

# Impact of COVID-19 Lockdown on Oral Oncology-related Outpatient Volume at Indian Dental Institutions

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## ABSTRACT

**Aim and objective:** This study aimed to evaluate the impact of the lockdown on oral oncology-related out-patient volume at Indian dental institutions.

**Materials and methods:** The total number of newly diagnosed cases of oral submucous fibrosis, oral leukoplakia, oral lichen planus, and oral cancers, recorded at two dental institutional settings before lockdown (January–March 2020) and after lockdown (June–August 2020), were included retrospectively and compared.

**Results:** The study included a total of 797 cases at both institutions. At Institution-I, a total of 312 cases were recorded before the lockdown, and 63 cases were recorded after the lockdown. At Institution-II, a total of 311 cases were reported before lockdown, and 111 cases were recorded after lockdown. Comparisons between the pre-lockdown and post-lockdown data yielded a significant change in the proportions of oral submucous fibrosis, oral leukoplakia, oral lichen planus, and oral cancers at both institutions (Chi-square test;  $p < 0.001$ ). Following the lockdown, a substantial reduction was observed in the proportion of oral submucous fibrosis (OSMF) cases at both institutions, and the proportion of oral cancers increased at both institutions. There was a significant difference between the proportions of cases reported before lockdown at both institutions ( $p < 0.001$ ). However, after-lockdown, no such differences were noted ( $p = 0.69$ ); the absence of significance could most likely be due to the low sample size or low-power during the post-lockdown period.

**Conclusion:** The oral potentially malignant disorders (OPMD) and oral cancer (OC) patient volumes reduced substantially following lockdown. During the post-lockdown period, the proportion of oral cancers increased, whereas the proportion of OSMF cases decreased. Results indicate that OPMD and oral cancer patients were impacted differently by the lockdown.

**Clinical significance:** This study provides insight into the impact of lockdown and highlights the importance of reestablishing oral oncology-related patient care. A vital discussion is also provided on useful compensatory strategies that may reduce delays during the ongoing crisis.

**Keywords:** COVID-19, Diagnostic delay, Lockdown, Oral cancers, Oral potentially malignant disorders, Pandemic.

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## INTRODUCTION

Due to the coronavirus disease-2019 (COVID-19) pandemic, as of January 19, 2021, 93,217,287 confirmed cases, and 2,014,957 deaths were recorded globally.<sup>1</sup> In India alone, 10,557,985 confirmed cases and 152,274 deaths were recorded.<sup>1</sup> Due to the pandemic and the implementation of strict lockdown measures in India (~2 months),<sup>2</sup> there was a substantial reduction in overall patient flow in different health care settings at a comparatively early stage. As clinical care was mainly restricted to emergency cases, there was a compromise in routine patient care. In India, lockdown measures were instituted in a phased manner; it began on March 25, 2020 and was lifted on May 31, 2020. Since June 2020, following the lockdown release (Unlock 1.0), few patients have started visiting dental settings (dental institutions, private clinics, and related health-care centers).

Because of the lockdown and the ongoing pandemic, there is an emergence of diagnostic delay-related health issues. While the impact of lockdown is critical to all patients (with dental and oral complaints), it is especially critical to those bearing oral potentially malignant disorders (OPMDs) and oral cancers (OCs). As OPMDs are predominantly painless/asymptomatic conditions, even in a non-pandemic setting, there is a generalized delay before patients reach clinics. Since OPMDs are relatively common in India, such delays could be further extended because of the lockdown and pandemic. In the Indian context, the most common OPMDs include oral submucous fibrosis (OSMF), oral leukoplakia (OL), and oral lichen planus (OLP). During the

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current crisis, the fear of severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) infection is also widespread, and many OPMD patients face great difficulty accessing dental clinics.

Since oral medicine departments at dental colleges are the vital peripheral centers where most oral oncology (OPMD + OC) patients are routinely diagnosed and managed, the pandemic's impact could be validated if patient volumes are evaluated at these specialty clinics. Delays to these clinical centers can reduce the scope of overall detection and management of pre-cancer and cancer and slow down the biopsy of suspicious (oral dysplastic) lesions. This work aims to quantify the impact of lockdown on common oral potentially malignant disorders (i.e., OSMF, OL, OLP) and oral cancers at two dental institutions located in different states.

