

## BUKTI KORESPONDENSI

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Judul Artikel : The Multifaceted Influence of COVID-19 on Indian Dentists: A Cross-Sectional Survey.

Penulis : Omkar Shinde, Aditi Jhaveri, Ajinkya M Pawar, Mohmed Isaqali Karobari, Kulvinder Singh Banga, Suraj Arora, Anuj Bhardwaj, Anastasia Gabriella Djuanda, **Dian Agustin Wahjuningrum**

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- Clinical trials registration
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## Submission Details

|                                |  |
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| <b>Manuscript Title:</b>       | The Multifaceted Influence of COVID-19 on Indian Dentists: A Cross-Sectional Survey                      |
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| <b>Contact Person:</b>         | Dian Agustin Wahjuningrum  |
| <b>Submitted On:</b>           | 19 Apr 2022  |
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## Submission history

- 1** Submission
- 13 April 2022 **Submission created**
- 13 April 2022 **Submission submitted + Editorial checks**
- 19 April 2022 **Awaiting re-submission**
- 19 April 2022 **Revised submission received**
- 20 April 2022 **Editorial checks completed moved to Compliance checks**

2

## **Peer Review**

- 26 April 2022 **Peer review selection**
- 26 April 2022 **Peer review invitations sent**
- 27 April 2022 **First peer reviewer allocated**
- 29 April 2022 **Two or more peer reviewers allocated**
- 29 April 2022 **First report returned**
- 12 May 2022 **Second or more peer reviewer reports returned**

3

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- 13 May 2022 **Report sent to the Editor-in-Chief**
- 13 May 2022 **Report: revise with changes**
- 19 May 2022 **Resubmission pending**
- 28 May 2022 **Resubmitted manuscript received**
- 4 July 2022 **Processing revised manuscript**
- 9 June 2022 **Sent to Editor-in-Chief for acceptance or rejection**
- 9 June 2022 **Peer reviewer(s) second round**
- 15 June 2022 **Peer reviewer(s) second round completed**

4

#### **Invoicing**

16 July 2022 **Invoice to follow for article processing charge subject to final decision**

18 July 2022 **Accepted for publication, invoice sent**

5

#### **Production**

22 July 2022 **Payment has been received**

26 July 2022 **Manuscript sent to typesetter for pre-edit. No action required from the author**

28 July 2022 **Manuscript with the typesetter for first proof creation or updates to the proof. No action required from the author**

28 July 2022 **Typeset page proofs sent to the author(s) for correction or approval. Please login using the link provided to submit the proof back to Editorial team**

29 July 2022 **Author has returned corrections**

29 July 2022 **Author has returned corrections**

31 July 2022 **Page proofs approved by the author. At this point the manuscript is ready for publication**

1 August 2022 **Page proofs approved by the author. Paper is on hold awaiting further information**

1 August 2022 **Manuscript is sent for page numbering at Typesetter**

1 August 2022 **Manuscript been returned from Typesetter with page numbers**

1 August 2022 **Online final version is published**

## **Uploaded Files**

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Dr Dian Agustin Wahjuningrum

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# The Multifaceted Influence of COVID-19 on Indian Dentists: A Cross-Sectional Survey

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**Introduction:** COVID-19 has had a new challenge on dental workers, radically altering clinical and personal management. The cross-sectional survey sought to examine and comprehend the influence of COVID-19 on Indian dentistry practitioners.

**Methods:** A 38-item questionnaire-based survey was communicated to Indian dental practitioners through a web-based form (Google form). The questionnaire was categorized into four sections: (i) Personal protective equipment (PPE), (ii) dental treatments, (iii) auxiliary management, and (iv) personal impact. The findings were examined and studied in order to comprehend the repercussions of COVID-19. The questionnaire was completed by 513 of the 1129 dentists to whom it was delivered.

**Results:** For the current questionnaire, a response rate that we received was 45.44%. When compared to the pre-pandemic era, the use of PPE has increased dramatically (95.7%). The use of PPE alleviated dental practitioners' and patients' doubts about viral transmission. The epidemic prompted the Ministry of Health and Family Welfare (MoHFW) to issue specific recommendations for dental treatments, which were followed by 92.5% of dentists. The majority of dentists reported a considerable impact on both financial and mental health concerns. Teleconsulting and distant learning gained greater prominence. The COVID-19 epidemic affected the lives of dental professionals both within and outside of the dental setting, as well as the auxiliary.

**Conclusion:** COVID-19 has left a trail of devastation in its aftermath. Dentists were affected both emotionally and professionally. Dentists rapidly and uniformly followed the revised recommendations.

**Keywords:** auxiliary, COVID-19, dentist, distance learning, mental health, mouthwashes, PPE, psychological impact, rubber dam, tele consulting

## Introduction

COVID-19, caused by the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) virus, created unparalleled and severe disruption in our lives. It had an influence on many aspects of life, including social, economic, psychological, political, and interpersonal relationships. COVID-19 was designated an international public health emergency by the World Health Organization on January 30, 2020.<sup>1,2</sup> This unusual scenario had a serious impact on people's mental health and generated a stressful condition in society.<sup>3</sup> These circumstances were especially hard for people working in the healthcare system.<sup>4</sup> Health-care workers (HCWs) have worked diligently to provide emergency health-care services while also assisting in the containment of the virus's spread throughout the pandemic. HCWs were impacted on several levels, including stress, infection, mortality, exhaustion, minimal social well-being, occupational injuries, and restricted equipment availability.<sup>5</sup>



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COVID-19 emerged from China in December 2019. It quickly escalated from a Chinese-only national problem to a worldwide catastrophe.<sup>6</sup> On January 27, 2020, India saw its first officially documented case. On March 24, India declared a national lockdown, bringing the whole country to a standstill.<sup>7,8</sup> The first wave of the pandemic during this period saw the closure of every facility except the emergency health-care facilities. During this time, the government limited human movement to just essential services, suspending non-essential services. SARS-CoV-2 is known to spread through the air or by respiratory droplets.<sup>9</sup> Inhalation or mucous membrane damage from direct or indirect spray renders a person vulnerable.<sup>9</sup> By coming into direct or indirect touch with mucosal membranes, contaminated surfaces can potentially enhance cross infection.<sup>10</sup>

Dentists are particularly susceptible to infection due to the nature of their work involving close quarters to the oral cavity and aerosolized procedures, with Occupational Safety and Health Administration (OSHA) guidelines placing them in the very high-risk category for nosocomial infection.<sup>11</sup> Furthermore, infection transmission through asymptomatic persons is a significant difficulty for dental workers in protecting themselves from the virus.

COVID-19 witnessed the implementation of new regulations in dental settings across the world.<sup>12</sup> The Ministry of Health and Family Welfare (Government of India) established comprehensive health-care standards for health-care personnel that were continuously revised in accordance with international criteria. The new standards required dental practitioners to adapt and change dental treatments in order to comply with the new regimen.<sup>13</sup> During the pandemic, tele-dentistry and tele-consultation were on the increase, and they may soon become a major feature in the area of dentistry.<sup>14</sup> It might have far-reaching implications in a sector that has historically relied on regular patient-doctor interaction. Social isolation and shorter treatment times have also altered our approach to patient care.

Over the last year, researchers have worked tirelessly to learn more about this virus, its potential consequences, and treatment options, resulting in rapidly changing knowledge and guidelines. It has resulted in the development of the COVID-19 vaccine, research into the role of comorbidities within the illness, and the adoption of basic preventative measures such as mask wearing.<sup>15-17</sup>

The aim of this questionnaire-based study is to understand the impact of COVID-19 on dentists and analyze the challenges faced by them in terms of access and use of protective equipment, management of staff, dealing with patient anxiety and their own mental health.

## Materials and Methods

A nation-wide cross-sectional study was conducted, and an online open survey was designed on Web-based form (Google forms). The survey questionnaire was face validated by experts in the field and ethical consent from the Institutional Ethical Committee (IEC) (CDSH/06/2021) was obtained. A pilot study was conducted on a subset of participants for a one-month period in June 2021 and modifications were made to the questionnaire. A minimum of two years' work experience was chosen to ensure they could compare at least one year of work experience before the pandemic to their work experience during the pandemic. Consent was received from all those participating in the study. The survey was anonymous and voluntary. Convenience sampling was performed and the dentists' email ids, SMS information and state of practice were obtained through a Dentist Directory on the Indian Dental Association website (<https://www.ida.org.in/Directories/DentistsDirectory>). The survey was then emailed as well as messaged to these dentists. Out of the total dentists emailed, dentists per state were emailed in proportion to number of dental colleges in that state. The form was tracked using the software Formstack to obtain data on total form views, unsubmitted incomplete forms and submitted completed forms.

The survey was a 38-question survey which took 3 minutes and 15 seconds to fill on average. It was divided into 4 sections: (i) Personal protective equipment (PPE) use, (ii) clinical operations, (iii) auxiliary management and (iv) personal impact. Some of the survey questions were single answer questions while some were multiple answer questions. The survey was open to new responses for a period of 6 months dating from 1st August, 2021 to 31st January, 2022.

The personal protective equipment (PPE) section pertained to use of N95 masks, use of PPE and its provision to patients, perceptions regarding safety afforded by PPE and its continued use post pandemic. It also delved upon perceptions relating to and psychological impact of using PPE as well as consistent adherence to safety protocols in each COVID wave.

The second part of the questionnaire was related to patient care and operative procedures. It covered patient flow, pre procedural precautions such as reverse transcriptase polymerase chain reaction (RT-PCR) tests, use of mouthwash before and during the pandemic, procedural changes such as regular use of rubber dam and alteration of treatment modalities to fall in line with Ministry of Health and Family Welfare (MoHFW) prescribed guidelines.

The auxiliary management section covered areas such as requirements for specialized training for auxiliary staff, reluctance to report to work, mental health of staff and solutions to ease burden.

The final section explores the impact of the pandemic on the dentist at a personal level. Questions posed include adoption of tele consulting and its future, continued dental education. Questions addressing stress, anxiety and the effect of the pandemic on the dentist's mental health were included. The participants were also questioned on activities they undertook to offset the mental effects of the pandemic. Descriptive analysis was performed on the responses.

## Results

A nationwide survey was conducted from 1st August 2021 to 31st January 2022 to understand the impact of COVID-19 on Indian dentists. Of the 1129 dentists that the questionnaire was sent to, 513 dentists submitted a completely filled questionnaire yielding a response rate of 45.44%.

One hundred and twenty-four dentists viewed the questionnaire and left the survey midway. Characteristics of the participants collected were Age, Gender, Nationality, level of education, i.e Bachelor of Dental Surgery (B.D.S) or Master of Dental Surgery (M.D.S), duration of clinical practice (minimum duration of 2 years), type of practice (group, individual or institutional), location of practice, part time or full time status. Forty eight percent point three respondents were below the age of 29, 46.7% were in the 30–59 range and 5% were above the age of 60. Fifty nine percent respondents were females and 41% were males. All respondents were Indian nationals (100%). Sixty five percent dentists had individual dental practices and 73% practiced full time. Fifty seven percent respondents had completed their Master of Dental Surgery (Table 1). Out of the 513 respondents 18% were from Maharashtra, 16% were from Tamil Nadu, 28% from Karnataka, 7% from Uttar Pradesh, 5% from Kerala, 4% from Andhra Pradesh, 4% from Punjab, 3% from Gujarat, Rajasthan, and Madhya Pradesh, 2% from Telangana and Haryana, 1% from Delhi, Chhattisgarh, West Bengal, Himachal Pradesh, and Jharkhand (Tables 1 and 2). All data collected regarding characteristics apart from geographic locations were self-reported.

**Table 1** Data from Questionnaire Regarding Sample Characteristics

|   | Characteristic                       |             |             | Total         |     |
|---|--------------------------------------|-------------|-------------|---------------|-----|
| 1 | Age                                  | >29 years   | 30-59 years | >60 years     | 513 |
|   |                                      | 248 (48.3%) | 240 (46.7%) | 25 (5%)       |     |
| 2 | Gender                               | Male        | Female      |               | 513 |
|   |                                      | 210 (41%)   | 303 (59%)   |               |     |
| 3 | Nationality                          | Indian      |             |               | 513 |
|   |                                      | 513 (100%)  |             |               |     |
| 4 | Number of years of clinical practice | 2-5 years   | 5-10 years  | >10 years     | 513 |
|   |                                      | 334 (65.1%) | 107 (20.9%) | 72 (14%)      |     |
| 5 | Type of practice                     | Individual  | Group       | Institutional | 513 |
|   |                                      | 333 (65%)   | 77 (15%)    | 103 (20%)     |     |
| 6 | Part time/Full time status           | Full time   | Part time   |               | 513 |
|   |                                      | 374 (73%)   | 139 (27%)   |               |     |

(Continued)

Table 1 (Continued).

|                   | Characteristic                  |                  |                       | Total |
|-------------------|---------------------------------|------------------|-----------------------|-------|
| 7                 | Level of Education              | BDS              | MDS                   | 513   |
|                   |                                 | 292 (57%)        | 221 (43%)             |       |
| 8                 | Geographic location of practice | State            | Number of respondents | 513   |
|                   |                                 | Karnataka        | 143 (28%)             |       |
|                   |                                 | Maharashtra      | 92 (18%)              |       |
|                   |                                 | Tamil Nadu       | 82 (16%)              |       |
|                   |                                 | Uttar Pradesh    | 35 (7%)               |       |
|                   |                                 | Kerala           | 25 (5%)               |       |
|                   |                                 | Andhra Pradesh   | 20 (4%)               |       |
|                   |                                 | Punjab           | 20 (4%)               |       |
|                   |                                 | Rajasthan        | 15 (3%)               |       |
|                   |                                 | Madhya Pradesh   | 15 (3%)               |       |
|                   |                                 | Telangana        | 10 (2%)               |       |
|                   |                                 | Gujarat          | 15 (3%)               |       |
|                   |                                 | Haryana          | 10 (2%)               |       |
|                   |                                 | Delhi            | 5 (1%)                |       |
|                   |                                 | Chhattisgarh     | 5 (1%)                |       |
|                   |                                 | West Bengal      | 5 (1%)                |       |
|                   |                                 | Himachal Pradesh | 5 (1%)                |       |
|                   |                                 | Jharkhand        | 5 (1%)                |       |
|                   |                                 | Bihar            | 0                     |       |
|                   |                                 | Orissa           | 0                     |       |
|                   |                                 | Pondicherry      | 0                     |       |
|                   |                                 | Assam            | 0                     |       |
| Jammu and Kashmir | 0                               |                  |                       |       |
| Uttarakhand       | 0                               |                  |                       |       |
| Manipur           | 0                               |                  |                       |       |
| Chandigarh        | 0                               |                  |                       |       |
| Daman and Diu     | 0                               |                  |                       |       |
| Goa               | 0                               |                  |                       |       |

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## 144 Use of Personal Protective Equipment (PPE)

145 A total of 65.1% respondents had been practicing clinically for 5 years, 20.9% for 5–10 years, and 14% for more than 10  
 146 years. Before the pandemic, 83.7% of dentists did not use personal protective equipment, and 92.9% did not use N95  
 147 masks (Figure 1). Following the outbreak of the pandemic, there was an increase in the number of practitioners adopting  
 148 PPE (95.7%).

