

# Profile of Cases of Fatal Road Traffic Accident with Respect to Diurnal Variation of Time, Age, Sex and Death of Victim in Central Rural India-Autopsy Based Study

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## ABSTRACT

Road traffic accident is a complex phenomenon. Constant rise in the number of motor vehicles, rampant encroachment of road, easy to avail the vehicle because of loan facility, nasty tendency of violating traffic rules and anarchic traffic systems have greatly contributed to rapid increase in RTAs. The rise of road traffic accidents has become a major public health problem. RTAs cost a lot not only to the individuals affected and their families but also to the nation. The injuries, disability and fatality resulting from unexpected RTAs put a significant drain on the economy of the nation.

The present study was a cross-sectional study conducted in central India during 2 year period from 1<sup>st</sup> June 2014 to 31<sup>st</sup> May 2016. During the study period, a total of 757 medicolegal autopsies were conducted in this institute, out of which 109 cases of fatal road traffic accidents (died on spot or within 24 hours of accident) were studied. The purpose of the study was to know the age and sex wise distribution, diurnal variation and to correlate the above parameters with the cause of death.

**Keywords:** *Fatal road traffic accident, Intracranial hemorrhage, Diurnal variation, death.*

## INTRODUCTION

Accidents are world's most serious health problem. The motorized transportation media like vehicles, trains, aeroplanes etc, with fast moving vehicular traffic, vast urbanization and changing social patterns, have contributed to increase in the incidence of trauma to human body.

Road Traffic Accident (RTA) is any vehicular accident occurring on the roadway (i.e. originating on, or involving a vehicle partially on the roadway)<sup>19</sup>. This includes collision of an automobile with a pedestrian, another automobile or with a non-automobile on the roadway or fall from a moving vehicle causing injuries or death of involved individuals.

In 2013, global rate of death from Road Traffic Injuries was 16.6 per 1,00,000 population, 1.25 million people died globally from road traffic injuries in year 2013<sup>19</sup>. In India, more than 4.8 lakh accidents and more than 1.3 lakh deaths were reported during 2013<sup>5</sup>. According

to an expert study group appointed by Government of India "RTAs have come to be considered as the third deadly killer, next to heart disease and cancer." Every year the World Health Organization (WHO) hosts an event, usually on 7<sup>th</sup> April, to celebrate the anniversary of its founding in 1946. Each year the event focuses on one health issue. In response to a growing concern about RTAs the WHO Director-General, Dr. Lee Jong Wook has for the first time in history of WHO devoted<sup>9</sup> 7<sup>th</sup> April 2004 specifically to road safety and the slogan was "Road Safety Is No Accident." Early detection of the injury and prompt treatment are necessary in saving the lives of many of these victims<sup>11</sup>.

## AIMS AND OBJECTIVES

1. To analyze the cause of death due to fatal road traffic accident brought to mortuary of our institute for post-mortem examination.
2. To study age and sex wise distribution of fatal road traffic accidents.

3. To study diurnal variation of time of fatal road traffic accidents.

### MATERIALS AND METHOD

The present study was a two year cross-sectional study. The material for the study was the cases of road traffic accidents brought to mortuary for post mortem of this institution situated in central India, during the period from 1<sup>st</sup> June 2014 to 31<sup>st</sup> May 2016. The present study includes documenting types of wound, their anatomical location and commonest injuries leading to death in fatal road traffic accidents. Ethical clearance for the present study was obtained from the institutional ethical committee. On the arrival of the case in Mortuary of this institute, informed expressed consent was taken from the relative of deceased for examination of wound and their documentation. In the present study, detailed information regarding the wounds and various factors regarding the circumstances of the occurrence, like type of road traffic accidents, time and place of accidents, who treat case first, occupation and other relevant information were gathered from relative and were recorded in the predefined proforma. Details of name, age, sex, address, occupation, type of accident etc. were recorded from relative. All the wounds were examined for their location, size and shape. In the present study though the size of all wounds were noted but it is not included in the analysis because it is beyond the preview of present study.

During the present study period from 1<sup>st</sup> June 2014 to 31<sup>st</sup> May 2016 at this institute in central India—

1. Total no of medicolegal autopsies were conducted during the study period = 757.
2. Autopsies of fatal road traffic accident (died on spot, brought dead to hospital or died within 24 hours of accident) = 109.

**Inclusion Criteria:** All the victims of road traffic accidents who were died on spot or brought dead to hospital or died within 24 hours of accident.

