GENDER DISTRIBUTION AND ETIOLOGY OF FACIAL TRAUMA - AN INSTITUTIONAL STUDY

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ABSTRACT

Facial trauma is an injury to the face which may involve both soft and hard tissues. There are many etiologies associated with facial trauma. The aim of the current study is to assess the gender distribution and etiology of maxillofacial trauma among the south indian population. The retrospective study was performed among 77 patients who had undergone trauma management in the department of oral and maxillofacial surgery in our institution; from the time period between June 2019 to March 2020. The data was tabulated using MS-Excel and analysed using IBM SPSS Software (version 20). The gender distribution among trauma patients in south india was 85% males and 15% in females. Road traffic accidents and fall injuries were among the most common etiology for both genders. Work Hazard injury and sports injuries were observed exclusively in males while females were exclusively associated with domestic violence. Males have higher incidence of maxillofacial trauma, and the most common etiology of maxillofacial trauma among south indians were road traffic accidents followed by assault and fall injuries. Males were exclusively subjected to sport injuries while females were subjected to domestic violence.

Keywords: assaults; falls; etiology; gender; maxillofacial trauma; road traffic accidents.

I. INTRODUCTION:

Maxillofacial trauma is any physical trauma impacting the facial region. The maxillofacial region can be divided into three parts: 1.The upper face- Frontal bone and associated parts 2.The midface - nasal bone, ethmoid, zygomatic maxillary bone - this part of the face is majorly involved in Road traffic accidents and sustain fractures 3.the lower face- Mandible bone(Angelopoulos, 2014). Majority of the maxillofacial injuries are associated with multiple injuries to the chest,C-Spine,abdomen,extremities subjecting the patient to physical and emotional trauma(Ceallaigh et al., 2007; Akama et al., 2008; Eidt et al., 2013; Alves et al., 2014; Patil, 2017). Facial fracture management is commonly encountered by maxillofacial surgeons apart from orthognathic surgeries, temporomandibular disorders and orofacial pathology and is often associated with high fatality rates(Leles et al., 2010; Patturaja and Pradeep, 2016; Patil et al., 2017a; Marimuthu et al., 2018; Jain et al., 2019).

The etiology of trauma in various countries have variations; with road traffic accidents playing a significantly major role in fractures related to midface-lower face(Ceallaigh et al., 2007; Singaram, G and Udhayakumar, 2016; Abhinav et al., 2019; Abosadegh et al., 2019). The data availability on the etiology and fracture patterns observed among south indians are very minimal(Veeresh and Shakararadhya, 1987)(Weihsin et al., 2014). Henceforth, this study was taken up to assess the gender and etiology of maxillofacial trauma in a tertiary care center in chennai where several clinical trials had been conducted(Jesudasan, Abdul Wahab and Muthu Sekhar, 2015; Christabel et al., 2016; Kumar and Sneha, 2016; Kumar, 2017a, 2017b, 2017c; Kumar and Rahman, 2017; Packiri, Gurunathan and Selvarasu, 2017; Rao and Santhosh Kumar, 2018; Abhinav, Sweta and Ramesh, 2019). Previously our team has a rich experience in working on various research projects across multiple disciplines((Neelakantan et al., 2015; Ramamoorthy, Niveditha and Divyanand, 2015; Abdul Wahab et al., 2017; Eapen, Baig and Avinash, 2017; Manivannan et al., 2017; Patil et al., 2017b; Ezhilarasan, Sokal and
II. MATERIALS AND METHODS:

This retrospective study was performed among the patients who had undergone trauma management during a time period between June 2019 to March 2020. Data was obtained of all patients who underwent open reduction internal fixation as a part of trauma management from the department of oral surgery. Patients who underwent conservative or closed reduction were excluded from the study. The sample size of the current study was seventy seven. Institutional ethical committee clearance was obtained for data retrieval and usage as needed for the study (SDC/SIHEC/2020/DIASDATA/0619-0320).

The verification of details was done with the presence of two reviewers to reduce observers bias. The verification was done using photographs and procedural notes. Data with incomplete procedural notes and photographs were excluded from the study. Parameters including gender, age, etiology, maxillary vs mandibular bone involvement were tabulated in MS-Excel. The data was entered in IBM SPSS (version 20) and the results were tabulated and interpreted. Pearson’s Chi square test was performed.

