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RESEARCH ARTICLE

PATTERNS OF HEAD INJURIES IN ROAD TRAFFIC ACCIDENTS-----AN AUTOPSY STUDY

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ABSTRACT

Road traffic accidents (RTA) have been the bane of the modern civilization accounting for considerable loss to the nation. Head injuries are leading causes of death from vehicle crashes with many deaths occurring despite optimal use of the available treatment facilities. Hence the present study was conducted to know the patterns of head injuries in fatal accidents involving vehicles. This study was conducted from 1st sept 2013 to 1st sept 2014 at MGM Hospital attached Mortuary, Aurangabad. The present study entirely focuses on the patterns of head injuries in fatal accidents who were autopsied during this period. A total of 100 cases of deaths due to vehicular accidents were reported for the autopsy. Most victims were male (89%). The age span of 20–60 years comprises 83% of all road traffic accident deaths. The deaths in road traffic accidents were more among married persons, (64%). It was observed that majority of victims involved in road traffic accident 23 cases (62%) were addicted to alcohol. It was observed that incidents leading to maximum number of deaths occurred during 06 PM to 9 PM and 06 AM to 9 AM. Abrasion + contusion +laceration+ crush was the most common combination of injuries sustained by the victims observed in 37cases (37%), Fissured fracture Was commonest pattern of fracture observed in 58% in these accidents. Extradural and subdural hemorrhage was the most common and present in 27 (24.57%) cases.

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INTRODUCTION

Accident represents a major epidemic of non communicable disease in the present century. World health organization has defined accidents as "an unpremeditated event resulting in recognizable damage" (Aggarwal *et al*., 2009). Moreover, fatalities due to road traffic injuries in India are projected to increase by 150% by the year 2020, (Peden *et al*., 2004) with the majority of this increase being among users of motor vehicles.(2,3) A road traffic injury is a fatal or non-fatal injury incurred as a result of a collision on a public road involving at least one moving vehicle. India has experienced rapid growth in motorization in the last decade, with concomitant increases in road traffic injury (RTI) related mortality. (Peden *et al*., 2004; National Crimes Record Bureau, 2006) In many countries, motor vehicle accidents rank first among all fatal accidents. Every year almost 1.3 million people die from road accidents in the world. (K. park The textbook of community medicine) In India data from Ministry of home affairs in 2006 alone shows, over. 105, 700 people died and 452,900 were injured due to road traffic injuries with vehicular users accounting for 17.8% of the fatalities. (Younger man S Head injury, 2004). Head injury associated with traumatic brain injury occurs with an incidence of 20-40 cases per 100,000 populations per year. It is the common cause of death in young adults (age 15-24 years) and is more common in males than females. Head injury is recognized as a major health problem and those due to road traffic accidents accounts for the great majority worldwide. Motor vehicle accidents represents 45 per cent of the causes of head injuries and occurs more frequently in young adults (Younger man S Head injury, 2004) the present study will highlight the magnitude of head injury causing death and also to identify potential, associated risk factors, identifying the variations between deceased people in road traffic accidents. In India, the motor vehicle population is growing at a faster rate than the economic and population growth. The surge in motorization coupled with expansion of the road network has brought with it the challenge of addressing adverse factors such as the increase in road accidents (Aggarwal *et al*., 2009). It was also considered necessary to determine whether factors such as age, sex, time of incidence etc play any role in contributing or predisposing to such fatal head injuries.

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MATERIALS AND METHODS

This is a descriptive cross-sectional study

The inclusion criteria were 100 medico-legal autopsies in which the cause of deaths is head injury in fatal vehicular road traffic accidents and the cases which show multiple injuries to the body along with head injuries would be taken for study. This study was carried out at the PM Centre attached to MGM Aurangabad. The detailed post mortem examination carried out in each case comprised of an external and an internal examination during the Period of Sept 2013 to Sept 2014. The data was entered into MS-Excel data sheet and analyzed using SPSS 17.0 software. The data was presented using descriptive statistics such as frequencies and percentages followed by graphs and charts

