

INCIDENCE OF MAXILLOFACIAL TRAUMA FOLLOWING INTERPERSONAL VIOLENCE IN PATIENTS REPORTING TO A DENTAL INSTITUTE

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ABSTRACT

Background: The prevalence of maxillofacial fractures differs significantly across countries. A number of factors involved, including environmental, cultural, and socioeconomic factors, contribute to the large variability in reported incidence and aetiology. Interpersonal violence is a significant health concern and leads to the high volume of trauma reported in emergency departments. It's still one of the most common reasons for maxillofacial fractures.

Aim: To determine the incidence of Maxillofacial trauma following interpersonal violence in patients reporting to a dental institute in Chennai

Materials and Methods: This is a retrospective study in which the Data of patients who were diagnosed with maxillofacial trauma in a private teaching hospital, Chennai from June 2019 to February 2021 was collected by reviewing patient's records and analysed. The collected data (n=282) was compiled, reviewed, tabulated and imported to SPSS statistical software (IBM SPSS Statistics 23.0) to analyse the data. The chi-square test was used to analyse the data.

Results and discussion: Within the limits of the study, The prevalence of maxillofacial trauma following IPV was found to be 18%. The age of the patients ranged from 2 to 64 years (mean 28). The most prevalent site of fracture was the mandible, followed by the zygoma.

Conclusion: During the study period, the number of facial fractures associated with interpersonal violence increased. The age group most impacted was young male adults. Facial fractures caused by violence are a public health hazard that require significant public awareness and the implementation of prevention programmes.

Keywords: Alcohol, Facial fracture, Innovative, Interpersonal violence, Maxillofacial trauma,

INTRODUCTION

Any physical damage to the face is referred to as facial trauma or maxillofacial trauma. Soft tissue trauma like burns, lacerations, and bruising, as well as facial bone fractures like nasal fractures and jaw fractures, may also result from facial trauma. Injury to the face can result in disfigurement and loss of function, Facial trauma, though rarely life-threatening, can be fatal. (Chandrasekar, Chandrasekhar, Shantha Sundari, *et al.*, 2020) Facial fractures can occur due facial traumas, and they can occur alone or in combination with other injuries (Erdmann *et al.*, 2008) (Kaban, Anthony Pogrel and Perrott, 1997). Facial fracture diagnosis and management remains a difficult issue that often necessitates a multidisciplinary treatment (Katzen *et al.*, 2003) (J *et al.*, 2018). The prevalence of maxillofacial fractures differs significantly between countries (Al Ahmed *et al.*, 2004). Road accidents, assaults, falls, and sports injuries are the leading causes worldwide (Ellis, el-Attar and Moos, 1985) (Lee, 2009). Interpersonal abuse has increased to become one of the most common causes of maxillofacial trauma. (Figure 1)

Interpersonal violence (IPV) is described by the World Health Organization as violence committed by a single person or a small group of people, and involves physical and sexual abuse, mental and psychological assault, and negligence. (Dahlberg and Krug, 2006) (Bishir *et al.*, 2020) (Fan *et al.*, 2021) As a result, IPV covers a wide range of physical and mental injury. The World Health Organization's European region estimates that IPV causes about 73,000 deaths every year in Europe, and that with every death caused by IPV, an additional 20 to 40 patients need emergency care, with far more going unnoticed and untreated (Organization and Others, 2005). The recent escalation of violence has been aided by many significant causes.

IPV is primarily a health condition that affects young adults in social situations, and it is linked to psychosocial factors such as social, economic, and emotional conflicts. Drug addiction, family fragmentation, unemployment, depression, and alcoholism are also societal consequences. Disobedience of traffic regulations and excessive alcohol consumption are two examples of non-compliance with social norms. (Montovani *et al.*, 2006)

IPV patients also sustain head and neck injuries. Facial injuries, such as facial fractures, are common in patients who present to the emergency room after IPV, with one major study showing a 30% incidence of facial fractures in all patients, with facial fractures being the primary diagnosis of 22% of all patients (Wladis, Boström and Nilsson,

1999)(Narayanasamy *et al.*, 2021) Shepherd et al discovered that the face was involved in 83 percent of fractures suffered by attack victims. According to Brink et al(Brink, Vesterby and Jensen, 1998), the craniofacial area was involved in 69 percent of all patients with violence-related injuries interviewed and treated at an emergency room, and the face was involved in 66 percent of all lacerations.