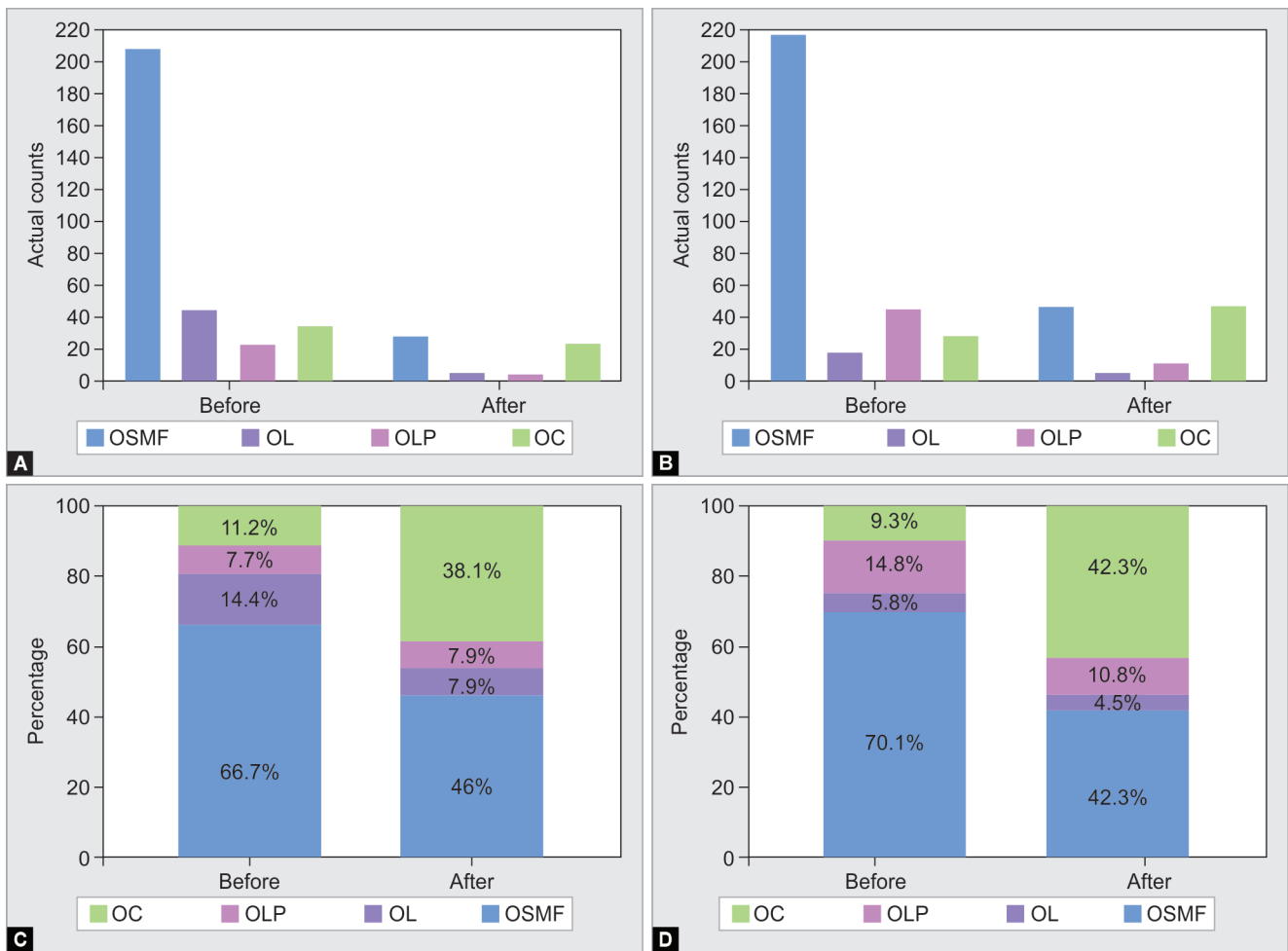
### MATERIALS AND METHODS

The newly diagnosed cases of OSMF, OL, OLP, and OCs recorded before (January 1, 2020–March 20, 2020) and after lockdown (June 1, 2020–August 20, 2020) at Government Dental College, Indore, Madhya Pradesh (Institution-I), and Institute of Dental Sciences, Bhubaneswar, Orissa (Institution-II) were retrospectively analyzed. The incidences were evaluated at an equal interval of 79 days. A change in the distribution of OSMF, OL, OLP, and OCs at both institutions was analyzed using a Chi-squared test. Differences between institutes in the distribution of groups before and after the lockdown were assessed using a Chi-squared test. Data

