

## Pattern of Injury among Motorized Two Wheeler Road Traffic Accidents: An Autopsy Based Study

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### Abstract

*Background:* Deaths due to road traffic accidents are one of the common forms of unnatural death and its history is as old as the invention of the wheel. Two wheeler riders are more vulnerable to sustain injuries as the external shell of the vehicle is absent to protect them as compared to light motor and heavy motor vehicles. Lost balance during two wheeler accidents further increases the risk of injury. *Study Design:* It's a cross sectional Prospective study. *Place of Study:* At Mortuary of Department of Forensic Medicine, Gandhi Medical College Secunderabad. *Material and Method:* The present study was done in mortuary of Department of Forensic Medicine, Gandhi Medical College Secunderabad. The collected data was entered in Microsoft Excel. Coding of the variables was done. SPSS version 11.5 was used for analysis. *Observation and Discussion:* Deaths due to accidents which were subjected to post mortem examination at Gandhi Medical College, Secunderabad are 1710 over a period of year. Among them deaths due to two wheeler accidents were 576 (33.68%). Males deaths are more and they accounted to 515 (89.41%) and females 61 (10.59%). 287 males (49.83%) and 4 females (0.69%) were riding the vehicle, male to female ratio is 8.44: 1. Deaths in the age group of 21 to 30 years tolled as many as 164 lives (28.47%). Late night accidents (i.e. from 9 pm to 3 am) are commonly seen in the present study, 129 persons (22.40%) died on the spot, and another 124 person (21.53%) could survive up to more than 6 hours, but died within 24 hours of the accident. Maximum number of two wheeler accidents during late evening is because the traffic density is high during this time and is coupled with the poor infrastructure and fall in traffic discipline. *Conclusion:* A total of 576 victims of two-wheeler road traffic accident in this part of world were studied. The study highlights the need of compulsory implementation of helmet wearing for motorcyclist and necessitates the need for taking urgent steps for establishing ambulance services and provision of pre-hospital care & trauma services to reduce mortality and morbidity.

**Keywords:** Road Traffic Accidents; Motorcyclist; Autopsy; Injury.

### Introduction

Birth and death are two extremes of the life and death is the ultimate truth. But unnatural death is known for its immense striking power and is always a surprise. Deaths due to road traffic accidents are one of the common forms of unnatural death and its

history is as old as the invention of the wheel [1]. Road traffic accident (RTA) is one of the major preventable public health problems and is on the rise which can be attributed to increase in the number of vehicles, lifestyle changes and risky attitudes.

Accidents occur not only due to ignorance but also due to carelessness, thoughtlessness and over confidence. Human, vehicular and environmental factors play role before, during and after a Road Traffic Accidents [2]. As per World Health Organization, "accident" means an event, independent of human will, caused by an outside force acting suddenly leading to bodily or mental injury. Roads and vehicles which are for making life comfortable and faster, can result in miserable life when one meet a road traffic accident. The problem is so severe that, by 2020, it is projected that road

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traffic disability-adjusted life years (DALYs) lost will move from being the 9<sup>th</sup> leading cause of disability-adjusted life years lost to the 3<sup>rd</sup> leading cause in the world and will be 2<sup>nd</sup> leading cause in developing countries [3].

Motor cyclists are about 25 times more risk than passenger car occupants to die because of road traffic accidents. About more than 25% of the global traffic accidental deaths occur in South East Asia region [4]. Two wheeler riders are more vulnerable to sustain injuries as the external shell of the vehicle is absent to protect them as compared to light motor and heavy motor vehicles. Lost balance during two wheeler accidents further increases the risk of injury [5,6].

The problem of Road Traffic Accidents is compounded by the fact that, the age groups primarily involved in Road Traffic Accidents belong to the most productive age group of 15-40 years. Developing countries, such as India face the double burden of already existent communicable diseases and increasing burden of non-communicable diseases including Road Traffic Accidents. Understanding a problem is one of the first steps towards averting the problem. Present study on fatal Two wheel road traffic accidents has been undertaken to analyze this most important yet the most neglected aspect of human sufferings. It is an effort to elucidate the multi-factorial causations leading to the rise in everyday fatal two wheel road traffic injuries.

#### *Aims and Objectives*

To study the pattern of injuries in a victim of road traffic accident, who died of two wheeler accident, the factors which hampered the protection of helmet and caused the death and enlist the factors which are responsible for causation of accident and death in twin cities.

