

# Epidemiological Study of Road Traffic Fatalities: 5 Years Retrospective Autopsied Cases Study in Varanasi, Uttar Pradesh, India

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**Abstract:** According to a study conducted by the National Transportation Planning and Research center (NTPRC) of New Delhi Thirunathpuram, every four minutes, a person is killed or injured in road accident in India. The present retrospective study has been conducted for the period of 5 consecutive years i.e. 2009 to 2013 based on autopsy record of the unnatural death cases (total 10185 cases) resulting from road traffic fatalities (3963). These cases were brought to the Department of Forensic Medicine, IMS, BHU, Varanasi and have been analyzed retrospectively. R.T.A. (road traffic accident) is the major cause of death among all medico-legal autopsy cases in Varanasi area. Number of males involved in R.T.A. is more than number of females. Majority of deaths were in 21 to 30 years of age group. Rural areas (90%) are more common than urban areas (4%). About all death on road traffic fatalities is accidental in manner (89%). Hindu road traffic fatalities death are more common i.e. 90%. Analysis of data for retrospective study suggests that age, sex, habitat, marital status, religion and manner of death significantly affect community. In the present study road traffic fatalities were most common cause of death in Varanasi region.

**Keywords:** Forensic medicine, Road and traffic accidents, Autopsies, Manner, Epidemiological factors.

## 1. Introduction

According to a study conducted by the National Transportation Planning and Research center (NTPRC) of New Delhi Thirunathpuram, every four minutes, a person is killed or injured in road accident in India, which has a network of 1,500,000 roads. Drivers were found to be at fault in about 45 per cent of the accident [1]. Each year, road traffic injuries take the lives of 1.2 million people around the world and seriously injured millions more. The death rate is highest and still growing in low and middle-income countries, where pedestrians, motorcyclists, cyclists and passengers are especially vulnerable. Moreover, estimated costs of road traffic injuries are between 1% and 2% of GNP per annum in these countries, and accounts for a loss of approximately US\$ 65 billion every year; almost twice the total development assistance received worldwide by developing countries. India accounts for about 10 percent of road accident fatalities worldwide, 85% of all road accident deaths occur in developing countries, and nearly half in the Asia-Pacific region [2]. Government of India, one accident occurs every two minutes, and one suicide every five minutes in India, with the accident rate corresponding to 45 per 100 000 population. However, there is underreporting of traffic injuries by the health sector in India [3]. Road traffic accident or motor vehicle collision occurs when a vehicle collides with another vehicle, pedestrian, animal, road debris or other stationary barrier, such as tree or utility pole [4]. Social forensic message - learn traffic manner first before driving a vehicle, a must test for all drivers and drunken driving can produce disability or will bring miseries to your love me [5]. As there is no study available regarding injury profile in road accident deaths from our part of the country; the present study was conducted to study the demographic and injury profile in autopsy cases with alleged history of road traffic accidents.

## 2. Literature Survey

Road traffic accident is the major preventable cause of all deaths. Regarding this to, study the demographic profile in autopsy cases with an alleged history of RTA.

## 3. Problem Definition

Stricter laws and better enforcement of the laws and population policy in India

## 4. Material and Methods

Present study is carried out at forensic medicine department, Institute of Medical Sciences, Banaras Hindu University, Varanasi. Relevant information and subjective data like age, sex, habitat, marital status and manner of road traffic fatalities of victims have been collected from medico legal autopsy register. Data are analyzed retrospective for periods of five years. Cases were included in group of road traffic fatalities, on the basis of confirmation by investigating officer and corroborative finding at medico legal examination.

## 5. Result

**Table 1:** Out of 10185 medico-legal autopsy cases conducted during the study period total of 3963 cases (38.87%) of death on road traffic accident were recorded at Institute of Medical Sciences, Banaras Hindu University, Varanasi Uttar Pradesh, India. **Table2:** Age and sex wise distribution of road traffic fatalities shows that more deaths in 21 to 30 years of age group, total (24 %) in both male (25 %) and female (14 %) and before this age group and after this age group case are progressively less in number. **Table 3:** Distribution of death on road traffic fatalities in

