

Original Research Article

Analysis of Pedestrian Deaths in Road Traffic Accidents –An Autopsy Based Study in Visakhapatnam

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Abstract: Road Traffic Accidents (RTAs) are important causes of mortality and morbidity. India has a wide road network and a greater number of RTAs compared to other countries. The objectives of this study were to determine the demographic distribution of cases of pedestrian accidents that are presented for autopsy at King George Hospital Mortuary. The study period is from 1st January 2016 to 31st December 2016. A total of 1782 medico legal autopsies were conducted during the study period (2016). Road traffic fatalities alone accounted for 36.81% (n=656) of all autopsied cases. Among them 147 cases 8.5% are pedestrians, male female ratio is 3:1 highest number of deaths 78 (53.06 %) between 41-60 years, rainy season accounting for 34%, accidents are from 6PM to 12 Mid night amounting to 48% (n=71cases). Brought to hospital 71%, died during transport to hospital 15% of cases and 13% died at the spot of accident. Victims sustained trauma on high ways which is 44 % (n=65cases). Two-wheeler vehicles involvement by 58% (n= 35) and heavy motor vehicles by 42% (n=17). All cases showed primary impact injuries. Secondary impact injuries were found in 47.61% (n=70 cases) and secondary injuries in 97.27 % (n=143 cases).

Keywords: RTA, Pedestrian, highways, motor vehicle type, autopsy, impact injuries.

INTRODUCTION

The first human fatality associated with a motor vehicle was a pedestrian killed in 1899 (Rivara, F. P. *et al.*, 1997). Road transport is vital to India's economy as it contributes nearly 4.8% share towards Gross Domestic Product (GDP) of India in 2013 – 14. Road Traffic Accidents (RTAs) are important causes of mortality and morbidity due to the increasing number of vehicles, changes in lifestyle and the risk behaviors among general population. A total of 4,64,674 road accident cases were reported during 2015. Road accident cases in the country have increased by 3.1% during 2015 compared to 2014 (4,64,674 in 2015 from 4,50,898 in 2014). The highest number of persons died in road accidents were reported on the National Highways accounting for 33.4% (49,651 out of 1,48,707) followed by State Highways (27.7%) (41,219 deaths). A total of 1,849 persons died due to road accidents on the Expressways during 2015 (National crime record bureau.2015). Half of the world's road traffic deaths occur among motorcyclists (23%), pedestrians (22%) and cyclists (5%) – i.e. “vulnerable

road users” – with 31% of deaths among car occupants and the remaining 19% among unspecified road users (WHO.2016).

India being a developing country is experiencing a double burden from already existing communicable diseases and increasing burden of non-communicable diseases including road traffic accidents. Traditionally, the data sources for epidemiological assessments of RTAs in India have been records from accident and emergency departments, surgical and intensive care units of specific hospitals and, more commonly, the local police. However, internationally, an important tool in assessing RTAs has been the autopsy. Medico-legal autopsies help answer a number of questions that assist in resolving a case, such as the cause of death, the time between injury and death, and the time since death (Joseph., H.D. 2005) and these findings are admissible evidence in the court of law. Besides resolving legal issues, autopsy studies allow planners to determine logistics such as the number of beds, and ambulances, and staff required for dealing

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with trauma efficiently; devise strategies for future training; and add to public health research (Moharamzad, Y. *et al.*, 2008). The number of vehicles in India is rapidly increasing, with about 20 million new motor vehicles sold every year (SIAM).

MATERIAL AND METHODS

The present study is made on the deaths involving pedestrians in road traffic accidents which occurred in and around Visakhapatnam which are subjected to post mortem examination in the mortuary of Andhra Medical College, King George Hospital, Visakhapatnam, India during the period January 2016 to December 2016.

