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Indian Journal of Forensic and Community Medicine

Journal homepage: www.ijfcm.org

Original Research Article

A data analysis of periodontal health services provided during COVID-19 pandemic in a dental institute

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Abstract

Background: Periodontal practice is nearly synonymous with the current state of COVID-19. Economic lock-down has imposed many restrictions on dental practice, and referrals to dentists have greatly significantly decreased, thus dental and specific periodontal care was largely limited to emergencies. The object of the study was to analyze and compare type, frequency, and various periodontal health services provided from a dental institute during and after every wave of COVID-19.

Materials and Methods: The research was performed from June 2020 to March 2022 in the Department of Periodontics and Implantology at Vishnu Dental College, Bhimavaram, Andhra Pradesh, India. Patients were recruited from the outpatient department as well as the satellite clinic for oral health services amid the COVID-19 pandemic. Each patient was then stratified into one of three groups depending on which wave of COVID-19 they fell under: Group A: 1st wave of COVID-19; Group B: 2nd wave of COVID-19; Group C: 3rd wave of COVID-19. After the periodontal assessment, all patients that utilized the services amid the pandemic were assessed for the need of periodontal health services, and provided appropriate health services based on their need.

Results: In the first wave of the pandemic, the Department of Periodontics had 1046 patients seek care. Then in the second wave, it was 1192 patients, and the third wave increased the number to 1531 patients all requesting periodontal health.

Conclusions: This work provides a commentary on the quick data analysis information with respect to the types and number of periodontal health services provided across the first, second, and third wave of COVID-19. The important role of periodontal health services during the time of the pandemic assists in moving toward prevention of the severe forms of COVID-19.

Keywords: COVID-19, Data analysis, Dental health services, Pandemic, Periodontal disease, Satellite clinics.

Received: 10-03-2025; **Accepted:** 03-05-2025; **Available Online**: 26-06-2025

1. Introduction

Dentists are now facing a multitude of pandemic-related issues. The disease is transferred via doctor - patient contact, aerosol production whilst treating, and via touching contaminated surfaces.[1]

There are two primary dimensions regarding COVID-19 in regard to dental and periodontal procedures. Due to frequent closures, dentists are receiving less patient referrals, and patients also have only emergency medical care sewn up for dental and periodontal care. Periodontal patients usually have some clinical symptomatic findings like diseased gums, Merriam-Webster or toothaches. Patient's knowledge of COVID-19 infection clinical characteristics could greatly impact treatment and management protocols.[2]

Numerous case-control studies have looked at the relationship of risk for COVID-19 with periodontitis. In one study with 568 COVID-19 patients, the authors reported that periodontitis patients had an outcome from the infection bad enough to require hospitalization in an intensive care unit or assisted ventilation, and a higher risk of death.[3]

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https://doi.org/10.18231/j.ijfcm.2025.015

Dysbiosis, or a transition in the community composition of tooth biofilm, indicates a step-up from healthy levels to those associated with diseased/dysbiotic levels, elevating levels of periodontitis-associated pathogens. Dysbiotic oral communities encourage respiratory infection persistence. People with COVID-19 are more prone to oral dysbiosis because of medication, diet, and immune system depression. Further, due to both the illness and hospitalization of critically ill patients, those patients' oral hygiene was not maintained, which also promotes more dysbiosis. The prevention of any dental/oral diseases as well as medical treatment for biofilm gain, facilitated the preventing of serious manifestations of COVID-19.

Additionally, dental treatments with aerosol creation or application, had higher spread risk to oral health care workers. This study first, explored the nature of the periodontal care provided at a dental institution during COVID-19 and its waves; second it compared and contrasted the amount of non-surgical versus surgical periodontal care across the waves of COVID-19 pandemic.

2. Materials and Methods

This retrospective data analysis was completed in the Department of Periodontics and Implantology at Vishnu Dental College and its associated satellite clinics to determine the status of periodontal health services after the disruption caused by the COVID-19 pandemic. Patients were examined routinely using oral and periodontal examinations and the need for periodontal health services were assessed for patients who had visited them pre-pandemic (pre-COVID), during pandemic (COVID), and after pandemic (post-COVID) providing them the relevant health services when necessary. Study location was VDC, Bhimavaram, Andhra Pradesh, India from June 2020 to March 2022 at Department of Periodontics and Implantology. Ethical approval was obtained for the study from institutional ethical committee, Reference number IECVDC/23/UG01/PI/IVT/55. Clinical procedures followed were guided by the Declaration of Helsinki and Good Clinical Practice Guidelines.

