

Socio-Demographic Profile of Two Wheeler Road Traffic Accidental Deaths in Mumbai Region

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Abstract

Original Research Article

In the 21st century in developing country like India due to the growth of economic status of the people and passion to own a vehicle in recent years, there is tremendous increase in the number of motor vehicles using the road. This Spectacular increase in the number of vehicles on the road had created a major problem of loss of lives and property through accidents. Road Traffic Accidents cause 1 death every 9 minutes (160 every day and 60,000 every year) four and half times as many as non-fatal accidents. Motorcycle accidents account for 25% of total road crash deaths. Motorized two-wheeler vehicles constitute a large portion of the vehicle fleet in India. Overall, 1969 medico-legal autopsies were conducted in the study center during the study period; among them, 132 cases are purely two-wheeler related Road Traffic Accidents. Two-wheeler fatalities were significantly higher in males (82.57%) than females (17.43%). Most of the victims were in the age group of 21 to 40 years (56.06%). The majority of the victims belong to Urban population (66.67%), graduate and high school certificate (73.47%), unskilled, semi-skilled, students and semi-profession group (65.16%), socio-economic class III and IV (71.97%), married(53.03%). Fatal accidents were noted most common in months of January to May (68.95%), Summer (56.06%) and winter (31.06%) were most common seasons. Most of the accidents were common in evening hours (56.06%) followed by morning (21.97%). In spite of the advancement of the technology and medical sciences dead and deformity following road traffic accidents is yet to be controlled successfully. Rather the incidence of road traffic accidents has been increasing at an alarming rate throughout the world, Road traffic accidents are the third major preventable cause of death. In this study, a sincere effort has been made to suggest measures to be taken to decrease road traffic accidents involving two-wheelers.

Keywords: socio-demographic, Two wheeler, Road traffic accidents, Deaths, Mumbai.

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INTRODUCTION

Percy Morrison, At the inquest into the world's first road traffic death on 17th August 1896, the coroner was reported to have said, "This must never happen again[1]." The victim Miss Bridget Driscoll a 44-year-old mother of two was a pedestrian who was struck down by a motor vehicle. And after almost 120 years, as it to mock the coroner's statement, about 1.25 million people die every year due to road traffic injuries worldwide and 50 million more are injured[2]. As per accidental and suicidal deaths (national crime record bureau of India) over 1,48,707 were killed in road accidents in 2015 alone in India, that is more than the number of people killed in all post-independence wars put together of India[3].

Due to the growth of the economic status of the people and passion to own a vehicle in recent years, there is a tremendous increase in the number of motor

vehicles using the road. This Spectacular increase in the number of vehicles on the road had created a major problem of loss of lives and property through accidents. Road Traffic accident is an unplanned event occurring suddenly, unexpectedly and inadvertently in an unforeseen circumstance. Road traffic accidents can be defined as " An accident that occurred on a way or street open to public traffic; resulted in one or more persons being killed or injured and at least one moving vehicle was involved. Thus RTA is collisions between vehicles, between vehicles and pedestrians; between vehicles and animals; or between vehicles and geographical or architectural obstacles [1].

Road Accidents cause 1 death every 9 minutes (160 every day and 60,000 every year) four and half times as many as non-fatal accidents. Road Traffic Accident injuries are currently ranked 9th globally amongst the leading cause of DALY (Disability-

adjusted life year) and the ranking is projected to rise to 3rd by 2020[4]. Low Income and middle-income countries accounts for 85% of the death, and for 90% of the annual disability-adjusted life years lost because of road traffic injuries [5]. Road Traffic Injuries in developing countries mostly affect pedestrians, passengers, and motorcyclists as opposed to drivers who are involved in most of the deaths and disabilities occurring in the developed world [2]. Incidences are more common among the two-wheeled vehicles. Motorcycle accidents account for 25% of total road crash deaths [6].

Motorized two-wheeler vehicles constitute a large portion of the vehicle fleet in India[7]. Two wheelers are preferred transportation vehicles for vast Indian families as they are cheaper, gives better mileage, carry at least 2 to 3 passengers, easy to park & ride in traffic congestion. Thus a Motorcycle is defined as "Motorcycle means a motor vehicle with motive power having a seat or saddle for the use of the rider and designed to travel on not more than two wheels in contact with the ground. Motor-driven cycle means a motorcycle with a motor that produces 5-brake horsepower or less [6]."

