



**PATTERN, DISTRIBUTION AND FATALITY OF INJURIES IN ACCIDENTAL DEATHS OF TWO-WHEELER RIDERS IN HARYANA**

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**ABSTRACT**

The present study was conducted in the mortuary of Pt. Bhagwat Dayal Sharma Post-Graduate Institute of Medical Sciences, Rohtak Haryana. 100 autopsy cases were taken who died due to two-wheeler accident. Data was collected and analyzed statistically. It was observed that most commonly involved age group was between 21-30 years involving the 28 victims (28%); out of two-wheeler riders/ pillion riders accidental deaths the male occupants constituted nearly ¾ (73.9%). Probable most common cause of accident in the study population was rash and negligent driving by the drivers of the offending vehicles (63.0%). Abrasions were the most common type of injuries noticed in 89% of the cases; however, head injury was the most common fatal injury comprising 65% of the total cases.

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**INTRODUCTION**

The term accident has been defined as an “occurrence in a sequence of events which usually produces unintended injury, death or property damage”. It’s a major epidemic of non-communicable disease in the present century. In India, road traffic accidents constituted about 45% of total unnatural causes of death in the year 2010.<sup>1</sup> Injuries from road traffic accidents are the third most common cause of disability worldwide and the second most common cause of disability in the developing countries.<sup>2</sup> This study basically deals with accident involving two-wheelers because it is commonly used vehicles for personal transport throughout the world. Injuries caused due to two-wheeler accidents have a certain pattern. So this study was planned to indentify the pattern, distribution and fatality of injuries in accidental deaths of two-wheeler riders so that we should understand various causative factors of such accidents and to suggest the preventive measures to avoid and decrease the fatality in these cases.

**Aims and Objectives**

The present study was undertaken with the following aims and objectives:-

1. To know the pattern and distribution of injuries in cases of accidental deaths of two-wheeler riders.
2. To know the fatal injuries in cases of accidental deaths of two-wheeler riders.

**MATERIAL AND METHODS**

The present study was conducted in the Department of Forensic Medicine, Pt. B. D. Sharma Post Graduate Institute of Medical Sciences, Rohtak. A total number of 100 cases of accidental deaths of two-wheeler riders/ pillion riders were included in the study. The study group was comprised of the cases of accidental deaths of two-wheeler riders brought for medico-legal autopsy in the mortuary of the department.

**Inclusion criteria**

All cases of accidental deaths of two-wheeler riders in whom there was no suspicion regarding the accidental manner of death.

**Exclusion criteria**

The cases of accidental deaths of two-wheeler riders where the circumstances regarding the manner of accident were not clear or appear to be suspicious.

**RESULTS**

Table-1 reflects that most commonly involved age group was between 21-30 years involving the 28 victims (28%), followed by 11-20 years (19 cases, 19%) and 31-40 age-groups (15 cases, 15.0%). The victim of the accidents consisted of 92 (92.0%) males and 8 (8.0%) females. Thus males outnumbered the females in ratio of 11.5:1.

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**Table 1** Showing Age and Sex-wise distribution of the cases

Age groups (in years)	Male		Female		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
0-10	1	1.08	1	12.5	2	2
11-20	19	20.65	0	0	19	19
21-30	27	29.34	1	12.5	28	28
31-40	15	16.30	0	0	15	15
41-50	13	14.13	4	50	17	17
51-60	11	11.95	1	12.5	12	12
> 60	6	6.52	1	12.5	7	7
Total	92	100	8	100	100	100

**Table 2** Showing accidental deaths of two-wheelers rider and pillion-rider

Victim	Male		Female		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Rider	68	73.9	0	0	68	68
Pillion Rider	24	26.1	8	100	32	32
Total	92	100	8	100	100	100

The above table depicts that out of two-wheeler riders accidental deaths the male occupants constituted nearly ¾ (73.9%) while over ¼ of the occupants were pillion-riders whereas all the female victims were pillion-riders.

**Table 3** Showing probable cause of accidents of the two-wheeler occupants

Cause of accident	Number	Percentage
Rash driving by offending vehicle	63	63
Due to skid	24	24
Stray animals on roads	7	7
Alcohol influence	4	4
Improper parking of tractor	1	1
Poor visibility	1	1
Total	100	100

The above table shows that the probable cause of accident in the study population, rash and negligent driving by the drivers of the offending vehicles was the most common cause (63.0%). Other causes of two-wheeler accidents were due to skid (24.0%) followed by stray animals on road (7.0%) and under influence of alcohol in 4.0% of cases.