were analyzed using GraphPad Prism version 9.0.0 for Windows (GraphPad Software, San Diego, California, USA, www.graphpad.com). Significance was defined as  $p < 0.05$ .

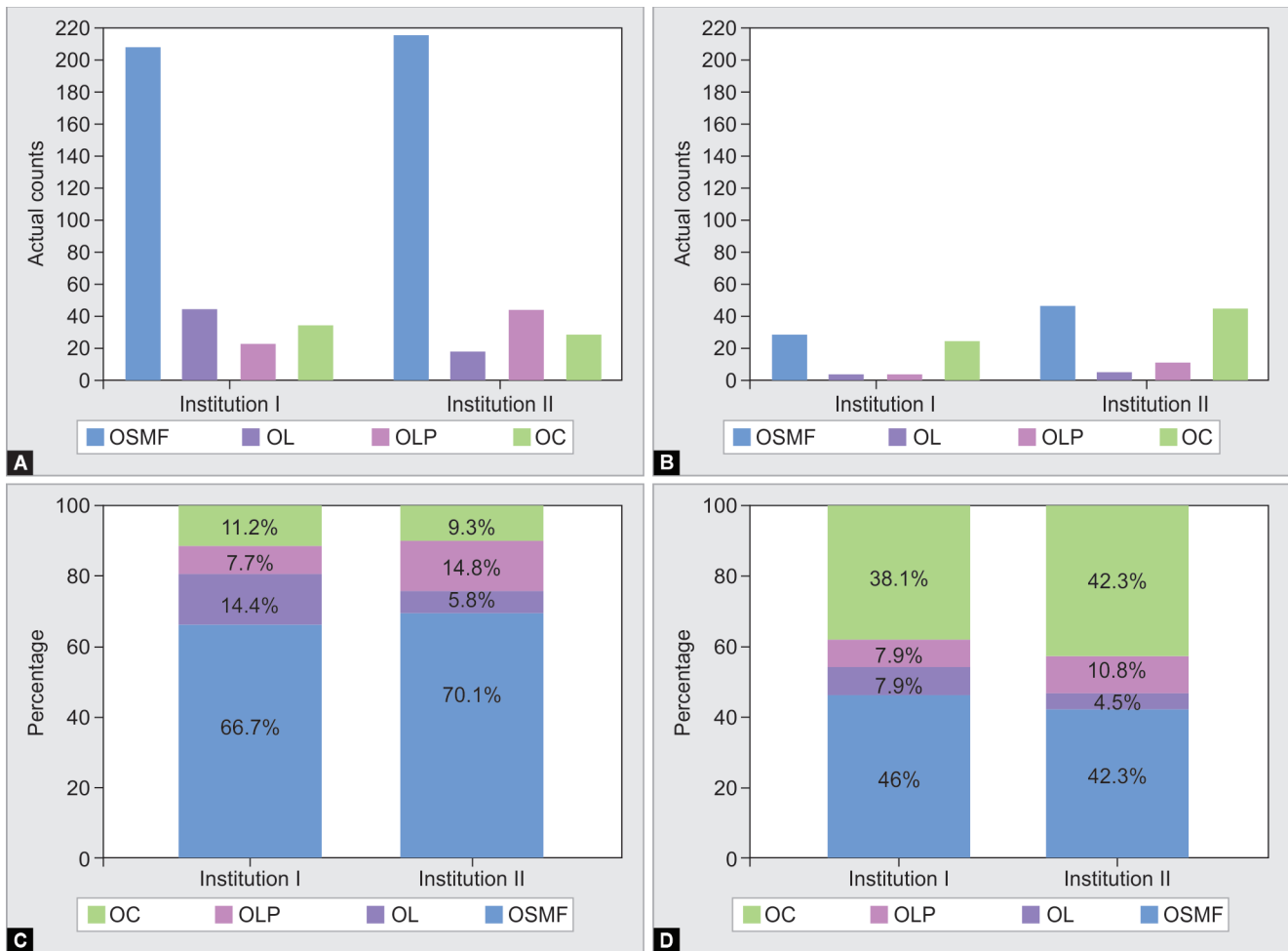
### RESULTS

A total of 208 OSMF (66.7%), 45 OL (14.4%), 24 OLP (7.7%), and 35 OC (11.2%) patients visited Institute-I before lockdown, and 29 OSMF (46%), 5 OL (7.9%), 5 OLP (7.9%), and 24 OC (38.1%) were reported after lockdown. At Institute-II, 218 OSMF (70.1%), 18 OL (5.8%), 46 OLP (14.8%), and 29 OC (9.3%) patients visited before lockdown, and 47 OSMF (42.3%), 5 OL (4.5%), 12 OLP (10.8%), and 47 OC (42.3%) patients were reported after lockdown. The number of oral oncology-related cases declined steadily from 312 to 63 at Institution-I and 311 to 111 at Institution-II (Figs 1A and B). In the pre-lockdown period (that closely resembles the general-day scenario), the OSMF–OL ratio was 5.1 at Institute-I and 11.7:1 at Institute-II. A change in the proportions of OSMF, OL, OLP, and OCs was observed at both institutions (Chi-squared test;  $p < 0.001$ ). The proportion of OSMF decreased substantially at Institute-I (66.7 vs 46%) and Institute-II (70.1 vs 42.3%), and the proportion of OCs increased substantially after lockdown at Institute-I (11.2 vs 38.1%) and Institute-II (9.3 vs 42.3%) (Figs 1C and D). In the pre-lockdown



**Figs 1A to D:** Pre-lockdown and post-lockdown comparisons at each institution. The number of cases in each category (oral submucous fibrosis (OSMF), oral leukoplakia (OL), oral lichen planus (OLP), and oral cancer (OC)) at Institution-I (A) and Institution-II (B). The distribution of groups changed significantly after lockdown at both the institutions (C and D)





**Figs 2A to D:** Pre-lockdown and post-lockdown comparison between the two institutions. The number of cases in each category (oral submucous fibrosis (OSMF), oral leukoplakia (OL), oral lichen planus (OLP), and oral cancer (OC)) at both institutions before lockdown (A) and after-lockdown (B). Differences between institutes in the distribution of groups before (C) and after the lockdown (D)

period, the incidences at Institute-I were in the order OSMF (66.7%), OL (14.4%), OC (11.2%), and OLP (7.7%), and the incidences at Institute-II were in the order OSMF (70.1%), OLP (14.8%), OC (9.3%), and OL (5.8%) (Figs 2A and 2B). In the post-lockdown period, the incidences at Institute-I were in the order OSMF (46%), OC (38.1%), OL (7.9%), and OLP (7.9%), and at Institute-II, the incidences were in the order OSMF (42.3%), OC (42.3%), OLP (10.8%), and OL (4.5%). There was a significant difference between the proportion of cases reported before lockdown at both institutions ( $p < 0.001$ ) (Fig. 2C). However, after-lockdown, no such differences were noted ( $p = 0.69$ ) (Fig. 2D).

## DISCUSSION

A sustained downtrend of OPMD cases was observed following the lockdown, but a surge was observed concerning OCs. Since higher OC incidences were noted after the lockdown, we believe patients bearing such presentations do possess a general understanding of their oral condition, and therefore despite the fear of the pandemic, few patients have sought consultation.

The significant difference between the two institutions before the lockdown is likely associated with different habits prevalent in

the respective places. However, the lack of significant difference ( $p = 0.69$ ) in the post-lockdown data, despite differences between groups, is most likely related to lack of power associated with small samples available. At any given timing (pre-lockdown or post-lockdown), the incidence of OLP at Institute-II (Orissa population) was higher than Institute-I (Madhya Pradesh population); this may be related to a higher susceptibility to OLP. Furthermore, the proportion of OL cases in the populations may indicate their overall compliance with tobacco control measures.

