

Pattern of Maxillofacial Fractures at Federal Teaching Hospital, Gombe, North East Nigeria

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ABSTRACT

Objective: In the North Eastern region of Nigeria, there has been an increase in the scourge of insurgency related violence especially in the rural and sub-urban areas with consequent rise in urban migration. It is not yet known how this may have affected the pattern of maxillofacial fractures. The objective of the study was to describe the socio-demographics of patients with maxillofacial fractures and to determine the various causes and type of maxillofacial fractures observed in North Eastern zone of Nigeria.

Methods: A four (4) year retrospective review of maxillofacial fractures at the Federal Teaching Hospital, Gombe spanning 2014 -2018 was conducted. Information such as age, sex, occupation, causes and types of fractures are retrieved from the case files and data gathered analyzed using SPSS version 21.0.

Results: In the period under review, 324 (7.6%) patients had trauma of which 66 (20.4%) sustained maxillofacial fractures. These consisted of 61 (92.4%) males and 5 (7.6%) females; giving a male to female ratio of 12.2: 1. The overall age range was 15 – 54 years while the peak age range was 21 – 30 years. The most common cause and type of injury were automobile crashes (43.9%) and mandibular fractures (57.6%) respectively.

Conclusion: Despite the rise in insurgency related violence in North Eastern Nigeria, the pattern of facial fractures is similar to observations from other geopolitical zones and the global literature.

Keywords: Maxillofacial, fractures, North east, Nigeria

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INTRODUCTION

Aetiology of maxillofacial injuries varies from one country to another and even within the same country, it is affected by the prevailing cultural, political, socioeconomic, and environmental factors.^{1,2} Gombe is a major city in the North East geopolitical zone of Nigeria, and can be classified among the “non conflict” states. It is naturally an agrarian community with large number of the populace dwelling in the rural and suburban settlements. However, the rising spate of insurgency related violence in the North Eastern part of Nigeria

predominantly affecting the rural and urban populace in “conflict states like Adamawa, Borno and Yobe” have caused spillover effect in states like Gombe and Taraba, where they have witnessed a high rate of urban migration³. Consequently, Gombe is being gradually transformed into a commercial hub and a rapidly metropolitan city and place of refuge to migrants from the interior and neighbouring states most of whom are driven by the threats of insurgency. Hence, parallel to the surge of insurgency related violence is the collateral increase in vehicular movements⁴ within the city involving

cars, buses, lorries, and motorbikes used by commuters in pursuits of daily living.

Alteration in aetiology and pattern of maxillofacial injuries due to modernization and shifts in lifestyle and socioeconomic system of a population has been exemplified in Europe and America where earlier studies^{5,6} reported road traffic crashes as the leading cause but more recent studies^{7,8} have suggested a change whereby assault now predominates. The Federal Teaching Hospital, Gombe (FETHGO) is one of the main tertiary hospitals in the North East and a receiving centre for both victims of insurgency/other violence related injuries and those from other causes such as road traffic crashes, sports, domestic fall etc. Considering the changing socioeconomic activities in Gombe city, we hypothesized that the recent surge of insurgency and the parallel consequence of increased urban migration may have altered the prevalence, aetiology and pattern of maxillofacial fractures presenting to FETHGO in comparison to other Nigerian geopolitical zones and the global literature. This study was therefore conducted to investigate this hypothesis by describing the socio-demographics of patients with maxillofacial fractures and the various causes and type of maxillofacial fractures currently being observed in North Eastern zone of Nigeria in one of the “non conflict states” where the rural and urban afflicted migrate to.

