



## A Questionnaire-based original research study on Oral complications in COVID recovered patients

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### ABSTRACT

*Due to the global COVID-19 outbreak, health services around the world are in an unprecedented scenario. COVID19 therapies and multi-drug treatments have some indirect problems, and COVID19 disease worsens several oral complications, especially in those with autoimmune disorders, those who have weakened immune systems, or those who are receiving long-term pharmacotherapy. From the previous five months, 432 Covid recovered patients were chosen. To assess the appropriateness of subjects for the study, a questionnaire survey and patient interview were conducted. Some COVID-19 recovered patients with weakened immune systems or defence mechanisms as well as patients on long-term multidrug therapy exhibit oral problems. With excellent dental care and routine checkups, we can lower our risk of developing oral complications as well as our risk of having it get worse.*

**Keywords**-Oral Problems, COVID 19, Several Medication Regimens, Questionnaire, Survey.

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### INTRODUCTION

The total effect of COVID-19 on oral health appears to be multidirectional, immune-related, and most likely indirect. This reflects the pathogenic nature of corona virus invasion through mucosal membranes in the respiratory track. Regarding extrapulmonary manifestations, a number of authors have described cases with cutaneous manifestations, with the most frequent manifestations being those of the maculopapular, acral, urticariform, vesicular, and vascular obstruction types, Despite the potential for saliva to spread viruses and the potential role of salivary glands as a reservoir during this time, few oral symptoms have been documented [1-2]. The most frequently reported oral symptoms include oral dryness, vesiculobullous lesions, aphthous-like lesions, dysgeusia, and anosmia. According to reports, SARSCoV2 has demonstrated certain neurotropic and mucotropic properties that have the ability to change taste and smell perception, salivary gland function, and oral mucosa integrity, as well as the dynamic oral environment by influencing the balance of the microbiota [3]. Severe COVID-19 acute infection and related therapeutic interventions have the potential to have a negative impact on oral health[4]. They may increase the risk of opportunistic fungal infections, xerostomia, which is associated with decreased saliva flow, ulcerations, and gingivitis due to compromised immune function and/or susceptible oral mucosa. It is important to keep in mind that a cytokine storm brought on by abnormal humoral and cellular processes might exacerbate pre-existing autoimmune diseases in the oropharyngeal region. People suffering from COVID-19 require further post-acute treatment to recover from the primary and concurrent infection, and it is advised that their dental health be closely monitored, particularly while moving from the hospital to different care facilities and homes. The expansion of current oral healthcare facilities ought to enable the continuation of secondary care for patients with oral disorders who previously received follow-up care but had to wait because of emergency measures, regardless of whether their COVID 19 status was negative or positive[5].

Drugs used both often and experimentally to treat COVID 9 patients have side effects, but their advantages outweigh their drawbacks [6]. Even after fully recovering from COVID 10, some patients may experience dental or oral problems related to soft tissues, saliva production, neurologically based oral sensations, etc. as a result of intensive pharmacotherapy. Oral health had been reported to decrease in critically ill hospitalised patients as a direct result of life-saving therapies, such as external breathing and blood oxygenation, particularly in the case of those remaining in intensive care units. Advanced medical care, intubation, tracheostomy, external ventilation, as well as mouth breathing and hyposalivation, are

given treatment priorities before mouth care, which can quickly deteriorate oral health and cause complications that also affect the lower respiratory system, similar to aspiration pneumonia[7]. Systemic medications can cause oral microbiota imbalance, and changing the intraoral environment can cause further issues. In order to support medical and dental practitioners in their care delivery, professional associations should promptly provide advice for those who are or have had "aggressive" treatment for COVID-19[8]. The main goal of this study was to determine how frequently COVID-19 survivors experienced oral problems.

## **MATERIAL AND METHODS**

This study was entirely executed on cross sectional philosophies. Authors also utilize logically framed questions which meets the standards of the study. A total of 432 Covid 19 recovered patients, were first targeted and approached for the study. To assess the appropriateness of subjects for the study, a questionnaire survey and patient interview were conducted. Each patient was given a thorough explanation of the study's protocol before their consent was obtained. Patients had the right to withdraw their name from the survey .All the subjects were asked 15 questions. Based on their answers the analysis was done.

### **INCLUSION CRITERIA:-**

1. Males and females Covid 19 recovered patients.
2. Patients, who are co-operative, motivated and give their consent will be included in the study by understanding the risks involved.

### **EXCLUSION CRITERIA:-**

1. Patient who are undergoing Covid 19 treatment.
2. Patient who are not Covid 19 positive.

### **ARMAMENTARIUM**

1. List of Covid 19 recovered patients of last 6 months (September- January 2020)with their contact details.
2. Survey questionnaire form in Hindi and English.

