A Descriptive Study of Pattern of Injuries in Driver and Pillion Rider Victims of Fatal Two Wheeler Accidents

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**Background:** Motor vehicle crashes are a major cause of fatality all over the world. By 2020 motor vehicle injury is projected to become the third leading contributor to the global burden of disease in the world. Motorcyclists are about 25 times more likely than car occupants to die in Road Traffic Accidents. The present study is aimed to analyse the injury pattern in driver and pillion rider victims of two wheeler accidents.

**Method:** In this study 135 (127 males and 8 females) cases of victims of fatal two wheeler accidents in the age group of 11 to 74 years were studied. The details of the accident were collected from police inquest, statements from investigating officers, statements from relatives/witnesses. In hospitalised cases details including laboratory investigation reports are collected from case sheet. General examination findings and injuries are documented and also photographed.

**Results:** It was observed that majority of the victims were between 20 and 50 years. Skilled labourers constituted 18.5%. Next were students. only 38.1% were using helmet at the time of accident. In 27.4% of cases definite history regarding helmet use was not available. Probably the relatives may not disclose the non usage of helmet for obvious reasons. It was observed that majority of the vehicle involved was motorcycle. Majority of accidents were front on collisions. Type of other vehicles involved in accidents was heavy vehicles. Among 135 cases alcohol odour was present for stomach contents in 11 victims, 8.3% of drivers and 7.5% of pillion riders. Maxilla was fractured in 11.9% in drivers and 17.64% in pillion riders. Mandible was fractured in 14.28% and 13.72%. Incidence of vertebral fracture was similar in both groups. (14.28% and 14.72%). In drivers and pillion riders head injury was the leading cause of death (70.23% and 66.66%). It includes all cases where head injury was the only cause or occurred in combination with other injuries. Head injury alone was the cause of death in 47% of drivers and 52.9% of pillion riders. Chest injury was the next frequent cause of death. (32.14% and 39.21%). Abdominal injury in 26.19% and 15.68% each. Vertebral column injury in 3.57% of drivers and 7.84% of pillion riders.

**Conclusion:** We conclude that in majority of cases the two wheeler involved was motor cycle and the other vehicle involved were heavy vehicles. The commonest modes of accidents were front on collisions, followed by skid and fall. Only 38.1% of drivers were wearing helmet at the time of accident. Incidence of scalp contusion in pillion riders were more, may be due to helmet use in 38.1% of the drivers. Scalp lacerations were more in drivers. Pillion riders showed more fissure fractures in skull vault. Base of skull fractures showed similar incidence in both groups. SDH and brain stem injuries were slightly more in pillion riders. Intra cerebral haemorrhage was seen in pillion riders only.

**Key words:** Head injury, Road traffic accidents, pillion rider, two wheeler accidents

**INTRODUCTION:**

Trauma is a major cause of morbidity and mortality worldwide for death of majority of victims in road traffic accidents (RTA). According to World Health Organization more than 90% of deaths occur in low and middle income countries (1). By 2020 Road Traffic Accident injuries will rise in the 6th place as a major cause of death worldwide (2). In many countries roads are planned and built to allow motor vehicles to travel faster while insufficient thought is given to the needs of two wheelers and pedestrians. Injury to the head is the commonest cause of mortality and morbidity following two wheeler crashes. Motor cyclists are about 25 times more likely than passenger car occupants to

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die in traffic crashes (3). About 20% of deaths in RTA are in
motor cycle accidents (4,5). Most of the people were young
males who are in the productive period of life. This places
heavy burden on the family social and medical resources.
Two wheeler riders are more vulnerable to RTA and for
sustaining injuries. This group of road users do not have protective shell around them and therefore are more at risk than those inside vehicles. They are at
additional risk when their needs have not been taken into
consideration during the planning of road construction.
The present study was undertaken to compare the injury
pattern in drivers and pillion riders in two wheeler accidents.

**MATERIALS AND METHODS:**

**Participants**

In this study 135 (127 males and 8 females) cases of victims
of fatal two wheeler accidents in the age group of 11 to 74
years, brought for autopsy in the Department of Forensic
Medicine, Medical College Kozhikode were studied. The
present study was conducted from Oct 2010 to August 2011.

**Inclusion and exclusion criteria**

All persons dying following two wheeler accidents are
considered for the study. Two wheelers include motor
cycles, scooters and mopeds. All the females were
pillion riders. Bicycles were excluded from the study. Accidents include all types, against all types of vehicles running on the road, collision with any object, surface or any animal or fall from vehicle.

**Methods**

The details of the accident were collected from police
inquest, statements from investigating officers, statements
from relative/witnesses. In hospitalised cases details
including laboratory investigation reports are collected
from case sheet. General examination findings and injuries are documented and also photographed.

**Ethical considerations**

The present study was approved by Institutional ethics
committee, Government Medical College, Kozhikode.

