

## Relationship Between Personal Safety Gears and the Extremity Injuries Due to Motorcycle Accidents

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### Abstract

Last few years shows dramatic increase in the number of motorcycle accidents (MCAs) in Sri Lanka. Extremity injuries due to MCAs cause a heavy burden on government hospitals. This study tries to determine the relationship between extremity injuries due to MCA with personal protective gears used by motorcycle users admitted to orthopedic wards in Teaching Hospital Kurunegala (THK). Associations were found between footwear and foot injuries and safety jacket and upper extremity injuries indicating that using safety gears can minimize the severity of extremity injuries in MCA victims. Thus it is necessary to ensure that motorcycle users use proper safety gears.

### Background

Mortality due to road traffic accidents in Sri Lanka increase each year (2012-715, 2013-723 & 2014-845). 30% of accidents were motorcycle accidents (MCAs) (Traffic,2007). MCAs place a heavy toll on the publicly funded health care system (epid,2013). Research on injuries due MCAs in Sri Lanka is scarce and most are based on police data or non-standardized medical records. Although in Europe, standards have been developed for motorcycle protective clothing (EEVC,1993, EU,2002, EU,1998, de Rome,Stanford,2006) Sri Lanka doesn't have proper standards and legislations for wearing safety gears for motorcyclists. Motorcycle is considered a cheap means of transportation used mainly by laborers who either do not buy any safety gear or buy sub-standardized ones. This study sought to identify dependence of extremity injuries of motorbike riders with safety gear they were wearing.

### Method

Demographic and clinical data on all motorcycle riders who were involved with motorcycle accidents and admitted to the orthopedic wards in THK with extremity injuries were collected between 1<sup>st</sup> February 2015 and 31<sup>st</sup> July 2015, in a prospective database. Pedestrians and automobile passengers involved in collisions with motorcycles and patients who couldn't give history due to severe head injuries were excluded. All other patients gave consent for the study and were interviewed by the principal investigator using a semi-structured questionnaire. Ethical approval was obtained from Hospital Ethics Committee of THK. Consecutive sampling method was used and the sample size was 410 patients. Data were analyzed using SPSS software (SPSS, 2007).

The following injury sites were considered for analysis; Upper Extremity (Humerous, Radius, Ulnar), Hand (Carpal, Metacarpal, Phalanx), Lower Extremity (Femur, Knee, Ankle, Tibia, Fibular) and Foot (Tarsal, Metatarsal, Toe)

### Results

Motorcycles used in Sri Lanka belongs to 100cc to 150cc engine capacity relationship between injuries and engine capacity of motorbikes were not taken for consideration. Distal radial fracture is the most common upper extremity injury (12%) and Tibial fracture is the most common and severe lower extremity injury (23%).

