

EPIDEMIOLOGY AND PATTERN OF ORTHOPAEDIC TRAUMA IN PATIENTS ADMITTED TO THE SURGICAL WARD OF A REGIONAL HOSPITAL

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Abstract

Background: Orthopaedic trauma related injuries have not been extensively studied in Sub-Saharan Africa. Increase in industrialization and motorization in these countries have seen a corresponding increase in injuries. The causes of these injuries may vary slightly from one geographic region to another. Knowing the circumstances under which these injuries occur affords policy makers the opportunity to put in place the necessary preventive measures

Objectives: To describe the epidemiological characteristics and cause of orthopaedic related trauma injuries in patients admitted to the surgical ward of Greater Accra Regional Hospital

Methods: Patients admitted to the surgical ward with orthopaedic trauma related injuries between May 2016 and October 2017 were retrospectively reviewed

Results: A total of 253 trauma related injuries were

admitted to the surgical ward with an average age of 45.2 years and a male to female ratio of 2.3:1.

Road Traffic Accidents (RTA) accounted for 49.2% of all trauma related admissions, with motorcycle related accidents accounting for 52.8% of all RTAs. The second most frequent cause of trauma related admission was falls, representing 29.9%. Two hundred and thirteen patients (84.2%) were admitted with fractures. Seventy-eight percent of the patients with fractures were managed operatively. The overall in-ward crude mortality was 1.98%

Conclusions: The findings from this study points to the fact that RTAs, (especially motorcycle related injuries) and falls, account for the majority of trauma related admissions. Fractures account for the majority of injuries sustained, with a significant proportion being managed operatively.

Key Words: Epidemiology, Pattern, Trauma, Admission

Introduction

According to the World Health organization (WHO), injuries account for 5 million deaths per year, representing 9% of all global deaths¹. It has also been projected that accidents will be the third leading global cause of death by the year 2020². Globally, orthopaedic conditions incur more than 52 million disability-adjusted life years (DALYs) annually, comprising more than 16% of the global disease burden³. In the developed countries, the burden of injuries is showing a downward trend while the exact opposite can be said for developing countries especially within sub-Saharan Africa⁴. In developing countries, the surge in industrialization and motorization is usually accompanied with increasing numbers of injuries⁵.

In Ghana the epidemiology of orthopaedic trauma related injuries has not been extensively studied. Among the handful of information available is a study conducted by Torgbenu et al that revealed that nearly half of the injuries sustained were fractures, and common causes were vehicular crash 113 (42.0%) and fall 68 (25.3%)⁶. Studying the epidemiology and pattern

of these injuries will not only help policy makers put in place preventive measures, but also will help the hospital management team to apportion resources appropriately for the care of these patients.

As a consequence, the authors investigated the epidemiological characteristics and pattern of orthopaedic trauma related admissions to the surgical ward of a Regional hospital in Ghana. As an accredited tertiary facility with a recent upgrade from 180 to 420 bed capacity. This increment may have a positive correlation with trauma related admissions because of increased number of beds on the surgical ward. Data from this study can provide a baseline information that can be used by management in planning towards trauma care delivery

Materials and methods

This study received institutional permission from the Greater Accra Regional Hospital (GARH), Accra, Republic of Ghana. GARH is the biggest regional hospital in Ghana, with a wide catchment area, and accredited as a tertiary hospital in 2019. Between May 2016 and October 2017, 253 patients were admitted to the surgical ward with trauma related injuries. Majority of these patients were admitted through the emergency without a referral, implying that it was the first point of call for most of these patients. Patient demographics, mechanism of injury, and sites and types of injury were retrospectively reviewed. IBM SPSS Statistics version 19.0 (IBM Corp., Somers, NY, USA) was used for

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statistical analyses. Continuous variables were compared using Student's t-test and categorical data were compared using the chi-square test and Fisher's exact test according to the mechanism of injury. Two-sided p values less than 0.05 were considered statistically significant.

Results

The mean age of trauma related admission was 45.2 years with a SD of 22.3. The admission pattern showed a preponderance of males, ratio of 2.3:1 (table 1).

