

## Original Research Paper

# Socio-demographic Profile of Head Injury Victims of Fatal Vehicular Accidents in Semi urban Region of Maharashtra

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### Abstract

Vehicular accidents are the major causes of death worldwide. Road traffic accidents are most common among all vehicular accidents. Head injury is the single most common cause of mortality in road traffic accidents. India has one of the highest road accident rates in the world. There has been a steady rise in the casualties in road accidents in the country and their proportions in total deaths due to all accident have also increased considerably in the past. The present study was undertaken on 202 victims of vehicular accidents, died due to head injury brought to our postmortem centre for medico-legal autopsy. The main purpose of our study was to find out the social and demographic profile of the victims involved in vehicular accidents and to provide epidemiological data, so the preventive measures can be undertaken. Our study shows that majority of the victims of road traffic accidents were mostly male of middle age group (20-40 years), when they were going on two wheelers without wearing helmets.

**Key Words:** Vehicular Accidents, Head injury, two wheelers, Socio-demographic profile, RTA

### Introduction:

Fast moving vehicular traffic and changing social pattern contributed to increase in incidence of trauma to human body. Head injury associated with traumatic brain injury occurs with the incidence of 20-40 cases per 100000 populations per year.

It is most common cause of death in young adults (age 15-24 years) and is more common in males than females. [1] Cranio-cerebral injury or Head injury is defined by the National Advisory of Neurological Disease and Stroke Council as "A morbid state resulting from gross or subtle changes in scalp, skull and/or contents of the skull produced by mechanical forces restricted to those forces applied externally to head.

Thus it excluding surgical ablations and internally acting forces such as raised intracranial tension resulting from oedema, hydrocephalous or intracranial space occupying lesions". [2]

Understanding transportation needs, patterns and modes is vital to ensure road safety. The growth of motor vehicle industry, liberalized economic policies of successive governments, aggressive media promotion, increasing purchasing power of people, easy availability of loans, poor public transport systems have contributed to increasing motorization and changing transportation scenario in India. [3]

A main purpose of this study was to collect pattern of head injuries in vehicular accidents, their correlation with factors such as age, sex, time of incidence, seasonal variations, economic status wise distribution, condition of roads, type of vehicle involved etc.

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### Material and Methods:

The current study is two years cross-sectional study conducted from 1<sup>st</sup> December 2010 to 31<sup>st</sup> November 2012 of the cases brought to our centre for medico-legal autopsy.

The study included all the autopsied 202 victims of head injury in various vehicular accidents in the Department of Forensic Medicine and Toxicology of Government Medical College, who died in the institute while getting the treatment, dead on arrival to casualty

department and also dead body brought by the investigation agencies.

Approval has been taken by institutional ethical committee of Government Medical College. All the cases of vehicular accidents which show multiple injuries to the body along with head injuries would be taken for study.

Thorough perusal of case papers including investigation, medico-legal register and police records like panchanama was carried out to collect relevant information. Detailed history related to time, manner and hospitalization taken from relatives. Proforma specially designed for this purpose was used for collection of data.

### **Observation and Results:**

Our study clearly demonstrates the male preponderance (90.6%) of head injury in all age groups in fatal vehicular accidents. The peak incidence (28.7%) was observed in the age group 21-30 years followed by 27.7% belonged to the age group 31-40 years.

Thus 56.4% of cases comprised of age group of 21-40 years in the study. Individuals in the age group 0-10 years were the least affected 3.5% followed by older people i.e. 60 years and above in 9.4% of total cases. The lowest age of the victim was one year and the highest age observed was 90 years.

Males comprised a majority and constituted 183 (90.6%) compared to females who were only 6 (9.4%). The male to female ratio in the study was 9.63:1. If females are considered individually major peak is in 2<sup>nd</sup> decade. (Table 1) In this study largest number of the accidents took place during the summer months of March, April, May and June (43.1%) Next in order of frequency of the number is rainy season July, August and September (29.7%) due slippage on the wet roads.

Though winter season is last in number of cases (27.7%) is slightly less than in rainy season. (Table 2) The majority of victims are from rural areas 76.7% whereas urban population is involved only 23.3% of cases in our study. (Table 3) Present study showed that the maximum number of vehicular accidents involving head injuries were sustained between 6.00 pm to 9.00 pm (the peak hours of return journey) followed by next peak in 9pm to 12am.

Thus maximum cases are seen during night between 6pm to 12am, whereas least cases are seen between 3am to 6am.