Evaluations of OL and OSMF incidences at different settings allow us to decipher the regional diversity of risk factors, such as betel quid (BQ), tobacco, and betel quid with smokeless tobacco (BQ + ST). Our data at both institutional settings displayed a relatively higher incidence of OSMF compared to OL. These institute-level incidences reflect BQ's dominance in the respective communities, and a similar incidence profile at both institutes reflects the broader picture of BQ's overuse at the nation-scale.

While interacting with OC patients, many revealed that a shortage of transportation services during the post-lockdown period was among the main reasons they could not reach out to hospital settings much earlier. Another reason for the surge in OC cases at dental institutions during the post-lockdown period could

be because the nearby “regional cancer centers” (which manage significant patient volumes) were not functioning at their previous capacities. The fact that OPMDs patients have not visited the centers during the post-lockdown period is alarming; such delays could inadvertently result in a future surge in OCs, significantly overburdening our health care system. It is vital to understand that a decline in transportation services, pandemic associated fear, could be primarily responsible for such delays.

Since dental institutional settings represent important centers for OPMD and OC cases in India, necessary measures need to be deployed at these centers to return to old times and work in previous capacities. It is vital to consider the necessary precautionary measures to reduce the SARS-CoV-2 transmission. Since there is also a possibility of a second wave (because of the emergence of mutated viral strains),<sup>3,4</sup> COVID-19 associated delays may likely be a long-term issue, and therefore, OPMD associated-diagnostic and management delays could also further continue. Delays may primarily occur in the older adults and elderly population who may be more vulnerable to “pandemic associated fear” (corona-phobia).<sup>5,6</sup> Even if the COVID cases reduce substantially, there is a possibility that many individuals may still not consider direct consultation because of underlying apprehension. COVID-associated delays may also increase the clinical stage of already diagnosed and undiagnosed OC cases. While esthetic procedures may be temporarily postponed (due to reduced workforce), the OPMD-OC patients make up a critical group that needs to be promptly managed. Therefore, more emphasis on compensatory mechanisms is needed in OPMD-OC rampant South Asian countries like India.

“Mouth self-examination” is a timely and highly beneficial strategy as this could enormously complement the oral oncology health-care system during the current times.<sup>7</sup> Since OPMD patients and chronic habit users may now have more personal time and increased health-care awareness than before, floating educational content concerning these entities in visual and print media is highly beneficial as it may motivate patients to overcome deleterious habits.

While the percentage of new cases currently seems low, many habit users and OPMD patients may continue BQ and ST use at their residences. It is noteworthy that pandemic associated distress and anxiety could also increase habit use and could potentiate dependence.<sup>8</sup> Hence during these times, patients must become even more conscious about their “habit use frequency.” It is vital to conduct interviews with “agricultural workers,” “construction workers,” “truck drivers,” and “middle-aged homemakers,” who are the most vulnerable populations for the different chewing habits.<sup>8</sup> It is vital to pursue more research on the impact of stress, anxiety, and depression on “chewing frequency,” an under-addressed research area. Given the current scenario, it is vital to also launch robust and globally implementable habit interception strategies in the above mentioned high-risk populations.

Since “tobacco smoking” is also a well-recognized risk factor for the SARS-CoV-2 infection and progression of COVID-19,<sup>9</sup> this timing is an opportunity for clinicians and health-care workers to discourage habit users in general and facilitate a shift to a lifestyle free of habits and external dependencies. Apprehension associated with the pandemic and excessive time availability might have been instrumental in increasing dependence. Therefore, although COVID-19 lockdown was an excellent time to quit habit use, we are unsure how many have considered this opportunity. While the impact of smoking on COVID-19 progression is widely researched, BQ and ST’s impact on COVID-19 progression is still not addressed.

While “smoking” is a more popular habit globally, “BQ and ST” use is equally detrimental and is observed in settings with the highest OC incidences, like South-Asia and India. The government and supportive print and visual media should provide adequate information to the general public about these possibilities.

