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Characteristics of Maxilllofacial Trauma Patiens before and during the Covid-19 Pandemic in Oral and Maxilllofacial Surgery Department of Dr. Hasan Sadikin Hospital Bandung

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Abstract

Introduction: Prior to the COVID-19 pandemic, motor vehicle accidents, falls, physical assaults, and sports injuries were the main causes of maxillofacial trauma. The existence of interventions to prevent the COVID-19 pandemic resulted in home-centered social activities in the community. This also contributes to alterations in the aetiology of maxillofacial trauma that occur worldwide and may affect other characteristics of this entity.

Methods: This is a retrospective study conducted at the Hasan Sadikin Hospital, Bandung, West Java, Indonesia, and was carried out in September–December 2022. The population of this study were maxillofacial trauma patients with diagnoses of vulnus (laceratum, schissum, punctum, and morsum), frontal, mandibular, maxillary fractures, orbit, naso-orbito-ethmoid (NOE), zygomaticus, and dentoalveolar fractures before the 2018–2019 pandemic period and during the 2020–2021 pandemic period at the Oral and Maxillofacial Surgery Department at RSUP Dr. Hasan Sadikin Bandung through the emergency department. The variables studied included age, gender, type of trauma, etiology, alcohol involvement, and management. The data are presented as frequency distribution and percentage in tabular and diagram.

Results: During the 2018–2021 periods, there were 504 patients who experienced maxillofacial trauma before the COVID-19 pandemic, and this number has decreased to 216 patients during the COVID-19 pandemic. The majority of maxillofacial trauma experienced both before (n = 314; [62%]) and during (n = 166; [77%]) the COVID-19 pandemic was caused by motor vehicle accidents. Most of patients before the COVID-19 pandemic were aged 0–19 years (n = 230; [46%]), meanwhile, during the COVID-19 pandemic most patients were aged 20–39 years (n = 88; [41%]).Overall, there were no differences in sex characteristics, alcohol involvement, type of maxillofacial trauma, or treatment given before and during the COVID-19 pandemic.

Conclusion: The existence of interventions to prevent the COVID-19 pandemic by imposing Large-Scale Social Restrictions (PSBB) has resulted in modifications to community social activities that are centered

in the home. This factor contributed to some differences in the characteristics of maxillofacial trauma patients at the Oral and Maxillofacial Surgery Department in Hasan Sadikin Hospital before and during the COVID-19 pandemic.

Keywords: Maxillofacial trauma, Characteristics, COVID-19

Introduction

Maxillofacial trauma is classified into injuries that can occur in the lower, middle, or upper third of the face, including injuries to the soft and hard tissues of the face and the oral cavity. The causes of maxillofacial trauma vary, including traffic accidents, physical violence, falls, sports, and trauma from firearms. The main causes of facial injuries in more developed countries are interpersonal violence, traffic accidents (motor vehicles and pedestrians), falls, sports, and recreational activities. Alcohol plays an important role in this injury. In a recent study, 55% of patients with facial fractures were under the influence of alcohol at the time of injury. Cameron et al. demonstrated that the density of alcohol outlets (bars, nightclubs, etc.) correlates with the amount of violence in the area.[1]Trauma to the face often results in airway obstruction, shock from bleeding, soft tissue injuries, hematomas, changes in facial contours, loss of support for bone fragments, and pain. The first treatment for facial injuries is crucial because later defects are difficult to treat.[1,2]

In December 2019, a new type of coronavirus, namely SARS-COV-2, was discovered in Wuhan, China, which causes Coronavirus-Disease 19 (COVID-19). The World Health Organization (WHO) officially declared COVID-19 a pandemic on March 11, 2020. COVID-19 has caused an extraordinary number of infections and deaths, leading to the collapse of healthcare systems worldwide. Social restrictions have been imposed by governments around the world to address this situation. Government regulations regarding Large-Scale Social Restrictions are listed in PP No. 21 of 2020. Mandatory changes have been made in elective and outpatient surgical clinics for the treatment of patients infected with COVID-19 in the medical field. Therefore, COVID-19 caused a significant decrease in the number of patients admitted to the hospital compared to the parallel period of previous years.[3,4]

Nevertheless, trauma remains a major health care concern even during periods of high-impact disease outbreaks, as it cannot be predicted easily, given that it is influenced by a variety of personal and social factors and occurs by chance. Injury patterns are known to be closely related to human behavior. Major changes in people's behavior patterns as a result of the direct impact of COVID-19 have resulted in changes to regularly observed injury patterns.[3–5]Prior to the COVID-19 pandemic, the characteristics of maxillofacial trauma varied from country to country but were typically caused by motor vehicle accidents, falls, physical assaults, and sports injuries. The existence of interventions to prevent the COVID-19 pandemic resulted in home-centered social activities in the community. This also contributes to alterations in the aetiology of maxillofacial trauma that occur worldwide. The reduction of traffic accidents, the universal cause of maxillofacial trauma, is one of these factors. Saladie et al.'s research. in Spain in 2020 stated that the number of traffic accidents decreased by 76% during the Lockdown period from March to April 2020 compared to the previous year. Haapanen et al. in Finland stated that there was a significant change in the distribution of injury mechanisms as hypothesised, where the proportion of facial fractures caused by assault decreased from 31.8 and 30.2% in 2018 and 2017, respectively, to 14.0% in 2020.[5] A recently published article by Boutray et al., Ludwig et al., and Yeung et al. reported significant reductions in facial trauma patients, respectively, in France, the USA, and London, UK, during the Lockdown period.[3–5]

Dr. Hasan Sadikin General Hospital, Bandung, is a referral center for the province of West Java,

where referral cases for maxillofacial trauma have a fairly high referral rate at this hospital. Based on the above, the authors are interested in analyzing the impact of the COVID-19 pandemic on the characteristics of maxillofacial fractures at Oral and Maxillofacial Surgery Department at Dr. Hasan Sadikin Hospital, Bandung, West Java, Indonesia.

