

## PATTERN AND FREQUENCY OF MOTOR CYCLE ACCIDENT INJURIES REPORTED TO CMH PANNU AQIL, SIND

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### ABSTRACT

**Objective:** To analyse the pattern and frequency of injuries in motor cycle accident reported at Combined Military Hospital Pannu Aqil.

**Study Design:** Descriptive cross sectional prospective study.

**Place and Duration of Study:** CMH Pano Aqil, from 19 Feb 2014 to 31 Nov 2015.

**Material and Methods:** All motor cycle occupants that got injured because of the accident brought to main reception centre of Combined Military Hospital Pannu Aqil were included in the study. Patients brought in dead after motor cycle accident were excluded from the study. Data were collected on the questionnaire, analysed and evaluated using SPSS version 17.

**Results:** We received 526 injured patients as a result of 436 motor bike accidents in Combined Military Hospital Pano Aqil. They were 422 male and 104 female. The peak incidence was noted between the ages of 20-30 years. More than half 310 (58.9%) were using helmets while driving. Majority of them 343 (65.1%) had a low speed impact (less than 60 km/hr). Bulk of the patients belonged to Armed Forces 213 (40.5%). The majority of the patients 419 (79.6%) had orthopaedic injuries. Abdominal thoracic and urological injuries were in 73 (13.9%), 15 (2.6%), 9 (1.7%) respectively. Sixty seven (12.7%) had head injuries and 11(2.1%) patients had spinal injuries. Soft tissue injuries accounted for 74 (14.06%). One hundred and forty two patients (26.9%) had injury to more than one organ. Fifty three (37.06%) patients had orthopaedic and head injury, forty five (31.69%) had orthopaedic and abdominal injury, 30 (21.1%) had orthopaedic and soft tissue injury, 3(2.1%) had orthopaedic and urological injury, 2(1.4%) patients had orthopaedic, head and thoracic injury, 6(4.2%) patients had abdominal and thoracic and 3 (2.1%) patients had abdominal and head injury.

**Conclusion:** The frequency of orthopaedic injuries, along with abdominal thoracic and urologic injuries were more as compare to the head and spinal injuries among the motor bike accidents.

**Keywords:** Head injuries, Helmet, Motor bike accident, Orthopaedic injuries.

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### INTRODUCTION

A report published by WHO in 2012 brought an interesting fact that more than 90 percent of the world fatality were due to accident are in the low or middle earning countries although they have less vehicles than the developed countries<sup>1</sup>.

Motor bike does not provide any sort of protection to its driver and occupant. It is estimated that motor bike occupant are 21 times more likely to die in case of road traffic accident<sup>2</sup>. In Pakistan, 41 people per every 1000 are

subjected to trauma because of road traffic accident<sup>3</sup>. More over 23.5 per 100,000 deaths are due to road traffic accident<sup>4</sup> in Pakistan. About half of them are due to motor cycle accident.

Pannu Aqil city is located on the busy national high way that connects Karachi with the rest of Pakistan. Most of the military and civilian personal belonging to the low and middle socioeconomic group use motor cycle as the mode of transport. Combined Military Hospital Pannu Aqil caters for all military and civilian road traffic accident emergencies in its vicinity.

In this study we tried to analyse the pattern and frequency of injuries in motor cycle accident that reported at Combined Military Hospital Pannu Aqil.

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Received: 29 Apr 2016; revised received: 02 May 2016; accepted: 03 May 2016

## MATERIAL AND METHODS

This was a descriptive cross sectional prospective study. All occupants who were injured after motor cycle accident reporting to main reception centre of Combined Military Hospital Pano Aqil between 19 February 2014 and 31 November 2015 were included in the study. All patients who were brought in dead because of motor cycle accident were excluded from the study. Injuries because of any cause other than motor cycle accident were also excluded from the study. All data were collected

statistics were applied to the data. Categorical variable were presented with frequency and percentages.

## RESULT

We received 526 injured patients as a result of 436 motor bike accidents in Combined Military Hospital Pannu Aqil. They were 422 (80.23%) males and 104 (19.77%) females. Their age distribution is as per table-I with the peak incidence between ages 20-30 years, mean age (32.3 years) with SD (13.8).