Most of the female victims are seen between 9am to 3am. (Table 4) In our study maximum victims 41.6% belong to middle class of socioeconomic status, followed by dependent class i.e. children's and housewives, 20.3%

victims belong to lower socioeconomic status. Least involved victims are from upper class of socioeconomic status. (Table 5)

Among 202 victims, 72 (35.6%) had been graduated or were studying graduation. Next 16.8% victims were illiterate were among 2<sup>nd</sup> most common category. 15.3%, 10.4%, 9.4%, 6.9%, 4% victims were studying high school, diploma, primary, middle school, post-graduate education respectively.

Illiterate victim's ranks second among all cases of fatal head injuries in vehicular accidents. (Table 6) In the present study, about half of victims (52.5%) were drivers followed by pedestrians (29.7%) and then passengers (17.8%). (Table 7) Regarding the condition of roads, maximum number of deaths was on roads which were in good condition 131 cases (64.9%), followed by bad condition 44 (21.8%). The under construction roads constituted 23 cases (11.4%). (Table 8)

### **Discussion:**

The peak incidence 28.7% was observed in the age group 21-30 years and 56.4% of cases comprised of age group of 21-40 years in the study. The lowest age of the victim was one year and the highest age observed was 90 years. Males comprised a majority 183 (90.6%) compared to females (9.4%).

Male to female ratio in the most commonly affected age group 21-30 years was 7.28:1. Amongst female victims the highest number 7 (3.5%) of death are observed in age group 21-30 years. Due to the fact that this is one of the active periods of life in males who work outdoors and therefore one is most commonly exposed to traffic accidents. The least common 3.5% age group is 0-10 years.

This is due to fact that young children are less exposed to the traffic environment. This study was in accordance with other studies. [4-8] whereas in contrast with studies done by Kamdar B et al. [6] The present study has obvious finding of male predominance.

The highest number 33 (51.4%) of the male victims are in the 21-40 years age group, most of whom must have been the sole bread earner of their families, bringing to light the socio-economic problems that confronts the dependent of the victims. As this study has been conducted in semi-urban areas, where there is presence of orthodox socio-cultural background and the lack of exposure to the traffic environment it leads to poor sense of traffic safety rules amongst females.

Largest number of the accidents took place during the summer months, which could

be attributed to the fact that this is the season for marriages and also for harvesting and marketing of the grains. These are also the vacation months eventuated by increase movement of people from one place to another through the road transport. Next in order of frequency of the number is rainy season Though winter season is last in number of cases (27.7%) is slightly less than in rainy season, attributable factor being not only the festive months of Diwali, but also the harvesting months for the autumn crops.

It is also possible that the foggy weather of the winter months leads to improper visualization and reason for total accidents leading to the vehicular accident. These findings were consistent with studies of Adhya S et al and Jha S et al [9, 10] and contrast to Eke N et al study. [6] In this study the majority of victims were from rural areas 76.7% whereas urban population is involved in 23.3% of cases.

The two wheelers are most common means of transportation in rural areas. Traffic rules are not followed by majority of rural population. Thus more awareness and strict implementation of traffic rules is required in these regions. [11] Most of the incidents (30.19%) of vehicular accidents, occurred between 6-9 pm and a large percentage of cases 49.99% occurred between 6 pm to 12 mid night, followed by 25.24% between 9am to 3pm.

The least number of incidents occurred between 3am to 6am. Congestion is more on the roads as everybody is in hurry to return back to home from jobs during evening periods and lighting conditions are poor on most of the roads on the outskirts of city as well as surrounding sub urban and rural areas, similar to other authors' studies. [11-13]

In this study maximum victims 41.6% belong to middle class of socioeconomic status and least were from upper class of socioeconomic status, similar to other studies. [11] Among 202 victims 72 (35.6%) had been graduated or were studying graduation. This region is well known educational hub of Marathwada region of Maharashtra.

The victims with and studying higher education included in graduate class showed major peak, as frequent use of motorized two wheelers by this class.

Also this class is always in hurry either to attend their jobs or educational classes and henceforth more prone for accidents as traffic exposure is more that too in rush hours. Illiterate victim's ranks second among all cases of fatal head injuries in vehicular accidents.

Jha S et al [10] study showed that over 3/4th (65 i.e. 76.8%) victims were either illiterate

or had education only up to schools level. In this series of accidents highest number of victims were students (16 i.e. 20.7%) followed by farmers (15 i.e. 19.5%). Present study findings were not comparable with Jha S et al study.

In our study maximum number of deaths was on roads which were in good condition 131 cases (64.9%), followed by bad condition 44(21.8%). This showed that in majority of cases carelessness and speed of vehicle might be major factor involved.

Probable cause may be the speed and carelessness and relaxing attitude of driver on good roads which lead to loss of control and increase in number of accidents. On the contrary at under-construction road the frequency of road traffic accident was less, as individuals are more conscious and speed is also restricted at under-construction roads.