The exponentially increasing number of automobile vehicles, poor adherence to traffic rules and regulations such as maintaining lane discipline, driving in zigzag patterns by public, poorly maintained motorcycles, poorly maintained and congested roads, abuse of alcohol, and lack of awareness about helmets and new generation of high speed vehicles are altogether responsible for accidents.

In spite of the advancement of the technology and medical sciences dead and deformity following road traffic accidents is yet to be controlled successfully. Rather the incidence of road traffic accidents has been increasing at an alarming rate throughout the world, Road traffic accidents are the third major preventable cause of death.

Indeed Traffic Accidents are a major cause of severe injuries and demand on the health system, whether at the primary health care level or hospital level. On an average in industrialized countries and also in many developing countries, one hospital bed in ten is occupied by an accident victim.

In this study, a sincere effort has been made to study the profile of victims of fatal road traffic accidents involving two wheeler motorcycles and to suggest measures to be taken to decrease the road traffic accidents involving two-wheelers.

MATERIALS AND METHODS

This prospective observational study was carried out on persons died due to fatal motorcycle accidents brought for postmortem examination at

Department of Forensic Medicine and Toxicology of Seth Gordhandas Sunderdas Medical College & King Edward Memorial Hospital, Parel, Mumbai during a period of January 2016 to June 2017. The ethical permission had been obtained from the Institutional Ethics Committee for conducting the study. Total 132 cases of fatal motorcycle accident out of 1969 medico-legal post-mortems conducted during the study period were considered with reference to epidemiology, the pattern of injuries and various factors responsible for two-wheeler motorcycle accidents. All cases of death due to motorcycle accidents involving vehicles with gear and without gear and rider and/or pillion brought to the mortuary at this center, for postmortem examination during the study period are included. Details regarding epidemiological factors required for study purpose were derived from documents received for post-mortem examination which includes, requisition letter from police, inquest panchanama, accidental death report, statements of relatives, spot inquest and hospital records in cases of admitted patients. There was no direct contact between the investigators and relatives of the deceased. The detailed post-mortem examination was carried out and findings were noted. The pattern of injuries and various factors in the causation of road traffic accidents was noted with the help of sketch diagrams, photographs, visiting the scene of crime and charts for easy understanding and interpretation. Internal organs were studied on naked eye examinations. The data collected was filled in a special proforma prepared for this study purpose only. It was analyzed by using Microsoft Excel.

RESULTS

Overall, 1969 medico-legal autopsies were conducted in the study center during the study period; among them 132 cases are purely two wheeler related RTA deaths. Two wheeler fatalities were significantly higher in males (82.57%) 109 cases than females (17.43%) 23 cases. Majority of victims were in the age group of 21 to 30 years (36.36%) followed by 19.70% who were in age group 31 to 40 years. It was observed that maximum numbers of victims were between 11-40 years of age constituting 93 (70.46%) of total victims of two wheeler fatalities i.e. more young patients were involved in two wheeler road traffic accidents. The majority of the victims belonged to urban population 88 (66.67%) as compared to rural 44 (33.33%) whereas maximum victims were educated involving graduates and high school certificates (73.47%). More frequently involved victims in two wheeler fatalities were unskilled 28 (21.21%) followed by semi-profession 21(15.91%) and students 19 (14.40%). Most victims were from socio-economic class III 56 (42.42%) followed by class IV 39 (29.55%) as compared to class I (1.52%) and class V (6.82%) and 70 (53.03%) were married. Fatal accidents were common in January to May 91 (68.95%) cases as compared to June to October 24 (18.17%) cases. Majority of two wheeler fatalities were noted in summer 74 (56.06%) cases followed by

winter 41 (31.06) cases and least in monsoon season 17 (12.88%) cases. Majority of the accidents i.e. 74

