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Original article

Changing trends in the outpatient dental visits during the COVID – 19 pandemic in a tertiary care hospital

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ABSTRACT

The coronavirus pandemic has caused a global public health crisis with an unprecedented shutdown of major establishments and non-emergency services. Disruptions across the country in dental hospitals led to challenges in addressing patient's dental complaints. The present study aimed to analyse the difference in the pattern of the Outpatient dental visits during the pandemic period in comparison to that of the pre-pandemic period in a tertiary care hospital. This retrospective study was carried out by retrieving the patient data from the diagnostic register of the Department of Oral Medicine and Radiology for a period of one year. The data that was retrieved from 24th September 2019 to 23rd March 2020 was categorized under the pre-pandemic period and the data from 24th March 2020 to 24th September 2020 was grouped under the pandemic period. Patient data regarding the age, gender and clinical diagnosis was recorded and categorized under three main categories: "Emergency", "urgent" and "elective". 7550 patients during pre-pandemic period and 4035 patients during the pandemic period visited the dental hospital during the study period. Under the "emergency dental care" category, during the pre-pandemic period, majority of the cases reported of acute dental pain (71.0%) followed by cellulitis and space infection (20.1%) and maxillofacial trauma (8.7%). During the pandemic period, acute dental pain consisted of all emergency visits (n = 307). The proportion of emergency dental visits during the pandemic were significantly higher than the pre-pandemic period. Elective dental visits were significantly higher during pre-pandemic period in comparison to the pandemic period. ($P < 0.001$). There was a notable change in the outpatient trend of the dental visits during the COVID-19 pandemic in comparison to the pre-pandemic period. Emergency dental services were utilized at a higher rate during the pandemic period in comparison to the pre-pandemic counterpart.

1. Introduction

The pandemic caused by the Coronavirus disease (COVID-19) crippled the healthcare delivery throughout the globe. It resulted in unprecedented nationwide lockdown in several countries across the world, extending for several weeks as a measure to control the spread of the disease (Eram et al., 2020). This was followed by gradual relaxations leading to resumption of health care services in a phased manner. The governing bodies put forth strict orders that any form of routine dental care should be avoided and only emergency services may be provided. This disruption of the

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standard of care protocols in dental hospitals across several countries led to challenges in addressing patient's dental complaints (Bhanushali et al., 2020; Eram et al., 2020).

The Centre for the Disease Control and prevention (CDC) released its guidelines for dental settings in response to the COVID – 19 pandemic which became the framework for dental healthcare providers across the globe. The World Health Organization (WHO), the National Health Service (NHS), The American Dental Association (ADA) and, the American Dental Hygienists' Association (AHDA) had also published their recommendations and guidelines. Every country, region and state modified the guidelines according to their rate of infection and regional requirements (Banakar et al., 2020). The Dental council of India (DCI) released the dental clinics protocol, personal protection for doctors and staff, and also classified the dental emergencies. When the dental clinics were reopened, clinicians were instructed to defer elective or cosmetic treatment to the patients (Ilangovan et al., 2020). The opening of emergency services in dental hospitals after weeks of complete shutdown saw a resurgence of patient in-flow with a wide array of cases ranging from acute pain conditions to elective dental care needs. Hence the present study aimed to analyse the difference in the pattern of the Outpatient dental visits during the pandemic period in comparison to that of the pre-pandemic period in a tertiary care hospital.

2. Materials and methods

This retrospective cross-sectional study was approved by the Institutional Ethics Committee (IEC:609/2020) and the study was registered under The Clinical Trials Registry – India (CTRI/2021/02031139).

The study was carried out by retrieving the patient data from the diagnosis register of the Department of Oral Medicine and Radiology for a one-year period (24th September 2019 to 24th September 2020). The data that was retrieved for the first six-month period from 24th September 2019 to 23rd March 2020 was categorized under the pre-pandemic period and the data from 24th March 2020 to 24th September 2020 was grouped under the pandemic period. The data regarding the total number of patients during the pandemic period was retrieved from the records maintained at the screening triage.

Special protocols were employed for all patients in our hospital setting during the pandemic period where a triage area was established to ensure strict screening of all patients entering the hospital. The triage area would aid in identifying patients with COVID-19 symptoms and refer them to the fever clinic. Triage desk facilitated the process of contact tracing. Demographic details (name, age, gender, address and contact details) and body temperature were systematically documented for all patients. They were asked for their travel history, presence of symptoms like cough, sore throat, fever, sneezing, or shortness of breath in the past 48 h.