## **RESULTS AND DISCUSSION**

Result based on table-1 and Figure 1 which showed that out of 432 covid recovered patients, 395 patients were ready to participate and give their responses were given in figure 1. All responses have also been illustrated in pie chart. The growing body of research on oral manifestations of COVID-19 has sparked a heated discussion on the pathophysiology and epidemiological importance of these mucocutaneous symptoms. A pathophysiological pathway for the development of oral symptoms in COVID-19 individuals, particularly in the most severely affected ones, has been proposed as immune dysregulation [9]. The majority of the elderly and immune-compromised patients had herpes simplex virus, which was discovered in several cases where recurring aphthous stomatitis and traumatic ulcerations had been ruled out by thorough clinical and laboratory research.

The severe acute infection, its consequences, and therapeutic approaches may all have an impact on oral health in the case of COVID-19. Xerostomia is a crucial factor in COVID-19's detrimental effects on tooth health. The direct impact of SARS-CoV-2 on the salivary glands could be one cause. Mouth breathing brought on by nasal congestion, anxiety, dehydration, and medicine are possible additional contributing factors. The above finding is confirmed in the present survey where 72.9% covid recovered patients reported with xerostomia [10]. Complications with the lower respiratory system and dental health are the results. If xerostomia persists, it may worsen oral health conditions, which was confirmed through the findings of the present survey inflammation, redness, swelling and bleeding gums was seen in 60% patients, ulcers and/or inflammation on the tongue and buccal mucosa was seen in 26.5% recovered patients, and halitosis was observed in 64% patients. In elderly patients with severe COVID-19 infection, the oral lesions were more severe and extensive.

According to reports, SARS-CoV-2 may impair one's sense of taste or smell. However, it is still unknown what causes olfactory and gustatory dysfunction in COVID-19 infection. This survey revealed the recovered cases of SARS-Cov-2 infection (Covid 19), with oral signs and symptoms which emerged in conjunction with the taste loss in 79% patients.

**Table 1:** Questionnaire assessment with responses of clinicians (in decreasing order)

S. No.	Variables (Questions)	Options	Responses of Patients
	Do you consent to participate in the survey?	1.Yes 2. No	Yes=98.4%
1	Age	1. < 20 yr 2. 20-40 yr 3. 40-50 yr 4.> 50 years	20-40yrs=57.3% 40-50 yr=18.1% > 50yr=18.6% < 20 yr=6%
2	When you get infected with coronavirus?	1.In last month 2.1-3 month back 3.3- 6 months back 4.6 months back	1-3month back =56.4% 3- 6=27.9% 6 months back=8.3% In last month=7.4%
3	What was the severity of disease?	1.Asymptomatic 2.Mild 3.Moderate 4.Severe	Mild=41.2% Asymptomatic=34.3% Moderate=15.7% Severe=8.8%
4	Did you admitted to a hospital or in ICU?	1.Yes 2. No	No=66.2%
5	After recovering from coronavirus did you see any change in the oral cavity?	1.Yes 2. No	No=95.1%
6	Did you see any redness or swelling or bleeding of gums after recovering from coronavirus?	1.Yes 2. No	No=95.6%
7	Was there any loosening of teeth after recovering from coronavirus?	1.Yes 2. No	No=99%
8	Did you face any bad breath problems after coronavirus?	1.Yes 2. No	No=94.1%
9	After recovering from coronavirus did you see any pus discharge from your gums?	1.Yes 2. No	No=97.5%
10	Did you get any kind of pain in the oral cavity after recovery from coronavirus?	1.Yes 2. No	No=95.5%
11	Did you face any loss of taste sensation after corona?	1.Yes 2. No	No=81.7%
12	After recovery from coronavirus Did you feel the dryness of the mouth?	1.Yes 2. No	No=89.7%
13	Did you get any white layer coated on your tongue after coronavirus infection?	1.Yes 2. No	No=94.6%
14	Did you have ulcers in your oral cavity after recovering from coronavirus?	1.Yes 2. No	No=96%
15	Did you go to the dentist for a follow-up after recovering from coronavirus?	1.Yes 2. No	No=93.6%

