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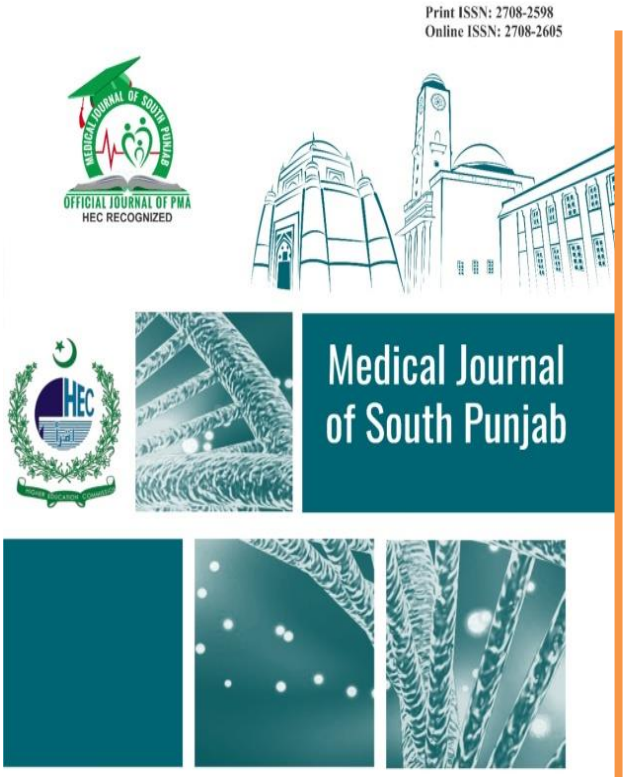

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Original Article

Pattern of Mandibular Fractures Presenting in Maxillofacial Department of Tertiary Care Hospital

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ABSTRACT

Objective: This study will be conducted to evaluate the pattern of mandibular fractures presenting in maxillofacial department of tertiary care hospital.

Methods: The study was conducted in the Department of Oral and Maxillofacial Surgery at Jinnah Postgraduate Medical Centre, Karachi, over a period of six months from December 2023 to June 2024, after the synopsis was approved. A validated questionnaire was used to collect demographic data, including age, gender, and residential status, as well as details regarding the etiology of the fracture (e.g., road traffic accidents, falls, assaults, sports injuries) and fracture characteristics (location, type, and complexity).

Results: Unilateral fractures 55.5% were more common than bilateral fractures 44.5%, with the angle 32.0% and body 26.5% being the most frequent fracture sites. Gender analysis showed no significant differences in fracture type (unilateral fractures: 53.5% in males vs. 60.7% in females, p=0.355) or fracture location (p=0.602), though males had a higher incidence of para-symphysis fractures 7.6% vs. 1.8%. Similarly, age stratification (18–40 years vs. 41–60 years) revealed no significant associations with fracture type or location.

Conclusion: Mandibular fractures are a fairly common injury in severe trauma, primarily affecting young males. The most frequent sites of fracture are the mandibular angle, followed by the body and the condyle, while symphyseal, parasymphyseal and ramus fractures are relatively rare.

Keywords: Trauma, Pattern, Mandible fracture,Maxillofacialsurgery.

1. INTRODUCTION

Mandibular fractures constitute one of the most common facial fractures and represent approximately 36–70% of all maxillofacial fractures reported worldwide[1]. There is increased predisposition due to the projection and exposure of the mandible in the face skeleton. The main etiological factors are road traffic accidents (RTAs), physical assaults, falls, sports injuries and occupational work[2]. Road traffic accidents (RTAs) are a major cause of TBI worldwide, particularly in (LMICs)," while on the contrary, "Interpersonal violence (IPV) is a leading cause of TBI in developed regions. Knowledge of the prevalence and cause of mandibular fracture is important to devise preventive strategies and also for formulating treatment modalities for these fractures[3].
The mandibular fracture pattern is determined by type of injury, impact force and anatomical sites. The fracture sites often occur in the condyle, angle, body, symphysis and ramus of the mandible; the condylar region is the most common, as it is mechanically weak[4]. Fracture patterns may also vary by age, sex and socioeconomic status, with young adult male being the predominant demographic[5]. Detailed study of the patterns of fracture helps in planning the surgical procedures and also in achieving a good surgical outcome, directing the kind of fixation[6]. The Department of Maxillofacial Surgery at a tertiary level hospital acts as the epicenter for the treatment of complicated mandibular fractures, with cases being referred from peripheral hospitals. With a large patient number involving multiple injury modalities, analyzing fracture patterns serves as useful epidemiological data in such environments[7].

