



Journal Homepage: -www.journalijar.com
**INTERNATIONAL JOURNAL OF
 ADVANCED RESEARCH (IJAR)**

Article DOI:10.21474/IJAR01/9012
 DOI URL: <http://dx.doi.org/10.21474/IJAR01/9012>



RESEARCH ARTICLE

PROFILE OF VICTIMS AND OFFENDING VEHICLES IN FATAL ROAD TRAFFIC ACCIDENTS IN WESTERN MAHARASHTRA - AN AUTOPSY STUDY.

Rashid Nehal Khan¹, K V Radhakrishna² and Ravi Rautji².

1. Assistant Professor, Department of Forensic Medicine & Toxicology, Armed Forces Medical College, Pune 411040 (Maharashtra)India.
2. Dept of Forensic Medicine & Toxicology Armed Forces Medical College, Pune (Maharashtra) India.

Manuscript Info

Manuscript History

Received: 02 March 2019

Final Accepted: 04 April 2019

Published: May 2019

Key words:-

Pedestrians, Victims, Road Traffic Accident, Heavy Vehicles, Light Vehicles.

Abstract

Background: Road traffic accidents are a leading cause of death in young and productive age group of society. The pedestrian deaths and two wheeler rider and pillion deaths are a cause of rising concern in urban centres. The paper brings forward the profile of victims who suffered fatal road traffic accident deaths and the offending vehicles which were the causation agents.

Aims and Objectives: To study the profile of victims of fatal road traffic accident cases and the offending vehicles and its relationship to various related factors.

Results: The study was done to study the profile of victims of road traffic accident fatalities in Western Maharashtra. The study was done for period of 18 months involving 120 cases. All the 120 autopsy cases involved in research were studied with the profile of victims and the offending vehicle. The study shows that that maximum number of fatal victims of road traffic accidents were pedestrians (n = 44, 36.67 %). Two wheeler riders were second (n = 31, 25.83 %), two wheeler pillion riders were third in number (n = 10, 8.33 %). Amongst pedestrians, heavy vehicles (truck and bus) caused 43.1 % of the casualties. Light vehicles (jeep, car, tractor, tempo and auto rickshaw) caused 54.6 % of the casualties and the least casualties were by motor cycles (2.3 %). Maximum fatalities were caused by Heavy vehicles (Trucks n = 48, 40 % and Buses n = 19, 15.83 %). Light vehicles responsible were Tempo (n = 14, 11.67 %), Tractor and Jeep each (n = 5, 4.17 %), Auto Rickshaw (n = 8, 6.67 %) and Car (n = 9, 7.5 %). Other vehicles were Two Wheeler (n = 11, 9.17 %), Pedal Cyclist and Unknown vehicle were one each.

Conclusion: It may be said that pedestrians and two wheeler riders are most vulnerable to RTAs and necessary preventive measures need to be undertaken to control the epidemic.

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Corresponding Author:-Rashid Nehal Khan.

Address:-Assistant Professor, Department of Forensic Medicine & Toxicology, Armed Forces Medical College, Pune 411040 (Maharashtra)India.

Introduction:-

Vehicular accidents usually involve the young people between the age group of 20-40 years. Fatal accidents in this group not only represent the tragic loss to the family but severe economic loss to the community as it entails the wastage of educational training and loss of productive human resource. Road safety is an ongoing challenge for civil engineers as well as for the global auto industry. Because laws don't seem to be working effectively, design and technology² will have to compensate. The people who made it happen will have to make sure it doesn't become a curse. *'In a world where buses are "flying coffins" and "moving morgues" and pedestrians should tremble, public-health experts (need to) take on a neglected epidemic'* – By Christopher Reed.³ Study of Rate of Road Accident Deaths per Thousand Registered Motor Vehicles in States and Union Territories revealed 97,398 males and 17,192 females (total 1,14,590 persons) were killed during the year 2007 while traveling by various modes of transport on roads. 24,649 persons (21.5%) of these were occupants of truck or lorry, 21,872 (19.1%) were riding on two-wheelers, 12,864 (11.2%) were killed while traveling in buses and 10,125 (8.8%) were pedestrians.⁴

Material and Methods:-

Medico-legal cases of fatal Road Traffic Accident reporting for autopsy to the mortuary of tertiary care centre were selected for the study. A total of 120 medico-legal autopsies performed were studied and relevant data was collected. For the purpose of the study, a road traffic accident (R.T.A.) was defined as accident which took place on the road between two or more objects, one of which must be any kind of a moving vehicle.

Inclusion Criteria

All the medico legal autopsies with definite history of road traffic accidents having relevant history as per study requirement were included in the study.

Exclusion Criteria

1. Autopsies with no specific history of road traffic accidents were excluded.
2. RTA cases with co – existing natural diseases, which might be primary cause of death
3. were excluded

Data Collection

All the relevant history obtained from relatives, police panchnama and by visiting the site of accident in were recorded in a proforma.

