 DOI : 10.48165/jiafm.2024.46.2(Suppl).4

ORIGINAL ARTICLE

A Study on Injury Patterns among Motorcyclists Presenting to a Tertiary Care Hospital in South Kerala

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Abstract :

High traffic levels on the road and the low costs of procurement and usage make motorcycles attractive in India. However, motorcycle riders and passengers are more vulnerable to traffic accidents. The present study, which was conducted in a tertiary care hospital in South Kerala, focused on injury patterns related to motorcycle accidents, including the factors associated with such accidents. The results found that males (80%, 212) were more often victims of motorcycle accidents than females (20%, 53). The most affected age group was 20–39 years, at 41.5% (110). Most victims who came to the hospital had fractures (73.2%). Based on the fracture site, the head and neck areas were the most affected (48.5%). Based on external injury, the head and neck areas were again the most affected (63.9%).

Keywords: Road traffic accidents; Motorcycle; Injury pattern; Epidemiology.

Introduction :

A road traffic accident (RTA) is any injury due to crashes originating from, terminating with or involving a vehicle partially or entirely on a public road.[1] Mortality for ages 5–29 years is primarily caused by RTA injuries. Approximately 1.3 million lives are lost on the roads each year. RTA deaths among vulnerable road users, including pedestrians, cyclists and motorcyclists, account for more than half of the casualties.[2] According to World Road Statistics (2018), India ranked first in the number of RTA deaths across 199 countries. The WHO's Global Report on Road Safety (2018) observed that almost 11% of accident-related deaths in the world occur in India. Two-wheelers account for 35% of all RTA deaths on national highways.[3] With the expansion of road transport facilities, improved living conditions enabling more private vehicles and noncompliance with traffic rules, the frequency of RTAs has increased, particularly those with two-wheeler involvement.

Many people rely on motorcycles in this part of the country because they can get through busy roads quickly, it is economical and it satisfies vogue concepts. The hospital under study is located near a busy street; therefore, the study of motorcycle cases here should offer a good overview of what happens in such accidents in this area. In high-traffic areas, hospital settings must be fully aware of the relevant demographics and other variables considered in this study to prepare for delivering appropriate care at all times. Efficiency in providing care can be improved with knowledge of probable injury sites, the mechanism of an accident and associated factors. Studies showing the characteristics of injuries would help in clinical management. This study aims to provide an understanding of different areas of the body sustaining fractures, different types of damage and patterns to make the delivery of medical services better in trauma cases involving motorcycles.

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Article History
DOR : 14.07.2023; DOA :12.09.2024

Material and methods:

This retrospective record-based study is part of the Indian Council of Medical Research-funded Short-term Student Project, which was conducted in a tertiary care centre in South Kerala. The primary means of private transport in that locale include cars and motorcycles. The target population was those affected by motorcycle-related trauma. This study reviewed cases of patients who presented to the emergency room of the institution following two-wheeler accidents. This study was carried out from August 2022 to October 2022. Proforma was used to collect relevant data. The records of cases satisfying the inclusion criteria were considered for the study, excluding other MLC cases arranged. The data was then entered into proforma, and patients were divided by injury type, including abrasions, contusions, lacerations, incised wounds, burns, puncture wounds, avulsions, penetrating wounds, etc. When different injuries occurred within the same region, they were recorded as combinations. However, fractures were considered separately. The entire body of each patient was assessed, and injuries and fractures in each area were marked. Data on documentation were recorded and then coded for analysis. The data were then compiled in a datasheet using Microsoft Excel (version 2013) and analysed using SPSS computer software version 16.0, which interpreted results in terms of percentage, mean and chi-square.

Result:

A total of 265 records were analysed for this study. Table 1 depicts the distribution of the study population based on gender. Males 212 (80%) outnumbered females 53 (20%).

Table 1: Distribution of study based on gender.

Gender	Frequency	Percentage
Male	212	80.0
Female	53	20.0
Total	265	100.0

Table 2: Distribution of study population based on age.

Gender	Frequency	Percentage
< 20 years	19	7.2
20–39 years	110	41.5
40–59 years	101	38.1
≥ 60 years	35	13.2
Total	265	100

Table 3: Distribution of study population based on fracture status.

Fracture	Frequency	Percentage
Present	194	73.2
Absent	71	26.8
Total	265	100.0

Table 4. Distribution of study population based on fracture site.

Fracture Site	Frequency	Percentage
Head & Neck	94	48.5
Upper Limb	60	30.9
Lower Limb	61	31.4
Thorax	20	10.3
Lumbar Region	9	4.6

Table 5. Distribution of study population based on external injury status.

External Injury site	Frequency	Percentage
Head & Neck	131	63.9
Lower Limb	70	34.1
Upper Limb	68	33.2
Abdomen	15	7.3
Thorax	10	4.9

The patients were categorised into different age groups. Table 2 depicts the distribution of the study population based on age. The age group 20–39 years was most affected (110 cases, 41.5%), followed by the age group 40–59 years (101 patients, 38.1%). Fractures were seen in 194 cases (73.2%). Table 3 shows the fracture statistics.

The fracture sites were determined by dividing the body into different regions, as depicted in Table 4. The head and neck regions were the most commonly affected (94 cases, 48.5%). Other sites were upper limbs (30.9%), lower limbs (31.4%), thorax (10.3%) and abdomen (4.6%). External injury distribution was also assessed region-wise. 77.4% of the reports had external injuries.

