

# Frequency and Etiology of Maxillofacial Fractures in Tertiary Care Hospital

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## ABSTRACT

Trauma is a global issue that causes illness and death. Maxillofacial fractures are common following trauma.

**Aims:** To determine the frequency and etiology of maxillofacial fractures in oral and maxillofacial trauma patients.

**Study Design:** Descriptive cross-sectional.

**Methodology:** The entire study population was adult having oral and maxillofacial trauma visiting the outpatient/emergency department at Hayatabad Medical Complex, Peshawar from April to October 2018. Patients (n=205) were enrolled. Detailed history with examination was done. An OPG (orthopantomogram) radiographic confirmation of maxillofacial fracture was performed, PA face (Reverse Towne's view open mouth), occipitomental (OM) view, sub-mentovertex (SMV) view and computerized tomography (CT) scan when needed. All this information was recorded on Performa.

**Statistical analysis:** Data was analyzed using SPSS version 26. Results were presented as frequency and percentage.

**Results:** Majority of patients (56.1%) suffered from road traffic accidents, 3.4% patients had few of them (3.4%) had sports injuries, 11.7% patients had interpersonal violence or firearm injuries while rest (18.1%) had injures from animals. As per maxillofacial surgeries, 3.9% patients had maxilla fractures, 10.7% patients had mandible fractures, 17.8% patients had zygomatic complex fractures, 13.2% naso-orbital fractures, 13.2% orbit fractures, 16.6% had frontal bone fractures, and 34.6% had nasal bone fractures.

**Conclusion:** The study concluded that the most common supporting maxillofacial trauma is young men with a common etiological condition of road accidents.

**Keywords:** Maxillofacial Injuries; Fractures, Bone; Causality; Accidents, Traffic.

## INTRODUCTION

Trauma is a global issue that causes illness and death.<sup>1</sup> Maxillofacial injury represents 20-60% of all traumas.<sup>2</sup> Incidence and etiology of maxillofacial fractures vary from country to country and reflect variability that may be due to social culture and environmental factors.<sup>3</sup> Maxillofacial fractures are common following trauma. The incidence of these fractures probably relates to prominent position and centrality of facial bones, which often expose to traumatic force.<sup>4</sup>

The peak age of maxillofacial injuries incidence is 21-30 years because this age group is highly active age group to be involved in different activities like travelling, doing acrobatic exercises, playing sports, careless driving, and physical violence are likely to be involved and these are employing at high risk of supporting maxillofacial injuries.<sup>5,6</sup>

In one study conducted in Pakistan revealed that males were commonly involved in maxillofacial trauma. Males work generally outdoor thus have to travel long distances on main roads. Majority of the males use motorbikes (unsafe vehicle) so they usually suffer from accidents.<sup>7,8</sup> One study reported that road traffic accidents (51%), falls (21%), interpersonal violence (20%) and injuries by animals (8%) cause maxillofacial fractures respectively.<sup>9,10</sup> RTAs remained the main cause of death. This study will further help the people to take proper precautionary measures in order to prevent the consequences of maxillofacial fractures. Due to its increasing prevalence and debilitating effect on the quality of life of the patients, we designed this study.

**Objectives:** To determine the frequency and etiology of maxillofacial fractures in oral and maxillofacial trauma patients.

## METHODOLOGY

Present study was a cross sectional study. The entire study population was adult having oral and maxillofacial trauma visiting the outpatient/emergency department at Hayatabad Medical Complex, Peshawar from April to October 2018. Patients (n=205) were enrolled. After approval of ethical review committee of the institute, a sample of 205 patients (WHO sample size calculator was used for sample calculation. Whereas, the parameters were used as following; desire precision rate was 16%, CI 95% and  $\alpha$  I error was 5%).<sup>7</sup> Patients with ages 18-65 years, both gender and duration of fracture less than 1 week on the basis of history, clinical and radiographic examination were the inclusion criteria. Patients

presenting with history of oral and maxillofacial trauma because of natural disasters and isolated nasal fractures were excluded from the study because it mostly presented to ENT department.

All patients who meet admission requirements were selected from the ward/emergency department of oral and maxillofacial surgery. Research protocol, use of research data and benefit of risk ratio were defined for patients to take written informed consent. A systematic proforma was used to record patient data and analyze it. Exclusion criteria was strictly followed to control results confounders and bias in this study.

Detailed history and examination was done. An OPG (orthopantomogram) radiographic confirmation of maxillofacial fracture was performed, PA face (Reverse Towne's view open mouth), occipitomental (OM) view, sub-mentovertex (SMV) view and computerized tomography (CT) scan when needed. These radiographs when needed can be done for free for deserving and not affording patients under hospital zakat (charity) fund. All this information was recorded on Performa.

**Statistical Analysis:** Data was analyzed by SPSS version 26.0. Mean  $\pm$  SD was used for age. Frequencies and percentages were used for categorical variables. Data was stratified for age and gender. Chi square Test was applied considering P-value < 0.05 as statistically significant.