Methods

This is a retrospective study using medical record data from maxillofacial trauma patients who underwent treatment at the Oral and Maxillofacial Surgery Department at Dr. Hasan Sadikin Hospital, Bandung, through the emergency department. The study was conducted at the Hasan Sadikin Hospital, Bandung, West Java, Indonesia, and was carried out in September–December 2022. This study was conducted after being approved by the Health Research Ethics Committee at the Dr. Hasan Sadikin Hospital, Bandung.

The population of this study were maxillofacial trauma patients with diagnoses of vulnus (laceratum, schissum, punctum, and morsum), frontal, mandibular, maxillary fractures, orbit, naso-orbito-ethmoid (NOE), zygomaticus, and dentoalveolar fractures before the 2018–2019 pandemic period and during the 2020–2021 pandemic period at the Oral and Maxillofacial Surgery Department at RSUP Dr. Hasan Sadikin Bandung through the emergency department. The inclusion criteria in this study were: (1) all medical records of patients who seek treatment at Oral and Maxillofacial Surgery Department at RSUP Dr. Hasan Sadikin Bandung through the emergency unit during 2018–2021; (2) maxillofacial trauma patients diagnosed with vulnus (laceratum, schissum, puctum, and morsum); (3) maxillofacial trauma patients diagnosed with maxillary fractures (Le Fort I, II, and III); (4) maxillofacial trauma patient diagnosed with mandibular fracture; (5) patients with maxillofacial trauma diagnosed with palatal fractures; (6) patients with maxillofacial trauma diagnosed with zygomatic fracture; (7) maxillofacial trauma patient diagnosed with NOE fracture. The exclusion criteria in this study were incomplete medical records.

The variables studied included age, gender, type of trauma, etiology, alcohol relationship, and management. Maxillofacial fractures were defined as fractures of the upper, middle, and lower thirds of the face. Vulnus is defined as a break in the continuity of soft tissue due to injuries such as lacerations, cuts, abrasions, punctures, and animal bites. A frontal fracture is defined as a break in the continuity of the frontal part of the skull (forehead bone). A mandibular fracture is defined as a loss of bone continuity in the lower jaw. A maxillary fracture is defined as the loss of bone continuity in the maxilla. Orbital fracture is defined as the loss of bone continuity in the area around the eye. NOE fractures are defined as a loss of bone continuity at the junction of the upper and middle thirds of the facial bones. A zygomatic fracture is defined as the loss of bone continuity in the lateral middle third of the face. A dentoalveolar fracture is defined as a break in the hard tissue continuity of the tooth structure and alveolar bone. The data are presented as frequency distribution and percentage in tabular and diagram.

Results

During the 2018–2021 period, there were 504 patients who experienced maxillofacial trauma before the COVID-19 pandemic, and this number has decreased to 216 patients during the COVID-19 pandemic. The characteristics of maxillofacial trauma patients at the Oral and Maxillofacial Surgery Department of Dr. Hasan Sadikin Hospital are presented in Table 1.

Table 1: Characteristics of study subjects

Characteristics	Before COVID-19 (2018–2019)		During COVID-19 (2020–2021)	
	Frequency (n=504)	Proportion (%)	Frequency(n=216)	Proportion (%)
Age (years)				
0–19	230	46	70	32
20–39	173	34	88	41
40–59	67	13	39	18
>60	34	7	19	9
Sex				
Male	359	71	172	80
Female	145	29	44	20
Etiology of Trauma				
Motor vehicles accident	314	62	166	77
Physical assaults	27	5	8	4
Fall	142	28	35	16
Sports injury	7	2	0	0
Work accident-related injuries	14	3	7	3
Types of Trauma				
Soft tissue	486	96	200	93
Hard tissue				
Dentoalveolar fracture	241	47	86	40
Skeletal fracture				
1/3 upper face fracture				
Frontal fracture	28	6	35	16
1/3 midface fracture				
Orbital fracture	69	14	64	30
NOE fracture	42	8	27	13
Zygomatic fracture	80	15	77	36
Maxillary fracture	39	8	42	19
1/3 lower face fracture				
Mandibular fracture	83	16	44	20
Alcohol Involvement				
Yes	36	7	19	9
No	469	93	197	91
Treatment				
Debridement and Suturing	471	93	190	88
Alvolectomy	77	15	27	13
Splinting	101	20	33	15
Closed reduction	47	9	21	10
Open reduction	86	17	79	37

Most of the study subjects were male both before the pandemic and during the COVID-19 pandemic (359 patients, 62%; 172 patients, 80%). In this study, it was found that 145 patients (29%) were female before the COVID-19 pandemic and 44 (20%) during the COVID-19 pandemic.

