

## UNDERSTANDING MOTORCYCLE ACCIDENT INJURIES: PATTERNS OBSERVED AT A TERTIARY CARE HOSPITAL OF SWAT

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### ABSTRACT

**Background and objectives:** Road Traffic accidents (RTA) are the leading cause of death and disability worldwide, with approximately 3,500 deaths occurring on roads every day and tens millions injured or disabled each year. If current trends continue, road crashes are predicted to become the fifth leading cause of death by 2030. The study aims to evaluate the patterns of injuries in patient presenting with motorcycle accident injuries in emergency department.

**Methods:** It was a cross-sectional study conducted at department of trauma and Orthopedic emergency unit Saidu Group of Teaching Hospital Swat (SGTH) from February 15<sup>th</sup>, 2023 to February 14<sup>th</sup>, 2024. After obtaining informed consent, 376 patients of both gender presenting with road traffic accidents due to motorcycle were included in the study through consecutive sampling. Data were collected on a structured proforma and analyzed using SPSS-26.

**Results:** Out of 376 patients, the most common fractures were Tibial Shaft Fracture 69 (18.4%) of patients, followed by Distal Femur Fracture in 48 (12.8%), Tibial Fracture in 43 cases (11.4%) and Distal Tibial Fracture in 33 cases (8.8%). Additionally, it was found that 52 patients (13.8%) presented with spinal, head, and neck injuries, with the majority (46 out of 52) not using protective helmets while driving. Management strategies included closed reduction with back slab support for 162 patients (43.1%), open reduction and internal fixation for 119 patients (31.6%), emergency fasciotomy for 38 patients (10.1%), and amputation for 5 patients (1.3%) to prevent further complications. About 52 patients (13.8%) suffered head and neck and spine injuries and were referred to neurosurgical department.,

**Conclusion:** motorcycle accidents can cause a range of Injuries, from minor bruises to fatal head injuries. Understanding pattern of injuries and emergency management in victims of motor cycle accidents will able trauma team to preplan the resources accordingly based on evidence which will help them in better management of different injuries.

**Key Words:** Trauma, Fracture, Closed reduction and back slab support, open reduction and internal fixation, Fasciotomy, Amputation.

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Road Traffic injury/accidents (RTA) is an injury or death that occurs as a result of an accident involving at least one vehicle moving on a public road.<sup>1</sup> RTAs are the leading cause of death and disability worldwide, with approximately 3,500 deaths on our

roads every day and tens millions injured or disabled each year. There are around 1.3 million people. If current trends continue, road crashes are predicted to become the fifth leading cause of death by 2030<sup>1</sup>. Traffic accidents are considered the most common type of accidents and threaten many people every year.<sup>2</sup> These accidents are the eighth leading cause of death; it is also stated to be the leading cause of death in the 15-29 age group. Therefore, RTAs are a major public health problem worldwide.<sup>3</sup> According to the Global Status Report on Road Safety 2018, road traffic accidents (RTAs)

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rank as the eighth leading cause of death globally. Every year, approximately 1.35 million people lose their lives and up to 50 million suffer injuries due to RTAs, with a significant impact observed among individuals aged 5–29 years. This highlights a critical issue affecting a wide age range and emphasizes the urgent need for effective road safety measures to prevent such tragedies.<sup>4</sup> Southeast Asian countries in the top five in accidents and deaths caused by road traffic accidents (RTA).<sup>5</sup> Traffic accidents cause greater than 1.24 deaths, around ten million disabilities and 50 million injuries each year.<sup>6</sup> Industrialization has in an increased in the rate of Road traffic accidents (RTA).

Incidence of different pattern of RTAs are revealed when considering the population of area. According to the previous literature, minor and more serious injuries are more prevalent in urban areas whereas fatal injuries are common in rural areas.<sup>7</sup> Motorcycle is one of the most popular mode of transport in developing countries such as Pakistan. Only in Karachi (the most populated city in Pakistan) more than 900 new motorcycle are registered every day and number are expected to reached 3.8 million by 2030.<sup>8</sup> Motorcyclists are the most vulnerable in road accidents. These type of vehicles are unsafe and are mostly are used by young people.<sup>9</sup> Motorcyclist are 9.5 times at higher risk of accident and deaths compare to other road drivers.<sup>10</sup> In Pakistan study conducted at Jinnah post graduate center karachi,<sup>11</sup> it's found out that younger males were more prone to motorbike injuries. Lower limb abrasions and fractures were the most common injuries. Mental depression, young age and lack of driving expertise were the major risk factors for motor bike accidents.<sup>12</sup> Identification of demographic characteristics and accident context is important for the prevention, control and analysis of road accidents. Based on this and considering the high fatality rate of motorcyclist in accidents, this study aims to evaluate the patterns of injuries in patient admitted to the emergency department of Saidu group of Teaching Hospital Swat.

