

Depiction of death due to Road Traffic Accident-an autopsy based Study

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Abstract

Background: We, as medico-legal expert observe a lot of cases of road traffic accident(RTA) annually. It implies RTAs have become one of the leading health hazards in context of time. **Objective:** To evaluate the socio-demographic and injury patterns found in RTA victims along with précised cause of death. **Materials and Methods:** This study is a retrospective autopsy based study conducted at Sir Salimullah Medical College Mortuary from 01.01.2014 to 31.12.2016 which revealed 1882 RTA cases out of the total 8500 medico-legal autopsies. Information regarding age, sex, type of the victim, date & time of incidence and death were collected from the inquest reports, hospital records and case files. They all were then compiled, analyzed and tabulated. **Results:** This study reveals 1882 cases of RTA (22.14%) of the total 8500 medico-legal autopsies. The most affected age group was 20-29 years i.e 476 cases (25.29%). 1452 male victims (77.15%) outnumbered the females i.e 430 cases (22.84%). Commonest victims were pedestrians i.e 862 cases (45.80%) followed by vehicle occupants 502 (26.67%), drivers 332 (17.64%), bicyclists 171 (9.08%) and undetermined 15 cases (0.79%). Most external injuries were found in head, neck & face regions i.e 2790 (33.53%) followed by lower limbs (2345), upper limbs (1378), thorax (1203) and abdomen (603). We observed 828 fracture of the skull (20.41%) followed by lower limbs (802), thorax (780), upper limbs (729), face (717), pelvis (105) and spine in 94 cases. Brain injuries were found in 803 cases (24.73%) followed by lungs, heart & great vessels, liver, stomach spleen, kidneys, intestine, diaphragm and spinal cord. Maximum victims died due to head injury in 814 cases (43.25%) followed by multiple trauma, haemorrhagic shock, spinal cord injury, septic shock and crush syndrome. **Conclusion:** Most of the victims were male and commonest site of injury was head, neck & face region. Head injury was the commonest cause of death.

Key words: Road traffic accident, injury, victim, death, autopsy

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Introduction

The term accident has been defined as an occurrence in the sequence of events which usually produces unintended injury, death or property damage¹. Accidents constitute a complex phenomenon of multiple causation. The etiological factors are classified into human and environmental factors². An injury is any harm whatever illegally caused to a person in body, mind, reputation or property³. Injury can lead to death in association with any form of transport, but the most common are with road, rail, and air transport systems⁴. Amongst all, road traffic accidents claim largest toll of human life and tend to be the most serious problem world over⁵. As countries become more developed, there is often an accompanying rise in life expectancy.

However, increasing motorization that accompanies economic growth has led to an increase in road traffic accidents (RTAs), and a corresponding rise in fatalities. Indeed, the World Health Organization has predicted that traffic fatalities will be the sixth leading cause of death worldwide and the second leading cause of disability-adjusted life in the developing countries by the year 2020⁶. Due to fast pace of modernization, the basic needs including the requirement of a vehicle for transportation are expanding rapidly and resulting in an epidemic situation of injury everywhere including developing countries like Bangladesh⁷. Persons involved in vehicular accidents sustain a large variety of injuries. These injuries often assume definitive pattern in case of a pedestrian or a driver or a passenger, such accidents are so common now-a-days that a doctor may be asked to draw an opinion from the injuries

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found on the body⁸. The spectrum of vehicular injuries is indeed immense. All kinds of injuries may be caused in vehicular accidents, depending on the following factors –a)Site of impact, b)Direction of impact, c)Force of impact, d) Behaviour of vehicle after impact, for example overturning , e) Ejection of victim, and, f) Supervening factor, for example, fire⁹. The important factors for road traffic accidents are human errors, driver fatigue, poor traffic sense, mechanical fault of vehicle, speeding and overtaking violation of the traffic rules, poor road conditions, traffic congestion, road encroachment etc¹⁰. The problem appears to be increasing rapidly in developing countries¹¹. The basic role of an autopsy surgeon is to reveal the cause of death in vehicular accidents whether it is an accident, bad luck, negligence while driving, suicide or homicide. This study has been done to describe the nature, distribution and types of injuries received during tragic road traffic accidents along with précised socio-demographic pattern of the unfortunate victims so that possible preventive measures can be taken.

Aims and Objectives

- To draw public attention regarding road traffic accident(RTA)
- To evaluate the cause of death in RTAs
- To determine the epidemiological factors in relation to RTA
- To prevent the occurrence of RTA

Materials and Methods

The present study was conducted in the Forensic Medicine Department of Sir Salimullah Medical College, Dhaka. The study period was of three years from 01.01.2014 to 31.12.2016. The material for this study included all dead bodied of the victim of road traffic accident brought to Sir Salimullah Medical College Mortuary. Thorough, elaborative and meticulous postmortem examinations of the dead bodies were done there. Information in relation to age, sex and type of the road users(victims) were collected from the inquest report, hospital records and case files. These informations were then compiled, analyzed and tabulated.