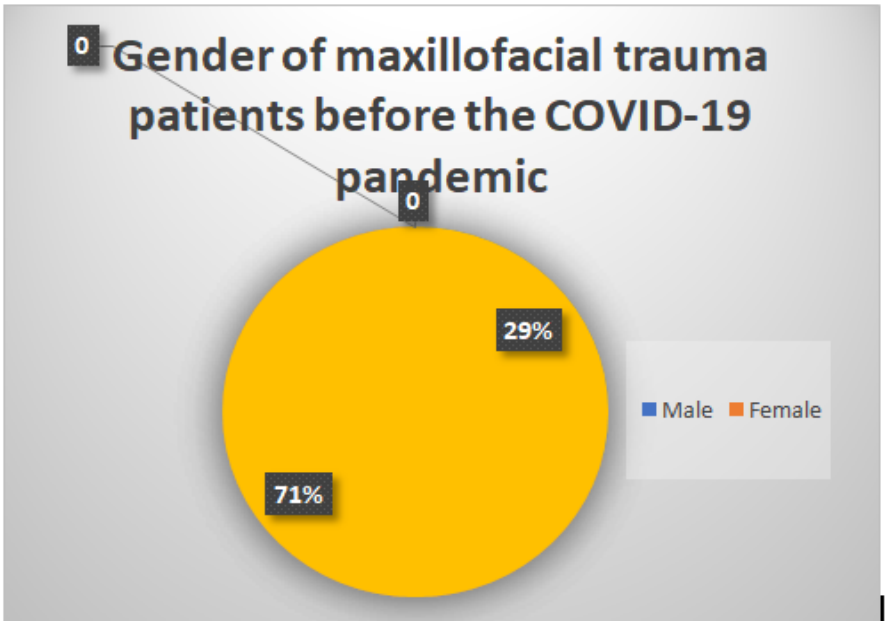

Figure 1: Gender of maxillofacial trauma patients before the COVID-19 pandemic

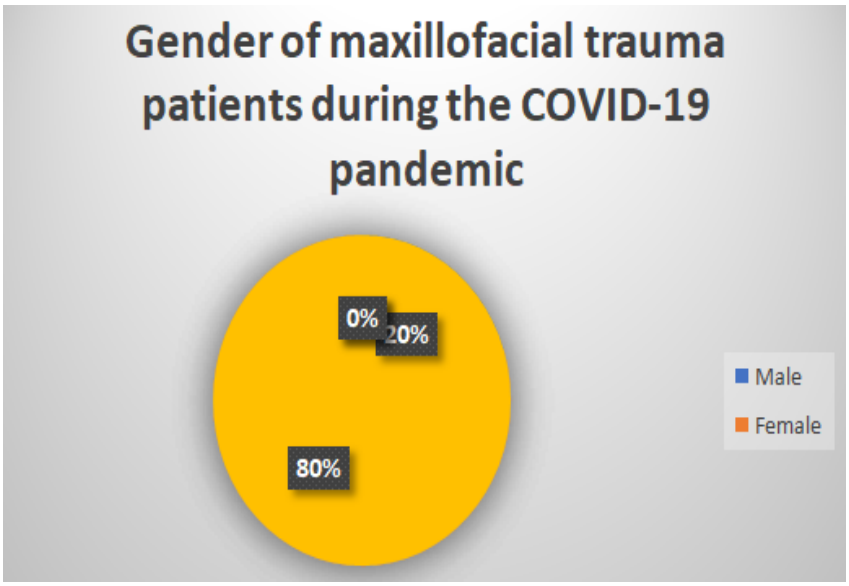

Figure 2: Gender of maxillofacial trauma patients during the COVID-19 pandemic

This study found that the majority of patients who experienced maxillofacial trauma before the COVID-19 pandemic were aged 0–19 years, with a total of 230 patients (46%). The majority of patients who experienced maxillofacial trauma during the COVID-19 pandemic were aged 20–39 years, with 88 patients (41%).

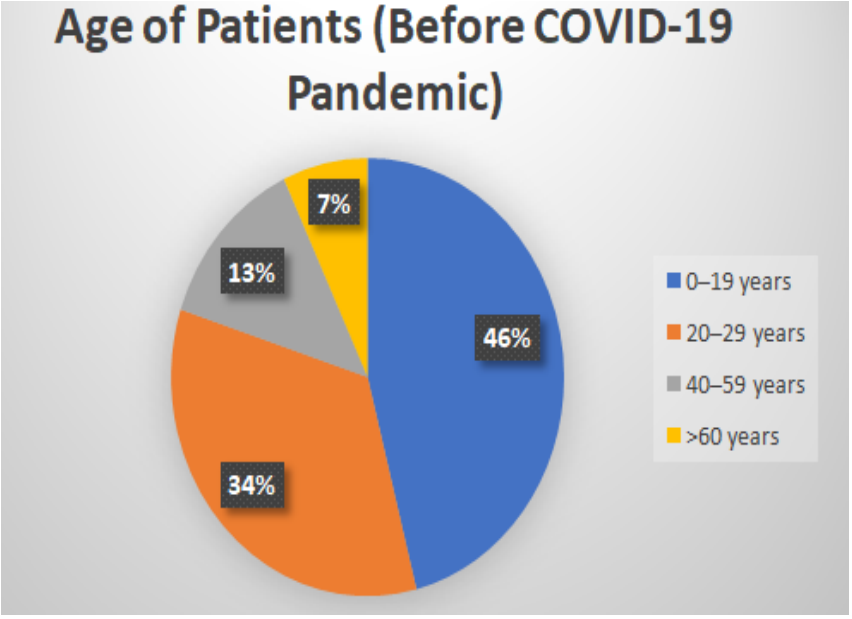

Figure 3: The distribution of age among maxillofacial trauma patients before the COVID-19 pandemic

