%)
Sports	1 (0.2%)	5 (1.1%)	3 (0.7%)	0 (0.0%)	1 (0.2%)	1 (0.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	11 (2.4%)
Bone impaction	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (0.7%)	0 (0.0%)	0 (0.0%)	2 (0.5%)	5 (1.2%)
Coin ingestion	4 (0.9%)	3 (0.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	7 (1.6%)
Glass ingestion	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.2%)

Assault/robbery	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.2%)	1 (0.2%)	1 (0.2%)	0 (0.0%)	0 (0.0%)	3 (0.6%)
Birth injury	7 (1.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	7 (1.6%)
Snake bite	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.2%)
Gunshot/Stab	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.5%)
Suicide	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.2%)
<b>Total</b>	<b>29</b> <b>(6.5%)</b>	<b>21</b> <b>(4.8%)</b>	<b>10</b> <b>(2.2%)</b>	<b>71</b> <b>(16.0%)</b>	<b>122</b> <b>(27.4%)</b>	<b>92</b> <b>(20.7%)</b>	<b>44</b> <b>(10.0%)</b>	<b>31</b> <b>(6.9%)</b>	<b>24</b> <b>(5.5%)</b>	<b>444</b> <b>(100%)</b>

**Table 2:** Mediums of accident and age group specific distribution (n=444).

#### 4. Discussion

This study was aimed at reporting the various mediums and demographic characteristics of accident patients who were referred for plain radiographs at the TRH. RTA, falls, foreign body ingestions, sports, other and birth injuries emerged the most leading causes of accident reported to the X-Ray Unit. The rest of the sources were assault, gunshot and suicide, which were the least reported. Meanwhile males were more vulnerable to accidents than females and persons from 18-55 years were most generally affected, followed by those between 0-17 years, and 56-66 $\geq$ . Primarily, RTA is causing more accident (76.3%) compared to other modes observed in this study. In dominance however motorcycle contributes the greatest proportion (71.3%), being also the leading reason most accident-related patient attend for X-Ray services at the TRH. In reports of earlier studies the use of motorcycle and its related accidents were reported to show association with socioeconomic/environmental determinants, such as education level, income, access to transportation, condition of roads and highways, systematic checks, motor maintenance, and risk factors including over speeding, drinking and driving and vehicle vulnerability [12]. Among the regions in Ghana, the Northern Region is the poorest, placing highest in illiteracy and bad transportation networks. The widespread nature of poverty may likely contribute to the common and widely use of motorcycle by majority of the people within the Region since it by far a cheaper means of transportation in terms of cost of owning and maintaining comparing to other motor engine vehicles [13].

Perhaps, the shape of motorbikes been relatively smaller in size could be influencing the high and popular patronage, as it is seen portable and convenient to move around, with ease and quick especially manoeuvring in heavy traffic jam and navigating on poor roads in the Region [13]. Probably, many riders take undue advantage of the small size to engage in misconduct on the road. Misconduct such as over speeding, ignoring and speeding through red and amber traffic signals, climbing pavements to join opposite sides of roads instead of using designated turning around routes, and riding in pedestrian pathways/walkways. On the other hand, there is also the rising habits

of riders using cell phones while riding, leading to loss of concentration and distraction. This habit and behaviour often initiate most of the motorcycle accidents and crashes sometimes resulting in multiple and severe injuries. Unarguably such misconducts are indication of potential neglect of safety precautions, lack of education on risky driving, non-compliance to traffic regulations, lack of enforcement, poor riding and driving habits, inadequate facilities to prevent RTA. Furthermore, age and or gender of riders/users is a contributing factor of motorcycle accident. In this present study patients who encountered most of the motorcycle accident were males and those within the active age brackets (18-55 years). This has been previously observed by other authors where majority of motorcycle accident victims were males and those aged between 11-45 years [13-14]. Generally these groups represent the active group category who would usually engage in high risk-taking activities such as reckless riding, over speeding and riding under influence of alcohol and drugs. The male preponderance could be that women for many decades in the history of the Northern Region were not riding until recently. Thus women riders in the Northern Region are traditionally fewer. Perhaps the reason why individuals in their youthful age are largely involved in motorcycle could be explained by the fact that at this age majorities are engaged in productive activities that require them to move fast enough from one area to another and in so doing are predisposed to risks of being involved in traffic accident. Representing the economically productive years, RTA may have an important economic impact in the Northern Region, therefore preventive interventions should target these individuals [13].

Beyond RTA, falls is a second disturbing accident cause in the Northern Region identified in this study. However, contrary to motorcycle accident, females constituted the highest affected (6.7% out of the total 12.8%), an outcome which is similarly reported by previous literature [15]. Worryingly, 21 patients out of the total 57 falls-victims were below 12 years. This number is highest comparing with the remaining other age category victim tallies. The observation raises concern of lack of supervision for this vulnerable individuals. This individuals require consistent guidance, coaching and monitoring both in school, at home and during involvement in general activities and sports. In advanced countries most falls victims are predominantly older persons (65 years or more) [15-16], contrary to the observation in this present study. Just as fewer as 7 persons at 66 years and above were victims of falls in this study. Probably, the predominant dry weather condition in Ghana, and more pronouncedly in the north is of great advantage to relieve the aged of slipping and tripping compared to the largely wet climate in advanced countries as a result of snowing and cold [15].

Birth related injuries was reported in 7 children in the age range 0-5 years. Though this study did not investigate the stage of the accident nonetheless two sources may be liable. Possibly either injury occurred while baby in mother's womb or during delivery. It is important for pregnant women to be adequately educated especially during antenatal clinic (ANC) attendance to avoid dangers and activities that could likely put unborn babies in such risk. Also, both skilled and traditional birth attendants should be cautious during safe vaginal delivery (SVD) and caesarean section (CS) assisted deliveries in order to prevent birth related accidents to babies. In a similar manner there is the need for parents, wardens, child minders, guardians and adults in general to be careful in keeping away harmful ingestible materials including coins, sharps and toxic solutions from children. Failure may put children in probable danger of suffocation and death if they mistakenly swallow and not timely rescued. Constant education of the children is also

vital. In the present study as much as 7 children below 12 years, made up of 4 between 0-5 year, and 3 in the range 6-11 years swallowed metallic coin of varying sizes. Meanwhile, bone impaction was the cause of accident in 5 persons; 3 among those aged 36-45 years and 2 in 66 ≥.

## **5. Conclusion**

Motorcycle accident is the major and general leading cause of accident in the Northern Region of Ghana. Male riders constitute the single largest risk group. Beyond, accident through falls, birth injury, sports injury, foreign body ingestions and other motor vehicles (car, bus and truck) are also to be much concerned about. Based on the outcome of this study the author suggest the following recommendations. Regarding RTA, preventive interventions should include strict enforcement of traffic regulation/law and continuous public education by all stakeholders including the Drivers and Vehicle Licensing Authority (DVLA), National Road Safety Commission and Ghana Police Service. Such intervention should particularly target males and those in the most youthful age group who are the most vulnerable. Installation of traffic cameras to track road users who flout traffic laws and bring them to discipline is highly recommended. To reduce incidences of birth injuries ANC staff should routinely educate pregnant women on activities that may pose physical harm to their unborn babies. In similar manner health professionals who assist with deliveries should be more careful with their delivery processes and methods to reduce birth injuries to babies. Parents and guardians should take keen interest in supervising, guiding and monitoring children during their involvements in general activities and sports both at school and in the home. The author cautions that the finding of this current research should be generalised in other settings with caution as the study was carried out with a single facility.

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