

# PATTERN OF INJURIES DUE TO FATAL ROAD TRAFFIC ACCIDENTS FROM RURAL CHENNAI

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## ABSTRACT

**Background-** Human, vehicular and environmental factors play role before, during and after a Road Traffic Accidents. Accidents occur not only due to ignorance but also due to carelessness, thoughtlessness and over confidence. **Aim-** The study aimed to analyze pattern and incidence various injuries sustained by RTA victims will be carried out. **Methods-** The present cross sectional study was carried out at Department of Forensic Medicine of a tertiary care teaching institution from rural Chennai. All the deaths due to road traffic accidents occurred at RIMS, Chennai during the period 2011-2013 were retrospectively analyzed. The detailed analysis of these cases was based on the inquest report, medical records and evaluation of autopsy reports. **Results-** Out of 1108 medico legal autopsies conducted during the study period, 302 (27.2%) were of vehicular accident fatalities. Maximum numbers of fatal vehicular accidents were reported on Saturdays followed by Fridays and Sundays. The majority of male victims were found in the age group (>10-40 years) with a percent of 55.2%. The lowest percentage of both male and female victims was in the age group (<10 years) which represented 3.9% and 2.0% respectively, which is statistically non-significant. A large proportion of the victims (34%) died on the spot/ brought dead or died within 1 hour of the accident. Nine percent cases survived up to 7 days whereas only 7.5% cases survived beyond 1 week. Skull fractures were found in 60.9 % cases of head injury. The commonest variety of intracranial haemorrhage was subarachnoid haemorrhage (60.9%). **Conclusion-** Findings of this study highlight that most of the deaths in road traffic accidents, brought to a tertiary care hospital in rural Chennai, take place either on the spot or within 24 hours of injury which shows need of good pre-hospital care and provision of quality trauma services at site in India.

**Keywords:** Road Traffic Accidents, Epidemiological study, Fatal, Injuries.

## INTRODUCTION

Road traffic accident (RTA) is one of the major preventable public health problems and is on the rise which can be attributed to increase in the number of vehicles, lifestyle changes and risky attitudes.

Accidents occur not only due to ignorance but also due to carelessness, thoughtlessness and over confidence. Human, vehicular and environmental factors play role before, during and after a Road Traffic Accidents.<sup>1</sup> The problem is so severe that, by 2020, it is projected that road traffic disability-adjusted life years (DALYs) lost will move from being the 9th leading cause of disability-adjusted life years lost to the 3rd leading cause in the world and will be 2nd leading cause in developing countries.<sup>2</sup>

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Road traffic accidents kill an estimated 1.3 million people and injure 50 million people per year globally. The magnitude of Road traffic accidents and fatalities in India is alarming. In 2009, 4.22 lakh road traffic accidents and 1.27 lakh road traffic fatalities were reported. These numbers translate into one road accident every minute and one road accident death every four minutes. However, this is an underestimate, as not all injuries are reported to the police.<sup>3</sup> This indicates that the surveillance system for vehicular accidents is not well established in India.

Human, vehicular and environmental factors play roles before; during and after a trauma event therefore accidents have to be studied in terms of an epidemiological model (agent, host and environmental factors). The present study was therefore conducted to ascertain the incidence of fatal vehicular accidents and patterns of injuries with emphasis on traumatic brain injuries amongst RTA victims brought to a tertiary care hospital in rural Haryana. Detailed analysis of the pattern and incidence various injuries sustained by RTA victims will be carried out. Besides, features pertaining to hosts (road users), day wise pattern of accidents, severity of injuries, duration of survival of victims, types of skull fractures sustained, types of Intracranial haemorrhage involved etc will be studied in detail.

#### MATERIALS AND METHODS

The present study was carried out at Department of Forensic Medicine of a tertiary care teaching institution from rural Chennai. All the deaths due to road traffic accidents occurred at RIMS, Chennai during the period 2011-2013 were retrospectively analyzed. The detailed analysis of these cases was based

on the inquest report, medical records and evaluation of autopsy reports.

