ORIGINAL ARTICLE

Characteristics and management of oro-maxillofacial trauma in the emergency room during the COVID-19 pandemic: a retrospective cross-sectional Study

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ABSTRACT

Introduction: Oro-maxillofacial traumas comprise injuries to the face, jaws, or both; they include injury to any of the bony structures, skin, and soft tissues around the face. During the COVID-19 pandemic, human activity was mostly at home, with movement restrictions. The purpose of this study is to find out the types of characteristics and management of oro-maxillofacial traumas during the COVID-19 pandemic at the emergency room. **Methods:** A cross-sectional study was conducted to evaluate every maxillofacial trauma in patients treated by the oral surgeon in the emergency room at RSUP Dr. Hasan Sadikin Bandung Hospital. Incidence records were taken directly from case reports from January 2020 to December 2021. The variables considered were patient age, gender, etiologies, sites, classifications, and management of the trauma. Then integrated into a table to be analyzed epidemiologically. **Results:** There were 177 maxillofacial trauma patients registered in the Department of Oral and Maxillofacial Surgery. It was found that the gender ratio, female to male, is equal to 2.3:7.6. The 18-36 age group accounted for the largest subgroup in both sexes. Motorcycle accidents accounted for as much as 80.22% of the etiology of the most common traumas. While dentoalveolar (28.22%) was the most common site of the fracture, followed by the mandible (23.31%). Injuries around the mouth made up the largest portion (62.15%) of the areas that were directly impacted by the injuries, followed by injuries to the face (18.64%) and injuries to the mouth and nose (6.21%). Among the 177 patients mentioned above, 10.17% were hospitalized. **Conclusion:** Male's are more likely to be involved in traffic accidents, mainly motorcycle crashes, which are the primary cause of traumas. Dentoalveolar fractures were the most common type of fracture, and the management of the oro-maxillofacial trauma is done according to the standard procedure.

KEYWORDS

oro-maxillofacial, emergency, trauma, dentoalveolar, COVID-19

INTRODUCTION

The American Dental Association states that dental emergencies can be life-threatening and require prompt treatment to relieve severe pain and infection and stop ongoing tissue bleeding.[1,2] According to Fausto et al., who conducted a retrospective investigation in Milan, the COVID-19 pandemic greatly affected trauma patients in Italy.[3,4] Moreover, the number of patients was inversely related to the evolution of the COVID-19 pandemic, with fewer patients accessing hospital emergency rooms for urgent dental care during the COVID-19 pandemic activity restrictions.[5]

The rapid and devastating spread of COVID-19 in the densely populated area of Bandung resulted in all emergency units being suddenly under pressure by many patients with acute respiratory distress who needed intensive care unit (ICU) support.[6] The system of services, including elective surgery activities, increased the number of beds available and directed anesthesiology staff to change operating and recovery rooms to ICU beds.[7,8] The routes of COVID-19 transmission might have varied, but infection was spread mainly through coughing, sneezing, and saliva.[9] The most common symptoms of COVID-19 included high body temperature (>37.4 ^{0}C), dry cough, dyspnea, asthenia, muscle aches, headache, sore throat, diarrhea, and vomiting.[10]

Nevertheless, trauma remains the mainstay of treatment even during the COVID-19 pandemic. Trauma cannot be predicted easily, given that various personal and social factors influence it and cause it occur by chance.[11,12] The injury pattern is known to be closely related to human behavior

(injury prevention and triggering behavior).[7] Major changes in people's behavioral patterns due to the direct impact of COVID-19 led to regular changes in observed injury patterns.[13,14] Studies across the UK have illustrated the pattern of oro-maxillofacial injury during the first wave of the pandemic.[9] Overall, hospitals continued to provide trauma services and treated their patients in the same way they did before the pandemic. However, some changes (type of intervention/anesthesia and suspension) occurred in a few cases.[15]

In the city of Daegu, Korea, when comparing the monthly number of fracture patients, the months with the most significant differences were February, June, and December. February 2020 was the month when the first confirmed case in Daegu was reported, while June and December 2020 were when the level of social distancing was raised due to the spike in the number of confirmed cases.[16,17,18] Judging from this, it appears that the number of fracture patients is decreasing following government policy along with the increasing number of confirmed cases of COVID-19.[19,20] This type of research has never been conducted in Indonesia, but it is essential the development of science.