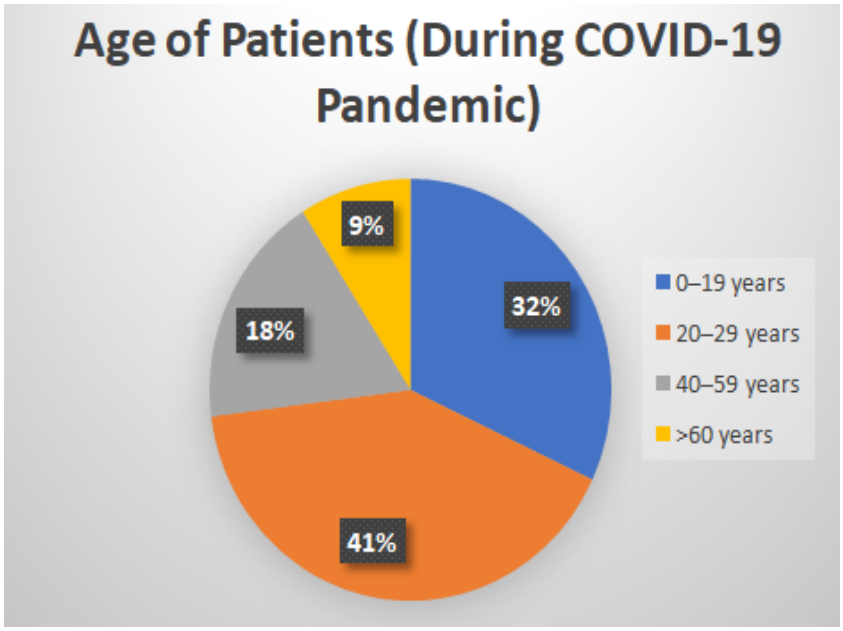

Figure 4: The distribution of age among maxillofacial trauma patients during the COVID-19 pandemic

The majority of maxillofacial trauma experienced both before and during the COVID-19 pandemic was caused by motor vehicle accidents (314 patients, 62%; 166 patients, 77%). The second highest cause of maxillofacial trauma experienced both before and during the COVID-19 pandemic was due to falls (142 patients, 28%; 35 patients, 16%).

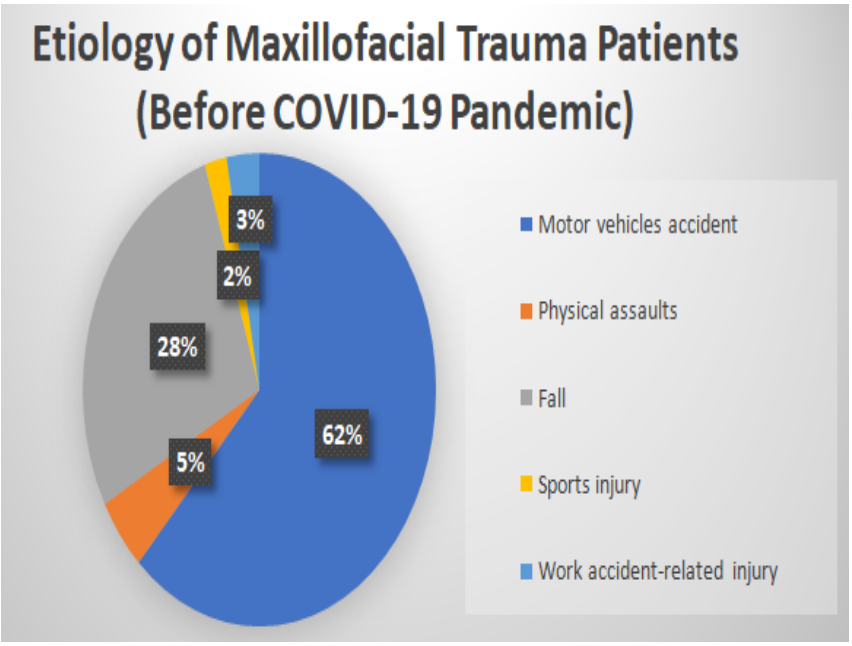

Figure 5: The distribution of maxillofacial trauma etiology before the COVID-19 pandemic