For the purpose of study, a road traffic accident was defined as any vehicular accident occurring on a public road or highway and includes vehicle accidents where the place of occurrence is unspecified.

A detailed proforma for the purpose of recording socio-demographic profile of victims, epidemiological data, pattern and severity of injuries sustained, pattern of skull fracture and cranial trauma and other relevant data etc was prepared for the purpose of filling observations of the present study. The collected data was entered in Microsoft Excel. Coding of the variables was done. SPSS version 11.5 was used for analysis. Interpretation of the collected data was done by using appropriate statistical methods like percentage, proportions, bar and line diagrams. Chi square ( $\chi^2$ ) test was applied to test significance wherever applicable.

#### RESULTS

Out of 1108 medico legal autopsies conducted during the study period, 302 (27.2%) were of vehicular accident fatalities. (Table 1) Males comprised 85.0% of the total fatalities, while females accounted for remaining 15.0%.

Maximum numbers of fatal vehicular accidents were reported on Saturdays followed by Fridays and Sundays. (Figure 1)

The majority of male victims were found in the age group (> 10-40 years) with a percent of 55.2%. The lowest percentage of both male and female victims was in the age group (< 10 years) which represented 3.9% and 2.0% respectively,

which is statistically non-significant. (Table 1)

A large proportion of the victims (34%) died on the spot/ brought dead or died within 1 hour of the accident. Nine percent cases survived up to 7 days whereas only 7.5% cases survived beyond 1 week. (Figure 2)

Head injuries (concussion, extradural haematoma, subdural haematoma, subarachnoid haematoma etc.) were more frequent in motorcyclists than other victims which were 80.4% versus 77.8% in drivers, 28.9% in passengers and 25.4% in pedestrians. The percentage of chest injuries (haemothorax, lung collapse etc.) was more frequent in motorcyclists than other victims which were 31.9% versus 5.0% in drivers, 7.2% in passengers and 6.9% in pedestrians. (Table 3)

### Head Injuries

Out of total number of 207 cases (68.5 %) who sustained head injury, 96 cases (31.8 %) sustained head injury without any significant injury to other parts of the body. Skull fractures were found in 60.9 % cases of head injury. The most common bone involved was the temporal bone 135 (44.7 %), followed by parietal bone (40.7 %), occipital bone (39.1%) and frontal bone (31.1%). The commonest variety of intracranial haemorrhage was subarachnoid haemorrhage (60.9 %). (Table 4)

## DISCUSSION

Road traffic injuries are as a result of “accidents or random events” does not hold good any more as evidence from research shows that like all injuries Road traffic injuries are partially predictable and hence preventable. According to

“National Crime Records Bureau, Ministry of Home Affairs”, RTA accounted for about one third of all unnatural causes of accidental deaths in the year 2013.<sup>4</sup> Around 443,001 RTAs were reported in the same year. Mortality due to RTA has declined by 1.2% during the year 2013 in comparison to year 2012.<sup>5</sup>

Our study showed the great majority of the deceased (88.2%) were males. It is due to greater male exposure on urban streets and similar higher incidence of traffic accidents among males has been found by many other researchers.<sup>6-9</sup> According to a study done from Puducherry, 83% were again males.<sup>10</sup> In the present study, the higher number of reported accident cases occurred on weekends (Fridays, Saturdays and Sundays) when compared to week days. Others also have observed similar results.<sup>11,12</sup> In another study from Delhi, the highest number of RTAs were observed on Mondays and Wednesdays. This is in contrast to the study by Singh A. et al who reported higher number of accident cases on week days.<sup>13</sup>

We observed that, majority of the RTA victims were in the age group of 10 to 40 years. Tendency of this age group to show scarce attention to traffic rules & regulations and non use of safety devices like helmets, seatbelts, restraints etc can be a possible explanation for the same. In a hospital based study by Ganveer GB majority of the victims were in the age group 18-37 years.<sup>14</sup> This shows that the people of the most active and productive age group are involved in RTAs, which adds a serious economic loss to the community. Similar observations were also made by others.<sup>15</sup>