**Table 4** Showing distribution of the cases according to the sites of injuries

Site of injury	Number	Percent
Head injuries	86	86.0%
Face	64	64.0%
Neck	4	4.0%
Chest (front & back)	55	55.0%
Abdomen & Pelvis	46	46.0%
Upper Limbs	85	85.0%
Lower Limbs	72	72.0%
Total number of injuries	426	
Mean number of Injuries per case	4.26	

The above table shows that multiple body parts were involved in almost every case. Head was involved in 86% of cases, followed by extremities (upper 85% and lower 72%), face (64.0%), chest (front & back) in 55.0 % cases, abdomen & pelvis in 46.0% cases and Neck in 4% cases. In cases of injuries to head, injury to the scalp region was seen in 85 (85.0%) cases, skull in 52 (52.0%) cases and brain in 20 (20.0%) of the cases.

**Table 5** Showing types of injuries in the occupants of two-wheelers

Type of Injury	Frequency	Percentage
Abrasion	89	89.0
Fracture	83	83.0
Contusion	82	82.0
Laceration	79	79.0
Crush wound	5	5.0

The table shows that abrasions were the most common type of injuries noticed in 89% of the cases, followed by fractures (83.0% cases), contusions (81.0%), lacerations (79.0%) and crushed wounds in (5.0%) cases.

**Table 6** Showing cause of death in the victims

Cause of Death in Victims	Frequency	Percent
Head Injury	46	46.0
Head & Thorax injury	11	11.0
Head & lower extremity injury	9	9.0
Abdominal Injuries	9	9.0
Head, Abdominal & lower extremity Injuries	5	5.0
Head & Abdominal Injuries	3	3.0
Thoraco-abdominal Injuries	3	3.0
Multiple Injuries	3	3.0
Thorax & lower extremity Injuries	2	2.0
Lower extremity injury	2	2.0
Head & Neck Injury	1	1.0
Head, Thorax & lower extremity Injury	1	1.0
Head & Pelvic Injuries	1	1.0
Thorax Injuries	1	1.0
Thoraco-abdominal & lower limb injuries	1	1.0
Abdominal & lower extremity Injuries	1	1.0
Pelvic & lower extremity Injuries	1	1.0
Total	100	100.0

The above table shows that head injury alone was the major cause of death in 46.0 % of the victims followed by combined head and thoracic region (11.0 %), abdominal injuries and combined head and lower extremities (9.0% each), combined head, abdominal and lower extremities (5.0%), combined head and abdominal injuries and thoraco-abdominal injuries and multiple injuries (3.0% each).

**Table 7** Showing distribution of cases according to Fatal Injury (ies)

Fatal injury (ies)	Number of cases	Percentage
Head Injury	65	65
Head Injury and Lung Laceration	6	6
Head Injury and Liver Laceration	5	5
Head Injury and Spleen Laceration	3	3
Head Injury and Liver & Spleen Laceration	1	1
Head Injury and Pelvic Injury	1	1
Lung, Liver and Spleen Laceration	1	1
Lung and Liver Laceration	3	3
Lung Laceration	2	2
Liver Laceration	3	3
Spleen Laceration	3	3
Liver and Kidney Laceration	1	1
Liver Laceration and Abdominal Aorta rupture	1	1
Small Intestine Rupture	1	1
Lower Extremity Injury	3	3
Multiple Injuries	1	1
Total	100	100

This table shows that head injury was the most common fatal injury comprising 65% of the total cases followed by combined head injury and lung laceration comprising 6% of

the cases; combined head injury and liver laceration comprising 5% of cases; combined head injury and laceration of spleen, combined lung and liver laceration, liver laceration, spleen laceration, and lower extremity injury, each comprising 3%; liver laceration comprising 2%.

## DISSUCTION

There is a steep rise in the vehicular accidents in the present era due to urbanisation and tremendous growth in road transport sector. Population explosion is a catalysing factor for number of accidents. Accidents just do not happen but are caused. The causes in given situations may vary since accidents are multi-factorial and hence call for an inter-sectoral approach to both prevention of accidents and care of the injured persons. In the present study of 100 autopsy cases of two-wheeler accidents, the victims belonged to the age between 4 years to 85 years and the most vulnerable age-group was between 21-30 years (28%) followed by 11-20 years (19%). This is due to the fact that these groups are the most active groups of the society. Sharma *et al*<sup>3</sup> (2007) observed that 36% of the victims were in age group of 21-25 years. Mcharo<sup>4</sup> (2012) also observed similar finding in his study that majority of the victims (45.7%) of motorcycle crash were in the age group of 21-30 years.

Males were predominantly involved in the present study constituting 92 cases (92.0%) while female population comprised of 8 cases (8.0%). This was consistent with the earlier studies done by Sharma *et al*<sup>3</sup> (2007), Mcharo<sup>4</sup> (2012), and Kakeri *et al*<sup>5</sup> (2014) who observed that males outnumbered females in ratio of 1.7:1, 6.4:1, 7.1:1 and 5.1 respectively. This was due to the fact that males are engaged in outdoor activities, so have high risk of accidents.

