SCIENTIFIC ARTICLE

A cross-sectional study on road traffic injuries: expanding epidemic in developing countries

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Abstract

Introduction

Worldwide, road traffic accidents are one of the leading causes of death. The mechanism and extent of injuries in patients will vary according to the nature of the vehicle, its speed, and the site of impact. The aim of this study is to assess the particular aspects of RTAs including socio-demographic factors, details of vehicles, sites of injuries and the outcome of RTAs.

Methodology

This study was conducted as a cross-sectional study in a tertiary care center, for two months from November 2019. A data extraction form was used to collect socio-demographic details, details of vehicles and drivers, sites of injuries, places, time, transport mode, and outcome of incident. Descriptive statistics and multi variate analysis.

Results

A total of 102 victims were studied including 92 (90.2%) males and 10 (9.8%) females. 60.8% of victims were in the range of 19 to 40 years. Around 10% of senior citizens (above 60 years) met RTA. Most of the accidents happened from 3 am to 10 pm (44.1%). Most happened in urban places (69.6%). Lower limb injuries were the most common injury (42.2%). Mortality rate was 2%. Outcome of RTA was statistically associated with age (p=0.010), time of RTA (p=0.030) and type of victims (p=0.042) at 5% level of significance.

Conclusion

This study offers significant insights into road traffic accidents and their consequences. It highlights the need to factor in gender, age, time of day, urban or rural context, and victim type in crafting road safety strategies. Further investigation and interventions are warranted to address the unique risks and requirements of diverse demographics in order to mitigate the occurrence and gravity of such accidents.

Introduction

Road traffic accidents (RTA) are vehicle collisions with movable or immovable objects. Any injury occurring as a result of RTA is defined as road traffic injury [1]. These road traffic injuries were holding 10th position for the cause of death in 2020 in lower middle-income countries and by 2030, it is expected to rise to the 8th position. [2]. Special care must be taken for more defensive driving habits to minimize accidents. When casualties are considered, the motorcycle is the most dangerous vehicle. This is possibly due to riders who ride[3]. The mechanism and extent of injuries in patients will vary according to the nature of the vehicle, its speed, and the site of impact. Injury severity is proportionally increased with the weight and speed of the vehicle. Injury patterns in children are different from adults with similar impact. Old age people are presented. more numerous and more severe injuries for any given impact. So, the age and size of the victim are very important [4]. When patients undergo vehicle impact, they sustain injuries by several mechanisms. Secondary injuries are sustained by subsequent contact with the surface of the road.

The speed of impact by a vehicle cannot be assessed by studying the nature of the injuries. These accidents can be fatal even at slow speeds of the vehicle, yet occasionally high-speed impacts can produce only minor damage. The description of patient injuries reflects the dynamic nature of the event [5]. Commonly, primary injuries are less severe than secondary injuries. The Pattern of secondary injuries may vary from simple graze abrassion to fracture of the skull or axial skeleton. Traumatic brain damage and diffuse axonal injuries are frequently seen in fatally injured victims even in the absence of skull fracture [6].

Methodology

This study was conducted as a cross-sectional study in a tertiary care center, at Kalubowila for two months from

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November 2019 . The aim of this study is to assess the particular aspects of RTAs including socio-demographic factors, details of vehicles, sites of injuries and the outcome from RAS. A data extraction form was used to collect socio-demographic details, details of vehicles and drivers, sites of injuries, places of incident, time of incident, mode of transport and outcome of incident. A descriptive analysis was performed using the statistical software SPSS, version 23 to obtain knowledge about the properties and distributions of variables to identify relationships between two variables. We used the multi variate analysis to test the relationship between the two categorical variables, at 5% level of significance.

Results

A total of 102 victims were studied including 92 (90.2%) males and 10 (9.8%) females. The majority were aged between 12 to 60 years. 60.8% of victims were in the range of 19 to 40 years. Around 10% were senior citizens (above 60 years) (Table 1). Of 102 victims, 52.0 % were married out of the total 86.2% were Sinhala and the remaining were Tamil (6.9%) and Muslim (6.9%). A majority had completed either the Ordinary level (52.9%) or advanced level (31.4%) of education qualification. Most of them were self-employed (33.3%) while others worked in the private sector (30.4%).

Most of the accidents occurred between 3 am and 10 pm (44.1%), with 40.2% between 6 am and 3 pm (Figure 1). The majority of accidents took place in urban areas (69.6%). Substance abuse was reported in 22.5% of the victims. Most of these accidents involved individuals riding motorcycles (76.5%), as shown in Figure 3. Among the motorbike riders, 73.5% were wearing proper helmets, while 4.9% were not. The majority of victims were either motorbike riders (64.7%) or pedestrians (8.8%). The most common type of injury was lower limb injuries (42.2%), as depicted in Figure 2. 27.5% of the victims had upper limb injuries, and 20.6% had head and neck injuries. Among those with lower limb injuries, 71.6% were wearing slippers, and 26.5% were wearing shoes.

Table 1. Distribution of age and gender of victims

Age group	Sex		Total
	Male	Female	
<12	2 (2.0%)	0 (0.0%)	2 (2.0%)
13-18	9 (8.9%)	3 (3.0%)	12(11.9%)
19-40	59(58.4%)	3 (3.0%)	62(61.4%)
41-60	16(15.8%)	0 (0.0%)	16(15.8%)
>60	6 (5.9%)	3 (3.0%)	9 (8.9%)
Total	92(91.0%)	9 (9.0%)	101(100.0%)

Approximately 61.8% of victims were transported to the hospital by private vehicles, and 35.3% were brought in by ambulance. 54.9% were discharged from the accident Service, while 41.2% were transferred to the Orthopedic unit for further treatment. The mortality rate was 2%.