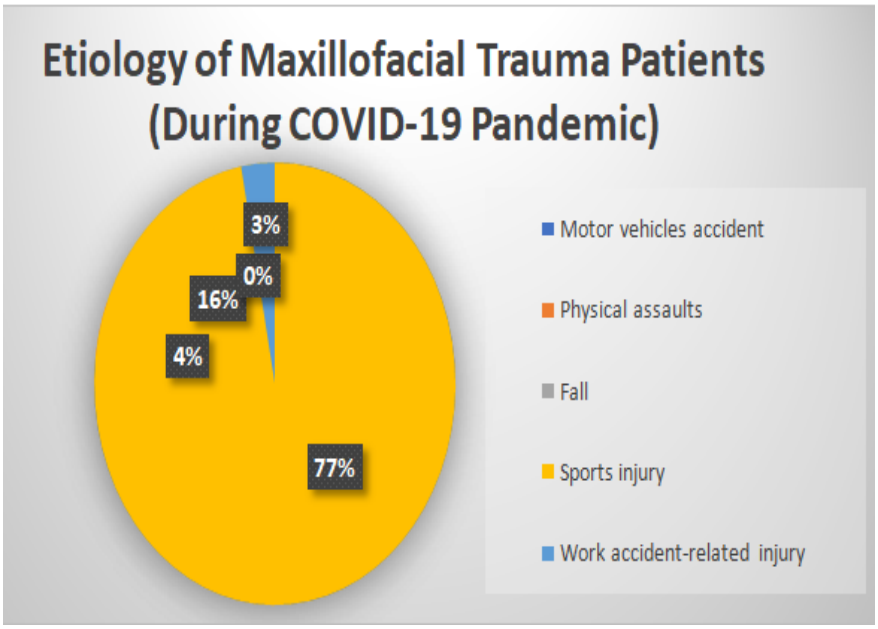

Figure 6: The distribution of maxillofacial trauma etiology during the COVID-19 pandemic

In this study, the majority of maxillofacial trauma experienced both before and during the COVID-19 pandemic involved soft tissues (486 patients, 96%; 200 patients, 93%). The most common type of maxillofacial trauma involving hard tissue was dentoaveolar fracture (241 patients, 47%; 86 patients, 40%). Before the COVID-19 pandemic, the majority of skeletal fractures occurred in the mandible, or lower 1/3 of the face(83 patients, 16%), while during the COVID-19 pandemic, the majority of skeletal fractures occurred in the zygomaticus bone or the middle 1/3 of the face (77 patients, 36%).

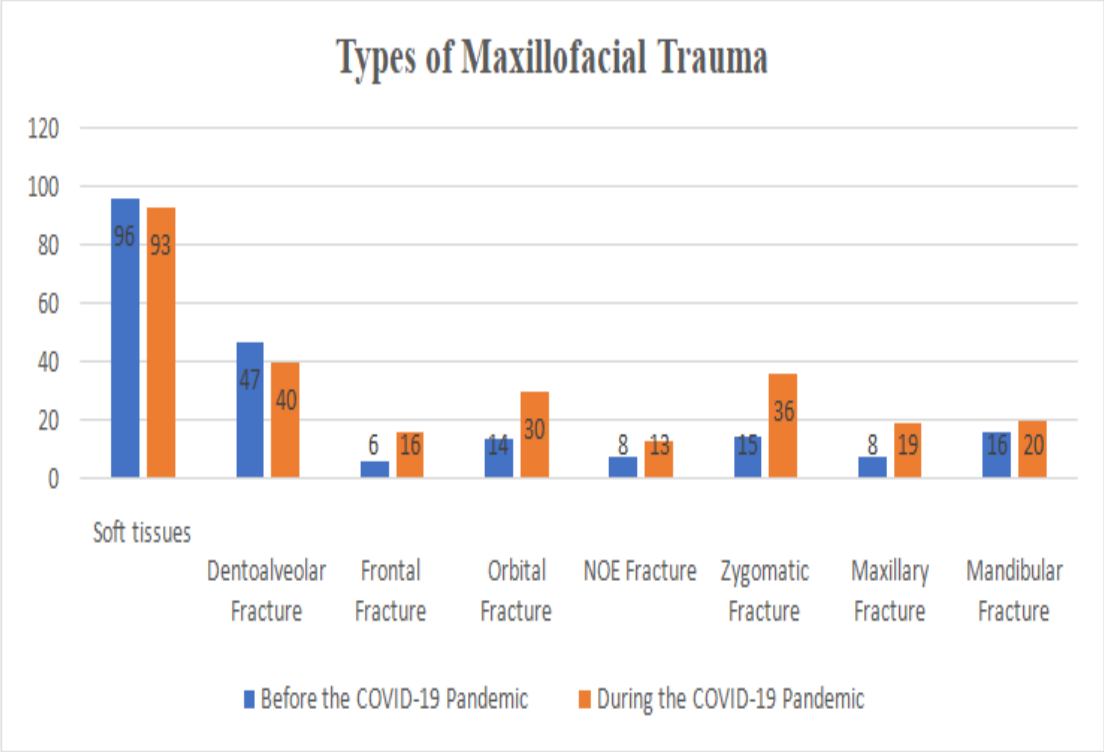

Figure 7: Distribution of Types of Maxillofacial Trauma

This study shows that the majority of maxillofacial trauma incidents, both experienced before the COVID-19 pandemic and during COVID-19, did not involve alcohol (469 patients, 93%; 197 patients91%).