149 Only 41.9% respondents continued to use Personal Protective Equipment (PPE); however, 73.8% believed it is useful  
 150 in protecting the practitioner (Figure 2). More than half respondents (55.8%) believed PPE should be continued to be  
 151 used even when the pandemic ends (Figure 2). A total of 72% practitioners reported that they felt providing PPE to  
 152 patients could be beneficial however less than half of them (20.9%) provided personal protective equipment to their  
 153 patients (Figure 2). A significant number (48.8%) of dentists reported a beneficial psychological impact of use of PPE on  
 154 both patient and practitioner with both feeling more safe and secure. An appreciable number of dentists (72.1%) had  
 155 continued following the safety protocols issued in the first waves in the subsequent waves (Figure 2).



**Table 2** Data from Questionnaire Regarding Sample Geographical Information

|    |                   | State-Wise Distribution of Dental Colleges in India (Total - 323) | Number of Dentists Contacted for Survey Per State (Total - 1129) | Number of Dentists that Responded Per State (Total - 513) |
|----|-------------------|---|--|---|
| 1  | Karnataka         | 48 (14.8%)  | 167 (14.8%)  | 143 (28%)   |
| 2  | Maharashtra       | 38 (11.7%)  | 124 (11.7%)  | 92 (18%)  |
| 3  | Tamil Nadu        | 30 (9.2%)   | 101 (9.2%)   | 82 (16%)  |
| 4  | Uttar Pradesh     | 27 (8.3%)   | 93 (8.3%)  | 35 (7%)   |
| 5  | Kerala            | 26 (8.0%)   | 90 (8.0%)  | 25 (5%)   |
| 6  | Andhra Pradesh    | 16 (4.9%)   | 55 (4.9%)  | 20 (4%)   |
| 7  | Punjab            | 16 (4.9%)   | 55 (4.9%)  | 20 (4%)   |
| 8  | Rajasthan         | 16 (4.9%)   | 55 (4.9%)  | 15 (3%)   |
| 9  | Madhya Pradesh    | 15 (4.6%)   | 51 (4.6%)  | 15 (3%)   |
| 10 | Telangana         | 14 (4.3%)   | 48 (4.3%)  | 10 (2%)   |
| 11 | Gujarat           | 13 (4.0%)   | 45 (4.0%)  | 15 (3%)   |
| 12 | Haryana           | 10 (3.0%)   | 33 (3.0%)  | 10 (2%)   |
| 13 | Delhi             | 6 (1.8%)  | 20 (1.8%)  | 5 (1%)  |
| 14 | Chhattisgarh      | 6 (1.8%)  | 20 (1.8%)  | 5 (1%)  |
| 15 | West Bengal       | 6 (1.8%)  | 20 (1.8%)  | 5 (1%)  |
| 16 | Himachal Pradesh  | 5 (1.5%)  | 16 (1.5%)  | 5 (1%)  |
| 17 | Jharkhand         | 4 (1.2%)  | 13 (1.2%)  | 5 (1%)  |
| 18 | Bihar             | 4 (1.2%)  | 13 (1.2%)  | 0   |
| 19 | Orissa            | 4 (1.2%)  | 13 (1.2%)  | 0   |
| 20 | Pondicherry       | 4 (1.2%)  | 13 (1.2%)  | 0   |
| 21 | Assam             | 3 (0.9%)  | 10 (0.9%)  | 0   |
| 22 | Jammu and Kashmir | 3 (0.9%)  | 10 (0.9%)  | 0   |
| 23 | Uttarakhand       | 3 (0.9%)  | 10 (0.9%)  | 0   |
| 24 | Manipur           | 2 (0.6%)  | 6 (0.6%)   | 0   |
| 25 | Chandigarh        | 1 (0.3%)  | 3 (0.3%)   | 0   |
| 26 | Daman and Diu     | 1 (0.3%)  | 3 (0.3%)   | 0   |
| 27 | Goa               | 1 (0.3%)  | 3 (0.3%)   | 0   |

## Dental Procedures

A major decline was reported by 45.2% of dentists in patient flow since the onset of the pandemic (Table 3). They also noted a change in patients' behavior where 81% patients appeared to be taking extra precautions, 52.4% seemed to be more anxious, 35.7% were hesitant to seek treatment while 35.7% opted for tele consultations and 14.3% completely avoided consultations leading to a build-up of dental issues (Figure 3).

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## Use Of PPE And N-95 Masks



Figure 1 Response of the dentists regarding the use of PPE and N95 masks.

## USE OF PPE AND IMPACT

■ Yes ■ No ■ Sometimes

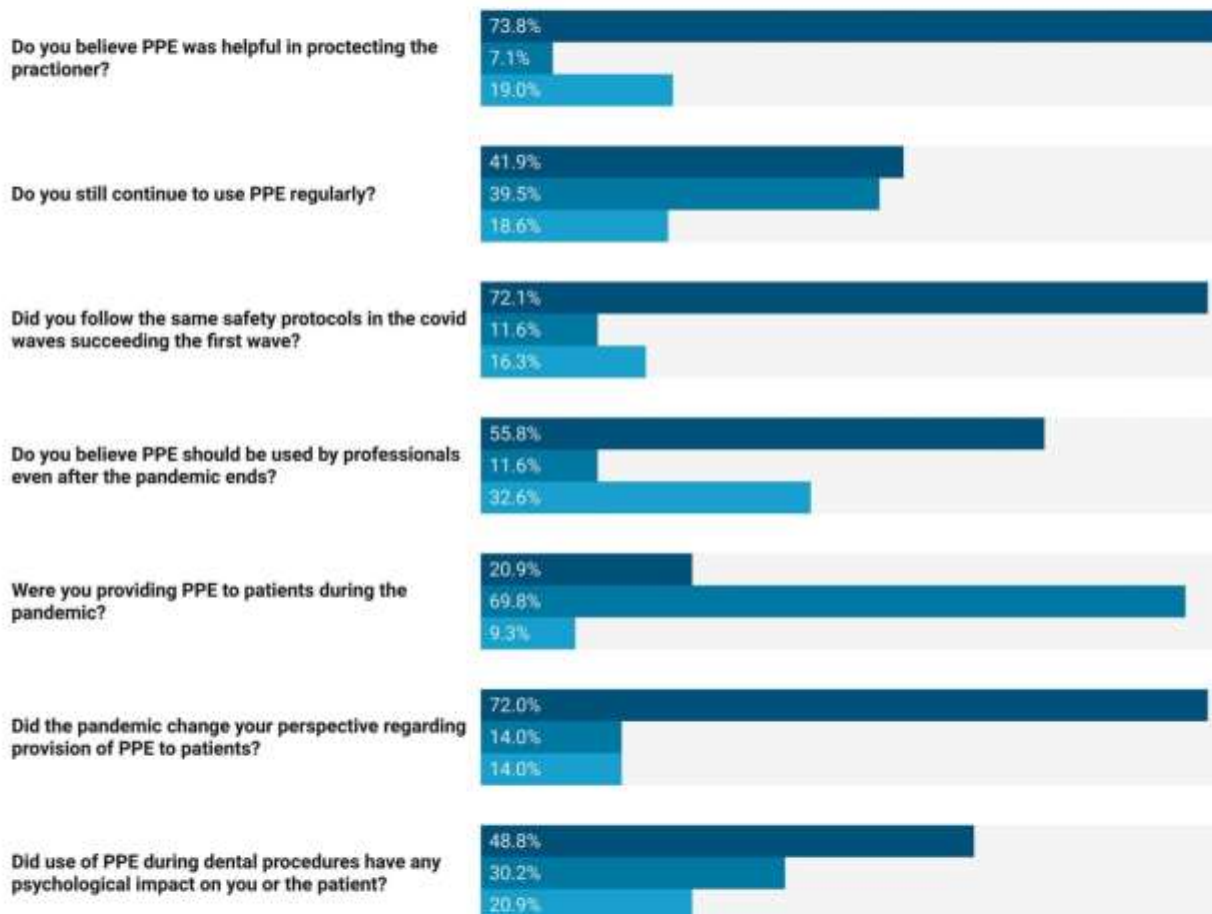


Figure 2 Response of the dentists regarding the use of use of PPE and its impact.

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A considerable amount (34.1%) of practitioners noted changes in patient management in terms of safety protocol, infection control, first line of treatment compared to before the pandemic and 90.2% practitioners considered altering treatment due to the pandemic (Table 3). A large number (92.5%) of respondents stated they adhered to guidelines issued by the Ministry of Health and Family Welfare (Table 3). Just more than half (51.2%) clinicians used oral rinses regularly before the pandemic with the value changing to 78% during the pandemic (Table 3). However, only 48.8% believed it

**Table 3** Data from Questionnaire Regarding Patient Management

| Serial No. | Questions   | Responses              |                      |                         |                   | Total        |
|------------|---|------------------------|----------------------|-------------------------|-------------------|--------------|
|            |   | Major Decline          | Minor Decline        | No Decline              |                   |              |
| 1          | Was there a decline in number of patients reporting to dental clinics since the beginning of COVID-19 | 232 (45.2%)            | 205 (40.5%)          | 76 (14.3%)              |                   | 513          |
|            |   | <b>Yes</b>             | <b>No</b>            | <b>Some procedures</b>  |                   | <b>Total</b> |
| 2          | Do you ask every patient for a RT-PCR test before conducting any dental procedure?                    | 122 (23.8%)            | 183 (35.7%)          | 208 (40.5%)             |                   | 513          |
|            |   | <b>Yes</b>             | <b>No</b>            | <b>Sometimes</b>        |                   | <b>Total</b> |
| 3          | Did you regularly use a mouth wash for patients before procedures pre-pandemic ?                      | 263 (51.2%)            | 163 (31.7%)          | 87 (17.1%)              |                   | 513          |
|            |   | <b>Yes</b>             | <b>No</b>            |                         |                   | <b>Total</b> |
| 4          | Did you regularly use a mouth wash before procedures during the pandemic?                             | 400 (78%)              | 113 (22%)            |                         |                   | 513          |
|            |   | <b>Povidone iodine</b> | <b>Chlorhexidine</b> |                         |                   | <b>Total</b> |
| 5          | Which mouth wash did you use for patients during the pandemic began?                                  | 122 (23.73%)           | 391 (76.3%)          |                         |                   | 513          |
|            |   | <b>Yes</b>             | <b>No</b>            | <b>Not sure</b>         | <b>Cannot say</b> | <b>Total</b> |
| 6          | Do you believe mouth wash could halt the spread of COVID-19 infection?                                | 250 (48.8%)            | 25 (4.9%)            | 188 (36.6%)             | 50 (9.8%)         | 513          |
|            |   | <b>Yes</b>             | <b>No</b>            |                         |                   | <b>Total</b> |
| 7          | Did you use rubber dam regularly during procedures before the pandemic?                               | 192 (37.5%)            | 321 (62.5%)          |                         |                   | 513          |
| 8          | Did you use rubber dam regularly during procedures in the pandemic?                                   | 309 (60.3%)            | 204 (39.7%)          |                         |                   | 513          |
| 9          | Have you adhered to the guidelines prescribed by Ministry of Health and Family Welfare (MoHFW)?       | 475 (92.5%)            | 38 (7.5%)            |                         |                   | 513          |
| 10         | Did you consider altering treatment methods and protocol due to COVID-19 pandemic?                    | 463 (90.2%)            | 50 (9.8%)            |                         |                   | 513          |
|            |   | <b>Yes</b>             | <b>No</b>            | <b>Thought about it</b> |                   | <b>Total</b> |
| 11         | Did you educate yourself regarding COVID-19 and its impact on dentistry?                              | 451 (87.8%)            | 37 (7.3%)            | 25 (4.9%)               |                   | 513          |

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could aid in the halt of infection (Table 3). Chlorhexidine (76.3%) over Povidone iodine was the preferred choice for dental practitioners (Table 3). One-third (23.8%) practitioners made RT-PCR tests for patients mandatory before treatment (Table 3). A small number of practitioners (37.5) used rubber dams during various procedures pre pandemic; however, this changed to 60.3% during COVID-19 (Table 3). A whopping number (87.8%) of practitioners have been

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## Changes in patient behaviour



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Figure 3 Response of the dentists regarding the changes in patient behavior.

