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Effect of COVID 19 pandemic on oral maxillofacial trauma casualties: A cross-sectional analytical study at a regional trauma centre, Chidambaram

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ABSTRACT

COVID -19 pandemic has unprecedented effect globally. The world health organization has declared it to be a Public Health Emergency of International Concern (PHEIC). The pandemic has a widespread effect on all sectors particularly on health care and management. This has an indirect effect on the lifestyle of people. Various studies have shown that there is a drastic reduction in cases with heart ailments and other major systemic diseases during this era of pandemic. This is a study conducted on trauma cases that has been reported during this pandemic before and after lockdown to analyze the effect of lifestyle on road traffic accidents, to differentiate the mode of maxillofacial injuries, to assess the severity of injury.

Aim: To study and compare prevalence, mode, severity and the effect of lifestyle on maxillofacial injury reported at casualty during lockdown.

Objective: 1) To estimate the total prevalence of OMF trauma casualties for the past 7 months (Jan 2020–July 2020) at a Regional Trauma Centre, Chidambaram. 2) Assess the prevalence of OMF trauma casualties during the pre & post lockdown period at a Regional Trauma Centre, Chidambaram. 3) Assess the mode of injury in relation to OMF trauma casualties during the pre & post lockdown period at a Regional Trauma Centre, Chidambaram. 4) Assess the severity of injury (soft tissue and bony) in relation to OMF trauma casualties during the pre & post lockdown period at a Regional Trauma Centre, Chidambaram. 5) To compare the effect of alcohol in relation to OMF trauma casualties during the pre & post lockdown period at a Regional Trauma Centre, Chidambaram.

1. Introduction

In December 2019, the rapid spread of SARS COV2 (severe acute respiratory syndrome corona virus – 2) and related pneumonia (COVID 19) originated from the Wuhan province of china has proved to be a major challenge for healthcare systems worldwide [1]. The contagious nature of the disease made the government of the nations to implement public health measures to limit the spread of the disease. These measures include social distancing, use of protective gears, awareness about personal hygiene, closure of educational institutions, restraining of public gatherings, non essential events and activities. This has indirectly affected the life style of the public and economic turndown worldwide.

By march 2020, WHO had declared worldwide pandemic with 216 countries, areas or territories showing 10,719,646 cases and 517,337 deaths by july 2, 2020(WHO 2020) [1–3]. The restraining measures taken by the government to contain the disease has proven to be effective in reducing the rapidity of spread.

Various studies have shown that there is a drastic reduction in cases reporting with other systemic diseases during this era of pandemic. The restrictions laid over transport has lead to reduction in migration of people from various places. This measure has not only aid in the control of disease spread but it also has an indirect effect on the road traffic accidents. Since the transmission of virus is through respiratory secretions, the specialities dealing around these areas are at high risk, like ENT, Oral and Maxillofacial Surgery and general dentistry. Maxillofacial

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surgery represents an example of a specialty that has had to adapt to this outbreak, because of the subspecialty of oncology and traumatology. The aim of this article is to showcase the statistical reduction in number of maxillofacial trauma casualties and role of maxillofacial surgeons during this pandemic.

2. Materials and methods

A total number of 3182 trauma cases due to road traffic accidents, self-fall, interpersonal violence and other accidental injuries have been reported to the casualty of Raja Muthiah Medical College And Hospital, Chidambaram, Tamilnadu, India from the period of January 2020 till July 2020.

The secondary data’s were collected from the medical records department of Raja Muthiah Medical College and Hospital from January 2020 till July 2020. The data’s include demographic details of the patient, date of trauma, mode of injury and severity of injury.

Maxillofacial trauma with or without polytrauma are included in the study irrespective of age, gender. Patients sustained injuries due to systemic illness like seizures, hypotension, snake bites, accidental falls are excluded from the study. After exclusion, a total of 359 maxillofacial trauma cases are taken up for the study.

2.1. Sampling method & statistical analysis

Data regarding patients demographics, date of trauma, consumption of alcohol, mode of injury and severity of injury were entered into Microsoft Excel and analysed using IBM SPSS Statistics for Windows, Version 20 (IBM Corp., Armonk, N.Y., USA). The frequencies of demographics, total (General + OMF) and OMF trauma casualties, and the mode and severity of injury in OMF trauma casualties during pre and post lockdown periods were analysed. The influence of alcohol consumption on OMF trauma casualties was analysed using Kruskal Wallis H Test. The level of statistical significance is determined at p < 0.05.

3. Results

After exclusion, a total of 359 maxillofacial trauma cases are taken up for the study. The present study was a comparative analysis of trauma casualties pre and post lockdown period at the casualty of Raja Muthiah Medical College And Hospital, Chidambaram. All 359 patients were studied based on their demographic details (Fig. 1), influence of alcohol during trauma/violence, mode of injury and severity of injury (Table 1). The prevalence of maxillofacial casualties for the total period of study is found to be 11.28% out of general casualties (Fig. 2) (Table 2). The prevalence of maxillofacial casualties during the Pre lockdown is 64% whereas post lockdown is 36% (Fig. 3) whereas the total casualties accounts for 55% and 45% pre and post lockdown period respectively (Fig. 4).