Oro-maxillofacial trauma is associated with injuries to the face or jaw caused by physical force, foreign bodies, or burns, including injuries to any of the face's bony structures, skin, and soft tissues.[15] Strong blows can injure any part of the face, as well as the eye with its muscles, nerves, and blood vessels, resulting in visual disturbances, diplopia, shifting of the eyeball position, and the fractures of the eye socket's bones.[18,19] While in the oral cavity, it can cause loose or detached teeth and soft tissue damage such as edema, contusions, abrasions, lacerations, and avulsions. The causes of trauma include neglecting to use seat belts and airbags and motor vehicle accidents.[20]

In Indonesia, there is insufficient amount of research associating the condition of the COVID-19 pandemic with cases of maxillofacial trauma. The purpose of study is to determine the characteristics and management of oro-maxillofacial traumas during COVID-19 pandemic at the emergency room.

METHODS

A retrospective study of patients was conducted from January 2020 to December 2021 at the Department of Oral and Maxillofacial Surgery at the Central General Hospital (RSUP) Dr. Hasan Sadikin Bandung. The sample population consisted of 177 case reports of trauma patients visiting the emergency room. The total sampling technique was used for this study.

Records of maxillofacial trauma were taken directly from case reports of oral surgery emergencies. The variables considered were the patient's age, gender, etiology, location, classification, and trauma management. All the information found was processed using SPSS and then integrated into tables for descriptive epidemiological analysis.

The inclusion criteria were oro-maxillofacial trauma patients treated in the emergency room who were recorded in the oral surgery emergency report. Exclusion criteria included incompletely recorded oro-maxillofacial trauma.

The diagnosis of oro-maxillofacial fracture is based on the history, clinical examination of fracture signs or symptoms, and radiographic interpretation. Critical points considered in this study were age and sex distribution, etiological factors and incidence of oro-maxillofacial trauma, and pattern, and distribution of maxillofacial fracture sites.

RESULTS

The research findings show there were 177 patients, consisting of 136 male and 41 female patients. Our results suggest that men (76,83%) experienced more oro-maxillofacial injuries than women (23,16%). Patients aged 19-36 years were found to be more prone [at risk] to injury, with up to 80 patients, compared to aged under 18 with 48 patients, and age over 36 with 51 patients. Among oro-maxillofacial fractures that occurred in the selected time range, the highest trauma incidence was in the age range of 19-36 years (46%), the second was at the age of fewer than 18 years (28%), and the third was at the age of more than 36 years (26%).

The month of January 2020 encountered the greatest number of patient visits, with 28 patients (15.81%). The second highest was in February 2020 with 18 patients (10.16%), and followed by the month of December 2021 with 16 patients (9.04%) (Figure 1). Motorcycle accidents were the most common etiology, with a total of 142 traumas (80.22%) (Figure 2). From the results of the research, the second most common cause of trauma is falling on the road, with seven trauma cases (3.95%), followed by a car accident, and slipping while walking, each with six trauma cases (3.39%) (Table 1).

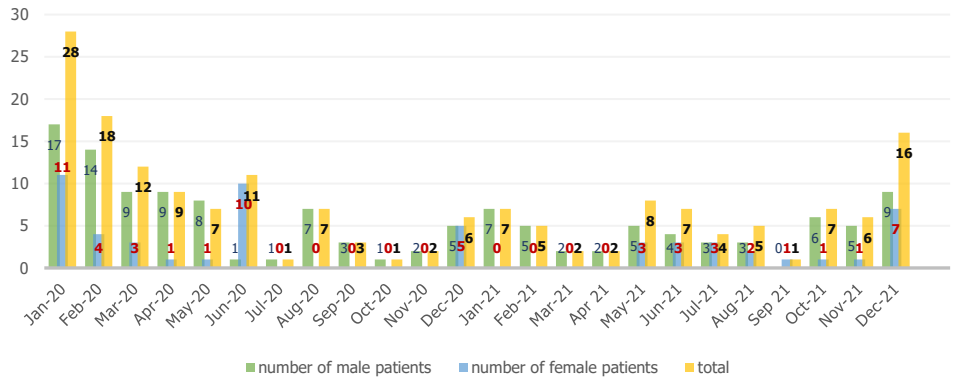

Figure 1. Oral surgery emergency patient visit data from Januari 2020 to December 2021

Figure 1 shows the highest peak of visits in the emergency room was January 2020 and the lowest visits were in July, October 2020 and September 2021.