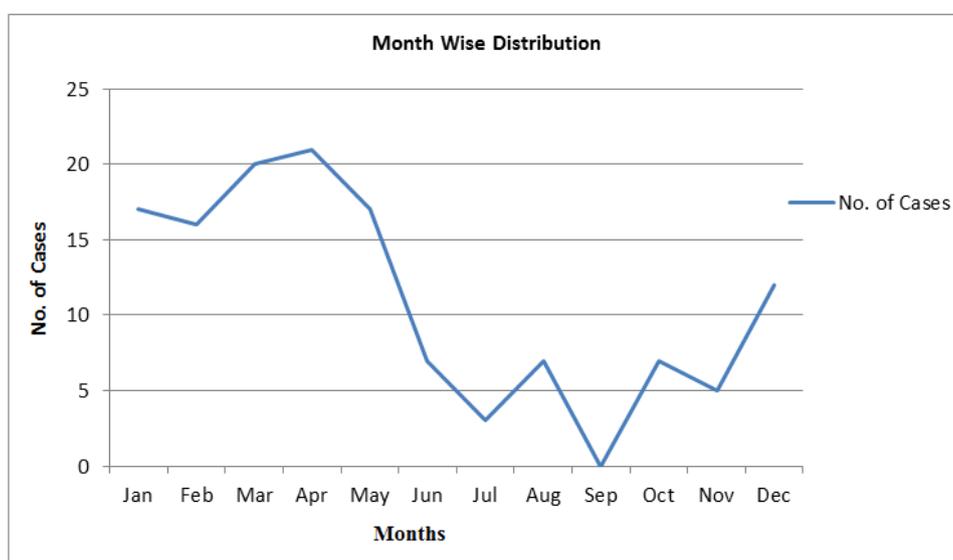
(56.06%) occurred between 03.00 pm to 12.00.am followed by 6.00 am to 12.00 pm 29 (21.97%).

Table-01: Demographic Variables associated with Two Wheeler Road Traffic Accidents

Demographic variables	No. of Cases	Percentage
Gender		
Male	109	82.57%
Female	23	17.43%
Age		
0-10	2	1.51
11-20	19	14.40
21-30	48	36.36
31-40	26	19.70
41-50	18	13.64
51-60	15	11.37
61-70	2	1.51
>70	2	1.51
Region		
Urban	88	66.67
Rural	44	33.33
Educational Status		
Illiterate	10	7.58
Primary School	5	3.79
Middle School Certificate	19	14.40
High school certificate	43	32.57
Graduate	54	40.90
Postgraduate	1	0.76
Occupation		
Unemployed	6	4.54
Housewife	17	12.88
Student	19	14.40
Unskilled worker	28	21.21
Semiskilled worker	18	13.64
Skilled worker	12	9.09
Semi-Profession	21	15.91
Profession	11	8.33
Socio-economic Class		
I	2	1.52
II	26	19.70
III	56	42.42
IV	39	29.55
V	9	6.82
Marital Status		
Unmarried	62	46.97
Married	70	53.03
Seasonal variations		
Monsoon (June to September)	17	12.88
Winter (October to January)	41	31.06
Summer (February to May)	74	56.06

Table-02: Distribution of Cases by Month of Incidence

Month	No. of Cases	Percentage
January	17	12.88
February	16	12.13
March	20	15.15
April	21	15.91
May	17	12.88
June	7	5.30
July	3	2.27
August	7	5.30
September	0	00
October	7	5.30
November	5	3.79
December	12	9.09
Total	132	100

**Fig-01: Month wise distribution of cases****Table-03: Distribution as per time of incidence**

Time Period	No. of Cases	Percentage
Early Morning (06 to 8.59 Hours)	12	9.09
Late Morning (09 to 11.59 Hours)	17	12.88
Early Afternoon (12 to 14:59 Hours)	14	10.60
Late Afternoon (15 to 17:59 Hours)	24	18.18
Early Evening (18 to 20.59 Hours)	20	15.15
Late Evening (21 to 23.59 Hours)	30	22.73
Early Night (00 to 02.59 Hours)	10	7.58
Late Night (03 to 05.59 Hours)	5	3.79
Total	132	100

