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An analysis of gender and age profiles of casualties of road traffic accidents in Sri Lanka

R. M. S. S. Sanjeevani¹, E. G. S. S. Chandrasena² and G.G.D.B.S. Samarasinghe³

Abstract

Road traffic accidents are becoming an alarming issue of the society and have vital impact on socio-economic context of each nation of the world. Accordingly the World Health Organization (WHO) statistics, about 1.25 million people die each year as a result of road traffic crashes and it is the eighth leading cause of deaths in the world, hence immersing as a global public health problem. Sri Lanka is also facing the adverse impacts caused due to dramatically increasing rates of road accidents and accompanied casualties. Hence statistical analysis of demographic characteristics is mandatory to suggest strategies to prevent road accidents and minimize impacts. This study aims to analyze age and gender profiles of casualties of road accidents in Sri Lanka from 2010 to 2014. Descriptive statistical analysis is conducted using accident data records obtained from accident data base of Sri Lanka Police. According to all reported accidents, 90.8% of the casualties are male while female proportion is even less than 10%. Among them, those who are between 18-40 are extremely vulnerable. Most of male casualties are drivers or riders followed by pedestrians. Majority of them are motorbike drivers. Most of men involve with head-on collisions and most of casualties has faced or met with accidents during night time or under gloomy lighting conditions. Relatively low vulnerability to road traffic accidents is observed for females. However among the female casualties, majority of them are passengers, pedestrians or pillion riders. Most of women casualties have met with accidents during day time. Casualty rates decreases with age. However considerable percentage of casualties are witnessed in age categories, "below 18" and "above 60" which are counted under pedestrians or passengers or pillion riders. Demographic variables such as gender and age are crucially important to clearly identify some risks and vulnerabilities in road traffic accidents that these outputs can be essentially utilized in determining road accident prevention policies and planning.

Keywords: Casualties, severity, collision, elements, lighting condition

Introduction

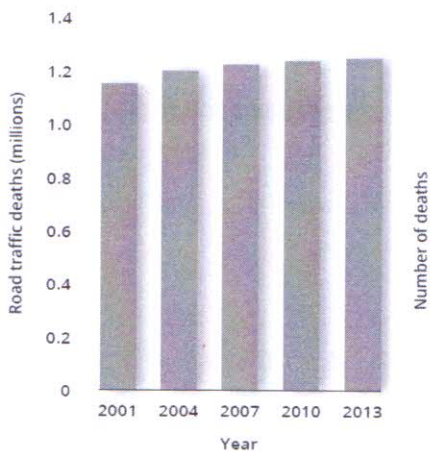
Road traffic accidents are becoming an alarming issue of the society and have vital impact on socio-economic context of each nation of the world. Economically road traffic accidents incur a loss of 3% of the gross domestic product of each country in the world. In case of health, World Health Organization (WHO) reports that, about 1.25 million people die each year as a result of road traffic crashes and keeps increasing (figure 1). Road traffic accidents are predicted to be the seventh leading causal factor for worldwide deaths by 2030, if the present trends of road traffic accidents continues the same and also identified as an immersing global public health problem in almost all the countries. However 90% of the total road traffic accidents are reported from low and middle income countries, even though they are owned by 54% of total number of vehicles in the world. Additionally to deaths, approximately 50 million people suffer from nonfatal injuries each year as a result of road traffic crashes claiming a huge cost. Furthermore WHO, 2015 indicates that road traffic accidents is the primary causal factor for deaths of the age group between 15 and 29 (Figure 2).

¹ Department of Geography, University of Colombo, Sri Lanka.

² Road Development Authority, Sri Lanka.

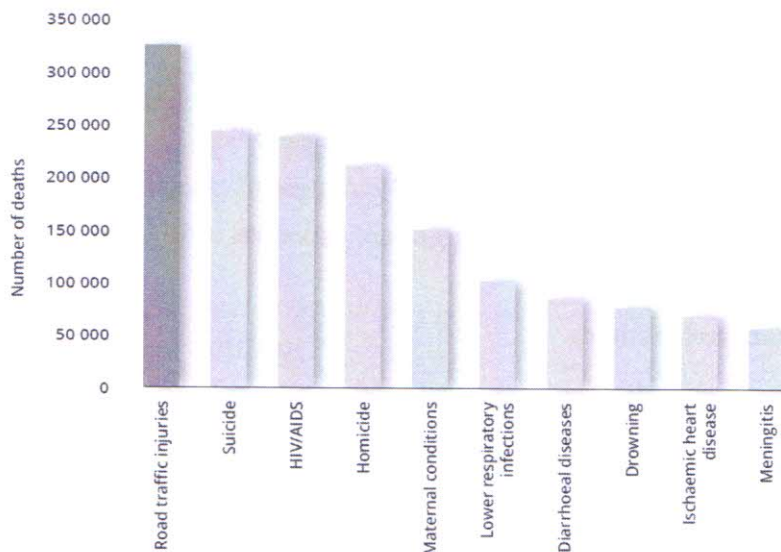
³ Department of Transport & Logistics Management, University of Moratuwa, Sri Lanka.