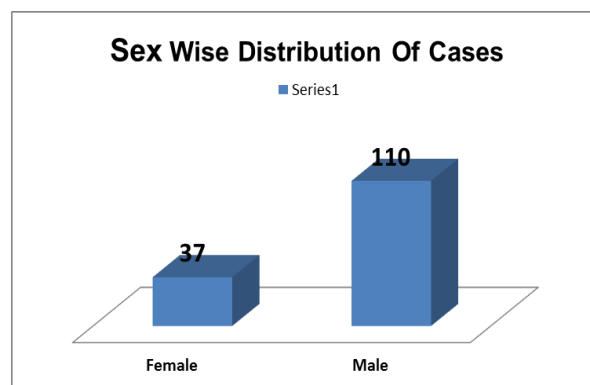
Among those cases, which were admitted into the hospital, the details regarding the duration of stay in the hospital, the period of survival were recorded from the hospital records. Based on these observations and history obtained from the police regarding the accidents and inquest reports an attempt has been made to show the number of accidents, to increase the traffic awareness in public, safety methods of transportation, to develop traffic emergency medicine in the field of public health as vehicles on road are major causes of vehicular accidents

RESULTS & DISCUSSION

A total of 1782 medico legal autopsies were conducted during the study period (2016). Road traffic fatalities alone accounted for 36.81% (n=656) of all autopsied cases. Among them 147 cases are pedestrians. Major road network in Visakhapatnam City area extends over length of 126 kilometres. Road Length – State High way- 30 kilometres. Road network of Visakhapatnam is congested due to narrow carriage way, high pedestrian traffic and slow-moving vehicle concentration. Thus, resulting in high incidence of pedestrian accidents

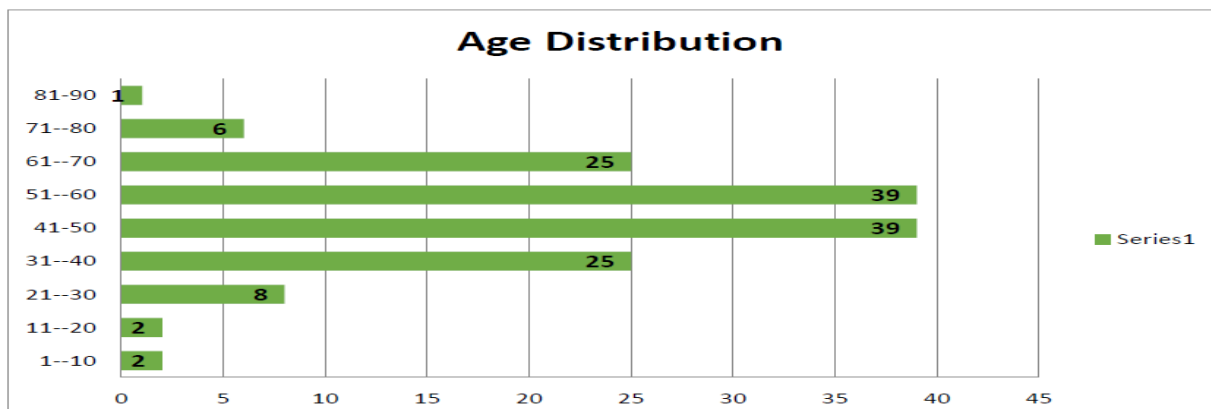
In this present study, males are more involved with ratio being 3:1. This male predominance of our

study fits with reporting of other research of similar nature (Farooqui, J. M. *et al.*, 2013; Pruthi, N. *et al.*, 2012; & Zia, Y. *et al.*, 2014). This gender bias could be due to more males being involved in outdoor works and commonly exposed to accidents. Many of them were the only source of income for the family especially in our parts of state of Andhra Pradesh. Majority of females are dependants which constitutes home makers. It is presumed that they have poor sense of traffic safety rules leading to pedestrian accidents.