In addition, the examination of fracture incidence is useful to notice trends, such as increasing violence or decreasing RTA related fractures as a product of better road safety actions[8]. The common signs & symptoms seen in patients with mandibular fractures are pain, swelling, malocclusion, trismus and inability to bite properly. Correct diagnosis is based on clinical assessment as well as imaging, including OPG and CT[9]. An early and accurate diagnosis is crucial to avoid sequelae such as non-union, infection and temporomandibular joint dysfunction. By identifying the most common patterns of fractures, clinicians can work towards optimal protocols for diagnosis and allocation of resources[10].

This study investigated the pattern of mandibular fractures presenting to the Maxillofacial Department of a tertiary care hospital with respect to the incidence, etiology, site distribution and demographic changes. Through addressing these factors, the results will inform enhanced trauma care strategies, preventive health interventions, and public awareness initiatives. Ultimately, this collaboration aims to improve care of patients and lessen the overall impact of mandibular fractures on the population.

2. METHODOLOGY

The study was conducted in the Department of Oral and Maxillofacial Surgery at Jinnah Postgraduate Medical Centre, Karachi, over a period of six monthsfrom December 2023 to June 2024, after the synopsis was approved. A sample size of approximately 200 cases was determined using OpenEpi Online software, based on a frequency of parasymphysis fracture of 13.09%[9], a 95% confidence level, and a 5% margin of error. Non-probability consecutive sampling was employed for patient selection.
The study followed a descriptive cross-sectional design. Patients aged 18 to 60 years with mandibular fractures, regardless of

gender, were included, while those with previous treatment for mandibular fractures, medical comorbidities, or additional facial trauma were excluded. Patients who did not provide consent were also excluded.

After obtaining ethical approval, patients meeting the inclusion criteria were recruited from the outpatient and inpatient departments. Written informed consent was obtained after explaining the study's purpose, risks, and benefits. A validated questionnaire was used to collect demographic data, including age, gender, and residential status, as well as details regarding the etiology of the fracture (e.g., road traffic accidents, falls, assaults, sports injuries) and fracture characteristics (location, type, and complexity).

Data were analyzed using SPSS version 25. Descriptive statistics were computed, with mean ± standard deviation reported for quantitative variables such as age, while frequencies and percentages were calculated for qualitative variables such as gender, fracture site, and etiology. Stratification was performed to control for effect modifiers like age, gender, residential status, and etiology. A chi-square test was applied post-stratification to assess the impact of these variables on fracture patterns, with a p-value of ≤ 0.05 considered statistically significant.

3. RESULTS

This study analyzed 200 mandibular fracture patients in which (72% male& 28.0% female) with mean age 35.71±8.19 years, age range between 18-60 years. Majority of the patients 69.5% were between 18-40 years. According to residential status, the patients distributed as (50.5% urban & 49.5% rural). Road traffic accidents (41.5%) and falls (39.5%) were the leading etiologies. (Table. I).Unilateral fractures (55.5%) predominated over bilateral (44.5%), with the angle (32.0%) and body (26.5%) as the most common fracture sites. (Table. II).

Gender analysis revealed no significant differences in fracture type (unilateral: 53.5% males vs. 60.7% females, p=0.355) or fracture location (p=0.602). Although males showed higher para-symphysis fractures (7.6% vs. 1.8%). (Table. III).Similarly, age stratification (18–40 vs. 41–60 years) showed no significant associations with fracture type (p=0.507) or location (p=0.928). (Table. IV).

Table-I: Demographics and baseline profile

Variable	N (%)	Mean±S.D
Gender		
Male	144 (72.0)	
Female	56 (28.0)	
Age (years)		35.71±8.19
18-40	139 (69.5)	
41-60	61 (30.5)	
Age Range (18-60 years)		
Residential status		
Urban	101 (50.5)	
Rural	99 (49.5)	
Etiology		
RTA	83 (41.5)	
Fall	79 (39.5)	
Assault	19 (9.5)	
Sports injury	8 (4.0)	
Others	11 (5.5)	

Table-II: Distribution of types of mandibular fracture and mandibular fracture

Variable	N (%)
Type of mandibular fracture	
Unilateral	111 (55.5)
Bilateral	89 (44.5)
Mandibular fracture	
Angle	64 (32.0)
Body	53 (26.5)
Condylar	25 (12.5)
Coronoid	11 (5.5)
Dentoalveolar	10 (5.0)
Para symphysis	12 (6.0)
Symphysis	10 (5.0)
Ramus	11 (5.5)
Combination	4 (2.0)