relation to marital status. In male married are nil i.e. (0 %), male unmarried are (5%), and most of the case are male of unknown marital status i.e. (95%) of total male cases. In female 70% are married, 23 % of female are unmarried and in rest 6% cases were marital status unknown. In our study male death on road traffic fatalities dominated over female in the ratio of 6.18:1. **Table 4:** Incidence of road traffic fatalities in rural areas (90%) is more common than urban areas (4%) and unknown habitat status in (6%) cases. Rural and urban male outnumber than rural and urban female. **Table 5:** Regarding manner of death in our study shows that about all death on road traffic fatalities is accidental in manner (89%) and suicidal case only one male. Homicidal cases were 8%, among male 254 i.e. 7% and among female 47 i.e. 9%. Cases 4 % was unknown. **Table 6:** Year wise frequency of total autopsy in relation to road traffic fatalities from 2009 to 2013 are as follows 19%, 20%, 19%, 20% and 21% respectively. This correlates with road traffic fatalities as 20%, 20%, 20%, 21% and 20% respectively. Percentage of total autopsy is more or less static average 20%, and percentage of total road traffic fatalities are average 20%. **Table 7:** Shows that distribution of road traffic fatalities on the basis of Seasonal variation. Majority of death occur in summer 1532 i.e. 38.66% followed by winter 1265 i.e. 31.92%, and rainy season 1166 i.e. 31.92%. **Figure 1:** Distribution of road traffic fatalities death on the basis of religion. In Hindu road traffic fatalities death are more common i.e. 90%, in Muslim are 3.59%, unknown 6% and in Christian only 3 cases.

## 6. Discussion

### 1. Incidence

India has 1% of vehicles in the world; but it accounts for about 6% of the total cases of unintentional injuries<sup>[3]</sup>. Out of 10185 medico-legal autopsy cases conducted during the study period total of 3963 cases (38.87%) of death on road traffic accident were recorded. Percentage of total autopsy is more or less static average 20% and percentage of total road traffic fatalities on average 20% or can say from 2009 to 2013 each year 20%.

### 2. Gender

In our study male death on road traffic fatalities dominated over female in the ratio of 6.18:1. The fact that males are usually the earning members of the families makes them more vulnerable to the accidents and industrial mishaps as compared to females who are mostly indulged in household chores. Other study also shows that males constituted 85.14% of the total victims i.e. male outnumber than female<sup>[6]</sup>. A similar study finds that male fatality was 3.2 times higher than female fatality<sup>[7]</sup>.

### 3. Age group

Age and sex wise distribution of road traffic fatalities shows that more deaths in 21 to 30 years of age group, total (24 %) in both male (25 %) and female (14 %) and before this age group and after this age group case are progressively less in number. The subjects in the age group of 21-30 years lead more active life and are at the peak of their creativity having the tendency to take risk, personal problems like deviance, hyperactivity, low tolerance,

inattentiveness were associated factor, thereby subjecting themselves to the dangers of accidents and injuries.

Other study shows about similar study that most victims died (53.01%) victims were between 20-40 years of age<sup>[6]</sup>. Kumar Adarsh et al<sup>[9]</sup> reported that number of cases and mortality was more in the age group of 21-30 years followed by 31-40 years. Similar findings were also reported by Meera Th et al<sup>[10]</sup> and Banerjee et al<sup>[11]</sup> and Husaini Numan et al<sup>[8]</sup>.

### 4. Marital status

In male married are nil i.e. (0 %), male unmarried are (5%), and most of the case are male of unknown marital status i.e. (95%) of total male cases. In female 70% are married, 23 % of female are unmarried and in rest 6% cases were marital status unknown.

### 5. Habitat

Incidence of road traffic fatalities in rural areas (90%) is more common than urban areas (4%) and unknown habitat status in (6%) cases. Rural and urban male outnumber than rural and urban female. Badrinarayan Mishra et al find that Victims from rural areas 237 (65.83%) were more as compared to urban areas 123 (34.17%)<sup>[12]</sup>.

### 6. Manner of death

In our study shows that about all death on road traffic fatalities is accidental in manner (89%) and suicidal case only one male. Homicidal cases were 8%, among male 254 i.e. 7% and among female 47 i.e. 9%. Cases 4 % was unknown.

### 7. Religion

In Hindu road traffic fatalities death are most common i.e. 90%, in Muslim are 3.59%, unknown 6% and in Christian only 3 cases.

Badrinarayan Mishra et al find that Hindus and Buddhists dominated the study population i.e. 216 (60%) and 138 (38.33%), respectively as per the expected religion breakup, in our study there is no Buddhists because there is no such population dominated<sup>[12]</sup>.

### 8. Seasonal variation

In our study showed that majority of death occur in summer 38.66% followed by winter 31.92%, and rainy season 31.92%. In summer more accident may be due to longer duration of day activity, heat exhaust leading to confusion and dizziness increase incident. In winter may be due to fog visual distance decreases.

Other study<sup>[13]</sup> shows that winter season fog, ice, snow lead to increased vehicular collisions and longer hours of darkness are associated higher accident rates.

## 7. Conclusion

Based upon the present study following conclusion are made:

1. R.T.A. is the major cause of death among all medico-legal autopsy cases.

2. Number of males involved in R.T.A. is more than number of females.
3. More deaths in 21 to 30 years of age group.
4. Rural areas (90%) are more common than urban areas (4%).
5. About all death on road traffic fatalities is accidental in manner (89%).
6. Hindu road traffic fatalities death are most common i.e. 90%.
7. Majority of death occur in summer 1532 i.e. 38.66%.