#### **Material and Method**

The present study was made on those dead bodies which were subjected to Post-mortem examinations in the mortuary of Department of Forensic Medicine, Gandhi Medical College, Secunderabad, from November 2008 to October 2009. A detailed Proforma for the purpose of recording socio-demographic profile of victims, epidemiological data, pattern and severity of injuries sustained, cranial trauma and other relevant data etc was prepared for the purpose of filling observations of the present study. Accidental details obtained the medico-legal records, police

inquest, statements from witnesses/relatives and injury record from the examining doctor and the experts dealing with the injury. The collected data was entered in Microsoft Excel. Coding of the variables was done. SPSS version 11.5 was used for analysis. Interpretation of the collected data was done by using appropriate statistical methods like percentage, proportions, bar and line diagrams. Sufficient permissions and consents were procured and clearance from the Institutional Ethical committee was obtained in advance.

#### *Inclusion Criteria*

The dead bodies with a history of death due to accident from a two wheeler, both riders and pillion riders died in the two wheeler accidents, all age groups from both sexes were selected for this study, and deaths which occurred without treatment or after the treatment for injuries were also selected

#### *Exclusion Criteria*

Deaths occurring from accidents by other vehicles were excluded from the study.

#### **Observations and Discussion**

Man invented wheels accidentally and ever since then he has been doing accidents. This man made hazard is becoming a pandemic in spite of improvement in the safety rules, quality of the vehicles, conditions of the road etc. The catastrophic outcome of this hazard has not spared people of any age group or any geographical region whether rural or urban. As per Figure 1, Total numbers of deaths due to accidents which were subjected to post mortem examination at Gandhi Medical College, Secunderabad are 1710 over a period of year. Among them deaths due to two wheeler accidents are 576 (33.68%).

As per Figure 2, there is not much seasonal variation of accidents during the calendar year. However accidents are less in number in the months of April, July, October and November in comparison with rest of the months.

Males deaths are more and they accounted to 515 (89.41%) and females 61 (10.59%). The male to female ratio is 8.44 : 1. Male preponderance almost in consistence with the study reported [7,8].

Deaths in the age group of 21 to 30 years tolled as many as 164 lives (28.47%); in the age group of 31 to 40 years 122 (21.18%) deaths occurred. Next age

group is 11 to 20 years in which 94 deaths (16.32%) occurred; in the age group of 41 to 50 years 83 deaths (14.41%) occurred. If we look at the graph the peak is rising towards 21 to 30 years age group both in males and females and falling afterwards. This is in

accordance with the studies done, reports that age group between 20-30 years, were commonest, observed that age group of 0-9 years were more

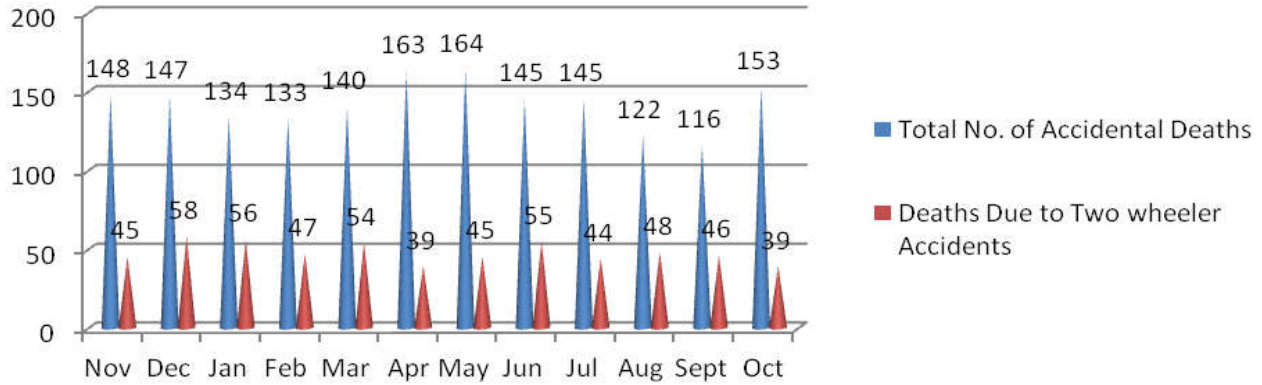


Fig. 1: Comparison of total no. of accidental deaths of the two wheeler accidental deaths

