

# Impact of COVID-19 Pandemic on Dental Practice: A Questionnaire Survey

SHIVANI KONDHALKAR<sup>1</sup>, DAISY HAPPY<sup>2</sup>

## ABSTRACT

**Introduction:** Coronavirus Disease-2019 (COVID-19) pandemic had unprecedented health and economic consequences. Dentists encounter maximum aerosol production due to frequent use of ultrasonic and polishing devices or other surgical interventions, thus increasing the risk of nosocomial infections. The situation had caused drastic change in the clinical routines including modifications in infection control strategies, managing of minimally invasive procedures, reducing the patient visits and updating themselves to use telecommunication to cater to the need of patients.

**Aim:** To evaluate the consequences and impact of COVID-19 pandemic by conducting an online survey using questionnaire amongst dentists as healthcare providers in the country of India.

**Materials and Methods:** This was a questionnaire-based, cross-sectional survey conducted using online platform in India with a sample size of 225 participants who were practicing dentists, either graduates or postgraduates, and agreed to give an informed consent. The questionnaire consisted of six segments: participants demographics, changes in clinical routine of the respective dentist, upgrading facilities in clinic, infection control measures, telecommunication and impact on financial aspect of the practitioner. Open-ended questions were also

included giving an opportunity to the participant to share his or her perspective. Chi-square test of proportion was performed to assess the difference in proportion of the responses. A p-value <0.05 was considered statistically significant.

**Results:** This study has shown that the pandemic has impacted negatively on financial status, patient flow and daily practice. Total 221 (98.2%) clinicians agree to the fact that, COVID-19 has affected their clinical routine, 203 (90.2%) clinician were aware of the aerosol generating procedures and 95 (42.2%) practitioners have installed devices for air purification. A 209 (92.8%) emphasise on the use of Personal Protective Equipment (PPE) kits and majority 84 (37.3%) were delaying elective procedures. About 184 (81.7%) have experienced decrease in number of patient flow and 104 (46.2%) practitioners agreed that their emotional and psychological wellbeing is affected due to drastic changes made in their practicing protocols due to COVID-19.

**Conclusion:** The COVID-19 pandemic has affected the social, economic, physical as well as mental wellbeing of practitioners all around the world. More or less the practice is hampered causing frustration and instability. Focusing the light on practicing dentists, they have seen to make significant changes in their zone of practice and have updated to the new normal version of practice.

**Keywords:** Aerosols, Coronavirus disease 2019, Dental health professionals

## INTRODUCTION

The latest threat to global health was the outbreak of Coronavirus Disease-2019 (COVID-19) [1]. According to World Health Organization (WHO), coronaviruses are known as a large family of viruses that cause illness ranging from common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) [2]. The COVID-19, has strangled the world by spreading its tentacles in all spheres of life, initiated as a pneumonia outbreak in Wuhan, China. Various studies have reported that human coronaviruses can remain viable on various inanimate surfaces from 2 hours to up to 9 days [3].

The spread of COVID-19 posed significant challenges for all healthcare professionals in the affected countries. Like-wise it has also affected the healthcare providers and dental practitioners. dental professionals are at the front line of healthcare, working in the oral cavity, with a potentially increased viral exposure [3]. As per Occupational Safety and Health Administration agency (United States of America), all dental healthcare professionals are categorised to be most vulnerable to Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) exposure. This is primarily due to face-to-face contact, nature of treatment causing high-risk of contamination and infection as well [4].

Dentists also encounter maximum aerosol production due to frequent use of ultrasonic and polishing devices or other surgical interventions simultaneously increasing the risk of nosocomial

infections [5]. The situation has caused drastic change in the clinical routines including modifications in infection control strategies, managing of minimally invasive procedures, controlling of aerosol generation, reducing the patient visits and updating themselves to consult patients via telecommunication devices, managing financial aspects [4,6].

This questionnaire study attempts to evaluate the overall impact caused on the clinical routine of dentists. Although there are a few studies done previously to understand the dental practitioners' mindset and awareness regarding the pandemic but very few studies attempted to understand the overall impact caused by COVID-19 pandemic on practitioners in developing countries like India [4,5]. There was an disparity in terms of effect of pandemic between different countries. This is a fact that developed, developing and under developed countries have reacted dissimilarly to the pandemic situation [5]. Hence, this survey was designed to evaluate and understand the impact on clinical practice, financial aspects and alterations clinicians had to make, to cope up with the situation in India.

