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Original Article

Demographic factors, patterns, and trends of deaths following road traffic accidents in the northern Sri Lanka.

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Abstract

This study aimed to understand the prevalence of road traffic accident (RTA)-related death in the northern province of Sri Lanka, exploring the demography, vehicle involved, and hospital admission.

A Hospital-based cross-sectional descriptive study done and data were collected retrospectively from 210 autopsies and case notes at Teaching hospital Jaffna.

Motorbike riders were more vulnerable, with an incidence of 55.2%. Age above 61 years contributed significantly to death after hospitalization with a P-value of < 0.005. The influence of alcohol at the time of the incident markedly contributed to the loss of life before hospital admission.

In conclusion the motorcycles were deemed to contribute to the mortality and alcohol influence and age contributing to the pre-and post-hospitalization deaths, respectively.

Keywords

Road traffic accidents; Vulnerable Road users; Alcohol influence: hospital admissions, Northern Sri Lanka

Introduction

Road traffic accidents (RTA) are unintended collisions of one motor vehicle with another, a stationary object, or a person, resulting in injuries, death, and property loss. RTA is a major worldwide public health problem that kills nearly 1.25 million people and leaves 20-50 million people injured annually (1,3). WHO indicates that road traffic injuries are currently estimated to be the 9th leading cause of death across all age groups globally and predict it to become the 7th leading cause of death by 2030 (4). Most of the time, those who survive are left with disabilities that seriously hamper their quality of life and productivity. Low and middle-income countries are the most affected, as the road traffic crashes and injuries are linked to the number of vehicles, road conditions, drivers' behavior, and the country's level of economic and social development (5,7). Poor road infrastructure, inappropriate mixing of vehicle types, inadequate traffic law enforcement, and delayed implementation of road safety policies contribute to the increased incidence of road traffic crashes (7,8).

Sri Lanka is dealing with an injury-related crisis, with a recent 85% increase in road traffic fatality rates, leading to crashes accounting for 25000 injuries yearly and ten deaths every day (9,12). Trauma is the leading cause of hospitalization in Sri Lanka, with a rate of 3100 admissions per 100000 population (12). Current expenditures for trauma management are estimated to be in the range of 14.2 billion rupees ($80 million), with 37% of that cost dedicated to inpatient care (13).

The Sri Lankan government recently implemented new legislation to prohibit the importation of motor vehicles without seatbelts, airbags, and anti-lock brake systems from improving vehicle safety (14). Despite this development being a forward move towards reaching the global best practice vehicle safety measures, such regulations would have minimal impact on the protection of pedestrians, pedal/motorcyclists, and three-wheeler passengers, which comprise a large proportion of Sri Lankan and Indian sub-continental road traffic trauma casualty mass.

In Sri Lanka, a lack of road safety research and the limited availability of statistics on road traffic crashes and injuries make it difficult for policymakers to propose interventions to prevent them. This study highlights the demographic factors, patterns, and trends of deaths following RTA in the northern part of Sri Lanka.

Methodology

Our study was a retrospective hospital-based cross-sectional study. We obtained data from 210 autopsies performed at Teaching hospital Jaffna of RTA victims from January to

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December 2019. The data contained pre autopsy interviews, a perusal of facts from bed head tickets, and autopsy reports. The data was recorded and organized based on the variables by the researchers. Collected information was analyzed using SPSS (version 25), Chi-Square test was used for statistical analysis. A p-value of less than 0.05 was considered statistically significant.

Results

Socio-demographic factors

We had analyzed 210 autopsies. There were 83.3% males and 16.2% females. It was noted that the victims were mainly from the age between 20-40 (33%) and age above 60 years (37.1%). A total of 152 (72.4%) were married and 47.6% (n-100) were on daily wage (Table 1).

