

PATTERN AND DISTRIBUTION OF INJURIES IN FATAL ROAD TRAFFIC ACCIDENTS IN ROHTAK (HARYANA)

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ABSTRACT

Accidents are now one of the major causes of death. In this study pathological features of these cases as type of injury, pattern and distribution of injuries, body parts involved, fatal injuries and cause of deaths were noted at the actual autopsy examination of victim. All the data thus collected was analyzed statistically.

KEYWORDS: Stab wound, homicidal, suicidal, critical analysis.

INTRODUCTION

The term accident has been defined as an occurrence in the sequence of events which usually produces unintended injury death or property damage [1]. Among all types of accidents, those caused by motor vehicles claim the largest toll of life and tend to be most serious. There are almost 885,000 deaths from road accidents annually and total casualties number goes up to 10 million. 80,000 people were killed in 1998 in road accidents in India as compared to 60,000 in 1991, 40,000 in 1986. Studies done by WHO show that road accidents account for 2.5% of total deaths. But in age group of 5-44 years, it is as high as 10% and is among six leading causes of death [1]. According to study conducted by National Transportation Planning and Research Centre, Delhi a person is killed or injured in every 4 minutes in traffic accidents in India.

Accidents constitute a complex phenomenon of multiple causation. The etiological factors are classified into human and environmental factors [2]. There is a steep rise in vehicular accidents in present era due to urbanization and tremendous growth in road transport sector. Population explosion is a catalyzing factor for a number of accidents. The important human factors could be lack of adequate traffic planning and consumption of alcohol.

The present study has been carried out regarding the various epidemiological, medicolegal aspects of vehicular accidents in our country making an attempt to establish various causative

factors, pattern and distribution of injuries and thereby to plan successful measures against it.

MATERIAL AND METHODS

450 cases of fatal road traffic accidents brought to mortuary of Department of Forensic Medicine, PGIMS, Rohtak during one year period 20.05.2000 to 19.05.2001 comprised the material for the present study. Various demographic and epidemiological characters related to victim's accidents were gathered from police records or by direct interrogations of the police officials, or relatives and friends of deceased accompanying dead bodies. The pathological features of these cases as type of injury, pattern and distribution of injuries, body parts involved, fatal injuries and cause of deaths were noted at the actual autopsy examination of victim. All the data thus collected was analyzed statistically.

RESULTS

450 fatal road accidents which occurred during one year period, constituted 29.8% of total medicolegal deaths autopsied (1510) during same period.

1. Types of Road user killed in road accidents
Pedestrians were the commonest group of victims involved, comprising 28.7% cases, followed by occupants of cabs and jeeps (25.8%) and motor cyclists (23%).

2. Age and Sex group involved in road accidents
The commonest age group involved was 21-30 years (27.3%) followed by 31-40 years (20.6%) and

11-20 years (17.3%) males out- numbered females in ratio 9: 1. Two third of cases were in age group of 11-- 40 years.

Table 1: Age and sex distribution of cases (n=450)

Age gp (years)	Males		Females		Total	
	Cases	%	Cases	%	Cases	%
0-10	27	6.7	8	16.7	35	7.8
11-20	76	18.9	2	4.2	78	17.3
21-30	110	27.4	13	27.1	123	27.3
31-40	91	22.6	2	4.2	93	20.6
41-50	46	11.4	8	16.7	54	12.0
51-60	28	6.9	9	18.7	37	8.3
61-70	20	5.0	5	10.4	25	5.6
71-80	3	0.8	1	2.0	4	0.9
81-90	1	0.3	0	0	1	0.2
91-100	0	0	0	0	0	0
Total	402	100	48	100	450	100

Table 2: Distribution of cases according to place of accident (n=450)

Place of accident	Cases	%
National highway	142	31.6
State Highway	122	27.1
City roads	77	17.1
Village roads	78	17.3
Approach roads	31	6.9
Total	450	100

3. Place of accidents

31.6% cases occurred on National Highways and 27.1% cases occurred on State Highways.

4. Seasons and time of occurrence of accidents
Maximum cases occurred in winter 46.23% and between 8-10 A.M. (14.9%) followed closely by 6-8 P.M. (24.7%) and 12-2 P.M. (13.1 %) respectively.

5. Vehicles responsible for accidents

Heavy vehicles were commonest offenders, responsible for 38.9% fatalities followed by cars and jeeps (30.4%) cases.

6. Road accidents, causes and factors

The factor of human error is most significant (74.4%) in which drivers were at fault in majority of cases (55.6%) as against fault of other on road comprising just 18.8% cases. Out of 104 motor cyclists only one was wearing helmet. None of the occupants of cars used protective seat belts.

7. Site of injury

Multiple body parts were involved in each case. Counted together extremity injuries outnumbered others (78.5%). Next were head and face 77.6%, chest 44%, abdomen 31.8% and neck 12.9% of all cases. Total injuries seen in 450 victims were 1,603, injury per case 3.5 whereas total of 1,107 major injuries were seen, injuries per case being 2.4.