Figure 1. Number of road traffic deaths, Worldwide, 2013



Source: WHO, 2015

Figure 2. Top ten causes of death among people aged 15–29 years, 2012



Source: WHO, 2015

Dramatically increasing road accident rates. There had been 1963 total fatal accidents in 2000 as per the police records and it has increased up to 3101 by 2017. This is 2.80% of the total deaths of the country and Age-adjusted death rate is 16.33 per 100 000 people. Among them, 1269 deaths are caused by motor cycle accidents. Correspondingly number of motor cycles have been risen from 2,546,447 to 4,044,010 respectively in 2012 and 2017, the largest vehicle group. Increase of road traffic accidents and accompanied deaths and injuries have been resulted by accelerating number of vehicles and very poor development of road infrastructure (Somasundaraswaran, 2006).

Most of the road traffic accidents are caused due to ignorance, carelessness, thoughtfulness and over confidence of the road users (Aggarwel et.al, 2012). Socio-demographic profile of road users directly or indirectly reflects influence it can generate on the number of occurrence of accidents. For an instance significant differences in driving characteristics are observed between male and female in case of speed, skill, and attitude (Al-balbissi, 2010). Hence gender can mainly impact on causing road traffic accidents based on the above stated criterion. On the other hand gender and age of causalities are important to understand the vulnerability of road traffic accidents and getting ready to undertake the challenge of mitigating adverse impacts accompanied by road traffic accidents. Lihare and Swarnkar, 2016 identified in their research that young men are highly vulnerable to road traffic accidents in India and since this age group is economically productive, their families will face a misery if they are dependents of the victims.

Knowledge on demographic characteristics of fatalities of road traffic accidents are crucially important to be considered when designing policies in order to reduce deaths (Ding et.al, 2016). Accordingly traffic separation measures such as bicycle- and pedestrian-only routes, car-free routes and bus lanes, and traffic signals staying on green for longer are some implementations in Jiansu in accordance with the knowledge on demographic characteristics of road traffic fatalities to secure vulnerable road users like pedestrians. Also introduction and enforcement of speed limits and intervention in drink-driving

were among successfully implemented policies in Suzhou (in southern Jiangsu) and Dalian as pilot projects.

Hence it is timely important to analyze the demographic characteristics such as age and gender of road traffic fatalities in order to realize the current trends accompanied by the triggering occurrences of road traffic accidents and also to recognize the possible implications aiming reduced number of road traffic accidents and losses on the way forward to the sustainable development of the country.

Objective

With the primary focus of analyzing age and gender profiles of casualties of road accidents in Sri Lanka from 2010 to 2012 this study carries few specific objectives including,

1. To examine gender based variations of casualties of Sri Lanka
2. To study age based trends of casualties of Sri Lanka

Data and methods

Entire project depends on secondary data sources that accident data base obtained from the Sri Lanka police from 2010 to 2012 (consecutive 3 years) was used for the analysis to reach the above mentioned objectives of the study. This study considers all accident records reported in police throughout entire country.

Age and gender profiles of both drivers and casualties are examined based on the accident characteristics including,