IPV is the leading cause of facial fractures in North America, South Africa, Europe, and Australia(Haug, Prather and Indresano, 1990; Bamjee *et al.*, 1996), according to recent data. (Kruger, Smith and Tennant, 2006)13, (Schön, Roveda and Carter, 2001). IPV prevalence in India ranged from 18% to 45 percent, according to surveys (Fulu *et al.*, 2013) IPV has been consistently identified as the leading cause of facial fractures, emphasising its increasing trend in recent decades.(Stanley, 2009; Simister and Mehta, 2010)

Our team has extensive knowledge and research experience that has translate into high quality publications(J *et al.*, 2018),(Wahab *et al.*, 2018),(Mudigonda *et al.*, 2020),(Narayanasamy *et al.*, 2021),(Gan *et al.*, 2019; Li *et al.*, 2019a; Ma *et al.*, 2019; Bishir *et al.*, 2020; Zhang *et al.*, 2020a; Fan *et al.*, 2021; Saravanakumar *et al.*, 2021; Veeraraghavan *et al.*, 2021; Wang *et al.*, 2021; Wei *et al.*, 2021)(Sathya *et al.*, 2020),(Felicita and Sumathi Felicita, 2018; Ramakrishnan, Dhanalakshmi and Subramanian, 2019; Chandrasekar, Chandrasekhar, Sundari, *et al.*, 2020).(Su *et al.*, 2019; Wan *et al.*, 2020)

The present study aimed to find the Prevalence of maxillofacial trauma following interpersonal violence in patients reporting to a dental institute in Chennai

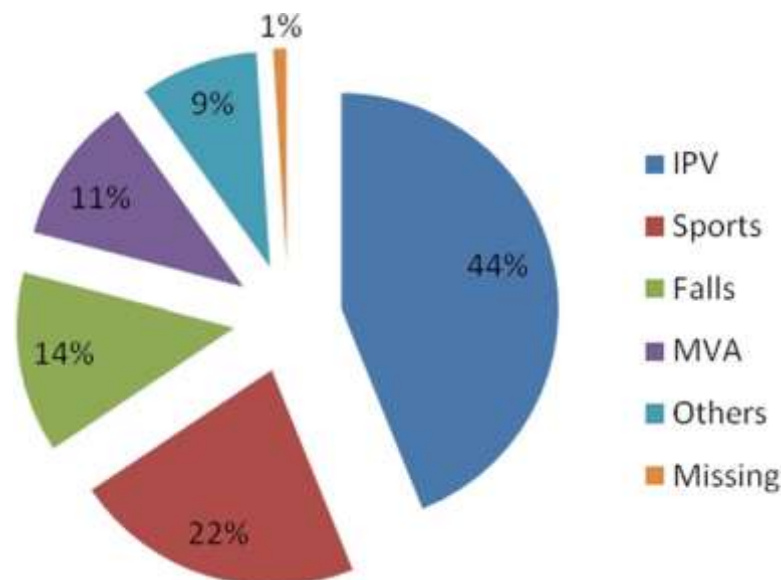


Figure 1 depicts Most common causes for facial fracture according to Kai Lee, 2009.

MATERIALS AND METHODS:

This was a retrospective study which was done in a private dental college in Chennai, India. The data of patients who were diagnosed with Maxillofacial trauma in the department of Oral and Maxillofacial surgery between June 2019 and February 2021, was collected by reviewing patient records and analyzing the data. These data were cross verified with photographs and tabulated in Excel. The sample size of the total number of patients diagnosed with maxillofacial trauma was n = 1527 of which people had trauma due to interpersonal violence was 282. Data was collected with the following parameters: patient demographics, fracture types, mode of injury and treatment delivered. The patients were grouped into age groups as <16;16-30;31-45;46-60; and >60. Patients of both sexes were present. Data were analysed using SPSS statistical software. (IBM SPSS Statistics 23.0) Data analysis done using chi-square test. p value was set as 0.05 as level of significance.

