Impact of Lockdown Measures During the COVID-19 Pandemic on the Number and Nature of Trauma Presentations to Oral and Maxillofacial Surgery of a Level I Trauma Center—A Study

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Abstract

Introduction: The COVID-19 pandemic triggered unprecedented nationwide regulations aimed primarily at slowing the spread of the virus. The objective of this study was to describe the effect of these regulations on the number and natures of trauma presentations to oral and maxillofacial department of level I trauma center in the city of Lucknow, Uttar Pradesh.

Methods: A retrospective cohort study of the triage register at Trauma Centre of King George Medical University, Lucknow was conducted, comparing all trauma presentations from March 23, 2020 to July 31, 2020 with those from the preceding 5 months. The number of patients, mechanism of trauma, and severity of illness was recorded and compared.

Results: A reduction in the number of trauma cases was recorded for the particular period. The statistical analysis was done with SPSS software (version 1.1). The incidence of maxillofacial trauma was more in males than females. During the study period, data shows that road traffic accidents (91.68%) was the most common cause of trauma followed by fall from height (4.06%) and physical assault (2.34%), respectively. The most common injury was soft tissue lacerations (38.07%), followed by hard tissue injury (LeFort: 20.6%, zygomaticomaxillary complex fractures: 9.44%, parasymphysis: 8.02%), respectively.

Conclusion: This study shows that the burden of trauma presenting to the emergency department was decreased during lockdown period by the regulations implemented in response to the COVID-19 pandemic.

Keywords

COVID-19 pandemic, maxillofacial trauma, lockdown pandemic, impact of lockdown, oral & maxillofacial surgery

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Introduction

On March 11, 2020, the World Health Organization declared the outbreak of the SARS-CoV-2 (COVID-19) virus a global pandemic. On March 22, 2020, Indian government implemented a series of measures aimed at limiting the spread of the COVID-19 pandemic. These measures included restricting nonessential travel, prohibiting the sale of alcohol, closure of workplaces for nonessential services, and restricting social gatherings. All nonurgent elective surgeries in government-run hospitals were postponed for the foreseeable future.

These unique circumstances provided an opportunity to study the effect of these conditions on the burden of trauma presentations to a level I trauma center, an area described as having a high trauma burden, particularly with regard to motor vehicle accidents, pedestrians injured by motor vehicles, and interpersonal violence.

The aim of this unicenter retrospective study is to gain an understanding of the impact that a nationwide lockdown has had on the rates, mechanisms, and types of injuries in...
maxillofacial region together with their management at a regional trauma service. These findings will serve as a record of this particular aspect of the pandemic, but they may also inform strategies for injury prevention in the area.

**Materials and Methods**

Retrospective data was collected from patient records from the oral and maxillofacial surgery unit at Trauma Centre of King George Medical University, Lucknow. Some restrictions on lockdown were officially lifted at the end of July. So, the time period for the study was taken from 4 months before lockdown and 4 months after till the end of July to evaluate the time period.

Demographic data were collected along with nature of injury, mechanism of injury, and the treatment provided. Any patients with incomplete data for analysis were excluded from the study. Injury type was categorized into bone fracture, soft tissue injury, and multiply injured patients. Mechanism of the injury was subcategorized into fall (including slip, trip), road traffic accidents, interpersonal assaults, and any other cause. The statistical analysis was done with software SPSS (version 1.1). The comparison made between groups was done with multiple regression analysis with data available from the daily trauma entry register of oral and maxillofacial unit of level I trauma center in Lucknow. Approval from the ethical committee of the study institution was not required since patients were not included in the study.

**Results**

During the study period, data shows that road traffic accidents (RTA) (91.68%) was the most common cause of trauma followed by fall from height (4.06%) and physical assault (2.34%), respectively. The most common injury was soft tissue lacerations (38.07%), followed by hard tissue injury (LeFort: 20.6%, zygomaticomaxillary complex fractures: 9.44%, parasymphysis: 8.02%), respectively.