Table 1. Characteristics of the patients

	N=253
Age (years, means)	45.2±22.3
Sex (M: F)	176:77
Injury site	
Lower extremities	221 (87.4%)
Upper extremities	32 (12.6%)
Not specified	8 (3.2%)
Multiple site injury	64 (25.3%)
Injury type	
Fracture	213 (84.2%)
Open fracture	69/213 (32.4%)
Dislocation	12 (4.7%)
Laceration	12 (4.7%)
Degloving injury	6 (2.4%)
Others	10 (4.0%)
In-hospital mortality	
Pulmonary embolism	1
Aspiration pneumonia	1
Fat embolism	2
Sepsis	1

The commonest injury site was the lower extremity (n=221, 87.4%) with the commonest injury type being fractures, (n= 213, 84.2%). Sixty-nine out of all the fractures (32.4%) were open fractures. There was an overall in-ward mortality rate of 1.98 among trauma admitted patients. Majority of the fractures admitted

during this study period were managed operatively (n=166, 77.9%, table 2).

Table 2. Treatment of fractures

	N=213
Operative	166 (77.9%)
ORIF with plate and screws	58
Debridement with external fixation	36
Open/Closed IM nailing	36
Hemiarthroplasty	22
K-wiring/Cerclage	14
Conservative	34 (16.0%)
Not specified*	13 (6.1%)

*Include patients who opted for discharge against medical advice after admission and patients who asked for transfer to other facilities because of proximity sake

Road traffic accidents (RTA) accounted for 49.4 % of all trauma related admissions, with motorbike related injuries accounting for 52.8% of all RTAs (table 3).

Table 3. Mechanism of injury

	N=253
Road traffic accident	125 (49.4%)
Motorbike rider	66/125 (52.8%)
Vehicle	12/125 (9.6%)
Pedestrian	35 (28.0%)
Not specified	12 (9.6%)
Fall-down	76 (30.0%)
Fell from height	19/76 (25.0%)
Slipped and fell	45/76 (59.2%)
Fell into a gutter	10/76 (13.2%)
Not specified	2 (2.6%)
Extrinsic injury	16 (6.3%)
Not specified	36 (14.2%)

This was followed by 35 pedestrian injuries (28.0%) and 12 vehicular accident related injuries (9.8%). There was a relationship between gender and mechanism of injury in the RTA patients with significant male preponderance in motorbike injuries (p<0.001, table 4).

Table 4. Characteristics of the 113 patients who were injured by road traffic accident according to the mechanism of injury. Twelve patients who were not specified with the mechanism of injury were excluded from analysis

	Motorbike (n=66)	Vehicle (n=12)	Pedestrian (n=35)	p-value
Age (years, means)	32.2±11.4	37.3±13.1	38.3±20.9	0.136
Male	65 (98.5%)	7 (58.3%)	19 (54.3%)	<0.001
Lower extremity injury	60 (90.9%)	11 (91.7%)	32 (91.4%)	>0.999
Pelvis, Acetabulum	3 (5.0%)	1 (9.1%)	1 (3.1%)	0.377
Femur, Thigh, Knee	22 (36.7%)	2 (18.2%)	7 (21.9%)	
Tibia, Fibula, Ankle, Foot	35 (58.3%)	8 (72.7%)	24 (75.0%)	
Upper extremity injury	7 (10.6%)	2 (16.7%)	4 (11.4%)	0.615
Fracture	59 (90.8%)	9 (81.8%)	30 (90.9%)	0.572
Multiple site injury	20 (31.7%)	5 (45.5%)	10 (29.4%)	0.605

Table 5. Characteristics of the 74 patients who were injured by fall-down according to the mechanism of injury. Two patients who were not specified with the mechanism of injury were excluded from analysis.

	Fell from height (n=19)	Slipped and fell (n=45)	Fell into a gutter (n=10)	p-value
Age (years, mean \pm SD)	45.6 \pm 22.2	76.6 \pm 15.5	53.8 \pm 17.2	<0.001
Male	13 (68.4%)	18 (40.0%)	6 (60.0%)	0.087
Lower extremity injury	16 (84.2%)	44 (97.8%)	8 (80.0%)	0.042
Pelvis, Acetabulum	4 (25.0%)	5 (11.4%)	1 (12.5%)	<0.001
Femur, Thigh, Knee	6 (37.5%)	37 (84.1%)	3 (37.5%)	
Tibia, Fibula, Ankle, Foot	6 (37.5%)	2 (4.5%)	4 (50.0%)	
Upper extremity injury	4 (21.1%)	2 (4.4%)	1 (10.0%)	0.084
Fracture	16 (84.2%)	44 (97.8%)	7 (70.0%)	0.012
Multiple site injury	5 (27.8%)	2 (5.1%)	1 (10.0%)	0.041

The second cause of trauma related admission was falls (n=76, 30.0%). In this category of patients, there was a statistically significant relationship between age and mechanism of fall ($p < 0.001$, table 5). Slipped and fell was generally seen in elderly patients while falling from a height and falling into a gutter were seen in relatively young patients (table 5). There was a statistically significant relationship between sustaining a fracture and the nature of fall injury with 97.8% of the patients sustained a fracture after slipping and falling ($p = 0.014$, table 5).

