Research Article

Profiling of two-wheeler related fatal accident cases autopsied at the union territory of India – Puducherry

Reddy A.[1*], Kagne R. N.[2], Balaraman R.[3], Sivaraman V.[4], Diwakar S.[5]

[1]Assistant Professor, [2]Professor and Head, Department of Forensic Medicine and Toxicology, Sri Manakula Vinayagar Medical College, Puducherry-605106, INDIA.
[3]Head, [4]Chief Medical Officer, [5]Senior Resident, Department of Forensic Medicine, Indira Gandhi Government General Hospital and Postgraduate Institute, Puducherry-605001 INDIA.
Email: fmreddy2@gmail.com

Abstract

Background: Road traffic accidents are considered to be one of the leading causes of disabilities and mortalities all over the world. Two wheeler accidents are quite common in developing countries and effective measures are needed to prevent them. **Objectives:** This study was carried out to assess the involvement of motorcycle and pedal cycle occupants, and also pedestrians who succumbed due to two wheeler accidents. Profiling of these fatal cases in the union territory will be highlighted here. **Materials and Methods:** Retrospective study was carried out at the Indira Gandhi Government General Hospital and Postgraduate Institute in Union territory, Puducherry. Specifically, two wheeler related fatalities autopsied in the calendar year 2012 were analyzed. **Observations:** It was identified that two wheeler related accidental deaths were accounted for 8.65% (135) of all medico legal autopsies (n=1560) conducted in 2012. Predominantly male gender (male: female ratio is 7:1) and adults in the age group of 20-49 years (62%) are vulnerable to two wheeler accidents. Two wheeler riders (43%), pedestrians (33%) and pillion riders (13%) are most frequent sufferers in the descending order. Evidently involved vehicles are geared motorcycles (80%) compared to non-geared motorcycles and pedal cycles. Fissured fractures are the most common type of skull fracture and head injuries are the most frequent cause of death in two wheeler accident deaths. **Conclusions:** Health education and awareness among public regarding road safety measures. Obeying traffic laws and use of protective measures will benefit the users by decreasing the severity of accidents, disabilities and in turn fatalities.

Key Word: Two wheeler accidents, Fatalities, Occupants, Road safety.

Address for Correspondence
Dr. Ananda Reddy, Assistant professor, Department of Forensic Medicine, Sri Manakula Vinayagar Medical College, Madagadipet, Puducherry-605106, INDIA.
Email: fmreddy2@gmail.com
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INTRODUCTION

Road traffic accidents (RTA) constitute a major public health problem and one of the leading cause of death throughout the world [1] and India is not exception to this general rule. According to the World Health Organization (WHO) Global Status Report on road safety, India has literally overtaken china and having highest number of road accidents in the world with over 1,30,000 deaths reported annually. RTA's are responsible for a greater percentage of emergency hospitalization, a huge socio-economic burden to families, disabilities and deaths of the young and middle aged populations in India.[2,3] Road traffic accidents are considered as *"hidden epidemic"*, though they require a utmost priority but has received very less attention.[4] It is evident that in recent years with a significant increase in urbanization and motorization particularly in India, two wheelers usage is growing rapidly. Half of those dying on the roads are vulnerable road users like motorcyclists, pedestrians and pedalcyclists. Puducherry has reported the highest rate of

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accidental deaths, having 80.1 deaths per lakh population as compared to the national average of 32.6. Deaths due to road accidents in India have increased by 1.3% during 2012 compared to 2011 and 23.2% of victims were occupants of two wheelers.[5] Although a number of studies have been conducted and published on road traffic accidents in the past decades, the estimation of the profiling of injuries and fatalities related to two wheeler accidents are less studied and relatively overlooked in this union territory. The present study is aimed at interpreting the demographic profile and pattern of injuries in fatal two-wheeler accidents autopsied in Puducherry.

