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# Risk Factor Profile of Motorcycle Crash Victims in Rural Kenya

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## Abstract

**Background:** Road traffic injuries involving motorcycles are increasing especially in rural Kenya resulting in both human and economic loss. This study was done to identify the risk factors and the host characteristics associated with motorcycle injury victims in rural setting so as to institute appropriate interventions for prevention of these incidents. **Methods:** A descriptive cross-sectional study conducted at Kangundo District Hospital between 1st July and 31st December 2011. **Results:** 167 crash victims (136 (81.4%) males, 31 (18.6%) females) were seen. Mean age was 29 years; most victims (94.2%) being aged 16-40 years. Cyclists comprised 61 (36.5%) while 79 (47.3%) were passengers. All cyclists were men; more women were

passengers (p, 0.03), while pedestrians were mostly children below 10 years. Most victims (74.3%) did not wear helmets while 72.1% did not wear jackets with reflectors. Alcohol use was recorded in 22.8% of cyclists. About 71.9% of cyclists lacked valid driving licenses. Overloading was common, with 74.8% of the cyclists carrying two or more passengers. **Conclusion:** Poor driving skills, reluctance to use protective gear, alcohol use and overloading of passengers were the main risk factors observed. Our observations call for more stringent regulations and aggressive road safety campaigns. Injury prevention and safety promotion campaigns should focus more on the risk factors for motorcycle accidents.

**Key Words:** Motorcycles, Crash, Risk factors, Rural

## Background

It is estimated that every day, about 3000 people die and 30,000 are seriously injured in road crashes, with much of the burden borne by low to middle income countries (1). Kenya has a very high road crash fatality rate, with over 3000 deaths being recorded annually (2). Road traffic crashes are the leading traumatic cause of morbidity, mortality and disability in the country (3). The prevalence of road traffic crashes in Kenya is over 30 times more than highly motorized countries (3). In over 75% of the cases, the casualties are young energetic adults, who are the main contributors to the economic growth of the country (3).

Motorcycles have become the favored means of transport in third world countries because they are thought to facilitate mobility in busy urban roads and narrow rural roads, are easier to maneuver, consume less fuel and have short acceleration transit time (4,5). Motorcycle riders are seriously disadvantaged by lack of safety devices like safety belts and airbags and the absence of a protecting chassis as opposed to motor vehicles (5). As such, they are at risk of more serious and multiple injuries. Riding motorcycles carries a higher risk of being involved in a fatal road crash than other modes of transport (6). In the European Union, half of motorcycle crashes are caused by collision participants other than

motorcycle riders while about 40% are caused by the motorcycle riders and the rest by factors associated with the vehicle or road (6).

Wearing of safety gear like helmets improves chances of survival in case of a crash (7). Further, jackets with reflectors significantly reduce incidence of crashes. Wells et al (2004) (8) observed that alcohol, poor weather conditions associated with poor visibility, and night riding are associated with a higher incidence of crashes.

Between 2005 and 2011, motorcycle registration increased by almost 40-fold. In 2011, motorcycles made up 70% of all newly registered vehicles (9). However, data on the predisposing factors, injury patterns, demographic and host characteristics of the victims, as well as outcome and complications is scanty in the literature. This data is valuable for future policy interventions and in the possible formulation of a road safety policy for motorcycle users.

**Methods**

This study was conducted in the outpatient and inpatient surgical departments of Kangundo District Hospital, a level 4 hospital serving a high catchment area in lower eastern Kenya. The hospital has an in-patient capacity of 120 beds, and serves a total of about 1800 patients monthly, with about 10% of inpatients being trauma patients.

Pre-designed questionnaires were used to collect data from victims of motorcycle crashes presenting in the hospital between 1st July and 31st December 2011. Permission to carry out the study was granted by the hospital ethics and review board. Variables documented included: sociodemographic characteristics, risk factor profile, and time and circumstances of the accident.

Data were coded and entered into Statistical Package for Social Sciences version 16.0 (Chicago, Illinois). Descriptive statistics were employed in analysis. Parametric statistics like the chi square test and the student’s t-test were used to compare variables where appropriate.