Patients were classified in three groups based on the waves of the COVID-19 Pandemic in the following way: Group A: COVID-19 1st wave, Group B: COVID-19 2nd wave, Group C: COVID-19 3rd wave. Following a thorough oral examination and periodontal screenings, patients that required periodontal treatment were identified to participate in the study (**Figure 1**). Types of services provided to patients during the COVID-19 1st wave: April 1st 2020 - June 31, 2021 **Table 1**); Types of services provided to patients during the COVID-19 second wave: from March 1 to June 30, 2021 (**Table 1**); Type of services provided to patients during the COVID-19 3rd wave; from January 2022 to March 2022 (**Table 1**).

3. Results

The COVID-19 pandemic caused a drastic disruption in the system of dental healthcare delivery in India due to several points of public health contingency for the country by the government: vaccination, two separate lockdowns across states, and an extended cessation of dental service delivery. As specialty providers and representatives of the specialty, they will represent the most at risk of acquisition and spread of COVID-19. The amount of aerosols generated during dental procedures is theorized to carry a significant risk of virulent transmission. Most dental services were, therefore, offered illicitly during the lockdown.

While dental services are not classified as essential health care, the Dental Council of India provided guidelines to safely deliver dental patient care in line with the World Health Organization (WHO), the American Dental Association (ADA), the UK National Health Service (NHS), the Chinese National Health Committee, and dental organizations across the world.

In the first wave of the pandemic, the Vishnu Dental College Department of Periodontics, managed 1046 patients, during the second wave they managed the periodontal health care for 1192 patients and in the third wave they managed to treat 1531 patients. Among these 1046 patients, during the first wave, only 63 patients were treated with just medications. The remaining non-surgical treatments included oral prophylaxis on 810 patients, splinting on 7 patients and local drug delivery on 11 patients, and an additional 107, 46, and 2 patients managed as minor, major and implant surgical techniques respectively. In the second wave of the pandemic, among 1192 patients, only 27 patients received medication only, and the remainder non-surgical treatments included oral prophylaxis on 980 patients, splinting on 23 patients, and local drug delivery on 21 patients with 72, 65, and 4 surgical techniques managed as minor, major and implant techniques respectively.

During the third wave of the pandemic, of those 1531 patients, 8 only had medication and no other type of therapy. However, 1171 patients had oral prophylaxis, 18 had splinting, and 23 patients had local drug delivery as non-surgical therapy. As a part of the surgical procedures, 128 were minors, 136 were major, and there were 47 implant cases. (**Table 1** and **Figure 2**)

Table 1: Describes the number of non-surgical and surgical cases treated in first, second and third wave of COVID-19 pandemic

	Total no. of non-surgical cases					Total no. of surgical cases			
COVID-19 pandemic	**Medication**	**Scaling**	**Splinting**	**LDD**	**Total**	**Minor**	**Major**	**Special cases**	**Total**
1st wave	63	810	7	11	891	107	46	2	155
2nd wave	27	980	23	21	1051	72	65	4	141
3rd wave	8	1171	18	23	1220	128	136	47	311