**Table 1. Gender-Wise Distribution of Maxillofacial Trauma in Prelockdown and Lockdown Period.**

| Category         | Month-Year | Gender | Total | P Value |
|------------------|------------|--------|-------|---------|
|                  |            | Male   | Female|         |
| Prelockdown      | Nov-19     | 157 (23.02%) | 19 (25.33%) | 176 (23.25%) | .0004 |
|                  | Dec-19     | 123 (18.04%) | 12 (16.00%) | 135 (17.83%) |     |
|                  | Jan-20     | 130 (19.06%) | 8 (10.67%)  | 138 (18.23%) |     |
|                  | Feb-20     | 172 (25.22%) | 10 (13.33%) | 182 (24.04%) |     |
|                  | Mar-20     | 100 (14.66%) | 26 (34.67%) | 126 (16.64%) |     |
| Lockdown period  | Apr-20     | 48 (25.26%)  | 12 (31.58%) | 60 (26.32%)  | .4661 |
|                  | May-20     | 55 (28.95%)  | 13 (34.21%) | 68 (29.82%)  |     |
|                  | Jun-20     | 41 (21.58%)  | 8 (21.05%)  | 49 (21.49%)  |     |
|                  | Jul-20     | 46 (24.21%)  | 5 (13.16%)  | 51 (22.37%)  |     |
| Overall study period | Nov-19     | 157 (18.00%) | 19 (16.81%) | 176 (17.87%) | .0001 |
|                  | Dec-19     | 123 (14.11%) | 12 (10.62%) | 135 (13.71%) |     |
|                  | Jan-20     | 130 (14.91%) | 8 (7.08%)   | 138 (14.01%) |     |
|                  | Feb-20     | 172 (19.72%) | 10 (8.85%)  | 182 (18.48%) |     |
|                  | Mar-20     | 100 (11.47%) | 26 (23.01%) | 126 (12.79%) |     |
|                  | Apr-20     | 48 (5.50%)   | 12 (10.62%) | 60 (6.09%)   |     |
|                  | May-20     | 55 (6.31%)   | 13 (11.50%) | 68 (6.90%)   |     |
|                  | Jun-20     | 41 (4.70%)   | 8 (7.08%)   | 49 (4.97%)   |     |
|                  | Jul-20     | 46 (5.28%)   | 5 (4.42%)   | 51 (5.18%)   |     |

**Source:** Trauma Unit of Oral and Maxillofacial Surgery Department, King George Medical University.

**Note:** The statistical analysis shows that there is significant difference (.0004) in gender distribution during prelockdown period with number of cases being more in males (682) than females (65). There is no statistically significant difference (.4661) between males and females during lockdown period. The overall study period shows that there is significant difference (.0001) in case distribution among gender with male predominance during the study period.
Table 2. Distribution of Maxillofacial Trauma in Demographic Characteristics During Prelockdown and Lockdown Period.

| Variable         | Study Period                  | Total | P Value |
|------------------|-------------------------------|-------|---------|
|                  | Prelockdown Period            |       |         |
|                  | Lockdown Period               |       |         |
|                  | Total                         |       |         |
| Gender           | Male                          | 682 (90.09%) | 190 (83.33%) | 872 (88.53%) | .0064 |
|                  | Female                        | 75 (9.91%) | 38 (16.67%) | 113 (11.47%) |       |
| Age group (in years) | 10–30                        | 372 (49.14%) | 0 (0.00%) | 486 (49.34%) | .8212 |
|                  | 31–60                         | 385 (50.86%) | 114 (50.00%) | 499 (50.66%) |       |

Source: Trauma Unit of Oral and Maxillofacial Surgery Department, King George Medical University.

Table 3. Age Group (in Years) Wise Distribution of Maxillofacial Trauma in Prelockdown and Lockdown Period.