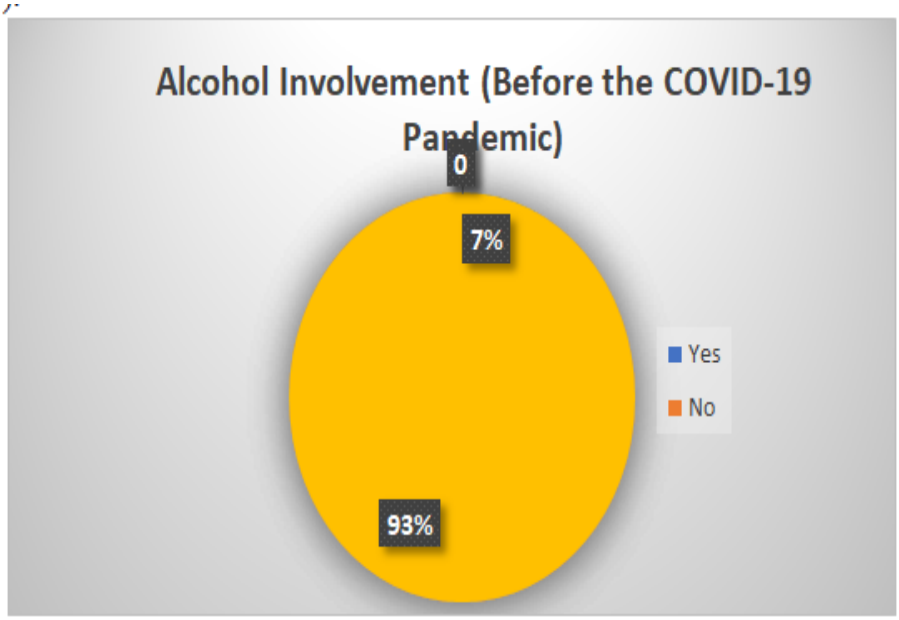

Figure 8: The distribution of alcohol involvement before the COVID-19 pandemic

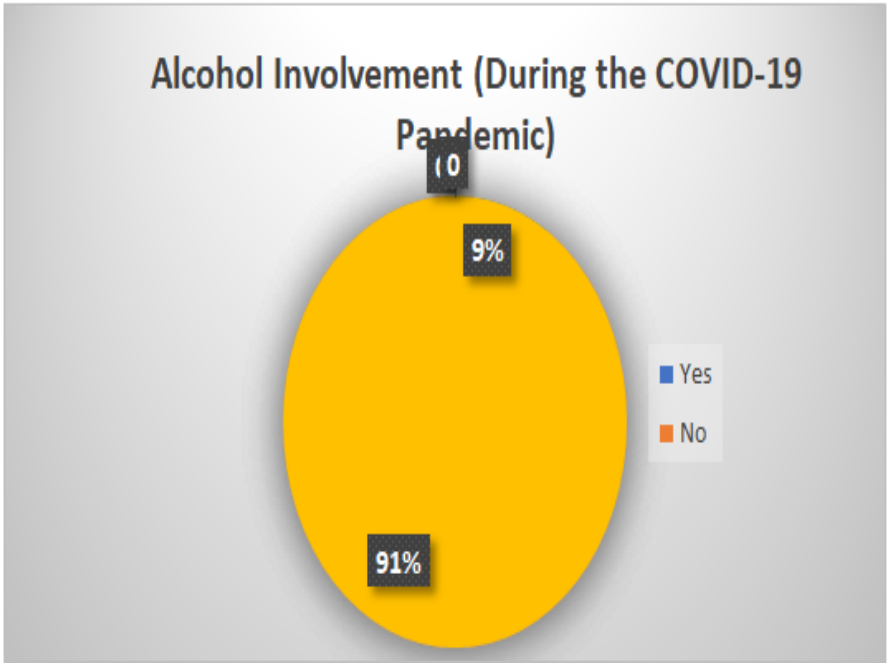

Figure 9: The distribution of alcohol involvement during the COVID-19 pandemic

The majority of maxillofacial trauma incidents, both before and during COVID-19, were treated with debridement and suturing, according to this study (471 patients, 93%; 190 patients, 88%).

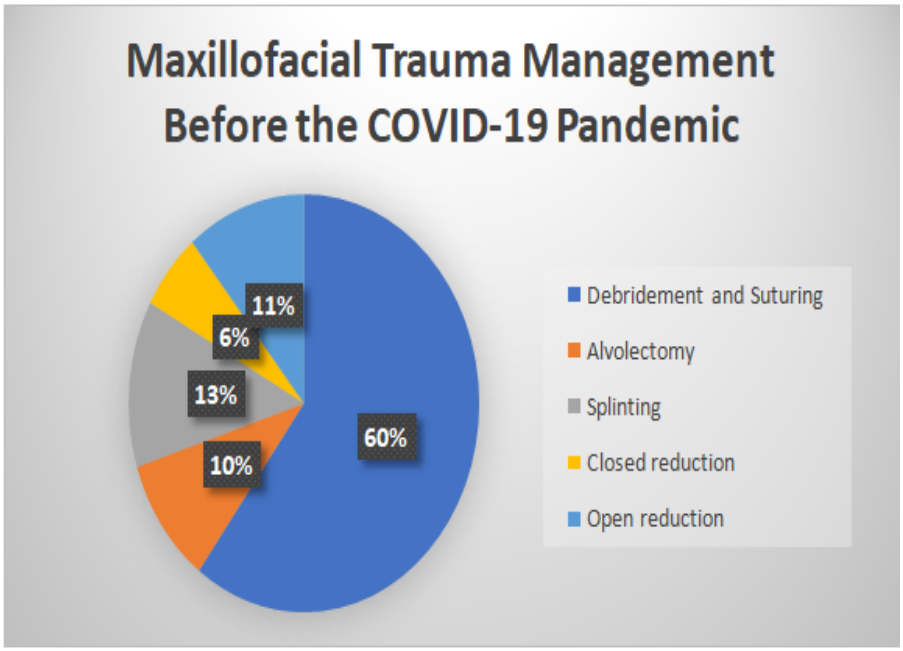

Figure 10: The distribution of maxillofacial trauma management before the COVID-19 pandemic