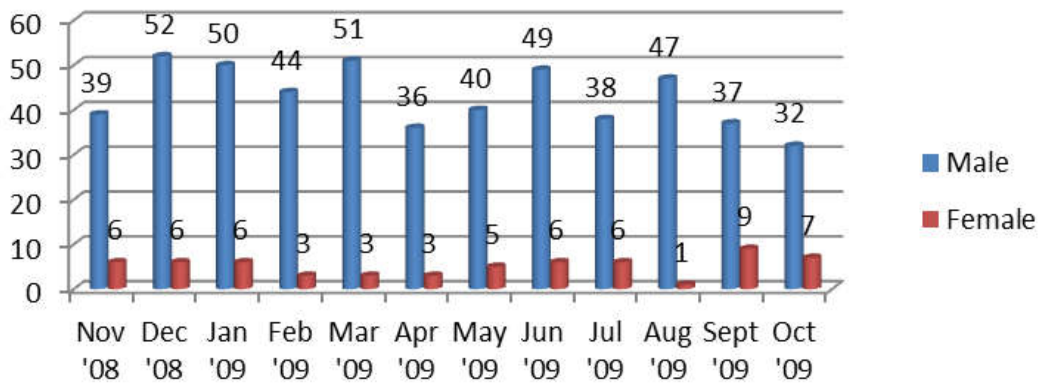


Fig. 2: Monthly distribution of Two wheeler accidental deaths

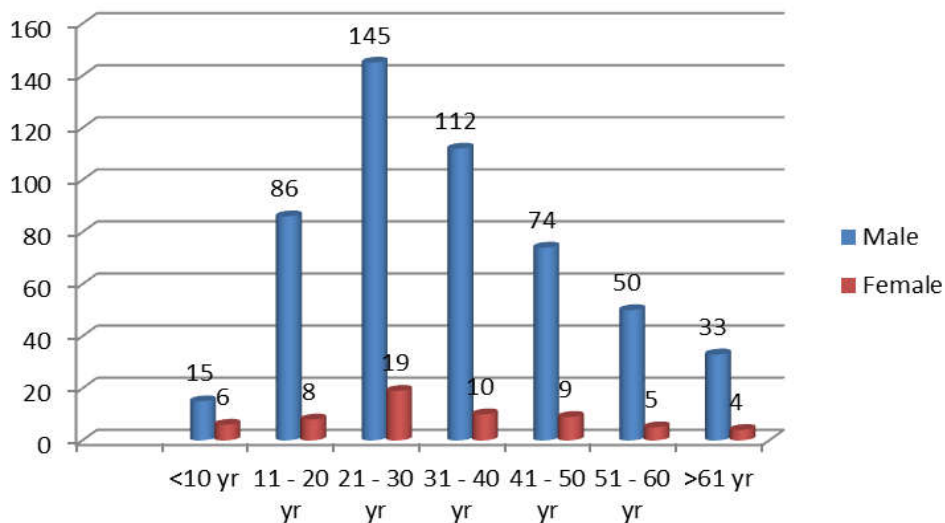


Fig. 3: Age and Sex distribution of the Victims

commonly involved. It does not agree with the study done by Agarwal and Agarwal<sup>9</sup>.

As per Fig No 4, among both sexes, urban males are 56.5%; Sub-urban males are 28.35% and rural males are 15.15%. Similarly among females urban

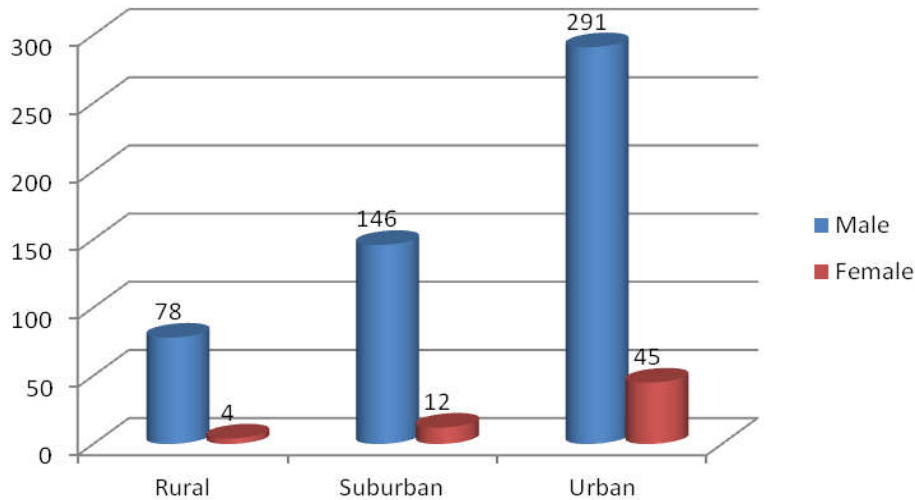


Fig. 4: Habitat of the victim

people are 73.77%, sub-urban people are 19.67%, rural females are 6.56%. This is due to the increase in the urban and suburban population due to rapid urbanization.