Observations and Results

We observed most of the cases of road traffic accidents (RTAs) in the year 2016 i.e 689 cases (22.85%) out of the total 3015 medico-legal autopsies. It was evident that there was an annual increase in the total number of RTAs i.e we observed 565 cases (21.56%) out of the total 2620 autopsies

in 2014 and 628 cases (21.91%) out of the total 2865 autopsies in 2015. In total we observed 1882 cases of RTA out of the total 8500 medico-legal autopsies accounting for 22.14%(Table-1)

Most of the victims were from the age group 20-29 years i.e 476 cases (25.29%) followed by the age group >60 years i.e 347 cases (18.43%), 10-19 years 312 cases (16.57%), 40-49 years 231 cases (12.27%), 50-59 years 209 cases (11.10%), 30-39 years 202 cases (10.73%) and 0-9 years 105 cases comprising 5.57% of the total 1882 cases of RTA. (Table-2)

Predominant victims were male i.e 1452 cases (77.15%) and we observed 430 female victims comprising 22.84% of the total 1882 cases. (Figure-1)

Pedestrians were the commonest victims i.e 862 cases (45.80%) followed by vehicle occupants 502 cases (26.67%), Drivers 332 cases (17.64%), Bicyclists 171 cases (9.08%) and 15 victims were undetermined comprising 0.79% of the total (Figure-2)

Considering distribution of external injuries we observed 2790 injuries (33.53%) over head, neck & face (960 abrasions+943 contusions+887 lacerations) followed by lower limbs 2345 cases i.e 28.18% (819 abrasions+737 contusions+789 lacerations), upper limbs 1378 cases i.e 16.56% (972 abrasions+209 contusions+197 lacerations), thorax 1203 cases i.e 14.46% (807 abrasions+189 contusions+207 lacerations), abdomen & pelvis 603 cases i.e 7.24% (262 abrasions+129 contusions+212 lacerations). In total we observed 8319 visible external injuries out of the total 1882 victims of RTA. (Table-3)

Considering observation of bony fractures we observed most of the fractures were in the skull bones i.e 828 cases (20.41%), lower limbs in 802 cases (19.77%), thorax in 780 cases (19.23%), upper limbs 729 cases (17.97%), face 717 cases (17.68%), pelvis 105 cases (2.58%) and spinal fractures in 94 cases comprising 2.31% of the total. We observed the total of 4055 fractures out of the total 1882 RTA victims. (Table-4)

Considering distribution of visceral injuries we observed injury to the brain in 803 cases (24.73%) followed by lung

injury in 689 cases (21.22%), heart & great vessel injury in 652 cases (20.08%), liver injury in 201 cases (6.19%), stomach injury in 188 cases (5.79%), spleen injury in 184 cases (5.66%), Kidney injury in 176 cases (5.42%), intestinal injury in 164 cases (5.05%), diaphragmatic injury in 107 cases (3.29%) and spinal cord injury in 82 cases comprising 2.52% of the total 3246 (100%) visceral injuries among the total 1882 RTA victims (Table-5)

Majority of the victims died due to head injury i.e in 814 cases (43.25%) followed by multiple trauma 729 cases (38.73%), haemorrhagic shock 193 cases (10.25%), spinal cord injury 79 cases (4.19%), septic shock 38 cases (2.01%) and crush syndrome 29 cases comprising 1.54% of the total 1882 cases of RTA victims (Figure-3)

Table 1: Year-wise Distribution of RTA cases

Year	Total No of PM Examination	Cases of RTA	Percentage%
2014	2620	565	21.56%
2015	2865	628	21.91%
2016	3015	689	22.85%
Total	8500	1882	22.14%

Table 2: Age-wise distribution of the RTA victims (N=1882)

Age (Years)	No of RTA victims	Percentage%
0-9	105	5.57%
10-19	312	16.57%
20-29	476	25.29%
30-39	202	10.73%
40-49	231	12.27%
50-59	209	11.10%
>60	347	18.43%

Figure 1: Sex-wise distribution of the RTA victims (N=1882)

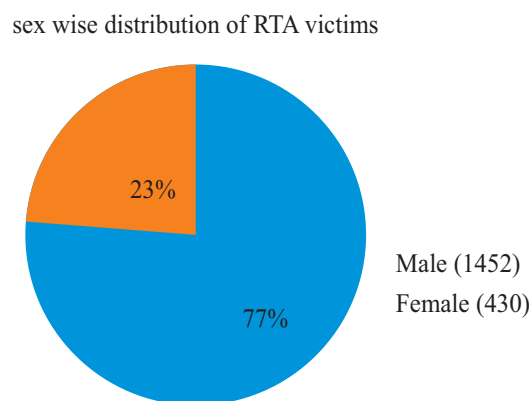


Figure 2: Types of road users killed in RTA (N=1882)