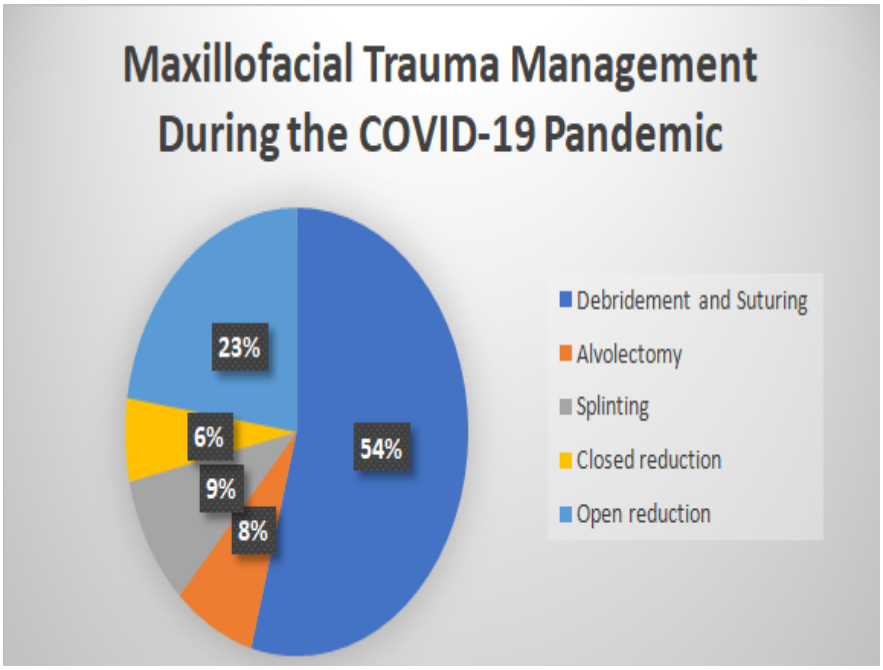

Figure 11: The distribution of maxillofacial trauma management during the COVID-19 pandemic

Discussion

Based on Table 1, the incidence of maxillofacial trauma at the Oral and Maxillofacial Surgery Department in Dr. Hasan Sadikin Hospital has decreased during the COVID-19 pandemic from 504 patients to 216 patients. This is in line with a study conducted by Boom et al., where the incidence of maxillofacial fractures was significantly lower after intervention from the central government by establishing Large-Scale Social Restrictions (PSBB) in the context of accelerating the prevention of the COVID-19 pandemic, causing changes in community social activities that are focused at home compared to equivalent time periods in other years. The existence of PSBB appears to reduce the number of maxillofacial fractures, mainly due to a decrease in traffic-related injuries.[6]

This research shows that the majority of patients are male (359 patients before the pandemic, 71%; 172 patients during the pandemic, 80%). The ratio of male and female patients during the COVID-19 pandemic was 2.3:1, while the ratio of male and female patients during COVID-19 was 4:1. This is in line with a study conducted by Boom et al., where the ratio of males and females was equal to 2.6:1.[6] Ozkan et al. stated in their study that out of a total of 84 patients treated in the emergency department with maxillofacial trauma, 61 were males and 23 females, with an average age of 31.88 ± 2.53 (range 1 to 93) years. From the control group (n = 148), 112 males and 36 females had a mean age of 31.40 ± 1.74 (range, 2 to 95) years. There were no statistically significant differences in the sex and age of the patients and controls between the time periods ($p = 0.721$ and $p = 0.874$, respectively).[7]

This study shows that there is a difference in the age of the majority of patients who experienced maxillofacial trauma before the pandemic and during COVID-19, namely ages 0–19 before the COVID-19 pandemic and ages 20–39 during the COVID-19 pandemic. This is related to government policies during the COVID-19 pandemic, where the government issued PSBB policies such as dismissing schoolchildren and limiting people from leaving the house, especially at ages that are vulnerable to infection with the COVID-19 virus, such as young people and the elderly. Therefore, adults of productive age who can carry out activities outside the home are in

accordance with the vulnerability of the majority of maxillofacial trauma during the COVID-19 pandemic, namely at the age of 20–39 years.

This study describes that the majority of maxillofacial trauma experienced both before and during the COVID-19 pandemic was caused by motor vehicle collisions (314 patients before the pandemic, 62%; 166 patients during the pandemic, 77%). The second highest cause of maxillofacial trauma experienced both before and during the COVID-19 pandemic was falls (142 patients before the pandemic, 28%; 35 patients during the pandemic, 16%). Traffic accidents are the main cause of maxillofacial trauma.[1,8] Research by Rabi and Khateery (2002), also shows that among several etiologies of maxillofacial trauma, traffic accidents are the main cause, followed by other causes such as trauma when playing in a park, accidents at work or industry, accidents during sports, and others. The most common cause of maxillofacial fractures was traffic accidents (89.8%), followed by falls (5.3%), assaults (1.5%), gunshots (1.1%), and sports accidents (0.8%).[9]