Discussions

This study revealed a male to female ratio of 2.3: 1 for patients admitted with orthopaedic trauma related injuries. This finding, is in keeping with other studies conducted in sub-Saharan Africa⁷ and South Africa⁸, which showed a male preponderance.

The overall mean age for trauma related admission was 45.2 years with a SD of 22.3, close to the results of an earlier study, conducted by Torgbenu et al⁶, which stated a mean age of 38 years with a standard deviation of 19.88.

The main causes of trauma related admissions were, RTAs (49.4%) and falls (30.0%). This was in conformity with studies conducted in Iran⁹ and Nigeria¹⁰. The fact that this study was conducted in an urban setting, heart of Accra, with increased vehicular and motorcycle transportation, also lends explanation to the majority of trauma related admissions being RTA related.

It was also observed from this study that, motorcycle related injuries accounted for 52.8% of all RTAs. This finding, is in keeping with earlier work done in a tertiary facility in Nigeria by Madubueze C, C et al¹¹, indicating that motorcycle injuries accounted for 54% of all RTAs. Moreover, a study conducted at the Accident Centre of the Korle Bu Teaching Hospital revealed that, RTAs, especially motorcycle related, are a significant cause of injuries in Ghana¹². With the ever increasing numbers of motorcycles on our road, supported by a publication in 2018, that revealed that there was a 47% increment in the number of motorcycles

in Ghana over a five year period, spanning from 2012 (350,000) to 2016(515000)¹³; it will be prudent to pay more attention to motorcycle injuries when discussing prevention of RTAs. The recent calls for the amendment of the Legislative Instrument (LI 2180) that banned the use of motorbikes as taxis in the year 2012¹⁴ should be looked at carefully, because legalization of motorbikes as a means of transportation, without adequate regulation and law enforcement will put a lot of pressure on our already constrained health system. This is supported by a study conducted in the northern region of Ghana that estimated the economic burden of motorbike injuries as 1.2 million US Dollars¹⁵.

Also, this study showed that, slipping and falling, mainly occur in elderly patients in their sixth to eighth decade of life. We need to pay attention to this finding, because, earlier data from the United Nation population division, captured in a WHO global report¹⁶ on falls among older persons revealed that, absolute number of older persons in Africa is projected to increase dramatically: from 47.4 million in 2005 to 193 million by 2050 with a corresponding increase in life expectancy; 15 years for men and 17 years for women at age 60, slightly similar to that in other developing and developed regions. This increase in the number of older persons in Africa, together with increased life expectancy, will expose a greater number to the risk of falls. To prevent such falls, the components of successful multifactorial approaches as captured by WHO report¹⁷ on fall prevention should be adopted; these include environmental risk assessment and modification; balance and gait training with appropriate use of assistive devices; medication review and modification; managing visual concerns; and addressing orthostatic hypotension and other cardiovascular problems. As a retrospective study with its general limitations, subsequent studies should assess the frequency of slipping and falling due to a preceding medical condition, so that appropriate preventive interventions can be put in place.

An in-ward crude mortality rate of 1.98 was observed over the study period, similar to a study conducted in Nigeria¹⁸ but slightly lower than two other

studies conducted in sub-Saharan Africa¹⁹ and the United Kingdom²⁰.

Although the severity of injuries was not standardized for direct comparison of crude mortality between countries, this finding, of relatively low mortality rate shows that patient care at GARH is satisfactory.

Conclusion

Orthopaedic trauma related admissions were found to be as a result of road traffic accident and falls. Motorcycle injuries accounted for majority of Road traffic Accidents, while slipping and falling accounted for the main mechanism of fall injuries. Majority of these injuries were fractures with about a third being open fractures. Most of these fractures were managed operatively. The overall in-ward crude mortality rate of 1.98 was slightly lower than most centers, in and outside of sub-Saharan Region.

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