## METHODS

This was a cross-sectional study conducted at department of trauma and Orthopedic emergency

unit Saidu Group of Teaching Hospital Swat (SGTH) from February 15, 2023 to February 14, 2024 (One-year duration). Ethical Board approval were obtained from the institutional board of Saidu Medical College Swat (EBR# 44-ERB/024) Sample size was calculated using open epi.com software, keeping population size one million, anticipated frequency 74%,<sup>13</sup> margin of error 5%. For 97% confidence interval, the approximate sample size would be 363. Written informed consent were taken from either patient or patient first relative for inclusion in the study.

After informed consent patient with age between 10 to 70 years, who presented to trauma and orthopedic emergency unit of SGTH within 24 hours after motorbike accident sustaining closed injuries were included in the study. Moreover, all those patients having age below 10 or above 70 years, pregnant women, those who did not give informed consent, having multiple comorbidities, osteoporosis were excluded from the study. Strictly inclusion and exclusion criteria were followed in order to control confounder and bias in the study.

After obtaining informed consent, patients participating in the study were referred to the trauma ward for further evaluation, including detailed clinical and physical examinations. Radiographic images including X-rays in multiple views, Computer tomographic image and Magnetic resonance image of different bones based on patient subjective complaints were taken. Expert opinion were taken from consultant Diagnostic radiologist, orthopedic neuro surgeon before final diagnosis. All data were recorded in google document form and Microsoft Excel sheet. Data include information about patient age, gender, Type of trauma, Sustained injuries, duration between injuries and hospital arrival, past medical and surgical history.

The data was analyzed in IBM SPSS version 26. Frequency and percentage were computed for categorical value like gender and measure of center tendency, distribution and dispersion were analyzed for scale data like age. All data were documented in tables and charts.

**RESULTS**

The study was conducted on 376 subjects, out of them 281 (74.73 %) were male and 95 (25.26 %) were female. Male to female distribution ratio were around 3:1. Age Distribution among these subjects were done into three groups (Table 1) with mean age of 30.59 Year (SD= 9.14). All these patients presented to Emergency department of SGTH Swat after Motor-bike accidents and among them pattern of different injuries were studied.

Out of 376 subjects, fracture around the knee were most common fracture; 69 patients present with Tibial

**Table 1:** Gender and age distribution of the victims (n=376)

Gender Wise Distribution		
Gender	Frequency	Percentage
Male	281	74.73 %
Female	95	25.26 %
Age Group wise Distribution		
Age Group	Frequency	Percentage
15-to-30 Year	210	55.85 %
31-to-45 Year	136	36.17 %
46-to-60 Year	30	7.97 %

**Table 2:** Frequency distribution of type of injuries in the victims

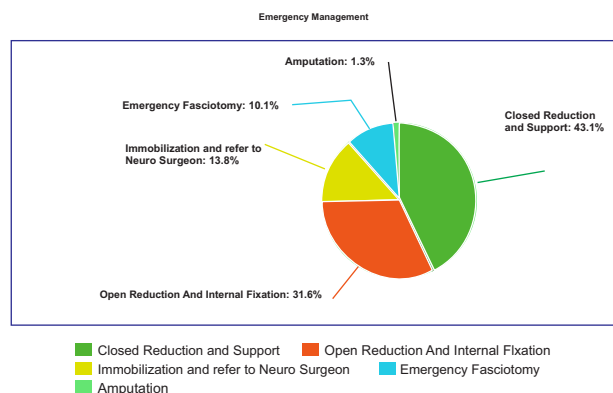
Type of Injuries	Frequency	Percentage
Tibial Shaft Fracture	69	18.35 %
Distal Femur Fracture	48	12.76 %
Proximal Tibial Fracture	43	11.43 %
Distal Tibial Fracture	33	8.77 %
Shaft of Femur Fracture	28	7.44 %
Pelvic Fracture	24	6.38 %
Hip Fracture	20	5.31 %
Forearm (Radial and/or Ulnar Fracture)	19	5.05 %
Multiple Bone Fracture	18	4.78 %
Ankle Fracture	11	2.92 %
Humerus bone Fracture	11	2.92 %
Head and Neck Injuries	26	6.91 %
Spinal injuries	26	6.91 %

Shaft Fracture, 48 with Distal Femur Fracture, 43 having with Tibial Fracture, 33 with Distal Tibial Fracture, 28 Shaft of Femur Fracture, 24 with Pelvic Fracture, 20 with Hip bone fracture and 11 with Ankle bone fracture. Aside from lower limb bone fracture, 19 patients

present with forearm i.e. Radial and/or ulnar bone fractures and 11 with Humerus bone fracture. Moreover, 18 patients presented with multiple bone fracture including bone from upper limb, lower limb and trunk. Additionally, 52 patients also present with spinal, head and neck injuries. (Majority of them 46 out of 52) did not use protective helmet during driving. All the 52 patients were Immobilization and referred to the Neuro-surgery division for further management Table #2.