The mode of injury has been compared for pre and post lockdown period and found there is no significant correlation between them (Table 3) (Fig. 5). The severity of injury based on bony and soft tissue injury during the pre and post lockdown has been compared and the values are found to be statistically significant (p = 0.048) is shown in Table 4 and Fig. 6. The pivotal role played by alcohol in the road traffic accidents and interpersonal violence have also been compared for pre and post lockdown period and found to be statistically non significant (Table 5) (Fig. 7).

4. Discussion

In December 2019, Wuhan province of China faced a severe acute respiratory illness started spreading, which was then identified to be SARS-COV 2 infection. The disease has an unprecedented effect globally due its contagious nature. This upsets the life style of general public and economy of nations worldwide.

By July 2, 2020 the virus has affected 10,719,646 people with 517,337 death spreading to almost 216 countries [1–3]. The government of the nation’s together imposed protocols to reduce the rapidity of...
spread that includes lockdown of educational institutions, public places like theatres, parks, recreational centers. A restriction in road transports has limited the migration of people from place to place. This restriction has created psychological impact on the people which has led to increase in depression, suicidal thoughts and interpersonal violence with a drastic reduction in road traffic accidents.

Road traffic accidents are considered as the major public health threat across the globe. According to the estimates of the world health organization road traffic crashes (RTC’s) will be the 5th leading cause of global death by 2030. Globally more than 1.2million individuals are killed per year on roads and around 50million are injured. Among all of the determinants of RTC’s the use of psychoactive substances particularly alcohol but also drugs are established as a clinical risk factor globally. The use of substances can impair judgement and increase the possibility of other high risk behaviors such as speeding, risk taking and violating traffic rules [4].

Chidambaram Raja Muthiah Medical College And Hospital runs one of the leading casualties in the South Arcot district of Tamilnadu, with the major reported cases being RTAs’. Since 2003, maxillofacial surgery residents and doctors were actively managing patients with craniofacial and head and neck injuries at the casualty of RMMCH. From the single call for all trauma system the trend has evolved to comprehensive on call based on the injury makes it easier for evaluation and appropriate treatment on time for maxillofacial trauma cases.

According to international association of oral and maxillofacial surgeons, the scope of the specialty is extensive and includes facial injuries, head and neck cancers, salivary gland pathologies, facial

| Pre-lockdown (Jan 1, 2020 to Mar 24, 2020) | Total trauma casualties (n = 3182) (n (%) | OMF Trauma casualties (n = 359) (n (%)) |
|-------------------------------------------|------------------------------------------|---------------------------------------|
| Pre-lockdown (Mar 25, 2020 to July 31, 2020) | 1757 (55.21) 230 (64.06)                  |
| Post-lockdown (Mar 25, 2020 to July 31, 2020) | 1425 (44.78) 129 (35.93)                  |
disproportions, facial pain, temporomandibular joint disorders, impacted teeth, cyst and tumors of the jaws, as well as numerous problems affecting oral mucosa such as mouth ulcers and infections. The fundamental knowledge about occlusion and facial architecture have made maxillofacial surgeons play an important role in the management of maxillofacial/craniomaxillofacial injuries. This trend has now evolved as they expand their skill to treat skull base fractures [5].

Maxillofacial injuries are more prone to compromised airway, on account of its location in the crumple zone of the face even minor injuries can result in significant casualty to airway [6] Presence of foreign body, multiple mandible fractures, midface fractures, broken teeth, dentures and edema to glottis can complicate the scenario. Alcohol, drugs along with the ingested and pooled blood can trigger nausea and vomiting. Therefore, systemic analysis of airway, to avoid airway compromise must be in a initial assessment. Removal of any foreign body, reduction of fractures and use of high vacuum suctions supplemented with adequate oxygen may help improve the condition. Emergency intubations can also be done, if condition worsens.

![Total Casualties at Regional Trauma Center](image)

**Fig. 4.** Prevalence of total casualties during pre and post lockdown period.

| Mode of Injury | OMF Trauma casualties (n = 359) | H-statistic value* | p value |
|----------------|---------------------------------|-------------------|---------|
|                | RTA n (%) | ASSAULT n (%) | SELF-FALL n (%) |                      |        |
| Pre-lockdown   | 97 (71.85) | 41 (62.12) | 92 (58.22) | 2.01 | 0.36 (NS) |
| Post-lockdown  | 39 (28.88) | 26 (39.39) | 64 (40.50) |                  |        |
| Total cases    | 136 (37.88) | 67 (18.66) | 156 (43.45) |                  |        |

*Kruskal Wallis H Test; p ≤ 0.05 (Statistically Significant); NS – Not Significant.