With regard to pattern of injuries, musculoskeletal injuries topped the list of injuries of RTA in all groups of victims. While, the percentage of head (89.48%),

chest (31.5%) and abdomen (15.7%) injuries in motor cyclists were more frequent than other victims due to severe trauma to unprotected bodies. These results are cohort with others.<sup>16-18</sup>

Multiple injuries in the pedestrians of the present study can be explained by imagining the scenario of crashes between the body of pedestrians victims and the vehicle; first limbs and pelvis fractures are so frequent due to direct collision between vehicle and pedestrians body, second the victim is thrown in the air to the ground leading to subsequent more injury where any part of the body liable to be injured, third the wheel of the vehicle can pass on the victims adding more injuries (limb amputation etc). So in pedestrians multiple injuries are the rule. This comes in agreement with Al Madani and Al Janahi<sup>19</sup> who found that pelvis and lower extremities fractures were more frequent in pedestrians.

Most of the deceased suffered from multiple skull bone fractures. The most frequent bone fractured was temporal bone (44.7%). The results are identical to study conducted in northern India.<sup>20</sup> The probable reason of multiple skull bone fractures is very high speed at which vehicles move on highways. So accidents which occur at high speeds cause a great impact on head when it strikes by forcible contact with a broad resisting surface.

### CONCLUSION

Findings of this study highlight that most of the deaths in road traffic accidents, brought to a tertiary care hospital in rural Chennai, take place either on the spot or within 24 hours of injury which shows need of good pre-hospital care and provision of quality trauma services at site in India. A nationwide computerized trauma registry is required to bring out

the risk factors, circumstances, chain of events leading to the accidents.

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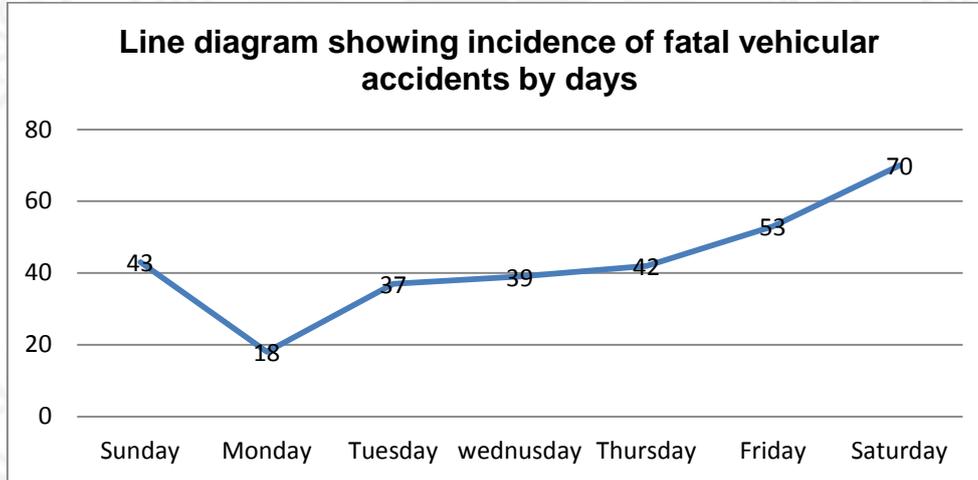
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**Table 1: Yearly distribution of total medico legal cases autopsied and fatal vehicular accidents**

Year	Medico legal cases autopsied	Fatal vehicular accidents
2011	340	94
2012	373	101
2013	395	107