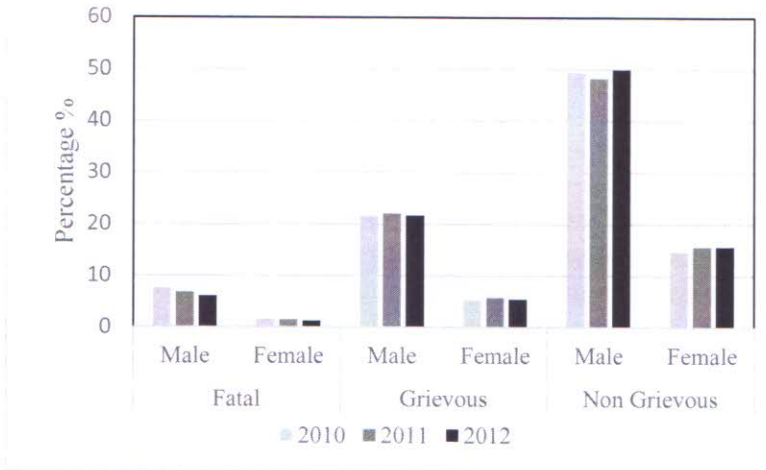
1. Severity : fatal, grievous and non-grievous
2. Category: driver/rider, pedestrian, passenger/pillion rider, passenger/pillion rider falling off vehicle, passenger entering/leaving bus.
3. Collision Type: based on thirteen collision types-head on collision, angular collision, hitting from back, side swipe, collision while turning from different directions, collision while turning from the same direction, hitting on a parked vehicle, hitting on a property, hitting a pedestrian, passenger falling from a vehicle, accident involving a cyclist, accident involving an animal, accident involving an object or a train and any other type
4. Lighting condition: daylight, night/no street lighting, dusk/dawn, night improper street lighting and night/good street lighting
5. Element type: car, dual purpose vehicles, lorry, cycle, motor cycles, three-wheeler, articulated vehicles/prime mover, SLTB bus, Private bus, Intercity bus, land vehicle, tractor, animal drown vehicle, rider on animals, pedestrian, not known

Age categories considered in this study are "below 18, 18-40, 40-60, above 60". Descriptive statistical methods including frequencies, percentages, proportions and bar-charts are used for identifying age and gender related trends and patterns of accident casualties.

Results and discussion

Gender based variations of casualties of road traffic accidents in Sri Lanka
Severity of casualties

Figure 3: Casualty gender vs. severity of accidents

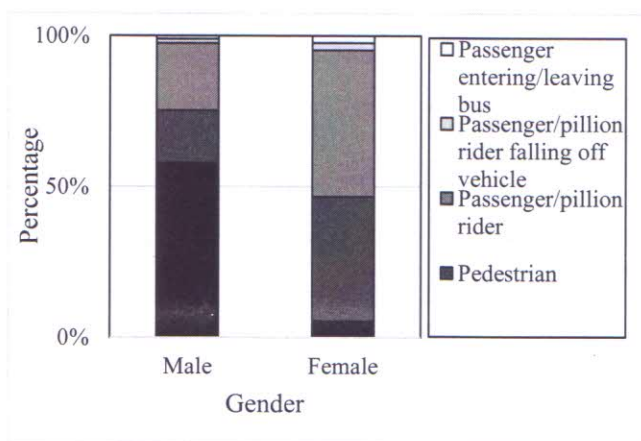


Source: Based on Sri Lanka Police Department data 2010-2012

Four main categories of accidents based on the severity includes fatal, grievous, non-grievous and damage only. Accordingly majority (40%) is damage only, grievous and non-grievous collectively about 50% whereas 5-7% is fatal. Among them, casualties are identified under three main severity types including fatal, grievous, non-grievous followed by the figures respectively 7-9%, 27-28% and 64-65%. In case of gender, 90.8% of the casualties are male while female proportion is even less than 10% (Figure 3). Kumar & Srinivasan, 2013 justify this situation as resulted by male dominance in job performance, lower literacy, family norms, cultural aspects etc, where the females are mostly confined to the residential place alone. Male proportion of fatal, grievous and non-grievous are respectively 82%, 80% and 76%. There is not a significant difference found among severity type where in each category reported approximately equal percentages as at 80% (male) and 20% (female).

Accident category

Figure 4: Casualty gender vs. accident category



Source: Based on Sri Lanka Police Department data 2010-2012

Gender verses accident category also was examined to identify whether there are gender based patterns according to accident category. As a whole nearly half (46.27%) of the casualties are drivers or riders. Second largest category is passenger/pillion rider (28.13%) followed by pedestrians with a