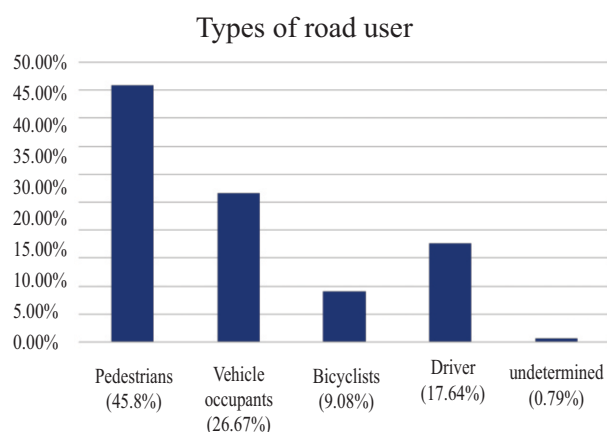


Table 3: Distribution of external injuries found in RTA victims on different parts of the body

Part of the body	Abrasion	Bruise	Laceration	Total
Head, neck & face	960 (11.53%)	943 (11.33%)	887 (10.66%)	2790 (33.53%)
Upper limbs	972 (11.68%)	209 (2.51%)	197 (2.36%)	1378 (16.56%)
Thorax	807 (9.70%)	189 (2.27%)	207 (2.48%)	1203 (14.46%)
Abdomen & pelvis	262 (3.14%)	129 (1.55%)	212 (2.54%)	603 (7.24%)
Lower limbs	819 (9.84%)	737 (8.85%)	789 (9.48%)	2345 (28.18%)
Total	3820(45.91%)	2207(26.52%)	2292(27.55%)	8319 (100%)

Table 4: Distribution of fractures among RTA victims

Part of the body	Number with Percentage %
Skull	828 (20.41%)
Face	717 (17.68%)
Spine	94 (2.31%)
Thorax	780 (19.23%)
Pelvis	105 (2.58%)
Upper limbs	729 (17.97%)
Lower limbs	802 ((19.77%)
Total (%)	4055 (100%)

Table 5: Distribution of visceral injuries among the RTA victims

Part of the body	Number with percentage %
Brain	803 (24.73%)
Spine	82 (2.52%)
Lungs	679 (21.22%)
Heart & Great vessels	652 (20.08%)
Liver	201 (6.19%)
Spleen	184 (5.66%)
Kidneys	176 (5.42%)
Stomach	188 (5.79%)
Intestine	164 (5.05%)
Diaphragm	107 (3.29%)
Total (%)	3246 (100%)

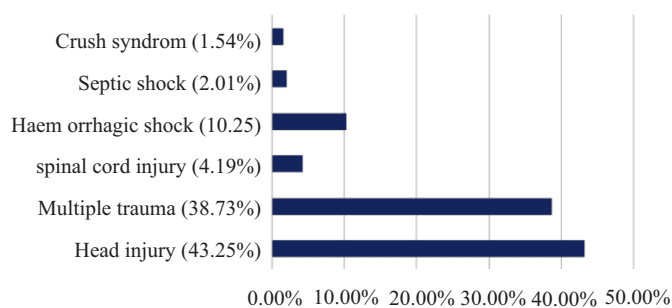


Figure 3: Distribution of RTA victims in relation to cause of death

Discussion

During the three year study period we observed the total of 1882 cases of road traffic accidents out of the total 8500 medico-legal autopsies done at Sir Salimullah Medical College Mortuary from 01.01.2014 to 31.12.2016.

Maximum cases were from the age group 20-29 years i.e 476 cases (25.29%) followed by the age group >60 years i.e 347 cases (18.43%), 10-19 years 312 cases (16.57%), 40-49 years 231 cases (12.27%), 50-59 years 209 cases (11.10%), 30-39 years 202 cases (10.73%) and 0-9 years 105 cases accounting for 5.57% of the total 1882 cases of RTA. Similar study was done in India which shows most of the victims of RTA were from the age group 30-39 years 26 cases (26.53%) followed by the age group 50-59 years 17 cases (17.34%), > 60 years 16 cases (16.32%), 20-29 years and 40-49 years 13 cases (13.26%) respectively, 10-19 years 8 cases (8.16%) and 0-9 years 5 cases comprising 5.10% of the total 98 cases of RTA victims¹².

Majority of the victims were male i.e 1452 cases (77.15%) and we observed 430 female victims comprising 22.84% of the total 1882 cases. Similar findings were observed in an Indian study where out of 98 victims of RTA there were 74 male victims (75.51%) and 24 female victims comprising 24.48%¹².