The study thus, aims to evaluate the consequences and impact of COVID-19 pandemic by conducting an online survey using questionnaire amongst dentists as healthcare providers.

## MATERIALS AND METHODS

This was a questionnaire-based cross-sectional survey conducted using online platform in India for the duration of 3 months from

October 2021 to December 2021. It was approved by the scientific ethical committee. The questionnaire had an informed consent and the link to its access was circulated through different social media platforms (WhatsApp, Instagram, Telegram). A convenience sampling technique was used considering all the questionnaire answered within 3 months by clinicians who met the inclusion criteria of the study.

**Inclusion criteria:** All practicing dentists (graduates or postgraduates) who agreed to participate in the questionnaire survey by checking the box related to informed consent were included in the study.

**Exclusion criteria:** Dentists who ceased their professional activities more than 1 year ago, who did not complete the survey or did not agree to provide their informed consent were excluded from the study.

**Sample size calculation:** A total sample size of 225 participants were included in the study. Sample size was calculated using OpenEpi software. At 5% confidence limit (95% confidence interval) with 82.7% hypothesises percentage frequency of outcome factor in the population from previous literature [7], the sample size estimated was 220. The formula used for sample size estimation was:

$$n = [DEFF * Np(1-p)] / [(d^2/Z_{1-\alpha/2}^2 * (N-1) + p*(1-p)]$$

Where, DEFF (Design Effect=1),

p (proportion)=0.827) and

d (confidence limit=5%)

## Questionnaire

The questionnaire for the survey was framed by authors and was validated before use. The questionnaire was divided into six domains.

**First domain:** Demographics of participants.

**Second domain:** Changes in clinical routine of the respective dentist.

**Third domain:** Upgrading facilities in clinic.

**Fourth domain:** Infection control measures.

**Fifth domain:** Questions regarding telecommunication.

**Sixth domain:** Financial aspect of the practitioner.

The survey was a structured

- Multiple-choice questionnaire with seven questions having multiple select and 13 questions having single select.
- Apart from this, six open-ended questions were also included giving an opportunity to the participant to share their perspective.

Likert scale was used to evaluate the psychological wellbeing of the practicing dentists. It was a self-designed questionnaire administered in English language. Google forms platform was used to generate the layout of the questions.

The face validation of the questionnaire instrument was determined using Cohen's Kappa Index on collected data. The Kappa index value was 0.7 for inter-rater agreement in the questionnaire. Internal consistency refers to the extent to which all of the items in a scale measure the different aspects of the same attribute. Cronbach's alpha was determined to assess the internal consistency and the alpha value for the overall questionnaire was 0.90. Pearson's correlation coefficient was calculated for test-retest reliability on the scores of the participants who completed the questionnaire twice. The overall reliability was high (r-value=0.80, p-value<0.001).

## STATISTICAL ANALYSIS

The data was arranged in an Excel sheet. For all the multiple-choice questions, the frequency of each response for every question was calculated. For open-ended questions, different responses were tabulated and qualitatively analysed. The demographic data of participants was also analysed. Chi-square test of proportion was performed to assess the difference in proportion of the responses. The significance level was set at 95% and p-value <0.05 was considered statistically significant.

## RESULTS

Data from 225 practicing dentists was collected and analysed. [Table/Fig-1] summarises the participant demographics.

Characteristics	n (%)
<b>Gender</b>	
Male	161 (71.5%)
Female	64 (28.4%)
Others	0
<b>Age (years)</b>	
23-33	180 (80%)
34-44	35 (15.5%)
45-55	10 (4.4%)
>55 years	0
<b>Designation</b>	
Bachelor of Dental Surgery	139 (61.7%)
Master of Dental Surgery	86 (38.2%)
<b>Location of practice</b>	
Urban	194 (86.2%)
Rural	31 (13.7%)

[Table/Fig-1]: Participant demographics (N=225).

The second domain included changes made by practitioners in their clinical routine. Practitioners have written responses about modifications made in their working environment. Some of them have placed glass shields, applied barriers to maintain social distancing, placed charts and posters to educate patients regarding sneezing, coughing and sanitization protocols. [Table/Fig-2] shows the details regarding changes made in clinic routine. Total 152 (67.5%) practitioners made all of the mentioned changes in their clinical routine (p-value<0.001).