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educating themselves regarding COVID-19 since the start of the pandemic while 7.3% did not educate themselves and a small number of dentists (4.9%) thought about educating themselves about COVID-19. After understanding the recent development related to COVID-19, large group of dentists (90.2%) altered the treatment protocols (Table 3).

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## Auxiliary Staff

A substantial (70.7%) number of respondents stated that they think that dental assistants require special training post pandemic (Table 4). The measures used to combat psychological stress by auxiliary staff included educating (80%), counseling (57.5%), providing financial assistance (42.5%), flexible work schedule (45%) and an advance on salary (17.5%) (Table 4). Almost all (95.9%) dentists noticed an increase in concerns by auxiliary staff. They noted the majority feared contracting the virus (58.5%), followed by more anxious nature (29.3%), and hesitance to work (22%), while very few (9.8%) had apprehensions regarding salary (Table 4) (Figure 4). Considerable number of dentists (34.2%) experienced their auxiliary staff quitting their jobs (Table 4).

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## Personal Impact

It was seen that 61% dentists felt that treatment and patient management had changed during the pandemic including the way they had to approach patients, new protocols, and an overall sense of fear that they had to deal (Table 5). A bulk (53.7%) of respondents practiced tele-dentistry during the pandemic and 39% felt it will play an important role in dentistry in the future (Table 5). Almost three quarters (65.9%) respondents felt distance learning has gained

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Table 4 Data from Questionnaire Regarding Auxiliary Staff and Their Management

| Serial No. | Questions  | Responses                               |                                       |   |                                       |  | Total        |
|------------|--|---|---------------------------------------|---|---------------------------------------|--|--------------|
|            |  | Yes                                     | No                                    | Maybe                                   |                                       |  |              |
| 1          | Do you think dental assistants require any special training post pandemic?   | 363 (70.7%)                             | 50 (9.8%)                             | 100 (17.1%)                             |                                       |  | 513          |
|            |  | <b>Counseling</b>                       | <b>Educating</b>                      | <b>Providing financial assistance</b>   | <b>Flexible work schedule</b>         | <b>Advance on salary</b>               |              |
| 2          | Were any measures taken to reduce psychological stress experienced by auxiliary staff at the clinic during the pandemic? | 295 (out of 513)<br>57.5% (out of 100%) | 410 (out of 513)<br>80% (out of 100%) | 218 (out of 513)<br>42.5% (out of 100%) | 231 (out of 513)<br>45% (out of 100%) | 90 (out of 513)<br>17.5% (out of 100%) |              |
|            |  | <b>Yes</b>                              | <b>No</b>                             |   |                                       |  | <b>Total</b> |
| 3          | Did auxiliary leave job at the clinic due to pandemic?   | 175 (34.2%)                             | 338 (65.8%)                           |   |                                       |  | 513          |

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## Concerns shown by dental assistants during COVID-19



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Figure 4 Response of the dentists with respect to the concerns shown by dental assistants during COVID-19.

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traction and will be important in the future (Table 5). Various difficulties were faced by dentists during the pandemic with 29.3% respondents having to move out of their clinic (Table 5). Half of (53.8%) respondents experienced poor financial returns while 20.5% had to downsize their team and let off staff members (Figure 5). A meager (12.2%) respondents also considered changing their profession during the pandemic (Table 5). Considerable number (67.5%) of respondents have seen partial economic recovery, while 12.5% have experienced continued losses (Table 5).

Table 5 Data from Questionnaire Regarding Professional Impact

| Serial No. | Questions  |                          |                         |                         |                                  | Total        |
|------------|--|--------------------------|-------------------------|-------------------------|----------------------------------|--------------|
|            |  | Yes                      | No                      | Maybe                   |                                  |              |
| 1          | Was patient treatment and management the same as it was pre- pandemic?   | 175 (34.1%)              | 313 (61%)               | 25 (4.9%)               |                                  | 513          |
|            |  | <b>Yes</b>               | <b>No</b>               |                         |                                  | <b>Total</b> |
| 2          | Did distance learning play a more important role during the pandemic and do you think you will continue with it in the future? | 338 (65.9%)              | 175 (34.1%)             |                         |                                  | 513          |
|            |  | <b>Yes</b>               | <b>No</b>               | <b>Sometimes</b>        |                                  | <b>Total</b> |
| 3          | Did you practice tele medicine during the pandemic?  | 275 (53.7%)              | 137 (26.8%)             | 101 (19.5%)             |                                  | 513          |
|            |  | <b>Yes</b>               | <b>No</b>               | <b>Maybe</b>            |                                  | <b>Total</b> |
| 4          | Do you think tele medicine will play an important role in dentistry in the future?   | 200 (39%)                | 188 (36.6%)             | 125 (24.4%)             |                                  | 513          |
| 5          | Did you consider changing your profession during the pandemic?   | 63 (12.2%)               | 413 (80.5%)             | 37 (7.3%)               |                                  | 513          |
|            |  | <b>Yes</b>               | <b>No</b>               | <b>Did consider</b>     |                                  | <b>Total</b> |
| 6          | Did you move out of your place of practice during the pandemic?  | 150 (29.3%)              | 313 (61%)               | 50 (9.8%)               |                                  | 513          |
|            |  | <b>Complete recovery</b> | <b>Partial Recovery</b> | <b>Continued losses</b> | <b>Not affected economically</b> | <b>Total</b> |
| 7          | What has economic recovery after the first few waves looked like?  | 26 (5%)                  | 346 (67.5%)             | 64 (12.5%)              | 77 (15%)                         | 513          |

## Economic repercussions



Figure 5 Response of the dentists regarding the economic repercussions.

## Effect on mental health

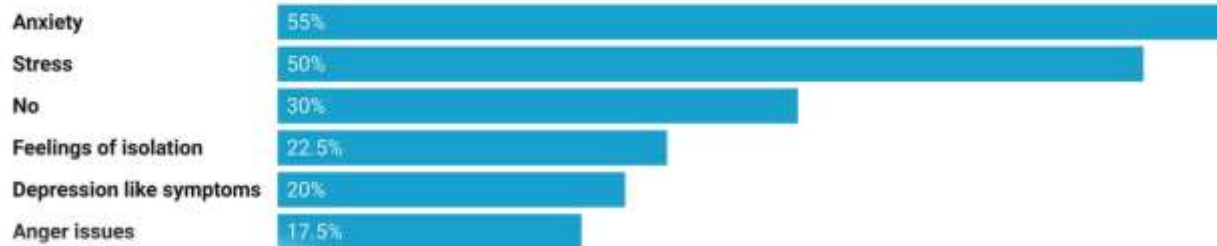


Figure 6 Response of the dentists regarding the effect on mental health.

## Mental health management

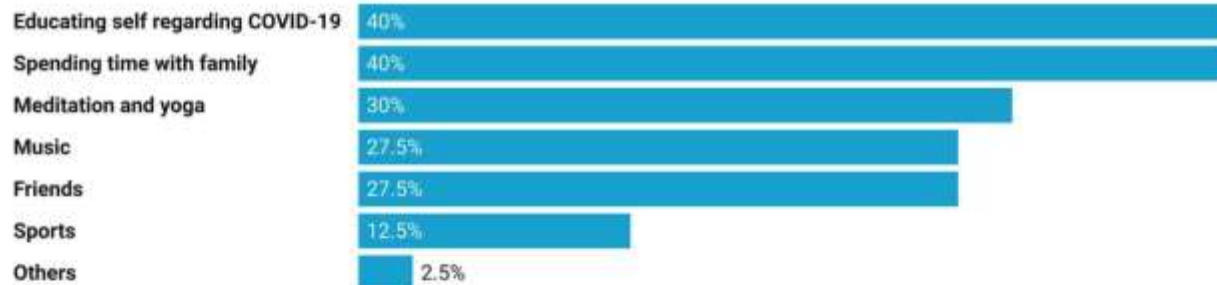


Figure 7 Response of the dentists regarding the measures taken for mental health management.

A considerable number (70%) of respondents said their mental health was affected during the pandemic with 55% experiencing an increase in anxiety, 50% more stressed, 22.5% felt isolated, 20% felt low and 17.5% faced anger management issues (Figure 6). Dentists used various measures to manage their mental health during the pandemic such as spending time with family (40%), educating themselves regarding COVID-19 (40%), meditation and yoga (30%), friends (27.5%), music (27.5%), sports (12.5%) (Figure 7).

## Discussion

The study results described the dentists' experiences during the pandemic. While an inclusion criteria was that all the respondents had to have an experience of minimum of 2 years that had to be self-reported, majority of those who completed the questionnaire had been practicing clinically for less than 5 years (65.1%), a smaller percentage had been practicing for 5–10 years (20.9%), and the remainder had been practicing for more than 10 years (14%) hence the results are a more appropriate representation of recently graduated professionals (Table 1). The greatest percentage of respondents were from Karnataka (28%), Maharashtra (18%), and Tamil Nadu (16%) (Table 2).

255 Surgical masks or cotton fabricated masks were used more prevalently and N95 was restricted to a very few (0.7%)  
256 dental professionals on a daily routine basis pre-pandemic. The use of N95 masks was on a rapid rise during the COVID-  
257 19 pandemic.<sup>18</sup> The main advantage of a N95 mask was its filtration efficiency and tight seal, thus preventing air leakage  
258 around the edges.<sup>18</sup> While respirators provide more protection, they may be more difficult to tolerate or wear  
259 continuously.

260 PPE supply to patients was uncommon in pre-pandemic dentistry facilities. Various studies affirmed the importance  
261 of PPE in protecting the dental professionals as well as the patients in the dental operator.<sup>20,21</sup> Majority dentists (73.8%)  
262 believed that PPE was an important aspect in controlling the spread of COVID-19 infection in the dental operator. This  
263 brought about a change in perspective regarding use of PPE and regarding provision of PPE to patients (72%). Following  
264 the commencement of the pandemic, there was a surge in the percentage of practitioners adopting PPE (95.7%).  
265 A significant proportion of dental professionals (88.4%) made the use of PPE mandatory after the first wave, whereas  
266 the rest gradually reduced their usage of PPE over time (11.6%). The decrease in PPE usage can be ascribed to variables  
267 such as communication challenges (visual, auditory, or verbal), heat, pressure, or discomfort, and dizziness or difficulty  
268 concentrating. Despite a steady drop in PPE use throughout the course of the pandemic, it is worth noting that more than  
269 half of respondents believed that PPE use should continue after the pandemic.

270 Fear and anxiety are emotional issues that may be linked to the widespread coverage of the COVID-19 pandemic in  
271 social, electronic, and print media. A total of 40.5% of dentists reported a minor decrease in the number of patients,  
272 which is relevant because of the outbreak; however, it raises the question of how many patients neglected treatment  
273 because of which they potentially reported at a later stage when tooth had been irreversibly damaged. Armfield et al  
274 discovered that people with high fear were more likely to have a longer duration since their last dental visit in a study of  
275 Australian residents.<sup>19</sup> According to Pohjola et al, high fear was associated with irregular dental attendance among  
276 Finnish adults.<sup>20</sup> Analogously, in Iran, Saatchi et al unearthed that patients who attended irregularly were more afraid  
277 than regular attendees.<sup>21</sup> This denial of dental care due to fear may exacerbate pre-existing oral conditions, create  
278 a negative spiral of dental fear, enhance treatment needs, and deteriorate oral health status.<sup>22</sup>

279 Dentists observed that majority of patients (81%) became more careful while visiting the dental clinic. These patients'  
280 donned N95 masks in addition to surgical masks, latex gloves before and after entering the dental setting, and hand  
281 sanitizers. During this time span, a considerable number of patients (52.4%) began to be more nervous, which might be  
282 connected to the fear of contracting infection in the dental setting or the use of PPE by themselves during dental  
283 treatments. Some patients (35.7%) were apprehensive to visit the dental clinic and indicated greater interest in  
284 telemedicine (35.7%). During this time, a portion of patients (14.3%) entirely skipped dental care. In Beijing, China,  
285 a retrospective analysis revealed that 1567 patients gained emergency dental services prior to the COVID-19 epidemic,  
286 compared to 970 patients during the pandemic. This revealed a 38.1% decline in emergency dental care usage, indicating  
287 that the COVID-19 epidemic had a significant impact on emergency dental care utilization.<sup>23</sup>

288 Because of the characteristics of the COVID-19 virus's dissemination, majority of dentists (40.5%) made the negative  
289 RT PCR test essential only for certain treatments. Around 35.7% of dentists did not request RT PCR testing for any of  
290 the treatment operations, but the remaining dentists (23.8%) made negative RT PCR tests necessary for all dental  
291 treatments, which might be associated with safeguarding everyone in the dental operator.