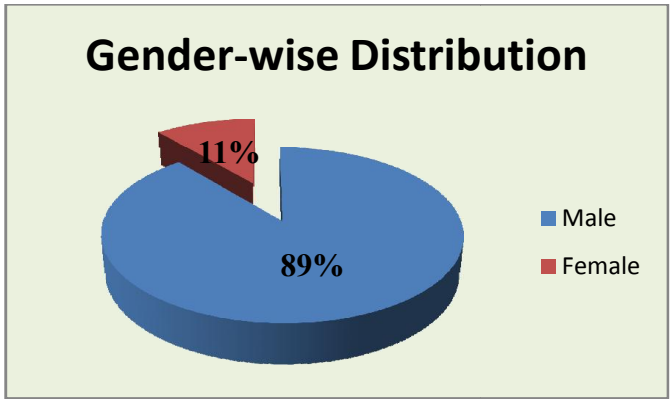
OBERVATION AND RESULTS

A study of total of 100 medico-legal postmortem examinations (autopsies) were performed at the PM Centre. In this study, cases included were the cause of deaths is head injury in fatal vehicular road traffic accidents.

Among the 100 road traffic accident related deaths, 89 were male comprising 89% and 11 were female comprising 11%. The male to female proportion was 8.9**:**1 (Table 1).

Gender wise Distribution

Gender	Frequency	Percent
Male	89	89%
Female	11	11%
Total	100	100%



The age span of 20–60 years comprises 83% of all road traffic accident deaths. The most common age group was 20-40 years and the mean age of the victims was 30 years. (Table 2)

Age-wise Distribution

Age in Years	Frequency	Percent
Below 20	12	12%
20-30	31	31%
30-40	27	27%
40-50	10	10%
50-60	15	15%
Above 60	5	5%
Total	100	100%

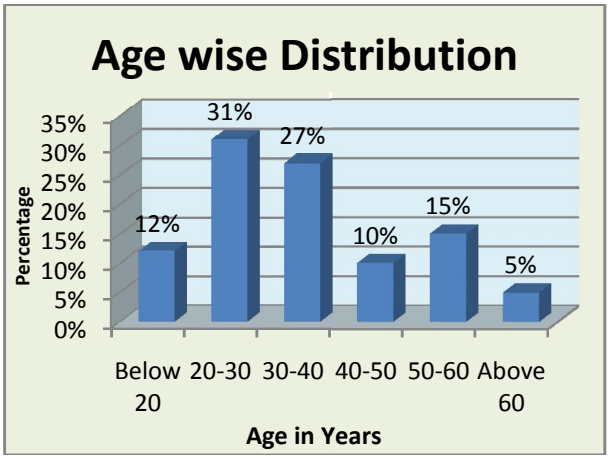


Fig. 2. Percentage of Agewise Distribution

In this study it was observed that deaths in road traffic accidents were more among married persons, cases (64%). The unmarried comprised of cases (26%). In10 cases (10%) the marital status could not be ascertained. (Table 3)

Table 3. Distribution of cases according to marital status

Marital status	Frequency	Percentage
married	64	64%
bachelor	26	26%
Not known	10	10%

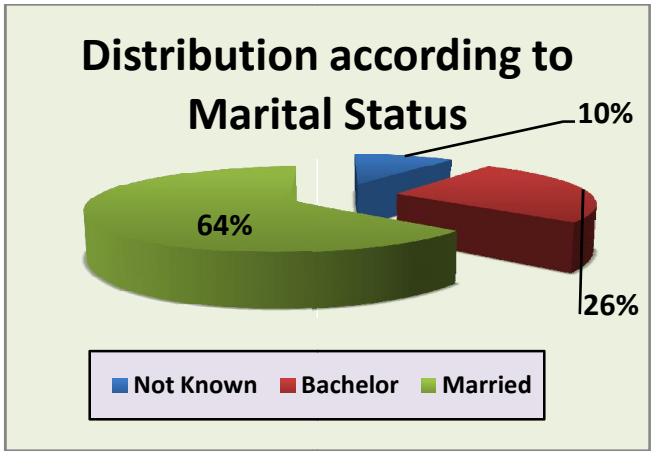


Fig. 3. Distribution of cases according to marital status

It was observed that majority of victims involved in road traffic accident 23 cases (62%) were addicted to alcohol, followed by smoking 4 cases (11%). In 33 cases type of addiction could not be recognized. (Table 4)