Table-III: Association of gender with types of mandibular fracture

Variable	Gender		p
	Male 144 (72.0%)	Female 56 (28.0%)	
Type of mandibular fracture			
Unilateral	77 (53.5)	34 (60.7)	0.355
Bilateral	67 (46.5)	22 (39.3)	
Mandibular fracture			
Angle	46 (31.9)	18 (32.1)	0.602
Body	35 (24.3)	18 (32.1)	
Condylar	19 (13.2)	6 (10.7)	
Coronoid	7 (4.9)	4 (7.1)	
Dentoalveolar	6 (4.2)	4 (7.1)	
Para symphysis	11 (7.6)	1 (1.8)	
Symphysis	8 (5.6)	2 (3.6)	
Ramus	8 (5.6)	3 (5.4)	

Combination	4 (2.8)	0 (0.0)	
N (%), chi-square test of significance was applied			

Table-IV: Association of age with types of mandibular fracture and mandibular fracture

Variable	Age (years)		p
	18-40 139 (69.5%)	41-60 61 (30.5%)	
Type of mandibular fracture			
Unilateral	75 (54.0)	36 (59.0)	0.507
Bilateral	64 (46.0)	25 (41.0)	
Mandibular fracture			
Angle	48 (34.5)	16 (26.2)	0.928
Body	35 (25.2)	18 (29.5)	
Condylar	16 (11.5)	9 (14.8)	
Coronoid	7 (5.0)	4 (6.6)	
Dentoalveolar	8 (5.8)	2 (3.3)	
Para symphysis	9 (6.5)	3 (4.9)	
Symphysis	6 (4.3)	4 (6.6)	
Ramus	7 (5.0)	4 (6.6)	
Combination	3 (2.2)	1 (1.6)	
N (%), chi-square test of significance was applied			

4. DISCUSSION

The mandible, although considered the strongest facial bone, is prone to fractures due to its prominent position, U-shaped geometry (which is structurally weaker), and gradual weakening over time[11]. In this study, most of our patients (72%) were male, which is likely due to the higher social involvement of men in physically demanding tasks such as operating motor vehicles. A previous study by Mushtaqet al[9] reported a similar trend, with male patients (n = 125, 69.4%) outnumbering females (n = 43, 28.6%). In contrast, Mittal et al[12] observed a higher incidence of cases among female patients. These findings highlight considerable variations in gender distribution across different studies.

In our study, most cases occurred in individuals aged 18–40 years, which aligns with previous research. However, this finding contrasts with a study by Kamaliet al[13] who reported a higher prevalence of mandibular fractures in males aged 11–20 years. The increased incidence in the 21–40 age group may be attributed to the fact that this period of life is the most active and physically demanding, making individuals more susceptible to trauma. Additionally, people in this age group are often the primary earners for their families, particularly in developed countries, which may lead to greater exposure to risk factors.

The study findings indicate a nearly equal distribution of mandibular fracture patients between urban (50.5%) and rural (49.5%) areas. This contrasts with study conducted by Atilganet al[14] where urban predominance was noted due to higher traffic density and occupational hazards. However, similar rural-urban distributions have been reported in regions with underdeveloped road safety measures in rural settings[15].

Road traffic accidents (RTAs) (41.5%) and falls (39.5%) were the leading causes of mandibular fractures, aligning with global trends where RTAs remain a major etiology, particularly in low- and middle-income countries[16]. However, in high-income countries, assaults and falls often dominate due to stricter traffic regulations[17]. The high incidence of falls in this study may reflect occupational or environmental risks in the study population.

Iqbal et al[18] reported the most common type of fracture was combination fractures followed by parasymphysis and condyle i.e. 142 (30.6%), 79 (17 %) and 75 (16.2 %) respectively while Krishnan et al[19] reported angle fracture was most common followed by parasymphysis, condylar, dentoalveolar and body i.e. 31.67%, 28.33%,13.33%, 10% and 8.33% respectively. Another study from Peshawar reported that the most common was body fracture n= 57 (33.93%) followed in frequency by condylar fractures (n=46, 27.38%), angle (n= 29,17.26%) and parasymphysis n=22, 13.09%)[20].

5. CONCLUSION

Mandibular fractures are a fairly common injury in severe trauma, primarily affecting young males. The most frequent sites of fracture are the mandibular angle, followed by the body and the condyle, while

symphyseal, parasymphyseal and ramus fractures are relatively rare.

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