292 Because of the proximity to the patient during dental treatment, the elevated production of aerosols, and the  
293 identification of SARS-CoV-2 in saliva, the oral cavity has been viewed as a possible reservoir for COVID-19  
294 transmission. To decrease the number of microorganisms in aerosols and drops throughout dental procedures, preopera-  
295 tive antimicrobial mouth rinses with chlorhexidine gluconate (CHX), cetylpyridinium chloride (CPC), povidone-iodine  
296 (PVP-I), and hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) have been suggested. Even before the pandemic, antiseptic mouthwashes were  
297 widely used in dentistry, particularly preoperatively.<sup>24</sup> Because of the antiseptic nature of mouthwashes, more than half of  
298 dentists (51.4%) used them in pre-operative procedures. The usage of mouthwashes increased substantially following the  
299 onset of COVID-19 (78%). The majority (76.3%) utilized chlorhexidine, while the remainder used povidone iodine  
300 solution (23.7%). SARS-CoV-2 was eliminated from the oropharynx of those who used chlorhexidine as an oral rinse,  
301 according to one investigation.<sup>25</sup> Studies were carried out to understand if mouthwashes could halt or reduce the spread  
302 of COVID-19 infection.<sup>26-28</sup> Based on different studies, it was understood that antiseptic mouthwashes lower the chances

304 of spread of COVID-19 infection.<sup>24</sup> The same was reflected by just less than half of the dentists (48.8%) who believed  
305 that mouthwashes could halt the spread of infection.

306 Rubber dam is an important aid used during the treatment mainly for isolation procedures. A whopping number of  
307 dentists (67.5%) stated that they had not been using rubber dams in dental procedures while the rest had been using  
308 rubber dams. Guidelines and safety protocols were released by the Government of India in line with the guidelines  
309 released by the WHO. Almost all (92.5%) adhered to all the guidelines released to ensure safety for everyone in the  
310 dental setup. A small number of dentists (7.5%) did not follow the guidelines. Around 87.8% of dentists made an effort  
311 to understand COVID-19's impact on dentistry using available evidence. And 90.2% altered treatment approach in  
312 accordance. Non-emergency procedures were postponed, treatment time was shortened, aerosol generating procedures  
313 were suspended and emphasis was placed on ventilation of the operatory.<sup>29</sup>

314 COVID-19 presented a conflicting situation to dentists in terms of not simply taking care of themselves but also the  
315 auxiliary staff employed at their clinics.<sup>29,30</sup> The survey showed that the auxiliary staff showed an increase in fear of  
316 contracting the virus (58.5%), greater anxiety (29.3%), hesitation in working (22%) as well as no shows to work (2.4%).  
317 Staff management combined with patient fears and an explosive outburst of disease posed a daunting challenge to  
318 dentists. One year later dentists have been able to evaluate the staffs as well as their preparedness for situations like these  
319 in the future. The survey showed that 70.7% respondents believe dental assistants require special training post pandemic.  
320 The crux of the problem potentially lies in poor availability of simplified information to understand the rapid changes in  
321 information relating to disease and the associated protocols. Continued education programs and regular updating of staff  
322 with changes in medicine can aid in doing away with fears and make staff members more secure in the work they do. The  
323 scope of additional training could include common diseases encountered as well as diseases that require universal  
324 precautions. Further training in infection control, regular updating of protocols and counselling to aid in dealing with  
325 high stress situations could aid in improved patient outcomes. Measures such as educating, counseling and providing  
326 financial assistance with flexible work schedules were some of the measures taken up by dentists to reduce psychological  
327 stress and need to be carried forward beyond the pandemic.

328 The survey also showed that 34.2% of staff members left their jobs. Finding new staff members posed an added  
329 challenge to dentists. Creation of a national portal with registered dentists and auxiliary staff members as well as their  
330 region of practice/residence could simplify hiring especially when manpower resources are limited. It could also provide  
331 staff members with increased options and control when searching for jobs.

332 Distance learning took on a new important role and 65.9% respondents in the survey felt distance learning is and will  
333 continue to be crucial. Increasing availability of such courses and making them more accessible through subscription  
334 services could promote continued education. Technology is rapidly changing conventional dentistry. Tele-medicine  
335 provided a way to interact and manage patients while in isolation. Further development of this field could potentially  
336 aid in delivering universal healthcare.

337 The economic impact was felt across the profession with a downturn in regular income. This yielded a section of  
338 dentists to shut down their clinics, lay off workers or simply absorb losses dipping into previous savings. Aid and  
339 stimulus packages by the government could have aided dentists. Discussions and policy changes need to be tabled by the  
340 Dental Council of India in conjunction with the government to ensure security for dentists in lieu of future crises like  
341 this.

342 Mental health has also been deeply impacted during the pandemic. Between one and two of every five health-care  
343 workers reported anxiety, depression-related symptoms, distress, and/or sleep problems.<sup>31,32</sup> A focus on self-care, therapy  
344 and social support through friends and family could aid in combating the mental effects of the pandemic. The most  
345 commonly reported protective factor associated with reduced risk of mental health problems was having social support.<sup>31</sup>  
346 However, what is interesting is that the focus on individual risk and resilience factors and pathology in research may  
347 hinder the discovery of underlying organizational faults, which could be more appropriate targets of intervention. In  
348 Mueller's systematic review it was seen that in two studies participants specified that they had a greater need for personal  
349 protective equipment than for psychological help. Chung and Yeung reported this in a survey that allowed health-care  
350 workers to describe their needs and concerns in free text and to request contact with a psychiatric nurse.<sup>33</sup> This points to  
351 the need to rapidly assess and diagnose faults at individual as well as institutional level.



A limitation of the present investigation was that it was limited to Indian dental practitioners. Also, the years of practice was self-reported. The analysis also does not quantify the type of economic hardships endured by dentists. Additionally, it presents hardships faced by auxiliary from a dentist's perspective and does not represent the staff members views. Further, despite repeatedly following up with dentists, responses from some states were not received.

## Conclusions

As a result, while the COVID-19 pandemic persists, new cases are still being noted, and the hazard of reciprocal transmission of infection between patients and dental care providers necessitates additional precautionary measures to limit COVID-19 spread. According to the current data, the COVID-19 pandemic influenced how dentists practiced, with elevated use of PPE for themselves and patients. During the COVID-19 pandemic, fear was common among patients, with a significant proportion exhibiting high dental fear and anxiety. There was a decrease in dental patient flow, increased anxiety among patients and auxiliary staff. Dentists were heavily affected economically and recovery has been slow but steady. Investigating its timeline, stimulus packages and potential future infrastructure requirements could be interesting.

## Data Sharing Statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Ethics Approval and Consent to Participate

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Ethics committee, Department of Conservative Dentistry and Endodontics, College of Dental Sciences & Hospital, Indore 453331, India with the Ethics approval code (CDSH/06/2021). As the questionnaire was anonymous informed consent was not applicable. The survey was anonymous and voluntary.

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## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work. Alternatively, this section can be removed. Please amend your manuscript file accordingly.

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## Disclosure

The authors declare no conflicts of interest.

## References

1. Robillard R, Saad M, Edwards J, et al. Social, financial and psychological stress during an emerging pandemic: observations from a population survey in the acute phase of COVID-19. *BMJ Open*. 2020;10(12):e043805. doi:10.1136/bmjopen-2020-043805
2. Chaudhary F, Fazal A, Javaid M, et al. Provision of endodontic treatment in dentistry amid COVID-19: a systematic review and clinical recommendations. *Biomed Res Int*. 2021;2021:1–8. doi:10.1155/2021/8963168
3. Gallegos A. WHO declares public health emergency for novel coronavirus. *medscape medical news*. References-ScientificResearch Publishing; 2020. Available from: <https://www.scirp.org/reference/referencespapers.aspx?referenceid=3067856>. Accessed January 19, 2022.

- 403 4. Benfante A, Di Tella M, Romeo A, Castelli L. Traumatic stress in healthcare workers during COVID-19 Pandemic: a review of the immediate  
404 impact. *Front Psychol*. 2020;11. doi:10.3389/fpsyg.2020.569935
- 405 5. Ehrlich H, McKenney M, Elkbuli A. Protecting our healthcare workers during the COVID-19 pandemic. *Am J Emerg Med*. 2020;38(7):1527–1528.  
406 doi:10.1016/j.ajem.2020.04.024
- 407 6. Yu J, Zhang T, Zhao D, Haapasalo M, Shen Y. Characteristics of endodontic emergencies during coronavirus disease 2019 outbreak in Wuhan.  
408 *J Endod*. 2020;46(6):730–735. doi:10.1016/j.joen.2020.04.001
- 409 7. Shinde O, Pawar A, Banga K, Atram J, Wahjuningrun D. Endodontic emergencies in Mumbai City during COVID-19 lockdown and different  
410 phases of unlock. *Int J Environ Res Public Health*. 2021;18(14):7314. doi:10.3390/ijerph18147314
- 411 8. Wikipedia. COVID-19 pandemic in India. Available from: [https://en.wikipedia.org/wiki/COVID-19\\_pandemic\\_in\\_India](https://en.wikipedia.org/wiki/COVID-19_pandemic_in_India). Accessed January 24,  
412 2022.
- 413 9. Stadnytskyi V, Bax C, Bax A, Anfinrud P. The airborne lifetime of small speech droplets and their potential importance in SARS-CoV-2  
414 transmission. *Proc Natl Acad Sci*. 2020;117(22):11875–11877. doi:10.1073/pnas.2006874117
- 415 10. Buonanno G, Stabile L, Morawska L. Estimation of airborne viral emission: quanta emission rate of SARS-CoV-2 for infection risk assessment.  
416 *Environ Int*. 2020;141:105794. doi:10.1016/j.envint.2020.105794
- 417 11. Hameed T, Bashir E, Khan A, Ahmad M. Safety culture implications on safe work practices and work place exposure incidents in Operation  
418 Theater. *Pak J Med Sci*. 2021;37(2):379–384. doi:10.12669/pjms.37.2.2946
- 419 12. Nguyen L, Drew D, Graham M, et al. Risk of COVID-19 among front-line health-care workers and the general community: a prospective cohort  
420 study. *Lancet Public Health*. 2020;5(9):e475–e483. doi:10.1016/s2468-2667(20)30164-x
- 421 13. Government of India, Ministry of Health and Family Welfare. Revised Advisory for managing Health Care Workers (HCWs) working in COVID  
422 and NonCOVID areas of the Health Care Facilities. Available from: <https://www.mohfw.gov.in/pdf/RevisedAdvisoryformanagingHealthCareWorkersHCWsworkinginCOVIDandNonCOVIDareasofoftheHealthCareFacilitiesupdatedon9thJanuary2022.pdf>. Accessed January 22, 2022.
- 423 14. Nassani M, Al-Maweri S, AlSheddi A, et al. Teledentistry—knowledge, practice, and attitudes of dental practitioners in Saudi Arabia: a  
424 Nationwide Web-Based Survey. *Healthcare*. 2021;9(12):1682. doi:10.3390/healthcare9121682
- 425 15. Mishra S, Tripathi T. One year update on the COVID-19 pandemic: where are we now? *Acta Trop*. 2021;214:105778. doi:10.1016/j.  
426 actatropica.2020.105778
- 427 16. Ejaz H, Alsrhani A, Zafar A, et al. COVID-19 and comorbidities: deleterious impact on infected patients. *J Infect Public Health*. 2020;13  
428 (12):1833–1839. doi:10.1016/j.jiph.2020.07.014
- 429 17. Allison A, Ambrose-Dempster E, Bawn M, et al. The impact and effectiveness of the general public wearing masks to reduce the spread of  
430 pandemics in the UK: a multidisciplinary comparison of single-use masks versus reusable face masks. *UCL Open Envir*. 2021;3. doi:10.14324/  
431 111.444/ucloe.000022
- 432 18. Dugdale C, Walensky R. Filtration efficiency, effectiveness, and availability of N95 face masks for COVID-19 prevention. *JAMA Intern Med*.  
433 2020;180(12):1612. doi:10.1001/jamainternmed.2020.4218
- 434 19. Armfield JM, Spencer AJ, Stewart JF. Dental fear in Australia: who's afraid of the dentist? *Aust Dent J*. 2006;51:78–85. doi:10.1111/j.1834-  
435 7819.2006.tb00405.x
- 436 20. Pohjola V, Lahti S, Vehkalahti MM, Tolvanen M, Hausen H. Association between dental fear and dental attendance among adults in Finland. *Acta  
437 Odontol Scand*. 2007;65:224–230. doi:10.1080/00016350701373558
- 438 21. Saatchi M, Abtabhi M, Mohammadi G, Mirdamadi M, Binandeh EX. The prevalence of dental anxiety and fear in patients referred to Isfahan  
439 Dental School, Iran. *Dent Res J (Isfahan)*. 2015;12(3):248–253.
- 440 22. Nazir M, Almulhim K, AlDaamah Z, et al. Dental fear and patient preference for emergency dental treatment among adults in COVID-19  
441 quarantine centers in Dammam, Saudi Arabia. *Patient Prefer Adherence*. 2021;15:1707–1715. doi:10.2147/ppa.s319193
- 442 23. Guo H, Zhou Y, Liu X, Tan J. The impact of the COVID-19 epidemic on the utilization of emergency dental services. *J Dent Sci*. 2020;15 (4):564–  
443 567. doi:10.1016/j.jds.2020.02.002
- 444 24. Vergara-Buenaventura A, Castro-Ruiz C. Use of mouthwashes against COVID-19 in dentistry. *Br J Oral Maxillofac Surg*. 2020;58(8):924–927.  
445 doi:10.1016/j.bjoms.2020.08.016
- 446 25. Huang Y, Huang J. Use of chlorhexidine to eradicate oropharyngeal SARS-CoV-2 in COVID-19 patients. *J Med Virol*. 2021;93(7):4370–4373.  
447 doi:10.1002/jmv.26954
- 448 26. Chopra A, Sivaraman K, Radhakrishnan R, Balakrishnan D, Narayana A. Can povidone iodine gargle/mouthrinse inactivate SARS-CoV-2 and  
449 decrease the risk of nosocomial and community transmission during the COVID-19 pandemic? An evidence-based update. *Jpn Dent Sci Rev*.  
450 2021;57:39–45. doi:10.1016/j.jdsr.2021.03.001
- 451 27. Burton M, Clarkson J, Goulao B, et al. Antimicrobial mouthwashes (gargling) and nasal sprays administered to patients with suspected or  
452 confirmed COVID-19 infection to improve patient outcomes and to protect healthcare workers treating them. *Cochrane Database Syst Rev*. 2020.  
453 doi:10.1002/14651858.cd013627
- 454 28. Burton M, Clarkson J, Goulao B, et al. Antimicrobial mouthwashes (gargling) and nasal sprays to protect healthcare workers when undertaking  
455 aerosol-generating procedures (AGPs) on patients without suspected or confirmed COVID-19 infection. *Cochrane Database Syst Rev*. 2020.  
456 doi:10.1002/14651858.cd013628
- 457 29. Purayil T, Pentapati K, Muliya V, Gadicherla S, Notalapati R. Local dental emergencies and mitigation strategies adopted by private dental  
458 practitioners of South India during COVID-19 shelter in place warning - multi-centric online survey. *Open Dent J*. 2021;15(1):384–390.  
459 doi:10.2174/1874210602115010384
- 460 30. Ahmad Chaudhary F, Ahmad B, Gul M, et al. The psychological impact of the COVID-19 pandemic on oral health care workers and its impact on  
461 their willingness to work during this pandemic. *Arch Psychiatry Res*. 2021;57(2):179–188. doi:10.20471/dec.2021.57.02.06
- 462 31. Muller A, Hafstad E, Himmels J, et al. The mental health impact of the covid-19 pandemic on healthcare workers, and interventions to help them:  
463 a rapid systematic review. *Psychiatry Res*. 2020;293:113441. doi:10.1016/j.psychres.2020.113441
- 464 32. Javed M, Chaudhary F, Mohsin S, et al. Dental health care providers' concerns, perceived impact, and preparedness during the COVID-19  
465 pandemic in Saudi Arabia. *PeerJ*. 2021;9:e11584. doi:10.7717/peerj.11584
- 466 33. Chung J, Yeung W. Staff mental health self-assessment during the COVID-19 outbreak. *East Asian Arch Psychiatry*. 2020;30(1):34. doi:10.12809/  
467 eaap2014