In this study, the majority of maxillofacial trauma experienced both before and during the COVID-19 pandemic was trauma involving soft tissues (486 patients before the pandemic, 96%; 200 patients during the pandemic, 93%). The most common type of maxillofacial trauma involving hard tissue is dentoaveolar fracture (241 responders before the pandemic, 47%; 86 responders during the pandemic, 40%). This is different from a study conducted by Lee et al. and Yokoyoma et al., where for the type of fracture, the majority of cases of maxillary fractures were (14.7%) with Le Fort II fracture types (36.5%), followed by Le Fort I (31.1%) and Le Fort III (27.0%). Of the mandibular fractures, the percentage of cases (44.2%), and types of fracture based on anatomical location include fractures of the parasymphysis (27.4%), body of the mandible (22.4%), condyle (20.2%), angulus (17.9%), symphysis (7.2%), ramus (3.1%), and coronoid (1.8%). Zygomatic complex fractures (94.8%) were the most frequently reported fractures of the mid- and upper facial regions.[9]

This study also described that the majority of maxillofacial trauma, both experienced before and during COVID-19, did not involve alcohol (469 patients before the pandemic, 93%; 197 patients during the pandemic, 91%). According to Boom et al., during the Lockdown, relatively few fractures were reported on weekends. Restaurants, bars, and nightclubs were closed, reducing travel movements and reducing violence from person-to-person interactions. Thus, fewer maxillofacial fractures occur. On April 28, 2021, bars and restaurants were gradually allowed to reopen, which may explain the mild resurgence of trauma over the weekend in 2021.Alcohol consumption may play a role in this. On the one hand, alcohol consumption may decrease when bars and restaurants are closed. But isolation and stress after sudden changes in daily life can drive alcohol consumption. However, alcohol-related injuries were not significantly related to PSBB in this study. As average alcohol consumption has remained the same during lockdowns worldwide, PSBB may not trigger an increase in alcohol-involved maxillofacial fractures.[6]

This study described that the majority of maxillofacial trauma incidents, both those experienced before COVID-19 and during COVID-19, were treated in the form of debridement and suturing (471 patients before the pandemic, 93%; 190 patients during the pandemic, 88%). This is because most cases of maxillofacial trauma occur in soft tissue, namely in skin tissue, where skin is the first protective tissue in the body, so before damage to hard tissue occurs, soft tissue damage will occur first. The existence of government intervention in the handling of COVID-19 during the pandemic resulted in patients who experienced maxillofacial trauma who came through the emergency department getting priority for soft tissue treatment first by carrying out debridement and suturing, while for trauma to the soft tissue, an elective Open Reduction Intrafixation (ORIF) was carried out if general conditions allowed. Actions Treatment of maxillofacial fractures in hard tissue can be carried out using the open reduction method or the closed

reduction method depending on the severity of the case, but for maxillary fractures that include leforts I, II, or III or those followed by occlusion abnormalities, treatment must be carried out using the open reduction method. In achieving this, the surgical principle should follow the following rules: (1)Debridement, or the meticulous cleansing of the fracture side; (2) Reduction is the process of aligning the ends of fractured bones; (3) Fixation, specifically stabilising bone fractures, was performed using micro bone plates and scrubs (rigid internal fixation) after the above procedure was completed; (4) Immobilisation, or the binding of fractures to the joints, is accomplished by simultaneously wiring the joints for 4–6 weeks with a wide distribution using strong internal fixation; however, this procedure aids in healing very quickly; (5) Rehabilitation, consisting of complete rest in the trauma-affected region, such as the reattachment of teeth lost as a result of trauma and injury with prosthetics.[10–12]

Conclusion

The existence of interventions to prevent the COVID-19 pandemic by imposing Large-Scale Social Restrictions (PSBB) to accelerate the prevention of the COVID-19 pandemic, as outlined in Government Regulation Number 21 of 2020, which went into effect in April 2020, has resulted in modifications to community social activities that are centered in the home. This factor contributed to variations in the characteristics of maxillofacial trauma in patients at the Oral and Maxillofacial Surgery Department in Hasan Sadikin Hospitalduring 2018–2019, which decreased in comparison to patients who experienced maxillofacial trauma during the COVID-19 pandemic (during 2020–2021).This study found that the majority of patients who experienced maxillofacial trauma before and during the COVID-19 pandemic were of different ages. This is related to government policies during the COVID-19 pandemic, when the government issued PSBB policies such as dismissing schoolchildren and limiting people's ability to leave their homes, especially those of vulnerable age groups, such as the young and elderly. The majority of maxillofacial trauma cases during the COVID-19 pandemic occurred in individuals between the ages of 20 and 39. Consequently, this age range corresponds to individuals of productive age who are able to engage in outside-the-home activities. Before and during the COVID-19 pandemic, this investigation compares the majority of maxillofacial hard-tissue trauma. Prior to the COVID-19 pandemic, the majority of maxillofacial trauma occurred in the lower 1/3 of the face or on the mandible. During the COVID-19 pandemic, however, the majority of maxillofacial trauma occurred in the middle 1/3 of the face. This is connected to Dr. Hasan Sadikin Bandung's role as a national referral centre for COVID-19 treatment, so that patients will contemplate contracting the COVID-19 infection. Consequently, during the COVID-19 pandemic, the majority of maxillofacial trauma cases necessitated complextreatment, specifically for the middle one-third of the face. While conditions affecting the lower one-third of the face can be treated at a lower hospital level.

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