

# An Epidemiological Study of Road Traffic Accident Cases (A Study from Eastern Uttar Pradesh, India)

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## **Abstract:**

**Background:** Accidents do not occur only due to ignorance, but are due to carelessness, thoughtlessness and overconfidence. As well as being a public health problem, road traffic accidents (RTA) are a development issue, Road traffic injuries are the leading cause of death among the people aged 15 to 29 years and cost countries 1-3% of GDP. According to WHO, road traffic injuries are the sixth leading cause of death in India.

**Aims & objectives:** To know the epidemiological factors associated with road traffic accidents.

**Material & Method:** Study design: Descriptive, Setting: the study was carried out at Trauma Centre & Super Speciality Hospital, IMS, BHU, Participants: 500 road traffic victims who need at least 24 hours of hospitalization and non-medico-legal case. Statistical analysis: Proportions.

**Results:** There were 76% male and 24% female accident victims. Farmers & Labourers were the highest (22%) among the victims. The highest number of accidents took place in the month of January (40%) and on Sundays (22%). The road traffic accidents victims were mostly (58%) in the age group (20-40) years. Among the motorized vehicles, two-wheeler drivers were more (81.4%) involved in accidents. Head injury was the highest among two-wheeler occupants (56%) are more involved in of the road traffic crashes victims. Among the two-wheeler occupants, head injury was highest (56%) followed by lower limb (17%).

**Key Words:** Road traffic accident, Road traffic injury, Epidemiological study

**Background:** "Health of the country is more crucial than the wealth of the country." India has just a single percent of the world vehicle population, however, accounts six percent of the mischances and ten percent deaths due to road traffic accidents. Road Traffic Injuries are extensive and growing public health burden, especially in low and middle-income countries where 90% of world's deaths due to road traffic accidents are assessed to happen despite the fact that these nations have half of the world's vehicles<sup>[1]</sup>. Overall road traffic crashes causes about 1.25 million deaths about 20 to 50 million people suffer from non-fatal injuries with many sustaining a disability as result of their injuries. Road accidents are the main cause of death of young men worldwide. During 2008, road traffic injuries related trauma ranked fourth among the leading cause of death in the world<sup>[2]</sup>. According to an estimate of the Ministry of Road Transport & Highways, Government of India, 195000 adolescents killed every year in traffic accidents, 60% are boys. In 2011, for every 3.7 minute and 1 minute one death and one injury took place in India from road accidents. Accidents not occur only due to ignorance, but

are due to carelessness, thoughtlessness and overconfidence. As well as being a public health problem, road traffic injuries are a development issue, low and middle-income countries lose approximately 3% of GDP as a result of road traffic crashes <sup>[3]</sup>. According to Ministry of Road Transport & Highways, during the calendar year 2016, the total number of road accidents is reported at 4,80,652 causing injuries to 4,94,624 persons and claiming 1,50,785 lives in the country. In other words, we can say that, on an average, 55 accidents and 17 deaths took place every hour in 2016.<sup>[4]</sup> According to the WHO road traffic accidents, injuries are the sixth leading cause of death in India with a greater share of hospitalization, death, disabilities and socio-economic losses in the young and middle age population. This is a growing area of research, neglected from health agenda, largely preventable and predictable. According to William Haddon, road traffic accidents are associated with numerous problems each of which needs to be addressed separately. <sup>[5][6]</sup> Roy et.al. in 2014, pointed out in his study that only half of the total accident cases were attended by police and again only half of them received ambulance services. One-third injuries were because of not wearing seat belt and helmets.<sup>[7]</sup> Another study on road traffic accident, conducted by Ismail et.al. in 2009, suggested that Road traffic accidents are a major but neglected public health challenge that requires concerted efforts for effective and sustainable prevention. It is mostly affecting young age groups that need comprehensive health educations regarding safety measures of driving in addition to addressing road safety measures to policymakers.<sup>[8]</sup> A study conducted in 2004 reveals that RTAs were more common in the younger age group which shows that they are giving less attention to traffic rules and regulations and use of safety device.<sup>[9]</sup> As per the bibliometric analysis, India contributed only 0.7 percent papers on road traffic injuries and had less than one article on road traffic injuries per 1000 road traffic-related deaths.<sup>[10]</sup> According to an estimate given by Ministry of Road Transport & Highways, Government of India, about 54.1 percent of all persons killed in road accidents are in the 15 - 34 years age group during the year 2015.<sup>[11]</sup> However, this is probably an underestimate, because all road traffic accidents are not reported to the Police department.<sup>[12]</sup> A study conducted by Singh et.al. in 2011, reveals that road traffic accidents are the third major preventable cause of death. In this study maximum number of victims was in the age group 20-30 years and contributed 40.63 % of total cases. Male victims constitute 74.4 percent of the total cases reported.<sup>[13]</sup> Among the drivers of different types of vehicles, Motorized two-wheeler drivers were more involved in road traffic accident cases. Alcohol intake was an important factor in RTA. Being knocked down was the common mode of an accident.<sup>[14]</sup>

