ORIGINAL ARTICLE

Road traffic accidents in Eastern Sri Lanka: An analysis of admissions and outcome

Peethambaram Jeepara, MBBS, MS, FRCS[1], Selladurai Pirasath, MBBS[2]

1 Consultant Surgeon, Teaching Hospital, Batticaloa, Sri Lanka

2 Intern Medical Officer, Teaching Hospital, Batticaloa, Sri Lanka.

ABSTRACT

Objective: To study selected aspects of aetiological factors, type of injuries and treatments of road traffic accidents (RTA) in a single surgical unit at the Teaching Hospital, Batticaloa.

Methods: Data were collected using an interviewer based questionnaire from 1st April to 31st June 2011 and data were analyzed using the SPSS analytical package.

Results: Males aged 19-40 yrs are mostly vulnerable to RTAs which are common in urban areas. Drivers (45 %) and passengers (42%) are common victims. Driving under the influence of alcohol (25%), without a license (17%), without wearing helmets (22%), helmet belts (17%) or helmets regularly (35%) are the main contributing factors to RTAs. Motor bike (71%) accidents are common as are head (69%) and limb injuries (72%). Closed fractures (42%) and long bone displaced fractures (75%) are common among limb fractures. Lower limb injuries (69%) are commoner than upper limb injuries (57%). Most were managed without operation. The personal characteristics of victims are significantly associated with incidence and poorer outcome of road traffic injuries ($P<0.05$). Associated co-morbid disease and drug therapy significantly influence outcome and treatment of injury respectively ($P<0.05$).

Conclusion: Most victims of RTAs were young, male adults in urban areas. The commonest victims are motor bike riders. The personal characteristics of victims are important contributors to an RTA. Head and limb injuries are the commonest injuries.

Key words: Road traffic injuries, Lifestyle, Victims.

Introduction

A traffic collision, also known as a road traffic accident, occurs when a vehicle collides with another vehicle, pedestrian, animal, road debris or other stationary object such as a tree or utility pole. Traffic collisions may result in injury, death and damage to property.

Road Traffic Accidents (RTAs) among the leading cause of morbidity and mortality worldwide with 86% of deaths occurring in low and middle income countries despite accounting for only 40% of motor vehicles [1]. Road traffic accidents end hundreds of thousands of lives across the world every year. The average person in a developed country has a one in hundred lifetime risk of being killed in a road traffic accident (RTA) and a one in three lifetime risk of being injured [2]. In Sri Lanka, 103 road traffic accidents occur per day [3]. Six victims are killed in RTAs each day in Sri Lanka [3]. Many factors are accountable for the high RTA rates in low-income countries including, lack of driving skills, lack of knowledge of road traffic rules and vehicle type. However, the most significant differences found in low-income countries are the wide variation in the quality of roads and vehicles and the high number of vulnerable road users such as those under the influence of alcohol and without consideration for road traffic rules. The mixture of road users including pedestrians, cyclists, handcarts, mopeds, rickshaws, motorcycles, vans, cars, trucks and buses means that schemes to combat this problem have not been

Correspondence: Peethambaram Jeepara, Consultant Surgeon, Teaching Hospital, Batticaloa, Sri Lanka

Email: jeepara@yahoo.com

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required in the same context in high-income countries and, therefore, local research is needed [4]. Lack of research in low-income countries has meant a slow introduction of effective intervention strategies to reduce mortality rates.

A number of factors contribute to the risk of collision ; vehicle design, speed of operation, road design, and driver skill, fatigue and/or other impairments. Worldwide motor vehicle collisions lead to significant death and disability as well as significant financial costs to both society and the individuals involved. Human factors in vehicle collisions include all factors related to drivers and other road users that may contribute to a collision. Examples include driver behaviour, fatigue, visual and auditory acuity, decision-making ability, reckless driving, negligence of pedestrians, driving under the influence of liquor, fatigue, falling asleep and reaction speed. In Sri Lanka, human factors such as driving over the speed limits, under the influence of alcohol, fatigue and without consideration for road rules are major contributing factors for RTAs [3]. Increase in the number of vehicles on the roads also contributes to the rise in the number of accidents [3]. By end 2010, there were 2.1 million motor cycles, 529,543 three wheelers, 410,282 motor cars among a total number 3.9 million registered vehicles in Sri Lanka. As a result of increased number of vehicles and poor development of road infrastructure, the incidence of traffic accidents in Sri Lanka shows an ever increasing trend with an alarming number of fatalities [5]. Most fatal accidents involved motor cycles accounting for 28% , with 16% colliding with state run buses , 13% with private buses and the rest with other vehicles. Last year, of 2,515 fatal accidents, 722 involved motor cycles, 372 - lorries, 314 - private buses, 227 - three wheelers and the rest were with other vehicles such as containers, cars and heavy vehicles [3]. The objective of this study was to evaluate selected aetiological factors, type of injuries, treatments and outcome of victims involved in road traffic accidents admitting to a single surgical unit, Teaching Hospital, Batticaloa.

