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Pattern of pedestrian injuries during road traffic accidents in autopsied cases at Belgaum institute of medical sciences, Belagavi

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Abstract

A cross sectional study was conducted at Dept. of Forensic Medicine and Toxicology, Belgaum Institute of Medical Sciences, Belagavi for a period of one and half yrs. from November 2013 to April 2015, on the pattern of injuries among pedestrian deaths autopsied at Belgaum Institute of Medical Sciences hospital, Belagavi. During the study period of one and half yrs., 2670 cases of road traffic accident were admitted/brought dead to BIMS hospital, out of which 255 cases expired, thus mortality rate being 9.6%. Out of 255 Road traffic accident cases autopsied, 82 cases (32.1%) were pedestrians.

Keywords: Pedestrians, accidents, autopsy, mortality

Introduction

Traffic accident is an unexpected incident with potential for harm occurring through the movement or collision of vehicle. They are human tragedies that involve high suffering and monetary costs in terms of untimely deaths, injuries and loss of potential income. WHO defines Road Traffic Accident (RTA) as an event occurring on a street, road or highway, in which at least one motor vehicle in motion is involved by collision or losing control, and which causes physical injury or damage to property ^[1]. They are no longer considered accidental; rather they are part of the price we pay for technological progress. It is a counter product of urbanisation and hasty life and is considered as a modern day epidemic. A pedestrian is any person involved in a transport accident who was not at the time of accident, riding in or on a motor vehicle, rail road train, street car, animal-drawn or other vehicle, or on a bicycle or animal ^[2]. The patterns of injuries sustained by pedestrians can be grouped as (i) Primary impact injuries (ii) Secondary impact injuries (iii) Secondary injuries (iv) Crush injuries ^[3]. Analysis of the trend of pedestrian injuries will help in planning the preventive and remedial measures.

Materials and Methods

A Cross sectional study was conducted from November 2013 to April 2015, on the pattern of injuries among pedestrian deaths autopsied at Belgaum Institute of Medical Sciences hospital, Belagavi. Information about the pattern of injuries sustained by the deceased was obtained from hospital case records (in admitted cases) and post mortem findings. The socio demographic profile of the deceased was obtained from police records and from the relatives of the deceased.

Inclusion criteria

All cases of pedestrian deaths due to road traffic accidents autopsied at BIMS hospital, Belagavi.

Exclusion criteria

Other road traffic accidents cases autopsied at BIMS hospital Belagavi during the study.

Observation and Results

During the study period 1172 cases were autopsied at BIMS, Belagavi out of which 255 cases (21.75%) Table 1, were due to road traffic accidents and out of the 255 cases of road

traffic accident deaths, 32.1% (82 cases) table 2, were pedestrians. Among the 255 cases of road traffic accident deaths that were autopsied, 82 cases were pedestrians, constituting 32.1% of pedestrian deaths, 76 were occupants of 2 wheelers (29.8%), 66 (25.9%) were 4 wheeler occupants and 31 (12.2%) 3 wheelers (table 2). The male-female ratio among pedestrian deaths was 3:1 (table 3) and majority of the victims among the 82 cases of pedestrian deaths were in the age group of 40-60 yrs. (46% table 4). Among the pattern of injuries sustained by the pedestrians, 83% (68) cases had head injuries, 25 cases had abdominal injuries, 41 cases had chest injuries and in 42 cases injuries were seen in extremities (table 5). Abrasion was the most common external injury seen in 76 cases (table 6). Head injury was the commonest cause of death seen in about 54% of cases followed by shock and haemorrhage involving multiple vital organs was the cause of death in 30.5% cases (table 7). The most common offending vehicle resulting in

pedestrian death in the present study was a two wheeler with 18 cases (22%), followed by car with 16 cases (19.5%), heavy four wheelers (bus, truck, minivan, tractor) accounting for 19 cases (23.2%). Hit and run cases where the offending vehicle could not be traced amounts for 34.1% (28 cases) (table 8).

Among 82 pedestrian deaths, maximum deaths 38 (46.3%) happened in the outskirts (Belgaum rural area with kaccha roads), followed by 25 deaths (30.5%) on highways and 19 deaths (23.2%) occurring on intra city roads (table 9). During the study period of one and half yrs., 2670 cases of road traffic accident were admitted to BIMS hospital, out of which 255 cases expired, thus mortality rate being 9.6%. This data shows that timely medical aid saved 90% of lives in road traffic accidents.