Table 4. Distribution According to Addiction

Addiction	Frequency	Percent
Alcohol	23	62%
Smoking	4	11%
Ganja	1	3%
Alcohol+Tobacco	6	16%
Alcohol+Smoking	1	3%
Alcohol+Ganja	1	3%
Tobacco+Smoking	1	3%
Total	37	100%

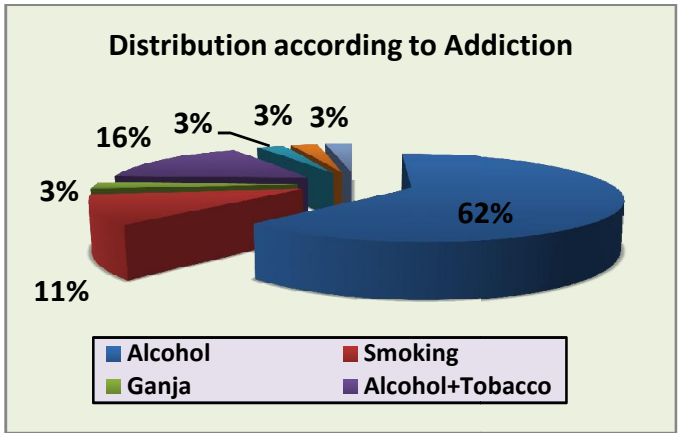


Fig. 4. Percentage distribution according to addiction

It was observed that majority of death occurred in relation to four wheeler-33 cases (33%) followed by bike (motor cycle) which constituted 16 cases (16%). (Table 5)

Table 5. Distribution According to Type of Vehicle

Type of Vehicle	Frequency	Percent
Not known	32	32%
Bi-cycle	5	5%
Bike	16	16%
Four Wheeler	33	33%
Others	10	10%
Bi-cycle + four wheeler	1	1%
Bike + Four wheeler	3	3%
Total	100	100%

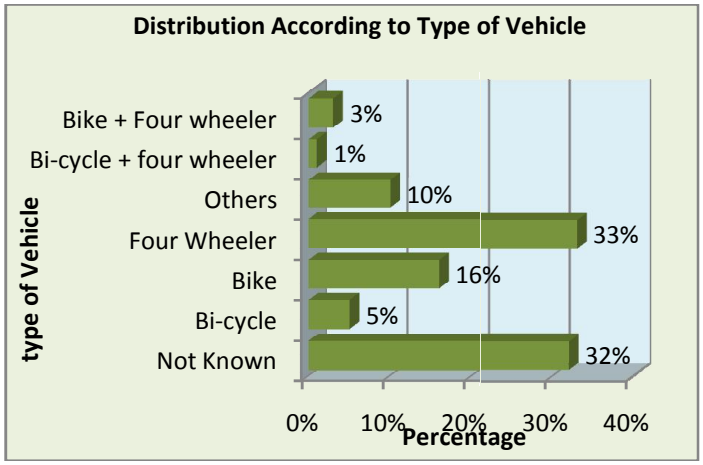


Fig. 5. Percentage of Distribution of type of vehicle

It was observed that incidents leading to maximum number of deaths occurred during 06 PM to 9 PM and 06 AM to 9 AM. These comprise of 21 cases (21%) and 20 cases (20%) respectively. It was observed that the highest cases of road traffic accident deaths (28 cases or 28%) occurred among the pedestrian. Most of the victims (82 %) of road traffic accident excluding spot deaths were brought to the hospital after 1 hour. Within one hour only 10 % victims can reach the hospital. Among the 100 cases, highest number of cases showed injuries to the head, face and neck region comprising 86 cases (86%), followed by injuries in the upper limbs (45 cases or 45%). Abrasion + contusion +laceration+ crush was the most common combination of injuries sustained by the victims; observed in 37cases (37%), followed by a triad of injuries i.e. combination of crush, contusion and laceration; 33 cases (33%). Crush amputation along with (abrasion, contusion and laceration) was observed in 16 cases (16%). Fractures of the skull vault were observed in 99 (99%) cases, distribution as per the types of fracture is summarised in the following table. Fissured fracture alone was observed in 58% cases, whereas skull vault was crush in 11.07% cases. Comminuted fracture was noted in 52 % cases and combination of comminuted fracture with depressed fracture was noted in 7% cases.