Characteristic	n (%)	p-value
<b>1. Has COVID-19 emergence caused change in your clinical routine?</b>		
a. Yes	221 (98.2%)	<0.001
b. No	4 (1.7%)	
<b>2. What are the changes made that have caused an impact on your clinical routine? (Multiple-select)</b>		
a. Modifications in working environment	47 (20.8%)	<0.001
b. Disinfection measures	44 (19.5%)	
c. Increased use of PPE	35 (15.5%)	
d. Reduction in number of patient visits	36 (16%)	
e. Updating yourself to telecommunication devices	43 (19.1%)	
f. All of the above	152 (67.5%)	
<b>3. Do you follow the guidelines issued by DCI and IDA while practicing?</b>		
a. Yes	222 (98.6%)	<0.001
b. No	3 (1.3%)	

[Table/Fig-2]: Changes made in clinic routine. p-value<0.05 was considered statistically significant

[Table/Fig-3] shows further questions included in the questionnaire regarding the upgrading of facilities in the clinic to subside the production and spread of COVID-19 infection. Amongst all the respondents 95 (42.2%) dentists have installed devices in the clinic. and different practitioners have opted for equipment according to their convenience (p-value=0.253). None of the participant suggested any equipment for air purification in open-ended question.

[Table/Fig-4] shows all the detailed responses regarding the infection control. Practitioners have stated in the open-ended question that they have instructed their receptionists to tell patients to sanitize their hands before entering the clinic. And also, the most preferred device was the hand sanitiser dispenser opted by 203 (90.2%) participants (p-value<0.001). Practitioners have made modification

Characteristic	n (%)	p-value
<b>Are you aware of Aerosol Generating Procedure (AGP) due to various periodontal procedures?</b>		
a. Yes	203 (90.2%)	<0.001
b. No	22 (9.7%)	
<b>To reduce the effect of aerosol production and purify air have you installed any device in your clinic?</b>		
a. Yes	95 (42.2%)	<0.001
b. No	130 (57.7%)	
<b>If yes, which new equipment related to air purification is installed in your clinic?</b>		
a. In-room HEPA filtration units	25 (26.3%)	0.253
b. Ozone air treatment system	8 (8.42%)	
c. UV light disinfection system	33 (34.77%)	
d. High vacuum suction devices/ Portable Vapor Vac station	15 (15.76%)	
e. Filter sheets in air conditioners	14 (14.75%)	
f. If any other, Specify.....	(Open-ended)	

**[Table/Fig-3]:** Upgrading facilities in the clinic.  
p-value<0.05 was considered statistically significant

Characteristic	n (%)	p-value
<b>What devices are installed in the reception area for infection controls? (Multiple-select)</b>		
a. Hand sanitiser dispensers	203 (90.2%)	<0.001
b. Sanitiser pressure spray	88 (39.1%)	
c. Electric disinfectant sprayer	25 (11.1%)	
d. Wash basin with hand wash	98 (43.5%)	
e. If any other, Specify.....	(Open-ended)	
<b>Are you screening temperature of visiting patients?</b>		
a. Yes	212 (94.2%)	<0.001
b. No	13 (5.7%)	
<b>Are you screening oxygen saturation of visiting patients?</b>		
a. Yes	212 (94.2%)	<0.001
b. No	13 (5.7%)	
<b>How do you perform patient screening?</b>		
a. By asking the patients regarding history, signs and symptoms via Tele-dentistry before appointing them.	82 (36.4%)	0.162
b. By Filling a form or asking the patients regarding history, signs and symptoms after they visit clinic.	117 (52%)	
c. Going for Rapid Antigen test before treatment.	19 (8.4%)	
d. None	7 (3.1%)	
<b>What measures do you take to prevent cross infection while treating patients? (Multiple-select)</b>		
a. Use of PPE kit	209 (92.8%)	<0.001
b. Use of rubber dams in patients	117 (52%)	
c. Practice only non-aerosol generating procedures	12 (5.3%)	
<b>Are you using preprocedural antimicrobial oral rinses in patients before starting any treatment procedure?</b>		
a. Yes	117 (52%)	<0.001
b. No	96 (42.6%)	
c. Only before aerosol producing procedures	12 (5.3%)	
<b>Have you switched to any procedural changes in your practice? (Multiple-select)</b>		
a. Switching from ultrasonic to hand scaling	37 (16.4%)	0.110
b. Performing only non aerosol procedures	44 (19.5%)	
c. Providing only emergency treatment	71 (31.5%)	
d. Delaying or avoiding elective or surgical procedures.	84 (37.3%)	
e. No change	81 (36%)	
f. Any other, please specify.....	(Open-ended)	

**[Table/Fig-4]:** Infection control.  
p-value<0.05 was considered statistically significant

in their working environment like placing glass shields, application of barriers to maintain social distancing, placing of charts and posters to educate patients regarding sneezing, coughing and sanitisation protocols as answered in the open-ended slot.