# The Multifaceted Influence of COVID-19 on Indian Dentists: A Cross-Sectional Survey

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**Introduction:** COVID-19 has had a new challenge on dental workers, radically altering clinical and personal management. The cross-sectional survey sought to examine and comprehend the influence of COVID-19 on Indian dentistry practitioners.

**Methods:** A 38-item questionnaire-based survey was communicated to Indian dental practitioners through a web-based form (Google form). The questionnaire was categorized into four sections: (i) Personal protective equipment (PPE), (ii) dental treatments, (iii) auxiliary management, and (iv) personal impact. The findings were examined and studied in order to comprehend the repercussions of COVID-19. The questionnaire was completed by 513 of the 1129 dentists to whom it was delivered.

**Results:** For the current questionnaire, a response rate that we received was 45.44%. When compared to the pre-pandemic era, the use of PPE has increased dramatically (95.7%). The use of PPE alleviated dental practitioners' and patients' doubts about viral transmission. The epidemic prompted the Ministry of Health and Family Welfare (MoHFW) to issue specific recommendations for dental treatments, which were followed by 92.5% of dentists. The majority of dentists reported a considerable impact on both financial and mental health concerns. Teleconsulting and distant learning gained greater prominence. The COVID-19 epidemic affected the lives of dental professionals both within and outside of the dental setting, as well as the auxiliary.

**Conclusion:** COVID-19 has left a trail of devastation in its aftermath. Dentists were affected both emotionally and professionally. Dentists rapidly and uniformly followed the revised recommendations.

**Keywords:** auxiliary, COVID-19, dentist, distance learning, mental health, mouthwashes, PPE, psychological impact, rubber dam, tele consulting

## Introduction

COVID-19, caused by the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) virus, created unparalleled and severe disruption in our lives. It had an influence on many aspects of life, including social, economic, psychological, political, and interpersonal relationships. COVID-19 was designated an international public health emergency by the World Health Organization on January 30, 2020.<sup>1,2</sup> This unusual scenario had a serious impact on people's mental health and generated a stressful condition in society.<sup>3</sup> These circumstances were especially hard for people working in the healthcare system.<sup>4</sup> Health-care workers (HCWs) have worked diligently to provide emergency health-care services while also assisting in the containment of the virus's spread throughout the pandemic. HCWs were impacted on several levels, including stress, infection, mortality, exhaustion, minimal social well-being, occupational injuries, and restricted equipment availability.<sup>5</sup>



COVID-19 emerged from China in December 2019. It quickly escalated from a Chinese-only national problem to a worldwide catastrophe.<sup>6</sup> On January 27, 2020, India saw its first officially documented case. On March 24, India declared a national lockdown, bringing the whole country to a standstill.<sup>7,8</sup> The first wave of the pandemic during this period saw the closure of every facility except the emergency health-care facilities. During this time, the government limited human movement to just essential services, suspending non-essential services. SARS-CoV-2 is known to spread through the air or by respiratory droplets.<sup>9</sup> Inhalation or mucous membrane damage from direct or indirect spray renders a person vulnerable.<sup>9</sup> By coming into direct or indirect touch with mucosal membranes, contaminated surfaces can potentially enhance cross infection.<sup>10</sup>

Dentists are particularly susceptible to infection due to the nature of their work involving close quarters to the oral cavity and aerosolized procedures, with Occupational Safety and Health Administration (OSHA) guidelines placing them in the very high-risk category for nosocomial infection.<sup>11</sup> Furthermore, infection transmission through asymptomatic persons is a significant difficulty for dental workers in protecting themselves from the virus.

COVID-19 witnessed the implementation of new regulations in dental settings across the world.<sup>12</sup> The Ministry of Health and Family Welfare (Government of India) established comprehensive health-care standards for health-care personnel that were continuously revised in accordance with international criteria. The new standards required dental practitioners to adapt and change dental treatments in order to comply with the new regimen.<sup>13</sup> During the pandemic, tele-dentistry and tele-consultation were on the increase, and they may soon become a major feature in the area of dentistry.<sup>14</sup> It might have far-reaching implications in a sector that has historically relied on regular patient-doctor interaction. Social isolation and shorter treatment times have also altered our approach to patient care.

Over the last year, researchers have worked tirelessly to learn more about this virus, its potential consequences, and treatment options, resulting in rapidly changing knowledge and guidelines. It has resulted in the development of the COVID-19 vaccine, research into the role of comorbidities within the illness, and the adoption of basic preventative measures such as mask wearing.<sup>15-17</sup>

The aim of this questionnaire-based study is to understand the impact of COVID-19 on dentists and analyze the challenges faced by them in terms of access and use of protective equipment, management of staff, dealing with patient anxiety and their own mental health.

## Materials and Methods

A nation-wide cross-sectional study was conducted, and an online open survey was designed on Web-based form (Google forms). The survey questionnaire was face validated by experts in the field and ethical consent from the Institutional Ethical Committee (IEC) (CDSH/06/2021) was obtained. A pilot study was conducted on a subset of participants for a one-month period in June 2021 and modifications were made to the questionnaire. A minimum of two years' work experience was chosen to ensure they could compare at least one year of work experience before the pandemic to their work experience during the pandemic. Consent was received from all those participating in the study. The survey was anonymous and voluntary. Convenience sampling was performed and the dentists' email ids, SMS information and state of practice were obtained through a Dentist Directory on the Indian Dental Association website (<https://www.ida.org.in/Directories/DentistsDirectory>). The survey was then emailed as well as messaged to these dentists. Out of the total dentists emailed, dentists per state were emailed in proportion to number of dental colleges in that state. The form was tracked using the software Formstack to obtain data on total form views, unsubmitted incomplete forms and submitted completed forms.

The survey was a 38-question survey which took 3 minutes and 15 seconds to fill on average. It was divided into 4 sections: (i) Personal protective equipment (PPE) use, (ii) clinical operations, (iii) auxiliary management and (iv) personal impact. Some of the survey questions were single answer questions while some were multiple answer questions. The survey was open to new responses for a period of 6 months dating from 1st August, 2021 to 31st January, 2022.

The personal protective equipment (PPE) section pertained to use of N95 masks, use of PPE and its provision to patients, perceptions regarding safety afforded by PPE and its continued use post pandemic. It also delved upon perceptions relating to and psychological impact of using PPE as well as consistent adherence to safety protocols in each COVID wave.

The second part of the questionnaire was related to patient care and operative procedures. It covered patient flow, pre procedural precautions such as reverse transcriptase polymerase chain reaction (RT-PCR) tests, use of mouthwash before and during the pandemic, procedural changes such as regular use of rubber dam and alteration of treatment modalities to fall in line with Ministry of Health and Family Welfare (MoHFW) prescribed guidelines.

The auxiliary management section covered areas such as requirements for specialized training for auxiliary staff, reluctance to report to work, mental health of staff and solutions to ease burden.

The final section explores the impact of the pandemic on the dentist at a personal level. Questions posed include adoption of tele consulting and its future, continued dental education. Questions addressing stress, anxiety and the effect of the pandemic on the dentist's mental health were included. The participants were also questioned on activities they undertook to offset the mental effects of the pandemic. Descriptive analysis was performed on the responses.

## Results

A nationwide survey was conducted from 1st August 2021 to 31st January 2022 to understand the impact of COVID-19 on Indian dentists. Of the 1129 dentists that the questionnaire was sent to, 513 dentists submitted a completely filled questionnaire yielding a response rate of 45.44%.

One hundred and twenty-four dentists viewed the questionnaire and left the survey midway. Characteristics of the participants collected were Age, Gender, Nationality, level of education, i.e Bachelor of Dental Surgery (B.D.S) or Master of Dental Surgery (M.D.S), duration of clinical practice (minimum duration of 2 years), type of practice (group, individual or institutional), location of practice, part time or full time status. Forty eight percent point three respondents were below the age of 29, 46.7% were in the 30–59 range and 5% were above the age of 60. Fifty nine percent respondents were females and 41% were males. All respondents were Indian nationals (100%). Sixty five percent dentists had individual dental practices and 73% practiced full time. Fifty seven percent respondents had completed their Master of Dental Surgery (Table 1). Out of the 513 respondents 18% were from Maharashtra, 16% were from Tamil Nadu, 28% from Karnataka, 7% from Uttar Pradesh, 5% from Kerala, 4% from Andhra Pradesh, 4% from Punjab, 3% from Gujarat, Rajasthan, and Madhya Pradesh, 2% from Telangana and Haryana, 1% from Delhi, Chhattisgarh, West Bengal, Himachal Pradesh, and Jharkhand (Tables 1 and 2). All data collected regarding characteristics apart from geographic locations were self-reported.

**Table 1** Data from Questionnaire Regarding Sample Characteristics

|   | Characteristic                       |             |             | Total         |     |
|---|--------------------------------------|-------------|-------------|---------------|-----|
| 1 | Age                                  | >29 years   | 30–59 years | >60 years     | 513 |
|   |                                      | 248 (48.3%) | 240 (46.7%) | 25 (5%)       |     |
| 2 | Gender                               | Male        | Female      |               | 513 |
|   |                                      | 210 (41%)   | 303 (59%)   |               |     |
| 3 | Nationality                          | Indian      |             |               | 513 |
|   |                                      | 513 (100%)  |             |               |     |
| 4 | Number of years of clinical practice | 2–5 years   | 5–10 years  | >10 years     | 513 |
|   |                                      | 334 (65.1%) | 107 (20.9%) | 72 (14%)      |     |
| 5 | Type of practice                     | Individual  | Group       | Institutional | 513 |
|   |                                      | 333 (65%)   | 77 (15%)    | 103 (20%)     |     |
| 6 | Part time/Full time status           | Full time   | Part time   |               | 513 |
|   |                                      | 374 (73%)   | 139 (27%)   |               |     |

(Continued)

Table 1 (Continued).

|                   | Characteristic                  |                  |                       | Total |
|-------------------|---------------------------------|------------------|-----------------------|-------|
| 7                 | Level of Education              | BDS              | MDS                   | 513   |
|                   |                                 | 292 (57%)        | 221 (43%)             |       |
| 8                 | Geographic location of practice | State            | Number of respondents | 513   |
|                   |                                 | Karnataka        | 143 (28%)             |       |
|                   |                                 | Maharashtra      | 92 (18%)              |       |
|                   |                                 | Tamil Nadu       | 82 (16%)              |       |
|                   |                                 | Uttar Pradesh    | 35 (7%)               |       |
|                   |                                 | Kerala           | 25 (5%)               |       |
|                   |                                 | Andhra Pradesh   | 20 (4%)               |       |
|                   |                                 | Punjab           | 20 (4%)               |       |
|                   |                                 | Rajasthan        | 15 (3%)               |       |
|                   |                                 | Madhya Pradesh   | 15 (3%)               |       |
|                   |                                 | Telangana        | 10 (2%)               |       |
|                   |                                 | Gujarat          | 15 (3%)               |       |
|                   |                                 | Haryana          | 10 (2%)               |       |
|                   |                                 | Delhi            | 5 (1%)                |       |
|                   |                                 | Chhattisgarh     | 5 (1%)                |       |
|                   |                                 | West Bengal      | 5 (1%)                |       |
|                   |                                 | Himachal Pradesh | 5 (1%)                |       |
|                   |                                 | Jharkhand        | 5 (1%)                |       |
|                   |                                 | Bihar            | 0                     |       |
|                   |                                 | Orissa           | 0                     |       |
| Pondicherry       | 0                               |                  |                       |       |
| Assam             | 0                               |                  |                       |       |
| Jammu and Kashmir | 0                               |                  |                       |       |
| Uttarakhand       | 0                               |                  |                       |       |
| Manipur           | 0                               |                  |                       |       |
| Chandigarh        | 0                               |                  |                       |       |
| Daman and Diu     | 0                               |                  |                       |       |
| Goa               | 0                               |                  |                       |       |

## Use of Personal Protective Equipment (PPE)

A total of 65.1% respondents had been practicing clinically for 5 years, 20.9% for 5–10 years, and 14% for more than 10 years. Before the pandemic, 83.7% of dentists did not use personal protective equipment, and 92.9% did not use N95 masks (Figure 1). Following the outbreak of the pandemic, there was an increase in the number of practitioners adopting PPE (95.7%).