**Figure 1: Line diagram showing incidence of fatal vehicular accidents by days**

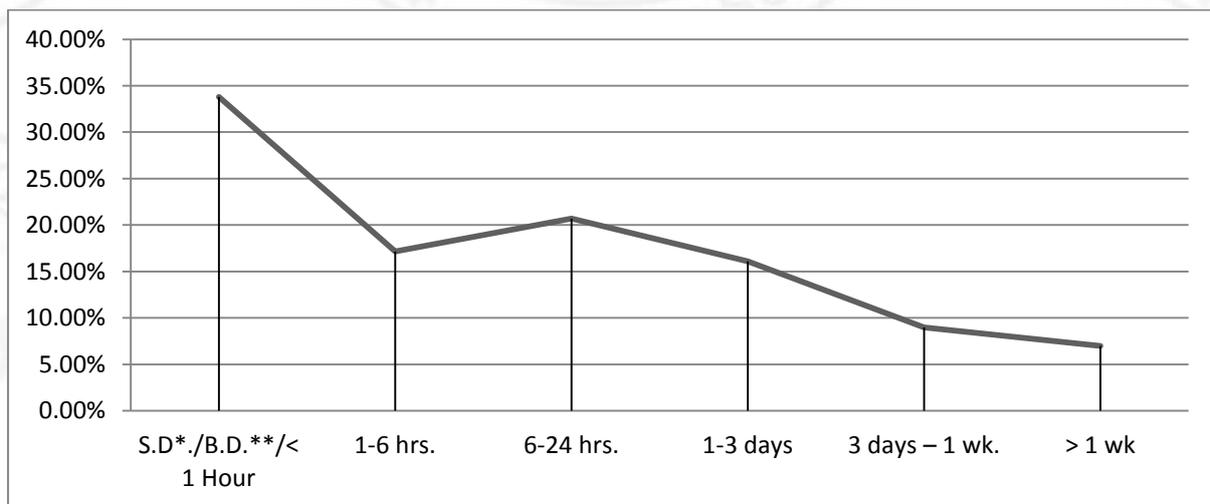


**Table 2: Distribution of subjects according to age and sex**

Sex	Male		Female		Total		X <sup>2</sup>	P
	N.	%	N.	%	N.	%		
< 10	12	3.9	6	2.0	18	5.9	6.3	0.52
> 10-40	107	35.4	60	19.8	167	55.2	4.9	0.07
> 40-60	41	13.6	32	10.6	73	24.2	5.3	0.49
> 60	20	6.6	24	7.9	44	14.5	4.2	0.03

P > 0.05: Non significant, P < 0.05: Significant

**Figure 2: Line diagram showing duration of survival of victims**



**Table 3: Pattern of various injuries sustained in fatal vehicular accidents**

Victim status	Pedestrians N= 102		Passengers N= 83		Drivers N= 20		Motorcyclists N= 97	
	N	%	N	%	N	%	N	%
<b>Injured system</b>								
Head injuries	26	25.4	24	28.9	14	77.8	78	80.4
Chest injuries	7	6.9	6	7.2	1	5.0	31	31.9
Abdominal injuries	1	0.98	3	3.6	1	5.0	16	16.5
<b>Musculoskeletal systems</b>								
Fracture (excluding rib fract.)	72	70.5	45	54.2	27	65.0	64	65.9
Several tendon injuries	4	3.9	2	2.4	2	10.0	22	22.7
Lacerated wound	7	6.8	11	13.2	1	5.0	55	56.7
Limb amputation	1	0.98	-	-	-	-	-	-

**Table 4: Incidence and pattern of different type of injuries in fatal vehicular accidents**

<b>Death due to injury in fatal vehicular accidents</b>		
Injury	Frequency	Percentage
Head alone	96	31.8
Head + other	111	36.7
Other	87	32.8
<b>Pattern of different type of skull fractures*</b>		
Fracture	Frequency	Percentage
<b>Bone involved</b>		
Temporal	135	44.7
Occipital	118	39.1
Parietal	123	40.7
Frontal	94	31.1
Sphenoid	66	21.8
Base of skull	184	60.9
<b>Pattern of cranial trauma*</b>		
Injury	Frequency	Percentage
<b>Intracranial haemorrhage</b>		
Subdural	66	21.8
Subarachnoid	184	60.9
Intracerebral	43	14.2
Extradural	57	18.9
Brain laceration	45	14.9
Multiple responses*		