Patient data regarding the age, gender and clinical diagnosis was recorded from the diagnosis register. Diagnostic records with incomplete data and patients who refused to opt for detailed investigations for diagnosis were excluded from the study. Patients who directly visited the emergency triage or trauma triage and had not subsequently visited the dental outpatient department were also excluded from the study. Patients who were provided teleconsultation services for addressing acute dental pain and who were prescribed with suitable medications (analgesics and antibiotics) via e-prescriptions were excluded from the study.

The patients were categorised into emergency, urgent and elective care based on the classification given by the Dental Council of India (Council, 1948) (Dental Council of India (A statutory body constituted under the Dentists act, 2020), American Dental Association(ADA American Dental Association, 2020) and modified according to the dental needs of our patients : (Table 1)

I) Emergency: Clinical conditions of dental origin, which increase the patient's death risk. The acute dental pain conditions of odontogenic origin that were severe and uncontrolled even after analgesic and antibiotic use were also categorized as emergency.

II) Urgent: Clinical conditions of dental origin, which require priority care but do not increase the patient's death risk

III) Elective: Clinical conditions of dental origin, which need not be treated on priority and does not pose any risk to the patient if left untreated in the current scenario.

All the analysis was done using SPSS version 20 (IBM Corp. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.). A P-value of < 0.05 was considered statistically significant. Comparison of categorical variables (nature of dental visit, gender distribution during pre-pandemic and pandemic period) was done using Chi-square test. Normality was tested using Kolmogorov – Smirnov test for continuous variables (age of the participants). The distribution of age was not normally distributed. Comparison of mean age between Pre-pandemic and Pandemic period was done using Mann-Whitney *U* test.

3. Results

7550 patients visited the dental hospital seeking dental care during pre-pandemic period. 5750 (76.15%) patients received dental care. 4035 patients were screened during the pandemic period

Table 1
Table depicting the classification of dental emergency.

Emergency dental care	• Maxillofacial trauma • Cellulitis/space infection • Uncontrolled bleeding from the oral cavity • Severe tooth pain • Atypical facial pain, Temporomandibular joint pain, Myalgia, Trigeminal Neuralgia, Erythema Multiforme, Sialadenitis
Urgent dental care	• Carcinoma of the oral cavity • Potentially malignant disorders • Pericoronitis and pain arising from the third molars and impacted tooth • Soft tissue lesions (aphthous ulcers, traumatic ulcers, pemphigus vulgaris, mucous membrane pemphigoid, irritation fibroma, pyogenic granuloma) • Odontogenic cysts and tumors • Non– Odontogenic cysts and tumors • Dry socket and post-operative pain • Abscess (periapical/periodontal), reinfection of root canal treated tooth • Fractured tooth and avulsed tooth • Dental clearance from Medical departments (malignancies that were posted for chemotherapy or radiotherapy and wanted dental clearance prior to starting the procedure, cardiac and orthopaedic patients who were referred for dental clearance prior to their surgical procedures, otorhinolaryngology referrals to rule out odontogenic foci of infections and neurology referrals to rule out dental cause of pain) • Dislodged restoration or crowns and fractured crowns • Biopsy
Elective dental care	• Carious teeth and root stump that are currently asymptomatic • Defective/temporary/fractured restorations, wasting diseases • Denture and denture related problems • Oral prophylaxis • Orthodontics and related problems • Others problems – maxillary sinusitis, physiologic mobility in deciduous teeth

in the screening triage and only 1438 (35.63%) patients received dental treatment. There were incomplete patient details in about 23.85% of the cases.

The mean age of the patients during the pre-pandemic period was 39.02 ± 18.64 years and during the pandemic was 39 ± 17.9 5 years (P-value = 0.759).

Of the 5750 patients who received dental treatment during the pre-pandemic period, 3101 were males and 2649 were females. Of the 1438 patients who received dental care during pandemic period, 783 were males and 655 were females. There was no significant difference in the gender distribution during pre-pandemic and pandemic period. (Table 2)

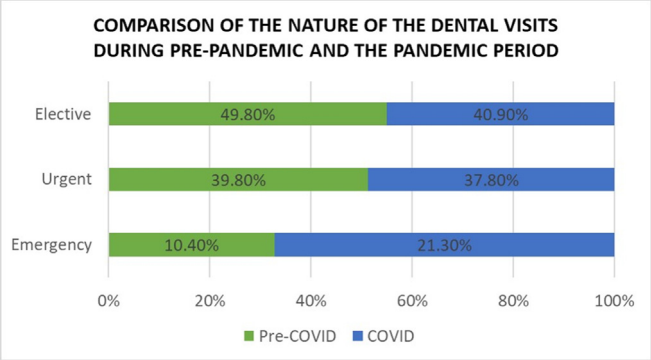
During the pre-pandemic period, 10.4% received emergency dental care. 39.8% of them were categorized under urgent dental care and 49.8% received elective dental treatment.