Pedestrians were the prime victims i.e 862 cases (45.80%) followed by vehicle occupants 502 cases (26.67%), Drivers 332 cases (17.64%), Bicyclists 171 cases (9.08%) and 15 victims were undetermined comprising 0.79% of the total. Similar study was done in India which revealed pedestrians were the commonest victim i.e 880 cases (47.00%) followed by vehicular occupants 517 cases (27.61%), drivers 266 cases (14.20%), bicyclists 196 cases (10.47%) and undetermined 13 cases comprising 0.69% of the total 1872 cases of RTA¹³.

In relation to distribution of external injuries we observed 2790 injuries (33.53%) over head, neck & face (960 abrasions+943 contusions+887 lacerations) followed by lower limbs 2345 cases i.e 28.18% (819 abrasions+737 contusions+789 lacerations), upper limbs 1378 cases i.e 16.56% (972 abrasions+209 contusions+197 lacerations), thorax 1203 cases i.e 14.46% (807 abrasions+189 contusions+207 lacerations), abdomen & pelvis 603 cases i.e 7.24% (262 abrasions+129 contusions+212 lacerations).. In total we observed 8319 visible external injuries out of the total 1882 victims of RTA. Similar Indian study revealed head, neck & facial injury 122 (32.44%) followed by upper limb injury 79 (21.01%), lower limb injury 74 cases (19.68%), thoracic injury 55 (14.62%), and (abdominal

+pelvic) injury 46 cases out of the 376 external injuries of which total RTA victims were 98 in number¹².

In connection with bony fractures we observed most of the fractures in the skull bone i.e 828 cases (20.41%), lower limbs in 802 cases (19.77%), thorax in 780 cases (19.23%), upper limbs 729 cases (17.97%), face 717 cases (17.68%), pelvis 105 cases (2.58%) and spinal fractures in 94 cases comprising 2.31% of the total. We observed the total of 4055 fractures out of the total 1882 RTA victims. Similar Indian study shows skull fracture 59 (29.64%), thoracic fracture 39 (19.59%), lower limb fracture 32 (16.08%), upper limb fracture 31 (15.57%), facial fracture 24 (12.06%), spinal and pelvic fracture 7 each comprising 3.51% of the total 199 fractures found among 98 victims of RTA¹².

In relation to visceral injuries we observed injury to the brain in 803 cases (24.73%) followed by lung injury in 689 cases (21.22%), heart & great vessel injury in 652 cases (20.08%), liver injury in 201 cases (6.19%), stomach injury in 188 cases (5.79%), spleen injury in 184 cases (5.66%), Kidney injury in 176 cases (5.42%), intestinal injury in 164 cases (5.05%), diaphragmatic injury in 107 cases (3.29%) and spinal cord injury in 82 cases comprising 2.52% of the total 3246 (100%) visceral injuries among the total 1882 RTA victims. Similar Indian study shows injury to the brain in 78 cases (38.61%), lungs in 25 cases (12.37%), liver in 24 cases (11.88%), heart & great vessels in 16 cases (7.92%), intestine in 14 cases (6.93%), spleen in 12 cases (5.94%), spinal cord in 7 cases (3.46%), stomach in 5 cases (2.47%) and diaphragm in 4 cases comprising 1.98% of the total 202 visceral injuries¹².

Most of the RTA victims died due to head injury i.e in 814 cases (43.25%) followed by multiple trauma 729 cases (38.73%), haemorrhagic shock 193 cases (10.25%), spinal cord injury 79 cases (4.19%), septic shock 38 cases (2.01%) and crush syndrome 29 cases comprising 1.54% of the total 1882 cases. Similar Indian study also revealed majority of the victims died due to head injury in 46 cases (46.93%) followed by polytrauma in 34 cases (34.69%), haemorrhagic shock in 14 cases (14.28%), spinal cord injury and complications 2 cases each comprising 2.04% of the total 98 cases of RTA victims¹².

Conclusion

An autopsy is an integral component to establish the cause and nature of death. This study has documented the increased trend of RTA fatalities in relation to demographic pattern from 2014 to 2016. It has displayed the age and gender variation and the possible risk factors involved in

RTA. Vehicular accidents have continued to be a threatening factor, incurring great loss of valuable man-power each year. Unsafe driving practices such as high speed driving, avoid using helmets and seat belts while driving or using mobile phones while crossing roads are very common among young drivers. Strict re-enforcement of traffic rules, road safety regulations and improvisation of emergency medical services altogether can prevent death and disabilities caused by vehicular accidents. Public awareness campaign concerning tragic ends of most valuable human lives, safety rules targeted at the high risk group and the maintenance of good road condition should be kept continued. Further studies concerning road traffic accidents should be encouraged in the upcoming future days.

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