

# Road Traffic Injuries among Drivers and Pillion Riders using Two-Wheeler Motorized Vehicle in Western Uttar Pradesh

URFI<sup>1</sup>, ALI AMIR<sup>2</sup>, SALMAN KHALIL<sup>3</sup>, MOHD. FAKHRUL HUDA<sup>4</sup>

## ABSTRACT

Road Traffic Injuries (RTIs) today is public health and development problem. It is among the leading cause of head injury as well. Motorized Two-Wheeler (MTW) users are at distinguished risk for same. Though these vehicles are mostly driven by males, but females being pillion riders are too at increased risk. To explore the pattern of head injury among MTW users, a hospital based cross-sectional study was planned at Jawaharlal Nehru Medical College and Hospital, Aligarh between August 2010 and July 2011. A total of 340 cases of Road Traffic Accidents (RTAs) with Head Injury aged 15-45 years were included in the study using purposive sampling. There was a marked male preponderance with 261 (76.76%). However, among the pillion riders females outnumbered the males. The most vulnerable age group was 15-24 years. Distribution of scalp and brain injury was similar among the drivers and pillion riders. Most frequent of all scalp injuries was bruise/superficial injury. Severity of head injury and its outcome was similar with no significant difference between drivers and pillion riders.

**Keywords:** Head injury, Motorcycle related injury, Road traffic accident

## INTRODUCTION

Road Traffic Injuries (RTIs) are a growing public health and development problem. Motorized two-wheeler users are at distinguished risk for RTIs. WHO data show that globally more than 2,86,000 motorcyclists were killed in road traffic crashes in 2013 [1]. This represents almost a quarter of all road traffic deaths in that year. The peak age for motorcycle-related injury in low and middle income countries is in the early to late twenties [2]. According to the Ministry of Road Transport and Highways, 4,94,624 people were injured in 4,80,652 road accidents in India in 2016 and 1,50,785 people lost their lives. Uttar Pradesh tops the list of fatal road accidents and shared more than 12% of all fatalities. Two-wheeler riders accounted for the highest share (33.8%) in total number of road accidents in 2016. Road users of two-wheelers are also most vulnerable to meet fatal RTIs and constituted 34.8 per cent of all those killed in 2016 on Indian roads [3]. Majority of RTIs are of the nervous system, predominantly of the brain [4]. Head injury remains the most frequent type of injury both among the drivers and pillion riders of two-wheelers.

## MATERIALS AND METHODS

This cross-sectional study was conducted in casualty and neurosurgery ward of Jawaharlal Nehru Medical College Hospital, Aligarh Muslim University, Aligarh from August 2010 to July 2011. Study subjects comprised of all the patients of Road Traffic Accidents (RTAs) with head injury, who used motorized two-wheeler vehicle at the time of accident, aged 15-45 years and those subsequently admitted to this hospital during the study period. The study was undertaken using purposive sampling technique. The presence of head injury following RTA was confirmed by residents of Neurosurgery unit of hospital who first came in contact with the patient. The patients excluded were those who did not give consent to be part of study, those immediately referred to higher centre and patients brought dead. Ethical clearance was obtained from Jawaharlal Nehru Medical College ethics committee.

A pre-tested and semi-structured proforma modified from WHO Injury surveillance guidelines was used for interview of patients. Informed consent (verbal) was taken from patient or concerned attendants or relatives after they were told the purpose of study and assured that confidentiality would be maintained.

Information regarding age and gender of the patient along with day and month of occurrence of RTA was put on record. Monday to Friday were grouped as weekdays and Saturday and Sunday as weekends. Further details about head injury were recorded. Injury was classified as scalp/vault injury or brain injury. Scalp injury was further subclassified as bruise/superficial injury, fracture of any skull bone and cut/open wounds. Similarly brain injury was divided into intracranial haemorrhage, concussion and diffuse axonal injury. Use of helmet was also assessed among both the road users.

Severity of head injury was assessed at the initial contact with the patient by the neurosurgery unit using Glasgow Coma Scale (GCS). Head injury was classified as mild, moderate, or severe as per GCS score. Before discharge GCS score was assessed again to classify patient into recovered completely and those who recovered with some deficit. Recovered completely was defined as having GCS score of 13-15 at the time of discharge while recovered with some deficit as having GCS score of 12 and below. Other outcome considered were died, referred to higher centre during the course of hospital treatment and left against medical advice. Association of type of road user with severity of injury and outcome of injury was analysed using chi-square test. Data was analysed using the SPSS 20.0.

Operational definition of RTA used in the study was: A collision involving at least one vehicle in motion on a public or private road that results in atleast one person being injured or killed [4,5].