Accident on pucca (94.9%) found to be significantly higher ( $p < 0.05$ ) than kuccha road (5.1%). Present study is partly accordance with study of Kumar D et al. [11]

### **Summary and Conclusions:**

Distribution and causes of head injury are more or less similar to the pattern found in most of other studies. The accidents occur most commonly in age group of 20-40years with male predominance. Most of the incidents of vehicular accidents occurred between 6 pm to 9 pm and almost half of the incidences occurred between 6pm to 12 mid night.

Largest number of the accidents took place during the summer months of March, April, May and June (43.1%) which could be attributed to the fact that this is the season for marriages, and also for harvesting and marketing of the grains.

These are also the vacation months eventuated by increase movement of people from one place to another through the road transport. Middle class graduated or were studying graduation were most common victims of fatal road traffic accidents.

Drivers' involvement was hallmark of all vehicular accidents, followed by pedestrian and passengers are least involved of total cases.

Motorized two wheelers were most commonly involved, neither driver nor passenger of motorized two wheelers were wearing helmet.

The rate of incidence is higher in India because of its traffic patterns and their demographic profile. Possibly, the lack of preventive measures such as helmets in motor cyclists, seatbelts in automobiles, poorly controlled traffic conditions and poor road

conditions are other factors responsible for injuries.

**Recommendations:**

Keeping in view the results of study, Multi factorial approach is needed to prevent road traffic accident and to minimize their consequences.

The mortality in road traffic accident victims can be reduced with following recommendations:

**A. Safety Education:**

1. Safety education must begin with school children.
2. Mass media can also be utilized.
3. Children and youth involvement in various social programmes for awareness among common masses regarding vehicular accidents.
4. Drivers need to be trained by an authorized centre in proper maintenance of vehicle, safe driving and first aid.

**B. Enforcement of Law:**

1. Good enforcement of law is an integral part of road safety; legislation embodies codified set of rules. These are enforced by state to prevent accidents.
2. Setting an enforcing speed limit and its strict implementation.
3. Increasing helmet wearing through the enforcement of law, as their use is important, especially in our country where two wheeler uses is high and current level of helmet wearing is low.
4. Helmets should be properly ventilated and designed as per comfort of occupants, so that its utilization will increase.

**C. Measures to Reduce Environmental Risk Factors:**

- Categorization of roads according to road functions and speed.
- Be careful while driving on defective and narrow roads, defective layouts of cross-roads, speed breakers, T junctions, pedestrians crossing and traffic signals.
- Avoid poor lighting and overloaded, overcrowded vehicles.
- Avoid illegal transport system and prefer public transport

There is no panacea that will prevent all road traffic accidents, what is required is an organized team work by people in many disciplines such as education, engineers, medical practitioners, psychologists and enforcement officers for effective prevention of road accidents and to minimize their consequences.