MATERIALS AND METHODS

The study setting was Federal Teaching Hospital, Gombe (FETHGO) - a regional referral centre in Northeast Nigeria. The Northeast region includes Adamawa, Bauchi, Borno, Yobe, Taraba and Gombe states. The hospital serves the need of the largely rural/urban population of Gombe state and the neighboring states. In order to fulfill the objectives of this study, a retrospective study design was employed. Records of patients who were seen in the Dental/Maxillofacial clinic or Accident and Emergency ward of the hospital between October 2014 and September 2018 are retrieved. This period covers the era of the surge in, insurgency related violence in the geopolitical zone. Case files documenting trauma cases were selected and studied for diagnosis of maxillofacial fractures. Files of patients with confirmed maxillofacial fractures were then isolated for retrieval of the necessary variables. Patients brought in dead and in whom the

specific type of fractures were not well established were excluded. Variables such as age, sex, occupation, aetiology, type and site of fractures were extracted. Mandibular fractures were segmented into dentoalveolar, symphyseal, parasymphyseal, body, angle, ramus and condyle fractures, while midface fracture were divided into Dentoalveolar, Le Fort, zygomatico-orbital complex, naso-orbito-ethmoidal complex fractures. Only cases established with detailed clinical features and radiological investigations were included.

Data analysis involved descriptive summaries of sex, etiology, site of fracture, occupation and types of fracture presented as frequency tables or charts while measures of central tendencies were calculated for age using SPSS version 21.0

RESULTS

There were 4,266 patients seen by the Department of Oral and Maxillofacial Surgery during the period under review. Of these, 324 (7.6%) patients were victims of trauma but only 66 of them were confirmed to have sustained maxillofacial fractures and so included in the analysis. Thus, maxillofacial fractures cases constituted only 1.55% of oral and maxillofacial disease burden and 20.4% of all trauma burden received at FETHGO over the period concerned. Sex distribution among maxillofacial fracture patients was in the proportion of 92.4% for male and 7.6% for females, giving a male to female ratio of 12:1. The age of patients ranged from 15 – 54 years with a peak frequency at 21 – 30 years (Table 1) while the mean age \pm SD was 30.7 \pm 9.7 years. The commonest aetiology was automobile accident accounting for 43.9% of cases followed by motorbike accident (25.8%) (Table 2). In terms of occupation, students (17; 25.8%) and farmers (13; 18.2%) were mostly affected while there were more housewives (4; 6.1 %) with maxillofacial fractures than military personnel (2; 4.6%). Of the 3 cases of gunshot, two involved military personnel while the only case of bomb blast affected a farmer. Motorbike accident almost exclusively affected motorbike drivers and students. Generally, there was no significant statistical difference between occupational categories in terms of aetiology (Table 2). As shown in Table 3, there were 73 fractures in 66 patients including 7 patients with bilateral mandibular body fractures. More than half of the patients (38; 57.6%)

had mandibular fractures either in isolation or in combination with mid-facial fractures; mandibular body fractures was the most frequent type; accounting for 28 out of 73 fractures and occurring in 21 (21.2%) patients of whom 7 had bilateral involvement.

Table 1: Sociodemographic characteristics of patients

Male: Female	12 : 1
Age range	15-54 years
Mean (\pmSD)	30.7 \pm 9.7 years
Age group	Frequency (%)
10-20	8 (12.1%)
21-30	32 (48.4%)
31-40	17 (25.8%)
41-50	4 (6.1%)
51-60	5 (7.6%)
TOTAL	66 (100%)

On the other hand, less than half of the patient population (42.4%) had mid-facial fractures of which zygomatic complex fractures was relatively most common (13.6%). Table 4 depicts the distribution of maxillofacial fractures in relation to gender and aetiology. Of the 38 patients with isolated mandibular fractures only four were females while one person out of 20 with isolated midface fracture was female. No female had combined facial fractures. The causes of injuries in females was basically either road traffic accident (RTA) of domestic fall while the males were involved in all forms of causes such as assaults, bomb blast, gunshot, in addition to being predominantly

victims of RTAs.

DISCUSSION

The fact of increased violence in the rural-suburban communities and the consequent urban migration in North - Eastern Nigeria is indubitable⁹ going by official reports from law enforcement agencies such as the Nigeria police, Military, and Road Safety Corps. This observation is further corroborated by news from both the print and electronic media as well as anecdotal observations at the points of care especially in the last half a decade. It was expected that this change in societal dynamics would influence the incidence and prevalence of trauma related injuries, hence the frequency of maxillofacial fractures as well. This study was therefore embarked upon to determine the rate and pattern of maxillofacial fractures presenting at FETHGO as a reflection of the increase spate of trauma in Northeast Nigeria.