The present study showed that rash and negligent driving by offending vehicle was the most common cause of accident (63.0%) followed by skidding of the two-wheelers (24.0%). Sharma *et al*<sup>3</sup> (2007) also reported that in 40% of the cases, deaths of two-wheelers occupants was due rash and negligent driving by heavy vehicle and in 11% cases, it was due to skidding of two-wheeler itself.

In the present study, riders were victim in 68 cases (68.0%) and pillion-riders in the remaining 32 cases (32.0%). All the 8 cases (8.0%) of female victims were pillion-riders. Sharma *et al*<sup>3</sup> (2007) noticed that out of 134 autopsy cases of two-wheeler accidental deaths, riders were 88 (66.0%) and pillion-riders were 46 (34.0%). Mcharo<sup>4</sup> (2012) observed in his study that 46.7% of the cases of motorcycle crash injuries were found to be riders which inconsistent with the present study.

In the present study, injuries over head region (86.0%) were present in maximum number of cases followed by extremities (upper-85% and lower 72%), face in 64.0% cases, chest (front and back) in 55.0% cases, abdomen and pelvis in 46.0% cases and neck in 4% cases. In cases of head injury, injury to scalp was seen in 85 (85.0%) cases, skull in 52 (52.0%) cases and brain in 20 (20.0%) cases. Incidentally, spinal injury was not seen in any of the victims. This is consistent with the study of Oberoi *et al*<sup>6</sup> (2010) which showed that head/ face was involved in 26.26% of cases, chest in 18.18%, abdomen in 4.24%, pelvis in 7.87%, and neck and spine in 1.80%. In the present study, upper extremities were involved more frequently (85.0% cases) than lower extremities (72.0% cases) which is contrary to the study of Oberoi *et al*<sup>6</sup> (2010) which

showed that lower extremities were involved more commonly (21.8%) than upper extremities (20.0%).

In the present study, abrasion was the most common type of injury observed which was seen in maximum number of cases (89.0%). It was followed by fractures (83.0%), contusions (81.0%), lacerations (79.0%) and crush wounds in 5.0% of the cases. Oberoi *et al*<sup>6</sup> (2010) noticed that fracture was most common type of injury seen in 31.3% of two-wheelers road traffic accident victims followed by abrasions in 29.9%, lacerations in 29.1% and contusions in 9.7% of the cases.

The present study revealed that head injury alone is the major cause of death in 46.0% of victims followed by combined head and thorax (11.0%), combined head and lower extremities and abdominal injuries (9.0% each), combined head, abdominal and lower extremities (5.0%). The study done by Oberoi *et al*<sup>6</sup> (2010) also observed that injuries to the head/face (26.26%) was the most common cause of death in the victim of two-wheeler accidents. Ravikumar<sup>7</sup> (2013) in his study on the pattern of head injuries in road traffic accidents involving two-wheelers also noticed that head injuries constituted as a major cause of death in occupants of two-wheelers.

## CONCLUSION & SUMMARY

As discussed in the present study there are many causative factors involved in two-wheelers road traffic accidents which include interactions by road users, vehicles and road environment. So multi-dimensional approach is needed to reduce the morbidity and mortality of the individuals in road traffic accidents. The present study showed that males are more involved in two-wheeler accidents death. Deaths were more among the riders as compared to pillioners. Rash driving of offending vehicle was the most common cause of accident. Head was the most commonly involved region followed by upper limb and lower limb. Head injury was the most common cause of death.

## References

1. Park K. Epidemiology of chronic non-communicable disease and conditions. In: Textbook of Preventive and Social Medicine. 22<sup>nd</sup>ed. Jabalpur: Banarsi Das Bhanot; 2013.p. 374-5.
2. Murray CJ, Lopez AD. Alternative projections of mortality and disability by cause 1990- 2020. Global Burden of Disease Study. Lancet 1997; 349:1498-504.
3. Sharma BR, Gupta N, Sharma AK, Sharma S. Pattern of fatal motorized two-wheeler crash injuries in northern India: is safety helmet adequate prevention. *Trends Medical Res* 2007; 2:27-36.
4. Mcharo B. Motorcycle crash: injuries pattern and associated factors among patients treated at Muhimbili Orthopaedic Institute (MOI). Dissertation for Master of Medicine submitted at Muhimbili University of Health and Allied Sciences.2012.
5. Kakeri SR, Bagali MA, Goudar ES, Qadri SY. Pattern of injuries and death sustained by the occupants of the two-wheeler during road traffic accidents. *Al Ameen J Medical Sci* 2014; 7(2):118-24.

6. Oberoi SS, Aggarwal KK, Bhullar DS, Kumar R. Pattern and distribution of injuries in fatal two-wheelers accidental cases. *J Punjab Acad Forensic Med Toxicol* 2010; 10:11-3.
7. Ravikumar R. Patterns of head injuries in road traffic accidents involving two-wheelers: an autopsy study. *J Indian Acad Forensic Med* 2013; 35(4):349-52.

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