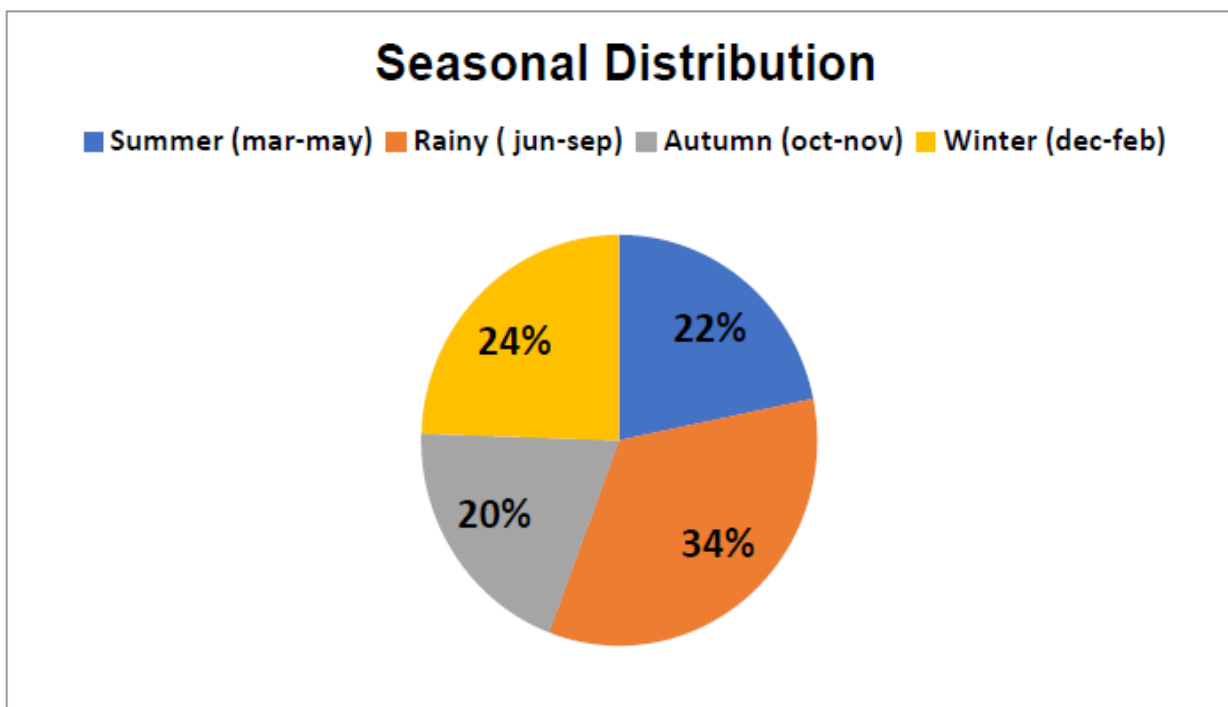
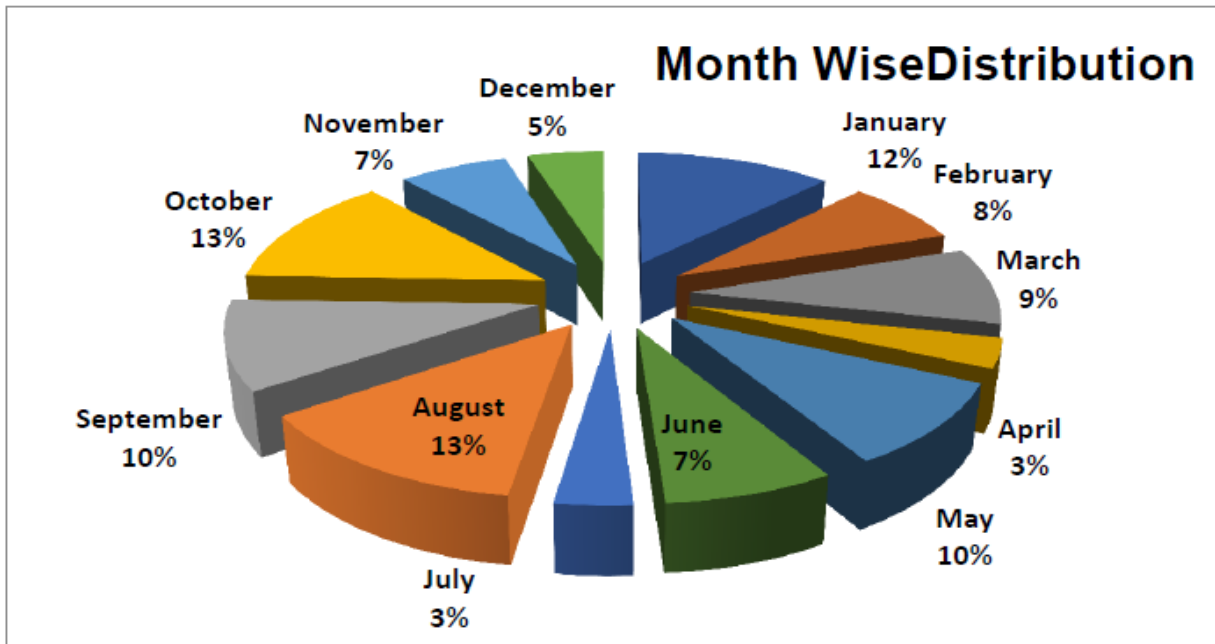