The next questions in the questionnaire were about telecommunication. The most preferred telecommunication opted by many practitioners is telephone call 173 (76.8%) (p-value <0.001). None of the participant mentioned procedural changes in your practice in open-ended slot. [Table/Fig-5] shows the modes of communication opted by practitioners and the type of services provided by them to the patients.

Characteristic	n (%)	p-value
<b>What is the preferable mode of telecommunication with your patients? (Multiple-select)</b>		
a. WhatsApp	123 (54.6%)	<0.001
b. E-mail	16 (7.1%)	
c. Telephone call	173 (76.8%)	
d. Video conferencing	29 (12.8%)	
e. None	5 (2.2%)	
<b>What kind of services you are providing through telecommunication? (Multiple-select)</b>		
a. Appointments	180 (80%)	.015
b. Palliative care (antimicrobial rinses etc.)	99 (44%)	
c. Symptomatic treatment to relieve pain or discomfort (analgesics)	152 (67.5%)	
d. Treatment plan	37 (16.4%)	
e. Any other.....	(Open-ended)	

**[Table/Fig-5]:** Telecommunication.  
p-value<0.05 was considered statistically significant

The services provided by dentists via telecommunication included scheduling appointments to their patients along with palliative care. Symptomatic treatment is provided by about 152 (67.5%) practitioners so as to relieve pain or discomfort in their patients. Around 37 (16.4%) respondents opt discussing treatment plan with their patients via telecommunication (p-value=0.015). None of the participant mentioned procedural changes in your practice in open-ended slot.

The next and last domain in the questionnaire was regarding financial aspect of the practitioners. It has affected the income source in various manners presented in following [Table/Fig-6].

There was no other reason stated in the open-ended section regarding any other causes affecting the economy of the individual. Out of total, 49 (21.7%) were not in favour of increasing the cost (p-value <0.001), reason as stated in the open-ended slot being that common people were already in stress and facing various challenges in their day-to-day living. Majority of practitioners agree to the fact that the ongoing pandemic has affected their psychological wellbeing negatively (p-value=0.042).

An open-ended question regarding impact of pandemic on the physical, mental and emotional wellbeing of the clinicians was asked in the questionnaire. Dentists have put up their various opinions in this section. Amongst the respondents the new and young generation with fresh knowledge mention that there is lack of exposure to the clinical practice which is a noteworthy point. They also mention lack of confidence, finding less opportunities and were emotionally drained. Practicing dentists also mention increase in stress levels, non productivity, decreased peace of mind, depression and facing work related anxiety. The increased stress levels have also caused an effect on sleep cycles, increased frustration and confusion. Life seems to be monotonous and dull than before for many practitioners.

Characteristic	n (%)	p-value
<b>Has COVID-19 emergence caused an impact on your financial aspect?</b>		
a. Yes	215 (95.5%)	<0.001
b. No	10 (4.4%)	
<b>If yes, what manner has COVID-19 affected your financial aspect? (Multiple select)</b>		
a. Confronting maintenance cost seem less easy than before (clinic rent, equipment maintenance, managing staff salary etc.)	171 (76%)	0.262
b. Decrease in number of patient flow	184 (81.7%)	
c. Increase in treatment cost	95 (42.2%)	
d. Any other specify.....	(Open-ended)	
<b>Do you feel it the need of hour to increase the treatment costs in this current pandemic situation?</b>		
a. Yes	176 (78.2%)	<0.001
b. No	49 (21.7%)	
(Please mention the reason.....)		
<b>Current situation certainly has negative effect on my psychological well-being. Grade this statement. (Likert scale)</b>		
a. Strongly Agree	73 (32.4%)	0.042
b. Agree	104 (46.2%)	
c. Neutral	29 (12.8%)	
d. Disagree	16 (7.1%)	
e. Strongly disagree	3 (1.3%)	
What impact has the pandemic caused on your physical, mental and your emotional health?..... .....		
(Open-ended)		

**[Table/Fig-6]:** Financial aspects.  
p-value<0.05 was considered statistically significant

Apart from the negative responses from the dentists some of the practitioners also had a positive perspective about the pandemic. Participants gave an opinion that they were getting time to focus on themselves. Some mention practicing exercise, yoga and meditation keeping themselves more physically and mentally fit. Practitioners had got a chance to enhance themselves in other leisure activities and have got a chance to segregate between their priorities and materialistic things. The other possible positive impact of COVID-19 pandemic is the rise in international and national interactions. Virtual backgrounds of the conferences have increased the chances of sharing knowledge and newer techniques by conducting online programs for the new practitioners.