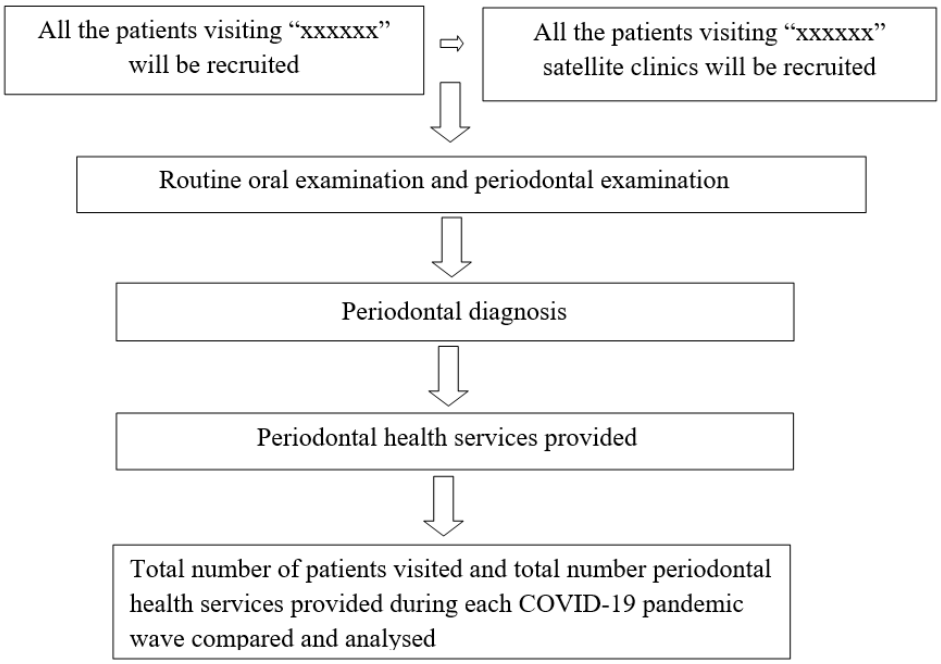

Figure 1:

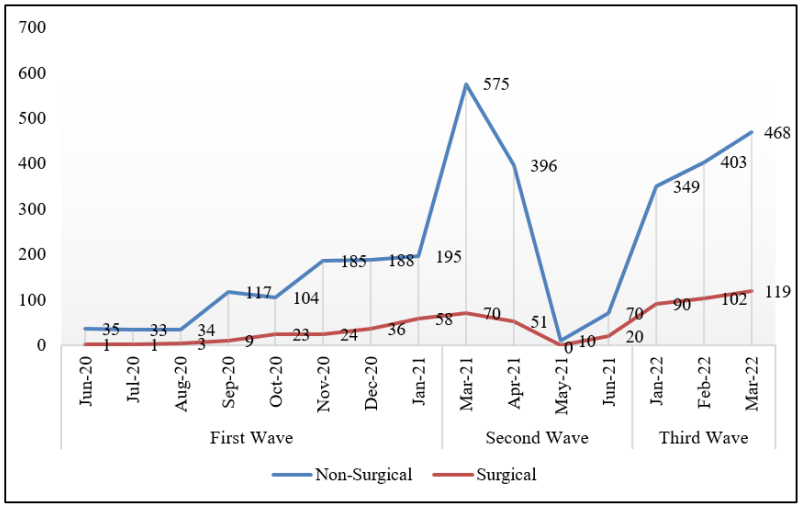

Figure 2:

4. Discussion

So, in short, removal of bacterial biofilm and treatment of a dental and/or oral condition would avoid the sequelae of COVID-19 infection. These recommendations are referenced by the CDC for screening patients prior to performing dental care when they present with symptoms, such as fever.[1] However, severe COVID-19 patients may experience dysbiosis of the oral environment and can exhibit periods of increased periodontal disease progression due poor oral hygiene and diminished immune response. Thus, recommendations suggest treating patients to establish

reasonable oral hygiene practices, especially those patients who will be hospitalized.[2,3]

To begin with, the nature of splitting dental services into urgent or elective procedures is as subjective as it is objective, per the patient as much as the objective. This is shown with the three phases of COVID-19 with a stronger percentage of patients that received emergency care [as the first wave] than in the second wave, as noted with the two implant placements (in the first wave) to only four implants (in the second), as I was in the middle of performing the surgical procedure for those implants.[1-8] Towards the end of the third wave and beginning of the early days of the new normal, these same patients receiving implants were much higher, being applicants for elective treatment for implants when they knew they were to start the treatment process when they went into lockdown.[8,9]

The research will add to the clinical research literature on engaging different types of periodontal health services that were engaging in the COVID-19context and post- COVID-19context. Each patient will learn about the importance of periodontal health during the COVID-19pandemic and the role it played in preventing the spread of infection during the Covid-19 pandemic. The said outcome will be dependent on what type of guidelines and instructions the clinicians enacted based on the guidelines given to the patient in preventing further contagion during the pandemic.

In a literature review by Darestani MN et al., undertaken in 2022, clinical and immunological links of COVID-19 and oral periodontal diseases were considered. In the literature review, titled "Stopping the Pandemic: Clinical Considerations for, and Financial Impact of, Infections in the Dental Office," the second part seeks to limit transmission in dental practice, considering the economic effects as well. The authors conclude that periodontal disease has the potential to be linked to differences in the severity of the disease related to COVID-19. Identifying periodontal disease and treating it could allow clinicians to make the right decisions with anticytokine drugs, and cytokine profiling could perhaps identify patients likely to show hyper responsiveness that we could target definitively with our treatments. The current study documented that the organization stepped up to provide periodontal care, even during the three phases of the COVID-19 pandemic, with respect to guidelines that were provided for preventing transmission of COVID-19.[10]