RESULTS:

DEMOGRAPHICS

There were 210 males and 72 females in the study, with a mean age of 28.12 (SD: 13.12) years.(Table 1). The youngest patient was two years old, while the eldest was sixty-four years old. The age difference between male and female patients was not significant.

Figure 2 shows the annual incidence of IPV-related injuries, which suggests an increase in maxillofacial damage caused by IVP in the years 2019 and 2021. The highest cases occurred in the year 2019 (38.30%) followed by 2021 (36.17%) and 2020 (25.53%)

		Gender		Total
		Female	Male	
Age	<16	11	33	44
	16-30	25	111	136
	31-45	20	48	68
	46-60	14	17	31
	>60	2	1	3
Total		72	210	282

Table 1 : Demographic details of the participants

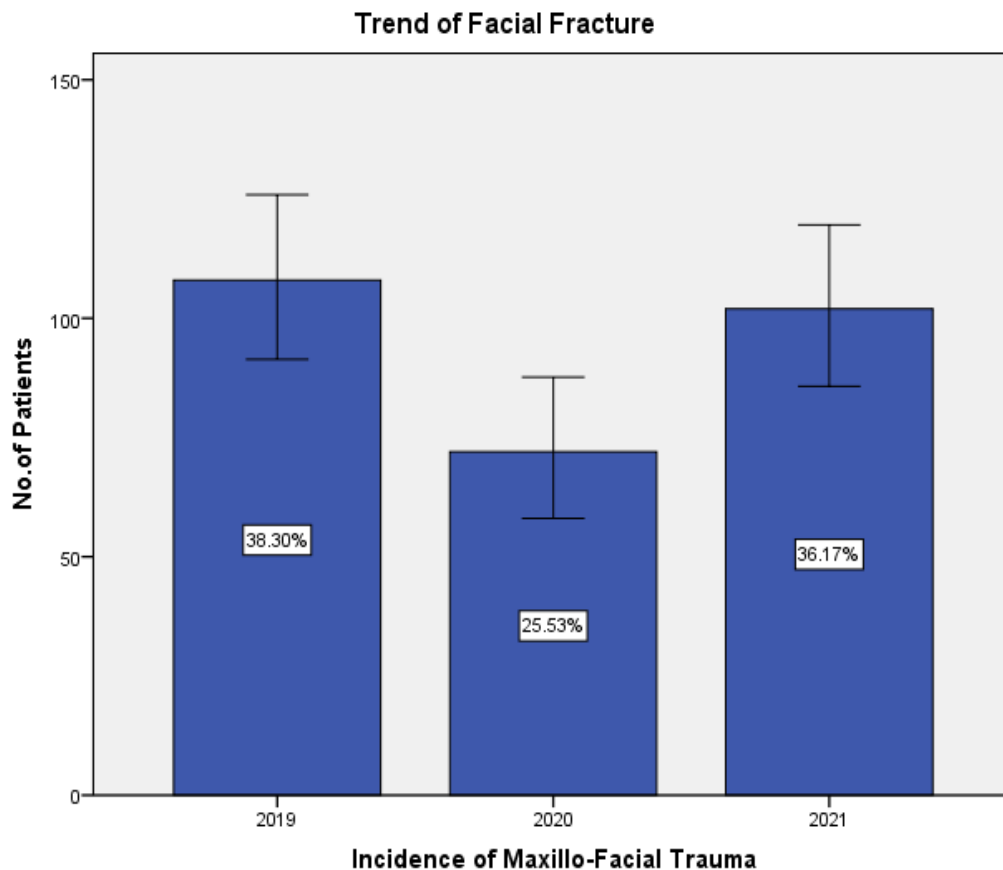


Figure 2 showing Incidence of maxillofacial trauma in the study period. 2019 had a highest of 38.30% followed by 2021, 36.17% and 2020 25.53%.