Only 41.9% respondents continued to use Personal Protective Equipment (PPE); however, 73.8% believed it is useful in protecting the practitioner (Figure 2). More than half respondents (55.8%) believed PPE should be continued to be used even when the pandemic ends (Figure 2). A total of 72% practitioners reported that they felt providing PPE to patients could be beneficial however less than half of them (20.9%) provided personal protective equipment to their patients (Figure 2). A significant number (48.8%) of dentists reported a beneficial psychological impact of use of PPE on both patient and practitioner with both feeling more safe and secure. An appreciable number of dentists (72.1%) had continued following the safety protocols issued in the first waves in the subsequent waves (Figure 2).

**Table 2** Data from Questionnaire Regarding Sample Geographical Information

|    |                   | State-Wise Distribution of Dental Colleges in India (Total – 323) | Number of Dentists Contacted for Survey Per State (Total – 1129) | Number of Dentists that Responded Per State (Total – 513) |
|----|-------------------|---|--|---|
| 1  | Karnataka         | 48 (14.8%)  | 167 (14.8%)  | 143 (28%)   |
| 2  | Maharashtra       | 38 (11.7%)  | 124 (11.7%)  | 92 (18%)  |
| 3  | Tamil Nadu        | 30 (9.2%)   | 101 (9.2%)   | 82 (16%)  |
| 4  | Uttar Pradesh     | 27 (8.3%)   | 93 (8.3%)  | 35 (7%)   |
| 5  | Kerala            | 26 (8.0%)   | 90 (8.0%)  | 25 (5%)   |
| 6  | Andhra Pradesh    | 16 (4.9%)   | 55 (4.9%)  | 20 (4%)   |
| 7  | Punjab            | 16 (4.9%)   | 55 (4.9%)  | 20 (4%)   |
| 8  | Rajasthan         | 16 (4.9%)   | 55 (4.9%)  | 15 (3%)   |
| 9  | Madhya Pradesh    | 15 (4.6%)   | 51 (4.6%)  | 15 (3%)   |
| 10 | Telangana         | 14 (4.3%)   | 48 (4.3%)  | 10 (2%)   |
| 11 | Gujarat           | 13 (4.0%)   | 45 (4.0%)  | 15 (3%)   |
| 12 | Haryana           | 10 (3.0%)   | 33 (3.0%)  | 10 (2%)   |
| 13 | Delhi             | 6 (1.8%)  | 20 (1.8%)  | 5 (1%)  |
| 14 | Chhattisgarh      | 6 (1.8%)  | 20 (1.8%)  | 5 (1%)  |
| 15 | West Bengal       | 6 (1.8%)  | 20 (1.8%)  | 5 (1%)  |
| 16 | Himachal Pradesh  | 5 (1.5%)  | 16 (1.5%)  | 5 (1%)  |
| 17 | Jharkhand         | 4 (1.2%)  | 13 (1.2%)  | 5 (1%)  |
| 18 | Bihar             | 4 (1.2%)  | 13 (1.2%)  | 0   |
| 19 | Orissa            | 4 (1.2%)  | 13 (1.2%)  | 0   |
| 20 | Pondicherry       | 4 (1.2%)  | 13 (1.2%)  | 0   |
| 21 | Assam             | 3 (0.9%)  | 10 (0.9%)  | 0   |
| 22 | Jammu and Kashmir | 3 (0.9%)  | 10 (0.9%)  | 0   |
| 23 | Uttarakhand       | 3 (0.9%)  | 10 (0.9%)  | 0   |
| 24 | Manipur           | 2 (0.6%)  | 6 (0.6%)   | 0   |
| 25 | Chandigarh        | 1 (0.3%)  | 3 (0.3%)   | 0   |
| 26 | Daman and Diu     | 1 (0.3%)  | 3 (0.3%)   | 0   |
| 27 | Goa               | 1 (0.3%)  | 3 (0.3%)   | 0   |

## Dental Procedures

A major decline was reported by 45.2% of dentists in patient flow since the onset of the pandemic (Table 3). They also noted a change in patients' behavior where 81% patients appeared to be taking extra precautions, 52.4% seemed to be more anxious, 35.7% were hesitant to seek treatment while 35.7% opted for tele consultations and 14.3% completely avoided consultations leading to a build-up of dental issues (Figure 3).

## Use Of PPE And N-95 Masks

|   | Yes   | No    | Sometimes |
|---|-------|-------|-----------|
| Did you use PPE before the pandemic?        | 4.7%  | 83.7% | 11.6%     |
| Did you use PPE during the pandemic?        | 95.7% | 4.3%  | 0%        |
| Did you use N-95 masks before the pandemic? | 4.8%  | 92.9% | 2.3%      |
| Did you use N-95 masks during the pandemic? | 92%   | 2.7%  | 5.3%      |

Figure 1 Response of the dentists regarding the use of PPE and N95 masks.

## USE OF PPE AND IMPACT

■ Yes ■ No ■ Sometimes

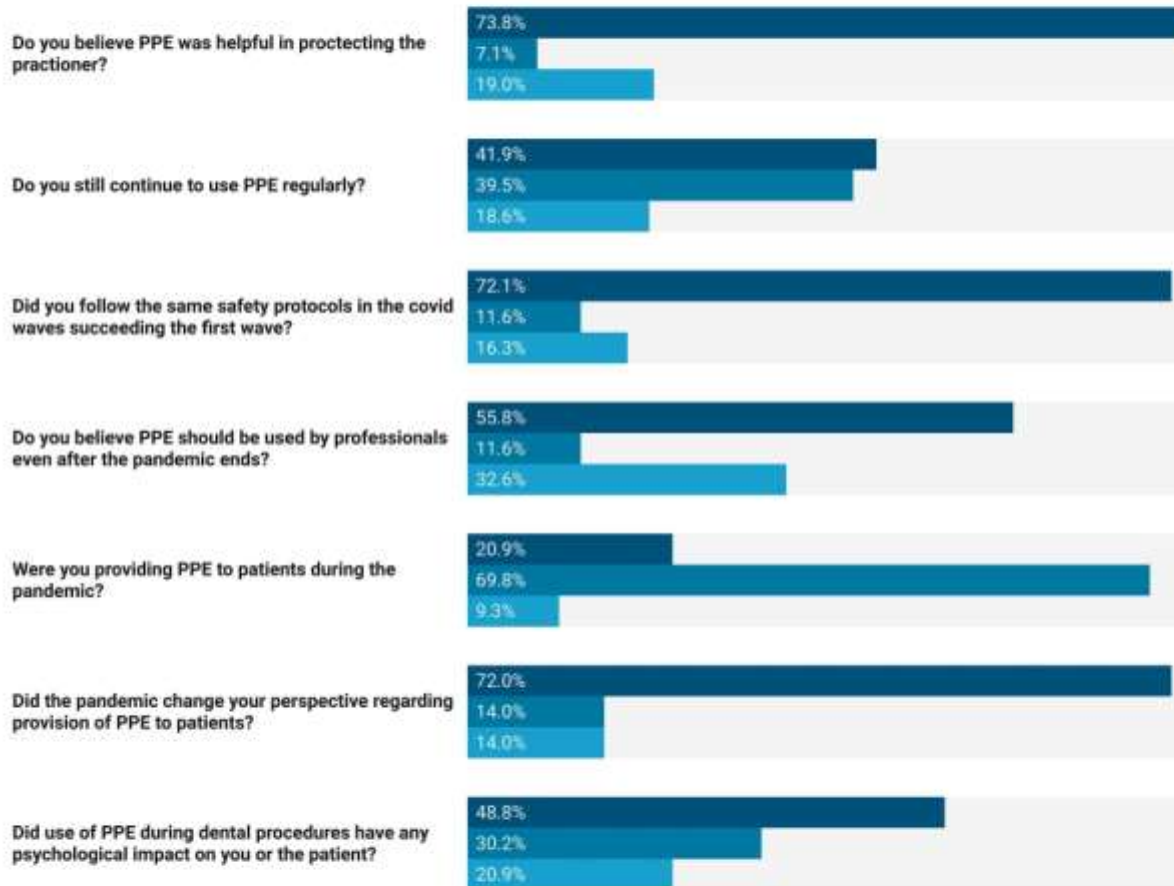


Figure 2 Response of the dentists regarding the use of use of PPE and its impact.

A considerable amount (34.1%) of practitioners noted changes in patient management in terms of safety protocol, infection control, first line of treatment compared to before the pandemic and 90.2% practitioners considered altering treatment due to the pandemic (Table 3). A large number (92.5%) of respondents stated they adhered to guidelines issued by the Ministry of Health and Family Welfare (Table 3). Just more than half (51.2%) clinicians used oral rinses regularly before the pandemic with the value changing to 78% during the pandemic (Table 3). However, only 48.8% believed it



**Table 3** Data from Questionnaire Regarding Patient Management

| Serial No. | Questions   | Responses              |                      |                         |                   | Total        |
|------------|---|------------------------|----------------------|-------------------------|-------------------|--------------|
|            |   | Major Decline          | Minor Decline        | No Decline              |                   |              |
| 1          | Was there a decline in number of patients reporting to dental clinics since the beginning of COVID-19 | 232 (45.2%)            | 205 (40.5%)          | 76 (14.3%)              |                   | 513          |
|            |   | <b>Yes</b>             | <b>No</b>            | <b>Some procedures</b>  |                   | <b>Total</b> |
| 2          | Do you ask every patient for a RT-PCR test before conducting any dental procedure?                    | 122 (23.8%)            | 183 (35.7%)          | 208 (40.5%)             |                   | 513          |
|            |   | <b>Yes</b>             | <b>No</b>            | <b>Sometimes</b>        |                   | <b>Total</b> |
| 3          | Did you regularly use a mouth wash for patients before procedures pre-pandemic ?                      | 263 (51.2%)            | 163 (31.7%)          | 87 (17.1%)              |                   | 513          |
|            |   | <b>Yes</b>             | <b>No</b>            |                         |                   | <b>Total</b> |
| 4          | Did you regularly use a mouth wash before procedures during the pandemic?                             | 400 (78%)              | 113 (22%)            |                         |                   | 513          |
|            |   | <b>Povidone iodine</b> | <b>Chlorhexidine</b> |                         |                   | <b>Total</b> |
| 5          | Which mouth wash did you use for patients during the pandemic began?                                  | 122 (23.73%)           | 391 (76.3%)          |                         |                   | 513          |
|            |   | <b>Yes</b>             | <b>No</b>            | <b>Not sure</b>         | <b>Cannot say</b> | <b>Total</b> |
| 6          | Do you believe mouth wash could halt the spread of COVID-19 infection?                                | 250 (48.8%)            | 25 (4.9%)            | 188 (36.6%)             | 50 (9.8%)         | 513          |
|            |   | <b>Yes</b>             | <b>No</b>            |                         |                   | <b>Total</b> |
| 7          | Did you use rubber dam regularly during procedures before the pandemic?                               | 192 (37.5%)            | 321 (62.5%)          |                         |                   | 513          |
| 8          | Did you use rubber dam regularly during procedures in the pandemic?                                   | 309 (60.3%)            | 204 (39.7%)          |                         |                   | 513          |
| 9          | Have you adhered to the guidelines prescribed by Ministry of Health and Family Welfare (MoHFW)?       | 475 (92.5%)            | 38 (7.5%)            |                         |                   | 513          |
| 10         | Did you consider altering treatment methods and protocol due to COVID-19 pandemic?                    | 463 (90.2%)            | 50 (9.8%)            |                         |                   | 513          |
|            |   | <b>Yes</b>             | <b>No</b>            | <b>Thought about it</b> |                   | <b>Total</b> |
| 11         | Did you educate yourself regarding COVID-19 and its impact on dentistry?                              | 451 (87.8%)            | 37 (7.3%)            | 25 (4.9%)               |                   | 513          |

could aid in the halt of infection (Table 3). Chlorhexidine (76.3%) over Povidone iodine was the preferred choice for dental practitioners (Table 3). One-third (23.8%) practitioners made RT-PCR tests for patients mandatory before treatment (Table 3). A small number of practitioners (37.5) used rubber dams during various procedures pre pandemic; however, this changed to 60.3% during COVID-19 (Table 3). A whopping number (87.8%) of practitioners have been

## Changes in patient behaviour



**Figure 3** Response of the dentists regarding the changes in patient behavior.

educating themselves regarding COVID-19 since the start of the pandemic while 7.3% did not educate themselves and a small number of dentists (4.9%) thought about educating themselves about COVID-19. After understanding the recent development related to COVID-19, large group of dentists (90.2%) altered the treatment protocols (Table 3).

