

“PREVALENCE OF ORTHOPEDIC INJURIES IN MOTORCYCLE ACCIDENTS IN PATIENTS PRESENTED TO KHALIFA GUL NAWAZ TEACHING HOSPITAL BANNU”

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ABSTRACT

Objective: To determine the prevalence of orthopedic injuries in motorcycle accidents in patients presenting to Department of Orthopedic, K.G.N. Hospital, Bannu, KPK.

Methodology: This descriptive study was done at Department of Orthopaedic & Traumatology, K.G.N. Hospital, Bannu, KPK in a total of 258 patients with motorcycle related orthopedic injuries, from August 2014 to August 2015 (One year).

Results: Majority were males 249 (96.51%) and 09 (03.48%) were females, 50 (19.37%) were between 11-20 years of age, 122 (47.28%) between 21-30. Majority injuries 139 (53.87%) were on the lower limbs, 105 (40.69%) on the upper limbs, 10 (3.87%) in the cephalic segment and 04 (01.55%) on the spine. In majority 60 (23.25%) fractures located on the knee, 55 (21.31%) on the ankle, 26 (10.07%) on the hand, 97 (37.60%) wounds, 80 (31.00%) bruises, 41 (15.90%) closed fractures, 16 (06.20%) openfractures. In 122 (47.28%) cases fracture was on the bones of the foot, 65 (25.19%) on the ankle, 44 (17.05%) on the femur, 13 (05.03%) fibula/tibia, 08 (03.10%) on the bones of the hand, 03 (01.16%) on the wrist, 02 (00.77%) on the clavicle and 01 (00.38%) on the other bones.

Conclusions: From the results of this study, it is concluded that RTA was a leading cause of bone fractures especially in individuals in their 2nd and 3rd decades of life, constituting most of its victims. Males were observed to be predominantly involved with the lower extremity the most affected site of bone fractures of foot and knees.

Key words: Motorcycle-road traffic accidents; fractures and injuries; tibia, lower extremity injury.

INTRODUCTION

Motorcycle accidents are one of the major causes of road death and injuries all over the world.¹⁻³ In 2002 road traffic accidents caused more than 2 million deaths all over the world. It was the 2nd leading cause of deaths among 15 - 44 years of age and 80% of these deaths occurred in developing countries.⁴ By 2020 road traffic accidents are expected to be the 3rd leading cause of death and disability worldwide.⁵

Motorcycles have come into extensive use as mode of transport and commuting to work.⁶ The number of motorcycles has increased especially in large urban areas possibly due to increasing fuel costs, intense traffic and low purchase price for motorcycles.⁷⁻¹⁰ Despite being considered dangerous, motorcycles are an attractive and cheap option for leisure and/or work, particularly, in urban areas.⁷ Motorcyclists are extremely vulnerable road participants who are exposed to severe, often fatal injuries.¹¹

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Trauma caused by motorcycle crashes is extensive, expensive and increasing. American literature has shown that more people than ever are purchasing motorcycles, particularly more middle-aged men.¹² An article by Hinds and colleagues¹³ showed that in the United Kingdom a motorcyclist is killed or seriously injured every 665894 Km compared with 18661626 Km for cars.

Motorized two-wheeled vehicles account for a large proportion of road traffic in Pakistan and riders of such vehicles have a high risk of road injuries.¹⁴

Motorcycle riders would be more vulnerable in the event of a crash because of their lack of protection which would often result in suffering from more severe injuries than car drivers.¹⁵ Motorcyclists are about three times more likely than car occupants to be injured in a crash and 16 times more likely to die.^{6,16} Contrary to a car crash, in a motorcycle crash, the riders often absorb all kinetic and compressive energy resulting from the crash.^{17,18} Among those who are injured in a motorcycle crash, injury to head and leg is much more prevalent.^{1,3,19} Motorcycles are considered to be one of the most dangerous modes of transportation because of increased risk of direct energy transfer to motorcycle riders and/or passengers.²⁰

Motorcyclists typically suffer multiple injuries; head and lower limb/pelvic injuries being the most frequent.^{21,22} Unfortunately, injuries sustained by motorcyclists tend to have chronic consequences, particularly

following brain injury,²³ and this is typically and most tragically among young males in the most productive years of their lives.²⁴

The objective of the study was to determine the prevalence of orthopedic injuries in patients having motorcycle accidents presenting to orthopedic department of Khalifa Gul Nawaz Teaching Hospital, Bannu, KPK.