FRACTURE SITES

There were 320 fracture sites recorded, with 20 (6.3%) including the frontal bone, 167 (52.2%) the midface, and 125 (39.1%) the mandible (FIGURE 3). The most common site of midface fracture was the zygoma (20 percent of all

patients). The most isolated fracture site in patients with mandibular fracture was the mandibular angle (35.2%), followed by the condyle (27.2%).(figure 4).

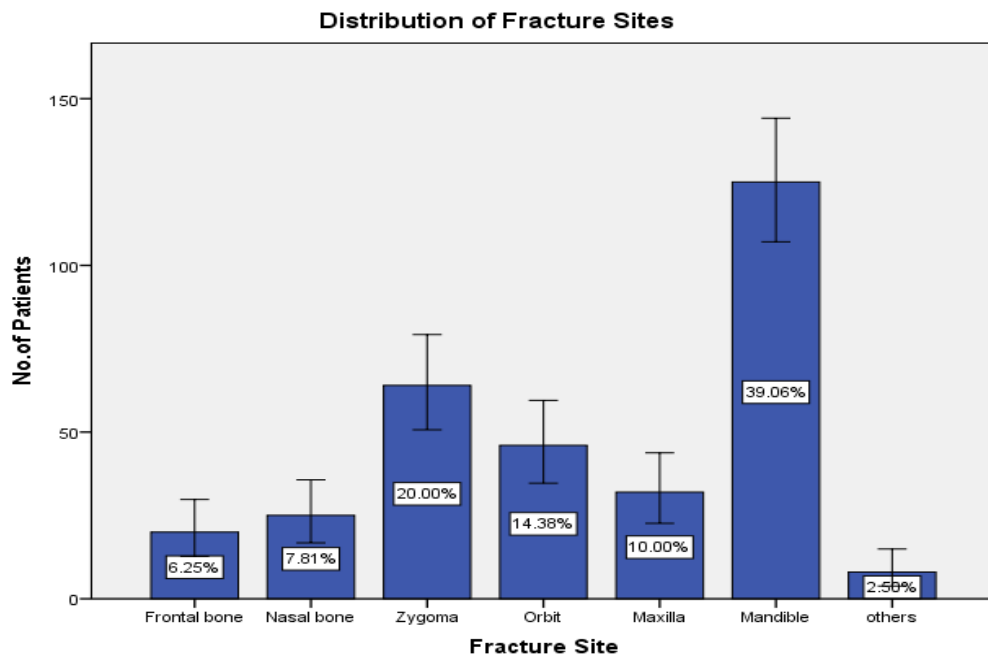


FIGURE 3 showing incidence of fracture sites in patients with maxillofacial trauma following IPV .X-axis represents the Fracture site and the Y Axis represents the number of patients. Out of a population of 282 , 39.06% had fracture of the mandibular fracture , 20% had zygoma fracture , 14.38% had orbit fracture , 10% had maxilla fracture , 7.81% had fracture of the nasal bone , 6.25% had frontal bone fracture and the rest 2.5% had other fractures.