For convenience of distribution the age groups were divided at 10 years interval such as 1-10 years, 11-20 years and so on. The outcome of division highlights majority of victims are between 41-50 years and 51-60 years age group each accounting for 39 cases followed by 31-40 years and 61-70 years age group and least between 1-20 years and 81-90 years age groups.

The highest number of deaths 78 (53.06 %) between 41-60 years is a matter of great loss to the family, society and nation as this age group will pave the way for next generation for the bright future. The studies conducted by Yousaf Zia *et al.*, (2014), mandel BK *et al.*, (2014), had similar statistics. Age group 35-55 is in accordance with Mandel BK *et al.*, (2014) studies.



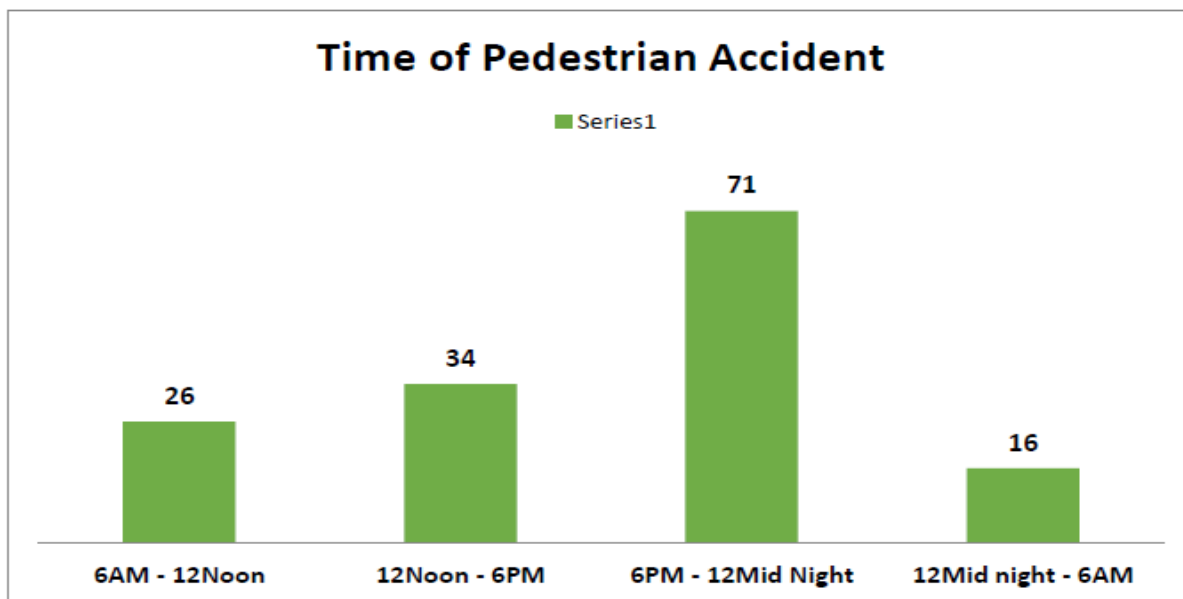
There is not much seasonal variations but majority of reported cases are during rainy season accounting for 34%, the reason could be slippery nature of road for both pedestrians and vehicles, moreover pedestrians will be in hurry in reaching their destinations and crossing the roads to get away from rain.