MATERIAL AND METHODS

This retrospective study was conducted in the coastal city of Puducherry, the capital of the union territory of Pondicherry in south India. Pondicherry has a population of 950,289 in which males and females were 468,258 and 482,031 respectively, according to 2011 census.[6] The total geographical area of Puducherry is 294 square kilometers and has an extensive road network facility. Two major highways run through it, namely National Highways 45A and 66 which connects Puducherry city to Tamil Nadu state and a major state highway (East Coast Road) connected to Chennai on one side and Cuddalore district on the other side. Data collection was carried out in the Department of Forensic Medicine, Indira Gandhi Government General Hospital and Postgraduate Institute (IGGGH and PGI) Puducherry. IGGGH and PGI and Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER) institutions are the only two nodal health centers where all the medicolegal autopsies are conducted in the Puducherry territory. Before conduction of this study permissions were obtained from the institutional ethical committee and medical record section of the forensic medicine department of IGGGH andPGI. A proforma was designed for entering the data of the present study. The demographic details of each deceased died due to the involvement of two wheeler are recorded from the dead body inquest and post mortem reports. The details of autopsy findings mentioned in the post-mortem report, including injuries sustained and accessory investigation findings are considered for analysis. Data collected for each case of two wheeler related deaths autopsied from 1st January to 31st December 2012 was tabulated and entered into the computer using the Microsoft excel package for detailed analysis. Deaths occurred as a result of RTA involving vehicle more than two wheelers and non-vehicular injuries are excluded from this study group. It was found that most of the inquest and postmortem reports are complete in all aspects; except for few cases were demographic details like caste, status are missing. Statistical me are frequencies, Percentages, pro charts, pie diagrams and line appropriately for interpreting resu

OBSERVATIONS AND RE

Table 1: Age and sex wise distribution

Age group (in years)	Number of casesand Percentage	Ma
0-9	03 (02%)	
10-19	10(07%)	
20-29	34(25%)	
30-39	27(20%)	
40-49	23(17%)	
50-59	19(14%)	
60-69	09 (07%)	
>70	10(07%)	
Total	135(100%)	1