**Table 3:** Frequency distribution of management according to the type of injury

Type of Injuries	Closed Reduction and Back Slab Support	Open Reduction And Internal Fixation	Emergency Fasciotomy
Tibial Shaft Fracture	34	29	05
Distal Femur Fracture	24	12	12
Proximal Tibial Fracture	24	16	03
Distal Tibial Fracture	19	13	01
Shaft of Femur Fracture	11	00	17
Pelvic Fracture	10	14	00
Hip Fracture	11	09	00
Forearm Fracture	15	04	00
Multiple Bone Fracture	00	18	00
Ankle Fracture	04	03	00
Humerus bone Fracture	10	01	00



**Figure 1-** Distribution of emergency management procedures

Different emergency management protocol was used in different patient depends upon the severity of underlying pathology. out of 376 patients, 162 were manage by applying Closed reduction and back slab support, 119 with open reduction and internal fixation,

52 were refer to Neuro surgery department, 38 patents need emergency Fasciotomy and Only five needs Amputation to prevent further complications (1 amputation in tibial shaft fracture and 4 in ankle fractures) (Figure 1). Cross-tabulation of Underlying pathology and Emergency management are shown in table number 3.

## DISCUSSION

Motorcycle accidents remain a significant public health problem with increasing trends in recent years.<sup>14</sup> In large city of developing countries motorcyclist face a high risk of accidents resulting in traumatic injuries including polytrauma.<sup>15</sup> Our study aims to determine pattern of different injuries in motorcycle accident. Majority of patients in our study were male with male to female ratio were about 3:1. In Pakistan, culture and social norms make it extremely rare for women to drive a motorcycle. Study Conducted in Saudi Arabia found out the most common injuries that patients presented with after a road traffic accident (RTA) were fractures, followed by lacerations and cuts.<sup>16</sup> Consistent with our findings previous literature<sup>15,17</sup> have also reported a lower number of female participant in similar type of studies. In our findings 55% of injuries were in age group between 15 to 30 years. Previous literature<sup>16</sup> also indicate that young people are prominent involve in fetal motorcycle accidents.

In our study lower limb injuries were more prevalent as compared to upper limbs and other injuries in victim of motor cycle accident. This correlate with other studies in previous literature conducted by MW Ahmad et. al<sup>18</sup> which find out that lower limb injuries were the most common injures in motor cycle accident. In lower limb, fracture around the knee joint are most common associated with motor cycle accident in our study. It includes tibial shaft bone fracture, proximal tibial bone fracture and distal femur bone fracture. Previous literature, including studie conducted by Ghasempouri et al. investigating traumatic injuries in road accidents<sup>19</sup> had find out Lower extremity injuries are the most common injuries in road accidents, followed by upper extremity, spinal cord, and head

injuries. Although head and spinal cord injuries occur less frequently, they often result in permanent disability or death.

Moreover, in upper limb the most common injuries occur to the forearm bone including radius and ulnar bone accounting for 5 % of overall injuries. According to available literature, tibia being the most common site of injuries in lower limb while radius being the most common fracture in upper limb in victim of motor cycle accidents.<sup>20</sup> Apart from orthopedic injuries, around 14 % patients presents with head, neck and spinal injuries. Majority of them lack protective gears. World health organization report on traumatic brain injuries reported that around 69 million people sustain head injuries each year.<sup>21</sup> Outcome of these patients include neurological impairment, moderate to severe disability and even death.<sup>22</sup> Therefore, all these patient having neurological trauma were referred to neurosurgical department for further follow up and management.

## CONCLUSION

In conclusion, motorcycle accidents can cause a range of Injuries, from minor bruises to fatal head injuries. Although orthopedic injuries occur most commonly in motorcycle injuries but Neurological injuries like head, neck and spinal injuries are also of major concern. Understanding pattern of injuries and emergency management in victims of motor cycle accidents will able trauma team to follow evidence based protocol in diagnosis and management of different injuries.

### Ethical Approval:

The ethical Approval was obtained vide letter no. 44-ERB/024

### Conflict of Interest:

*None*

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