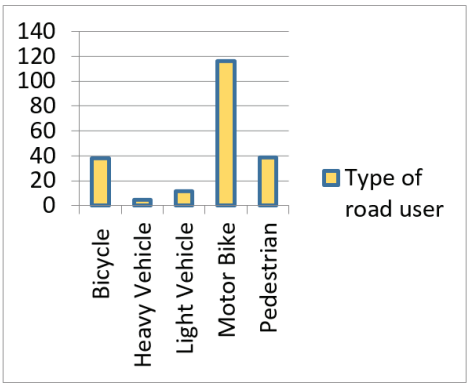
Table 1: Socio-demographic factors of the deceased who have died following RTA

Socio-demographic factors	Number	Percentage
Age		
0-10 Years	5	2.4%
11-20 Years	14	6.7%
21-30Years	35	16.7%
31-40years	35	16.7%
41-50 Years	19	9.0%
51-60 Years	24	11.4%
61-70 Years	42	20%
Above 70	36	17.1%
Sex		
Male	176	83.3%
Female	34	16.2%
Marital status		
Married	152	74.4%
Unmarried	58	27.6%
Incomes		
Permanent income	45	21.4%
Daily wage	100	47.6%
No income	65	31.0%

Alcoholism

A total of 78 (37.1%) were habitual alcohol consumers, and all of them were males. Forty seven (22.4%) were under the influence of alcohol at the time of the accident. Nearly 69.5% (n-146) died after hospital admission. Motorbike riders were more vulnerable. 55.2% (n-116) of motorbike users succumbed following RTA (Figure 1).

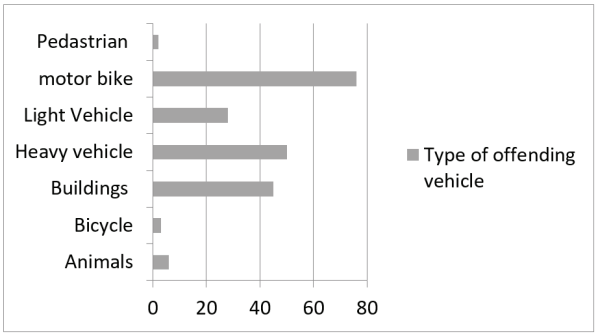
Figure 1: Type of road users



Type of offending vehicle

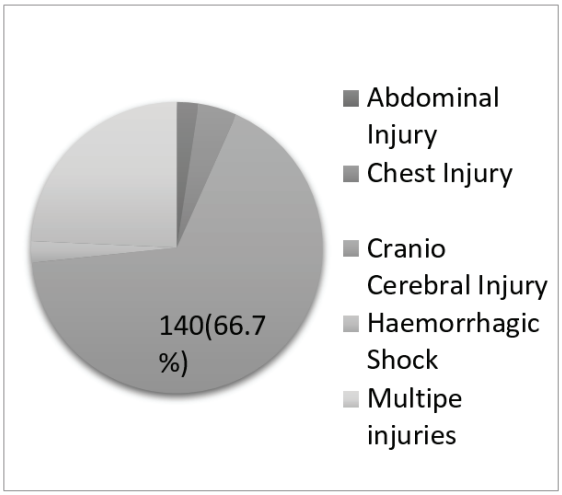
Nearly 31.4% (n-66) died after colliding with a motorbike. Heavy vehicles also contributed significantly. Nearly 23.8% (n-50) have died following being struck by a heavy vehicle. Third offenders (21.9%, n-46)) colidied with a stationary object alongside the roadside such as parapet walls, lamp posts, etc. (Figure 2)

Figure 2: Type of offending vehicle



Analysing the cause of death, 67.7% (n-140) fatality was due to craniocerebral injuries (Figure 3)

Figure 3: Cause of death



Relationship between the age and deaths following hospital admission

Based on the age of the victims, the researchers classified the samples into two groups.

The first group, above 61 years, and 63 (80.7%) succumbed to death. The Chi-square test revealed a p-value less than 0.005, indicating that the age above 61 years contributed significantly to death after hospitalization ($P < 0.005$) (Table 2).

Table 2: Association between age and hospital admission.

Age of the victim	Occurrence of Death		
	After hospital	Before Hospital	Total
Less than61	83	49	132
More than 61	63	15	78
Total	146	64	210

Out of 163 people who were not under the influence of alcohol, 24.5% (n-40) died before the hospital admission. Out of 47 people under the influence of alcohol at the time of the accident, 51.1% (n-24) died before hospital admission. The influence of alcohol at the time of incidence significantly contributed to the pre-hospitalization deaths ($P < 0.001$) (Table 3).

Table 3: Association between alcohol influence and hospital admission.