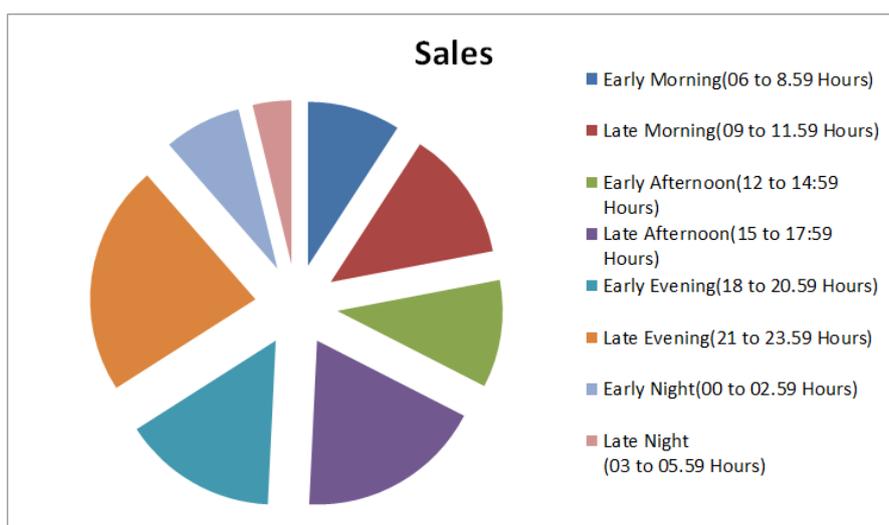


Fig-01: Time of Incidence wise distribution of cases

DISCUSSION

Road Traffic Injuries are one of the leading causes of deaths, hospitalizations, disabilities and socio-economic losses in India with liberalized economic reforms, industrialization migration and changing values of the large, middle class young and middle age sections of the society. As there is no significant increase in mass public transportation systems, two-wheeler motorcycles have become the major choice of the people. Considering the constraints of time and the need for travel, individual personal modes of transport are becoming the law of the land. Large numbers of poor and middle-income families are compelled to use two-wheelers, as they are not highly expensive. Even though motorcycles are economical for the individual, this motorization has placed considerable problems in society.

Among total 132 cases of death due to two-wheeler motorcycle accidents studied, males (82.57%) predominance was observed in our study as compared to the females 23 (17.43%), male to the female ratio obtained was 4.7:1. This might be due to the fact that males are more active in our society and uses two-wheeler commonly. Similar findings were noted in other studies of Singh YN *et al.* [8] males belonged to 86.96% and females belonged to 13.04%. Also in the study of Kumar A.*et al.* [9] where males belonged to 88.22% and females 11.77% and similarly 83% of males and 17% of females were involved in a study by Jha N *et al.* [10] and Gururaj G [11]. Our finding regarding sex ratio was in contrast to Kumar. R *et al.* [13], who found greater sex ratio in the range of 10:1. The predominance of the males can be explained by the fact that males lead a more active life, travel more, drive more and so are exposed to the hazards of traffic, accidents, and trauma. Females generally stay at home, but now there is an increasing trend of RTA among females too due to their awareness regarding career and their active participation in socio-economic activities.

Most Vulnerable age groups that are the active population of the study resulting were those persons of third and fourth decade 21-40 years (56.06%) followed by second decade 11-20 years (14.40%) and fifth decade 41-50 years (13.64%) which is in harmony with studies conducted by Kumar. A. *et al.* [9] which showed that the younger economical active groups 21-30 years followed by 31-40 years, highest number of fatalities (54.24%) was in the 21- 40 years were predominantly involved. Similarly, majority (77%) of the victims were in the age group 18-44 years in the study conducted by Jain A.*et al.* [14]. After 40 years and above there is a decreased frequency of accidents, on the contrary persons between 20-39 years are more commonly involved because of these age groups are found using the roads frequently and are generally rash driver. The present study has shown that young adults, predominantly males in their most productive year of life are especially prone to accidents. A large number of cases in the young age group can be justified by the fact that young persons in this age group are at the peak of enthusiasm, energy, and creativity. They lead an active life and have the tendency to take the undue risk like speed driving, overtake wrongly, the triple riding of a bike, boarding over running vehicle, etc. which expose them to the hazards of accidents and injuries.

In our study it was observed that incidences were more in the urban areas, this reveals the common outdoor working time of the urban regions which is similar to observations made in different studies. Singh Y N *et al.* [8] found 16.98% of victims from rural areas and 83.02% were from urban areas. Also Mohammadi J *et al.* [15] found 45.1% from rural and 57.9% from urban road collisions and Mohammed S *et al.* [16] found 52.14% from urban areas and 47.85% from rural areas which is consistent with our study. In our study it was observed 33.33% of victims were from rural areas and 66.67% were from urban areas. In contrast, Sinha ND *et al.* [17] found victims from rural areas 237 (65.83%) as compared to urban areas 123 (34.17%).

Also Reddy *et al.* [18] found that most of the victims from rural and semi-urban areas. This might be due to the fact that the study was conducted in a rural population.

The present study showed that incidences were more common among graduates and high school certificates (73.47%). This might be due to the fact that in a metropolitan city, most of the population uses two-wheeler motorcycles for their jobs, colleges, school, etc. Findings observed by Jakkam S [19], literates were 228 (76.77%), Illiterates found in this study were 50 (16.83%), which is similar to our study. In contrast, Neeta P *et al.* [20] observed that 40% were uneducated followed by graduate and above 23%. Greater proportions of victims in two-wheeler RTA were illiterates and low education personals and it may be correlated with poor road sense / Ignorance of road safety rules and traffic sense.