from high socio economic strata which amounts to 7.99%. 29 were from low socio economic status which accounted to 5.03%. In 202 cases the information about their socio economic status is not available.

It is found that people from middle socio economic status are involved in more number from both sexes i.e. 293 (286+13) which amounts to 51.91%. People

Socioeconomic status is well known to be a risk factor for injury generally, and road traffic injury is no exception as exemplified above. Studies have

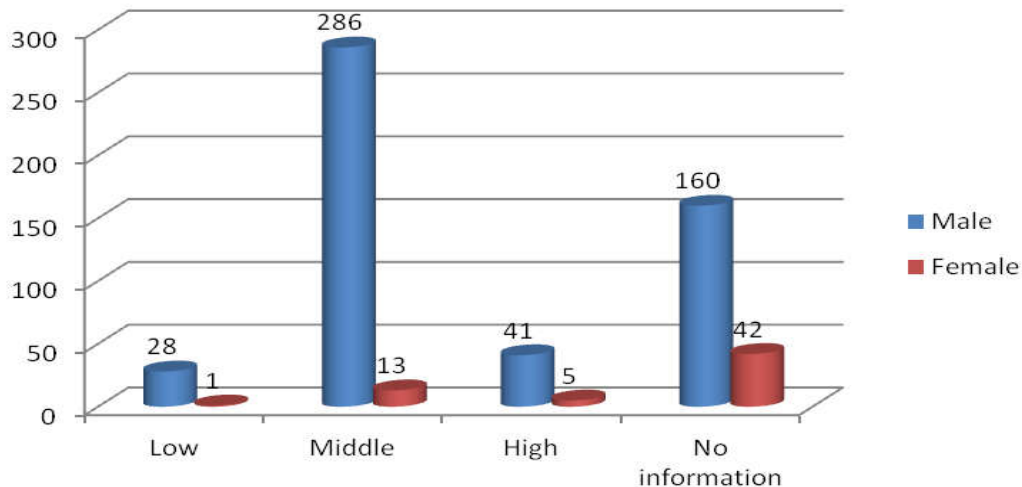


Fig. 5: Socio economic status

found that individuals from disadvantaged socioeconomic groups or living in poorer areas are at greatest risk of being killed or injured as a result of a road traffic crash, even in high-income countries (Roberts I, Power C., 1996)<sup>10</sup>.

The deceased is not always the rider of the vehicle. In the present study 287 males (49.83%) and 4 females (0.69%) were riding the vehicle. Rest the people were 285 (49.48%) were pillion riders. Generally pedestrians have the highest numbers of road traffic deaths and in this study that has similar