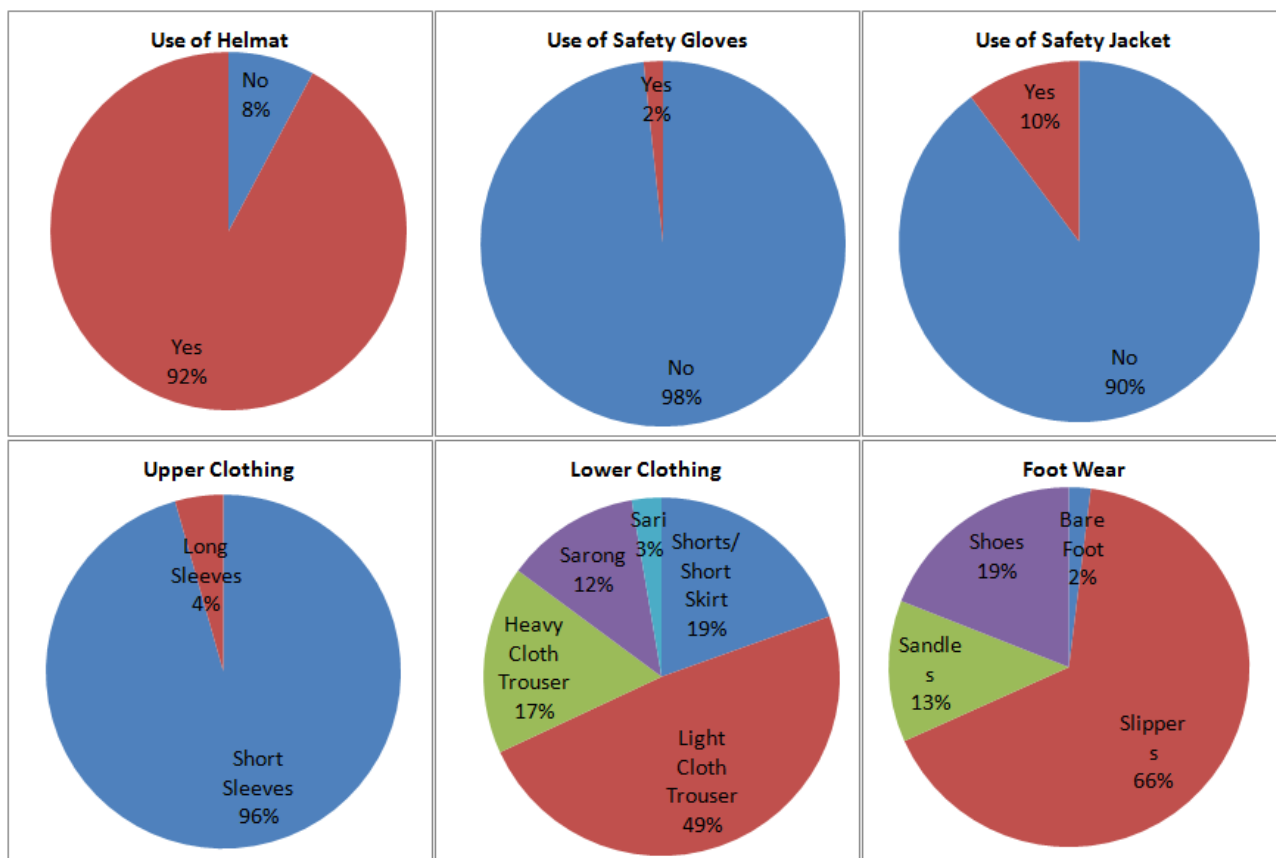


Figure 1. Patients wearing different types of safety gears

Most of the participants have not used safety gears, protective clothing or shoes. Most of the garments were either removed or cut open to give first aids and apply splints by the time they reached to orthopedic wards therefore tearing and bursting of garments couldn't be determined during admissions.

To identify the association between safety gears and clothing with injuries statistically Chi square analysis (Table 1) and Ordinal Logistic Regression (OLR) model was used.

Table 1 - Cross tabulation results of different safety gears and extremity injuries

Personal Safety Gears	Number of Patients			p value	Cramer's v value
	No Injury	Single Injury	Multiple Injuries		
Type of Footwear					
Barefoot	5	1	2	0.001 (<0.05)	0.203 Association
Slippers	232	22	18		
Sandals	41	6	5		
Shoes	77	0	1		
Use of Safety Jacket					
No	294	54	20	0.002 (<0.05)	0.177 Association
Yes	24	11	7		

All the assumptions for OLR held true and OLR results says.

- People wearing jackets are less likely to have single and multiple upper extremity injuries than people wearing no jackets.

- Accidents occurred on tar roads are less likely to cause single and multiple upper extremity injuries than accidents occurred on gravel and under construction roads.
- People wearing slippers, sandals or shoes are less likely to have single and multiple foot injuries than people on barefoot.

## Conclusions

There are associations between footwear and foot injuries and safety jacket and upper extremity injuries among MCA victims. This means that using safety gears can minimize the severity of injuries in MCA victims. Thus it is necessary to ensure that motorcycle users use proper safety gears.

## References

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