More than half 310 (58.9 %) were using

**Table-I: Age distribution of motor bike accident related injured patient (n=526).**

| Age          | Number | Percentage |
|--------------|--------|------------|
| 0-10         | 12     | 2.3%       |
| 11-20        | 34     | 6.5%       |
| 21-30        | 237    | 45.1%      |
| 31-40        | 141    | 26.8%      |
| 41-50        | 42     | 7.9%       |
| 51-60        | 43     | 8.2%       |
| 60 and above | 17     | 3.2%       |

on carefully designed questionnaire.

All patients were initially managed as per advanced trauma life support (ATLS) protocol in emergency. After stabilization, patients were sent to appropriate ward, theatre or ICU. Patients who were unconscious or were put on ventilator were reassessed for injuries once they regained consciousness. Appropriate radiological input (x-ray, CT scan) was taken where found necessary to support clinical examination.

During initial evaluation, age, sex and occupation of the individual were noted. Speed of the impact and use of helmet was also documented. Patients were evaluated according to the mechanism of injury (motorbike vs motorbike, motorbike vs pedestrian, motorbike vs car, motorbike vs bus / truck, solo motorbike) and pattern of injuries (poly-trauma, head injuries, spinal injuries, abdominal injuries, urological injuries, orthopaedic injuries, soft tissue injuries). All the data were analysed and evaluated using SPSS version 17. Descriptive

helmets while driving. However none of the second and third occupant was using helmet. Majority of them 343 (65.1 %) had a low speed impact (less than 60 km/hr). Greater proportion of the pattern were from Armed Forces (fig).

Of the 526 patients, there were about 142 patients who got injury to more than one organ. Fifty three (37.06%) of poly-trauma patients had orthopaedic and head injury, 45 (31.69%) had orthopaedic and abdominal injury, 30 (21.1%) had orthopaedic and soft tissue injury, 3 (2.1%) had orthopaedic and urological injury, 2 (1.4%) patients had orthopaedic, head and thoracic injury, 6 (4.2%) patients had abdominal and thoracic and 3 (2.1%) patients had abdominal and head injury.

The majority of the patients 421 (80.03%) had orthopaedic injuries. Abdominal, thoracic and urological injuries were seen in 73 (13.9%), 15 (2.9%), 9 (1.7%) respectively. 67 (12.7%) had head injuries and 11 (2.1%) patients had spinal injuries. Soft tissue injuries accounted for 74 (14.06%).

The sub division of the injuries are listed in table-II.