Figure 1: Age distributio

Figure 2: Marital status of

Figure 3: Religious status of th

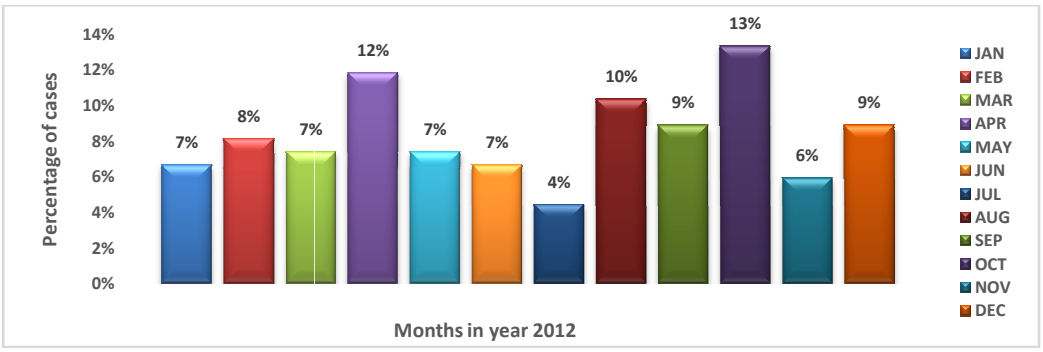

Figure 4: Monthly distribution of cases

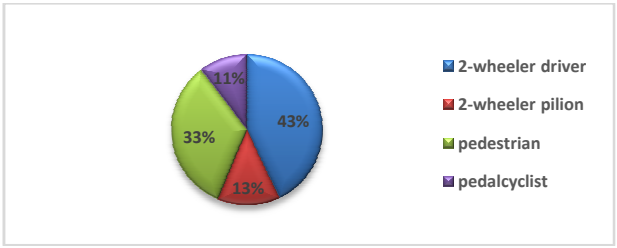

Figure 5: Roaduser status

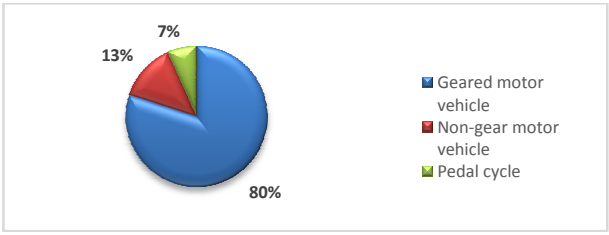

Figure 8: Type of vehicle involved

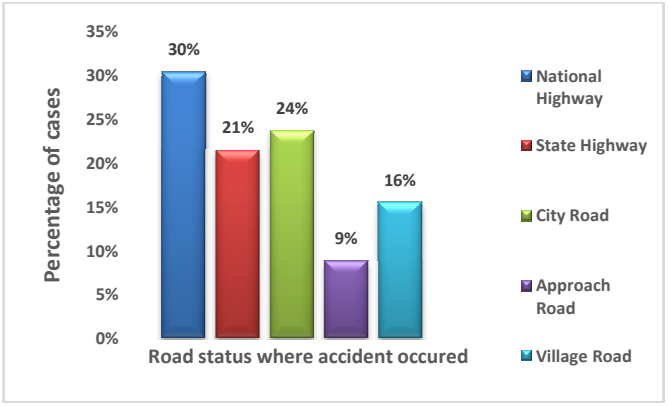

Figure 6: Place of accident occurrence

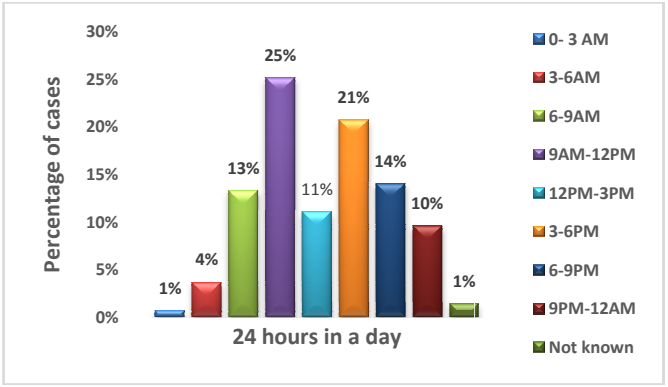

Figure 7: Time of accident

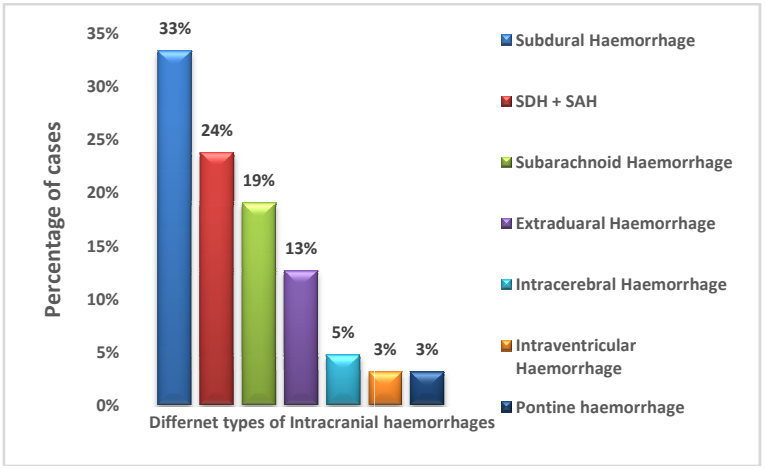

Figure 9: Intracranial Haemorrhages

A total of 1560 medico-legal autopsies were conducted in the study centre from 1st January to 31stDecember 2012. Among these, 135 deaths were reported to be due to the involvement of two wheeler accidents which includes occupants of motorcycles, pedalcycles and pedestrians hit by these vehicles. Hence two wheeler fatalities were responsible for 8.65% of the all medicolegal autopsies and 46.29% of the total road traffic accident deaths in that calendar year. The male gender is predominantly affected than females, males were 117(87%) and females were 18 (13%), with male to female ratio of 7:1 (Table 1).The majority of the deceased were in the age group of 20-49 years (62%) of which most frequently involved are young adults in the age group of 20-29 years (25%) (Table 1

andFigure 1). The highest number of deceased were married 95 (70%).According to 2011 census the religious status of the union territory population was Hindus-82.32%, Christians- 6.94% and Muslims- 6.09%.[6] while the religious status of the deceased in our study was Hindus-115 (85%),Christians-10 (7%) and Muslims- 8 (6%). In 2 cases we could not able to identify their religion as they were unidentified bodies (Figure 2 and 3). This study revealed that most of the accidents were occurred during peaks of summer and rainy seasons that is in the months of April, August and October (Figure 4). Two wheeler riders 58 (43%) were identified as maximum affected group, followed by pedestrians 45(32%) and pillion riders 18 (14%) (Figure 5). The majority of the accidents were occurred on national highways (41%) followed in decreasing order, on city roads (32%) and state highways (29%) (Figure 6). It was established that a significant number of accidents (99), occurred during rush hours between6AM to 12noon (38%) and between 3PM to 9PM (35%)(figure 7). The specific type of two wheeler mainly involved in the accidents was geared motorcycles (80%) compared to non-geared motorcycles (13%) and pedalcycles (7%)(Figure 8). Out of total 135 fatal cases, 76(56%) cases were hospitalized and rests were non-hospitalized. Spot deaths reported in 31cases and another 29victims were expired on the way to hospital or within an hour after hospitalization. The survival period varies from a few minutes to days, but the bulk of the victims succumbed within the first 6 hours of the accident. Predominant body part injured in fatal two wheeler accidents is head and neck, which was noticed in 97(72%)cases. Whereas injuries to limbs ranks second and appreciated in 72(53%) fatal cases, followed in order by injuries to multiple organs and thoracic-abdominal parts. Fatalities purely due to involvement of injuries to head and neck accounts for 69 (51%) cases. Chemical analysis for alcohol estimation was done in fatal two wheeler riders (58 cases) suspected to be under the influence of alcohol at the time of fatal accident, and it was found to be positive in 13(22%) cases.