Table 6. Distribution According to Fracture of Vault

Fracture of Vault	Frequency	Percent
None	1	1%
Fissured	5	5%
Depressed	13	13%
Comminuted	4	4%
Fissured +Depressed	12	12%
Fissured+Comminuted	11	11%
Fissured + Depressed +Comminuted	30	30%
Depressed + Comminuted	7	7%
Crush	8	8%
Craniotomy / Burrholes / Drain / Other Surgical Procedures	9	9%
Total	100	100%

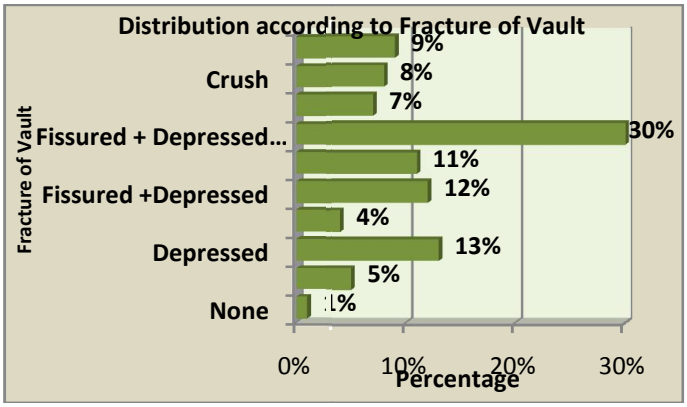


Fig. 6. Percentage Distribution of fracture of vault

Traumatic lesions to the brain were observed in 84 cases (84%). Intracranial haemorrhages were observed in 91 (91%) victims. Following table shows intracranial haemorrhages. Intracranial haemorrhages were seen either in combination or in isolation are summarised. Extradural and subdural hemorrhage was the most common; it was present in 27 (24.57%) cases followed by Extradural hemorrhage with 10 (9.1%) cases. (Table 7)

Table 7. Intracranial hemorrhages

Intracranial hemorrhages	Frequency	Percent
None	2	2%
EDH	10	10%
SDH	3	3%
EDH+SDH	27	27%
SDH+SAH	3	3%
EDH+SDH+SAH	8	8%
ICH	1	1%
Other Combination	34	34%
SHD+SAH+ICH	5	5%
Cerebral Edema	7	7%
Total	100	100%

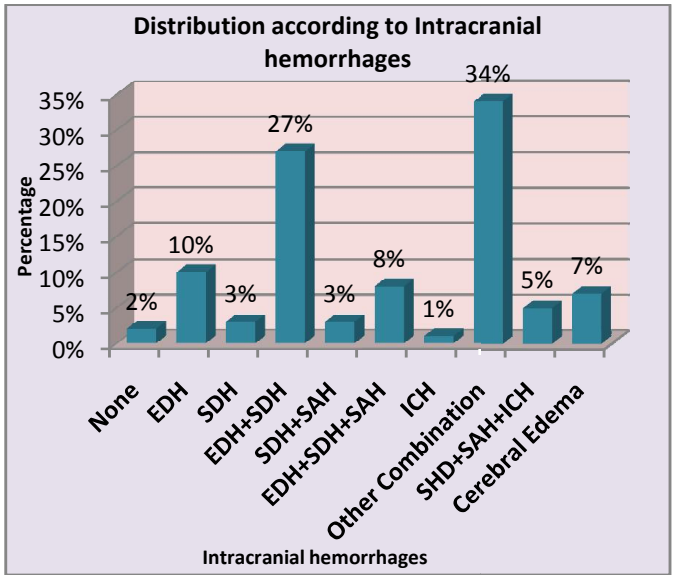


Fig. 7. Percentage Distribution according to intracranial hemorrhages

Internal injuries to thorax were observed in 63 (63%) victims. Fracture of ribs was observed in 20 (12.6%) victims. Injuries to lungs and heart were noted in 22.5 and 3.15% victims respectively. Injuries to the internal organs in the abdominal Cavity was observed in 43 victims (43%). Combination of injury to thoracic and lumbar spine was observed in 3 (1.08%) cases.