**Exclusion Criteria:**

1. All the victims who died in an incidence other than road traffic accidents.
2. All the victims of road traffic accidents who died after 24 hours of accident.

**Statistical Analysis:**

1. The software for graphs and calculation of statistical values is – SPSS.
2. The software used during creation or modification of some of the diagrams.
  - a. ADOBE PHOTOSHOP(R) 7.0
  - b. COREL DRAW X3
  - c. WINDOWS-10

### RESULTS

**Table 1: Age and sex wise distribution of cases of fatal Road Traffic Accidents**

Age group (in years)	Male	Female	Percentage	
			Male	Female
1 - 10	2	2	01.84%	01.84%
11 - 20	8	4	07.34%	03.67%
21 - 30	30	2	27.52%	01.84%
31 - 40	17	2	15.59%	01.84%
41 - 50	10	1	09.17%	00.92%
51 - 60	12	4	11.01%	03.67%
61 - 70	9	3	08.25%	02.75%
71 - Above	3	0	02.75%	00.00%
Total	91	18	83.47%	16.53%

**Table 2: Distribution of cases of fatal Road Traffic Accident as per diurnal variation of time**

Time of accident	No. of cases	Percentage
Morning (06:01 am to 12:00 noon)	21	19.27%
After noon (12:01 pm to 06:00 pm)	53	48.62%
Evening (06:01 pm to 12:00 midnight)	33	30.28%
Night (12:01 am to 06:00 am)	02	01.83%
Total	109	100%

**Table 3: Profile of cause of death**

Cause of death	No. of cases	Percentage
Intracranial injuries (intracranial hemorrhage/brain injury)	86	78.90%
Hemorrhagic shock	17	15.60%
Traumatic asphyxia	04	03.67%
Spinal cord injury	02	01.83%
Total	109	100%

## DISCUSSION

**Age and sex wise distribution of cases of fatal RTA (Table 1):** Out of 109 (91 cases, 83.47%) were male and (18 cases, 16.53%) were female indicating that large majority of victims were males. Male to female ratio was 5.06:1. Maximum number of victims (32 cases, 29.36%) were in the age group of 21 – 30 years, followed by 31 – 40 years (19 cases, 17.43%). Minimum victims were found in age group of 71 years and above (3 cases, 02.75%) followed by 1 – 10 years (4 cases, 03.68%). Youngest victim was 4 years old male child and the eldest was 85 years male.

Our findings are similar to result of following studies. In the study conducted at PGIMS, Rohtak,<sup>15</sup> males were involved in 89.30% of cases and females in 11.70%. Commonest age group involved was 21 – 30 years (27.30%), followed by 31 – 40 years (20.60%). In other study done at Government Medical College, Jammu,<sup>7</sup> majority of the victims were male (88.13%), while females were involved in 11.87% of cases. Most commonly involved age group was 21 – 30 years

(30%), followed by 31 – 40 years (19.20%). In another study carried out at Office of Judicial Medical Officer, Colombo,<sup>10</sup> 84.54% of victims were male and 15.44% were females. Maximum numbers of victims were in the age 20 – 29 years (20.12%) followed by 30 – 39 years (16.10%). In all the above studies minimum number of victims were in the extremes of age. In the study conducted at Belgaum, Karnataka<sup>13</sup> majority of victims were male (89%). Male to female ratio was 8.09:1. Maximum number of victims (28 cases, 28%) were in the age group of 21 – 30 years followed by 51 – 60 years (18 cases, 18%). Minimum of victims (3 cases, 3%) were found in the extreme age group of 71 – 80 years old male. Similar findings have also been observed in other studies.<sup>12, 4, 1, 14</sup>

The male preponderance in fatal road traffic accidents may be due to the paternalistic nature of our society where males lead a more active life and most of the time is involved in outdoor activities such as driving and travelling. On the contrary, females mostly keep themselves indoor because of cultural background and with the habit of watching TV programs. Totally more than half (56.88%) of victims were in the age group 21 – 50 years. This may be due to the fact that persons of this age group lead more active life, more mobile and go out for work and keep themselves outdoors most of the time. Besides, there is craziness in fast driving, less experience, less traffic sense, late night driving, especially after parties is usually seen in this age group. In our study, people in the extremes of age group comprised the minimum number of fatalities. Least fatalities in older persons may be due to more experience, more traffic sense, less tendency to take undue risks and they remain mostly indoors and leads less active life. Lesser involvement of children below 10 years may be because some senior members of the family accompanies them on road or non availability of driving license of motor vehicles.