Materials and Methods

Interviewer administered predesigned questionnaire were given to all patients admitted with road traffic injuries to a single surgical unit, at the Teaching Hospital, Batticaloa during the period 1st April to 31st June 2011. All those in the study gave informed written consent. Ethical approval for the study was obtained from the Ethical Review Committee, Faculty of Health Care Science, Eastern University, Sri Lanka. Data were analyzed using the SPSS analytical package (version, city, state).

Results

Of 106 victims, 76 (72%) were male and 30 (28%) were female. Among the victims, 45 (42%) were young adults, while children were also significantly affected by road traffic injuries (16; 15%). 77% of RTAs occurred in urban areas and 23% in rural areas. Among the RTAs in urban areas, 54% were outside the municipal area compared with 46% that were within the municipality area. 45 % of victims were found to be of a low educational status (less than grade 5) and 64 % were unemployed or had unskilled occupations. With regard to income 59% were of lower economical status (monthly income < Rs.13, 999).

Among the victims, 48 (45%) were the driver of the vehicle, 44 (42%) were passengers and 14 (13%) were pedestrians. Of drivers, 25% were under the influence of alcohol and 16% were un-licensed. Fifteen (21 %) victims had not worn helmets and 9 (17%) reported that helmet straps were loose. Thirty five percent of motorcycle riders did not war helmets on a regular basis. Motor bike (71%) accidents were more common than three- wheeler (13%), bicycle (12%) and heavy vehicle (4%) accidents.

Most of the victims had head (70%) and limb injuries (73%). Of those with head injuries, 42%were associated with limb injuries. Among the head injuries, most victims had non fatal injuries such as soft tissue injury, abrasions and lacerations. Five percent had CT detected intracranial hemorrhages such as intra-cerebral, subarachnoid and subdural hemorrhages. Two percent had cervical spine injuries of which the common injury was linear fractures at the level of C5-C6. Of the chest injury group, most (71 %) had soft tissue injuries. Only two victims had abdominal and/or pelvic soft tissue injury.Of the limb injury group, lower limb injuries (69%) were commoner than upper limb injuries (57%). Forty nine percent were fractures; 84% closed fractures, 16% compound.

In a univariate analysis, Low educational status, poor economic status, driving under the influence of alcohol or without a valid license, and driving or travelling without wearing helmets and helmet straps are significantly associated with incidence of RTA ($P<0.05$) (Table 1). Driving or travelling without wearing helmets and helmet straps in motor bikes are significantly associated with outcome of head injuries

(P<0.05). Associated co-morbid disease and drug therapy significantly influence treatment outcome of injury respectively (P<0.05).

Discussion

Males are more commonly affected by road traffic injuries than females. The age group 19-40 years is most vulnerable. The age group of 15 to 45 years is considered the most productive age group in a nation. An injury affecting someone in this age group will have a greater impact on productivity than that affecting a person outside this age group. Also,In our study, this age group was most commonly involved in road traffic accidents. This age predominance is evident in studies conducted all over the world. The high rate of crashes in this particular group illustrates the need for effective targeting of this age group for any intervention to significantly reduce the burden of road traffic accidents in the city. The study shows that children are also affected by road traffic injuries. RTAs are the overriding cause of child injuries killing approximately one hundred and eighty thousand children under 15years of age annually [6]. Children are rarely the cause of road traffic accidents but suffer as pedestrians, cyclists and passengers [6]. The incidence of RTA are common in urban areas compared with rural areas. Among urban areas, RTAs are common outside the municipal areas than inside the municipal areas [3].

Sri Lanka's roads are notoriously perilous, with aggressive drivers from public buses to three-wheeled 'tuk-tuks' jockeying for space, passing on blind turns and speeding through populated areas. The infrastructure has been neglected in several areas leaving many roads riddled with pot holes, rail crossings without gates and intersections without signals.

By comparison, 1,605 people died in road accidents in Australia last year, a country of 21 million, according to the Australian Transport Safety Bureau. It was not clear how many were injured. Nearly half a million people were killed or injured last year in road accidents in China, a country with 65 times as many people as Sri Lanka. Poor educational status, unemployed and unskilled status and Low economic status are also associated with the occurrence of RTAs. Low educational status, poor economic status, driving under the influence of alcohol or without a valid license, and driving or travelling without wearing helmets & helmet straps are significantly associated with incidence of RTA (P<0.05) (Table 1). Driving or travelling without wearing helmets & helmet straps in motor bikes are significantly associated with outcome of head injuries (P<0.05). Motor bike accidents are significantly associated with most of the injuries (P<0.05).The associated co-morbid diseases and drug therapy significantly influence the outcome of the victims and treatment of injury respectively (P<0.05). Drivers and passengers were more commonly affected compared with pedestrians. Driving under influence of alcohol, without a valid license, driving over the speed limit, non-use of helmets and travelling in overcrowded three wheelers are important contributors to RTAs. In about one-third of RTAs, inappropriate speed is the major cause. Collisions at 20 km/hr result in a 5% risk of death, whilst those at 85 km/hr result in an 85% risk of death [7]. According to a study by the Department of Transport in 2001, the introduction of speed cameras reduced casualties in the immediate vicinity by 47% and in surrounding areas by 18% [6]. To combat speed many local authorities are now introducing traffic calming measures including 20 mph zones outside schools and in town centres, speed humps and speed-activated signs at hazards [8, 9].