III. RESULTS AND DISCUSSION:

Among 77 patients included in the study, 85% were males and 15% were females (Figure 1). The median age was 29 years and the patients ranged between 4-64 years of age. There was a male predilection, as males sustained more injuries than females in the ratio of 6:1. Males between the age 25-45 years sustained trauma frequently while females between 20-55 years sustained maxillofacial injuries more frequently.

25% of the patients had fractures involving only the maxillary bone while 60% of the patients sustained fractures only involving the mandibular bone, whereas 15% of the patients sustained fractures in both maxillary and mandibular bone (Figure 2).

Majority of the patients who sustained maxillofacial trauma were victims of road traffic accidents (57%) followed by assault (18%), while 16% of the patients acquired fractures following accidental fall injuries. 4% of the population were victims of work hazard while 4% of the population sustained maxillofacial trauma due to sport injuries. A minority of the patients accounted for sustaining maxillofacial trauma due to domestic violence (1%). (Figure 3)

Males sustained fractures in the maxilla and mandible separately in many instances, and were prone to simultaneously fracture both the bones at the same time while females were less prone to bimaxillary fractures. Females sustained the majority of the fractures in the mandible. However the association of the site of trauma with gender was statistically not significant (p>0.813) (Figure 4).

The most common etiology for males to undergo fractures in the orofacial region was road traffic accidents followed by assault and accidental fall injuries while females were subjected to maxillofacial trauma majorly due to road traffic accidents, fall injuries and assault. Males were exclusively subjected to maxillofacial trauma due to work hazard and sport injuries while females were exclusively subjected to facial trauma due to domestic violence. However the association of etiology with gender was statistically not significant (p>0.132) (Figure 5).

Our current study revealed that males between the age 25-45 years and females between the age 20-55 years were more prone to maxillofacial trauma. The predominant etiology for males were road traffic accidents and assaults. While males are exclusively subjected to maxillofacial trauma due to work hazard injuries and sport injuries, females predominately were subjected to maxillofacial trauma due to road traffic accidents and fall injuries. Injuries due to domestic violence were exclusive to the females.

Siber S et al reported (Siber et al., 2015) that the gender distribution among the trauma patients subject to maxillofacial fractures was 65% males and 35% females among the European population where 74 patients were assessed. Among males the most common etiology was accidental fall injuries (39%), followed by assault (29%), sport injuries (12%) and work hazard injuries (10%). Females were subjected to facial fractures frequently due
to fall injuries (65%), traffic accidents (26%) followed by sports injuries (4%). Mandibular bone (20%) was more involved than maxillary bone (17%). The results of the previous study is in agreement with the current study in relation to gender predilection while contradicting our current study in relation to etiology where the most common etiology for males was road traffic accidents (54%) followed by assault (18%) and fall injuries (13%). Whereas females had traffic accidents (6%) as the most common etiology followed by fall injuries (4%) and assault (3%). In our current study only males were exclusively subjected for sports injuries while the European population had males and females sustaining sports injuries. Injuries due to domestic violence were not reported among the European population. There could be several possible reasons for the variations in results which include geographically different locations, adherence to local laws and effect of alcohol consumption on driving motor vehicles (Ramirez and Martin Ramirez, 1993; Parker, Lajunen and Summala, 2002; Abosadegh et al., 2019).

Sbordone et al reported (Sbordone et al., 2018) that the gender distribution among the trauma patients was 70% males and 30% females among the Italian population where 967 patients were assessed. The mandibular bone (35.4%) was most commonly involved in comparison to maxillary bone (4.3%). The most common etiology of orofacial trauma in Italian population was assault (30.4%) followed by road traffic accidents (27.2%), fall injuries (23.2%) and sport injuries (15.4%). Gunshot wounds (0.1%) were exclusively observed in the Italian population causing maxillofacial trauma. The current study is in consensus with the previous study in terms of male predilection for maxillofacial trauma. But the previous study contradicts the current study were the main etiology for maxillofacial trauma was road traffic accidents (57%) followed by assault (18%), accidental fall injuries (15%), work hazard (4%), sport injuries (4%) and domestic violence (2%). Increased incidence of maxillofacial trauma was observed due to sports injuries in Italian population than the south indian population. This increase in assaults and reduced road traffic accidents could be due to the aggressive nature of the Italian population and strict traffic rules of European Union respectively (Krahé, no date; Ramirez and Martin Ramirez, 1993; Parker, Lajunen and Summala, 2002; Liu, Lewis and Evans, 2013; Abosadegh et al., 2019).