Table 1. List of etiologies that occur in trauma patients

Number	Most trauma etiology:	Total trauma
1	Motorcycle accidents	142
2	Slipping	6
3	Work accidents	3
4	Bicycle accidents	2
5	Car accidents	6
6	Bus accident	1
7	Being hit by a knife	1
8	Falling from a chair	1
9	Falling from a truck	1
10	Falling on the road	7
11	Being stabbed by an iron	1
12	Falling on a bridge	1
13	Falling from a tree	1
14	Fencing accident,	1
15	Being bitten by someone	3
	Total	177

According to the data findings, it was discovered that, regarding the directly affected area, bleeding around the mouth was the most common case found in 110 patients (62.15%), followed by bleeding on the faces in 33 patients (18.64%) and bleeding from both mouth and nose in 11 patients (6.21%). Eight patients (4.52%) had bleeding from the mouth and face, two patients (1.13%) had wounds on the face region, and four patients (2.26%) had facial bone fractures. Whereas, only one patient (0.56%) had bleeding from the eye; from the nose; from the face, mouth, chin; from the mouth, nose, and ears; from the chin; from the ears and face; from the teeth, respectively.

From January 2020 to December 2021, a total of 177 patients (89.83%) did not receive inpatient treatment at the department of oral and maxillofacial surgery at RSUP Dr. Hasan Sadikin Bandung Hospital. However, after completion of treatment in the field of oral surgery, they continued to receive outpatient treatment. Among those who received inpatient treatment, 18 patients (10.17%) required further supervision pre-operatively and immediate surgical intervention. There are also among those outpatients who are continued by treatment by other fields and those who repatriate colleagues from the field who last handled them. Some of the outpatients continued to be treated by other areas and some were discharged by colleagues from the last area of care.

Among the fractures in the oro-maxillofacial area that occurred during the observation period, this data was found from traumatized patients; one patient had multiple types of fractures, with a total of 326 fractures from the total recorded patients. The largest number of dentoalveolar fractures occurred in 92 traumas (28.22%) (Figure 3) and the second largest was mandible fractures found in 76 traumas (23.31%). The treatment was initiated by suturing at the wound site, giving medication, an alveolectomy, and simple wiring.

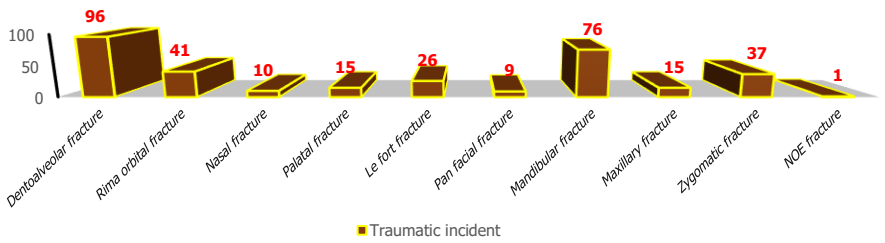

Figure 3. The number of emergency cases based on the fracture location.

Number of trauma events based on emergency reports. The bar chart image displays that the number of cases of dentoalveolar fractures has the highest number of 96 compared to other cases, the rarest case number is Nasoorbitoethmoid fracture (NOE) in the time span this study was conducted.

DISCUSSION

The COVID-19 pandemic has dictated modifications in the delivery of public health services, and recently, many epidemiological retrospective cohort studies have evaluated data for the medical services field.[15,16] During the pandemic, limited medical personnel and intensive care unit (ICU) beds required careful planning to meet the needs of patients who visited the hospital. Therefore, cohort data is valuable for carrying out strategic plans to provide hospital healthcare facilities.