During the pandemic period, 21.3% of them received emergency dental treatment, 37.8% received urgent treatment and 40.9% of them received elective dental treatments. (Graph 1)

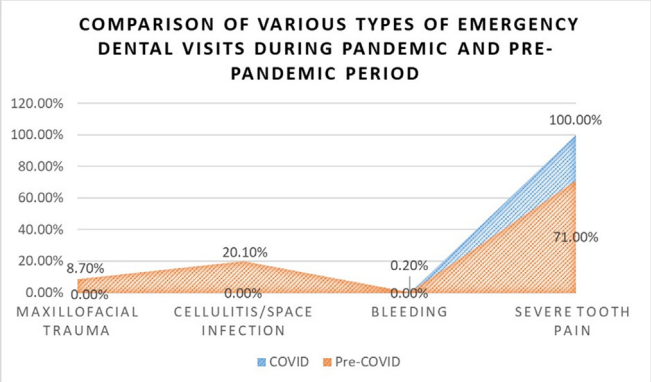
Under the "emergency dental care" category, majority of the cases reported of acute dental pain (71.0%) followed by cellulitis and space infection (20.1%) during the pre-pandemic period. Other trends observed were cases of maxillofacial trauma (8.7%) and uncontrolled bleeding (0.2%). During the pandemic period, acute dental pain consisted of 100% of all emergency visits (n = 307). The proportion of emergency dental visits during the pandemic were significantly higher than the pre-pandemic period. (Graph 2).

Cases categorised under "urgent dental care" during the pre-pandemic period were periapical or periodontal abscess consisting of 31.8%. 21.1% of the cases were referred from the medical hospital for dental clearance. Benign soft tissue lesions comprised of 14% of the cases and 10.4% of the cases were potentially malignant oral disorders. 6.7% of the cases reported of pain due to pericoronitis and 5.1% were diagnosed with malignancy of the oral cavity. During the pandemic period, more than half of the total number of cases under this category (52.9%) were referrals from medical hospital for dental clearance prior to treatment. 35.5% of the cases were those who came with dislodged restorations and crowns or fractured crowns that needed to be replaced. 6.4% of the cases were diagnosed with potentially malignant oral disorders. The distribution of all cases in the urgent category are depicted in Graph 3a and 3b.

The outpatient trends for "elective dental care" during the pre-pandemic period and pandemic period is depicted in Table 3. During the pandemic period, 36.4% of the patients reported with periodontal complaints. 33% of them reported for orthodontic related issues and 30.6% of children reported of pre-shedding mobility of deciduous teeth.



Graph 1. Comparison of the nature of the dental visits during pre-pandemic and the pandemic period.



Graph 2. Comparison of various types of emergency dental visits during pandemic and pre-pandemic period.

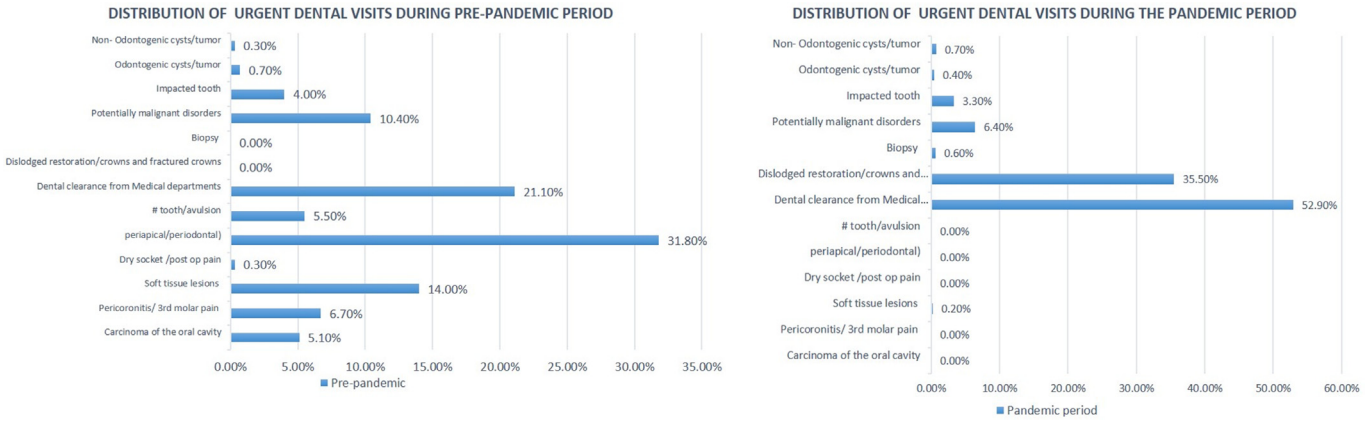
4. Discussion

This retrospective study was designed to assess the effect of the pandemic on the changing trends of the dental Outpatient department. The analysis of patients in the pre-pandemic would reflect the usual pattern of cases attending our tertiary care centre and the pattern of cases in the pandemic period would help us in understanding the impact of the pandemic on the Outpatient trends.