**References:**

1. Williams N, Bulstrode C, Connel P. Bailey & Love's short Textbook of Surgery. 25<sup>th</sup> Ed. London. Edward Arnold.2008.Chapter 23. Head Injury: 299.
2. Tedeschi CG, Eckert WG, Tedeschi LG. "Forensic Medicine: A study in trauma and environmental hazards. Vol. I; Mechanical Trauma "section: Mechanical Injury. Philadelphia. WB Saunders Co. 1977. Chapter 3. The Wound Assessment by Organ Systems, Head and Spine: 29.
3. Gururaj G. Road traffic deaths, injuries and disabilities in India: Current scenario. The National Medical Journal of India. 2008. 21(1):14-20. [Internet]. 2008 [cited 2012, Mar18]. Available from: [http://nmji.in/archives/Volume\\_21/Issue-1/PDF-Volume-21-issue-1/RA.pdf](http://nmji.in/archives/Volume_21/Issue-1/PDF-Volume-21-issue-1/RA.pdf).
4. Eke N, Etebu E, Nwosu S. Road Traffic Accident Mortalities In Port Harcourt, Nigeria. Anil Aggarwal's Internet Journal of Forensic Medicine and Toxicology; 2000; 1(2). [Internet] 2000 [updated 2000 August 5 cited 2012 Nov 10]; Available From :[http://www.anilaggarwal.com/ij/vol\\_001\\_no\\_002/paper006.html](http://www.anilaggarwal.com/ij/vol_001_no_002/paper006.html)
5. Menon A. Nagesh K. Pattern of fatal head injuries due to vehicular accidents in Manipal. JIAFM, 2005: 27 (1): 19-22.
6. Sharma B, Harish D, Singh G, Vij K. Patterns of Fatal Head Injury in Road Traffic Accidents. Bahrain Medical Bulletin; 2003, 25 (1): 22-25.
7. Shinde J, Jawale S, Lamb M, Tandale R, Wakade S. A Study of Fatal Road Traffic Accidents in Aurangabad, Maharashtra. Medico-legal Update 2012; 12(1): 37-39
8. Dandona R, Mishra A. Deaths due to road traffic crashes in Hyderabad city in India: Need for strengthening surveillance. The National Journal of India; 2004.17, (2):67-72. Available From: [http://nmji.in/Issue%2017\\_2%20PDF/original%20article/oar2.pdf](http://nmji.in/Issue%2017_2%20PDF/original%20article/oar2.pdf)
9. Adhya S, Meshram R, Sukul B, Batabyal S. A Retrospective Study on Different Aspects of Road Traffic Accident Victims in N.R.S. Medical College, Kolkata in Last 3Years (2006-2008). Medico-Legal Update; 2011, 11(2): 29-30.
10. Jha S, Yadav B, Karn A, Aggarwal A, Gautam A. Epidemiological Study of Fatal Head Injury in Road Traffic Accident Cases: A Study From BPKIHS, DHARAN. Health Renaissance. 2010, 8 (2): 97-101. Available From: [www.nepjol.info/index.php/HREN/article/download/4420/3702](http://www.nepjol.info/index.php/HREN/article/download/4420/3702)
11. Kumar D, Bains V, Sharma B, Dasari H. Descriptive Study of Head Injury and its associated Factors at Tertiary Hospital, Northern India Journal Of Community Medicine and Health Education; 2012, 2 (4): 2-4. Available from 113 [www.omicsonline.org/2161-0711/pdf/download.Php?Download=2161-0711-2-141.pdf&aid=5712](http://www.omicsonline.org/2161-0711/pdf/download.Php?Download=2161-0711-2-141.pdf&aid=5712)
12. Singh H, Dhattarwal S. Pattern and Distribution of Injuries in Fatal Road Traffic accidents In Rohtak (Haryana). JIAFM; 2004; 26(1): 20-23.
13. Singh Y, Biragi K, Das K. An Epidemiological Study of Road Traffic accident Victims in Medico-legal Autopsies. JIAFM; 2005 .27, (3):166-169

**Table 1: Age and Sex wise Distribution**

Age grps (Yrs)	Male (%)	Female (%)	Total (%)
0-10	06(03.0)	01(0.5)	7(3.5)
11-20	10(05.0)	00(0.0)	10(5)
21-30	51(25.2)	07(03.5)	58(28.7)
31-40	53(26.2)	03(1.55)	56(27.7)
41-50	30(14.9)	03(1.5)	33(16.3)
51-60	16(07.9)	03(1.5)	19(9.4)
>60	17(08.4)	02(1.0)	19(9.4)
Total	183(90.6)	19(9.4)	202(100)

**Table 2: Season Wise Distribution**

Season	Cases	Percentage
Summer	87	43.1
Rainy	60	29.7
Winter	55	27.2
Total	202	100

**Table 4: According to Time of Incidence**

Time of Incidence	Cases	Male	Female	Percentage
00.01am-03.00am	7	6	1	3.46
03.01am-06.00am	3	3	0	1.48
06.01am-09.00am	11	11	0	5.44
09.01am-12.00pm	29	23	6	14.35
12.01pm-03.00pm	22	16	6	10.89
03.01pm-06.00pm	29	26	3	14.35
06.01pm-09.00pm	61	58	3	30.19
09.01pm-12.00am	40	40	0	19.80
Total	202	183	19	100

**Table 3: Area Wise Distribution**

Area	Cases	Percentage
Urban	47	23.3
Rural	155	76.7
Total	202	100

**Table 5: According to Economic Status**

Socioeconomic Status	Cases	Percentage
Upper Class	14	6.9
Middle Class	84	41.6
Lower Class	41	20.3
Dependent	63	31.2
Total	202	100

**Table 6: According to Educational Status**

Education Level	Cases	Percentage
Not Applicable	3	1.5
Illiterate	34	16.8
Primary	19	9.4
Middle School	14	6.9
High School	31	15.3
Diploma	21	10.4
Graduate	72	35.6
Post Graduate	8	4
Total	202	100

**Table 7: According to Type of Road User (Deceased)**

Type of Road User	Cases	Total (%)
Pedestrian	60	29.7
Driver	106	52.5
Passenger	36	17.8
Total	202	100

**Table 8: Distribution According to Condition of Road**

Condition of Road	Cases	Percentage
Good	131	64.9
Bad	44	21.8
Under construction	23	11.4
Not applicable	04	2
Total	202	100