METHODOLOGY

This study was conducted at the department of trauma and Orthopedics, K.G.N. Hospital, Bannu, KPK with motorcycle related orthopedic injuries, from August 2014 to August 2015 (One year). Patients who were brought to this hospital with motorcycle-related accident victims that required orthopedic treatment were included in this study irrespective of their age and sex, were included as per inclusion criteria. Patients with head injuries and comorbidities that required multidisciplinary treatment in hospitalization were excluded.

All these patients were received in orthopedic trauma centre (Emergency Department). All these patients were resuscitated and evaluated on arrival to the hospital. These patients were individualized on the basis of clinical parameters and group as stable and unstable. After hemodynamic stabilization decision regarding surgical intervention was made on the basis of clinical features and radiological examination. In this manner patient were grouped as those requiring conservative management or surgical intervention.

All patients were treated at the Emergency Department, resuscitated and transferred to the operating room for definitive care including close treatment, generous surgical wound debridement and skeletal fixation of their fractures. For unstable and open fracture patients, we use external fixators to stabilize the fractures. All patients received triple antibiotics, anti-tetanus injections and cleaning of wounds.

RESULTS

A total of 258 patients with motorcycle related orthopedic injuries, from August 2014 to August 2015 (One year), were reported in trauma and orthopedic unit, Khalifa Gul Nawaz Teaching Hospital, Bannu, KPK.

Among the 258 patients with motorcycle related orthopedic injuries, majority were males 249 (96.51%) and a little proportion of females 09 (03.48%) who were also on motorcycle at the time of accident, were injured.

According to age distribution of accident victims, 50 (19.37%) individuals were between 11-20 years of age, 122 (47.28%) between 21-30, 33 (12.79%) between 31-40, 29 (11.24%) between 41-50, 13 (05.03%) between 51-60, 09 (03.48%) between 61-70 and 2 (0.77%) were between 71-80 years of age. Details are summarized in Table No. 1.

As regards the type of accident, it was observed

Table no. 1: Various Characteristics of Patients (n=258)

Demographic data	No. of Cases	Percentage
Age ranges:		
11 – 20 years	50	19.37%
21 – 30 years	122	47.28%
31 – 40 years	33	12.79%
41 – 50 years	29	11.24%
51 – 60 years	13	05.03%
61 – 70 years	09	03.48%
71 – 80 years	02	0.77%
Gender distribution:		
Male	249	96.51%
Female	09	03.48%

Table No 2: Types of Accident, Injuries, and Distribution of Injuries, etc. of Cases (n=258)

Various Data	No. of Cases	Percentage
Type of accident:		
Motorcycle/Car	180	69.76%
Fall	55	22.31%
Motorcycle/Structure	18	06.97%
Motorcycle/Motorcycle	05	01.93%
Injuries by body segments:		
Lower limbs	139	53.87%
Upper limbs	105	40.69%
Cephalic	10	03.87%
Spine	04	01.55%
Specific distribution of injuries:		
Knee	60	23.25%
Ankle	55	21.31%
Hand	26	10.07%
Leg	25	09.68%
Shoulder	22	08.52%
Elbow	21	08.13%
Foot	18	06.97%
Wrist	15	05.81%
Thigh	12	04.65%
Forearm	04	01.55%

Table No 3: Types of Injuries, and Location of Fractures in Cases (n=258)

Various Data	No. of Cases	Percentage
Type of injuries:		
Wound	97	37.60%
Bruise	80	31.00%
Closed Fracture	41	15.90%
Open fractures	16	06.20%
Dislocation	09	03.48%
Sprain	05	01.95%
Vascular injury	04	01.55%
Ligament injury	03	01.16%
Tendon injury	02	00.77%
Nerve injury	01	00.40%