| Category          | Month-Year | Age Group (in Years) | Total | P Value |
|-------------------|------------|----------------------|-------|---------|
|                   |            | 10–30                |       |         |
|                   |            | 31–60                |       |         |
| Prelockdown period| Nov-19     | 176 (47.31%)         | 0 (0.00%) | 176 (23.25%) | .0001 |
|                   | Dec-19     | 125 (33.60%)         | 10 (2.60%) | 135 (17.83%) |       |
|                   | Jan-20     | 71 (19.09%)          | 67 (17.40%) | 138 (18.23%) |       |
|                   | Feb-20     | 0 (0.00%)            | 182 (47.27%) | 182 (24.04%) |       |
|                   | Mar-20     | 0 (0.00%)            | 126 (32.73%) | 126 (16.64%) |       |
| Lockdown period   | Apr-20     | 60 (52.63%)          | 0 (0.00%) | 60 (26.32%) | <.0001 |
|                   | May-20     | 54 (47.37%)          | 14 (12.28%) | 68 (29.82%) |       |
|                   | Jun-20     | 0 (0.00%)            | 49 (42.98%) | 49 (21.49%) |       |
|                   | Jul-20     | 0 (0.00%)            | 51 (44.74%) | 51 (22.37%) |       |
| Overall study period | Nov-19   | 176 (36.21%)         | 0 (0.00%) | 176 (17.87%) | <.0001 |
|                   | Dec-19     | 125 (25.72%)         | 10 (2.00%) | 135 (13.71%) |       |
|                   | Jan-20     | 71 (14.61%)          | 67 (13.43%) | 138 (14.01%) |       |
|                   | Feb-20     | 0 (0.00%)            | 182 (36.47%) | 182 (32.73%) |       |
|                   | Mar-20     | 0 (0.00%)            | 126 (25.25%) | 126 (22.37%) |       |
|                   | Apr-20     | 60 (12.35%)          | 0 (0.00%) | 60 (6.90%) |       |
|                   | May-20     | 54 (11.11%)          | 14 (2.81%) | 68 (6.90%) |       |
|                   | Jun-20     | 0 (0.00%)            | 49 (9.82%) | 49 (4.97%) |       |
|                   | Jul-20     | 0 (0.00%)            | 51 (10.22%) | 51 (5.18%) |       |

Source: Trauma Unit of Oral and Maxillofacial Surgery Department, King George Medical University.

Note: The statistical analysis shows that there was no statistical significance between compared age groups during prelockdown period. After imposing lockdown, the incidence in younger age group increased initially, but reduced drastically to zero at last 2 months of lockdown phase which is statistically significant (<.0001).
Discussion

The COVID-19 pandemic has surprised human lives to an extent that there was unforeseen casualties and scarce in resources, especially manpower, bed availability, medicines, PPE kits, operation theatre availability and other basic supplies not in a over a period of 100 years. Based on data from National Health Profile 2019, there were more than 7 lakhs beds in government setup in India. Bed availability amounts to 0.55 per 1,000 population, whereas for elderly age groups it stands at 5.16 per 1,000 population which are the groups of severe disease and death in COVID-19. According to a report, 80% to 85% population are affected in India and are asymptomatic. Several countries in the world have imposed a nationwide lockdown owing to pandemic unlike few other countries like Sweden, UK initially followed the concept of “Herd Immunity “ but were heavily criticized for avoidable mortality involved.

For countries like India with such population rate, nationwide lockdown is necessary to bring down the rate of spread and dent the curve. In India, nationwide lockdown was imposed on March 21, 2020 and in some states it was relieved at the end of month of July. Physical distancing on a large scale and movement restrictions lead to flattening of India’s economy and travel restrictions to such magnitude resulted in decrease in RTA and environmental pollution.
Maxillofacial trauma may occur either isolated or in combination with other fractures in the body. RTA is the most common cause of maxillomandibular fractures with incidence rate of 20% to 90%. Our study has shown a drastic fall in incidence of RTA to about 16% when compared to trauma records 4 months prior to lockdown period and the overall incidence in trauma cases irrespective of etiology was decreased by 53.2% when comparing to pre-COVID era (Figures 1 and 2). Vishal et al\(^2\) in his study reported a 73% decrease in number cases during the COVID period. In a French multicenter study, de Boutray et al\(^3\) reported a 64.4% decrease in overall cases of trauma during the lockdown period. On a contrary, Surendra et al\(^4\) reported a 19% increase in overall cases in a tertiary center in Sri Lanka.