	Occurrence of death		Total
	Before Hospital admission	After Hospital Admission	
Not under alcohol influence	40 (24.5%)	123(77.5%)	163
Under alcohol influence	24 (51.1%)	23(48.9%)	47
Total	64	146	210

($P < 0.001$)

Discussion

Sri Lanka is a small island in south Asia with around 21 million people. The public transport system in our country is in a primitive state therefore usage of personal vehicles is relatively high. The vulnerability of road users on the roads increased due to an increased number of personal vehicles. Vulnerable road users (VRU) are at more risk on the roads (10,11). Pedestrians, bicyclists, and motorbike users can be named VRU as they don't have any protective device to minimize injury. Three-wheeler occupants also must be considered as VRU as they have very minimal protection (15).

In our study, males are more affected (83.3%). Geepara et al. (72%) from Batticoloa and Vijitha De Silva (91%) from Galle also have male predominance in their studies (16,17). Those aged between 20-40 years (33.3%) and aged above 61 years (37.1%) had a higher mortality rate in our study. Geepara et al. stated that age between 19-40 years is more vulnerable, and Vijitha de Silva et al. show that in their research, 70% of the victims were between 21-50 years (16,17). Age of 21-45 years is a very active and productive age group. The death of a person in this age group will affect the whole family, their friends, and the nation as a whole. Our study reveals that those whose age is above 61 years also succumbed in alarming numbers following RTA. Morbidities, especially non-communicable diseases, are high in this age group (17). Comorbidities play a significant role in the outcome of the injured victims. Amongst the vulnerable road users, the elderly population contributes remarkably, be it actively or passively (15). For all these reasons, the elderly population is affected more. Around half of the people (47.6%) were on a daily wage basis. A study from India and Italy also reinforces that low socio-economic group people are subjected to road traffic injuries frequently (18,19).

Drunken drive is a well-known factor in road traffic crashes. Geepara et al. and A.U. Jayathilake et al. mentioned that being under the influence of alcohol is one of the key factors contributing to road traffic accidents (17,20). Our study shows that 22.4% (n-47) of the people were under alcohol at the incident. Edirisinghe et al. stated that around two-thirds of the pedestrians and nearly half of the active vulnerable road users had more than 80 mg/dl of alcohol in their blood (21). Compared to this study, our figures are low.

This study shows 92.4% (n- 194) of VRU have died following RTA. Amongst them, 55.2% were motorbike users, 19% were pedestrians, and 18% were bicycle riders. Edirisinhe et al. had the same results, as VRU were the most affected group (98%) (15). Forjuoh S stated that pedestrians are frequently the victims in RTA in African countries. The percentages of pedestrians being the victims are 75%, 65%, and 89% in Abidjan, Nairobi, and Addis Ababa, respectively (22). According to Edirisinghe et al., it was noted that 48% of the pedestrian and 45% of motorbike users lost their lives. This can be justified as the study has been done at Colombo North Teaching hospital, where pedestrians are high in number on the roads (15). In our study, 55.2% of the victims were motorbike users because motorbikes are the primary transport vehicle in the region where we conducted our study. Motorbikes were on the top of the list of offenders, with 35.7% (n-75), followed by heavy vehicles with 23.8% (n-50) and stationary objects alongside the roads being the third on the list with 21.9% (n-

46). A study from Sri Lanka and India revealed that heavy vehicles were the primary culprits for road crash deaths (17,23). Once again, motorbikes were the primary offending vehicles because they are used by the majority of the people in the area our study was conducted in.

In our study, those above 61 made up a higher percentage of those who died after getting admitted to the hospital. The northern part of Sri Lanka's elderly population's general mode of transportation is by foot, bicycles, small motorbikes, and public transport. They travel relatively slow. As the relative velocity of the accident decreases, the severity of the injuries also will reduce. This could have been the reason for the delayed deaths after the hospital admission. There is no literature available to support this correlation.

It is noted that a statistically significant amount of the people who were under the influence of alcohol at the time of the incident died before they could be admitted to the hospital. Euphoria, poor judgment, tunnel vision, delayed reaction time, and reduced alertness are the effects of alcoholism, leading to the driver's irresponsibility. High speed and poor control can lead to severe injuries, resulting in people losing their lives before even gaining admission to a hospital.

Conclusion

The study concluded that motorbike users predominantly succumbed following RTA. People under the influence of alcohol had a high chance of dying before hospital admission. A significant number of older people died after access to the hospital following RTA. The findings clearly show the need to develop specific RTA prevention strategies based on strict surveillance, legal actions, and community awareness to all wakes of people.

Conflict of interest: Nil

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