The COVID-19 pandemic was declared a public health emergency by the World Health Organization (WHO) and has led to health crisis and economic fallout (Bhanushali et al., 2020). Many countries followed a nationwide lockdown to control the spread. All establishments were shutdown except essential commodities and emergency hospital services. This had a huge impact on delivering dental health care services worldwide. Dental treatment procedures involve very close proximity of the patient and the dentist inevitably leading to violation of physical distancing norms. Also, the use of high speed hand piece and ultrasonic instruments in dental practice causes aerosol generation and further increase the risk of viral transmission (Bhanushali et al., 2020). Taking these issues into account, the Dental Council of India (DCI) provided an advisory to dentists across the nation to treat patients in dental

Table 2
Table depicting the total number of outpatient dental visits during the pre-pandemic period and the pandemic period.

		Pre-pandemic period		Pandemic period		P-value
		N	%	N	%	
Total number of patients screened		7550	100%	4035	100%	
Total number of patients treated		5750	76.15%	1438	35.63%	
Class	Emergency	596	10.4%	307	21.3%	<0.001
	Urgent	2291	39.8%	543	37.8%	
	Elective	2863	49.8%	588	40.9%	



Graph 3. (a) Distribution of urgent dental visits during pre-pandemic period. (b) Distribution of urgent dental visits during the pandemic period.

Table 3
Distribution of various types of elective dental visits during the pre-pandemic period and the pandemic period.

Class	Type	Group			
		Pre-pandemic period		Pandemic period	
		N	%	N	%
Elective dental care	Carious teeth, root stump that are asymptomatic	1331	46.5%	0	0.0%
	Defective restoration/temporary restoration, fractured restorations, wasting diseases	355	12.4%	0	0.0%
	Suture removal	2	0.1%	0	0.0%
	Denture and denture related problems	315	11.0%	0	0.0%
	Oral prophylaxis	860	30.0%	214	36.4%
	Orthodontics and related issues	0	0.0%	194	33.0%
	Pre-shedding mobility in deciduous teeth	0	0.0%	180	30.6%

hospitals only on emergency basis. Each state regulatory bodies routinely monitored and modified the advisories based on the rate of infection at the period of time and the resources and infrastructure available for tackling the situation (Ilangovan et al., 2020).

Studies have been conducted to assess the impact of COVID-19 pandemic on the emergency department visits and hospital admissions in health care systems (Boserup et al., 2020; Jeffery et al., 2020). Jeffery et al(Jeffery et al., 2020) examined the trends in emergency department visits in 5 different states of United States of America in the first few months of the COVID-19 pandemic and observed a decrease in emergency visits during the pandemic and emphasized the importance of educating the general public regarding making emergency triage visits for serious illnesses and injuries. Similar findings were also noticed by Boserup et al who assessed the changing trends in USA, Guam and Peurto Rico (Boserup et al., 2020). Pellegrini et al(Pellegrini et al., 2020) performed a retrospective study to analyse the changing trends of ocular trauma. They observed that there was a significant decrease in the eye injuries during the pandemic.

Studies have also addressed the impact of COVID-19 pandemic on the utilization of emergency dental services (Akhtar et al., 2020; Guo et al., 2020; Langella et al., 2021; Samuel et al., 2021). The present study is unique as there are no documented studies in scientific literature which compared pre-pandemic and pandemic records. In this study, the data has been systematically categorized under the three sub-classifications of ‘‘emergency”, ‘‘urgent” and ‘‘elective dental care” to analyse the changing trends in the outpatient dental visits.

In the present study, we found that during the pandemic period, the proportion of emergency dental visits were significantly higher. The results also revealed that during the pre-pandemic period, acute dental pain was the most commonly encountered dental emergency (71%). Whereas, during the pandemic period acute dental pain comprised of all the emergency dental care patients (100%) that visited the dental outpatient department for treatment.