## DISCUSSION

This study has shown that the pandemic has impacted negatively on financial status, patient flow and daily practice. The questionnaire study has accomplished the goal of understanding the impact of COVID-19 pandemic on the dental practice. The dentists who participated in the survey have given their respective opinions about the changes caused in their clinical routine. About 221 (98.2%) clinicians agreed to the fact that COVID-19 has affected their clinical routine. Dentists emphasise on following various disinfectant measures and have increased the use of PPE simultaneously. Out of total, 36 (16%) of them vote in favour of reducing the number of patient visits and have switched to updating themselves to using telecommunication devices to communicate with patients. 152 (67.5%) practicing dentists have

made all the mentioned changes in their clinical routine. Various guidelines were issued which were supposed to be followed by all the practicing dentists so as to avoid the further spread of infection and about 222 (98.6%) participants have claimed to follow the guidelines issued by Dental Council of India and Indian Dental Association which shows the high percentage of awareness amongst the practitioners.

Infection control is another important aspect in the maintenance of sanitization. Total 90.2% practitioners have placed hand sanitiser dispensers outside the clinic so that patients and visitors can apply the sanitiser before entering the clinic. In this present study 90.2% of the clinicians were aware of aerosol production during various dental procedures. Aerosol production proves to be an important aspect as it can be the potential cause of infection in the clinic. A trial conducted by Mohan M et al., in 2016 showed that Colony Forming Units (CFUs) decreased in patients who had a pre-rinse with chlorhexidine mouthwash when compared to patients with saline mouth rinse [6]. A recent German study had stated that longer the COVID-19 crisis continues, the more will be the financial distress in dental practice [7].

Various changes made in the clinic like incorporation of devices necessary to maintain sanitisation and avoid risk of infection are mentioned. Four categories of transmission routes have been proposed: (a) symptomatic transmission; (b) pre-symptomatic transmission; (c) asymptomatic transmission; (d) environmental transmission. There is current evidence that most transmission occurs from symptomatic people to others not wearing PPE and in close contact [8]. But this in return has also caused significant rise in the treatment costs. According to a survey conducted by the Irish Dental Association (IDA) about the impact of COVID-19 outbreak on dental practices, it was found that around 20% of dental care providers have closed their practices for a limited time or permanently [9]. Meng L et al., reported nine cases of COVID-19 among 169 dental practitioners, thus emphasizing the high-risk of professional contagiousness [10].

Apart from all these aspects the practitioners have acclimatised themselves to using telecommunication devices to avoid unnecessary gathering and exposure increasing the risk of infection. In an article COVID-19: Changing Trends and Its Impact on Future of Dentistry by Bhanushali P et al., more attention is given to changing trends like for example Teledentistry [11]. Teleconsultation provides the practitioners with contact-less consultation. It not only eliminates any chance of exposure to the virus but also decreases the service cost and helps in patient education [12]. Telescreening and teledentistry could be promoted [13]. But even if this fact is true, teledentistry does have limitations when it comes to dental practice. Emergency treatments cannot be done without physical presence of the dentist unlike other medical professionals.

Dentists being healthcare providers should keep themselves updated for the further challenges similar to the ongoing pandemic. This will avoid the sudden necessity of changes to be made in the future practice. Ultimately it will only ensure improvement in selfcare measures and avoid spread of infection [14]. Dentists should first prioritise their health rather than financial aspect. The results of this study are compared and discussed with related studies in [Table/ Fig-7] [7,8,15-21].

Author's name and year	Place of study	Title of study	Sample size	Population considered	Parameters assessed	Conclusion
Rocha Gomes G et al., (2021) [7]	Brazil and United States	Impact of coronavirus disease 2019 pandemic on Periodontal practice: A questionnaire survey	254	Periodontists	Investigated the factors that could possibly be responsible to cause changes in the periodontal practice due to pandemic in Brazil and US.	They concluded that pandemic was associated with a negative impact on practicing periodontists, especially those working in public sectors and academics institutions. The main factors associated to the perception of periodontists were the financial effect of the pandemic and the intensification of hand-washing habits.



