

**Awareness of Infection Control in COVID 19 Pandemic among Dental Practitioners of Ahmedabad District, Gujarat, India: A Cross Sectional Survey**

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**Abstract**

**Background:** Despite the availability of prevention guidelines and recommendations on infection control, many dental practices lack the minimum requirements of infection control.

**Aim:** The aim of the current study was to evaluate the awareness, regarding infection control in COVID19 pandemic among dental practitioners in Ahmedabad district.

**Materials and methods:** A self-administered, structured, pilot-tested close-ended 15 points questionnaire, was distributed among the dental practitioners in Ahmedabad district. A total of 150 participants completed the questionnaire. Data obtained was analyzed using SPSS 20 for data analysis.

**Results:** Among 125 participants a total of 72 (57.6%) exhibited high level of knowledge while 35 (28%)

demonstrated moderate knowledge and 18 (14.4) demonstrated low level of knowledge. Mean knowledge score was  $12.76 \pm 2.47$ , minimum and maximum scores were 5 and 15 respectively among the dental practitioners.

**Conclusion:** All the respondents seem to have adequate knowledge regarding COVID19 and adoption of infection control measures to prevent the spread of COVID19. The dental practitioners must be well informed of the recommended practices. Initiatives for attending webinars, continuing dental education programs on COVID19, have to be undertaken to keep themselves updated and be prepared with extra precautionary measures to be taken.

**Keywords:** Dentists, COVID 19, Infection control, Pandemic.

### Introduction

An outbreak of novel coronavirus disease (COVID-19) in China has influenced every aspect of life.<sup>1</sup> Within a few months, COVID-19 has spread globally and on 11th March 2020, the World Health Organization (WHO) declared it as a controllable pandemic disease.<sup>2,3</sup> The latest strain of coronavirus is believed to have originated in a seafood market in Wuhan, China<sup>1</sup>. On 11th February 2020, WHO used the term COVID-19 to describe the latest strain of coronavirus.<sup>4</sup> Structurally, COVID-19 is an ss-RNA, enveloped virus with a size of ~350 kilobase-pair (kbp) belonging to the  $\beta$  -Coronavirus genus.<sup>5</sup> It is known, to exploit angiotensin-converting enzyme 2 receptor(ACE2), which is found in the lower respiratory tract.<sup>1,2</sup>

Humans suffering from this disease clinically present with the primary symptoms of fever, cough, myalgia or fatigue, abnormal chest computed tomography (CT)image, and severe respiratory distress, whereas less common symptoms include sputum production, headache, hemoptysis, and diarrhea.<sup>6,7</sup> Initially, it was considered to have a zoonotic route of transmission; however, a new

person-to-person route of transmission is causing the disease to spread rapidly across different continents and is more likely to affect elderly males.<sup>7</sup>

In India, several active cases and deaths has been reported and the data is changing at an alarming rate every day. A huge number of medical staff were reported to acquire the disease while they were working with infected individuals.<sup>8</sup> The basic concept in mode of viral transmission is mainly through inhalation/ingestion/direct mucous contact with saliva droplets, respiratory fluids and aerosols; they can also survive on surfaces, objects that are exposed to infected body fluids.<sup>6</sup> Since the viral load contained in the human saliva is very high, it may serve as a potential source of infection. Owing to the nature of the dental procedures and treatments, dental office seems to be at high risk for this nosocomial infection and dental practitioner are considered to be at high risk.

Although patients diagnosed with COVID-19 are not supposed to receive dental treatments, dental emergencies are possible to occur, thereby, a close contact is unavoidable. Furthermore, the relatively prolonged incubation period of the disease; the median incubation period was estimated to be 5.1 days (95% CI, 4.5 to 5.8 days) or up to 14 days for some cases, before any symptoms could be even detected, and the post-infection period are both challenging to the medical staff to recognize the existence of COVID-19 infection, which could increase the transmission of the disease during these lay periods. Therefore, patients infected with COVID-19, without showing symptoms, are of a great threat to dentists and other members of the dental team. Dentists, thereby, should entertain a high level of awareness and integrity to deal with the disease and be able to control and manage its spread.<sup>8</sup>

There are practical guidelines recommended to dentists and dental staff by the Center for Disease Control and

Prevention (CDC), the American Dental Association (ADA) and the World Health Organization (WHO) to control the spread of COVID-19.<sup>9-11</sup> Like other contagious infections, these recommendations include personal protective equipment, hand wash, detailed patient evaluation, rubber dam isolation, anti-retraction handpiece, mouth rinsing before dental procedures, and disinfection of the clinic. In addition, some guidelines and reports had provided useful information about the signs and symptoms of the disease, ways of transmission, and referral mechanisms, to increase dentists' knowledge and prevention practices so they could contribute – at a population level – in disease control and prevention.

Taking into consideration the severity of the COVID19 pandemic, it is important to implement sound prevention measures in dental clinics and optimize their clinical practice to the changing trends to ensure safe and risk free practice. Hence, the current study aimed to assess the level of awareness regarding, COVID19 and infection control measures among dental practitioner in Ahmedabad district.

### Materials and methods

The current study was conducted after obtaining ethical clearance from the ethical committee of the college. The questionnaire was designed to be anonymous. The data were kept confidential and the results did not identify the respondents personally. The cross-sectional study was conducted among dental practitioner who are engaged in private practice in the Ahmedabad District. Taking account of potential errors and sample loss, a final sample size was estimated to be 125.