The change in the trend observed in this study could be attributed to various factors. Restriction of movement during the 2 months’ lockdown period hindered the patients from seeking prompt dental care and inability to receive the required treatment. In addition, patients may also be intentionally avoiding or delaying dental visits due to the fear of infection. Additional charges for the personal protective equipment further added to the treatment expenditure for the patients. Also, due to the awareness about the restriction of dental services during the initial pandemic period, the dental procedures were further delayed by the patients. Similar results were observed in the study by Moffat et al (Moffat et al., 2021) and Kranz et al (Kranz et al., 2021) who reported that half of participants delayed dental visits and treatment owing to the COVID-19 pandemic.

Samara et al(Samara et al., 2021) analyzed the effect of COVID-19 pandemic on the hospital admissions for dental infections. They noted that during the pandemic period, more than one-third of the patients who got admitted with severe dental infections had already contacted their dentists for antibiotic prescription.

In the present study, acute dental pain comprised all the cases under the emergency category. These results were in accordance with the study conducted by Langella et al(Langella et al., 2021) where the commonest dental emergencies encountered were severe dental pain from pulpal inflammation. Guo et al(Guo et al., 2020) assessed the impact of COVID-19 pandemic on the utilization of emergency dental services in China. The proportion of dental and oral infections were significantly raised from pre-COVID to COVID period and the incidences of trauma saw a sharp reduction. We observed similar findings during the pandemic period where

there was a sharp increase in acute dental pain and no reported cases of maxillofacial trauma. A drop in the number of traumatic accidents could be attributed to the travel and traffic restrictions imposed by the lockdown. Self-quarantining at homes, closure of schools could have also resulted in a decreased number of trauma incidences. Vishal et al also noted a similar trend in the reduction of overall trauma cases during the pandemic period (Vishal et al., 2020).

In the present study, during the pandemic, there was a notable increase in the cases referred from medical hospital for dental clearance. Also, more cases were noted with dislodged restorations and crowns, and, there was a drop in cases of periapical and periodontal abscess. This change in the trend could be attributed to the re-opening of the dental outpatient departments after the lockdown period and delayed reporting of patients due to absence of symptoms from dislodged crowns and restorations.

The findings of our study was in concordance with the study conducted by Qayyum Akhtar et al(Akhtar et al., 2020) who assessed the impact of COVID-19 on utilization of dental services by patients visiting tertiary care centre in Lahore, Pakistan. Their results found that acute pulpal and periodontal conditions were the leading cause of visits in the pre-COVID period. Whereas, during COVID period cellulitis and space infections were the primary cause followed by acute pulpal and periodontal conditions, non – emergency complaints and facial trauma.

Elective dental visits were significantly higher during pre-pandemic period in comparison to the pandemic period ($P < 0.001$). Restoration of carious teeth and extraction of asymptomatic root stumps were the major part of elective dental care during pre-pandemic period. Less than a third of them visited for oral prophylaxis. To the contrary, during the pandemic, more than a third of the patients reported for oral prophylaxis. One third of the patients sought elective dental care for orthodontic problems.

30.6% of the cases under elective care were children with pre-shedding mobility of teeth. Rathore K proposed the guidelines to be followed by pediatric dentists during the COVID-19 pandemic and encouraged the utilization of tele-consultation services (Rathore, 2020). Luzzi et al(Luzzi et al., 2021) performed a study in Italy to examine the paediatric dental emergencies during the COVID-19 pandemic. They recommended children to chew on hard food substances such as fruits and vegetables, to stimulate the loss of the primary tooth by complete mechanical removal from the bony support to avoid unnecessary visits to the dental hospital for extractions.

The present study has some limitations. Patients who had directly visited the emergency triage or trauma triage and had not subsequently visited the dental outpatient department were excluded from the study. This could have possibly resulted in lesser incidences of maxillofacial trauma. The frequency of antibiotic and analgesic intake of the patient prior to the visit could not be documented. The results of the present study only reflects the changing trends from a single tertiary care hospital.

The results of the present study has given us an insight into the impact of the COVID-19 pandemic and utilization of dental services by the patients. The consequences of this pandemic on the dental health of the public, its impact on the utilization of the dental hospital services, especially emergency care services were overlooked. Hence, the findings of the present study highlights the need for better preparedness in providing emergency and urgent dental care services in times of such similar pandemic situations.

5. Conclusion

There was a notable change in the outpatient trend of the dental visits during the COVID-19 pandemic in comparison to the pre-pandemic period. Emergency dental services were utilized at a higher rate during the pandemic period in comparison to the pre-pandemic counterpart. Understanding the current situation is paramount in predicting the future dental needs.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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