Nibali L et al., (2020) [8]	United Kingdom	The perceived impact of COVID-19 on periodontal practice in the United Kingdom: A questionnaire study	358	Members of the British Society of Periodontology and Implant Dentistry	Evaluated the effects of COVID-19 on professional practice, perceived support from the Government and General Dental Council (GDC), Infection control measures	They concluded that main concerns were related to financial issues and inability to provide appropriate levels of care to their patients. Participants felt that the areas most affected were reduced volume of patients per day, followed by use of hand scalers/curettes instead of ultrasonic/ piezoelectric devices. Study also stated that respondents felt the support from Government and GDC was not adequate, with many reporting a lack of leadership, lack of financial support and unclear, unhelpful and untimely advice.
Faccini M et al., (2020) [15]	Brazil	Dental Care during COVID-19 Outbreak: A Web-Based Survey	384	General dentists and specialists	Investigated parameters like type of dental care provided during quarantine, were emergencies increased, the dental office biosafety routine, the levels of concern about the impact of quarantine on dental care and the economic impact on dental practices	The survey concluded that the pandemic/quarantine had negatively affected the clinical routine of dental offices, and personal protection/hygiene care had to be adopted and reinforced by dental professionals/ staff and patients to make the dental procedures safer.
Becker K et al., (2020) [16]	European Union, 5 additional European countries (Iceland, Norway, Moldova, Switzerland, UK)	Dental care during COVID-19 pandemic: Survey of experts' opinion	27	Academic experts in Oral and Maxillofacial Surgery or Oral Surgery per country	Safety of dental settings, use of Personal Protective Equipment (PPE), and patient-related measures to reduce transmission risk.	The infection and transmission risk in dental settings was scored higher by the experts in the survey. For aerosol-generating procedures and patients at high/ very high-risk, maximum PPE use was recommended. Whereas the proposed measures (i.e, FFP2/3 masks, caps, gowns and face protection) may reduce the transmission risk in dental hospitals.
Schlenz MA et al., (2020) [17]	Germany	Perspectives from Dentists, Dental Assistants, Students, and Patients on Dental Care Adapted to the COVID-19 Pandemic: A Cross-Sectional Survey	184	Clinical dental students, dentists and dental assistants	Survey contained questions regarding the way participants dealt with the dental care concept adapted to COVID-19 including additional safety measures, anxiety about becoming infected or infecting others, and future prospects.	The cross-sectional study provides evidence that the perspectives of dentists, dental assistants, students, and patients on dental care adapted to the COVID-19 pandemic were predominantly positive. Anxiety about self-infection or infecting others was low. However, additional protection following the dental care concept adapted to COVID-19 was time-consuming in daily patient care.
Ahmadi H et al., (2020) [18]	Iran	The impact of COVID-19 pandemic on dental practice in Iran: a questionnaire-based report	240	214 general dentists and 26 specialists	Dentists' opinion on the COVID-19 pandemic and its effect on their personal life, financial status, and the quality of dental services for patients; multiple-choice questions about the dentists' perspectives on the pandemic and 5-point Likert-scale scoring to evaluate dentists' attitudes and views on the outbreak.	Report concluded that most of the Iranian dentists have followed the latest COVID-19 guidelines. Besides, they preferred to lower their work hours and limit dental procedures to emergency treatments until the end of the pandemic. The dentists encountered financial problems due to closure of dental clinics. Depression and anxiety were common symptoms among dentists during these times. They stated that the public organizations must intervene to financially and psychologically support the dentists during these unprecedented times.
Cagetti MG et al., (2020) [19]	Italy	COVID-19 Outbreak in North Italy: An Overview on Dentistry. A Questionnaire Survey	3599	Physicians, Surgeons and Dentists	Health conditions, working condition and PPE adopted after the outbreak of the infection, and the knowledge and the self-perceived risk of infection.	A quite high percentage of the sample reported symptoms attributable to the infection. Even though the majority of dentists adopted several precautionary measures, those working in the highest prevalence COVID-19 area reported adopting several measures less frequently than dentists in low prevalence area. Dentists in the highest prevalence area were more confident to avoid the infection. Only 1/3 <sup>rd</sup> of the dentists, reported to have followed a Continuous Educational Course on COVID-19, but the majority of the sample believed to have enough knowledge on the disease and the protective measures to avoid infection.
Humagain M et al., (2020) [20]	Nepal	Dental Practice during COVID-19 in Nepal: A Descriptive Cross-sectional Study	406	Dentists	The knowledge of dentists on COVID-19, and information on the impact of COVID-19 in dentists, patients, and dental treatments.	The survey stated that the dentists in Nepal had good knowledge of COVID-19. Over 85% of the Nepali Dentists were aware of the current WHO Guidelines. Use of personal protective equipment, hand hygiene practices, mouth rinsing, disposable instruments, and use of rubber dam, reducing ultrasonic instruments use. They concluded that treatment component should be strengthened to reduce the transmission and case fatality.
Duruk G et al., (2020) [21]	Turkey	Investigation of Turkish dentists' clinical attitudes and behaviors towards the COVID-19 pandemic: a survey study.	1958	Dentists	Measures taken in dental clinics against COVID-19	The results of the survey conducted in this study reveal that, although Turkish dentists have increased protective measures against the COVID-19 pandemic, they have not reached sufficient levels yet in terms of attitudes and behaviors. They are mostly concerned about the lack of awareness of patients because of the problems they had in their workplace during the COVID-19 pandemic.
Present study	India	Impact of COVID-19 pandemic on dental practice - A questionnaire survey	225	Practicing dentists (graduates or postgraduate)	Changes in clinical routine of the respective dentist, upgrading facilities in clinic, infection control measures, telecommunication, financial aspect of the practitioner	Negative effect on financial status, patient flow and daily practice were observed in this study. The practicing dentists had to make significant changes like paying additional attention on sanitization and modifying clinical setups with purification devices etc.