**Data analysis**

Data was analysed by SPSS 20.0

**RESULTS**

Data were presented in table no1 to table no13. It was observed that majority of the victims were between
20 and 50 years (table-1). Skilled labourers constituted
18.5%. Next were students (table no: 2). only 38.1% were
using helmet at the time of accident. In 27.4% of cases
definite history regarding helmet use was not available.
Probably the relatives may not disclose the non usage of
helmet for obvious reasons (table no:3). It was observed
that Majority of the vehicle involved was motorcycle
(table no:4). Majority of accidents were front on collisions
(table-5). Type of other vehicles involved in accidents
were heavy vehicles (table no: 6). Among 135 cases alcohol
odour was present for stomach contents in11 victims, 8.3%
of drivers and 7.5% of pillion riders (table no:7). Injuries
present in victims were presented in table no 8 to table no
13. Maxilla was fractured in 11.9% in drivers and 17.64%
in pillion riders. Mandible was fractured in  in 14.28% and
13.72%. Incidence of vertebral fracture was similar in both
groups.(14.28% and 14.72%). In drivers and pillion riders
head injury was the leading cause of death (70.23% and
66.66%). It includes all cases where head injury was the
only cause or occurred in combination with other injuries.
Head injury alone was the cause of death in 47% of drivers
and 52.9% of pillion riders. Chest injury was the next
frequent cause of death. (32.14% and 39.21%). Abdominal
injury in 26.19% and 15.68% each. Vertebral column injury
in 3.57% of drivers and 7.84% of pillion riders.

![THUMBNAIL](image.png)
Injury | Frequency %
---|---
Contusion | 47.4
Laceration | 14.3
Contusion + Laceration | 9.6
Abraision | 3.9
Abrasion + Contusion | 2.3
Abrasion + Contusion + Laceration | 1.5
Abrasion + Laceration | 1.4

Table-8: Injuries to scalp

| Injury | Driver N=84 | Pillion rider N=51 |
---|---|---|
Contusion | 61.9 | 62.7 |
Laceration | 29.5 | 27.5 |
Abrasion | 8.33 | 11.76 |

Table-9: Scalp injuries in drivers and pillion riders

Fracture | Driver N=84 | Pillion rider N=51 |
---|---|---|
Chest | 51.19 | 43.13 |
Abdomen | 35.71 | 33.33 |
Pelvis | 13.09 | 11.76 |
Limb | 27.38 | 23.57 |

Table-10: Skull fractures in drivers and pillion riders

Haemorrhage | Driver % | Pillion rider %
---|---|---|
SAH | 67.86 | 65 |
SDH | 30 | 35.29 |
Brain stem | 10 | 16 |
Intra ventricular | 13.48 | 16 |
Intra cerebral | 10 | 0 |
Cerebellar | 2 | 2 |
EDH | 2 | 2 |

Table-12: Intra cranial haemorrhages in drivers and pillion riders

| Injury | Driver % | Pillion rider %
---|---|---|
Chest | 32.19 | 43.13 |
Abdomen | 35.71 | 33.33 |
Pelvis | 13.09 | 11.76 |
Limb | 27.38 | 23.57 |

Table-13: Other injuries in drivers and pillion riders

DISCUSSION:
Injuries to the victims of two wheeler accidents constitute a significant proportion of severe traffic accident injuries. In the present study pattern of injuries especially injuries to head was based on 135 cases of autopsy done in Department of Forensic Medicine, Government Medical college, Kozhikode from October 2010 to August 2011. The objective of the study was to find the pattern of injuries especially head injury in victims of fatal two wheeler accidents in drivers and pillion riders.

The majority of the vehicles driven by the victims were motor cycles (95.6%). Skilled labourers were the most victims (18.5%) followed by students (13.3%). In African and western countries majority of the victims were students. The majority of the vehicles involved in collision were heavy vehicles - bus, lorry and tipper, together form about 50%. In a study by Harnam Singh et al it constituted 36.6% in India. In the study by Martinus Ritcher cars were the major collision opponents. The common mode of accident involving riders and pillion riders were front on collision. Drivers 50% and pillion riders 41.2%. Skid and fall was marginally high in pillion riders (11.8%) compared to riders (9.5%). The commonest mode as per study by Nupur pruthi et al was skid and fall, 45.5%. Only 38.1% were wearing helmet in spite of helmet wearing being made a statutory requirement.

Scalp injuries were present in 81.48% of cases. The victim's sustained contusion more than any other injury (47.4%), followed by laceration (14.8%). Incidence of contusion in pillion riders was more, may be due to the protection by helmet in drivers. Scalp laceration was more in drivers. In facial injuries abrasion was more in drivers (27.4%) than in pillion riders (19.6%).

In skull fractures fissure fracture was present in 32.59% of cases. Pillion riders showed more incidence than drivers, may be due to the protection by helmet.Incidence of skull base fissure fracture was almost same in both groups. Of all victims 78.51% presented with focal brain injury. Sub dural haemorrhage and brain stem haemorrhage were slightly higher in pillion riders. Intra cerebral haemorrhage as seen in drivers only (10%). Incidence of brain contusions were almost same in both groups. Vertebral fracture was seen in 14.07% of cases. Horacic vertebral fracture was more in pillion riders. In the present study in 135 victims other than head injury, chest injury was the common injury. It was present in 48.14%, followed by abdomen (36%) limbs (24%) and pelvis (13%). Out of 135 cases head injury was the cause of death in 49.6%. Incidence of head injury was slightly more in pillion riders, may be due to helmet use by drivers.

Conclusion
We conclude that in majority of cases the two wheeler involved was motor cycle and the other vehicle involved were heavy vehicles. The commonest modes of accidents were front on collisions, followed by skid and fall. Only 38.1% of drivers were wearing helmet at the time of accident. Incidence of scalp contusion in pillion riders were more, may be due to helmet use in 38.1% of the drivers. Scalp lacerations were more in drivers. Pillion riders showed more fissure fractures in skull vault. Base of skull fractures showed similar incidence in both groups. SDH and brain stem injuries were slightly more in pillion riders. Intra cerebral haemorrhage was seen in pillion riders only.

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