



Patterns of Injuries in Hospitalized Motor Cyclists in Nakuru

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SUMMARY

Background: Motorcycles have become a common means of transportation in Kenya. The burden of motorcycle crashes is now a source of concern.

Objective: This study aimed at determining the pattern of injuries sustained by motorcycle crash victims hospitalized in a major public hospital in Nakuru, Kenya.

Methods: A cohort of 60 consecutive hospitalized motorcyclists were selected from 1st July 2008 to 30th June 2009. Medical records of the patients were used to identify data on patient demographics, nature of injury (body region and severity) and outcomes.

Results: The mean age of the motorcyclists was 30.65 years (SD = 15.83). Most of the victims were males (87 percent). A majority of the motorcyclist sustained injuries of extremities and pelvic girdle (48 percent) and head and neck injuries (23 percent). Sixty-three percent of the hospitalized motorcyclists had major trauma (AIS \geq 3). Overall 30 percent of the motorcyclists needed follow-up after discharge from hospital.

Conclusion: Motorcycle crashes contribute to the health burden and warrant road safety campaigns.

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Introduction

Road Traffic Injuries (RTI) are a major cause of misery, morbidity and mortality globally, with a disproportionate number occurring in developing countries. In Kenya it is estimated that there were 12,918 RTI related deaths in the year 2007, or 34.4 deaths per 100,000 people [1]. Data on the extent of non-fatal injuries is rarely assembled. Conservative estimates using data from the

Traffic Police Department indicate that on average 10.3 percent of road traffic crash victims die, 32.5 percent are seriously injured and 57.2 percent are slightly injured [2]. There is need to document systematically non-fatal RTI. Such data is important since it provides a complete picture of road traffic crashes for policy-making.



Motorcycles have become an important means of transport in the country. In the year 2008, there were more than 1 million registered vehicles in Kenya, 18 percent of which were motorised 2 or 3 wheelers [1]. In the year 2003, it was estimated that only 0.7 percent of households in Kenya owned a motorcycle [3] and the annual registration of motorcycles never surpassed 2,000 units. The demand for motorcycles has been on the increase since the lowering of taxes on units of engine capacity of 250cc and below. For example, registration of motorcycles grew three-fold from 16,293 in 2007 to 51,412 in the year 2008, a 215 percent increase [4]. Motorcycles took up a 42 percent share of all new motor vehicle registrations in the year 2008 compared to 19 percent in 2007. Most of the motorcycles on roads in Kenya are used for commercial commuter service. Motorcycle crashes are a rapidly growing, yet preventable public health problem and there have not been any targeted efforts to address this concern in the country. Data on the patterns of RTI following motorcycle crashes in Kenya are yet to be assembled. This compromises efforts that can be used to mitigate against motorcycle crashes.

Generally studies show that motorcycle crashes are associated with higher case crash and fatality rates than other vehicles worldwide. For instance, in Singapore crash statistics from 2001 to 2006 show that the motorcycle crash fatality and injury rates per registered vehicle are higher than those of other motor vehicles by 13 and 7 times, respectively [5]. In Nigeria, motorcycle crashes are the second most common cause of RTI [6]. Studies also suggest that motorcyclists are vulnerable to injuries of different body regions and severity, especially the head and extremity

injury [7, 8]. The studies also show that implementing road safety measures lessens the number of motorcycle crashes, fatality rates and injury severity. For example, wearing a motorcycle helmet correctly reduces the risk of death by almost 40 percent and the risk of severe injury by over 70 percent [9]. There is little, if any, published information on the magnitude and patterns of injuries sustained by motorcycle crash victims in Kenya. This study was therefore undertaken to determine the pattern of injuries sustained by motorcyclists hospitalized in a major public hospital in Nakuru, Kenya. It is hoped that this study provides baseline data to policy makers and other stakeholders who may wish to undertake interventions to improve road safety among motorcyclist.

Methods

Study Design and Patients

This was a retrospective survey of motorcycle crash victims that were admitted at the Rift Valley Provincial General Hospital, a 650 bed public and referral hospital in Nakuru. Medical records of inpatients are stored using the straight numerical system of filing and recorded using the International Classification of Diseases (ICD) 10th Revision codes [10].

All the motorcycle crash victims admitted in the hospital from 1st July 2008 to 30th June 2009 formed the study population. Existing medical records were used to identify the study population. The minimum sample size was determined from published tables as 60 patients [11].



Data Type and Collection Procedures

Data of primary interest that was collected included patterns of injuries, the road user category and the nature of crash. Pattern of injuries were described based on the Abbreviated Injury Scale (AIS) [12]. A score of $AIS \geq 3$ was used as an indicator of major trauma [7]. The nature of crash was identified either as collision or a non-collision. The place of crash and nature of crash were extracted using ICD codes [10]. Other data that was extracted included patient demographics (age and sex), date of admission, principal diagnosis, date of discharge/ death/abscond and days of hospitalization. Follow-up plans after discharge for the patients were also identified. The eventual outcome of the patients was documented as discharged alive or dead.

Data was extracted from medical records using a pre-tested coding schedule. Three trained research assistants collected data. It was then double-entered by means of a purpose-designed Microsoft Excel 2003 interface. Data was summarised using frequency, percentages, mean and standard deviation (SD) and presented using tables. All analyses were done using SPSS Version 16.

Ethical Considerations

Clearance to conduct this study was sought from the Medical Superintendent of Rift Valley Provincial General Hospital. Further ethical clearance was obtained from the National Ethical Clearance Committee. A research permit was obtained from the Ministry of Science and Technology. Confidentiality was maintained through out the handling and analysis of patient records.