## RESULTS

A total of 340 cases of RTAs with head injury were included in the study. There was overall marked male preponderance. Males too outnumbered females among the drivers. However, the pillion riders

Age-group (Years)	Male	Female	Totale and 35- and 35-44 among t
15-24	108 (90.8%)	11 (9.2%)	119
25-34	51 (96.2%)	2 (3.8%)	53
35-44	87 (97.8%)	2 (2.2%)	89
Total	246	15	261

**[Table/Fig-1]:** Age and gender wise distribution of driver of MTWs.

Age-group (Years)	Male	Female	Total and 35- and 35-44 among t
15-24	20 (58.8%)	14 (41.2%)	34
25-34	7 (43.8%)	9 (56.2%)	16
35-44	4 (13.8%)	25 (86.2%)	29
Total	31	48	79

**[Table/Fig-2]:** Age and gender wise distribution of pillion riders of MTWs.

Road User (n=338)	Severity Of Injury			
	Mild	Moderate	Severe	Total
Driver	195 (75.3%)	43 (16.6%)	21 (8.1%)	259
Pillion rider	60 (75.9%)	16 (20.3%)	3 (3.8%)	79
Total	255	59	24	338

**[Table/Fig-3]:** Distribution of severity of head injury with type of road user.  $\chi^2=2.050$ ; p-value > .05

Road User (n=318)	Outcome Of Injury			
	Recovered completely with no deficit	Recovered with some deficit	Died	Total
Driver	190(78.5%)	42 (17.4%)	10 (4.1%)	242
Pillion rider	63 (82.9%)	10 (13.2%)	3 (3.9%)	76
Total	253	52	13	318

**[Table/Fig-4]:** Distribution of outcome of head injury with type of road user.  $\chi^2=0.768$ ; p-value > .05

comprised predominantly of females. The most vulnerable age group was 15-24 years both among the drivers and the pillion riders [Table/Fig-1,2].

Months of August and September accounted for highest number of RTAs with 38 (11.2%) and 39 (11.5%) cases respectively. This season also corresponds with the rainy season in India where numbers of RTAs are on the rise. Almost three-fourth of all accidents, 243 (71.5%), took place during weekdays but the difference with weekend was insignificant.

Scalp injury was noted in 337 (99.1%) of patients. Most frequent of all scalp injuries was bruise/superficial injury being present in 265 (77.9%), followed by fracture of skull bone noted in 182 (53.5%). Cut/open wounds were least common among those having scalp injury with 146 (42.9%). Distribution of different types of scalp injury was similar both among the drivers and pillion riders. Brain injury was present in 205 (60.3%) patients. Intracranial haemorrhage was most common of all types of brain injury, noted in 175 (51.5%) patients. Very few patients had other types of brain injury like concussion and diffuse axonal injury. The distribution of different types of brain injury too was similar both among the drivers and pillion riders.

Among the 261 drivers, 40 (15.3%) used helmet. However none of the pillion rider used helmet in the present study. Out of 340 patients included in the study, GCS could not be assessed in two patients because of overwhelming effect of alcohol. Therefore, severity of injury was assessed in 338 patients only. Most of the injuries were of mild grade in either type of road user, followed by moderate grade. Very few patients had RTIs of severe grade. Severity of injury did not differ significantly with the type of road user [Table/Fig-3] and with helmet use. Among the 40 drivers who used helmet, 2 (5%) had severe injuries as compared to 22 (7.4%) out of 298 non-helmet users.

Out of 340 patients, 17 left against medical advice during hospital stay while five others were referred to higher centre. Thereby, outcome was assessed in 318 patients. Among the remaining 318 patients, 253 (79.6%) of patients recovered completely with no deficit followed by those who recovered with some deficit. A total of 13(4.1%) of patients died during hospital stay. However, outcome of injury bore no significant relationship with type of road user [Table/Fig-4].

## DISCUSSION

Age and gender distribution of present study were in corroboration with findings of Khan MK et al., Mishra B et al., Swarnkar M et al., and Suryanarayana S et al., [6-9]. RTAs peaked around the rainy season in the present study. Similar seasonal preponderance was also noted by Mishra B et al., and Rahman MZ et al., [7,10].

Three-fourth of all accidents took place during weekdays but the difference with weekend was insignificant. Kumar A et al., too did not find any significant difference between the RTAs, whether it took place during weekdays or weekends [11].

The distribution of different types of brain injury too was similar both among the drivers and pillion riders. Similar pattern of distribution of head injury was also noted by Khan M et al., and Kumar A et al., [6,11]. Most of the injuries were of mild grade in either type of road user and severity decreased proportionally in both groups. Similar observations with regard to severity were also noted by Agnihotri AK et al., [12].