## DISCUSSION

Motor cycles are the most common mode of

**Table-II: Pattern and frequency of injuries in different body part as a result of motor bike accident (n= 526).**

| Organ involved              | Sub division                            | Number | Percentage |
|-----------------------------|---|--------|------------|
| <b>Orthopaedic</b>          |   | 421    |            |
|                             | Fracture clavicle                       | 13     | 3.09%      |
|                             | Fracture proximal humerus               | 17     | 4.04%      |
|                             | Fracture shaft humerus                  | 23     | 5.5%       |
|                             | Fracture distal humerus                 | 12     | 2.9%       |
|                             | Fracture olecranon                      | 3      | 0.71%      |
|                             | Fracture radius ulna                    | 37     | 8.8%       |
|                             | Fracture radius shaft                   | 12     | 2.8%       |
|                             | Fracture distal radius                  | 19     | 4.5%       |
|                             | Fracture metacarpal                     | 12     | 2.8%       |
|                             | Supracondylar fracture humerus children | 19     | 4.5%       |
|                             | Fracture pelvis                         | 6      | 1.4%       |
|                             | Fracture acetabulum                     | 2      | 0.47%      |
|                             | Fracture neck of femur                  | 19     | 4.5%       |
|                             | Fracture shaft femur                    | 59     | 14.01%     |
|                             | Fracture distal femur                   | 33     | 7.9%       |
|                             | Fracture patella                        | 18     | 4.3%       |
|                             | Fracture proximal tibia                 | 19     | 4.5%       |
|                             | Fracture shaft tibia                    | 56     | 13.4%      |
|                             | Fracture distal tibia                   | 14     | 3.3%       |
|                             | Bi malleolar fracture                   | 4      | 0.9%       |
|                             | Fracture talus                          | 2      | 0.47%      |
|                             | Fracture foot                           | 10     | 2.38%      |
|                             | Ankle dislocation                       | 3      | 0.71%      |
|                             | Hip dislocation                         | 2      | 0.47%      |
|                             | Shoulder dislocation                    | 7      | 1.6%       |
| <b>Thoracic injuries</b>    |   | 15     |            |
|                             | Pneumothorax                            | 9      | 60%        |
|                             | Lung contusion with rib fracture        | 4      | 26.7%      |
|                             | Hemothorax                              | 2      | 13.3%      |
| <b>Abdominal injuries</b>   |   | 73     |            |
|                             | Liver injuries                          | 7      | 9.6%       |
|                             | Splenic injuries                        | 17     | 23.3%      |
|                             | Gut injuries                            | 27     | 36.9%      |
|                             | Abdominal wall contusion                | 18     | 24.7%      |
|                             | Abdominal wall haematoma                | 4      | 5.5%       |
| <b>Head injuries</b>        |   | 67     |            |
|                             | Brain concussion                        | 36     | 53.7%      |
|                             | Sub Dural haematoma                     | 8      | 11.9%      |
|                             | Extra Dural haematoma                   | 5      | 7.5%       |
|                             | Intra-cerebral bleed                    | 6      | 8.9%       |
|                             | Skull fracture                          | 12     | 17.9%      |
| <b>Spinal injuries</b>      |   | 11     |            |
|                             | Lumbar fracture                         | 4      | 36.4%      |
|                             | Dorsal supine fracture                  | 2      | 18.2%      |
|                             | Spinal cord contusion                   | 5      | 45.4%      |
| <b>Urological injuries</b>  |   | 9      |            |
|                             | Urethral injuries                       | 3      | 33.3%      |
|                             | Kidney injuries                         | 5      | 55.6%      |
|                             | Urinary bladder injuries                | 1      | 11.1%      |
| <b>Soft tissue injuries</b> |   | 74     |            |
|                             | Contusion / abrasion                    | 29     | 39.2%      |
|                             | Laceration                              | 24     | 32.4%      |
|                             | Closed degloving                        | 6      | 8.1%       |
|                             | Radial nerve injury                     | 3      | 4.05%      |
|                             | Sciatic nerve injury                    | 1      | 1.3%       |
|                             | Soft tissue loss                        | 11     | 14.9%      |

transport being used by low and middle socio-economic group in the area surrounding Pannu Aqil cantonment. Cheap hire scheme by CSD and banks allow most people to purchase motor bikes easily. Most of these people do not have driving licence and driving sense which accounts for large number of motor cycle accidents.

Motor bike accidents in our study occurred in young active adults. These individuals use motor cycles as a mode of transport for study, business and other outdoor work. Similar age groups are involved in the study conducted by Solagberu BA<sup>5</sup> and Zargar M<sup>6</sup>. However, an Austrian study<sup>7</sup> showed that the peak incidence occurred in 11-19 yrs age group.

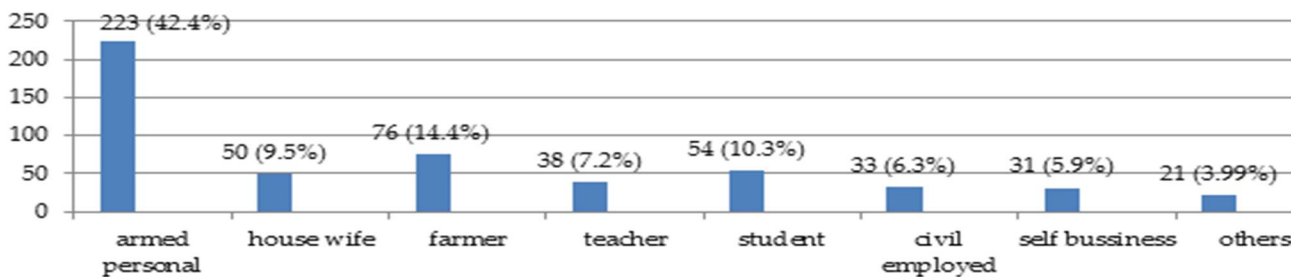
Male out number the female 4.05:1. It is because that in this part of the society, most of the outdoor work has to be done by the male and they have to travel long distances. Females mostly do indoor work and are less vulnerable to these accidents.

Bulk of the patients belonged to Armed Forces. It is because the data were collected from Combined Military Hospital Pannu Aqil which mainly looks after Armed Forces personnel.

