Year one of COVID-19 pandemic in India: Effect of lockdown and unlock on the presentation of patients with infective keratitis at a tertiary eye center

Dear Editor,

The COVID-19 pandemic brought about a significant number of new challenges in access to healthcare services for patients across the country.[1,2] The most common cause of patients seeking eye care services despite the lockdown was related to corneal disorders; among them, microbial keratitis was the most common condition.[3] We describe a comparative report of the effect of lockdown and unlock of the COVID-19 pandemic on the presentation of patients with infectious keratitis at a tertiary eye care center in India.

This was a cross-sectional observational hospital-based study that included 10,977 patients presenting between March 25, 2017 and March 31, 2021 to a tertiary eye care center in India. The data were analyzed using a browser-based electronic medical records system (eyeSmart EMR).[4,5] The study duration was divided into three categories: Pre COVID-19: March 25, 2017–March 24, 2020; Lockdown (Phase 1–4): March 25, 2021–May 31, 2021; and Unlock (Phase 1–10): June 1, 2020–March 31, 2021.[6] The patients presenting from the same location of the eye center were classified as “intracity,” those from outside the city but from the same state of the eye center were classified as “intrastate,” those from outside the state were classified as “interstate,” and those from outside India were classified as “international” patients.

1. Overall trend of infectious keratitis: Compared to the pre-COVID-19 phase with an average of 7.96 (8,088/1,096) patients per day, the number of patients seen during the lockdown phase with this diagnosis was significantly lower with an average of 2.94 ± SD (178/68) per day, which increased to an average of 6.77 (2,052/303) during the unlock phase. There was a slight increase in the mean age of the patients (44.86 ± 18.14 years vs. 43.19 ± 19.25 years) and median (45 (IQR: 32–59) years vs. 44 (IQR: 29–58) years) during the COVID-19 phase (lockdown and unlock phases) as compared to the pre-COVID-19 phase, which was statistically significant (P = <0.00001). There was a decrease (6.57%) in the proportion of pediatric patients (≤16 years) during the COVID-19 phase as
compared to the pre-COVID-19 phase (9.35%), which was statistically significant ($P = 0.000125$). There was a slight increase in access to care among the male (69.94% vs. 66.3%; $P = 0.148847$) patients and a slight decrease in female (30.06% vs. 33.7%; $P = 0.019177$) patients. There was an increase in access to care among the first-time visit (83.93% vs. 76.46%; $P = 0.00807$) patients and a decrease in follow up (16.07% vs. 23.54%; $P = <0.00001$) patients, which was statistically significant. The visual impairment (logMAR) at the time of presentation was worse at $2.17 \pm 1.25$ during lockdown phase as compared to $1.63 \pm 1.27$ during the pre-COVID-19 phase and was $1.89 \pm 1.29$ during the unlock phase. The trend of patients with keratitis over the three phases is detailed in Fig. 1. A proportional reduction of 65.7% was seen in patients
Table 1: Distribution and change in the yearly number of cases with infective keratitis during year one of the COVID-19 pandemic

| Type of Keratitis                  | Pre-COVID-19 (Average numbers of 3 preceding years) | Year One COVID-19 Pandemic | % Change (Pre-COVID-19 and year one pandemic) | P     |
|-----------------------------------|-----------------------------------------------------|-----------------------------|---------------------------------------------|-------|
|                                   | Overall                                             | Lockdown phase (Mar 25- May 31, 2020) | Unlock phase (Jun 1-Mar 31, 2021)          |       |
| Bacterial                         | 336                                                 | 248                         | 15                                          | 26.1% | 0.5864 |
| Fungal                            | 866                                                 | 790                         | 88                                          | 702   | 8.7%   | 0.003814 |
| Parasitic                         | 94                                                  | 64                          | 8                                           | 56    | 31.9%  | 0.433397 |
| Mixed                             | 22                                                  | 41                          | 0                                           | 41    | 8.6%   | 0.000655 |
| Viral                             | 945                                                 | 600                         | 45                                          | 555   | 36.5%  | 0.000797 |
| Microorganisms undetermined/No organisms | 432                                                 | 301                         | 22                                          | 279   | 30.3%  | 0.187269 |

Overall, we observed that there was a 22.5% decline in the total numbers seen at our center compared to previous years. The lockdown phase that lasted for nearly 2.25 months posed challenges such as intra- and interstate travel, which somewhat mitigated in the unlock phases when travel restrictions were relaxed and removed in the later months of the year. This trend is clearly seen in Fig. 2, which shows that although there was a sharp decline in patients visiting from outside the state and a complete decline in international patients during the lockdown, the pie diagram of patients consulting for infective keratitis following the unlock is almost a superimposition of pre-COVID-19 era.

The presenting visual acuity was worse in patients with infective keratitis in year one of the pandemic when compared to the previous years. The annual decline was maximum for viral keratitis (36.5%), followed by parasitic keratitis (31.9%), undetermined etiology (30.3%), bacterial keratitis (26.1%), fungal keratitis (8.7%) in that order, while there was an 8.6% increase in mixed infection category [Table 1]. The decline in numbers of patients with infective keratitis during the pandemic is most obviously linked first to the lack of transport during the lockdown, followed by restricted travel and patient apprehension. Other reasons would include preference for local care whenever it was accessible to patients, institution of teleconsultation services, and connectivity with the institute’s secondary centers for the patients from within the state. It is also likely that less severe cases, especially those with bacterial keratitis, could be favorably managed at local centers and only those with a more severe and nonresponsive course of the disease were referred to the center for further management. The tendency for an increase in overall numbers by January 2021 [Fig. 3]; overshooting pre-COVID-19 era by March 2021 is likely due to resumption of normal travel services and ease of apprehension for COVID-19 infection that was related to a reduction in the number of case counts, development of more effective therapeutic protocols, and availability of vaccines, leading to widespread access of the facility, rather than a true increase in the incidence of the infection. A higher proportion of patients presenting with greater visual impairment was seen during both the lockdown and unlock phase of the pandemic. The data on the number of therapeutic keratoplasties can serve as a proxy measure apart from the observation that there was an increase in those with worse visual acuity during the pandemic.

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Conflicts of interest
There are no conflicts of interest.

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