

## A Comprehensive Study of Fatal Head Injuries among Motorcyclists: A One Year Prospective Study.

Dr. J Surendar<sup>1</sup>, Dr. Siva Ranjan D<sup>2</sup>

Department of Forensic Medicine, Konaseema institute of medical sciences and research foundation, India.

Department of Pathology, Konaseema institute of medical sciences and research foundation, India.

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**Abstract:** Accidents were responsible for most common cause of death, followed by homicidal deaths, with suicides recorded as the least. In developing countries like India two wheeler accidents are more common than other vehicle accidents. The deaths due to head injury are inescapable in the modern way of life and their correct interpretation is vital to the reconstruction of the events of Forensic Medicine and their proper management for treatment of the injured. This prospective study was carried out on 88 victims among motorcyclists admitted to government hospital in warangal during 2009 – 2010. The objective of the study was to analyze the pattern of fatal head injuries among motorcycle riders and pillion riders.

**Key Words:** Motor cycle, Accidents, Head injuries.

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### I. Introduction

Among all motor vehicles fatalities, motorcycles are the most dangerous type of vehicle to drive. The two wheelers introduced in to Indian market by the multi-national companies in the recent past are not tested to the riding conditions of Indian countryside roads. The designing of these vehicles is made according to the riding conditions of west or sophisticated roads. They have a great pick up and high speed; which may lead to road traffic accidents. The total annual deaths due to road traffic accidents (RTA) have crossed 1.18 lakh, according to latest report of national crime records Bureau, NCRB [1].

Driving a two wheeler vehicle is definitely risky than a four wheeler vehicle on the same road. The risk to the rider or pillion rider increases by folds during,

- a. Faulty vehicle, due to either manufacturing defect or wear and tear effect.
- b. Unfavourable environmental conditions as in night or in fog, rain, bad road conditions, other moving vehicles or traffic.
- c. Overloaded vehicle either by pillion riders or by luggage.
- d. Faulty rider as untrained, compromised at health and vision, alcohol intoxicated or otherwise occupied by some other avocation at the time of riding.

### II. Material And Methods

The present prospective study was conducted in the Department of Forensic Medicine, kakatiya medical college, Warangal. Total 88 cases of fatal head injuries due to two wheeler motorcycle were brought to the mortuary during the period of June 2009- may 2010. All age groups with both sexes were included in this study. Information was obtained from the relatives of the deceased, police inquest, hospital records and post mortem examination findings. The data thus obtained was analyzed statistically. On the basis of analysis and observation, results were drawn and compared with the other similar studies.

### III. Results

Out of 1560 autopsies conducted in one year, 474 were accidental deaths. 88 victims were found dead due to head injury in 114 two wheeler accidental deaths.( table 1) The age of victims varied from 5 to 76 years. The peak incidence was observed in the age group of 21-30 years. Out of 88 cases 68 were males and 20 were females. Thus the ratio between male and female is 3.4:1. (table 2)

Most of the victims were riders at the time of accident. None of them were used helmet. (table 3) In 67 cases alcohol was not found in stomach(76%), and 21 victims had alcohol in stomach at the time of autopsy. (table4)

Four types of intracranial hemorrhages were seen in 88 cases of our study. The distribution of cases were shown in Table 5. All the hemorrhages were associated with different types of skull fractures. Table number 6 shows the period of survival of victims after accident, maximum number of deaths occurred with 24 hours of the accident. Different causes for accidental head injury were shown in table 7.

Table 1: Percentage of fatal head injuries in one year study.

Year	Total No. of Autopsies	Total No. of Accidental deaths	Deaths due to Two wheeler accidents (% in Total deaths)	Deaths due to head injuries in two wheeler accidents
june2009-may2010	1560	474	114 (7.31%)	88( 5.64%)

Table 2: Age and Sex Distribution

Age	Male	Female	Male (%)	Female (%)	Total
≤ 10 yr	2	1	2.27%	1.13%	3
11 - 20 yr	6	3	6.81%	3.4%	9
21 - 30 yr	26	8	29.54%	9.09%	34
31 - 40 yr	16	4	18.18%	4.54%	20
41 - 50 yr	8	3	9.09%	3.4%	11
51 - 60 yr	6	1	6.81%	1.13%	7
≥ 61 yr	4	0	18.18%	0	4
Total	68	20	77.27%	22.72%	88