### **Need For the Study**

Road traffic accidents are associated with numerous problems each of which needs to be addressed separately (William Haddon). India is facing a triple burden of communicable diseases, non-communicable diseases and injuries due to RTA. A Road traffic accident puts a huge burden on health sector as well as on economy, which

can be preventable. India accounts for as high as 6% of the world's RTAs, although it has 1% of world's vehicles. Human, Vehicle and environment play an important role before, during and after of a trauma event. Therefore accidents can be studied in term of an epidemiological model (agent, host and environment) and epidemiologically classified into time, person and place distribution.<sup>[15]</sup>

**Research question:**

1. What are the various epidemiological factors related to road traffic accident cases?
2. What are the various socio-demographic factors related to road crashes?

**Research objectives:**

1. To determine the socio-demographic profile of accident cases.
2. To study the various epidemiological factors associated with road traffic accident cases.

**Materials and Methods:**

The present study was carried out at Trauma Centre & Super Speciality Hospital, Institute of Medical Sciences, Banaras Hindu University (BHU), Varanasi. Medical records of all non-medico-legal cases (NMLC) patients, admitted due to road traffic accidents over a six month period i.e., between 1<sup>st</sup> January 2016 to 30<sup>th</sup> June 2016 were analyzed. A total of 500 victims of road traffic accidents, who reported to the emergency of the institute that required hospitalization for at least 24 hours & NMLC, were included in the study. The total no of Trauma cases were 4217 including medico-legal cases (MLC). A detailed proforma was used to collect data on the socio-demographic profile of the victims, time, place and type of accident, type of injury, treatment received, outcome and details of circumstances leading to accidents. In this study, RTA was defined as an accident which took place on the road between two or more objects, one of which must be any kind of moving vehicle. Any injury on the road without the involvement of a vehicle (eg. A person slipping and falling on the road and sustaining an injury) or injury involving a stationary vehicle (e.g. persons getting injured while washing or loading a vehicle) or deaths due to RTA were excluded from the study.

**Statistical Analysis:** Initially data has been entered in statistical software SPSS-20 and analyzed with statistical software SPSS-20 & M.S. Excel. Interpretation of the collected data was done by using appropriate statistical methods like percentage and proportions. Ethical clearance will obtain from the institutional head of the Trauma Centre & Super speciality Hospital, BHU.

**Results:**

The present descriptive study was conducted to know the various epidemiological factors related to road traffic accident cases admitted in Trauma Centre, IMS, BHU, Varanasi, Uttar Pradesh from 1<sup>st</sup> January 2016 to 30<sup>th</sup>

June 2016. Total 500 RTA victims were included in the study. There were 76% male and 24% female accident victims. Farmers & Labourers were the highest (22%) among the victims. The highest number of accidents took place in the month of January (40%) and on Sundays (22%). The road traffic accidents victims were mostly (58%) in the age group (20-40) years. Among the motorized vehicles, two-wheeler drivers were more (81.4%) involved in accidents. Head injury was the highest (52%) of the road traffic crashes victims. Among the two-wheeler occupants, head injury was highest (56%) followed by lower limb (17%). Among the road traffic accidents victims, 70% came directly to the hospital without any referral. It is interesting to see that 68% victims (44% belongs to other district and 24% to another state) were not related to Varanasi district.

Table 1: Distribution of RTA cases by age & sex

Age (Yrs)	Male (%)	Female (%)	Total (%)
0-9	15(3.9)	10 (8.3)	30 (6.0)
10-19	5(1.3)	10 (8.3)	10 (2.0)
20-29	80 (21.1)	20 (16.7)	100 (20.0)
30-39	150 (39.5)	10 (8.3)	160 (32.0)
40-49	80 (21.1)	30 (25.0)	110 (22.0)
50-59	20 (5.3)	20 (16.7)	40 (8.0)
60-69	10 (2.6)	20 (15.0)	30 (6.0)
Else	20 (5.3)	0 (1.7)	20 (4.0)
<b>Total</b>	<b>380 (100)</b>	<b>120 (100)</b>	<b>500 (100)</b>

Table-1 demonstrates the age distribution of road traffic victims by their gender. It is evident from the table that males 380(76%) are more involved in road traffic accidents as compared to females 120(34%). Majority of the victims 370(74%) were in the age group of 20-49 years which is economically active population. The Road traffic accident cases were highest 150(39.5%) among males in the age group 30-39 years & among females victims, it is 30(25%) in the age group 40-49 years. There were 30 victims (6%) below age 9 years & 50 victims (10%) were of age 60 and above.