The cytokine release syndrome, which results in dysregulation of humoral and cellular mechanisms with elevated levels of serum proinflammatory cytokines (including tumour necrosis factor-, interleukin (IL)-2, IL-6, IL-8, monocyte chemoattractant protein 1, and granulocyte colony-stimulating factor), anti-inflammatory cytokine IL-10, and inflammatory markers, is a serious complication in patients with severe COVID-19 (e.g., C-reactive protein). It might cause ARDS or multiple organ dysfunction, which would lead to death. It is important to remember that the cytokine storm might worsen pre-existing autoimmune disorders, including those that affect the oropharynx. Given the immunological inflammatory nature and

elevated levels of proinflammatory cytokines in periodontal disorders, the likelihood of causing periodontitis in susceptible patients or worsening already existing periodontitis should be taken into consideration [11]. The altered oral microbiota, opportunistic fungal infections, ulcerations, and gingivitis may be brought on by the immune system being compromised and the vulnerable oral mucosa. From the results of present survey it was observed that in severe cases, it was observed that they had presented with gingival and periodontal changes like bleeding from gums (60%) loosening of teeth (56%) and halitosis (64%). Also in some patients, pus discharge (17.5%) from the gingiva was also observed.

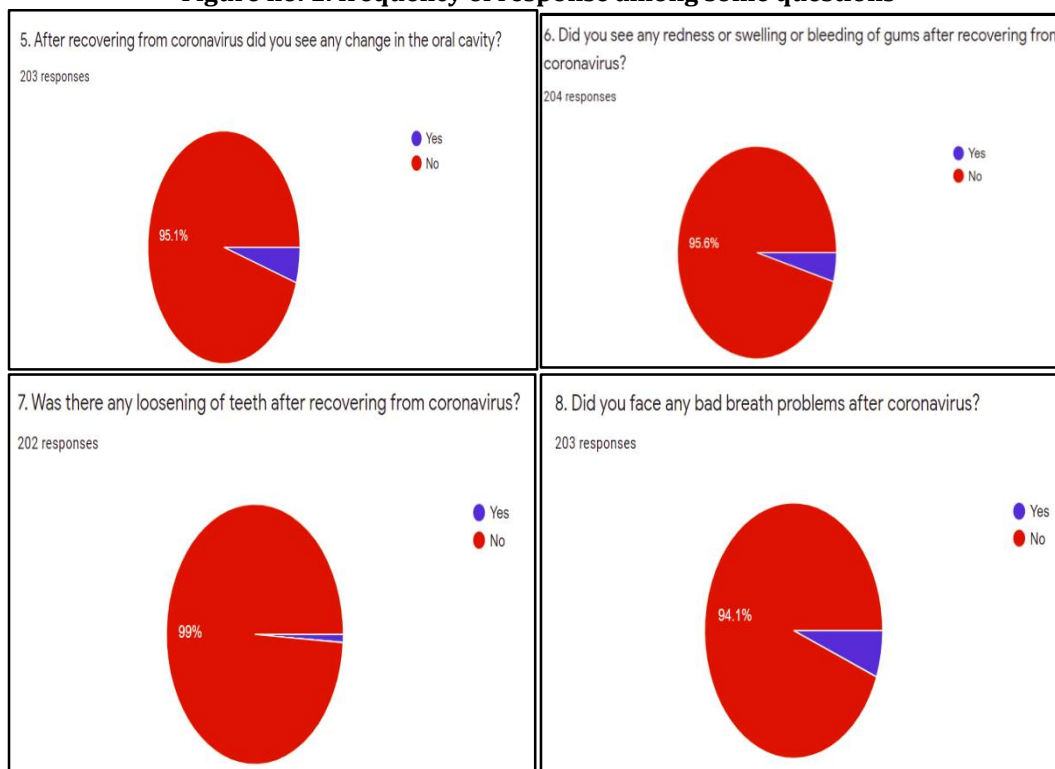
In addition to inflammation and edoema, a considerable portion of COVID-19 patients experience coating on their tongue, according to a research letter that was published in the British Journal of Dermatology [12]. One of the theory for the tongue symptoms is that cells containing ACE receptors are more susceptible to SARS-CoV-2 and ACE receptors are presented in sufficient number in the tongue, so the virus concentrates very heavily in this region. And that may result in signs like tongue enlargement and pimples. In the present survey tongue symptoms were reported by 65% patients which regressed with time by proper tongue cleaning. These symptoms are mostly seen in critical cases of covid 19 patients especially in older aged people and persons who are immuno-compromised [13].