Around 53% of victims who were in the age group of 19 to 40 years, used two wheelers for their traveling. Around 5% of

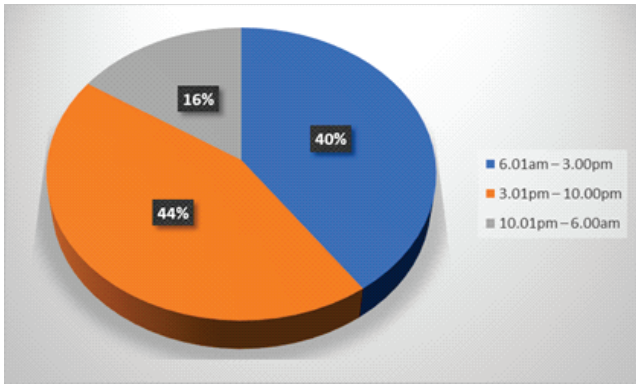

Figure 1. Time of accidents happened

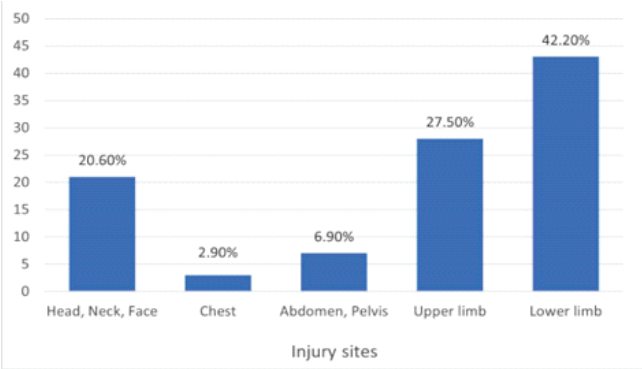

Figure 2. Distribution of injury types

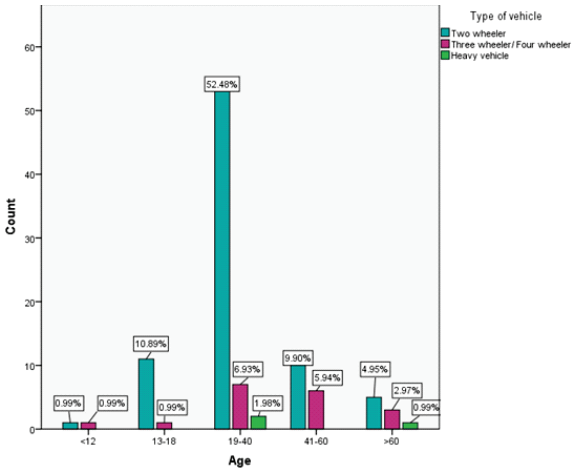

Figure 3. Distribution of type of vehicle travelled by victims with age

Table 2. Multivariate analysis between outcome and other parameters

Association of Parameters	P value
Outcome vs Age	0.010
Outcome vs time of RTA	0.033
Outcome vs type of victims	0.042

senior citizens (>60) were injured when traveling with two wheel vehicles.

Each variable that influencing the RTA was analysed with major injury sites and outcomes using a multi-variate variable analysis. Age, time of accidents and victims were statistically significant were significantly associated with the outcome of RTA (Table 2). Others were not statistically significant at 5 % level of significance.

Discussion

In 2013, the majority of victims fell within the age range of 19 to 39 years [7], and in 2021, it was the 26 to 35 age group that was most affected [8]. In 2022, victims ranged from 1 to 75 years of age [10], but the age group of 18 to 45 years is typically considered the most active and productive. This age range faces a higher risk, as is the case worldwide. Our study also revealed a higher number of male casualties. Notably, in regions like Anuradhapura, Kandy, and the Eastern districts, males were more predominant among road users [9, 11-12].

Motorcycle accidents are of high prevalence not only in Sri Lanka but in many countries [12]. These accidents often involve motorbike riders exceeding speed limits, not wearing helmets, disregarding road rules, and at time under the influence [14,15]. In our study, a significant 76.5% of RTA victims were using motorbikes at the time of the accident.

Furthermore, our research revealed that limb injuries were the most commenest types of injuries, accounting for 42.2% in lower and 27.5% in upper limb respectively. In a separate study conducted in Sri Lanka, head injuries were the primary concern [9], while other studies showed a high incidence of leg (39.7%) and limb injuries (73%) [8], as well as head and limb injuries (70% & 73%) [12].

A majority of accidents in our study (69.6%) occurred in urban areas, a trend consistent with findings in the Batticaloa district [13].

Additionally, most victims in our study fell within the age group of 19 to 40 years, a pattern observed in numerous studies. This underscores the need to focus on this age group to reduce road accidents by offering targeted measures to those approaching driving eligibility.

Conclusion

Worldwide, road traffic accidents are one of the leading causes of death. This study's emphasizes the importance of focusing on the 19-40 age group, which consistently appears vulnerable to RTAs. Effective road safety measures, especially targeting motorbike riders, should be implemented to reduce accidents and their associated injuries. It is imperative to address risk factors such as speeding, helmet use, and substance abuse to enhance road safety. Additionally, a more comprehensive understanding of regional and global trends in RTAs can aid in the development of more effective preventative strategies.

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