The overall male:female ratio during pre-COVID is 9.1:1 when compared to lockdown period which is 5:1 respectively (Tables 1 and 2), with mean decrease in number of cases in men to 7.5% and increase in women to around 7.5% during lockdown period. No significant difference found in gender toward mental health among individuals. The data collection and history also shows that interpersonal violence has increased within the family. A postscript published in *British Medical Journal* reported 1,493% increase in abusive head trauma during COVID-19 pandemic when compared over the previous 3 years.\(^7\)

While decoding maxillofacial trauma according to various etiologies, trauma resulting in soft tissue lacerations was most common during the study periods (Figures 4, 5 and 6). There was 8% reduction in number of cases of zygoma fractures during pandemic which was hypothesized that there was reduced need for the patient to report to the trauma centre as there is decreased necessity for correction of cosmetic deformity during pandemic than the functional occlusion unlike in Lefort and mandibular fractures. Other theories were restricted semielective General anaesthesia theatres, under reporting of cases due to tumbling SARS-COVID-19 infection at our institution.

LeFort and panfacial trauma stands next to soft tissue lacerations among injury type during study period. Theory was drawn that during lockdown period patients sustain low-impact trauma when compared to high-impact trauma which leads to increased incidence in soft tissue trauma.

### Conclusion

Trauma burden at the emergency unit was drastically reduced during the pandemic owing to restricted outdoor activities and work-related accidents. Boutray et al\(^,3\) in his multicenter study showed that overall incidence of leisure time trauma during lockdown is 4.7% which was reduced by 15% when comparing to various literatures during regular period.\(^3\) A British study by Yeung et al\(^6\) at King Hospital, London showed decrease in incidence of self-fall referrals during lockdown period which might be attributed to their improved infrastructure of the buildings. In our study, we had 1 case of self-fall which was due to suicidal tendency during lockdown period. It was hypothesized that it might be due to increased mental stress due to heightened social anxiety and decreased access to psychiatric care during the pandemic.

Interpersonal violence was reported to be the third-most common cause of maxillofacial injury which was increased by around 7.5% during lockdown period. This shows how isolation and paralysis of normal life imposed negative impact toward mental health among individuals. The data collection and history also shows that interpersonal violence has increased within the family. A postscript published in *British Medical Journal* reported 1,493% increase in abusive head trauma during COVID-19 pandemic when compared over the previous 3 years.\(^7\)
this pandemic teaches us to be prepared for the next hit and gives an idea about incidence and prevalence of maxillofacial trauma which will give us knowledge about managing the same during a pandemic in the upcoming years.

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**References**
1. India M. National Health Profile (NHP) of India- 2019: Ministry of Health and Family Welfare [Internet].Cbhidghs.nic.in. 2021 [cited 29 November 2021]. http://www.cbhidghs.nic.in/show-file.php?id=1147. Accessed January, 2022.
2. Vishal Prakash O, Rohit Prajapati V, Shahi A, Khaitan T. Incidence of maxillofacial trauma amid COVID-19: a comparative study. *J Maxillofac Oral Surg*. 2020. DOI:10.1007/s12663-020-01484-y.
3. de Boutray M, Kün-Darbois J, Sigaux N, et al. Impact of the COVID-19 lockdown on the epidemiology of maxillofacial trauma activity: a French multicentre comparative study. *Int J Oral Maxillofac Surg*. 2021;50(6):750-755.
4. Surendra G, Perera I, Ranasinghe A, Kumarapeli V, Tham R, Wickramaratne P. Pattern and causes of oral and maxillofacial injuries presented to a Tertiary Care Public Dental Hospital in strictly imposed COVID-19 lockdown scenario. *Oral*. 2020;1(1):3-14.
5. Morris D, Rogers M, Kissmer N, Du Preez A, Dufourq N. Impact of lockdown measures implemented during the Covid-19 pandemic on the burden of trauma presentations to a regional emergency department in Kwa-Zulu Natal, South Africa. *Afr J Emerg Med*. 2020;10(4):193-196.
6. Yeung E, Brandsma D, Karst F, Smith C, Fan K. The influence of 2020 coronavirus lockdown on presentation of oral and maxillofacial trauma to a central London hospital. *Br J Oral Maxillofac Surg*. 2021;59(1):102-105.
7. Sidpra J, Abomeli D, Hameed B, Baker J, Mankad K. Rise in the incidence of abusive head trauma during the COVID-19 pandemic. *Arch Dis Child*. 2020;106(3):e14-e14.