Table 2: Distribution of RTA cases by Occupation

Occupational Status	RTA cases (%)
Farmer/Labourer	110 (22)
Businessman	60 (12)
Housewife	90 (18)
Student	90 (18)
Employee in service	60 (12)
Unemployed	20 (4)
Not applicable	70 (14)
<b>Total</b>	<b>500 (100)</b>

Table-2 demonstrates the distribution of road traffic accident cases by their occupation. It is evident from the table that farmer/labourer were the highest 22% among the victims followed by the student (18%) and housewives (18%). 20 (4%) unemployed victims involved in road traffic accidents.

Table 3: Distribution of RTA cases by education

Educational Status	RTA cases (%)
Non-literate	150 (30.0)
Below Primary	70 (14.0)
Above Primary	10 (2.0)
Up to 10 class	100 (20.0)
Up to 12 Class	90 (18.0)
Above 12 class	80 (16.0)
<b>Total</b>	<b>500 (100)</b>

Table-3 demonstrates the distribution of road traffic accident cases by their education. It is evident from the table that non-literate victims were the highest 150(30%) of the road traffic accident victims. The victims who have education up to 10<sup>th</sup> class were the next largest group with 100(20%).

Table 4: Distribution of RTA cases by month

Month	RTA cases (%)
January	200(40.0)
February	20(4.0)

March	80(16.0)
April	70(14.0)
May	90(18.0)
June	40(8.0)
<b>Total</b>	<b>500(100)</b>

Table-4 demonstrates the distribution of road traffic accident cases by their month of occurrence. It is evident from the table that highest number of the road traffic accident cases 200(40%), took place in the month of January and lowest in the month of February 20(4%) and June 40(8%).

Table 5: Distribution of RTA cases by Day of occurrence

Day	RTA cases (%)
Sunday	110(22.0)
Monday	48(9.6)
Tuesday	60(12.0)
Wednesday	51(10.2)
Thursday	49(9.8)
Friday	90(18.0)
Saturday	92(18.4)
<b>Total</b>	<b>500(100)</b>

Table-5 reveals the distribution of road traffic accident cases by their day of occurrence. It is evident from the table that majority of the accidents took place on Sundays(22%) whereas on Monday (9.6%), and Thursday (9.8%) less number of accidents occurred.

Table 6: Distribution of RTA cases by sex and type of injury

Type of Injury	Male (%)	Female (%)	Total (%)
Head Injury	170(65.4)	90(34.6)	260(100)
Upper Limb	68(97.1)	2(2.9)	70(100)
Lower Limb	77(85.6)	13(14.4)	90(100)
Multiple	63(78.8)	17(21.3)	80(100)
<b>Total</b>	<b>380(76)</b>	<b>120(24)</b>	<b>500(100)</b>

Table 6 represents the distribution of RTA cases by their sex and type of injury they have. It is evident from the table that head injury cases were the highest in both males (170) and female (90) victims among all type of injuries. The percentage of upper limb injury was highest (97.1%) among males as compared to females (2.9%). The males were more involved in all injuries as a comparison to their females counterpart.

Table 7: Distribution of RTA cases by Type of vehicle

Vehicle type	RTA cases (%)
Two-wheeler	407 (81.4)
Pedestrian	8 (1.6)
Four Wheeler	70 (14.0)
Bus & Truck	12 (2.4)
Others	3 (0.6)
<b>Total</b>	<b>500 (100)</b>

Table-7 shows the distribution of road traffic accident cases by type of vehicle involved. Among 500 victims, two wheeler occupants were highest 407(81.4%) in road traffic accident cases. The victims who injured due to four wheeler were at the second position 70(14%) in this study

### Conclusion and Recommendations:

Road traffic accidents are a major public health burden, neglected from health agenda, required integrated efforts for effective and sustainable prevention. The first important steps should be giving the specific education regarding causation, prevention, health impact, the economic impact to the identified younger and economically active (aged 20-49 years) high-risk population. Primary road safety manual should be prepared and exercised through school-based education. A detailed scrutiny is needed for distribution of driving license and special drive should be organized to identify the alcohol user with specialized instruments like breath analyzer.

This study gives information about basic epidemiological features of accidents which can be corroborated by further studies with a more robust hypothesis and more detailed data collection with statistical analysis.

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