Most of the pedestrian accidents are from 6PM to 12 Mid night leading to 48% (n=71cases) followed by 12Noon to 6PM, 6AM to 12Noon and least is seen from 12Mid night to 6AM which is in concurrence with other studies such as Pruthi, N. *et al.*, (2012), Kaci L. Hickox *et al.*, (2014), Cobb *et al.*, (1994-1998).

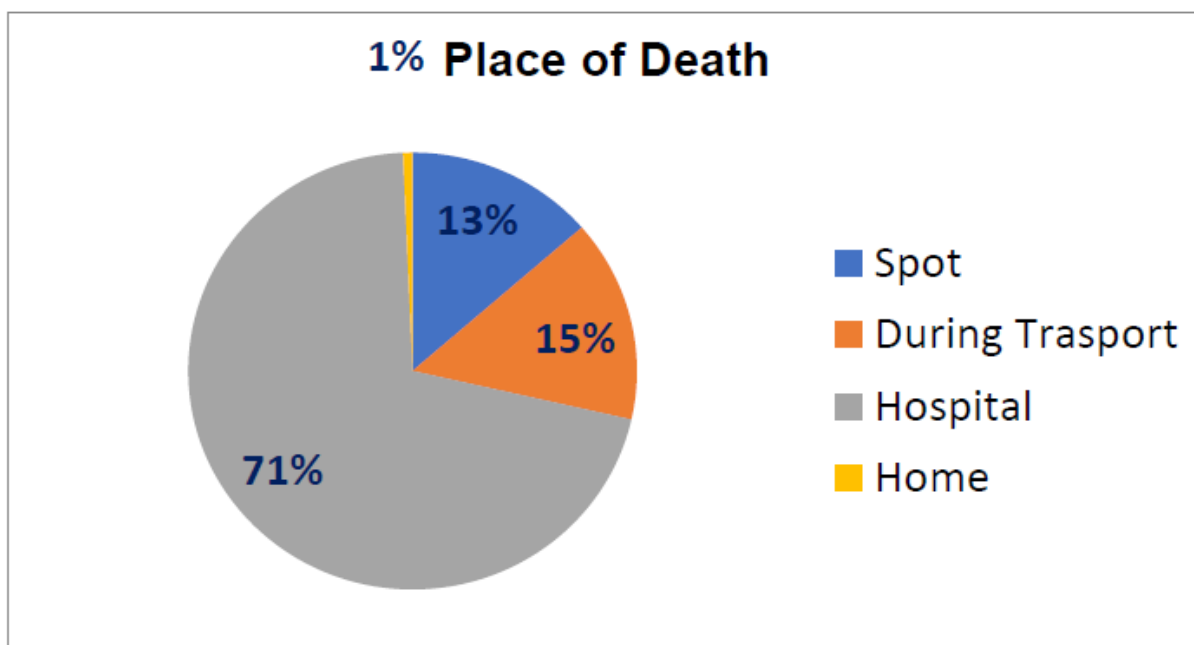
This indicates pedestrian accidents are common in evening and early night hours. Vehicle

traffic during these hours are usually peak and also increased pedestrian traffic and also associated with improper infrastructure facilities like absence of sidewalks, walk overs (pedestrian bridges) to cross the traffic road. Reduced attention of vehicle drivers and pedestrians related to fatigue of day after their day work is contributory factor.