## Auxiliary Staff

A substantial (70.7%) number of respondents stated that they think that dental assistants require special training post pandemic (Table 4). The measures used to combat psychological stress by auxiliary staff included educating (80%), counseling (57.5%), providing financial assistance (42.5%), flexible work schedule (45%) and an advance on salary (17.5%) (Table 4). Almost all (95.9%) dentists noticed an increase in concerns by auxiliary staff. They noted the majority feared contracting the virus (58.5%), followed by more anxious nature (29.3%), and hesitance to work (22%), while very few (9.8%) had apprehensions regarding salary (Table 4) (Figure 4). Considerable number of dentists (34.2%) experienced their auxiliary staff quitting their jobs (Table 4).

## Personal Impact

It was seen that 61% dentists felt that treatment and patient management had changed during the pandemic including the way they had to approach patients, new protocols, and an overall sense of fear that they had to deal (Table 5). A bulk (53.7%) of respondents practiced tele-dentistry during the pandemic and 39% felt it will play an important role in dentistry in the future (Table 5). Almost three quarters (65.9%) respondents felt distance learning has gained

**Table 4** Data from Questionnaire Regarding Auxiliary Staff and Their Management

| Serial No. | Questions  | Responses                               |                                       |   |                                       |  | Total        |
|------------|--|---|---------------------------------------|---|---------------------------------------|--|--------------|
|            |  | Yes                                     | No                                    | Maybe                                   |                                       |  |              |
| 1          | Do you think dental assistants require any special training post pandemic?   | 363 (70.7%)                             | 50 (9.8%)                             | 100 (17.1%)                             |                                       |  | 513          |
|            |  | <b>Counseling</b>                       | <b>Educating</b>                      | <b>Providing financial assistance</b>   | <b>Flexible work schedule</b>         | <b>Advance on salary</b>               |              |
| 2          | Were any measures taken to reduce psychological stress experienced by auxiliary staff at the clinic during the pandemic? | 295 (out of 513)<br>57.5% (out of 100%) | 410 (out of 513)<br>80% (out of 100%) | 218 (out of 513)<br>42.5% (out of 100%) | 231 (out of 513)<br>45% (out of 100%) | 90 (out of 513)<br>17.5% (out of 100%) |              |
|            |  | <b>Yes</b>                              | <b>No</b>                             |   |                                       |  | <b>Total</b> |
| 3          | Did auxiliary leave job at the clinic due to pandemic?   | 175 (34.2%)                             | 338 (65.8%)                           |   |                                       |  | 513          |

## Concerns shown by dental assistants during COVID-19



**Figure 4** Response of the dentists with respect to the concerns shown by dental assistants during COVID-19.

traction and will be important in the future (Table 5). Various difficulties were faced by dentists during the pandemic with 29.3% respondents having to move out of their clinic (Table 5). Half of (53.8%) respondents experienced poor financial returns while 20.5% had to downsize their team and let off staff members (Figure 5). A meager (12.2%) respondents also considered changing their profession during the pandemic (Table 5). Considerable number (67.5%) of respondents have seen partial economic recovery, while 12.5% have experienced continued losses (Table 5).

**Table 5** Data from Questionnaire Regarding Professional Impact

| Serial No. | Questions  |                          |                         |                         |                                  | Total        |
|------------|--|--------------------------|-------------------------|-------------------------|----------------------------------|--------------|
|            |  | Yes                      | No                      | Maybe                   |                                  |              |
| 1          | Was patient treatment and management the same as it was pre- pandemic?   | 175 (34.1%)              | 313 (61%)               | 25 (4.9%)               |                                  | 513          |
|            |  | <b>Yes</b>               | <b>No</b>               |                         |                                  | <b>Total</b> |
| 2          | Did distance learning play a more important role during the pandemic and do you think you will continue with it in the future? | 338 (65.9%)              | 175 (34.1%)             |                         |                                  | 513          |
|            |  | <b>Yes</b>               | <b>No</b>               | <b>Sometimes</b>        |                                  | <b>Total</b> |
| 3          | Did you practice tele medicine during the pandemic?  | 275 (53.7%)              | 137 (26.8%)             | 101 (19.5%)             |                                  | 513          |
|            |  | <b>Yes</b>               | <b>No</b>               | <b>Maybe</b>            |                                  | <b>Total</b> |
| 4          | Do you think tele medicine will play an important role in dentistry in the future?   | 200 (39%)                | 188 (36.6%)             | 125 (24.4%)             |                                  | 513          |
| 5          | Did you consider changing your profession during the pandemic?   | 63 (12.2%)               | 413 (80.5%)             | 37 (7.3%)               |                                  | 513          |
|            |  | <b>Yes</b>               | <b>No</b>               | <b>Did consider</b>     |                                  | <b>Total</b> |
| 6          | Did you move out of your place of practice during the pandemic?  | 150 (29.3%)              | 313 (61%)               | 50 (9.8%)               |                                  | 513          |
|            |  | <b>Complete recovery</b> | <b>Partial Recovery</b> | <b>Continued losses</b> | <b>Not affected economically</b> | <b>Total</b> |
| 7          | What has economic recovery after the first few waves looked like?  | 26 (5%)                  | 346 (67.5%)             | 64 (12.5%)              | 77 (15%)                         | 513          |

## Economic repercussions



Figure 5 Response of the dentists regarding the economic repercussions.

## Effect on mental health



Figure 6 Response of the dentists regarding the effect on mental health.

## Mental health management

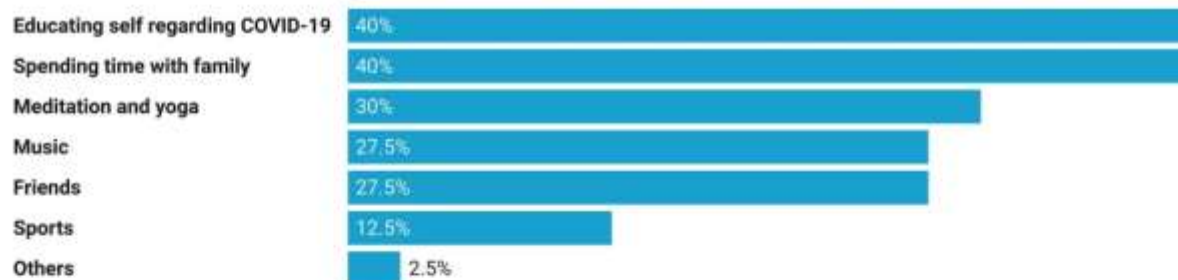


Figure 7 Response of the dentists regarding the measures taken for mental health management.

A considerable number (70%) of respondents said their mental health was affected during the pandemic with 55% experiencing an increase in anxiety, 50% more stressed, 22.5% felt isolated, 20% felt low and 17.5% faced anger management issues (Figure 6). Dentists used various measures to manage their mental health during the pandemic such as spending time with family (40%), educating themselves regarding COVID-19 (40%), meditation and yoga (30%), friends (27.5%), music (27.5%), sports (12.5%) (Figure 7).

## Discussion

The study results described the dentists' experiences during the pandemic. While an inclusion criteria was that all the respondents had to have an experience of minimum of 2 years that had to be self-reported, majority of those who completed the questionnaire had been practicing clinically for less than 5 years (65.1%), a smaller percentage had been practicing for 5–10 years (20.9%), and the remainder had been practicing for more than 10 years (14%) hence the results are a more appropriate representation of recently graduated professionals (Table 1). The greatest percentage of respondents were from Karnataka (28%), Maharashtra (18%), and Tamil Nadu (16%) (Table 2).

Surgical masks or cotton fabricated masks were used more prevalently and N95 was restricted to a very few (0.7%) dental professionals on a daily routine basis pre-pandemic. The use of N95 masks was on a rapid rise during the COVID-19 pandemic.<sup>18</sup> The main advantage of a N95 mask was its filtration efficiency and tight seal, thus preventing air leakage around the edges.<sup>18</sup> While respirators provide more protection, they may be more difficult to tolerate or wear continuously.

PPE supply to patients was uncommon in pre-pandemic dentistry facilities. Various studies affirmed the importance of PPE in protecting the dental professionals as well as the patients in the dental operator.<sup>20,21</sup> Majority dentists (73.8%) believed that PPE was an important aspect in controlling the spread of COVID-19 infection in the dental operator. This brought about a change in perspective regarding use of PPE and regarding provision of PPE to patients (72%). Following the commencement of the pandemic, there was a surge in the percentage of practitioners adopting PPE (95.7%). A significant proportion of dental professionals (88.4%) made the use of PPE mandatory after the first wave, whereas the rest gradually reduced their usage of PPE over time (11.6%). The decrease in PPE usage can be ascribed to variables such as communication challenges (visual, auditory, or verbal), heat, pressure, or discomfort, and dizziness or difficulty concentrating. Despite a steady drop in PPE use throughout the course of the pandemic, it is worth noting that more than half of respondents believed that PPE use should continue after the pandemic.

Fear and anxiety are emotional issues that may be linked to the widespread coverage of the COVID-19 pandemic in social, electronic, and print media. A total of 40.5% of dentists reported a minor decrease in the number of patients, which is relevant because of the outbreak; however, it raises the question of how many patients neglected treatment because of which they potentially reported at a later stage when tooth had been irreversibly damaged. Armfield et al discovered that people with high fear were more likely to have a longer duration since their last dental visit in a study of Australian residents.<sup>19</sup> According to Pohjola et al, high fear was associated with irregular dental attendance among Finnish adults.<sup>20</sup> Analogously, in Iran, Saatchi et al unearthed that patients who attended irregularly were more afraid than regular attendees.<sup>21</sup> This denial of dental care due to fear may exacerbate pre-existing oral conditions, create a negative spiral of dental fear, enhance treatment needs, and deteriorate oral health status.<sup>22</sup>

Dentists observed that majority of patients (81%) became more careful while visiting the dental clinic. These patients' donned N95 masks in addition to surgical masks, latex gloves before and after entering the dental setting, and hand sanitizers. During this time span, a considerable number of patients (52.4%) began to be more nervous, which might be connected to the fear of contracting infection in the dental setting or the use of PPE by themselves during dental treatments. Some patients (35.7%) were apprehensive to visit the dental clinic and indicated greater interest in telemedicine (35.7%). During this time, a portion of patients (14.3%) entirely skipped dental care. In Beijing, China, a retrospective analysis revealed that 1567 patients gained emergency dental services prior to the COVID-19 epidemic, compared to 970 patients during the pandemic. This revealed a 38.1% decline in emergency dental care usage, indicating that the COVID-19 epidemic had a significant impact on emergency dental care utilization.<sup>23</sup>

Because of the characteristics of the COVID-19 virus's dissemination, majority of dentists (40.5%) made the negative RT PCR test essential only for certain treatments. Around 35.7% of dentists did not request RT PCR testing for any of the treatment operations, but the remaining dentists (23.8%) made negative RT PCR tests necessary for all dental treatments, which might be associated with safeguarding everyone in the dental operator.

Because of the proximity to the patient during dental treatment, the elevated production of aerosols, and the identification of SARS-CoV-2 in saliva, the oral cavity has been viewed as a possible reservoir for COVID-19 transmission. To decrease the number of microorganisms in aerosols and drops throughout dental procedures, preoperative antimicrobial mouth rinses with chlorhexidine gluconate (CHX), cetylpyridinium chloride (CPC), povidone-iodine (PVP-I), and hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) have been suggested. Even before the pandemic, antiseptic mouthwashes were widely used in dentistry, particularly preoperatively.<sup>24</sup> Because of the antiseptic nature of mouthwashes, more than half of dentists (51.4%) used them in pre-operative procedures. The usage of mouthwashes increased substantially following the onset of COVID-19 (78%). The majority (76.3%) utilized chlorhexidine, while the remainder used povidone iodine solution (23.7%). SARS-CoV-2 was eliminated from the oropharynx of those who used chlorhexidine as an oral rinse, according to one investigation.<sup>25</sup> Studies were carried out to understand if mouthwashes could halt or reduce the spread of COVID-19 infection.<sup>26-28</sup> Based on different studies, it was understood that antiseptic mouthwashes lower the chances

of spread of COVID-19 infection.<sup>24</sup> The same was reflected by just less than half of the dentists (48.8%) who believed that mouthwashes could halt the spread of infection.