[Table/Fig-7]: Similar studies from the literature.

## Limitation(s)

Despite the relevance of findings in the study, some limitations need to be highlighted. As this was an observational study based on a questionnaire, conclusions drawn were dependent on responses of the participants and there was no way to assess the authenticity of the responses. Other limitation of the study was the participants interest in responding to the questionnaire. Response rate for open-ended questions were comparatively low. In future, study targeting specific areas (like urban or rural) or specific population (like institution or private practice) with more sample size can be conducted as there can be disparity between the effect of COVID-19 on different group of clinicians. Thus, a multicentric study with a multiphase sampling can be designed in future.

## CONCLUSION(S)

The survey has shown that the pandemic has impacted negatively on financial status, patient flow and daily practice. Focusing the light on practicing dentists, they had to make significant changes in their zone of practice and had updated to the new normal version of practice like paying additional attention on sanitisation, selfcare measures and modifying clinical setups with purification devices. Teledentistry is an upcoming concept which all should acclimatise to. It enables the interaction with patients and providing healthcare advices but to a minimal extent. Every outbreak provides an opportunity to gain knowledge and also access to new window of opportunities. Thus, the emerging concept of new normal shall be accepted.

## Acknowledgement

The authors received no financial support and declare no potential conflicts of interest with respect to the authorship and/or publication of this article. The authors thank Dr. Vineet Vinay for contributing to the formulation, design of study and data acquisition and Mr. Saurabh Galinde for providing technical support in the development of the study. All authors gave their final approval and have agreed to be accountable for all aspects of the work.