This study analyzed data from January 2020 to December 2021 to show the characteristics and management of trauma in the emergency room department of oral and maxillofacial surgery at RSUP Dr. Hasan Sadikin Bandung Hospital. From the results of this analysis, it is concluded that the pandemic has given significant impacts on hospital emergency services and the etiology of trauma in patients. During the pandemic, patients avoided going to the hospital out of fear of infection, as mentioned in the literature, and the data indicated a decline in overall hospital access.[10] Following the results of this analysis, a retrospective study in Korea also hypothesized that the number of trauma patients was more common among men, which is consistent with our findings: 87% of trauma patients were male. In addition, the patients' age range included adolescents and young adults, as well as, in our data, the age group 19-36 years (46% of the total incidence). This might be due to the activities they were doing within that age range, which was different from the others.[11] These results are also in accordance with a study by Yudianto et al. claiming that further research on the causes of a high incidence rate of the fracture trauma among adolescents is neccesitate.[16]

In particular, trauma patients who present to the emergency room will be treated according to the affected area of trauma. Oro-maxillofacial trauma patients who presented to the emergency room were some of the patients who experience oro-maxillofacial trauma in the area around RSUP Dr. Hasan Sadikin Bandung Hospital, because Bandung has several other large hospitals such as Borromeus Hospital, Melinda Hospital, Sentosa Hospital, Maranatha Hospital and many others. Monthly data regarding patient visits tooro-maxillofacial trauma department may vary. From January 2020 to December 2021, January 2020 was reported to have the highest number of patient visits (15.81%;Figure 1).[13] In this research of 177 patients (Table 1), the majority of the minor traumas were followed by moderate and mild traumas. This result is in accordance with previous studies which stated that 53% fell into minor category, 20% fell into moderate category, 11% fell into serious category, and the remaining percentages fell into heavy category.[18]

According to the American Dental Association, oro-maxillofacial trauma emergencies can be potentially life-threatening. Therefore, they require immediate treatment to reduce severe pain and infection, and to stop ongoing tissue bleeding.[19] Strongly influences oro-maxillofacial trauma care activities.[20] The authors found that the number of oro-maxillofacial trauma patients was inversely related to the evolution of the COVID-19 pandemic, with significantly fewer patients accessing hospital emergency rooms for dental care during the pandemic.[14,15,18,19]

In times of the COVID-19 pandemic, with fewer available inpatient beds, data can be helpful for predicting the need for non-delayed hospital care for oral and maxillofacial surgery, and for managing hospital organizations to respond to reductions in surgical options; this was also reported in most countries in comparison to emergency procedures.[13,14,15] A medical literature shows how the pandemic outbreak had also caused patients to leave the hospital, possibly due to the fear of SARS-CoV-2 contact.[8,15] There was also an increase in patients opting out treatment and hospitalization, while outpatient consultations decreased. In addition, hospitalizations increased, reaching statistical significance. These findings underscore how this fear of infection has changed patient behavior, resulting in the different logistical needs of hospitals.[15,20]

According to a literature, as a result of the COVID-19 pandemic, other countries have changed medical procedures in terms of providing care for emergency trauma patients.[12] Emergency and

invasive surgical procedures have increased significantly, while planned elective surgical procedures have decreased.[11] Patients at risk of permanent injury were less likely to receive inpatient treatment due to the fear of contracting COVID-19.[14] RSUP Dr. Hasan Sadikin Bandung Hospital is as a referral center for COVID-19 patients in Bandung, so a number of rooms were used for COVID-19 isolation. As a result, the percentage of oro-maxillofacial trauma patients who were hospitalized was lower (10.17%) to minimize patients staying in the hospital during the outbreak.

The oro-maxillofacial trauma service evaluates the severity of the trauma; the steps include examining patients with an antigen swab and rapid molecular test, determining the need for hospitalization, suturing the wound, treating fractures, and managing emergencies.[17] Treatment of patients is carried out in accordance with previous studies, which apply the general principles of oro-maxillofacial trauma management including identification, reduction, repositioning, stabilization, and fixation.[19] Patients are admitted to the emergency room based on a color-coded scale, ranging from white or green (not urgent or not too urgent). For critical situations, patients needing immediate treatment access and requiring hospitalization with life-threatening trauma are coded red.