Surprisingly, only 1.55% of the oral and maxillofacial workload within the study period of 4 years spanning October 2014 to September 2018 were constituted by maxillofacial fractures. This contrast with Olasoji et al.¹ where 306 trauma patients were treated for facial fractures the low prevalence could be partly explained by different reasons. First, the availability of another tertiary hospital in the Northeast, the case fatality of insurgency related violence in the region resulting in the death of many victims who may have sustained maxillofacial fractures, the exclusion from this study of cases where the specific facial fractures suspected were not well established with radiographic evidence, inadequate documentation as a characteristic limitation of retrospective studies, and the persisting faith of the locales in alternative care which limits patronage of orthodox medical care.

Table 2: Aetiology in relation to occupation

Aetiology →	Assault	Bomb blast	Vehicle accident	fall	Gun short	Motorcycle accident	n (%)
Occupation ↓							
Artisans	1	0	0	0	0	1	2 (3.03%)
Business	0	0	4	1	0	0	5 (7.58%)
Civil servant	1	0	6	0	0	1	8 (12.1%)
Automobile driver	0	0	4	0	0	0	4 (6.06%)
Farmer	3	1	5	3	0	0	13(18.2%)
House wife	0	0	1	2	0	1	4 (6.06%)
Military man	1	0	0	0	2	0	3 (4.55%)
Motor cycle driver	0	0	0	0	0	7	7(10.61%)
Professionals	0	0	3	1	0	0	4 (6.06%)
Students	3	0	6	1	0	7	17(25.8%)
Total	9 (13.6%)	1 (1.5%)	29 (43.9%)	8 (12.1%)	2 (3.03%)	17 (25.8%)	66 (100%)

P=0.000 (Fischer's Exact)

In this study, sixty-six patients were diagnosed with maxillofacial fractures majority of them were males. Although the fact of male preponderance in maxillofacial trauma is well known,^{10,11} many authors have reported a changing trend in male female disparity with increasing narrowing of the gender gap. This include Nigerian studies¹²⁻⁻¹⁶ as well as others from Western Europe¹⁷ and Asian countries¹⁸To the contrary, this study observes still a wide disparity of about twelve folds between male and female. Generally, males are known to be more actively involved than females in the strive for economic survival, high risk activities and contact sports which predispose them to injuries. However, the wide gender gap in this study may be related to the cultural norm of the Northern Nigeria where women are traditionally restricted from engaging in high risk pursuits. Unlike the gender prevalence which tend to contradict recent trend, the age prevalence often peaks at between 21- 30 years which is consistent with global literature^{1,19,20, 21}with

the subsisting explanation, this forms the age bracket within which men and women are most active in their lives. However, it is interesting to note that despite the high rise in insurgency related violence, road traffic accidents involving both automobiles and motorcycles remain the most predominant cause of maxillofacial injuries in Northeastern Nigeria. Other violence related causes such as gunshots, bomb blasts and assaults put together, do not even equal half the prevalence of RTAs. In a region supposedly riddled with insurgency attacks and violent homicides, one would have expected a different picture. This observation may however be explained by the fact that most of the insurgency related violence occur in the interior and the outcomes were often seriously fatal such that many of the victims die before arrival at the point of care or sometimes may be the consequence of long travels with a severely injured patient without adequate, ongoing, life-saving resuscitatory medical support. On another hand, increased spate of

insurgency may have indirectly contributed to the rise in RTA related injuries because of the intensive urban migration occasioned by the incidence thereby transforming the city life into a more highly

metropolitan and fast society with increased vehicular activities and crowding with attendant increase in the risk of accidents.