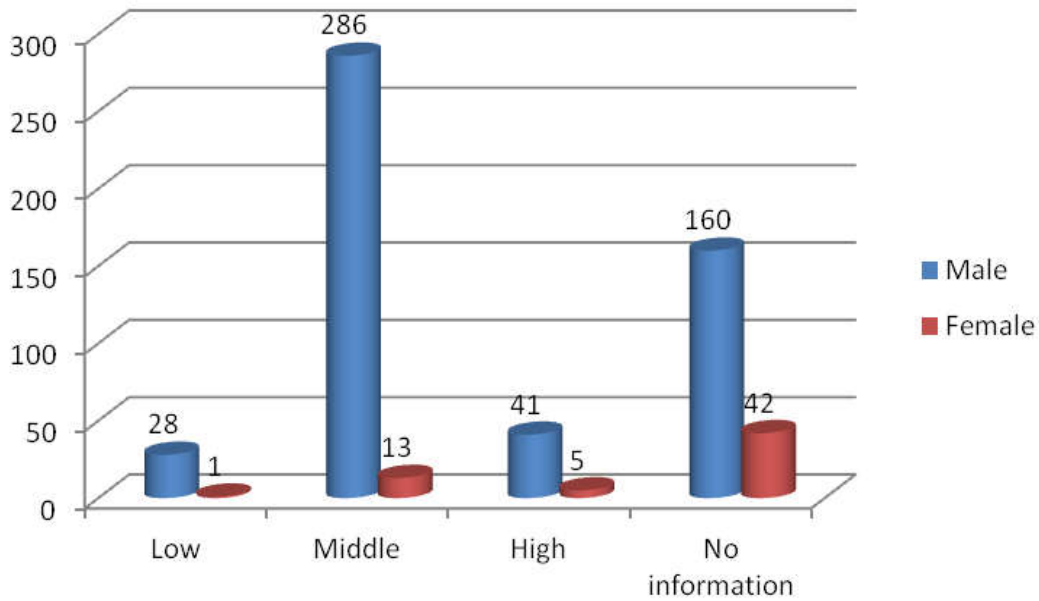


Fig. 6: Position of the victim over the two wheeler

findings to that of another report<sup>11, 12</sup>. When considering all vehicular disruptive collision types, it is clear that more emphasis of passenger preparedness and the enforcement of the national passenger and driver related laws need to be greatly improved.

Late night accidents (i.e. from 9 pm to 3 am) are commonly seen in the present study as there were 232 fatal accidents (40.28%) occurred in this period. The morning times (i.e. from 6 am to 12 noon) where 136 deaths occurred (23.61%) among the all accidents occurring in that period. In early nights i.e. from 6

pm to 9 pm there were 66 fatal accidents (11.46%) resulted in the deaths are seen. During the day time i.e. From 3 pm to 6 pm a total of 65 fatal accidents (11.28%) and from 12 noon to 3 pm a total 61 fatal accidents (10.59%). The least dangerous period was found to be from 3 am to 6 am wherein only 16 deaths (2.78%) resulted from the accidents occurred during this period.

Thus, the risk of injuries due to road traffic accidents was more during morning and evening peak hours. Late evening hours too were more risky due to less traffic on roads allowing over speeding

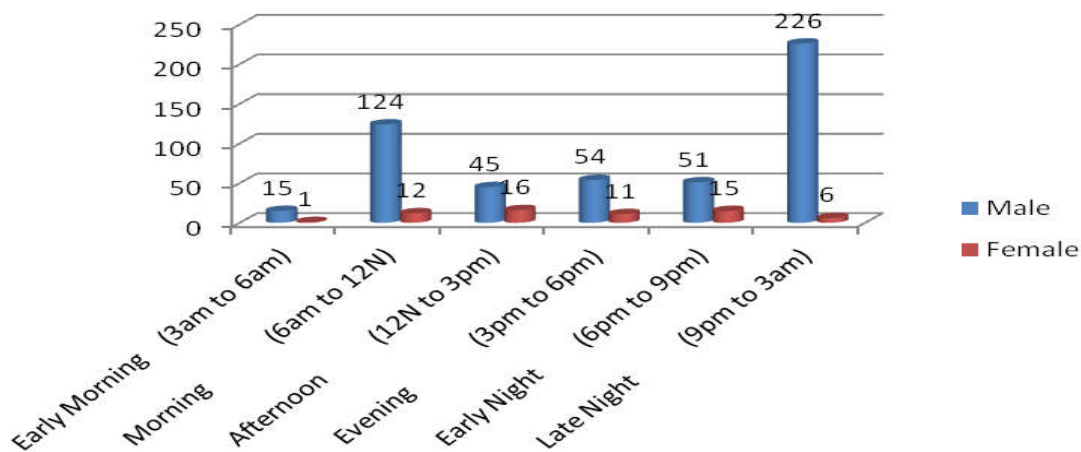


Fig. 7: Time of Accident

leading to fatal accidents. Rise in traffic accidents since afternoon till late night hours were also found in studies of Jain A et al, (2008) [13], Menon A et al [14] (2008). Maximum number of two wheeler

accidents during late evening is because the traffic density is high during this time and is coupled with the poor infrastructure and fall in traffic discipline.