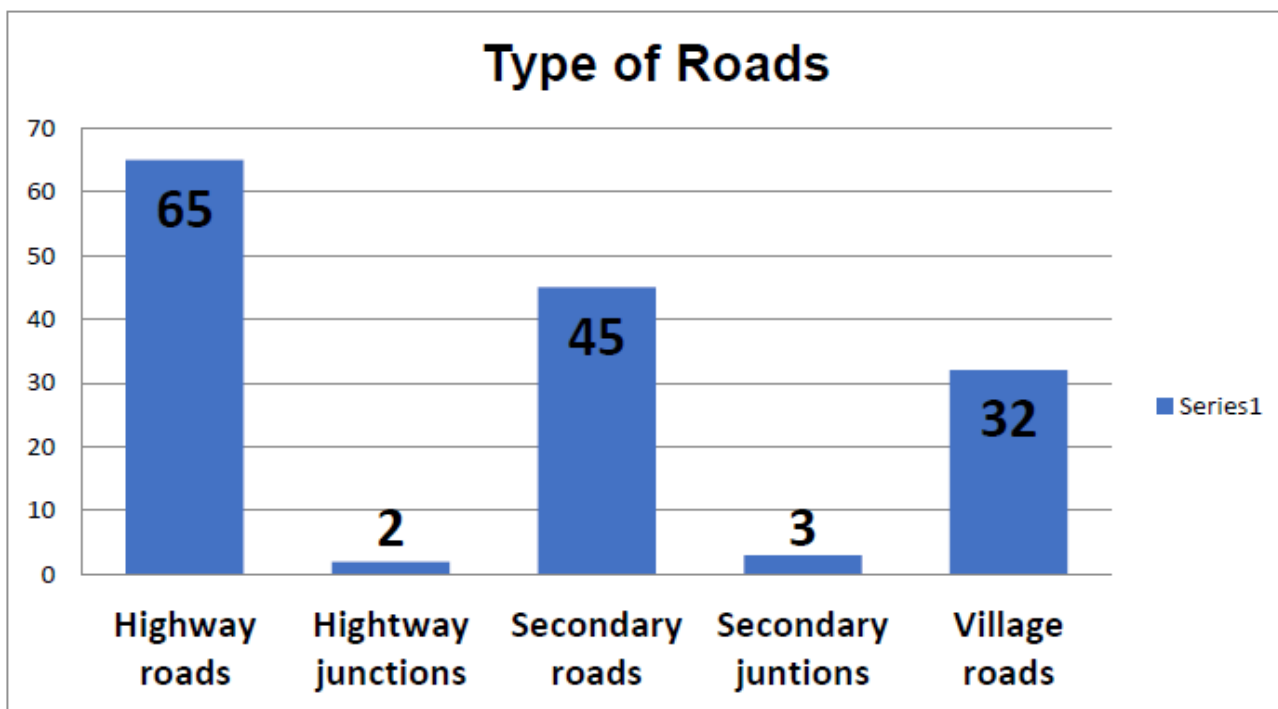
Majority of pedestrians were brought to hospital for treatment accounting for 71% as there are services like 108 service, emergency response service, at our place near to highways and state roads which

reach within 5 minutes from toll free call. 15% of cases died during transport to hospital and 13% died at the spot of accident.