Chronic stress, anxiety, and depression (associated with the pandemic) could also result in a surge in OLP,<sup>10,11</sup> an OPMD strongly linked to psychological and emotional triggers.<sup>12</sup> Although our OLP data did not indicate any surge in “new cases,” it is certainly possible that previously diagnosed (old) OLP patients may be experiencing stress-induced exacerbations of the disease. However, due to the escalating fear, it is possible that those suffering such episodes may still be at their residences or may be relying on the older prescriptions previously recommended by their clinicians. There is currently little knowledge concerning the differential impact of “work stress” and “life stress” in OLP’s genesis. While it is possible that “work stress” may have reduced due to a break from routine, “life stress” may have intensified because of the mounting financial tension, life-loss, and generalized apprehension. In fact, “loss of loved ones,” a possible OLP trigger,<sup>13,14</sup> has now become a common experience for many of us. Since the reported data was obtained from new-patient records at dental out-patient settings, we hypothesize that “pandemic associated distress” may be linked to OLP disease exacerbations than the incidence of new cases. To precisely record such exacerbations, we may need to engage in telephonic conversations with old OLP patients or directly through a door-to-door consultation approach in full-protective gear. While it is incredibly challenging to conduct such interviews, it is essential to connect to old patients because malignant transformations in OLP can, at times, rapidly occur.<sup>15</sup>

There is a definitive need to reach out to the “habit users” and “OPMD patients” who are highly vulnerable to OC development and several other chronic disease states due to prolonged habit use. Implementation of “Tele-oral medicine services” can be an excellent, practically feasible approach to assessing such patients during ongoing times.<sup>16,17</sup> It would be easy to capture the large oral masses using mobile phones,<sup>18</sup> mainly because smartphone use has become universal these days. Tele-medicine services and heavily used mobile applications like “WhatsApp” previously showed good agreement with clinical examination.<sup>19,20</sup>

Incorporating stress management approaches like “meditation” (into the habit interception protocol) may help reduce impulsive usage of tobacco and areca nut (AN)<sup>21,22</sup> and overcome anxiety-related exacerbations of OLP.<sup>13</sup> It is well known that many chewers engage in these practices as these are stress-coping methods.<sup>8,23</sup> As psychological factors may be a potential influencer of tumor progression, patients with OC may also be benefited if they rely on such methods.<sup>24</sup>

Such approaches offer the vulnerable patient populations a life-changing experience that will allow them to accept the inevitable reality and help them cope during these challenging times without relying upon external dependencies (e.g., BQ, tobacco, alcohol), the well-known risk factors for OC. In the south-Asian countries like India (where numerous patients report with habit use, OSMF, OL, and OC), there may be higher acceptability of such habit interception methods, as they are considered a vital component of their religion.<sup>21,23</sup> However, as many doubt the intrinsic value of traditional therapies, challenges exist concerning their real-world application or feasibility.

Since delays in diagnosing OPMDs and OCs can have dire consequences for patients and health care, we must adopt the appropriate strategies during the current crisis. Although the study’s

sample size is relatively large, one of the limitations is the inclusion of data originating solely from two clinical centers. The inclusion of more data from representative institutions (at least one in each state) could contribute to more insight concerning lockdown or pandemic-associated diagnostic delays. More detailed studies at several private and government dental institutions and regional cancer centers will significantly complement this data and will allow us to quantify the real impact of lockdown during the pandemic on a national scale.

## CONCLUSION

OPMD and OC patient volumes were substantially reduced after lockdown, and the overlapping results at both institutions are suggestive of a widespread impact. Patient and clinician associated delays emanating because of the pandemic could potentially result in a future surge in OC cases, and the real impact of the pandemic may be felt years later. Our results also indicate that OPMDs and OCs were impacted differently by the pandemic; the proportion of OC cases increased, and the proportion of OPMD cases decreased. Further assessments at multiple dental institutions and regional cancer centers could shed more light on COVID-19 related diagnostic and therapeutic delays. Mouth self-examination, telemedicine, and stress-management approaches are vital compensatory strategies with the potential to reduce delays and disease progression and are the need of the hour.

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