Observations

Accident victims:

It is seen that maximum victims of road traffic accidents were pedestrians (n = 44, 36.67%). Two wheeler riders were second (n = 31, 25.83 %). Two wheeler pillion riders were third in number (n = 10, 8.33 %). Other victims of road traffic accidents among drivers were Truck driver (n = 2), Bus driver (n = 1), Tempo driver (n = 1), Jeep driver (n = 2), Car driver (n = 5) and Auto Rickshaw driver (n = 2). Total 13, 10.83 %. Among passengers the victims were Truck passengers (n = 5), Bus passengers (n = 3), Tempo passengers (n = 4), Jeep passengers (n = 2), Car passengers (n = 1), Auto Rickshaw passenger (n = 2), Total 17, 14.17 %. Pedal cyclist were (n = 4) and in one case the information was not available. (Table 1).

Table 1:-Accident Victims

Victims	Number of Cases	Percentage
Pedestrian	44	36.67 %
Two wheeler rider	31	25.83 %
Two wheeler pillion	10	8.33 %
Truck passenger	05	4.17 %
Car driver	05	4.17 %
Tempo passenger	04	3.33 %
Pedal cyclist	04	3.33 %
Bus passenger	03	2.5 %
Truck driver	02	1.67 %
Jeep driver	02	1.67 %
Jeep passenger	02	1.67 %

Auto Rickshaw driver	02	1.67 %
Auto Rickshaw passenger	02	1.67 %
Bus driver	01	1.67 %
Tempo driver	01	1.67 %
Car passenger	01	0.83 %
Tractor driver	0	0
Tractor passenger	0	0
Unknown	01	1.67 %
Total	120	100

Vehicle involved

Maximum fatalities were caused by Heavy vehicles (Trucks n = 48, 40 % and Buses n = 19, 15.83 %). Light vehicles responsible were Tempo (n = 14, 11.67 %), Tractor and Jeep each (n = 5, 4.17 %), Auto Rickshaw (n = 8, 6.67 %) and Car (n = 9, 7.5 %). Other vehicles were Two Wheeler (n = 11, 9.17 %), Pedal Cyclist and Unknown vehicle were one each. (**Table2**)

Table 2:-Involved Vehicles

Involved Vehicle	Number of Cases	Percentage
Truck	48	40 %
Bus	19	15.83 %
Tempo	14	11.67 %
Motorised Two Wheeler	11	9.17 %
Car	09	7.5 %
Auto Rickshaw	08	6.67 %
Tractor	05	4.17 %
Jeep	05	4.17 %
Pedal Cycle	01	0.83 %
Total	120	100 %

Vehicles involved among Pedestrians

Amongst pedestrians, heavy vehicles (truck and bus) caused 43.1 % of the casualties. Light vehicles (jeep, car, tractor, tempo and auto rickshaw) caused 54.6 % of the casualties and the least casualties were by motor cycles (2.3 %).

Place / road of accident

The study noted that Highways were the most common place of fatalities due to road traffic accidents (n = 82, 68.3 %) followed by City Main Roads which showed 21, (17.5%) cases, City by-lanes 11, (9.16%) cases and Rural Roads 6 (5%) cases.

Time interval between injury and death

It was observed that maximum victims of road traffic accident died within 0- 1 hour post injury (n = 58, 48.33 %) followed by 1- 12 hrs post injury (n = 48, 40 %). 6 victims (5 %) died between 12 – 24 hrs post injury and 7 cases (5.83 %) died after 24 hrs of accident. Data regarding one case was not known.

Personal safety measure adopted:

102, (85 %) victims had not adopted any safety measure. 13 (10.83 %) two wheeler riders and 1 two wheeler pillion rider had worn helmet. Seat belt was worn only by 4 (3.33 %) drivers and none of the occupants had observed the precaution of using the seat belt.

Alcohol consumption:

20 (16.67%) victims had evidence of alcohol consumption while 100 (83.33 %) cases did not have history of alcohol consumption.

Discussion:-

Accident victims

In the present study (**Table 1**) it is seen that that maximum number of fatal victims of road traffic accidents were pedestrians (n = 44, 36.67 %). Two wheeler riders were second (n = 31, 25.83 %), two wheeler pillion riders were third in number (n = 10, 8.33 %). Similar studies by Kaul A et al⁵ report that pedestrian deaths accounted for 35.79% of total fatalities followed by riders of motorized two wheelers (30.53%). Sevitt S⁶ states pedestrians were the most common victims (50%). Singh Y N et al⁷ have reported that majority of the victims to be pedestrians (47%), followed by occupants/pillion riders (27.61%) and drivers/riders (14.20%). In the present study, though pedestrian fatality is in the same proportion as noticed by Singh Y N et al, occupant / pillion rider victims are more. Similarly fatalities amongst riders / occupants are more in the present study.

Vehicle involved

In the present study (**Table 2**) maximum fatalities were caused by Heavy vehicles (Truck n = 48, 40 % and Bus n = 19, 15.83 %). A total of 55 % of fatalities were caused by heavy vehicles. Kaul A et al⁵ report that majority (58.52%) of fatal RTAs were due to heavy vehicles (trucks, buses etc). Singh H and Dhatarwal SK⁸ report that heavy vehicles were the commonest offenders, responsible for 38.9% of cases. Singh Y N et al⁷ report that heavy vehicles caused 33.27% of fatal road traffic accidents. The findings of the present study, establishing heavy vehicles as the major offenders, are consistent with above studies.