### 8. Future Scope

Based upon the present study following point may need in future planning regarding prevention of RTA:

Promote awareness about the safety measures, lack of experience of drivers, narrow and broken roads with poor lighting especially in the crossings and speed breakers, overloaded vehicles and high speed. There should be stricter laws and better enforcement of the laws already on the book.

Availability of first aid to the victims of RTA and establishing high quality, modern trauma centers along with recruitment and retention of well-trained trauma specialists will help to mitigate the effects of RTA. Promote good practices related to helmet and seat-belt wearing, not drinking and driving, not speeding and being visible in traffic. Social awareness to avoid alcohol and narcotics during driving should be emphasized. Smooth and steady, well controlled driving minimizes R.T.A. Improvement of road conditions will be another important measure to control R.T.A.

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**Conflict of Interest:** Nil.

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**Ethical Clearance:** The present study was approved by "Institutional Ethical Committee" of Institute of Medical Sciences, Banaras Hindu University, Varanasi. All the information has been taken under consideration of medical ethical committee.

**Table 2:** Age and sex wise distribution of road traffic fatalities

Age (in year)	Total of Male cases		Total of Female cases		Total cases	
	NO.	%	NO.	%	N O.	%
0-10	112	3	66	12	178	4
11-20	412	12	86	16	498	13
21-30	854	25	78	14	932	24
31-40	699	20	90	16	789	20
41-50	609	18	99	18	708	18
51-60	392	11	67	12	459	12
61-70	259	8	52	9	311	8
>71	74	2	14	3	88	2
Total	3411	100	552	100	3963	100

**Table 3:** Distribution of road traffic fatalities in relation to marital status

Marital Status	Total Male cases		Total Female cases		Total cases	
	NO.	%	NO.	%	NO.	%
Married	0	0	388	70	388	10
Unmarried	175	5	129	23	304	8
Unknown	3236	95	35	6	3271	83
Total	3411	100	552	100	3963	100

**Table 4:** Incidence of road traffic fatalities in rural and urban areas:-

Habitat	Total Male cases		Total Female cases		Total cases	
	No.	%	No.	%	No.	%
Rural	3087	91	498	90	3585	90
Urban	116	3	23	4	139	4
Unknown	208	6	31	6	239	6
Total	3411	100	552	100	3963	100

**Table 1:** Incidence of road traffic fatalities

Total no. of autopsy conducted in 5 year 2009 to 2013	death on road traffic fatalities	%
10195	3963	38.87

**Table 5:** Distribution of road traffic fatalities in relation to manner of death

Manner	Total Male cases		Total Female cases		Total cases	
	No.	%	No.	%	No.	%
Accidental	3027	89	488	88	3515	89
Suicidal	1	0	0	0	1	0
Homicidal	254	7	47	9	301	8
Unknown	129	4	17	3	146	4
Total	3411	100	552	100	3963	100

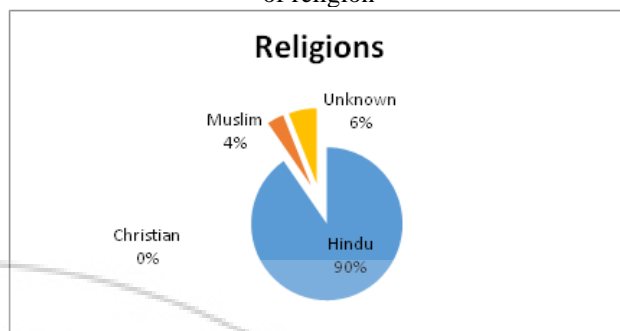
**Table 6:** Year wise frequency of total autopsy in relation to road traffic fatalities

year	Total NO. of autopsy	% of total autopsy	Total road traffic fatalities	% of total road traffic fatalities
2009	1986	19	798	20
2010	2025	20	784	20
2011	1974	19	781	20
2012	2081	20	815	21
2013	2129	21	785	20
Total	10195	100	3963	100

**Table 7:** Distribution of road traffic fatalities on the basis of Seasonal variation:-

Season	Total No. of cases	% of total cases	Male No. of cases	% of male cases	Female No. of cases	% of female cases
Summer (March-June)	1532	38.66 %	1319	38.67 %	213	38.59 %
Rainy (July-October)	1166	29.42 %	988	28.97 %	178	32.25 %
Winter (Nov.-December)	1265	31.92 %	1104	32.37 %	161	29.17 %
Total	3963	100.00 %	3411	86.07 %	552	13.93 %

**Figure 1:** Distribution of road traffic fatalities on the basis of religion



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