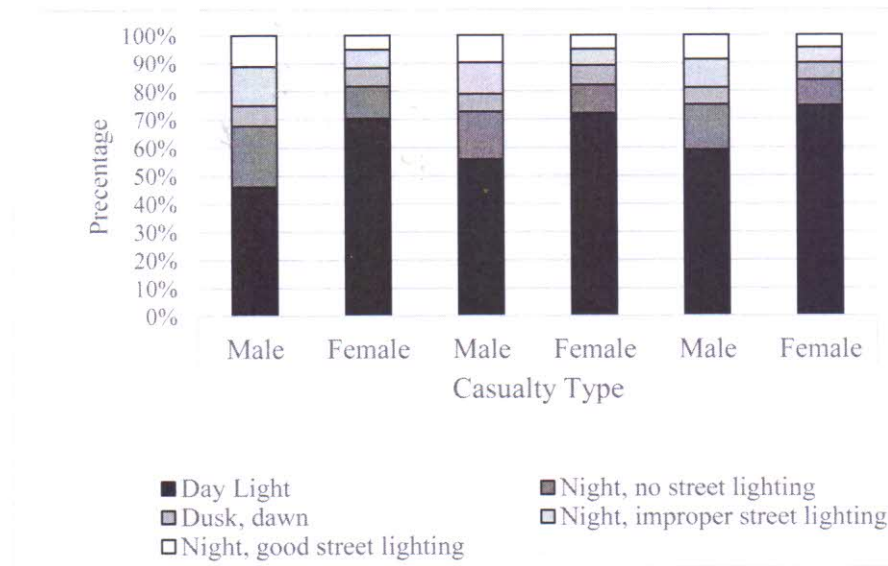
percentage of 22.63% (Figure 4). Men are the highly vulnerable group for each category when considering the total counts. However when examining gender base differences in the percentages, majority of male casualties (58%) are from driver rider category whereas for females, it is passenger/pillion category (48%). Pedestrian category is also considerably highlighted in case of female casualties that about 41% casualties are pedestrians.

Collision type

Most prominent collision types of road traffic accidents are head on collision and pedestrian collision followed by collision with property and accidents involving with cyclists. In comparison of collision type based on gender, majority of male casualties are recorded from head-on collision type (27%) followed by pedestrian collisions (19%) while for female most of collisions involves with pedestrians (41%) followed by head-on collisions (17%). About 12% of collisions involve with property in both genders. It is a highlighting fact that considerable percentage of female casualties incur owing to pedestrian collisions is almost as double as male percentage. It may be because of the lesser female driver percentage and subsequent higher percentage of female pedestrian. Furthermore, similar scenario can be witnessed in case of fatal casualties that higher percentage of female casualties resulted by pedestrian collisions verses higher percentage of male casualties due to head-on collisions. Also reflected same picture from grievous and non-grievous casualties too.

Lighting condition

Figure 5: Casualty gender vs. Lighting condition and severity



Source: Based on Sri Lanka Police Department data 2010-2012

Lighting conditions at the time of accident are also determining factors of accidents. Accordingly five conditions are identified as daylight, night/no street lighting, dusk/dawn, night improper street lighting and night/good street lighting. Night/no street lighting, dusk/dawn, night improper street lighting and night/good street lighting can be considered commonly as night time or week lighting condition. Percentage differences among male and female casualties under different lighting conditions were examined accordingly the severity type of the accidents. Resultantly, percentage of casualties reported by day time accidents are considerably higher than in other conditions irrespective of gender and severity (Figure 5). However there is a noticeable percentage difference between male and female casualties reported by day time accidents in each severity type as given by figure 5.

The fact that about 15% of the casualties in the age category "below 18" are drivers or riders should be further investigated (Figure 6). However majority of the casualties of the same age category are passengers or pillion riders. Drivers are the most prominent casualty type recorded between 18 to 60 years. In case of elderly approximately half of the casualties are pedestrians (48%).

Conclusion

In conclusion, males are highly vulnerable to road traffic accidents compared to females. Among them, those who are between 18-40 are extremely vulnerable. Most of male casualties are drivers or riders irrespective of the age categories followed by pedestrians. Majority of them are motorbike drivers. Elaborately most of men involves with head-on collisions. Also most of the accidents faced by the male casualties faced or met with accidents during night time or under gloomy lighting conditions. Relatively low vulnerability is observed for females in case of road traffic accidents which is even less than 10%. However among the female casualties, majority of them are passengers, pedestrians or pillion riders. Most of women casualties have met with accidents during day time. Furthermore casualty rates decreases when reaching upper age limits. However considerable percentage of casualties are witnessed in age categories, "below 18" and "above 60" which are counted under pedestrians or passengers or pillion riders. As Somasundaraswaran, 2006 mentions, one of the main reason for road traffic accidents is increasing number of vehicles. If the rates continues, number of casualties also will be increased. That will impact adversely on the mortality rates of the country. As well, age group between 18-60 are the highly vulnerable group for accidents that it will adversely impact on the economy of the country as they are the most productive age group of a country. Demographic variables such as gender and age are crucially important to clearly identify some risks and vulnerabilities in road traffic accidents that these outputs can be essentially utilized in determining road accident mitigation policies and planning.

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