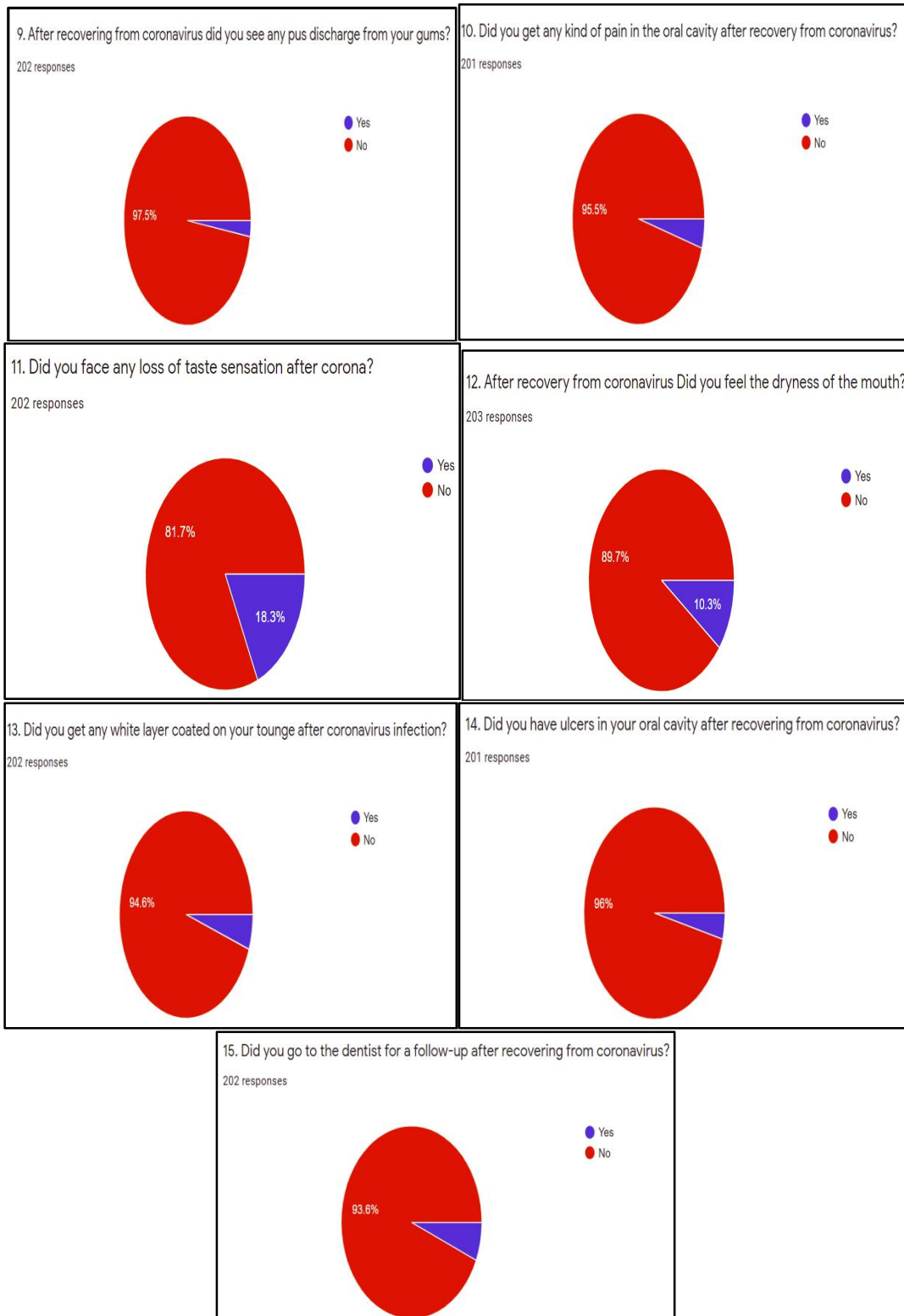
The lockdown has hampered access to dental care, which has impacted oral health care generally. Poor oral care in critically ill patients receiving life-saving treatments like ventilators and oxygenation may also have an impact on the patients' oral health. In the present survey 68% patients had oral manifestation during the infection stage and 65% covid recovered patients visited their dentist for check up after recovering from the disease. The maximum patients presenting with oral symptoms were in higher age group who developed serious form of disease or who required hospitalization [14].

### CONCLUSION AND RECOMMENDATIONS

Implications of this study clearly illustrated some COVID-19 recovered patients with weakened immune systems or defence mechanisms as well as patients on long-term multidrug therapy exhibit oral problems. According to this study mostly old aged covid 19 recovered patients experienced changes in oral cavity related to gingival or periodontal health. Mostly patients observed white patch on tongue which resolved with time in a week by taking proper measures of cleanliness of tongue. Loss of taste sensation and halitosis are experienced by all most all the recovered patients that is continued till date. Some patient required proper dental visits for their treatment that comes in oral cavity after recovering. Till now there is no proper global protocol or guideline for dental care provision. But we can reduce the likelihood of it getting worse by scheduling regular dental check-ups.

**Figure no. 1. frequency of response among some questions**





**CONFLICTS OF INTEREST:**

Nil

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