Results

Eighty one patients were hospitalised due to motorcycle crashes during the study period. A total of 45,075 admissions were made in the hospital during the study period. Therefore, motorcycle crash victims constituted 1.8 out of every 1000 admissions. Twenty one of these patients did not have complete medical records and were excluded from this study.

The mean age of these patients was 30.17 years (SD = 13.06). Eighty-seven percent of the patients are males (Table 1). The median length of hospitalization was 4 days. Five percent of the patients were referred from other hospitals.

Table 1: Demographic Characteristics of Hospitalised Motorcyclists

<i>Characteristic</i>	
Mean age in years	30.17(SD = 13.06)
Proportion of men (%)	87
Median length of hospitalization in days	4
Proportion of patients referred from other hospitals (%)	5

Collision crashes were reported by 44 percent of the inpatients. Twenty-six percent of the motorcycle crashes were caused by collisions with motor vehicles, 10 percent with pedestrians, 4 percent with cyclists, 3 percent with other motorised 2 or 3 wheelers and 2 percent with train. The nature of the crash was not specified in 34 percent of the hospitalised motorcyclist.



The place of crash for 49 percent of the hospitalised motorcyclists could not be specified. Thirty nine percent of the motorcycle crashes leading to hospitalisation occurred in the streets or highways while 12 percent occurred in other places such as trade and service areas (3.4 percent), industrial and construction areas (1.7 percent), other areas for specified uses (3.4 percent) and residential areas (3.4 percent)., while none occurred on farms, schools and public administrative areas or sports and recreational areas.

The patterns of principal injuries sustained by hospitalised motorcyclists are summarised in Table 2. Fractures are much more common accounting for 44 percent of hospital admissions. Other common causes of admission among them are soft tissue injuries (27 percent) and head injuries (22 percent).

Table 2: The Principal Diagnosis of Hospitalised Motorcyclists

	<i>Frequency (%)</i>
Fractures	26 (44)
Soft Tissue Injuries	16 (27)
Head Injury	13 (22)
Others (Dislocations, Burns, Tendon Injuries)	4 (7)
Total	59 (100)

Table 3 summarises the proportion of hospitalised motorcyclists in each of the six AIS body regions. Most of the motorcyclists (48 percent) suffered from injuries of extremities and pelvic girdle. The sampled motorcyclists did not have injuries of abdominal and pelvic contents.

Table 3: Distribution of Injured Body Regions of the Admitted Motorcyclists.

<i>AIS body region</i>	<i>Frequency (%)</i>
Extremities and pelvic girdle	29 (48)
External	16 (27)
Head and Neck	14 (23)
Abdominal/pelvic content	0
Chest	1 (2)
Total	60

The distribution of AIS among the hospitalised motorcyclists is summarised in Table 4. Sixty-three percent of the hospitalised motorcyclists had AIS of three and above, that is they had major trauma.



Table 4: Distribution of AIS among Hospitalised Motorcyclists

<i>AIS</i>	<i>Frequency (%)</i>	<i>Trauma (%)</i>
1	17 (29)	Minor (27)
2	5 (9)	
3	17 (29)	Major (63)
4	16 (27)	
5	3 (5)	
6	1 (2)	
Total	59 (100)	

One patient died in hospital. Upon discharge from hospital, 70 percent of the motorcyclist did not need any follow-up, 18 percent were referred to their primary health care provider and 12 percent were referred to the outpatient orthopaedic clinic.

Discussion

Motorcycle crash victims add to the burden of admission in the studied hospital. This finding adds to the current estimates that motorcycle crashes account for 1 percent of the road fatalities in Kenya [1]. Specifically, this result demonstrates that motorcycle crashes are an emerging health burden in Nakuru.

This study established that most of the hospitalised motorcycle crash victims are males in their early thirties. This demographic profile does not differ with that of other hospitalised road users in the country [2,

13]. This finding is not surprising as a majority of the motorcycles are used mostly by young males for short commuter passenger services. Road safety interventions should therefore target this profile.

The study also found out that collisions were the major causes of motorcycle crashes. The hospitalised motorcyclists literally collided with all the other categories of road users. This result may be an indicator of the wanting attitude of road users. Obedience to road traffic rules should be enforced.

Most of the motorcycle crashes leading to hospitalisation occurred in the streets or highways. This may suggest that the surveyed motorcyclists have problems manoeuvring their motorcycles in major roads. Proper training of motorcyclists is imperative.

Fractures, soft tissue injuries and head injuries in that order were the major diagnosis reported. This pattern is not markedly different from what is reported in other parts of the world where injuries of the head and extremity predominate [5], [6], [7], [8]. Further, most of the hospitalised motorcyclists had major trauma (AIS \geq 3). The expansion of the motorcycle sector in the country will most likely lead to an increase in presentation of injuries due to motorcycle crashes. Knowledge of the patterns of such injuries is crucial in order to recognize symptoms, achieve correct diagnosis and provide adequate medical care to patients.

Further the results show that 30 percent of the motorcyclists needed some follow-up after discharge from hospital. Managing such injuries is a major cost to the society. Motorcycle crashes are therefore an emerging health problem in the country. There is an urgent need to address this problem.



Conclusion

Most of the hospitalised motorcyclists suffered from major trauma. Motorcycle crashes are an emerging health problem that warrants vigorous road safety campaigns.

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