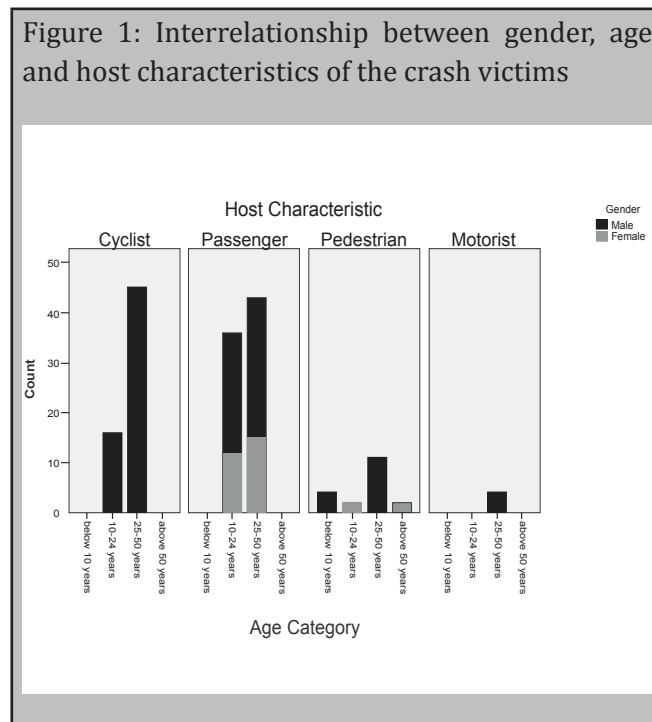
**Results**

One hundred and seventy two motorcycle crash

victims were seen during the study period. Five questionnaires were incomplete, therefore only 167 were analyzed. The mean patient age was 28.9 years (range 5-70 years). All cyclists involved in the crashes were male. Of the 79 passengers, 52 (65.8%) were male, while of the 23 pedestrians, 19 were male. Most accidents occurred in the evenings and nights (Table 1). Figure 1 summarizes the interrelationship between gender, age and host characteristics of the crash victims

**Table 1: time of accident**

Crash hour time	N	%
Day time (up to 6pm)	24	14.4
Evening (Up to 8pm)	95	56.9
Night (Up to 5am)	48	28.7



Carrying more than one passenger, alcohol use, inexperienced cyclists and lack of helmet use were the main risk factors associated with the injuries (Table 2). Only 25.7% of the cyclists and passengers in this study used helmets, while 23.4% wore jackets with reflectors. Overloading was common, with a range of 1-6 passengers and a mean passenger number of 1.89. 74.8% of cases had more than 2 passengers.

Table 2: Risk factors of the motorcycle accident victims

Risk factor	Response	Number	Percentage
Use of Helmet (n=140)	Yes	36	25.7
	No	104	74.3
Jacket with reflectors (n=140)	Yes	39	27.9
	No	101	72.1
Wearing knee guard (n=140)	Yes	14	10
	No	126	90
Report of alcohol use (n=167)	Yes	38	22.8
	Suspected	29	17.4
	No	94	56.3
	Not known	6	3.6
Possession of valid driving license by cyclist (n=167)	Yes	23	13.8
	No	120	71.9
	Not known	14	8.4
	Not recorded	10	5.9
Involvement of other road users (Vehicle, donkey-cart, bicycle, crossing pedestrians)	Yes	122	73.1
	No	42	25.1
	Not recorded	3	1.8

## Discussion

The current study confirms the high burden of motorcycle road crashes in Kenya, as has been documented by previous authors and might possibly be linked to the liberalization in the acquisition of motorcycles by the government (3). There has been an increase in number of motorcycles in rural Kenya, and small towns, where they are seen as a cheap and effective means of transport (9). Our study is in keeping with previous findings that majority of motorcycle crash victims are young men (10-14). Men are more likely to work as cyclists and engage in risky behavior, clouding their judgement, hence leading to traffic offences and speed violations. This preponderance of young, energetic males in motorcycle accidents has economic implications on the country. We also recorded an increased number of children below 10 years involved in accidents as pedestrians. This indicates possible poor road use and the need for traffic education to school going children.