Tables

Table 1: Showing profile of medico legal autopsies conducted during the study

| Type of case | No. | Percentage |
|---|------|------------|
| Road traffic accidents | 255 | 21.75% |
| Others (asphyxia, burns, poisoning, assault etc.) | 917 | 78.25% |
| Total | 1172 | 100 |

Table 2: Showing profile of deaths among victim of road traffic accidents

| Type of victim | No. | Percentage |
|----------------|-----|------------|
| Pedestrian | 82 | 32.10% |
| 2 wheeler | 76 | 29.80% |
| 4 wheeler | 66 | 25.88% |
| 3 wheeler | 31 | 12.15% |
| Total | 255 | 100 |

Table 3: Showing sex wise distribution of pedestrian deaths

| Sex | No | Percentage |
|--------|----|------------|
| Male | 62 | 75.6% |
| Female | 20 | 24.4% |
| Total | 82 | 100 |

Table 4: Showing age wise distribution of pedestrian deaths

| Age of pedestrian | No. of cases | Percentage |
|-------------------|--------------|------------|
| 0-10 yrs. | 3 | 3.7% |
| 10-20 yrs. | 0 | 0.0% |
| 20-30 yrs. | 10 | 12.2% |
| 30-40 yrs. | 12 | 14.6% |
| 40-50 yrs. | 17 | 20.7% |
| 50-60 yrs. | 21 | 25.6% |
| 60-70 yrs. | 15 | 18.3% |
| 70-80 yrs. | 3 | 3.7% |
| 80-90 yrs. | 1 | 1.2% |
| Total | 82 | 100 |

Table 5: Injuries

Table 5(a): 68 cases of head injury

| Type of head injury | No. of cases | Percentage |
|--|--------------|------------|
| Intra cranial hemorrhage + fracture of skull | 42 | 61.8% |
| Intra cranial hemorrhage | 26 | 38.2% |
| Total cases of head injury | 68 | 100 |

Table 5(b): 25 cases of abdominal injuries

| Type of abdominal viscera injured | No. of cases | Percentage |
|---|--------------|------------|
| Only liver | 9 | 36% |
| Only spleen | 4 | 16% |
| Liver + spleen | 5 | 20% |
| Liver + spleen + mesenteric vessels + intestine (crush) | 7 | 28% |
| Total | 25 | 100 |

Table 5(c): 41 cases of thoracic injuries

| Type of thoracic viscera injured | No. of cases | Percentage |
|----------------------------------|--------------|------------|
| Lungs + fracture ribs | 30 | 73.2 |
| Lungs only (contusions) | 7 | 17.2 |
| Lungs + ribs + heart(crush) | 4 | 9.6 |
| Total | 41 | 100 |

Table 5(d): 42 cases of skeletal injuries

| Skeletal injury to extremities | No. of cases | Percentage |
|--------------------------------|--------------|------------|
| Upper limb | 13 | 31% |
| Lower limb | 29 | 69% |
| Total | 42 | 100 |

Table 6: External injuries

| External injuries | No. of cases | Percentage |
|-----------------------------------|--------------|------------|
| No external injuries | 3 | 3.7 |
| Only abrasion | 16 | 19.5 |
| Abrasion + contusion | 7 | 8.5 |
| Abrasion + laceration | 35 | 41.4 |
| Contusion + laceration | 3 | 3.7 |
| Abrasion + contusion + laceration | 11 | 13.4 |

Table 7: Cause of death

| Cause of death | No. of cases | Percentage |
|--|--------------|------------|
| ICH (Only intra cranial hemorrhage) | 16 | 19.51 |
| CCI: (Intra cranial hemorrhage + skull fractures) | 28 | 34.15 |
| SH (Where more than one vital organ is involved) | 25 | 30.49 |
| NS (Crush injury involving viscera of all three vital systems) | 08 | 9.76 |
| RF(Fracture ribs & injury to lungs) | 04 | 4.88 |
| Septiciemia | 01 | 1.21 |
| Total | 82 | 100 |

Table 8: Showing offending vehicle wise distribution of pedestrian deaths

| Type of vehicle | No. of cases | Percent |
|---------------------|--------------|---------|
| Two wheeler | 18 | 22.0 |
| Car | 16 | 19.5 |
| Heavy four wheelers | 19 | 23.2 |
| Three wheeler | 1 | 1.2 |
| Hit and run | 28 | 34.1 |
| Total | 82 | 100 |

Table 9: Showing distribution based on type of road on which pedestrian deaths occurred

| Type of road | No. of cases | Percentage |
|--------------------|--------------|------------|
| Out skirts of city | 38 | 46.34 |
| Highways | 25 | 30.49 |
| Intra city | 19 | 23.17 |
| Total | 82 | 100 |