Feras Alqahtani reported a gender distribution among maxillofacial trauma patients that 90% were males and 10% were females. The most common etiology of orofacial trauma among the Saudi Arabain population was road traffic accidents accounting for 65-90% of the trauma cases (Alqahtani, Bishawi and Jaber, 2020). The range of patients undergoing trauma were 10-40 years in age. The current study is in agreement with the previous study due to similar culture and traffic laws. Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc, Marimuthu and Devadoss, 2018; Ramesh et al., 2018; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree Priyadharsini, 2019; Mathew et al., 2020). We hope this study adds to this rich legacy.

The current study has few limitations which includes availability of limited samples, short term study and geographically isolated population. The future scope of the study is to analyse the quality of life after trauma and to assess the correlation between age and specific trauma etiology.
Figure 1: Bar graph depicts the frequency of males and females who had undergone trauma in the time period from June 2019 - March 2020; where Y axis shows the percentage of patients involved in trauma and X axis shows the gender of patients. Blue colour represents male and Green colour represents females. 85.71% of males and 14.29% of females were subjected to trauma. Males are subjected to trauma more than females in our study population.
Figure 2: Bar graph depicts the frequency of maxillary and mandibular jaw bones involved in trauma during the time period from June 2019 - March 2020; where Y axis shows the percentage of patients involved in trauma and X axis shows the various bones involved in trauma. Light blue colour represents maxillary arch, Yellow colour represents mandibular arch and Dark green colour represents both maxillary and mandibular arch. Isolated maxillary arch fractures was observed in 24.68%, isolated mandibular fractures was seen in 59.74% and bimaxillary fractures was seen in 15.58% among the study population. Isolated mandibular fractures constitute most of the fractures observed in our study population.
Figure 3: Bar graph depicts the overall frequency of various etiologies causing trauma during the time period June 2019 - March 2020; where Y axis shows the percentage of patients involved in trauma and X axis shows the various etiologies causing trauma. Red colour denotes RTA, Grey colour denotes Fall injury, Purple colour denotes work hazard, Orange colour denotes assault, Brown colour denotes Domestic Violence and lavender colour denotes sports injury. 57.14% of cases due to RTA, 15.58% was due to fall injuries, 3.896% was due to work hazard, 18.18% was due to assault, domestic violence was 1.29% and sports injury was 3.8%. RTA was the major cause of trauma.
Figure 4: Bar graph depicts the association of gender and anatomical site of facial trauma during the time period June 2019 - March 2020; where Y axis shows the frequency of patients involved in trauma and X axis shows the various bones involved in trauma among males and females. Pearson’s chi square test was done; chi square value was 0.415; p value-0.813. The association of gender with the site of trauma was statistically not significant. 20.78% of males and 3.90% of females sustained maxillary bone fracture, 50.65% of males and 9.09% of females sustained mandibular bone fracture, 14.29% of males and 1.30% of females sustained bimaxillary bone fracture. Males sustained more fractures than females.
Figure 5: Bar graph depicts the association between gender and various etiologies of trauma; where Y axis shows the frequency of patients involved in trauma and X axis shows the various etiologies causing trauma among males and females. Pearson’s chi square test was done; chi square value was 8.432; p value 0.132. The association of gender with etiology was statistically not significant. 53% of males and 6% of females sustained trauma due to RTA. 4% of males and 0% of females sustained trauma due to sports injury, 0% of males and 2% of females sustained trauma due to work hazard. Males were subjected to facial trauma predominately by RTA than work hazard, sport injury fall injuries and assault, wherein they still outnumbered the female population.

IV. CONCLUSION.

Within the limitations of the study, it can be concluded that the frequency of maxillofacial trauma was greater in males in comparison to females and the most common etiology of maxillofacial trauma being road traffic accidents and accidental fall injuries in both gender, while work hazard injuries and sports injuries are exclusive for males and domestic violence are exclusive for females among the study population. The results of this study are in consensus with the existing literature for the gender distribution. However, the etiology varied among our population in comparison to other epidemiological studies.

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