Original Article

Pattern of Maxillofacial Injuries in Patients of Motor Bike Accidents with Helmet and without Helmet

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ABSTRACT

Objective: Objective of study is to investigate the frequency and pattern of maxillofacial injuries related to motor bike accidents among helmeted and non-helmeted riders.

Study Design: Cross sectional observational study

Place and Duration of Study: This study was conducted at the Nishter Institute of Dentistry, Multan from February 2020 to February 2021.

Materials and Methods: Data were obtained through interview and physical examination. A total of 150 patients with maxillofacial injuries presented at emergency and outdoor department were included in the study. Frequency and pattern of fracture and ration of helmet users are main variables of study. SPSS version 23 was used for data analysis. Mean ± SD and frequency (percentages) were calculated. Test of significance were applied and p values less than or equal to 0.05 was taken as significance.

Results: A total of 18.7% patients were with helmet and 81.3% without helmet. In patients with helmet, mandible, dentoalveolar region, angle of mandible, parasymphysis region and mandibular condylar were found as 50.0%, 42.9%, 7.1%, 17.9% and 14.3% respectively. While, in patients without helmet, dentoalveolar region, angle of mandible, parasymphysis region and mandibular condylar were found as81.1%, 77.9%, 95.9%, 81.1% and 46.7%, respectively. Zygomaticomaxillary complex fractures were most common in not-helmeted patients. The differences were statistically significant.

Conclusion: Motor bike riding without use of helmet is main cause of maxillofacial fractures which are common in young males compare to female due to lack of trend towards female riders. Mandible is the frequent fracture place with dentoalveolar pattern in motorbike accident patients.

Key Words: Maxillofacial Trauma, Road Traffic Accidents, Motorcycle Related Injuries, Helmet use.

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INTRODUCTION

In human body face is anterior part of skull anatomically divided into three segments, upper, middle and lower third of face, from inside-out consisting of bone, muscles, subcutaneous tissue and superficial layer of skin[1]. This datum makes it more exposed to injury in case of any tragedy. In Europe most frequent cause of facial trauma is assault but in developing countries motor bike and other road traffic accidents are common reason of maxillofacial injuries[2]. A remarkable trend has been noticed in developed and developing countries regarding ratio of accidents and facial injuries that may be due to rigidexecution of traffic rules[3].

Maxillofacial trauma involves injury to facial hard and soft tissues that may present as minor lacerations, abrasions, contusions or fractures of upper, middle or lower third of face. Array of facial injuries wasdescribed by Hippocrates as long ago as four thousand (400) BC. Maxillofacial trauma is common in both situations war and peace[4].

In Pakistani population 39-54% of maxillofacial injuries are due to road traffic accidents. Motorcycle is the most unsafe vehicle because of its two wheel design, lack of airbag installation and balancing problem[5]. There is no safety vessel around the driving person which makes them more susceptible to accidents and crashes during slipping and collision. Other then vehicle many factors are involved like poor legislation of traffic laws, substandard roads and lack of visibility especially at night time[6].

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Human factors include over speeding and ignorance of safety measures like helmets wearing, alcohol intake and substance use before driving[7]. Non helmeted motor bike riders are three times more prone to maxillofacial hard and soft tissue injuries as compared to motorcyclist who wearhelmet. Beyond the external protection, helmet provides little more shielding against traumatic brain injuries and reduces the severity of other facial injuries[8].

In Pakistani population extensive information is needed about epidemiological features of this problem considering its role on patients financial standing, psychological impact and quality of life[9, 10]. Even though the effectiveness of helmet use on mitigating head injuries in motorbike accidents is eminent but its influence on pattern of facial injuries is not well documented. This study would be helpful in evaluation of site of fracture and pattern of maxillofacial injury among riders of motor bikes who were wearing helmet and who were not.