Another large threat to road safety is alcohol. Of 1086 motor vehicle driver and motorcycle riders who died in RTAs, 19% were over the legal limit of 80 mg/dL in blood. The highest proportion of these drivers were aged 30-39 years [9]. Use of mobile phones while driving seems to be increasing rather than decreasing, especially by drivers on fast rural roads [10] In the USA [11], the factor attributed to the greatest number of fatal crashes in 2003 was "failure to keep in the proper lane or running off road", being reported in over 32% of fatal accidents." Driving too fast for conditions or in excess of posted speed limit or racing" was next, reported as being a factor in over 20% of fatal accidents. In 10%, driving under the influence of alcohol, drugs, or medication was the cause of fatal accidents that year.

A 1985, a study by Rumar, using British and American

crash reports as data, found that 57% of crashes were due solely to driver factors, 27% to combined roadway and driver factors, 6% to combined vehicle and driver factors, 3% solely to roadway factors, 3% to combined roadway, driver, and vehicle factors, 2% solely to vehicle factors and 1% to combined roadway and vehicle factors [12]. Based on our study, Human factors are the major factor contributed to RTAs. A 1985 report based on British and American crash data found driver error, intoxication and other human factors contribute wholly or partly to about 93% of crashes [12].One study observed that the introduction of improved brakes resulted in more aggressive driving, [13] and another argued that compulsory seat belt laws have not been accompanied by a clearly attributed fall in overall fatalities [14]. In Canada, a third of motor vehicle deaths were associated with alcohol use [15].

Head and limb injuries were common among RTA injuries in our study and have contributed to the rapid increase in road accidents [16] and admissions to the Neurosurgical Department of the National Hospital of Sri Lanka [17].

Lag between the occurrence of road traffic crash and initiation of treatment influences the outcome consequent to the injury. The first hour after the crash is referred to as a golden hour because of the precious nature of this interval with regard to survival of the injured person and long-term prognosis of the injury. An appropriate intervention carried out early is one of the cornerstones of medical and surgical care [18, 19] Prompt care would thus alter the mortality rates and significantly bring down the net costs. Our study shows that, apart from two cases reported, victims had not received immediate help after the crash. Secondary impact injuries have a role in the outcome of the victim, more than the primary impact injuries, in victims with antiplatelet therapy; patients receiving antiplatelet therapy are at high risk of intracranial. bleeding than those who not received such treatment.

By 2020, RTAs will be expected to have moved from ninth to third place in the world ranking of burden of disease [20]. Yet this modern epidemic is strangely neglected. Much could be done, to reduce the toll of death and disability. In Sri Lanka, the government spends Rs 6,000 million a year to treat victims of traffic accidents. This is a burden on the tax payer. So immediate intervention such as strict enforcement of road traffic rules by police, and health education of public are an urgent need to reduce road traffic accidents in Sri Lanka.

Conclusion

The incidence of RTA is high among young adult males and in urban areas especially outside the municipality area. The commonest victims are motor bike riders. Driving under the influence of alcohol, without a valid license, driving over the speed limit, without wearing helmets and helmet-straps and travelling in overcrowded vehicles, three-wheelers in particular, are important contributors to RTA. Head injuries and limb injuries are the commonest injuries. Head injuries lead to permanent disabilities and even death.

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Table 1. Association of significance with incidence of road traffic incidents using P values

Factors involved in RTAs	Factors involved in RTAs	P Value
High educational status (Nos 23) (Grade A/L)	Low educational status (Nos 52) (Grade < 5)	P value (<0.05)
High economic status (Nos 13) (Monthly income > Rs.20,000)	Low economic status (Nos 68) (Monthly income < Rs.9000)	P value (<0.05)
Not under the influence of alcohol (Nos 21)	Under the influence of alcohol (Nos 27)	P value (<0.05)
With a valid license (Nos 40)	Without a valid license (Nos 8)	P value (<0.05)
With helmet (Nos 54)	Without helmet (Nos 15)	P value (<0.05)
With helmet straps (Nos 45)	Without helmet straps (Nos 09)	P value (<0.05)
With regular helmelts (Nos 45)	Without regular helmelts (Nos 24)	P value (<0.05)

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