Rubber dam is an important aid used during the treatment mainly for isolation procedures. A whopping number of dentists (67.5%) stated that they had not been using rubber dams in dental procedures while the rest had been using rubber dams. Guidelines and safety protocols were released by the Government of India in line with the guidelines released by the WHO. Almost all (92.5%) adhered to all the guidelines released to ensure safety for everyone in the dental setup. A small number of dentists (7.5%) did not follow the guidelines. Around 87.8% of dentists made an effort to understand COVID-19's impact on dentistry using available evidence. And 90.2% altered treatment approach in accordance. Non-emergency procedures were postponed, treatment time was shortened, aerosol generating procedures were suspended and emphasis was placed on ventilation of the operator.<sup>29</sup>

COVID-19 presented a conflicting situation to dentists in terms of not simply taking care of themselves but also the auxiliary staff employed at their clinics.<sup>29,30</sup> The survey showed that the auxiliary staff showed an increase in fear of contracting the virus (58.5%), greater anxiety (29.3%), hesitation in working (22%) as well as no shows to work (2.4%). Staff management combined with patient fears and an explosive outburst of disease posed a daunting challenge to dentists. One year later dentists have been able to evaluate the staffs as well as their preparedness for situations like these in the future. The survey showed that 70.7% respondents believe dental assistants require special training post pandemic. The crux of the problem potentially lies in poor availability of simplified information to understand the rapid changes in information relating to disease and the associated protocols. Continued education programs and regular updating of staff with changes in medicine can aid in doing away with fears and make staff members more secure in the work they do. The scope of additional training could include common diseases encountered as well as diseases that require universal precautions. Further training in infection control, regular updating of protocols and counselling to aid in dealing with high stress situations could aid in improved patient outcomes. Measures such as educating, counseling and providing financial assistance with flexible work schedules were some of the measures taken up by dentists to reduce psychological stress and need to be carried forward beyond the pandemic.

The survey also showed that 34.2% of staff members left their jobs. Finding new staff members posed an added challenge to dentists. Creation of a national portal with registered dentists and auxiliary staff members as well as their region of practice/residence could simplify hiring especially when manpower resources are limited. It could also provide staff members with increased options and control when searching for jobs.

Distance learning took on a new important role and 65.9% respondents in the survey felt distance learning is and will continue to be crucial. Increasing availability of such courses and making them more accessible through subscription services could promote continued education. Technology is rapidly changing conventional dentistry. Tele-medicine provided a way to interact and manage patients while in isolation. Further development of this field could potentially aid in delivering universal healthcare.

The economic impact was felt across the profession with a downturn in regular income. This yielded a section of dentists to shut down their clinics, lay off workers or simply absorb losses dipping into previous savings. Aid and stimulus packages by the government could have aided dentists. Discussions and policy changes need to be tabled by the Dental Council of India in conjunction with the government to ensure security for dentists in lieu of future crises like this.

Mental health has also been deeply impacted during the pandemic. Between one and two of every five health-care workers reported anxiety, depression-related symptoms, distress, and/or sleep problems.<sup>31,32</sup> A focus on self-care, therapy and social support through friends and family could aid in combating the mental effects of the pandemic. The most commonly reported protective factor associated with reduced risk of mental health problems was having social support.<sup>31</sup> However, what is interesting is that the focus on individual risk and resilience factors and pathology in research may hinder the discovery of underlying organizational faults, which could be more appropriate targets of intervention. In Mueller's systematic review it was seen that in two studies participants specified that they had a greater need for personal protective equipment than for psychological help. Chung and Yeung reported this in a survey that allowed health-care workers to describe their needs and concerns in free text and to request contact with a psychiatric nurse.<sup>33</sup> This points to the need to rapidly assess and diagnose faults at individual as well as institutional level.

A limitation of the present investigation was that it was limited to Indian dental practitioners. Also, the years of practice was self-reported. The analysis also does not quantify the type of economic hardships endured by dentists. Additionally, it presents hardships faced by auxiliary from a dentist's perspective and does not represent the staff members views. Further, despite repeatedly following up with dentists, responses from some states were not received.

## Conclusions

As a result, while the COVID-19 pandemic persists, new cases are still being noted, and the hazard of reciprocal transmission of infection between patients and dental care providers necessitates additional precautionary measures to limit COVID-19 spread. According to the current data, the COVID-19 pandemic influenced how dentists practiced, with elevated use of PPE for themselves and patients. During the COVID-19 pandemic, fear was common among patients, with a significant proportion exhibiting high dental fear and anxiety. There was a decrease in dental patient flow, increased anxiety among patients and auxiliary staff. Dentists were heavily affected economically and recovery has been slow but steady. Investigating its timeline, stimulus packages and potential future infrastructure requirements could be interesting.

## Data Sharing Statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Ethics Approval and Consent to Participate

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Ethics committee, Department of Conservative Dentistry and Endodontics, College of Dental Sciences & Hospital, Indore 453331, India with the Ethics approval code (CDSH/06/2021). As the questionnaire was anonymous informed consent was not applicable. The survey was anonymous and voluntary.

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## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work. Alternatively, this section can be removed. Please amend your manuscript file accordingly.

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## Disclosure

The authors declare no conflicts of interest.

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## References

1. Robillard R, Saad M, Edwards J, et al. Social, financial and psychological stress during an emerging pandemic: observations from a population survey in the acute phase of COVID-19. *BMJ Open*. 2020;10(12):e043805. doi:10.1136/bmjopen-2020-043805
2. Chaudhary F, Fazal A, Javaid M, et al. Provision of endodontic treatment in dentistry amid COVID-19: a systematic review and clinical recommendations. *Biomed Res Int*. 2021;2021:1–8. doi:10.1155/2021/8963168
3. Gallegos A. WHO declares public health emergency for novel coronavirus. *medscape medical news*. References-ScientificResearch Publishing; 2020. Available from: <https://www.scirp.org/reference/referencespapers.aspx?referenceid=3067856>. Accessed January 19, 2022.

4. Benfante A, Di Tella M, Romeo A, Castelli L. Traumatic stress in healthcare workers during COVID-19 Pandemic: a review of the immediate impact. *Front Psychol*. 2020;11. doi:10.3389/fpsyg.2020.569935
5. Ehrlich H, McKenney M, Elkbuli A. Protecting our healthcare workers during the COVID-19 pandemic. *Am J Emerg Med*. 2020;38(7):1527–1528. doi:10.1016/j.ajem.2020.04.024
6. Yu J, Zhang T, Zhao D, Haapasalo M, Shen Y. Characteristics of endodontic emergencies during coronavirus disease 2019 outbreak in Wuhan. *J Endod*. 2020;46(6):730–735. doi:10.1016/j.joen.2020.04.001
7. Shinde O, Pawar A, Banga K, Atram J, Waljuningran D. Endodontic emergencies in Mumbai City during COVID-19 lockdown and different phases of unlock. *Int J Environ Res Public Health*. 2021;18(14):7314. doi:10.3390/ijerph18147314
8. Wikipedia. COVID-19 pandemic in India. Available from: [https://en.wikipedia.org/wiki/COVID-19\\_pandemic\\_in\\_India](https://en.wikipedia.org/wiki/COVID-19_pandemic_in_India). Accessed January 24, 2022.
9. Stadnytskyi V, Bax C, Bax A, Anfinrud P. The airborne lifetime of small speech droplets and their potential importance in SARS-CoV-2 transmission. *Proc Natl Acad Sci*. 2020;117(22):11875–11877. doi:10.1073/pnas.2006874117
10. Buonanno G, Stabile L, Morawska L. Estimation of airborne viral emission: quanta emission rate of SARS-CoV-2 for infection risk assessment. *Environ Int*. 2020;141:105794. doi:10.1016/j.envint.2020.105794
11. Hameed T, Bashir E, Khan A, Ahmad M. Safety culture implications on safe work practices and work place exposure incidents in Operation Theater. *Pak J Med Sci*. 2021;37(2):379–384. doi:10.12669/pjms.37.2.2946
12. Nguyen L, Drew D, Graham M, et al. Risk of COVID-19 among front-line health-care workers and the general community: a prospective cohort study. *Lancet Public Health*. 2020;5(9):e475–e483. doi:10.1016/s2468-2667(20)30164-x
13. Government of India, Ministry of Health and Family Welfare. Revised Advisory for managing Health Care Workers (HCWs) working in COVID and NonCOVID areas of the Health Care Facilities. Available from: <https://www.mohfw.gov.in/pdf/RevisedAdvisoryforManagingHealthCareWorkersHCWsworkinginCOVIDandNonCOVIDAreasoftheHealthCareFacilitiesupdatedon9thJanuary2022.pdf>. Accessed January 22, 2022.
14. Nassam M, Al-Maweri S, AlSheddi A, et al. Teledentistry—knowledge, practice, and attitudes of dental practitioners in Saudi Arabia: a Nationwide Web-Based Survey. *Healthcare*. 2021;9(12):1682. doi:10.3390/healthcare9121682
15. Mishra S, Tripathi T. One year update on the COVID-19 pandemic: where are we now? *Acta Trop*. 2021;214:105778. doi:10.1016/j.actatropica.2020.105778
16. Ejaz H, Alsrhani A, Zafar A, et al. COVID-19 and comorbidities: deleterious impact on infected patients. *J Infect Public Health*. 2020;13(12):1833–1839. doi:10.1016/j.jiph.2020.07.014
17. Allison A, Ambrose-Dempster E, Bawn M, et al. The impact and effectiveness of the general public wearing masks to reduce the spread of pandemics in the UK: a multidisciplinary comparison of single-use masks versus reusable face masks. *UCL Open Environ*. 2021;3. doi:10.14324/111.444/ucloe.000022
18. Dugdale C, Walensky R. Filtration efficiency, effectiveness, and availability of N95 face masks for COVID-19 prevention. *JAMA Intern Med*. 2020;180(12):1612. doi:10.1001/jamainternmed.2020.4218
19. Arnfield JM, Spencer AJ, Stewart JF. Dental fear in Australia: who's afraid of the dentist? *Aust Dent J*. 2006;51:78–85. doi:10.1111/j.1834-7819.2006.tb00405.x
20. Polijola V, Lahti S, Vehkälähti MM, Tolvanen M, Hausen H. Association between dental fear and dental attendance among adults in Finland. *Acta Odontol Scand*. 2007;65:224–230. doi:10.1080/00016350701373558
21. Saatchi M, Altabhi M, Mohammadi G, Mirdamadi M, Binandeh EX. The prevalence of dental anxiety and fear in patients referred to Isfahan Dental School, Iran. *Dent Res J (Isfahan)*. 2015;12(3):248–253.
22. Nazir M, Almulhim K, AlDaamah Z, et al. Dental fear and patient preference for emergency dental treatment among adults in COVID-19 quarantine centers in Dammam, Saudi Arabia. *Patient Prefer Adherence*. 2021;15:1707–1715. doi:10.2147/ppa.s319193
23. Guo H, Zhou Y, Liu X, Tan J. The impact of the COVID-19 epidemic on the utilization of emergency dental services. *J Dent Sci*. 2020;15(4):564–567. doi:10.1016/j.jds.2020.02.002
24. Vergara-Buenaventura A, Castro-Ruiz C. Use of mouthwashes against COVID-19 in dentistry. *Br J Oral Maxillofac Surg*. 2020;58(8):924–927. doi:10.1016/j.bjoms.2020.08.016
25. Huang Y, Huang J. Use of chlorhexidine to eradicate oropharyngeal SARS-CoV-2 in COVID-19 patients. *J Med Virol*. 2021;93(7):4370–4373. doi:10.1002/jmv.26954
26. Chopra A, Sivaraman K, Radhakrishnan R, Balakrishnan D, Narayana A. Can povidone iodine gargle/mouthrinse inactivate SARS-CoV-2 and decrease the risk of nosocomial and community transmission during the COVID-19 pandemic? An evidence-based update. *Jpn Dent Sci Rev*. 2021;57:39–45. doi:10.1016/j.jdsr.2021.03.001
27. Burton M, Clarkson J, Goulo B, et al. Antimicrobial mouthwashes (gargling) and nasal sprays administered to patients with suspected or confirmed COVID-19 infection to improve patient outcomes and to protect healthcare workers treating them. *Cochrane Database Syst Rev*. 2020. doi:10.1002/14651858.cd013627
28. Burton M, Clarkson J, Goulo B, et al. Antimicrobial mouthwashes (gargling) and nasal sprays to protect healthcare workers when undertaking aerosol-generating procedures (AGPs) on patients without suspected or confirmed COVID-19 infection. *Cochrane Database Syst Rev*. 2020. doi:10.1002/14651858.cd013628
29. Purayil T, Pentapati K, Muliya V, Gadicherla S, Nutalapati R. Local dental emergencies and mitigation strategies adopted by private dental practitioners of South India during COVID-19 shelter in place warning - multi-centric online survey. *Open Dent J*. 2021;15(1):384–390. doi:10.2174/1874210602115010384
30. Ahmad Chaudhary F, Ahmad B, Gul M, et al. The psychological impact of the COVID-19 pandemic on oral health care workers and its impact on their willingness to work during this pandemic. *Arch Psychiatry Res*. 2021;57(2):179–188. doi:10.20471/dec.2021.57.02.06
31. Müller A, Hafstad E, Himmels J, et al. The mental health impact of the covid-19 pandemic on healthcare workers, and interventions to help them: a rapid systematic review. *Psychiatry Res*. 2020;293:113441. doi:10.1016/j.psychres.2020.113441
32. Javed M, Chaudhary F, Mohsin S, et al. Dental health care providers' concerns, perceived impact, and preparedness during the COVID-19 pandemic in Saudi Arabia. *PeerJ*. 2021;9:e11584. doi:10.7717/peerj.11584
33. Chung J, Yeung W. Staff mental health self-assessment during the COVID-19 outbreak. *East Asian Arch Psychiatry*. 2020;30(1):34. doi:10.12809/eaap2014



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