MATERIALS AND METHODS

This cross sectional study was conducted at Nishtar Institute of Dentistry, Multan. Duration of study was one year from February 2020 to February 2021. Ethical approval from hospital ethical board was obtained before start of study. Informed written consent was obtained from patients before inclusion in study. Non probability consecutive sampling technique was used. Sample size was calculated by using online calculator SPSS version 23. Patients presented at emergency and outdoor department with maxillofacial fracture as a result of motor bike accident were enrolled in study. Maxillofacial fractures because of any other cause were excluded from study. Fig 1 and Fig 2 shows patient presented to us in Nishtar emergency department.

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History, clinical examination and other laboratory and radiological investigations were taken to make diagnosis. Orthopantomogram,submentovertex view, occipitomental view, lateral oblique view, Posteroanterior mandible view were main diagnostic tools. Computed tomography and magnetic resonance imaging was taken according to indications.

Collected data was entered in Statistical Package for Social Sciences (SPSS) version 23. Continuous variables were calculated and presented as mean and standard deviation like age. Catagorical data was calculated and presented as frequency and percentages like gender, pattern of fracture and use of helmet (yes/no). Test of significance (t-test and chi square test) were applied to see association among variables. P value ≤0.05 was considered as significant.

RESULTS

One hundred and fifty trauma patients were included this study. The mean age of the patients was 25.12±3.51 years and all of them were males. The proportion of helmet use in patient in our study was as shown in (Figure. 3).

Figure No. 1: A. RTA patient without helmet presented at emergency dpt, B. After initial management C. Follow up after 6 months

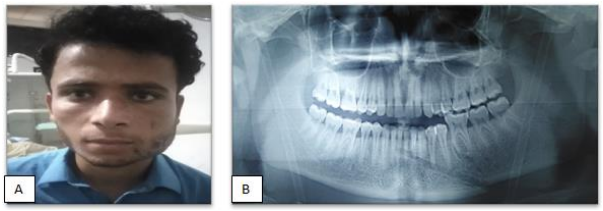

Figure No. 2: A. RTA patient with helmet presented at emergency dpt, B. OPG of same patient showing left oblique body fracture.

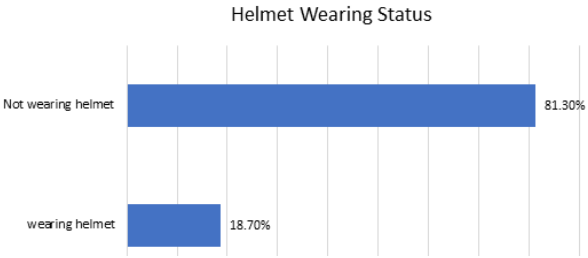

Figure No.3: Proportion of helmet use

The frequency of maxillofacial fracturesin helmeted patients was too low as compared to patients without helmet as shown in table 1. The differences were statistically significant (Table. 1).

Table No. 1: Mandibular Fracture distribution with respect to helmet wearing status

Mandibular Fractures	Helmet wearing status		P-value
	With helmet n=28 (18.7%)	Without helmet n=122 81.3%)	
Mandible	n=14 (50.0%)	n=99 (81.1%)	0.000
Dentoalveolar Region	n=12 (42.9%)	n=95 (77.9%)	0.000
Angle of Mandible	n=2 (7.1%)	n=117 (95.9%)	0.000
Parasymphysis Region	n=5 (17.9%)	n=99 (81.1%)	0.000
Mandibular Condylar	n=4(14.3%)	n=57 (46.7%)	0.000

The frequency of maxillary fractures in helmeted as compared to not helmeted patients as shown in table 2. The differences were statistically significant. (Table. 2).

Table No.2: Maxillary Fracture distribution with Respect to helmet wearing status.

Maxillary Fractures	Helmet wearing status		P-value
	With helmet n=28 (18.7%)	Without helmet n=122 (81.3%)	
Mid-face Fractures	n=4 (14.3%)	n=85 (69.7%)	0.000
Le Fort I	n=5 (17.8%)	n=91 (74.6%)	0.000
Le Fort II	n=3 (10.7%)	n=81 (66.4%)	0.000
Le Fort III	n=2 (7.1%)	n=111 (91.0%)	0.000
ZMC fracture	n=6 (21.4%)	n=74 (60.7%)	0.000

DISCUSSION

Pakistan is a developing country where condition of roads, compliance to the traffic rules and safety measures while driving is not well established; in addition the risk taking behavior of young adults while driving further complicates the situation[11]. Two wheel vehicle (motor bike) is a usual conveyance that is not safe and in comparison of other vehicles[12]. Ratio of road traffic accidents and trauma to faceis much higher than western countries. In this study pattern of maxillofacial injuries in patients with helmet and without helmet in Southern Punjab population was assessed.