## REFERENCES

- [1] Fong SJ, Dey N, Chaki J. Artificial Intelligence for Coronavirus Outbreak. Singapore: Springer Publication; 2020.1-22. Chapter 1, An introduction to COVID-19.
- [2] World Health Organisation. 2019, Available at <https://www.who.int/westernpacific/health-topics/detail/coronavirus>. Accessed on 16 July,2022.
- [3] Kochhar AS, Bhasin R, Kochhar GK, Dadlani H. COVID-19 pandemic and dental practice. *Int J Dent*. 2020;2020:8894794.
- [4] Campus G, Betancourt MD, Cagetti MG, Giacaman RA, Manton DJ, Douglas GV, et al. The COVID-19 pandemic and its global effects on dental practice. *J Dent*. 2021;114:103749.
- [5] Sarate S, Pawar BR, Salavadi SS, Sarate K, Dubey YK, Wankhede TD, et al. Awareness and attitude of dental professionals towards pandemic outbreak of covid-19 in central India-A questionnaire study. *IP Int J Periodontol Implantol*. 2020;5(3):124-28.
- [6] Mohan M, Jagannathan N. The efficacy of pre-procedural mouth rinse on bacterial count in dental aerosol following oral prophylaxis. *Dent Med Probl*. 2016;53(1):78-82.
- [7] Rocha-Gomes G, Flecha OD, Miranda TS, Duarte PM, Shaddox LM, Galvão EL, et al. Impact of the coronavirus disease 2019 pandemic on periodontal practice: A questionnaire survey. *Journal of Clinical Periodontology*. 2021;48(4):541-49.
- [8] Nibali L, Ide M, Ng D, Buontempo Z, Clayton Y, Asimakopoulou K, et al. The perceived impact of Covid-19 on periodontal practice in the United Kingdom: A questionnaire study. *J Dent*. 2020;102:103481.
- [9] Ali S, Farooq I, Abdelsalam M, AlHumaid J. Current clinical dental practice guidelines and the financial impact of COVID-19 on dental care providers. *Eur J Dent*. 2020.14(S 01):S140-S145.
- [10] Meng L, Hua F, Bian Z. Coronavirus Disease 2019 (COVID-19): Emerging and future challenges for dental and oral medicine. *J Dent Res*. 2020;99(5):481-87.
- [11] Bhanushali P, Katge F, Deshpande S, Chimata VK, Shetty S, Pradhan D, et al. COVID-19: Changing trends and its impact on future of dentistry. *Int J Dent*. 2020;2020:8817424.
- [12] Izzetti R, Nisi M, Gabriele M, Graziani F. COVID-19 transmission in dental practice: Brief review of preventive measures in Italy. *J Dent Res*. 2020;99(9):1030-38.
- [13] Prasad KR, Mounika G, Bodduru R, Veldurthi D, Madhuri A, Balu MS, et al. Assessment of knowledge and practice of infection control among Periodontists during COVID-19 pandemic—a questionnaire study. *J Adv Res Rev*. 2020;3(6):1-10.
- [14] Alzahrani SB, Alrusayes AA, Aldossary MS. Impact of COVID-19 pandemic on dental education, research, and students. *Int J Health Sci Res*. 2020;10:207-12.
- [15] Faccini M, Ferruzzi F, Mori AA, Santin GC, Oliveira RC, de Oliveira RC et al. Dental care during COVID-19 outbreak: A web-based survey. *Eur J Dent*. 2020;1:14-19.
- [16] Becker K, Brunello G, Gurzawska-Comis K, Becker J, Sivoletta S, Schwarz F, et al. Dental care during COVID-19 pandemic: Survey of experts' opinion. *Clin Oral Implants Res*. 2020;12:1253-60.
- [17] Schlenz MA, Schmidt A, Wöstmann B, May A, Howaldt HP, Albert D, et al. Perspectives from dentists, dental assistants, students, and patients on dental care adapted to the COVID-19 pandemic: A cross-sectional survey. *Int J Environ Res Public Health*. 2021;18(8):3940.
- [18] Ahmadi H, Ebrahimi A, Ghorbani F. The impact of COVID-19 pandemic on dental practice in Iran: A questionnaire-based report. *BMC Oral Health*. 2020;20(1):01-09.
- [19] Cagetti MG, Cairoli JL, Senna A, Campus G. COVID-19 outbreak in North Italy: an overview on dentistry. A questionnaire survey. *Int J Environ Res Public Health*. 2020;17(11):3835.
- [20] Humagain M, Humagain R, Rokaya D. Dental practice during COVID-19 in Nepal: a descriptive cross-sectional study. *JNMA: Journal of the Nepal Medical Association*. 2020; 58(230):764.
- [21] Duruk G, Gümüşboğa ZŞ, Çolak C. Investigation of Turkish dentists' clinical attitudes and behaviors towards the COVID-19 pandemic: A survey study. *Braz. Oral Res*. 2020;29:34.

### PARTICULARS OF CONTRIBUTORS:

1. Postgraduate Student, Department of Periodontology, Sinhgad Dental College and Hospital, Pune, Maharashtra, India.
2. Professor, Department of Periodontology, Sinhgad Dental College and Hospital, Pune, Maharashtra, India; PhD Fellow, D.Y. Patil Dental College and Hospital, Pimpri, Pune, Maharashtra, India.

### NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Shivani Kondhalkar,  
Shri Samartha Krupa Bunglow, Godavari Nagar, T.C College Road,  
Baramati-413102, Pune, Maharashtra, India.  
E-mail: shivanikondhalkar9996@gmail.com

### PLAGIARISM CHECKING METHODS: [Jain H et al.]

- Plagiarism X-checker: May 02, 2022
- Manual Googling: Sep 12, 2022
- iThenticate Software: Sep 15, 2022 (21%)

### ETYMOLOGY: Author Origin

### AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. No

Date of Submission: **Apr 30, 2022**

Date of Peer Review: **Jun 06, 2022**

Date of Acceptance: **Sep 16, 2022**

Date of Publishing: **Nov 01, 2022**