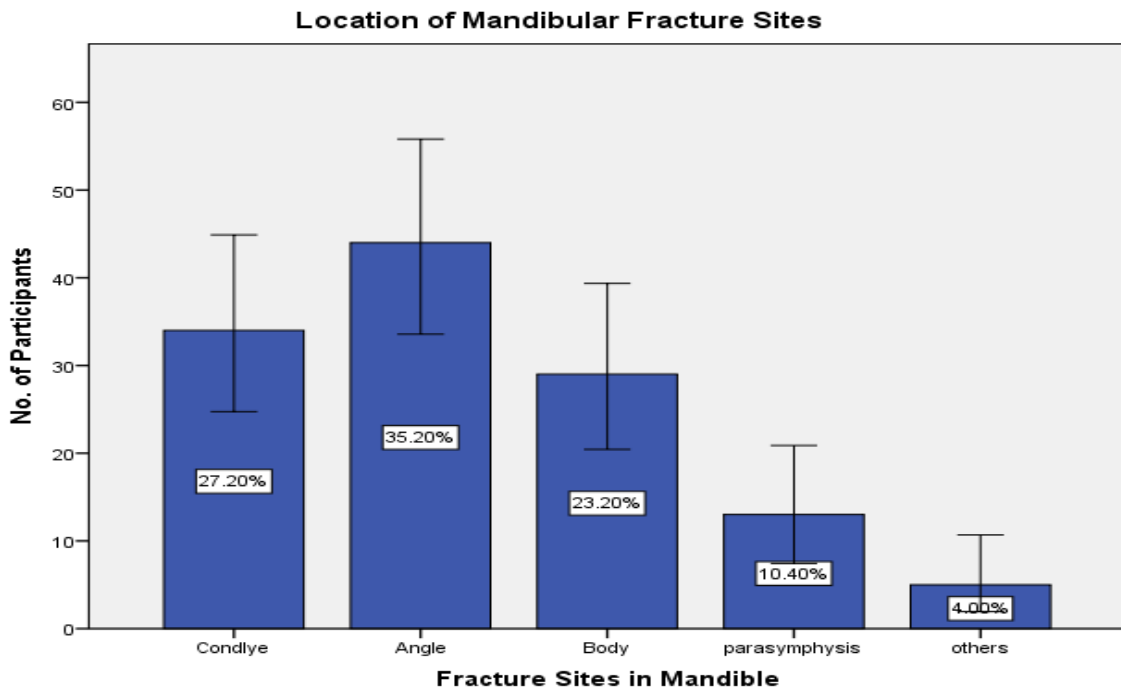


FIGURE 4 showing incidence of mandibular fracture sites in patients with maxillofacial trauma following IPV .X-axis represents the Fracture site in mandible and the Y Axis represents the number of patients. Out of a population of 282 , 35.20% had fracture of the angle of mandible , 27.20% had condylar fracture , 23.20 had fracture of the body of mandible , 10.20% had parasymphysis fracture and rest 4% had other fractures of the mandible.

ASSOCIATION

The correlation of the fracture sites to the Age showed that Maxillofacial fracture is be more common among the age group 16-30 followed by 31-45 , in particular mandibular fracture was found to be high among all the age groups(Figure 5) with highest among 16-30 (19.50%)

The correlation of the fracture sites to the Gender showed that Maxillofacial fracture is more common among males than of females. In which mandibular fracture(31.91% in males) were found to be record high among both the gender groups(figure 6)

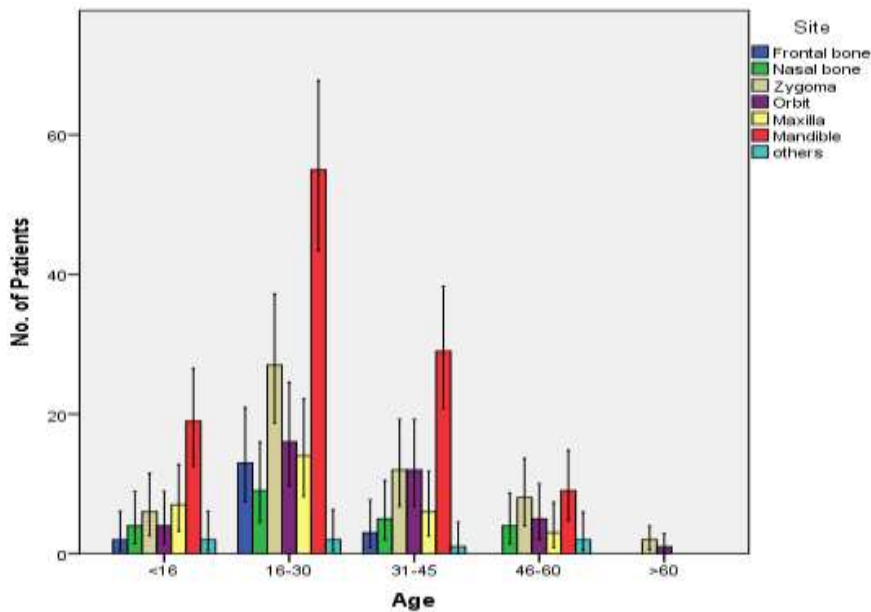


FIGURE 5:Bar graph showing association between Age and Fracture site .X-axis represents the gender and the Y-axis represents the patients with maxillofacial fracture due to IPV . Chi Square test was done and the Association was found to be not statistically significant. Pearson’s chi square value: 22.12 df: 24 p-value :0.572, ($p > 0.05$). Hence, not statistically significant, although Maxillofacial fracture is observed to be more common among 16-30 especially mandibular fracture(19.5%)