**Diurnal variation of cases of fatal RTA (Table 2):** Maximum number of accidents occurred in the afternoon hour's 53 cases (48.62%) and minimum 02 cases (01.83%) in the night. In the evening it was 33 cases (30.28%) and in the morning it was 21 cases (19.27%). Our result is similar to the observations made in the study conducted at Regional Institute of Medical Sciences (RIMS), Imphal, Manipur,<sup>16</sup> in which maximum number of accidents 49.27% occurred during afternoon hours and minimum 03.41% in the night, in the morning

hours the maximum number of accidents occurred were 31.71%. However the result of our study dose not match with the study done by Satish Babu at Belgaum, Karnataka<sup>13</sup> and Patel NS at Greater Lusaka, Zambia<sup>12</sup> and study conducted by Lal S Kohli et al in North East Delhi.<sup>10</sup> This difference can be attributed to the fact that the biggest period in the area where our study has been conducted is between 12:00 noon to 06:00 PM, where majority of people travel for work, school etc. with a sense of urgency to reach the destination. Moreover the peoples in rural area prefer to stay indoor and do not venture out after dark, there by low incidence of accidents in night. The second in order of the time of occurrence of accidents in our study was in the evening hours 30.28% and the tall of accidents in the evening may be due to high rush hour traffic (people return home from work), tiredness after day work, urgency to reach home, poor visibility due to insufficient road lighting in the rural area.

**Profile of cause of death (Table 3):** In our study cause of death was intracranial injuries 86 (78.90%) in maximum number of cases. Next to intracranial injuries was hemorrhagic shock seen in 17 cases (15.60%), traumatic asphyxia in 4 cases (03.67%) and spinal cord injury in 2 cases (01.83%). The finding of present study are similar to studies<sup>6, 3, 2, 8, 17</sup>. In the study conducted in Finland involving RTA during the period 1972 to 1982,<sup>18</sup> in which an injury to cervical spine was the main cause of death. Increasing age seems to increase the risk of fatal cervical spinal injuries. Patients between 16 to 25 years of age had the lowest risk and the patient over the age of 60 years had the highest risk of sustaining a fatal cervical spinal injury 16. Accordingly in our study most of the cervical spinal cord injury cases were above 40 years.

## CONCLUSION

Road traffic accident is a complex phenomenon. Constant rise in the number of motor vehicles, rampant encroachment of road, easy to avail the vehicle because of loan facility, nasty tendency of violating traffic rules and anarchic traffic systems have greatly contributed to rapid increase in RTAs. Population explosion is a catalyzing factor for a number of accidents. The rise of road traffic accidents has become a major public health problem. RTAs cost a lot not only to the individuals affected

and their families but also to the nation. The injuries, disability and fatality resulting from unexpected RTAs put a significant drain on the economy of the nation. The deaths due to RTAs accounted for 14.40% of total medico legal autopsies conducted (i.e. died on spot, brought dead to hospital or died within 24 hours of accident). All the victims of fatal RTAs had injuries of one or other system. Intracranial injuries were seen in 80.73% of the cases. In majority of victims, intracranial injuries contributed either directly or indirectly to death. Intracranial injuries cause alone was responsible for death in 78.90% of cases, followed by hemorrhagic shock 15.60%, spinal cord injury 01.83% and traumatic shock 03.67%. This shows that intracranial injuries are most common fatal injuries in road traffic accidents in this region. This could be due to the fact that, the intracranial injuries cannot be treated successfully, even in tertiary level hospitals. This may be because of their physiological and anatomical configuration. Therefore, the old saying, "Prevention is better than cure" holds true even here. Injuries and fatalities due to RTA can be prevented or at least can be reduced by preventing the accidents/crashes, in turn reducing fatal injuries and fatalities.

The present study was cross-sectional study conducted in central India during 2 year period from 1<sup>st</sup> June 2014 to 31<sup>st</sup> May 2016. During the study period, a total of 757 medicolegal autopsies were conducted in this institute, out of which 109 cases of fatal road traffic accidents (died on spot or within 24 hours of accident) were studied.

The predesigned and pretested proforma was used to collect the required data and following were the findings

1. Out of 109 victims of fatal RTA, 91 (83.47%) were male and 18 (16.53%) were female.
2. The largest number of victims were in the age group 21 – 30 years (27.52%).
3. Most of the accidents occurred in the afternoon hours (48.62%).
4. An intracranial injury alone was responsible for death in 86 cases (78.90%).

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