Out of the deaths occurred of two wheeler motor vehicle accidents, 129 persons (22.40%) died on the spot, and another 124 person (21.53%) could survive up to more than 6 hours, but died within 24 hours of the accident. Another 94 persons (16.32%) died with

6 hours of their accident. 89 persons (15.45%) died just before their hospitalisation. 56 persons (9.72%) survived for more than one week after their accident and succumbed to the injuries. 50 persons (8.68%)

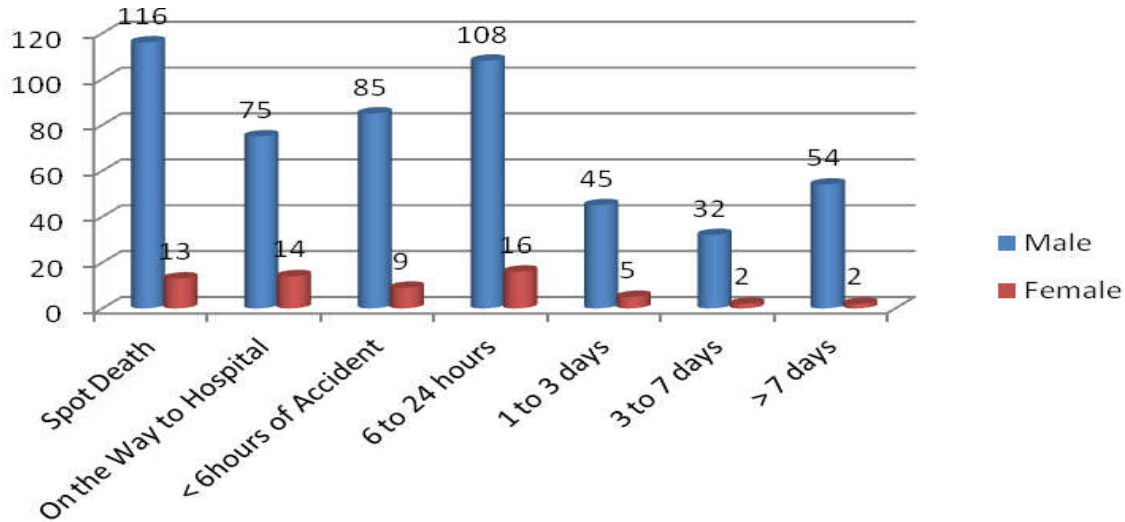


Fig. 8: Period of survival after accident

could survive more than one day but died within 3 days of their accident, another 34 persons (5.90%) could survive more than 3 days but died with one week of their accident. There is a need for better systematic coordination between all levels of medical

care inclusive of intensive care, radiology, physiotherapy etc. in response to the occurrence of a post-crash seriously injured individual.

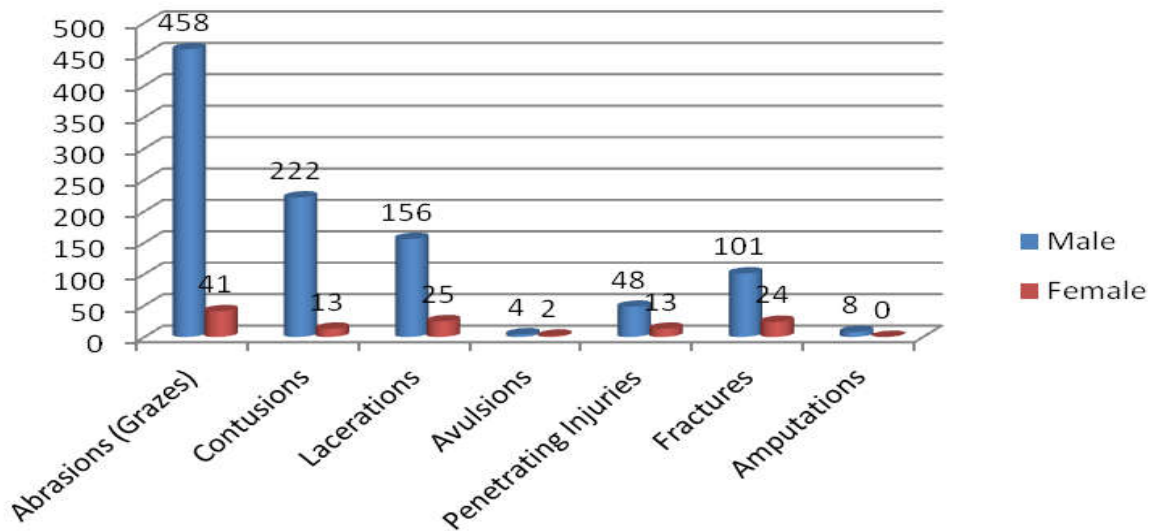


Fig. 9: Injuries spread over the body

The most frequently seen injuries are grazed abrasions in 499 (86.66%) cases of all. Followed by the contusions in 255 cases (44.27%), lacerations in 181 cases (31.42%) and fractures in 125 cases (21.70%). In 61 cases (10.59%) penetrating injuries

are also seen. In 8 cases (1.39%) amputations of the limbs occurred. It is also observed that in 6 cases (1.04%) only avulsion injuries are seen which indicate the run over after the accident.