Orthopaedic injuries (421) were the

vulnerable to the fracture. Lower limbs fractures result from the direct impact from front side and rear during motor cycle collision. Apart from the primary impact, lower limbs are also vulnerable to fracture as a result of secondary fall because of road traffic accident. A study<sup>11</sup> published in Singapore medical journal found that right leg is more commonly injured than left lower limb. They emphasised that leg protective gear, for example protective long boot should be worn by the individual and motor bike should have bar in front of the leg to shield them from getting injured. In upper limbs fracture radius ulna (37%), fracture humeral shaft (23%) and fracture distal radius (19%) are most common fractures. These fractures occur mostly as a result of fall on the out stretch hand during motor vehicle accident. Supracondylar fracture humerus in children (19%), fracture distal humerus (12%) and fracture olecranon (3%), occur due to direct blow on the elbow. Rubin G et al<sup>12</sup> found that upper limb fractures are more common in motor cycle accidents than in motor vehicle accidents.

Low incidence of head injuries when compared with the orthopaedic injuries is because 58.1% were using helmets. Helmet use was similar to another study conducted in



**Figure: Employment distribution of motor bike accident related injured patient (n=526).**

commonest. Fracture tibial shaft (56) and fracture femoral shaft (59) were the commonest orthopaedic injuries. The results were similar to studies by Pang TY et al<sup>8</sup>, Kortor JN et al<sup>9</sup> and Lateef Fatima<sup>10</sup> in which lower limb fracture was the most common orthopaedic injury. This is due to the fact that lower limbs are exposed while driving the motor bike and hence more

Karachi<sup>13</sup>. The use of helmet in the present study was higher than Sudan<sup>14</sup> and Uganda<sup>15</sup>. It is significantly in a study carried out in Singapore<sup>9</sup> where use of helmet is nearly 100%. Helmet use is mandatory for anyone who is sitting on the motor bike in Pannu Aqil cantonment. Most of the head injuries occurred in individuals who were living outside the cantonment and were not

using helmet. The use of helmet not only decreases patient morbidity but also reduces hospital expenses on surgery and intensive care management. Helmets reduce the chance of head injury by 72%<sup>16</sup>.

There was positive correlation between high speed impact and frequency of abdominal (73%), thoracic (15%) and urological (9%) injuries ( $p$ -value <0.05). They were all blunt abdominal and thoracic injuries. These were deceleration or direct impact injuries. There were no penetrating injuries. Low frequency of abdominal and thoracic injuries were related to lower power engine size (125 cc or below motorcycles) used by the population in question. An American study<sup>17</sup> showed increase in risk of thoracic and abdominal injuries when 1000 cc motor bikes were involved in accident.

There were 74 cases of soft tissue injury with contusion abrasion (29%) being most common. Thirty patients had soft tissue injuries associated with orthopaedic injuries. Twenty four patients had open tibial shaft fracture which has major physical, psychological and financial impact on patient life. These patients had to go through prolonged treatment, bear costly hospital expenses and more over they remained off duty during this time. Soft tissue injuries occur as the driver and second passenger's unguarded skin gets abraded by rough road surface or direct impact of unprotected skin to other motor vehicle. Similarly laceration occurs when unshielded skin has contact with sharp object such as pointed stone, glass piece. Different studies<sup>18-20</sup> has shown effectiveness of protective clothing in preventing soft tissue injuries. Schuller E et al<sup>21</sup> found that protective clothing reduces soft tissue injury by 43%, moreover these patients had shorter hospital stay and had 40% less likelihood of suffering permanent disability as compared to those who were not using protective clothing.

## CONCLUSION

The frequency of orthopaedic injuries, along with abdominal thoracic and urologic injuries

was more as compared to the head and spinal injuries among the motor bike accidents.

Motor cycle occupants are exposed to injuries in case of accident. Efforts should be made to prevent motor cycle accident. Strict legislation should be made so that only those holding valid driving licence can purchase a motor bike. While assessing the individual for driving licence, thorough evaluation of skill and road safety should be done. Strictness in traffic rules will also help in decrease the motor cycle accident. Motor cycle design should be altered to give some protection such as protective bar to shield most vulnerable lower limbs. It should be mandatory for driver and second occupant to wear protective clothing and helmet while sitting on a motor bike. These changes can be brought about by running public education awareness programmes. This will not only decrease the motor cycle accident, but in case of accident will give some protection to the occupant of the motor bike. More-over, it will decrease the number of injuries, disability and reduce hospital cost.

## CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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