Table No. 4: Distribution of Fractures (n=258)

Location	No. of Cases	Percentage
Foot	122	47.28%
Ankle	65	25.19%
Femur	44	17.05%
Fibula/tibia	13	05.03%
Hand	08	03.10%
Wrist	03	01.16%
Clavicle	02	00.77%
Others	01	00.38%

a predomination of 180 (69.76%) collisions between motorcycle and car followed by simple fall, which represents 55 (22.31%) accidents, motor cycle/structure 18 (06.97%) Motorcycle to motorcycle 05 (01.93%).

The distribution of injuries considering the body segment, showed majority 139 (53.87%) were on the lower limbs, 105 (40.69%) on the upper limbs, 10 (3.87%) in the cephalic segment and 04 (01.55%) on the spine.

Specific distribution of injuries showed that majority 60 (23.25%) located on the knee, 55 (21.31%) on the ankle, 26 (10.07%) on the hand, 25 (09.68%) on the leg, 22 (8.52%) on the shoulder, 21 (8.13%) on the elbow, 18 (06.97%) on the foot, wrist 15 (05.81%), thigh 12 (04.65%), and forearm 04 (01.55%) (Table No. 2).

As regards the types of injury, we have obtained 97 (37.60%) wounds, 80 (31.00%) bruises, 41 (15.90%) closed fractures, 16 (06.20%) open fractures, 09 (03.48%) dislocations, 05 (01.95%) sprains, 04 (01.55%) vascular injuries, 03 (01.16%) ligament injuries, 02 (00.77%) tendon injuries and 01 (00.40%) nerve injuries (Table No. 3).

Bearing in mind the location of the fractures we found 122 (47.28%) on the bones of the foot, 65 (25.19%) on the ankle, 44 (17.05%) on the femur, 13 (05.03%) fibula/tibia, 08 (03.10%) on the bones of the hand, 03 (01.16%) on the wrist, 02 (00.77%) on the clavicle and 01 (00.38%) on the other bones (Table No. 4).

DISCUSSION

The national injury survey in Pakistan has shown the yearly overall incidence of trauma to be 41 injuries for every 1000 persons.²⁵ This survey illustrates that road traffic accidents are one of major factor for injuries. Road collisions are the second cause of death among the youth (5-29 years old people) and the third cause of death among 30-44 years old people.²⁶

The most common cause of morbidity and mortality in the most productive period of life worldwide are road traffic accidents causing fractures.²⁷ It is not surprising, therefore, that these fractures occur most in people aged between 18 and 55 years with peak in fourth decade with male predominance.^{28,29}

In our study majority cases (47.28%) were between the age of 21-30 years, who were injured due to motorcycle accident. In a study of 387 patients needing only traumatic orthopedic treatment, were between 16 and 44 years of age.³⁰ In a local study done at Allied Hospital/Punjab Medical College, Failasalabad, Punjab, the age of injured patients was between 3 and 90 years with mean of 46.5 years with peak frequency of 21-30 years 318 (31.7 %).²⁰ The reason why the youth (at the age of 20 - 40 years) are involved in motorcycle could be explained by the fact that at this age group majorities are engaged in productive activities that require them to move fast enough from one area to another and in so doing are predisposed to risks of being involved in road traffic crashes.