8. Type of injury

Fractures, dislocation and lacerations were commonest seen in 89.1 % and 88.8% cases followed by abrasions (84.4%).

9. Fatal injuries

In 450 subjects, 664 injuries or group of injuries were believed to be fatal or contributing to death. Fatal injury per case being 1.4. Head injury was dominant in all road users (50.4%) followed by multiple injuries (15.8%) and thoraco-abdominal injuries (7.6%).

10. Time required to reach hospital (Table 3)

4.2% cases reached hospital within first 15 minutes, 15.4% died on the spot and were not brought to hospital 24% reached within half an hour and 57% reached in next one hour and remaining 19% were rushed to hospital in more than one and half hours. No one received any treatment or first aid at the site of accident.

11. Survival period

Table 4 shows cumulative percentage of dead by various times after accident. Altogether, 39.5% victims had succumbed within 1 hour, 2/3rd (67.8%) by 12 hours, 3/4th (77.1%) by 48 hours and 90% by one week and 97.7% within two weeks. The longest survival period was 30 days and 15 hours.

12. Major regional injuries in different road users

Head injuries were seen in 77.6% of cases. Fracture of Skull and face seen in 51.6% cases which were commonest in motorcyclists and pedestrians, Subdural haematoma was most frequent intracranial haematoma seen in 44.7% cases followed by subarachnoid haemorrhage in 34.7% cases, contusions and laceration of brain were seen in 24.2% cases and herniation of brain was seen in 12.2% of cases. Cervical spine injury was seen in 12.9% cases.

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Table 3: Time required to reach hospital (n=450)

Time reqd to hospital	Pedestrian	Scoterist	Cyclist	Occupant of car/jeep	Occupant of MTV	Occupant of HTV	Others	Unknown	Total
<15 min	9 (7)	7 (6.7)	3 (9.4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	19 (4.2)
15-30 min	22 (17)	20 (19.2)	6 (18.8)	15 (12.9)	4 (21.1)	3 (15)	3 (17.6)	0 (0)	73 (16.2)
30-45 min	27 (20.9)	23 (22.1)	9 (28.2)	22 (18.9)	2 (10.5)	1 (5)	1 (5.9)	2 (15.4)	87 (19.3)
45-60 min	16 (12.4)	13 (12.5)	1 (3.1)	13 (11.2)	2 (10.5)	2 (10)	4 (23.5)	1 (7.7)	52 (11.6)
1-1½ hrs	20 (15.5)	17 (16.4)	5 (15.6)	22 (18.9)	1 (5.3)	6 (30)	4 (23.5)	3 (23.0)	78 (17.3)
1½-2 hrs	9 (7)	3 (2.9)	0 (0)	11 (9.5)	4 (21.0)	0 (0)	1 (5.9)	1 (7.7)	29 (6.4)
2-2½hrs	8 (6.2)	2 (1.9)	1 (3.1)	5 (4.3)	2 (10.5)	1 (5)	1 (5.9)	1 (7.7)	21 (4.7)
2½-3 hrs	1 (0.8)	3 (2.9)	1 (3.1)	3 (2.7)	0 (0)	0 (0)	1 (5.9)	0 (0)	9 (2)
>3 hrs	3 (2.3)	3 (2.9)	1 (3.1)	3 (2.7)	0 (0)	0 (0)	1 (5.9)	2 (15.4)	13 (2.9)
Spot deaths	14 (10.9)	13 (12.5)	5 (15.6)	22 (18.9)	4 (21.0)	7 (35)	1 (5.9)	3 (23.1)	69 (15.4)
Total	129	104	32	116	19	20	17	13	450

Table 4: Deaths at different time after road accidents (survival period) (n=450)

Survival period	Pedestrian	Scoterist	Cyclist	Occupant of car/jeep	Occupant of MTV	Occupant of HTV	Others	Unknown	Total
0-½ hr	40 (31.1)	34 (32.7)	15 (46.9)	53 (45.7)	11 (57.8)	9 (45)	8 (47.1)	3 (23.1)	173 (38.4)
½-1hrs	1 (0.8)	1 (0.9)	0 (0)	1 (0.9)	0 (0)	1 (5)	1 (5.9)	0 (0)	5 (1.1)
1-6 hrs	29 (22.5)	15 (14.4)	9 (28.1)	24 (20.7)	4 (21.0)	5 (25)	4 (23.5)	3 (23.1)	93 (20.7)
6-12 hrs	11 (8.5)	9 (8.7)	1 (3.1)	9 (7.8)	0 (0)	2 (10)	1 (5.9)	1 (7.7)	34 (7.6)
12-24 hrs	7 (5.4)	5 (4.8)	0 (0)	1 (0.9)	1 (5.3)	0 (0)	0 (0)	1 (7.7)	15 (3.3)
24-48 hrs	6 (4.7)	11 (10.6)	2 (6.3)	6 (5.2)	1 (5.3)	0 (0)	1 (5.9)	0 (0)	27 (6.0)
48-72 hrs	4 (3.1)	7 (6.7)	1 (3.1)	3 (2.5)	0 (0)	0 (0)	0 (0)	0 (0)	15 (3.3)
3-5 days	11 (8.5)	10 (9.6)	2 (6.3)	7 (6.0)	1 (5.3)	1 (5)	0 (0)	1 (7.7)	33 (7.3)
5-7 days	4 (3.1)	3 (2.9)	0 (0)	4 (3.4)	0 (0)	0 (0)	1 (5.9)	1 (7.7)	13 (2.9)
7-14 days	11 (8.5)	9 (8.7)	1 (3.1)	7 (6.0)	1 (5.3)	1 (5)	0 (0)	2 (15.3)	32 (7.1)
>14 days	5 (3.8)	0 (0)	1 (3.1)	1 (0.9)	0 (0)	1 (5)	1 (5.9)	1 (7.7)	10 (2.2)
Total	129	104	32	116	19	20	17	13	450