Discussion

A prospective study conducted on pattern of pedestrian injuries among autopsied cases at Belgaum institute of medical Sciences, Belagavi revealed that among 255 cases of road traffic accidents, most common victims were pedestrians 82 cases (32.1%) followed by occupants of two wheelers 76 cases (29.8%), then occupants of 4 wheelers (car, van, bus, truck) 66 cases (25.9%) and 31 cases of 3 wheeler occupants. This data shows the vulnerability of pedestrian was high in road traffic accidents, mainly due to not following existing traffic rules by both pedestrians and drivers of vehicles. This data was similar to the prospective studies conducted by Khubchandani *et al.* [4] and by Farooqui JM *et al.* [5] at Loni. However a retrospective study conducted at KMC Manipal, by Kanchan T *et al.* [6] showed most common victims (43%) were 2 wheelers riders followed by pedestrians (33%).

Among 82 cases of pedestrian deaths, male:female ratio is 3:1 which shows almost 3/4th victims of pedestrian deaths are males. This is mainly because males are by and large more ambulant than females. The majority of the victims are in the age group 40-60 yrs. age group constitutes about 46%. This age group which is laden with immense stress of managing the full-fledged family, and thus are more ambulant and susceptible. The findings in this regard were similar studies conducted by Harnam Singh *et al.* [7] & Khubchandani *et al.* [4] and contrasting results were noted in studies conducted by Vestrup *et al.* [8]. Our studies show that more than 80% of victims had head injuries and was also the contributing factor for the cause of death in the pedestrians, the reason being, irrespective of the site of primary impact by any vehicle, as the pedestrian is suddenly and unexpectedly thrown on to hard ground (hard stones on the

kaccha road or hard surface of the high way) there is more susceptibility to sustain head injuries. The outcome of our study was similar to studies conducted by Umaru H *et al.* [9], and Harnam Singh *et al.* [7] & Khubchandani *et al.* [8]. The studies conducted in European countries by Vestrup *et al.* [8] & carlos *et al.* [10] showed thoracic & spinal injuries to be the commonest. Among the offending vehicles which have led to death of 82 pedestrians, in about 1/3rd of the cases (34.1%) the offending vehicle was not traced as they were hit and run cases. Among the vehicles that could be traced, heavy 4 wheelers (bus, truck, tractor) were main culprits in 19 cases, closely followed by 2 wheelers and car in 18 and 16 cases respectively. This data shows that 4 wheelers in general have contributed for about 43% of deaths. The outcome of the study was similar to most of the study results by, Harnam Singh *et al.* [7] and Khubchandani *et al.* [4]. Majority of deaths due to 4 wheelers had happened on highways which show that the highway crossing by the pedestrians is extremely dangerous as specific rules are not followed while crossing. Among 82 pedestrian deaths, majority of deaths have happened on the kaccha roads on the outskirts of the city 38 cases (46.34%), followed by highways 25 cases (30.5%) and 19 cases within the city (23.2%).

Conclusion

Road traffic accidents (RTA) represent a major epidemic of non-communicable disease in the present century. According to a report on by WHO on prevention strategies, the total number of RTA related deaths and injuries worldwide would have risen by 65% between 2000 to 2020 if efforts in prevention with new initiatives were not intensified [11]. India accounts for as high as 6% of the world's RTA, although it has only 1% of the world's vehicle. The above data shows, deaths due to road traffic accidents in urban areas are definitely on the rise but the more worrying factor is the threat posed to innocent pedestrians in such incidents. Accidents in general are preventable happenings, the solution for which is definitely in our hands. As the study clearly shows, timely medical help can prevent mortality to the extent of 90%, thus making fast and prompt accessibility of medical aid for the victims of road traffic accidents goes in a long way in preventing both morbidity and mortality. It is in the best interest of the pedestrians to construct over bridges or under pass for movements at all major junctions of the city. Foot paths which already exist in the city should be widened and strictly be meant only for pedestrians, not for parking vehicles or street vendors.

As the present study shows that hit and run cases are in majority, this fact emphasizes on the moral and conscious effort of the offender in providing the minimal medical assistance to the victim. Barring which the law has to have tight clutches in finding such offenders which will be possible by installing long range CC TV cameras all along the highway hotspots as eye witnesses in such cases are very less and those who have witnessed will never come forward to give evidence. Last but not the least, to follow or not to follow the existing rules, to feel guilty of causing injury or death of another person, to take moral responsibility in imbibing the values of human life in to the minds of children by parents, all in all a conscious human effort by heart and mind is the basic necessity in preventing such untimely deaths.

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