![Mode of injury of omf trauma casualties during pre and post lockdown period](image)

**Fig. 5.** Mode of injury of OMF trauma casualties during the pre and post lockdown period.
Maxillofacial region are richly vascular. Therefore even a minor injury of face bleed spontaneously. The major vessels supplying this region are facial artery, maxillary artery. Any hemorrhage must be anticipated immediately and stopped, by applying direct pressure over the site. Fracture site bleeding can be controlled by use of bone wax. Management of soft tissue injuries like lacerations must be immediately sutured by following proper disinfection and sterilization protocol. This helps the tissue to maintain its viability and improves healing of the wound site. The management of soft tissue wounds are crucial in maintaining the esthetics of the patient, requiring less plastic surgery intervention at later stages for reconstructive procedures.

Management of mandibular fractures by stabilizing the fracture segments at casualties play a very crucial role in restoring the function of the patient. These patients can later be taken up for open reduction and internal fixations under LA/GA. Immediate Management of midface fractures are generally not an emergency but any injury to the orbit bone causing occulo-cardiac reflex must be immediately intervened.

The reduction in number and severity of sustained injuries is notable during this lockdown. The management of soft tissue injuries are inevitable. Considering the emergency, the residents of OMS has to attend the on –call cases without COVID screening. Though there are many proposed protocols for managing the patients, these are never the same for all situations and hospital set up.

5. Protocols followed during COVID

As discussed earlier, maxillofacial surgeons play a major role in managing maxillofacial trauma. They must follow strict protocols amid the covid pandemic situations. Use of proper PPEs (Personal Protective Equipments) should be selected and used appropriately [6].

There even might be a need of training for using and disposing the PPE’s. as they are frequently exposed to saliva, sputum, and other body fluids, they are exposed to high risk of viral transmission. Antiseptic mouth rinse is believed to reduce the viral load in the oral cavity. There is also a recommendation to use hydrogen peroxide or povidone iodine solutions. At the current stage, the problems of re -infection and insuffcient immunity cannot be excluded. In order to save resources, the personal protective equipment should be chosen depending on the planned procedure and the infection status of the patient [6].

### Table 4
Severity of injury of OMF trauma casualties during the pre and post lockdown period.

| Lockdown period | OMF Trauma casualties (n = 359) | Chi square test (df) | p-value |
|-----------------|-------------------------------|---------------------|---------|
| Pre-lockdown    |                               |                     |         |
| RTA             | 72 (40.90)                    | 25                  | (46.29) |
| Assault         | 34 (19.31)                    | 7                   | (12.96) |
| Self-fall       | 70 (39.77)                    | 22                  | (40.74) |
| Total cases     | 176                           | 54                  | (73.97) |
| Post-lockdown   |                               |                     |         |
| RTA             | 35 (31.81)                    | 4                   | 0.993 (1)| 0.048* |
| Assault         | 22 (0.2)                      | 4                   | (21.05) |
| Self-fall       | 53 (48.18)                    | 11                  | (57.89) |
| Total cases     | 110                           | 19                  | (26.02) |

* *p ≤ 0.05, Statistically significant.

Maxillofacial region are richly vascular. Therefore even a minor injury of face bleed spontaneously. The major vessels supplying this region are facial artery, maxillary artery. Any hemorrhage must be anticipated immediately and stopped, by applying direct pressure over the site. Fracture site bleeding can be controlled by use of bone wax.

Management of soft tissue injuries like lacerations must be immediately sutured by following proper disinfection and sterilization protocol. This helps the tissue to maintain its viability and improves healing

Table 5
OMF Trauma casualties among alcoholics during pre and post lockdown period.

| Alcohol consumption | OMF Trauma casualties (n = 359) | H statistic test | p value |
|---------------------|-------------------------------|-----------------|---------|
|                     | RTA (n = 136) n (%) | Assault (n = 67) n (%) | Self-fall (n = 156) n (%) |
| Pre-lockdown        | Yes                          | 61 (48.85)       | 22 (32.83) | 60 (38.46) |
|                     | No                           | 36 (26.47)       | 19 (28.35) | 32 (20.51) |
| Post-lockdown       | Yes                          | 23 (16.91)       | 5 (7.46)   | 32 (20.51) |
|                     | No                           | 22               | 16 (11.76) | 21 (31.34) |

*Kruskal Wallis H Test; p < 0.05 (Statistically Significant); NS – Not Significant.*
6. Conclusion

The comparative evaluation of the casualties during pre and post-lockdown period has shown a significant reduction in the number of trauma cases during post lock down period. The influence of alcohol on road traffic accidents has also reduced during lockdown period. The severity of the injury has also been influenced by the imposition of lockdown. Road traffic accidents are day to day challenge for healthcare fraternity irrespective of the pandemic situation. The injury is rather soft tissue or hard tissue, if not managed primarily can lead to post traumatic residual deformity, the correction of which is more complicated and extensive. Hence, following the COVID appropriate protocol the service of the OMF residents and doctors are utmost important in managing the maxillofacial casualties during this difficult times of pandemic to avoid serious morbidities faced by the maxillofacial patients at later stage.

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