The present study showed more frequently involved groups in two-wheeler accidents were unskilled, semi-skilled, students and semi-profession workers (65.16%) Among occupation wise distribution we found that almost 68.18% were employed and 31.82% were unemployed. This might be due to the fact that there is shifting of educated and skilled population from rural areas for job and employment purpose in the metropolitan city and most common motorcycle accident injured patients were generally laborers. This finding is consistent with other studies with Neeta PN *et al.* [20] who observed that two wheeler accidents were more common in employed victims (26%) than unemployed victims (15%) and Ding SL *et al.* [21].

The present study showed that maximum victims were from lower middle class 56 (42.42%) followed by upper lower class 39 (29.55%) and upper middle class 26 (19.70%). These findings were consistent with Sinha ND *et al.* [17] who found that people from middle and low socio-economic class were affected more i.e. 198 (55%) and 114 (31.66%), respectively. Jakkam S [19] observed that most of the people were from the middle socio-economic group the number of people died in that group were 189 (63.64%). There were people from a high socio-economic group whose number is 80 (26.93%). The rest of them were from the low socio-economic group whose number was 28(9.43%). This might be due to the usage of two wheeler is increasing in populations from different sets of people. This can be interpreted as to the affordability of the people to maintain the vehicle.

The present study shows that there was not much difference between married and unmarried victims involved in two-wheeler accidents. Married victims were 70 (53.03%) and unmarried were 62 (46.97%) which is similar to observations noted by Reddy *et al.* [18] married 70 (49%) and unmarried 61 (43%). Verma PK *et al.* [22] observed that the annual

incidence of traffic injuries was more common in the married group as compared to those in the separated or divorced group. Guntheti BK *et al.* [23] found that Married persons 82 (75.92%) outnumbered unmarried persons 24 (22.22%). This might be due to the fact that they are prime bread earners of the family and thus remained outdoors during most of the day.

The present study showed most two-wheeler accidents occurred in month of January to May (68.95%) which is consistent with Reddy A *et al.* [18] who observed maximum cases of two-wheeler accidents in peaks of summer and rainy seasons that is in the months of April, August, and October. This might be due to the fact that the study was conducted in Mumbai city, where there is heavy rainfall leading to water-logging in most of the time in month of June-September. Hence, road transport especially by two-wheeler is heavily hampered. As per NCRB 2015 report [3], the total number of accidents were highest in the month of May (46,247) followed by the month of March (42,842) and December (42,827). On the other hand Pathak SM *et al.* [24] who observed that a total 29.67% cases occurred in July-Aug. The high number of cases in July and August owed to the monsoon weather which causes impaired visibility and judgment problems and skidding of vehicles of which the latter has been a major cause of accidents. In another study conducted by Kiran *et al.* [25] 78% of the accidents occurred in monsoons. In a study conducted by Jha and Agrawal [26] in Eastern Nepal maximum accidents took place in July (14.5%). The maximum number of injuries occurred in July, August and September (387 cases), which is the hot-wet season of India.

In our study peak timing of occurrence of RTA were at mornings (21.97%) and evening hours (56.06%) which is consistent with Jain A. *et al.* [14] who observed the highest number of accidents during 06.00 – 10.00 PM and Ding *et al.* [21] reported most of the head injuries occurred between 04.00 PM – 11.00 PM peaking at 9.00 PM. Sirathanont [27] demonstrated most of the motorcycle crashes were between 06.00 PM – 09.00 PM. The reason for this timing might be due to the crest of accidents during these hours co-exists with soaring traffic density, traffic congestion due to office hours, urge to reach the destination in time. This is probably due to, during morning hours most people are in a hurry to reach their office complex and heavy and unequal distribution of incidents occurred when the rush was too heavy on road at these working hours and the rider is generally exhausted after day's work.

CONCLUSION

From the present study, following conclusion were derived, two wheeler Road Traffic Accidents continue to be a growing menace, incurring a heavy loss of valuable manpower and human resources along with a corresponding drain of potential economic growth.

The following preventive aspects if followed may help to control human errors involved in fatal RTAs:

- Strict enforcement of traffic rules and regulations and awarding severe punishment for the offenders.
- Strict enforcement of rules regarding issuance of the license to drivers and making medical examination and fitness certificate compulsory during the renewal of driving license. Also, license cards must have details regarding blood group of the drivers.
- Imparting road sense for two-wheeler riders who are more vulnerable among other vehicle users.
- Public awareness must be generated regarding preventing two-wheeler riders from driving vehicles when they are not physically or psychologically well.

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