The upper limbs received most of the injuries and 303 cases (52.60%) they received different injuries mentioned above. Chest received next to upper limbs

and in 256 cases (44.44%) it had variety of injuries. In 180 cases abdomen (31.25%), in 172 cases lower

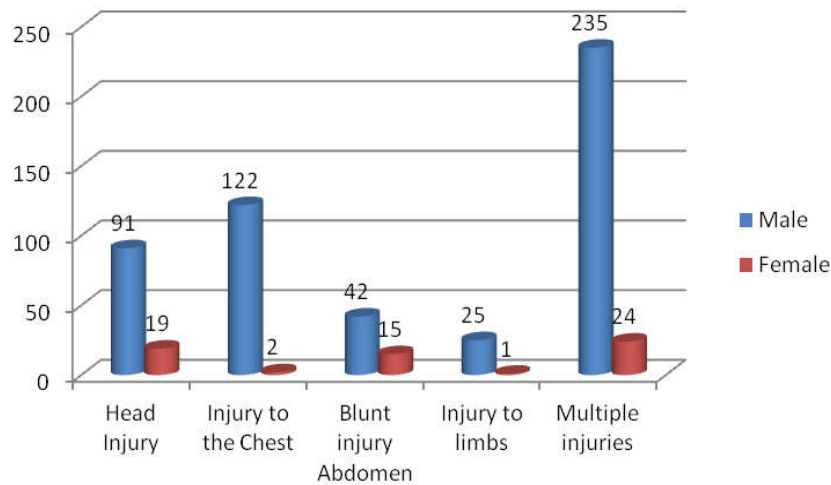


Fig. 10: Cause of death

limbs (29.86%), in 143 cases head and neck (24.83%) received injuries.

Though different parts of the body are injured the cause of death was opined as due to multiple injuries in 259 cases (44.97%). Chest injury was declared as cause of death in 124 cases (21.53%). Head injury was the cause of death in 110 cases (19.10%). In 57 cases the blunt injury abdomen (9.90%) was given as cause of death. Isolated injuries to the limbs are also given as cause of death in 26 cases (4.50%).

### Conclusion

Civilization has brought many miseries to the mankind. The greatest of all these miseries is the mounting tragic toll of road traffic accident deaths. The traffic accidents pose a problem to whole world. This may be due to bad roads, lack of road driving sense and lack of knowledge of traffic rules. There is abundant literature on various aspects of traffic accidents and their prevention.

A total of 576 victims of two-wheeler road traffic accident in this part of world were studied. The whole data was analyzed for pattern and distribution of injuries in cases of two wheeler road accidents and cause of death. This may be due to lack of road driving sense and lack of knowledge of traffic rules. The majority of the cases in our study were young in their productive age group and male predominance was seen. Pedestrians are at risk while commuting. The severity of head injury is an important predictor for prognosis. The mortality is directly related to head injury.

Presence of multiple injuries in our study is in accordance with the fact that multiple injuries are a rule in road traffic accidents. The study highlights the need of compulsory implementation of helmet wearing for motorcyclist and necessitates the need for taking urgent steps for establishing ambulance services and provision of pre-hospital care & trauma services to reduce mortality and morbidity. Use of heavy vehicles should be barred from the busy streets during evening hours and speed limits be enforced on them. Furthermore, law agencies needs to implement the traffic rules very strictly. The road safety and traffic rules awareness at all levels of society should be strengthened and directed at the high risk groups with more emphasis placed on the human errors and enforcement of current national traffic laws.

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### Conflict of Interest

The author declares no conflict of interest in the present study.

*Author Disclosures*

Authors have no conflict of interest. This study was a part of departmental research activities of Forensic Medicine at Gandhi Medical College Secunderabad.

*Ethical Consideration*

Clearance from the Institutional Ethical committee was obtained in advance.

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