DISCUSSION

The major aims of this work were to study various causative factors, external and internal injuries peculiar to vehicular road traffic accidents and to suggest preventive measures. During study period, Out of 100 medico-legal postmortem examinations (autopsies) performed at the centre, 89 % were male and 11% were female The male to female proportion was 8.09**:**1. It is due to greater male exposure on urban streets and similar higher incidence of traffic accidents among males has been found by many other researchers. The most common age group affected in the study was between 21-40 years and is consistent with the studies available from India and other Countries (Chandra *et al*., 1966; Friedman *et al*., 1988; Jha and Aggarwal, 2004; Salgado and Colombage, 1998; Sahdev *et al*., 1994; Sharma, 2001; Meel, 2007) Since the age group 20-40 years is the most active phase of life-physically and socially, and outnumbers the other road users, they therefore accounted for the maximum number of accidental deaths. Also, individuals of this age group were either students or prime bread earners of the family and thus remained outdoors during most of the day. Deaths in road traffic accidents were more among married persons, cases (64%).

In our study, majority of the RTA victims (67%) died on the spot or brought dead to the hospital and 23% died within 24 hours of the accident; 5% victims died within one week and rest 5 % cases expired after one week despite getting adequate treatment. Our findings were well corroborated by Other workers in the field. (Chandra *et al*., 1966; Economic Survey of Delhi 2001-02; Economic Survey of Delhi 2007-08; Murray and Lopez, 1996; Roniao, 2003)

A large proportion of road traffic accidents include four wheeled vehicle and motor cycle as they share traffic in urban road traffic. However, road design and traffic management fail to provide adequate safety to them. In this study 41% victims died during 06 PM to 9 PM and 06 AM to 9 AM. (National Crimes Records Bureau, 2013) These are the peak hours of traveling in Aurangabad. It was observed that the highest injuries were suffered by pedestrians 28 cases (28%), 14 cases of run over (14%) followed by 13 cases (13%) shows injury to the driver. (Roniao *et al*., 2003)

Abrasion + contusion +laceration+crush was the most common combination of injuries sustained by the victims observed in 37 cases (37%), followed by a triad of injuries i.e. combination of crush, contusion and laceration; 33 cases (33%). The fissured fracture was noted in 58% cases and Comminuted fracture was noted in 52% cases. Depressed fracture alone was observed in 13% cases, whereas skull vault was crush in 8% cases.

Intracranial hemorrhages were observed in 91 (91%) victims. Intracranial hemorrhages were seen either in combination or in isolation. Extradural and subdural hemorrhage was the most common, 27 (24.57%) followed by extradural hemorrhage with 10 (9.1%) cases.

Conclusion

Road traffic accidents in Aurangabad result in disproportionately high pedestrian fatalities compared with the other road users. This highlights the need for measures to ensure the safety of pedestrian road users. Although the majority of the road traffic accidents, and fatalities occur in the urban areas of the municipality with high concentration of the population. The immediate implementation of a road safety strategy is recommended for the reduction of the high pedestrian. Road traffic policies such as pedestrian friendly paths, separate lanes for light motor vehicles and heavy motor vehicles, and strict implementation of traffic rules and regulations may decrease the incidence of road traffic accidents and its fatalities. Head injury due to road traffic accident is major public health problem causing death among the population of our country. So the immediate action should be taken by concern authority. Awareness to public regarding importance of public regarding the importance of golden hour and prompt transportation of victims to specialized trauma centres. Establishment of help line and support centers in coordination with emergency response team to reduce the morbidity.

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