The research by Al-Omiri MK seeks to explain the COVID-19 pandemic through a dental lens in 2021. The study gives guidelines and recommendations for the provision of dental care based on the existing research in this area and the clinical experience and knowledge. The current research study further provides recommendations and guidelines for the provision of dental treatment and clinical management of dental practice amid the COVID-19 pandemic to arrive at high-quality standards for dental practice in a COVID-19 environment.[11] The current study showed that the institution has provided periodontal care in accordance with the COVID-19 transmission prevention tips in a three -phase capacity during the pandemic. The results from the current research study aligned with the essence of the work of Doceda MV.[12]

The study conducted by Vieira-Meyer APGF et al., in 2022 focused on the knowledge and practices of Brazilian dentists from public primary and secondary healthcare experiencing the COVID-19 outbreak. It conducted an electronic survey that included socio-demographic and COVID-19 knowledge items, and was given to 4048 dentists working in the public primary and secondary healthcare in Brazil. The findings of this study are comparable to the current study that employed advancements of technology in the development of preventive instruments together with national public guidelines and endorsing respected consensus regarding safety in dental treatment, to address the challenges experienced during COVID-19.[13]

Abdulkareem AA, et al. performed nearly the same study in 2021 to evaluate the effects of COVID-19 on economies in the Middle East, attitudes toward dental care, knowledge of oral hygiene (OH), and general fear of infections. This study also used an online questionnaire to survey the populations of Jordan, Iraq, and Egypt. They found that, among other things, the pandemic had a negative impact on awareness OH, although attitudes toward dental care also appeared to be only slightly affected. These findings lend support to the findings seen in the present study, where despite lockdowns for COVID-19, the treatment for periodontal disease was always performed during the three phases of the pandemic and after until the patients received treatment, and they followed protocols to prevent the transmission of COVID-19.[14]

To improve the way periodontal health services are provided during and after the pandemic, dental schools should take certain actions. First, they should implement appropriate infection control policies regarding patient and provider safety to ensure the potential of inadvertent transmission during treatment is minimized. Second, they should increase public awareness about oral health and awareness for it possibly being affected by systemic conditions like COVID-19 to try and improve available services to patients that may otherwise not access them in a timely fashion.[15]

Third, they should implement practical tele-dentistry availability into normal practice to ensure patients remain engaged and can consult their provider related to non-urgent issues. Also, dental schools should provide ongoing training to dental professionals on recommendations and practice protocols to maintain periodontal health and its care in pandemic circumstances. Last of all, further research is needed in regard to the practice of or delayed access to their oral healthcare as it impacts related systemic medical conditions so that any healthcare policies related to preventing the health problems that arose in patients during

the pandemic can then be improved in developed or similar situations.

4.1. Clinical implications

4.1.1. Scientific rationale

Investigating the effect of the pandemic on the development of periodontal disease and other health conditions; behaviors of patients; resource management; and to evaluate the efficacy of infection control methods.

4.1.2. Principal findings

Significant delays in service delivery due to the switch to emergency services exclusively, declining attendance rates, and increased usage of teledentistry. Improved infection control practices help to restrict the transmission of COVID-19 in the dental context.

4.1.3. Practical implications

Researches can obtain significant understanding on how best to improve patient outcomes and the provision of care by reviewing data of the periodontal health treatment given during the COVID-19 experience.

5. Conclusion

The scientific evidence suggesting any type of generalized relationship between COVID-19 severity and periodontal disease is largely lacking, inconclusive, and low-quality. During the pandemic there was continued medications and treatment of oral diseases combination of the Department of Periodontics and trial-runs of generalized rules by the Department and State, that loss may be contributory to lower rates of severe presentation of COVID-19.

6. Ethical Approval

There isn't any moral dilemma. The study was approved by the Institutional Ethics Committee (IECVDC/23/UG01/PI/IVT/55), and it was conducted by the best standards for clinical research.

7. Source of Funding

Funding organizations from the Governmental, Private, or nonprofit sectors did not provide a specific grant for this study.

8. Conflict of Interest

We have no conflict of interest to declare.

9. Acknowledgments

None.

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Cite this article: Bypalli V, Pasupuleti MK, Yaganti MVK, Penmetsa GS, Ramesh MV, Haribabu N, Mounika SVN. A data analysis of periodontal health services provided during COVID-19 pandemic in a dental institute. *Indian J Forensic Community*. 2025;12(2):86–90.