Table 3: Types and distribution of maxillofacial fractures

Pattern of presentation	Specific types	Frequency	Total
Isolated Mandibular fractures	Dentoalveolar	5	45
	Parasymphiseal	8	
	Body	28	
	Angle	3	
	Condyle	1	
Isolated Mid-facial fractures	Dentoalveolar	2	20
	Le fort 1	3	
	Le fort 2	5	
	Zygomaticorbital complex	9	
	Nasoethmoidal complex	1	
Combined	Le fort 1 and mandible body	1	8
	Le fort 2 and symphyseal	1	
	Maxilla & Mandible NOS	1	
	Panfacial	5	
			73

NOS – Not otherwise specified

Because of high patronage the operators of commercial vehicles make several trips, get overstressed and some take performance enhancing drugs, contravene speed limits while some of them carry overloads to maximize profits. All these

increase the risk of accident. The high occurrence of RTA leading to fractures observed in this study is similar to many other studies both from Nigeria^{13,18--21}and many other countries

Table 4: Maxillofacial fractures by gender and aetiology

Pattern of presentation	Gender	Aetiology						Total
		Assault	Bomb blast	Vehicle accident	fall	Gun shot	Motorcycle accident	
Isolated Mandibular Fractures	Male	7	1	12	4	2	8	38
	Female			1	2		1	
Isolated Mid-facial fractures	Male	2	-	9	2	-	6	20
	Female			1				
Combined	Male	-	-	6	-	-	2	8
	Female							
Total		9	1	29	8	2	17	66

It however contrasts the previous report by Olasoji et al.¹ who previously reported on maxillofacial fractures in Northeastern Nigeria and noted that firearms and assaults were the most common causes. His finding aligned with reports from the Middle east Iran as reported by Taher et al.²² Of all the RTA observed in the present study, automobile was most prevalent, this observation is at variance with Ogundipe²⁰, Obimakinde¹⁴, and Hernandex²⁰ studies, where motorcycle was the leading cause of RTA-related maxillofacial fractures.

Furthermore, in this study, assault was responsible for 13.6% Table 4 of maxillofacial fractures which is a considerable proportion and may be due to the rising spate of altercations and attacks on farmers by migrating herdsmen and cattle rustlers as well communal clashes due to boundary disputes in the region. A cross relation of victim's occupation with the causes of injury showed that the only two victims of gunshot in this study were military personnel even though the only victim of bomb blast was a farmer. The victims of RTAs were mostly farmers and student's which reflect the agrarian nature of the state's economy and high mobility of students who commute to and from their schools on a daily basis. In this study, maxillofacial fractures were categorized into isolated mandibular fractures, isolated middle third fractures, and combined facial fractures. There were 38 isolated mandibular fractures 20 of which were caused by RTAs while there were 20 isolated midface fractures majority of which were also due to RTA, the combined fractures all resulted from RTA also. Mandible was mostly fractured as previously reported by many others^{13,20,21,22,15,10} and mandibular body was clearly the most common individual site affected in this study. This contrasts some other authors who submitted that the Symphyseal, Parasymphyseal and Condyle were commoner than body fractures. In the facial middle third subregion, zygomatic complex was clearly more while Le fort fractures were sparingly observed in this study. Our suspicion is that Le-fort fractures presents a riskier injury due to airway involvement and haemorrhagic airway obstruction and risk of aspiration. Hence, most of the patients with Le Fort fractures may have been fatally injured and hence not accounted for in this study.

CONCLUSION

This study shows that automobile accidents remain the leading cause of fractures in Northeast Nigeria as reflected by patients who presented at FETHGO. The high spate of insurgency related violence does not appear to reflect in the aetiology of maxillofacial fractures however, an indirect effect was suspected arising from increasing urban migration occasioned by insurgency³. The high gender gap suggests that the changing trend in gender involvement reported in Nigeria and other climes does not seem to have caught up with Northeast Nigeria probably due to cultural resistance. Isolated mandibular fracture is commonest while high energy impact²³ mid-face fractures were sparingly encountered in the hospital.

RECOMMENDATIONS

There is a need for proactive governance to cater for the effect of urban migration through a more organized transport system, strict enforcement of traffic rules, structured regulation of the transportation and commerce industry and general population enlightenment.

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