The different regions of the body and the pattern of injury mostly suffered are depicted in Table 7. Abrasion forms the most common single type of injury in both limbs separately. In 37.1% cases, abrasions were present in the lower limbs while in 52.9% cases abrasions were present in the upper limbs. Lacerations were next most common, accounting for 30% of the cases in the lower limb and 16.2% in the upper limb. Among the combination of wounds, both limbs sustained abrasions and lacerations mostly, with 11.4% of the cases in the lower limb and 5.9% of the cases in the upper limb. A penetrating wound was seen in 1 case in the lower limb. The limbs alone showed the presence of a puncture wound. The most frequently found single type injury in the head and neck region was laceration (54 cases, 41.2%), followed by a combination of abrasion and laceration in 24.4% cases. Friction burns due to RTAs were seen in the head, neck, upper limb, and abdomen regions. Avulsions were seen in all regions except the thorax and abdomen. Apart from cases where one type of injury is more frequent in a particular site, different combinations of injuries are seen in different parts of the same region. Abrasions were the most common injuries in the abdomen and thorax regions. Only abrasions or contusions as different types of injuries were seen in the thorax.

Table 6. Distribution of study population based on site & type of external injury.

External injury site	External injury type	Frequency	Percentage
Head & Neck	Laceration	54	41.2
	Abrasion + Laceration	32	24.4
	Abrasion	25	19.1
	Contusion	11	8.4
	Abrasion+Laceration+Contusion	2	1.5
	Laceration + Burns	2	1.5
	Laceration + avulsion	1	0.8
	Laceration + contusion	1	0.8
	Abrasion + Contusion	1	0.8
	Laceration + Avulsion + Abrasion + Burns	1	0.8
	Laceration + Avulsion + Abrasion	1	0.8
Lower Limb	Abrasion	26	37.1
	Laceration	21	30
	Abrasion + Laceration	8	11.4
	Contusion	6	8.6
	Avulsion	2	2.9
	Abrasion + Puncture wound	2	2.9
	Puncture Wound	1	1.4
	Avulsion + Abrasion	1	1.4
	Abrasion + Contusion	1	1.4
	Abrasion + Penetrating wound	1	1.4
	Avulsion + Puncture + Abrasion + Laceration	1	1.4
Upper limb	Abrasion	36	52.9
	Laceration	11	16.2
	Contusion	4	5.9
	Burns	4	5.9
	Abrasion + Laceration	4	5.9
	Laceration + Puncture wound	3	4.4
	Puncture wound	2	2.9
	Laceration + Avulsion	2	2.9
	Avulsion	1	1.5
	Abrasion + Contusion	1	1.5
Abdomen	Abrasion	10	66.7
	Laceration	3	20
	Contusion	1	6.7
	Burns	1	6.7
Thorax	Abrasion	7	70.0
	Contusion	3	30.0

Discussion:

Road accidents caused by motorised two-wheelers are the leading cause of disability and fatality. We analysed about 265

cases that met the inclusion criteria and found that more men (212, 80%) were killed or injured than women (53, 20%) similar to studies by, Dandona R and Mishra A (>80%),[4] Saumil P. Merchant et al. (86.3%),[5] Dileep Kumar R. et al. (87%),[6] and Rakesh Kakkar et al. 10 (80.5%).[7] The most commonly injured age group (110 cases, 41.5%) was 20–39, and the second most commonly injured age group was 40–59 (101 cases, 38.1 %). The age group of 20-39 was the most engaged riders; this could be the reason for such an outcome in our study. Because this age group represents the backbone of the Indian economy, when people in the age group become injured or disabled, it affects the economic prosperity and development of the country. Mashreky et al.[8] reported that the age group of 18–45 is the most vulnerable, which aligns with our findings.

In this study, 194 of the 265 cases (73.2%) were reported to have fractures. Among them, we found that the most typical sites of fracture were the head and neck (94 cases, 48.5%), followed by the lower limbs (61 cases, 31.4%) and upper limbs (60 cases, 30.9%), respectively. Another study by Ranjana Singh, Hemant Kumar Sing, et al.[9] in contrast, found that the most typical fracture site was the lower limb, followed by the upper limbs and skull bones.

There were 205 (77.4%) external injury cases in this study; the most common sites involved were the head and neck (131 cases, 63.9%), followed by the lower and upper limbs. The higher rate of head and neck injuries and fractures could be due to wearing a helmet but not tying the straps properly or by a lack of awareness that helmets are designed for individual safety and not simply as a cover to avoid legal prosecution. Another study by Arun Prakash K.S, Sanjeev K. et al.,[10] found that there was a higher rate of head and neck injuries followed by injuries of head, neck and lower limb and head, neck and upper limb.

Among injuries, laceration (54 cases, 41.2%) was the most common followed by abrasion & laceration in the head and neck. In the lower limb, abrasion (26, 37.1%) was the most common, followed by laceration. In the upper limb abrasion (36,52.9%) followed by laceration and in abdomen and thorax abrasion was the most common external injury.

Conclusion:

For medico-legal evaluation of injuries, one needs the skill to differentiate between blunt and sharp force trauma. Police enquiry is mainly based on eyewitness statements. However, although such statements must be considered, they cannot be indiscriminately taken as factual. Emotions such as sorrow and guilt frequently taint eyewitness accounts, resulting in distorted, exaggerated, and misleading information. In a few cases, no one witnessed the accident, and the victim was later found by the roadside. Therefore, it is necessary for the vehicular and roadside evidence to corroborate the injuries documented by the doctor. Only enforcing strict laws, educating people on road safety, creating safe road infrastructure, and ensuring good governance and post-crash response times can reduce the number of fatalities.

Ethical clearance: A prior approval was obtained from the Institutional Ethics Committee.

Conflict of interest: None to declare.

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