In our study majority of motorcycle crash injury victims were males. Few (03.48%) of the females victims were also sitting on motorcycle at the time of the crash. Similar findings have been reported elsewhere.^{22,31-33} Similarly in another study of 387 patients needing only traumatic orthopedic treatment, majority of which 354 were males (91.0%).³⁰ In a local study done at Allied Hospital/Punjab Medical College, Failasalabad, Punjab, a total of 1003 patients were included who sustained road traffic injuries during the study period of one year. 859 (85.6%) patients were male. 144(14.4%) were female (M: F Ratio of 6:1).²⁰

The young males in their most reproductive and productive years were found to have high occurrence of motorcycle accidents which has been attributed to wide range of risky activities performed by this class of people. Males have more exposure to traffic as driver as well as passengers as they have to travel long distances to work and are more often involved in the use

of automobile as leisure activities. In Pakistan, a large proportion of motorcycle riders are male, most of them use it for commercial purposes. There is increased tendency in young males to have reckless riding without wearing helmet, over speeding, overloading and riding under the influence of alcohol and/or drug addiction.²⁰

The majority of fatalities occur in young male riders within the productive age group of 20–39 years.³⁴ Common cause of injuries in young riders is to ride without helmet and other protective gears and violation of traffic rules. The passengers are second most common victims in motorcycle accidents followed by pedestrians. Similar results were obtained from study conducted in Karachi.²⁵

Lower limb injuries contribute with the highest rates of morbidity and prolonged hospital stay and contribute from 18% to 80% of all the injuries.^{35,36} Most common pattern of orthopaedic injuries are fracture of lower limb bones particularly tibia followed by fractures of upper limb. This is because of direct energy transfer to the motorcycle riders and/or passengers during a collision. A study²⁰ found that the right side of the body of trauma victims is most likely to be injured. Majority of open fractures are noted in lower limb predominantly tibia fractures. This result is comparable with other studies.^{25,37} In all types of motorcycle accidents, lower proportion of injuries below 10 and above 60 years of age is due to their less exposure to the external environment.²⁵

In this study the lower extremities were the commonest body regions injured (53.87%) followed by upper extremities. This is in agreement with the previous findings elsewhere.^{22,31,38,39} The vulnerability of the extremities in particular the lower limbs could be due to a number of factors such as anatomical location, lack of protectors on the extremity and poor assembly of rear wheel. In this study as with other studies from elsewhere the commonest lower limb injuries were found to be fractures of tibia and fibula.^{22,31,32,40} Similarly in another study of 148 patients, lower and upper extremity injuries were 93 (62.8%) and 85 (57.4%) respectively.⁴¹

In our study we observed a predomination of collisions between motorcycle and car followed by simple fall. The greater severity of the fractures, bruises and wounds is listed in this study when the accident involves collision between the motorcycle and another vehicle (69.76%), followed by simple fall (22.31%). In agreement with a study of 387 patients needing only traumatic orthopedic treatment, the most common mechanism of trauma involved a collision between the motorcycle and another vehicle was 67.0% at a high speed.³⁰

In a study the most common orthopedic motorcycle injuries were tibia/fibula, spine, and forearm fractures, which occurred in 238 (19%) evaluations, 203 (16.2%), and 127 (10.1%) respectively.⁴²

In a recent study the femur was the most fractured long bone with 19 (38.78%) of its fractures occurring at its distal third, 17 (34.49%) of fractures occurred at its proximal third, while 13 (26.53%) at the midshaft. The tibia/fibula was next with fractures at its distal third, midshaft and proximal third accounting for 17 (45.95%), 12 (32.43%) and 8 (21.62%) of its fractures respectively.⁴³ Similarly in this study it was found that foot, ankle, femur, fibula/tibia were the common fractures.

In a local study done at Karachi showed that there were 210 (55.25%) closed fractures. In 165 patients (43.42%) the frequently found fracture was that of tibia shaft. Open fractures of tibia were observed in 107 patients (63.69%).⁴⁴ In contrast to the above referenced study we found wounds, bruises, closed fractures, open fractures, dislocations, sprains, vascular injuries, ligament injuries, tendon injuries and nerve injuries in descending order.

Every year a lot of people die in their productive age due to such type of accidents and hence leading to significant socioeconomic impact both at household and national level.²⁰

CONCLUSIONS

From the results of this study, it is concluded that road traffic accidents (RTA) were demonstrated to be a leading cause of bone fractures especially in individuals in their 2nd and 3rd decades of life, constituting most of its victims. Males were observed to be predominantly involved with the lower extremity the most affected site of bone fractures of foot and knees.

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