From January 2020 to December 2021, the characteristics of bleedings in the mouth area were the most common trauma found in patients at the department of oral and maxillofacial surgery at RSUP Dr. Hasan Sadikin Bandung Hospital (62.15%). The result of this study, reporting that 80.22% of oro-maxillofacial trauma patients were caused by accidents while driving a motor vehicle, is align with previous literature that highlighted the frequency of motor vehicle accidents.[19,20] This is also supported by Yudianto et al.'s study, which stated that the etiology of trauma in fracture patients at RSUP Dr. Hasan Sadikin Bandung Hospital was due to motor vehicle accidents.[13] From the patient's history, it can be concluded that a lack of protection provided by a half-face helmet they were wearing during the ride contributed to the high incidence of mouth injury.[9,15] These data can also be linked to the type of trauma and lifestyle during the pandemic.[12,13,18] Previous research in Bandung, West Java indicates a high incidence of accidents followed by motorized vehicles increase in maxillofacial fractures.[16,17]

Factors that can lead to high incidence fractures due to traffic accidents including bad road conditions maybe, low society awareness of safe driving and the low level of society compliance with traffic rules.[19] Even though the COVID-19 pandemic has impacted healthcare, managing traumatic injuries remains a priority in the care of oral and maxillofacial surgery patients. The treatment options for oro-maxillofacial trauma patients that are often performed are suturing and interdental wiring.[17] Other characteristics are the most dentoalveolar fractures (28.22%) and the minor NOE fractures (0.31%) (Figure 3).[18] In this sense, this study provides important clinical data, which can be evaluated and considered for oro-maxillofacial trauma care services in hospitals.

In patients recovering from COVID-19, prolonged symptoms may delay elective treatment of trauma patients. These prolonged post-COVID-19 symptoms may also affect post-treatment recovery, including oro-maxillofacial trauma care; Therefore, it is considered part of the treatment plan. Even in controlled situations, clinicians should consider scenarios of possible surgical and postoperative complications, focusing on preventive measures and minimally invasive techniques.[10]

The COVID-19 pandemic has substantially increased the implementation of remote healthcare in healthcare institutions and made it an essential tool for delivering healthcare. However, to provide adequate telehealth services, healthcare professionals must adapt to a changing work environment and be productive and thriving in general.[20]

CONCLUSION

Traffic accidents, especially motorcycle accidents, are the biggest cause of trauma cases, with males being more prone to accidents. Dentoalveolar fractures were the most common type of fracture, and the management of the oro-maxillofacial trauma is done according to the standard procedure. With this knowledge, we should be better prepared with all the necessary resources to diagnose and treat patients with oro-maxillofacial trauma in the future. This research data can be used to evaluate the development of the COVID-19 pandemic and determine the right course of action for oral-maxillofacial trauma services related to the etiology of trauma and its management.

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Informed Consent Statement: Patient consent did not apply to this study because it did not involve humans.

Data Availability Statement: Data supporting the reported results can be found in the medical records of Hasan Sadikin Hospital, Bandung, and can be from researchers who have requested data from the hospital..

Conflicts of Interest: The author declares no conflict of interest. The donor is one of a team of authors who have a role in research design; in the collection, analysis, or interpretation of data; in scriptwriting; or in the decision to announce the results.