DISCUSSIONS

Road traffic accidents are considered to be one of the leading causes of emergency hospitalization, disabilities and cause of deaths in the Indian settings. According to Vander Sluis *et al* study, RTAs are most important causes of severe injuries and they are responsible for death of ¾ of severely injured cases in the hospital. [7] In calendar year 2012, the two wheeler accidental deaths contribute to 46% of the total RTA deaths in our study centre, which is almost close to the results derived from the Pathak *et al* study (49%). It is evident that two wheelers are preferred choice of vehicle to travel short distances in India. Two wheelers are considered to be customer friendly to buyers and riders as they are economical and gives better mileage. They are traffic friendly too, because these vehicles are easy to move in small lanes, easy to turn and park, but with considerably poor safety issues. The male dominance in a number of deaths over female in the present study(7:1)were similar to the results of most other studies, the reason being males usually travels a lot in two wheeler compared to female. Singh and Dhatarwal study indicates that the sex ratio is more than the present study (9:1).[8] It was estimated that adults in earning age group between 20-49 years (62%) are worst affected and especially victims of 20-29 years are most vulnerable according to our study. Similarly majority of the victims were in the age group of 21-40 years (54.24%) and 18-44 years(77%) according to the studies conducted by Kumar A *et al* in 2008[9] and Jain A *et al* in 2009[10] respectively. This study revealed that the Peak hours for road traffic accidents to occur is between 9 AM to 12 noon and between 3 PM to 9 PM. There are multiple factors responsible for this upsurge during these hours namely heavy and unequal distribution of traffic during these hours and urge for the individual to reach their destination places in-time, stress and exhaustion. The highest number of motorcycle crashes are reported between 6 PM to 9 PM and between 6 PM to 10 PM according to the studies performed by Sirathanout (2003)[11] and Jain A *et al* (2009)[10] respectively. It is noteworthy that the percentage of victims died on the spot, on the way to the hospital and within 6 hours of accident constitutes the major bulk (64%) of the present study cases. Similar results were reported in the studies conducted by Singh YN *et al* (2005), Mohammed N (2009) and Singh B *et al* (2008). Various factors play a role in this aspect ranging from the severity of accident, lack of nearby medical emergency services, transportation problems, insufficient and untrained staff and facilities available in the hospitals. Motorcyclist and pedestrians are the common road user groups involved in accidents.[12] Head injuries (51%) were indicated as the dominant cause of death in our study because it is least protected, having a more striking surface and restricted mobility, hence receives maximum force. Most of the head injuries were associated with skull fractures, which in turn increased the fatality of victims but it is not a dictum to be present in all fatal head injuries. Skull fractures were seen in 56% of fatal head injury cases and the vault is predominantly involved, followed by a combination of vault and base of skull. The most important type of fractures is fissured fracture (32%) involving parietal and temporal areas of the skull bone. The data revealed that the commonest variety of intra-cranial haemorrhage was subdural haemorrhages

(33%) and subsequently followed by subarachnoid (19%) and epidural haemorrhages (13%) in descending order (Figure 9), which is consistent with Sarkar *et al* and Akhilesh Pathak[13] studies. The helmet wearing by the rider and the pillion rider is neither practiced efficiently nor mandatory by law in this union territory. Mobile usage by the rider while driving is common and no steps were taken to prevent and control them by the responsible individuals.

CONCLUSIONS

Male gender is commonly affected in two wheeler accidental deaths. The most vulnerable age group is adults between 20-49 years. Two wheeler riders and pedestrians are at significant risk. The peak time of occurrence is during rush hours between 9 AM to 12 noon and between 3 PM to 6 PM. Most of the deaths occurred on the spot or within 6 hours after the accident. Fissured fracture is the commonest skull fractures and subdural haemorrhage is the commonest type of intra-cranial haemorrhages. Head injuries are the predominant cause of death in fatal two wheeler accidents.

SUGGESTIONS

Strict enforcement of road traffic rules and regulations are very much essential to improve the safety of riders and pedestrians. Educational institutions, senior family members and private organizations must increase awareness and health education among children and young adults regarding the advantage of following right traffic rules, safe road usage and use of protective measures while utilizing two wheelers. Providing foot paths, crossovers at the circles and subways at heavy traffic areas and also speed breakers near schools and offices will reduce the chances of accidents to pedestrians. Drunken driving and using mobile phones while driving a vehicle should be strictly monitored by the Government and punishments to be given to the guilty without excuse. Availability of prompt first aid, emergency care during the early golden hours at the spot and at emergency departments will be helpful in dramatic reduction in mortalities and disabilities.

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