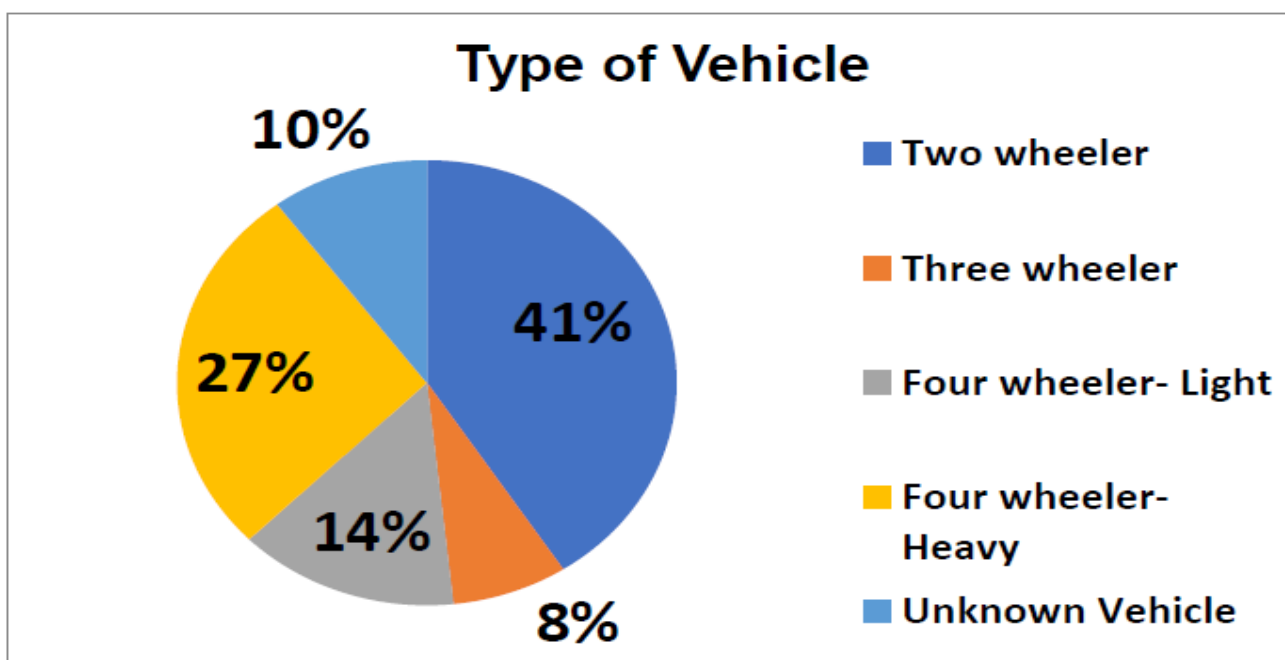
Most of victims sustained trauma on high ways which is 44 % (n=65cases). This can be explained on basis of lengthy highway covering entire city in between residences and highways being most busy roads with heavy traffic load and moreover there are no side lanes in Visakhapatnam city along majority of highway. (Deaths in pedestrians walking along the road account for 35% of cases). Our study shows 45 cases of pedestrian accidents in secondary roads as there are

more intersections of secondary roads with highways, traffic being deviated to secondary roads for quick reach of their destinations. 32 cases of pedestrian accidents were on village roads can be attributed outside city limits, brought to tertiary care hospital for better treatment. As this study shows pedestrians accidents walking across roads is seen in 65% of cases and walking along the roads is seen in 35% of cases.



In this study, 41% (n=60) cases suffered fatalities because of motorized two wheeler vehicles which is consistent with other studies such as Pruthi N. *et al.*, (2012). This may be explained by two wheeler being affordable for large number of people in society and among the vehicles two wheelers are most unstable vehicle when compared with other vehicles leading to more fatalities. Four-wheeler heavy motor vehicles are involved in 27% (n=40) of pedestrian accidents as there are no by passes in Visakhapatnam city, all vehicles

pass through entire length of city along national highway. Four-wheeler light motor vehicles are involved in 14% (n=21) of cases is double edged both on part of driver and pedestrian as majority do not follow rule of the road and lack of awareness on traffic rules. 10% of cases were hit and run by unknown vehicles. 8% of cases involve three-wheeler auto rickshaw vehicles. Similar observations in other studies which are having similar road situations (Pruthi, N. *et al.*, 2012; Mandal, B. K., & Yadav, B. N. 2014).



In present study, all cases showed primary impact injuries. Secondary impact injuries were found

in 47.61% (n=70 cases) and secondary injuries in 97.27% (n=143 cases).

Pedestrian Injuries		
Type of injury	No. of Cases	Percentage
Primary Impact Injuries	147	100
Secondary Impact Injuries	70	47.61
Secondary injuries	143	97.27

CONCLUSION

This present study shows pedestrian accident victims

- Have male preponderance.
- Middle age group is more involved.
- Occur more in rainy season
- Common in late evenings timings
- Two-wheeler vehicles are most commonly involved
- Occur more commonly on highways
- Occur while crossing the road from one end to opposite end
- Most common site of primary impact injury is legs.

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