Table 3: Position of the victim over the two wheeler

Position on the Vehicle	≤ 10 years	11 - 20 years	20 - 30 years	31 - 40 years	41 - 50 years	51 - 60 years	≥ 61 years	Total
Rider	0	6	29	16	8	5	2	66
Pillion Rider	3	3	5	4	3	2	2	22

Table 4: Presence of Alcohol in the Stomach

Alcohol in the Stomach	≤ 10 years	11 - 20 years	20 - 30 years	31 - 40 years	41 - 50 years	51 - 60 years	≥ 61 years	Total
Present	0	2	8	4	5	2	0	21
Not present	3	7	26	16	6	5	4	67

Table 5: type of intracranial haemorrhage

Type of intracranial Haemorrhage	Male	Female	Total
Extra dural	2	0	2
Sub dural	36	15	51
Sub arachnoid	19	12	31
Intra cerebral	16	1	17

Table 6: Period of Survival after accident

Period of Survival	Male	Female	Total
Spot death	28	13	41
On the way to Hospital	16	4	20
< 6 hours	10	2	12
6 to 24 hours	7	1	8
1 to 3 days	3	0	3
4 to 7 days	2	0	2
> 7 days	2	0	2

Table 7 different causes for accident leading to death.

Causes for Accident		Causes of Death
		Head Injury
Self-hit and fall	Uneven road	6
	Culvert	2
	Mile stone	1
	Tree	2
	Buffalo	5
	Speed breaker	2
Lorry / tipper / oil tanker		14
Motor cycle		22
Auto rickshaw		7
Bus		4
Car / Vans		8
Bullock cart		1
Tractor		2
Unknown vehicle		12
<b>Total</b>		<b>88</b>

#### IV. Discussion

The observations and results of the present study were compared with the others researches and discussed. Head injury was the sole cause of death in all the cases study. Head injury is a major health problem all over the world. Motor vehicle accident is the leading cause of serious injuries with associated head trauma.

The study was carried out among 88 cases of motor cycle fatalities. Among the cases studied, majority were males (77.27%) than females (22.72%). Similarly male predominance were observed by various researchers in their studies [2,3,4,5,6]. The peak incidence was observed in the age group of third and fourth decades (61.36%). Chandra et al also observed high incidence of death due to head injuries in the same age group. [7] the high mortality observed in this age group may be because of most active period of life and mostly involved in outdoor activities. Low incidence observed in extreme age group because children and old people are confined to their homes, hence the risk of exposure to the outer hazardous environment is low.

In our study most of the deceased were driving the vehicle at the time of accident (75%). None of them (riders and pillion riders) were wearing helmets at the time of accident because there was no compulsion to wear helmets in and around Warangal area. Heilman et al study clearly showed that wearing of helmets reduced the injuries to head.[8]

History of consumption of alcohol and smell of alcohol in the stomach is noticed in few cases only(23%). It does not mean that in the remaining people alcohol is not present. The gravity is showing the tip of iceberg. However in all the female deceased there is no alcohol present in the stomach.

The incidence of subdural haemorrhage(57.95%) and subarachnoid haemorrhage(35.22%) was maximum in the victims of our study while Extra Dural hemorrhage was observed in the least. Combination of both subdural and subarachnoid hemorrhages was seen in few cases of our study. Collaborative findings have been reported in which the incidence of subarachnoid haemorrhage has been reported as (81%) while that of subdural haemorrhage as (63.3%) .[9]

In the present study most of the victims were spot dead and on the way to the hospital (69.31%). And 92% were declared dead within 24 hours from the time of accident. A collaborative study showed similar observation.[7]

Self-hits i.e. person hitting a stable object present on the road is the major reason for fatal accident and most of them are resulted in head injuries. it clearly says that wearing of helmet could definitely have saved the lives at least in some of them. Heavy vehicular hits is another major cause for accidents and in most of them it resulted in multiple injuries or blunt injuries to the chest and abdomen or injuries to the limbs, resulting in fatal fractures of the bones of the limbs. The observations made in the present study can be compared with the study made in Punjab, where it is observed that, the maximum number of accidents was due to two wheeler vehicles

(scooter/motorcycle) which had the involvement of heavy and light four wheeler vehicles in the most road side accidents.[10]

## V. Conclusion

Males are predominant gender which is succumbing to the two wheeler accidents. People from 21 to 40 years age group are more vulnerable for two wheeler accidents. The magnitude is decreasing to the extremes of age. Head injuries are more common in two wheeler accidents which can be prevented to some extent by wearing helmets.

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