Figures in brackets shows percentage of cases in each group of road user.

Chest injuries were present in 44% cases and included fracture of ribs 36.9% cases, rupture of diaphragm 2% cases only and contusions and laceration of lungs in 29.8% cases.

Abdominal injuries were seen in 31.8% cases and included laceration of liver (26.9%), spleen 12.7%, gut 4.7%, kidneys 3.8%, bladder 2.9%, fracture of upper limbs 25.6% cases and both bone forearm 26% cases. Fracture of lower limbs was seen in 42.2% cases.

13. Cause of death

Shock and haemorrhage was most common cause of death (36.9%) followed by intracranial hemorrhages (19.6%) and severe brain injury (14.0%).

DISCUSSION

Motor vehicle accidents rank first among all total accidents throughout the world. In year 2000-2001, a total of 1,510 cases were brought for P.M.

examination to this department, out of which 450 cases were due to road accident deaths constituting 29.8% cases. This finding is in accordance with Srivastav and Gupta [8]. The most common age group involved is 21-30 years and males outnumbered females in ratio of 9:1. Two third of cases are in age group of 11-40 years. These findings are similar to studies conducted by McCarrol et al [4], PK Ghosh [10] and Tirpude et al [3].

National and State Highways account for majority of accidents as seen by Srivastav and Gupta [8] Majority of cases occurred in winter due to foggy weather, at times when movement on roads is more i.e. 8-10 A.M., 12-2 P.M., 4-6 P.M. as people went out for schools, offices and other activities at these times. Similar trends were seen by Norman [2].

Pedestrians are commonest group of victims involved comprising 28.7% followed by occupants of car and jeeps (26.8%). Similar trends

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were seen by Sevitt [5], Chandra et al [6], Galloway and Patel [7], Srivastav [8], Maheshwari [9], Tirpude et al [3].

Measures against road accidents

As illustrated above there are many causative factors involved in road accidents which include interactions by road users, vehicle and road environment. So a multidimensional approach is the need of the hour.

Road: This includes maintaining existing roads, improving road surface, removing obstacles, constructing guards, rails, proper signs and widening or narrow sections of roads. There should be good road lighting and segregation of slow moving vehicles, pedestrians from highways and use of Zebra crossing, sub ways for pedestrians.

Vehicles: Vehicles design to improve visibility and protection in event of crash, restraining devices as seat belts compulsorily present and proper maintenance of vehicle and regular inspection of vehicles.

Road Users: should be properly trained by authorised centers, medically fit and mentally alert, issuing licenses after strict testing of driving skills, medical fitness "and periodic review of driving skills specially annual medical examination of drivers above 50 years of age.

Administrative Measures: Enforcing traffic rules strictly, proper legislation to avoid drunken driving and in repetitive offenders' license should be cancelled. Establishment of statutory body for prevention of road traffic accidents is necessary.

Emergency medical care: There should be traffic aid posts at suitable distances on the highways to assist injured in case of accidents and quick transport of injured. Policeman at such posts should be trained in first aid procedures and ambulance with para-medical staff, oxygen, and life saving drugs at strategic points must be ready. Hospitals along major highways should be equipped with experienced surgical team, trauma centers with integrated facility of surgical, orthopedics and neuro-surgical, anesthetic experts with modern investigative procedures as C.T. Scan and Blood Banks is best solution for treatment. Modern rehabilitation measures for injured victims form an essential part of casualty service.

The single most important thing a person can do to stay healthy and alive is to pay close

attention to the way he or she drives or walks. Traffic safety education should be given in schools for production of skilled and responsible drivers in future. Members of public should take part in planning traffic Circulation and in designing living areas for benefit of residents. Schools should be located away from traffic. Attempts should be made to reduce travel and if travel is necessary public transport system should be available.

There is no Panacea that will prevent road traffic accidents, what is required is an organized team work by people in many disciplines like education, engineering, medical, law enforcement agencies for effective prevention of road accidents.

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