## RESULTS

For descriptive statistics, mean and SDs for age was recorded as 35.0 $\pm$ 13.5 years. Among 205 patients, 185 (90.24%) patients were male, and 20 (9.75%) patients were female. majority of patients (56.1%) suffered from road traffic accidents, 3.4% patients had few of them (3.4%) had sports injuries, 11.7% patients had interpersonal violence or firearm injuries while rest (18.1%) had injures from animals. Post stratification etiological factors of maxillary fractures with respect to gender were insignificant ( $p = 0.363$ ), whereas significant with respect to age ( $p = 0.006$ ). The descriptive statistics of frequencies and percentages as per maxillofacial surgeries were recorded (Table-1).

When stratified frequencies of maxillofacial fractures with respect to age brackets of patients, the post stratifications results were significant ( $p \leq 0.05$ ) as shown in table-2.

When stratified frequencies of maxillofacial fractures with respect to gender, the post stratifications results were insignificant ( $p \geq 0.05$ ) as shown in table-3.

Table 1: Frequencies and percentages for maxillofacial fractures (n =205)

Maxillofacial fractures	Frequencies	Percentages
Maxilla fractures	08	3.9%
Mandible fractures	22	10.7%
Zygomatic complex fractures	16	7.8%
Naso orbital fractures	27	13.2%
Orbit	27	13.2%
Frontal bone fractures	34	16.6%
Nasal bone fractures	71	34.6%

Table-2: Maxillofacial fractures stratification with respect to age (n=205)

Maxillofacial fractures		Age brackets in years			p value
		18-30	31-45	46-60	
Maxilla fractures	Yes	08	0	0	0.005*
	No	81	45	71	
Mandible fractures	Yes	22	0	0	0.0024*
	No	67	45	71	
Zygomatic complex fractures	Yes	16	0	0	0.0024*
	No	73	45	71	
Naso orbital fractures	Yes	27	0	0	0.001*
	No	62	45	71	
Orbit	Yes	12	15	0	0.001*
	No	77	30	71	
Frontal bone fractures	Yes	0	22	12	0.001*
	No	89	23	59	
Nasal bone fractures	Yes	04	08	59	0.001*
	No	85	37	12	

\*Statistically significant

Table-3: Stratification of maxillofacial fractures with respect to gender (n=205)

Maxillofacial Fractures		Gender		p value
		Male	Female	
Maxilla fractures	Yes	08	0	0.888
	No	177	20	
Mandible fractures	Yes	19	03	0.516
	No	166	17	
Zygomatic complex fractures	Yes	15	01	0.622
	No	170	19	
Naso orbital fractures	Yes	23	04	0.341
	No	162	16	
Orbit	Yes	23	04	0.341
	No	162	16	
Frontal bone fractures	Yes	32	02	0.404
	No	153	18	
Nasal bone fractures	Yes	65	06	0.646
	No	120	14	

**DISCUSSION**

The factors of fragmentation of maxillofacial fractures depend largely on a variety of factors such as the local area, culture, and socioeconomic background. However, epidemiological studies around the world have revealed that some features of the fracture pattern remain the same among different nations.

Udeabor et al conducted a study and they found facial fractures involved the mandible (59.2%), the zygomatic complex (18.5%), the maxilla (13.2%), the naso-orbito-ethmoidal complex (3.0%), the orbit (2.9%), the frontal bone (1.5%), and nasal bones (0.7%).<sup>4</sup> Whereas, in this study these figures are relatively low as compare to above mentioned study.

Literature review revealed that in UAE (11:1) and Nigeria (16.9:1), this figure is low but very high when compared to studies held in Korea (3.2:1) and Scotland (3:1).<sup>11-15</sup> This high prevalence among men is linked with the fact that in many families, men work too hard outside for a living which puts them at risk of road accident involvement and assault.

In our study, RTAs remained the leading cause of maxillofacial injury among our population. Our findings are related to the findings of other studies with respect to road accidents which are a major etiological feature of maxillofacial fractures.<sup>16</sup> It is because there is a lack of awareness of the importance of car safety equipment, non-compliance with safety rules and

regulations, traffic congestion due to the lack of various pedestrian lanes, large numbers of overcrowded buses and two badly maintained tires. It is in line with the research of Ellis and Roccia et al.<sup>17,18</sup> It is because as reported by a study that women are less likely to be associated with any type of outdoor activity.

The etiology of maxillofacial fractures has changed extensively for the last three decades and is changing continuously.<sup>8</sup> In a particular study the main etiology in maxillofacial fractures noted was road traffic accidents (RTA) followed by falls, interpersonal violence, fire arm, sports injury, industrial accidents and injuries by animals.<sup>9</sup> Road accident has been found to be a common cause of maxillofacial fractures. It conveys a negative sense of road traffic to road users, a lack of road safety measures and laws for our people.<sup>10</sup> In our study, majority patients were having road traffic accidents followed by animal injury, fire arm injuries, interpersonal violence, and sports injuries.

**Limitations:** Our study had limitations like financial constraints, lack of resources, genetic workup and short duration of study.

**CONCLUSION**

The study concluded that the most common supporting maxillofacial trauma is young men with a common etiological condition of road accidents. Road safety laws to be enforced vigorously and awareness to the public be made through electronic, print and social media.

**Authors' Contribution:**

KS & HU: Conceptualized the study, analyzed the data, and formulated the initial draft.

ZQ&SU: Contributed to the proof reading.

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