REFERENCES

1. Lee DW, Choi SY, Kim JW, Kwon TG, Lee ST. The impact of COVID-19 on the injury pattern for maxillofacial fracture in Daegu city, South Korea. Maxillofac Plast Reconstr Surg. 2021 ;43(1): 35. DOI:10.1186/s40902-021-00322-6
2. Alterman M, Nassar M, Rushinek H, Cohen A, Shapira L, Casap N. The efficacy of a protective protocol for oral and maxillofacial surgery procedures in a COVID-19 pandemic area-results from 1471 patients. Clin Oral Investig. 2021;25 (8): 5001-8. DOI: 10.1007/s00784-021-03809-8
3. Samudro EG, Madjid MA. Pemerintah Indonesia Menghadapi Bencana Nasional COVID-19 Yang Mengancam Ketahanan Nasional. J Ketahanan Nasional by Study Program of National Resilience, Graduate School Universitas Gadjah Mada in cooperation with Lemhannas RI (National Resilience Institute of Indonesia). 2020. 26(2).
4. Giudici R, Lancioni A, Gay H, Bassi G, Chiara O, Mare C, et al. Impact of the COVID-19 outbreak on severe trauma trends and healthcare system reassessment in Lombardia, Italy: an analysis from the regional trauma registry. World J Emerg Surg. 2021; 16(1): 39. DOI: 10.1186/s13017-021-00383-y
5. Famà F, Giudice RL, Vita GD, Tribst JPM, Giudice GL, Sindoni A. COVID-19 and the Impact on the Cranio-Oro-Facial Trauma Care in Italy: An Epidemiological Retrospective Cohort Study. Int J Environ Res Pub Heal 2021; 18(13): 7066. DOI:10.3390/ijerph18137066
6. Nismal H, Yuza AT, Fathurachman. Pengelolaan Maloklusi Open Bite Anterior Akibat Fraktur Neglected Maksila Le Fort I Dengan Teknik Osteotomi Le Fort I Dan Fiksasi Transosseous (Laporan Kasus). Cakradonya Dental J. 12. 2020. 132-139. DOI: https://doi.org/10.24815/cdj.v12i2.18446
7. Puglia FA, Hils A, Dawoud B, Magennis P, Chiu GA. Management of oral and maxillofacial trauma during the first wave of the COVID-19 pandemic in the United Kingdom. 2021. DOI: 10.1016/j.bjoms.2020.12.021
8. Perry M, Brown A, Banks P. Fractures of the Facial Skeleton Second Edition. John Wiley & Sons, 2015. p 9-23; 97-100
9. Purnomo YY, Sjamsudin E, Oli'i EM. Characteristics of Pain Based on Numerical Rating Scale in Maxillofacial Trauma Patients Treated with Open Reduction Internal Fixation. NMSJ. 2021; 6(1): 44-53. DOI: 10.20 956/nmsj.v6i1.13855
10. Sastrawan A, Sjamsudin E, Faried A. Penatalaksanaan emergensi pada trauma oromaksilofasial disertai fraktur basis cranii anterior. Majalah Kedokteran Gigi Indonesia. 2017; 3(2): 11-7. DOI: 10.22146/majkedgiind.12606
11. Jose A, Nagori SA, Agarwal B, Bhutia O, Roychoudhury A. Management of maxillofacial trauma in emergency: An update of challenges and controversies. J Emerg Trauma Shock. 2016; 9(2): 73-80. DOI: 10.4103/0974-2700.179456
12. Olusanya AA, Adeleye AO, Aladelusi TO, Fasola AO. Updates on the epidemiology and pattern of traumatic maxillofacial injuries in a Nigerian university teaching hospital: a 12-month prospective cohort in-hospital outcome study. Craniomaxillofac Trauma Reconstr. 2015; 8(1): 50-8. DOI: 10.1055/s-0034-1384740
13. Dorafshar AH, Rodriquez ED, Manson PN. Facial Trauma Surgery From:Primary Repair to Reconstruction uk. Elsevier. 2020. p 168-75
14. Lawler ME, Haas CA, Peacock ZS. Dentoalveolar Trauma. Facial Trauma Surgery. Elsevier. 2020, Pages 231-47. DOI: 10.1016/B978-0-323-49755-8.00026-8
15. Din Lam, Laskin DM. Oral and maxillofacial surgery review: a study guide. Quintessence Publishing Co, Inc. 2015. p 75
16. Samad S, Sjamsudin E, Tasman A, Faried A. Tingkat kejadian trauma maksilofasial akibat kecelakaan kendaraan bermotor di kota bandung, provinsi jawa barat. Mulawarman Dental J. Vol 1 No 1 2021. DOI:10.30872/mul .%20dent.%20j.v1i1.5540
17. Sjamsudin E, Sastrawan AD. Etiology of Pediatric Oral Maxillofacial Trauma in Emergency Department of Oral and Maxillofacial Surgery Dr. Hasan Sadikin General Hospital Bandung in 3 years 2015-2017. International J of Science and Research (IJSR). Volume 7 Issue 10, October 2018. DOI: 10.21275/ART20191830.
18. Yudianto C, Sjamsudin E, Oli'I EM. Karakteristik fraktur palatum yang disertai fraktur dentoalveolar pada pasien trauma maksilofasial. J Ked Gig Univ Padja. December 2022;34(3):243-249. DOI: 10.24198/jkg.v34i3. 42838.
19. Subyakto Y, Sjamsudin E, Adiantoro S. The characteristics of mandibular fractures in Dr. Hasan Sadikin General Hospital, Bandung, Indonesia. Bali Medical J 2021;10(2): 591-594. DOI: 10.15562/bmj.v10i2.2340.
20. Yudianto C, Sylvana M, Yuza AT, Sjamsudin E. Management of Multiple Fractures of the Maxilla and Mandible with Closed Reduction: A Case Report. Inl J Medi Biomedic Stud. 2022 6(9): 27-34. DOI: 10.32553/ijmbs.v6i9.2605