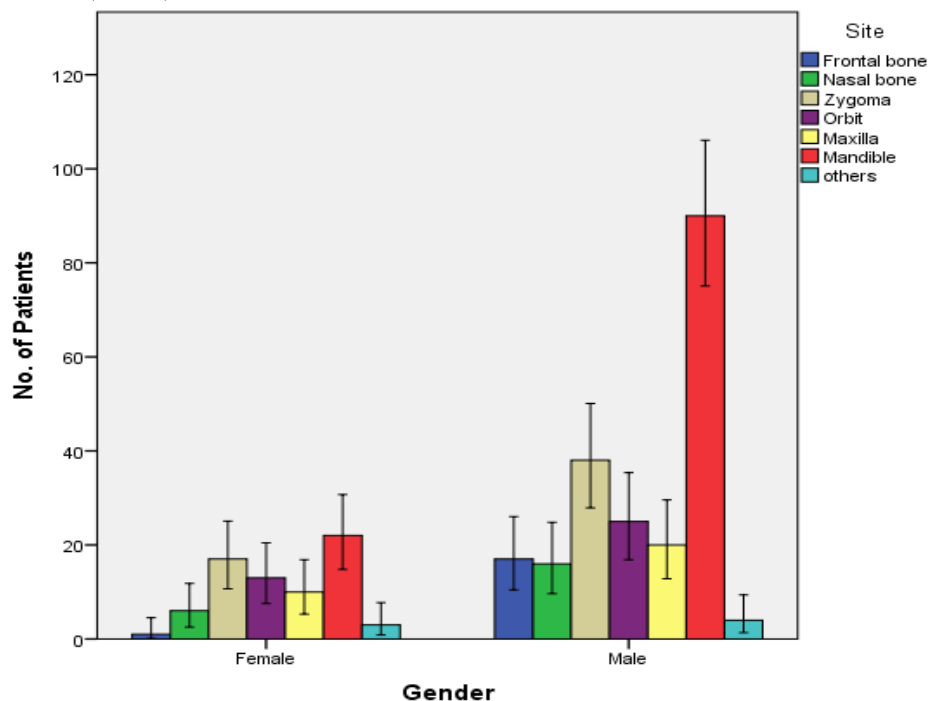


FIGURE 6 Bar graph showing association between Gender and Fracture site .X-axis represents the gender and the Y-axis represents the patients with maxillofacial fracture due to IPV . Chi Square test was done and the Association was found

to be not statistically significant. Pearson's chi square value: 10.26 df: 6 p-value :0.114, ($p > 0.05$). Hence, not statistically significant, although Maxillofacial fracture is observed to be more common among males than of females. especially mandibular fracture(31.91%)

DISCUSSION:

According to a World Health Organization investigation, the number of trauma patients is expected to rise in the future. Trauma management is a large part of most hospitals' workload, and it puts a lot of strain on the healthcare system. (Choi *et al.*, 2021)(Felicita and Sumathi Felicita, 2018) While maxillofacial trauma is rarely life-threatening, research into the presentation and management of trauma to a specific body region, such as the face, is critical for better treatment and estimating the health consequences of these patients.

Latest studies have discovered a growing trend in IPV-related facial fractures. (van Beek and Merckx, 1999; Kieser *et al.*, 2002) In the current report, the number of patients affected by IPV increased from 2019 to 2021 (Figure 1). IPV-related accidents appear to affect a specific patient population. In the current study, the average age of patients with IPV-related maxillofacial fractures was the younger age group, with a higher male-to-female ratio (figure 5). IPV was shown to be particularly common in young males aged 16 to 30 years in the current research (figure 6), which is consistent with previous findings. (Olasoji, Tahir and Arotiba, 2002; Deogratius, Isaac and Farrid, 2006; Li *et al.*, 2019b) A British study found that 61% with facial injuries were between the ages of 15 and 25. (Hutchison *et al.*, 1998) IPV affecting these young males is common in a social environment, with alcohol being a major contributor.