Our study has revealed minimal use of helmets and knee guards by cyclists and passengers in motorcycles. Ergonomic factors like discomfort, poor ventilation and noisiness have been cited by previous authors as reasons why people are reluctant to use helmets (15). In a study conducted in the highly motorized Barcelona city, it was found that accident victims with helmets suffered less severe injuries (16). We recorded a 25.5% uptake of helmets by cyclists and passengers, which is

slightly higher than the 8% reported in India (12). We posit that increased government surveillance and heavier traffic penalties could increase uptake of helmets by motorcycle users. In Brazil, it was found that introduction of a new traffic code resulted in an increase in helmet use (17).

Low motorcycle conspicuity or inability of motorcyclist to be seen by other road users is an important factor in road crashes (16). Therefore inexpensive measures such as wearing a jacket with reflectors can greatly enhance conspicuity. The Kenyan law demands that both the cyclist and passenger wear a reflective jacket. We have found in this study that only 27.9% of the cyclists and passengers interviewed wore reflective jackets in contrast to 10.6% in New Zealand (8). Wearing a high visibility upper torso garment was related to lower involvement in crashes (5,8).

Our study found that 22.8% of accident victims reported to having taken alcohol prior to the accident, while 17.4% were suspected to be alcohol-intoxicated. Blood alcohol levels were not conducted. Alcohol intoxication has been reported by many workers to be directly related to fatal road crashes. A survey conducted among hospitalized traffic accident victims in Eldoret, Kenya, showed that 40% of drivers and 20.2% of pedestrians were intoxicated at the time of crash (18). In an Indian study, 55% of accident victims tested for alcohol in blood were positive (10). We found that all cyclists were males, and that males were more likely to report alcohol use,

a fact confirmed by Romano et al. (2012) (19) who reported that males were more likely to be involved in alcohol-related crashes. It has been reported that alcohol consumption significantly increases accident severity risk because of possible speed and other safety violations (16). Stiffer penalties and enactment of new traffic codes of conduct can reduce incidence of alcohol-related crashes. In Brazil, reduction in alcohol use following enactment of a new traffic code of conduct was observed (17). Our study also found that 56.9% and 28.7% of crashes occurred in the evenings (up to 8 pm) and night respectively. This is because alcohol use is more in the later parts of the day, and drunk cycling is common. Wyss et al., (1990) (20) reported that alcohol-related crashes occurred predominantly in the nighttime and towards the end of the week, which is in concordance with our findings.

Our study demonstrated that very few of the motorcyclists possess the necessary skills to be riders, as evidenced by only 13.8% possession of valid driving licenses which was lower than 71% reported in Ghana (14). Further, only a third of the motorcycles were insured. There is an urgent need to step up crackdown of untrained riders, who cause these preventable motorcycle crashes.

Involvement of other road users plays a significant part in motorcycle crashes. In this study, 73.1% of the crashes reported involvement of other users like vehicles, bicycles, donkey or ox carts and pedestrians. We noted a high incidence of children less than 10 years as pedestrian casualties, a pointer to possible poor road use. Other pedestrians likely to be involved are adults intoxicated with alcohol, which clouds judgement and leads to crossing roads at non-designated points. In a Nigerian study, 48.5% of crashes were with moving vehicles (21). In India, 59% of motorcycle crashes involved other users (10). In Kenya, motor vehicles users frequently ignore motorcycles and deem them not to have right of way, increasing incidences of accidents. This means any attempt at reduction of motorcycle crashes must be multi-pronged, involving other motorists and pedestrians.

We found overloading to be common in our study subject, with up to 6 passengers being carried in a motorcycle meant for one passenger. We found that in 74.8% of the crashes, there were more than 2 passengers. This is much higher than the 15.02% reported in Nigeria (21). This is a possible failure by traffic enforcement agencies to rein on errant motorcyclists, fueled by traffic bribery. Compounding

this is the fact that none of the motorcycles in this study had insurance.

## Conclusion

This study has elucidated the risk factors for motorcycle crashes in rural Kenya, most of which are preventable. The typical motorcycle crashes victim is a young male cyclist or passenger, with no driving skills, possibly intoxicated and carrying more than one passenger. More stringent application of the law, coupled with public road safety campaigns targeting cyclists and the general population could significantly reduce the number of motorcycle crashes.

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