Type of vehicles causing fatalities amongst pedestrians

In the present study it is seen that amongst pedestrian deaths, heavy vehicles (truck and bus) caused 43.1 % of the casualties. Light vehicles (jeep, car, tractor, tempo and auto rickshaw) caused 54.6 % of the casualties. Least fatalities were due to motor cycles (2.3 %). Singh H et al⁹ report that 41.9 % of fatalities in pedestrians took place by cars and 31.8 % by heavy trucks. Occurrence of pedestrian fatalities due to different kinds of vehicles as observed in the present study is consistent with observations of above studies.

Place / road of accident

The present study showed that Highways were the most common places of fatalities due to road traffic accidents (68.3 %) followed by City Main Roads which witnessed 17.5 % cases, City By lanes 9.16 % cases and Rural Roads 5 % cases. This may be due to high speed of vehicles on the highways. In Pune, 'Sholapur Highway' runs through the main city which is densely populated resulting in high pedestrian fatalities. Also highways have maximum number of heavy vehicles plying at high speed. Similar findings have been observed by Singh H and Dhatarwal SK⁸, who report 142 (31.6%) fatalities on National Highways, 122 (27.1%) on State Highways, on City roads 77 (17.1%), on Village roads 78 (17.3%) and 31 (6.9 %) on approach roads respectively. Kaul A et al⁵ have reported that 83.05 fatalities took place on highways. Findings of the present study are consistent with above studies in that, maximum fatalities due to road traffic accidents took place on highways.

Time interval between injury and death

It was observed that maximum victims of road traffic accident died within 0- 1 hour post injury (n = 58, 48.33 %) followed by 1- 12 hrs post injury (n = 48, 40 %). 6 victims (5 %) died between 12 – 24 hrs post injury and 7 cases (5.83 %) died after 24 hrs of accident. Data regarding one case was not known. Teanby D N et al¹⁰ report that among 75 severely injured children (ISS >15 or death), 38 (50%) died at spot and 15(20%) deaths occurred before admission to hospital. Singh Y N et al⁷ report that hospital death was the most common outcome (1027, 54.86 % cases), followed by spot deaths (561, 29.96 %) and death on the way to hospital (284, 17.17 %). Overall, 50% of casualties died before reaching the hospital. Findings of all the above studies, including the present one, reveal that almost 50% of victims died due to delay in hospitalization beyond the 'Golden Hour'. This highlights the necessity of establishing Regional Trauma Care System facilitating early hospitalization of RTA victims.

Personal safety measure adopted

In the present study it is seen that 102 (85 %) cases no personal safety measures like seat belts, helmets etc were adopted. Only 13 (10.83 %) two wheeler riders and 1 two wheeler pillion rider had worn helmet. Seat belt was worn only by 4 (3.33 %) drivers and by none of the occupants. Jha N et al¹ report that, in their study, among fatal cases of two wheeler drivers (31.1%) none of the drivers or occupants of any motorized two wheeler vehicle was using any protective gear at the time of the accident. Newman R J¹¹ reports in his study that though the use of seatbelt has not decreased the percentage of rib fractures but it has changed the pattern of injuries sustained and thereby reducing the severity of injuries and fatalities. Lowe et al¹² report that protective device use of seatbelt was observed only in 3%

cases (17 cases) and use of helmets only in 2% cases (12 cases). Sood S¹³ reports that injury severity score of more than 15 among helmeted two wheeler riders was seen only in 06 cases (4.5 %) while among non helmeted riders the ISS of more than 15 was seen in 28 cases (16.5%). Appelleby J P and Nagy AG¹⁴ reported that 126 (22.41%) cases had used seat belts out of a total of 562 cases. Findings of the present study are consistent with above studies, in that, use of personal safety measures like wearing of helmets and seat belts needs serious enforcement and also awareness among people through public education.

Alcohol consumption

In the present study it is seen that (on gross autopsy finding of smell of alcohol and history taken from relatives) 20 (16.67 %) fatalities had findings of alcohol consumption while 100, (83.33 %), cases showed no evidence of alcohol consumption. Similar pattern is reported by Millo T et al¹⁵ in their study, which states that 34% RTA victims were positive for alcohol. Lowe D K et al¹² report consumption of alcohol 19 % cases. Charlton R and Smith G² report that out of 1086 motor vehicle drivers and two wheeler riders, 19 % were over the legal limit (80 mg /dl blood) of consumption of alcohol. The present study is consistent with above studies. It is an established fact that alcohol consumption lengthens the reaction time thus contributing to fatalities in road traffic accidents. Alcohol consumption needs to be curbed by serious policing and public education.

Conclusion:-

It may be said that pedestrians and two wheeler riders are most vulnerable to RTAs and necessary preventive measures need to be undertaken to control the epidemic.

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