A total 83 patients had moderate to severe grade of head injury and 13 among 318 patients (4.1%) died during hospital stay. Many of these head injuries could have been prevented or their severity could have been reduced through the use of simple and inexpensive helmets. It has been established that non-helmeted users of motorized two-wheelers are three times more likely to sustain head injuries in a crash compared to those wearing helmets [13]. Wearing a helmet correctly can cut the risk of death by almost 40%, and the risk of severe injury by 70% [14]. India has The Motor Vehicles Act which makes helmet use mandatory both for MTW drivers and pillion riders. However, the notification and enforcement of this law varies between individual states and is generally weak [15]. As per WHO, the enforcement of helmet law in India was rated 4 on a scale of 10 (where 0 was least and 10 was highly effective) [1]. Women too are not exempted from wearing helmet but again endorsement varies within the states. Now many states like Punjab, Haryana, Gujarat are coming up with strict enforcement of this law for women as well.

## LIMITATION

Some cases who might have had minor injuries, may have not visited the hospital. Hence these may have been missed.

## CONCLUSION

Young males driving the MTWs are at significant risk of RTAs, but the risk among females is also distinguished as they often comprise the pillion riders. Injury profile along with the severity of the injury together with its outcome are similar in both types of road user irrespective of patient being driver or pillion rider. A multifaceted approach is required for the most effective and long-lasting changes to be made to national road safety. Strict implementation of traffic rules like mandatory helmet use is the need of hour. Further RTI prevention strategy needs to be incorporated into public health programmes if the burden of this non-communicable disease is to be decreased.

## REFERENCES

- [1] Global status report on road safety, 2015. Geneva: World Health Organization; 2015.
- [2] Improving safety for motorcycle, scooter and moped riders. Paris: OECD Publishing; 2015.
- [3] Road accidents in India – 2016. Government of India, Ministry Of Road Transport and Highways, Transport Research Wing, New Delhi. 2017. Available from: www.morth.nic.in

- [4] Madan VS. Road Traffic accidents: emerging epidemic. *Indian Journal of Neurotrauma*:IJNT. 2006;3(1):1-3.
- [5] Patil SS, Kakade RV, Durgawale PM, Kakade SV. Pattern of road traffic injuries: A study from Western Maharashtra. *Indian Journal Community Medicine*. 2008;33(1):56-58
- [6] Khan MK, Hanif SA, Hussain M, Huda MF, Sabri I. Pattern of non-fatal head injury in adult cases reported at JNMC Hospital AMU, Aligarh. *J Indian Acad Forensic Med*. 2011;33(1):21-23.
- [7] Mishra B, Sinha ND, Sukhla SK, Sinha AK. Epidemiological study of road traffic accident cases from Western Nepal. *Indian Journal Community Medicine*. 2010;35(1): 115-21.
- [8] Swarnkar M, Singh P, Dwivedi S. Pattern of trauma in Central India: An epidemiological study with special reference to mode of injury. *The Internet Journal of Epidemiology*. 2010;9(1):1-7.
- [9] Suryanarayana S, Gautham MS, Manjunath M, Narendranath V. Surveillance of injuries in a tertiary care hospital. *Indian J Community Medicine*. 2010;35(1):191-92.
- [10] Rahman MZ, Ahmad M, Rahman FN, Islam SMK, Rahman KGM, Haque MR. Abundance of road traffic accidents among medico legal postmortem cases. *Faridpur Med Coll J*. 2011;6(1):28-31.
- [11] Kumar A, Lalwani S, Agrawal D, Rautji R, Dogra TD. Fatal road traffic accidents and their relationship with head injuries: An epidemiological survey of five years. *Indian Journal of Neurotrauma: IJNT*. 2008;5(2):63-67.
- [12] Agnihotri AK, Joshi HS. Pattern of road traffic injuries: One year hospital-based study in Western Nepal. *International Journal of Injury Control and Safety Promotion*. 2006;13(2):128-30.
- [13] WHO: Road traffic injury prevention: Training manual 2006.
- [14] WHO: Preventing Road Traffic Injuries: International efforts in road safety 2007. Available from: [www.who.int/roadsafety/](http://www.who.int/roadsafety/)
- [15] Gururaj G. Head injuries and helmets: Helmet legislation and enforcement in Karnataka and India. *National Institute of Mental Health and Neuro Sciences, Bangalore* 2005.

**PARTICULARS OF CONTRIBUTORS:**

1. Assistant Professor, Department of Community Medicine, JNMC, A.M.U., Aligarh, UP, India.
2. Professor, Department of Community Medicine, JNMC, A.M.U., Aligarh, UP, India.
3. Associate Professor, Department of Community Medicine, JNMC, A.M.U., Aligarh, UP, India.
4. Professor, Department of Neurosurgery, JNMC, A.M.U., Aligarh, UP, India.

**NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:**

Dr. Urfi,  
Department of Community Medicine, Jawaharlal Nehru Medical College (JNMC),  
Aligarh Muslim University (AMU), Aligarh, U.P., India.  
E-mail: [urfiislam@yahoo.com](mailto:urfiislam@yahoo.com)

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