In our study mandible is the most frequent place of fracture in motor bike accidents. Among presenting patients large proportion was not wearing helmet. Ajmalet al[13] conducted a study on this topic in Pakistani population and reported that mandibular fracture is the commonest fracture in road traffic accidents. Motamedi et al[14] reported in a study that mandibular fracture is most frequent fracture observed in 72.9% of patients and maxillary fracture is 2nd most (13.9%). In mandibular fracture 32% were condylar region. In maxillary fracture Le forte II was found in 54.6% of cases which were 18.3% in our study.

A study was conducted by Hameed et al[15] in 2018 and reported prevalence rate of Helmet users only 8.9% which is main contributing factor of increasing incidence of road traffic accidents. Most common fracture was mandibular fracture, 35.1% isolated and 20.6% complex fracture. Zygomatic fracture is the second most frequent fracture.

Another similar study was conducted by Oginiet al[16] on patients presented with maxillofacial trauma as a result of motor bike accident. Bony fracture was observed in 35% of patients and teeth fracture was found in 15% of patients. Observation of this study is also I to our study, large proportion of patients were not wearing helmet as safety measure. Rate of helmet use among these patients is only 3%, rest of patients werenot helmeted.

Iribhogbeet al[17] completed a study on road traffic accidents and associated injuries and concluded that non compliance to safety measures is the main reason behind maxillofacial injuries. In this study 56.4% patients claimed about crash of helmet and most of patients were illiterate or driving without license. This study also concluded that RTAs are the main health problem worldwide which are responsible for maxillofacial trauma.

In our study we observed male patients are affected in RTAs as compare to female due to lack of trend towards female drivers. Patients wearing helmet have isolated fracture but patients without helmet have complex fractures. Singh et al[18] conducted a study in 2012 and reported that maxillofacial injuries were common in male person because of their daily travelling and exposure to traffic accidents. Mandibular angle fracture is the most frequent fracture among these patients.

Our study showed that young male is larger in number with mean age of patients' 25.12±3.51 years. Back et al[19] completed a study on traffic accidents and reported mean age of patients 38 years with 76% male adults. In this study 50% of cases involved orbitozygomatic complex fractures. While in our study zygomatic complex fracture was found in 41.3% of cases.

In our study among mandibular fractures dentoalveolar fracture of mandible is the usual fracture place observed in 74% of mandibular fractures. Adeyemo et al[20] reported body of mandible common fracture found in 51.50% of patients and after that parasymphysis fracture observed in 45.25%. In maxillary fractures leforte 2 fractures is common observed in 84% injuries.

Despite the development of various safety measures like airbags, metallic sheets traffic signals, over speed prohibition and helmet use motor bike accidents are still leading cause of maxillofacial injuries and become huge economic burden on health sector.

CONCLUSION

Results of our study exhibit that motor bike riding without use of helmet is main cause of maxillofacial fractures which are common in young male as compare to female. Mandible is the frequent fracture place with dentoalveolar pattern.

Recommendations: Motor bike associated maxillofacial injuries are preventable, knowledge and awareness about traffic rules and safety measures especially use of helmet should be provided. Further studies needed about implementation of safety measures that reduce the incidence of facial injuries in road traffic accidents.

Author's Contribution:

Concept & Design of Study:	Sumaira Zahoor
Drafting:	Mohsin Majeed, Asif Nazir Ch

Data Analysis:	Noreen Rashid, Sohail Fareed, Nouman Mustafa
Revisiting Critically:	Sumaira Zahoor, Mohsin Majeed
Final Approval of version:	Sumaira Zahoor

Conflict of Interest: The study has no conflict of interest to declare by any author.

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