The pattern and distribution of facial fractures was influenced by the cause of these injuries as well as the structure of the facial skeleton. Direct injury to the chin can cause damage to the condylar region. (Yamamoto *et al.*, 2011) Recent studies have shown significant variations in the distribution of mandibular fractures, with some suggesting that the angle is the most frequent site (Dongas and Hall, 2002; Ogundare, Bonnicksen and Bayley, 2003) and others claiming that the body (Olasoji, Tahir and Arotiba, 2002) or condylar/subcondylar (Motamedi, 2003) are more vulnerable. In cases of violence, a punch or knock to the face is a common cause of facial fracture, with the aggressor often striking prominent points on the face, like the cheek or the jaw angle. In comparison, in crashes and bike accidents, the chin is often the point of contact, resulting in symphyseal and condylar mandible fractures. (Yamamoto *et al.*, 2011) As a result, IPV is frequently associated with isolated fractures, especially those affecting the mandible and zygoma. In the current analysis, 39.1% and 20% of the participants were affected, respectively. (Figure 3).

According to the findings of a report, IPV has a lower prevalence of skull fractures, implying that the fractures suffered by IPV are less severe and complex (Lee, 2009). In comparison, some forms of collisions, such as high-speed and heavy-impact motor vehicle crashes, are most likely to result in multiple facial skeleton fractures and multisystem damage. Patients with facial injuries were often admitted to the hospital. As compared to facial fractures from other causes, such as motor car collisions and accidental falls, the risk of multiple facial fractures and concomitant damage to other structures is lower. (Buchbinder, 1999)(Yokoyama *et al.*, 2006)(Wahab *et al.*, 2018)(Ma *et al.*, 2019) In studies with a high proportion of IPV-related facial fractures, surgical intervention was frequently needed (Deogratius, Isaac and Farrid, 2006).

Facial injuries have significant functional, cosmetic, social, and socioeconomic consequences. Such injuries may have a significant impact on a person's mental and emotional functioning, as well as cause economic losses. This population of patients is also prone to depression and social alienation. ('Victims of Personal Violence: The Relevance of Symonds' Model of Psychological Response and Loss-Theory', 1990; Joy *et al.*, 2000) Patients who have suffered severe facial injuries may need therapy or psychiatric care. Since impressions are often established based on one's appearance, even mild facial injuries can cause serious aesthetic complications for the patient. Injured patients' care should provide not only acute phase treatment, but also a combination of preventive and interventional programmes. (Shepherd, 2007)(Wang *et al.*, 2021)(Gan *et al.*, 2019; Zhang *et al.*, 2020b)

The medical profession, in order to improve public safety, plays a critical role in preventing community violence. Oral and maxillofacial surgeons, who usually treat these patients with facial trauma in the acute and convalescent phases, are well-positioned to implement the required recovery as well as a preventive initiative.

This is probably the first study of its kind to report data on maxillofacial trauma following interpersonal violence in patient reporting to dental clinics in Chennai, and the findings may be used to develop a prevention model that includes dental health education and procedures.

This study only gives an insight into the interpersonal violence related facial fracture of a small portion of the population. It should be noted that the study outcomes could not be strictly analogous to those of other studies due to a variety of differences, including population size, selection criteria for a specific age demographic, method evaluation of fracture which may be a study limitation.

CONCLUSION:

The prevalence of maxillofacial trauma following IPV was found to be 18%. In the last decade, IPV has been the leading cause of facial fractures. The largest demographic affected is young males between the ages of 16 and 30. Fractures were most common in the mandible and zygoma. The trend towards more violence-related injuries and less traffic-related injuries is continuing. Therefore clinicians have a major role to prevent IPV by creating public awareness and education.

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CONFLICT OF INTEREST:

None declared.

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