### Research instrument

A self-designed questionnaire written in English language was made by a research expert for the study. The questionnaire consisted of demographic data (3) and the (15) awareness questions (Table 1). The questionnaire was

made available using online mode as Google documents and the link was circulated among the practitioner using mail Id's and what's app. The principal investigator had access to the study data and the Responses from only those dental practitioners who gave consent by answering the questionnaire within the limited time frame of three months included in the study.

Total awareness score was calculated based on subject's responses. Each negative response was given “0” score and positive response was given “1” and The total score of the participant was calculated by adding the sum of all responses, that ranged from 1 to 15. The expected maximum total knowledge score was 15 and a minimum score of 0. Subject's levels of knowledge were defined based on Bloom's criteria. Based on the sum scores, level of knowledge was classified into low level knowledge (less than 60%; 0–8 scores), moderate level knowledge (60–80%; 9–11 scores) and high level knowledge (80–100%; 12–15score).

### Statistical analysis

The data was analyzed with IBM SPSS 20 for windows statistical software, and were presented by using mean and standard deviation. Categorical variables were presented by using frequency and percentage. The significance was set at <0.05.

Table 1: Questionnaire

1. Do you think COVID-19 increased potential risks mainly for dentist and staff?
2. Do you think COVID-19 has changed your perception of infection risks in a dental office?
3. Have you reviewed and implemented latest guidelines towards COVID-19 pandemic?
4. Do you have a policy and procedure for Infection Control and Prevention plan?

5. Have staff been trained on and demonstrated competency in the listed general standard precautions?
6. Do you have record of staff training on COVID-19 symptoms, transmission, screening criteria, and work exclusions?
7. Do you know what PPE should be used for which procedures, including guidance on optimization?
8. Do you know when to use alcohol-based hand rub vs. washing with soap and water?
9. Have you adapted your IPCP (Infection Prevention and Control Program Standards) for undiagnosed respiratory illness and COVID-19?
10. Do you have a policy on visitor screening and entry, including special circumstances under which a visitor will be permitted?
11. Would you prefer patients to have in-office rapid tests for COVID-19 before treatment?
12. Do you practice pre procedural mouth rinse with 0.2 povidone iodine or 1% hydrogen peroxide?
13. Do you sanitize working area after each patient?
14. Do you keep enough time interval between patients' appointments?
15. Are you using any mobile application to tract the health record of the patients coming to your clinic?

**Results**

Total 125 participants completed the survey questionnaires. The majority of the participants were females (60.8%). The mean age of the participants was 36.4 years with an SD (standard deviation) of 5.030. The age ranged from 25 years to 60 years. Subject's response for individual question is given in table 2. The summary of the frequency & percentage of responses on awareness regarding the COVID19 pandemic is shown in (Table 3).

A total of 72 (57.6%) participants exhibited high level of knowledge while 35 (28%) demonstrated moderate knowledge and 40 (14.4%) demonstrated low level of knowledge. Low level of knowledge was more obvious in questions related to IPCP (Infection Prevention and Control Program Standards) for undiagnosed respiratory illness, staff training, pre procedural mouth rinse with 0.2 povidone iodine or 1% hydrogen peroxide Personal protective kit usage and usage of mobile application in which the negative responses rate were 31.5%, 27%, % 48.8% and 40.4% respectively as shown in (Table 2, Graph 1). Mean knowledge score of  $12.76 \pm 2.47$ , minimum and maximum scores were 5 and 15 respectively.

The relationship of sociodemographic characteristics and overall mean knowledge are demonstrated in (Table 4). Among the socio demographic factors in the current study gender and age were factors that showed statically significant association with mean knowledge. Female dental practitioner exhibited more knowledge ( $13.80 \pm 1.67$  vs.  $12.25 \pm 2.78$ ,  $P = 0.01$ ), based on the age, practitioners with an age of more than 40 years have more experience and showed more knowledge compare to the practitioners between the age of 25 to 40. ( $11.21 \pm 1.62$  vs.  $10.46 \pm 2.31$ ,  $P = 0.00$ ). (Table 3).

Table 2: Subject response for individual question

Questions	Yes(%)	No(%)
1	98.9	1.1
2	95.5	4.5
3	96.6	3.4
4	84.3	15.7
5	89.9	10.1
6	75.3	27
7	87.6	12.4
8	83.1	16.9
9	68.5	31.5

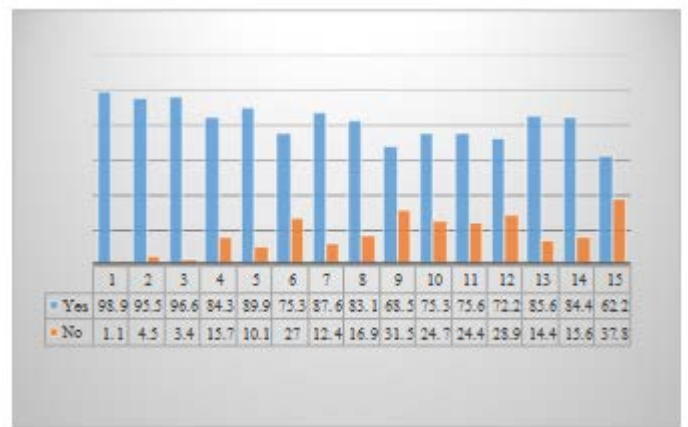
10	75.3	24.7
11	75.6	24.4
12	72.2	28.9
13	85.6	14.4
14	84.4	15.6
15	62.2	37.8

Table 3: Knowledge score among study participants (according to likert scale)

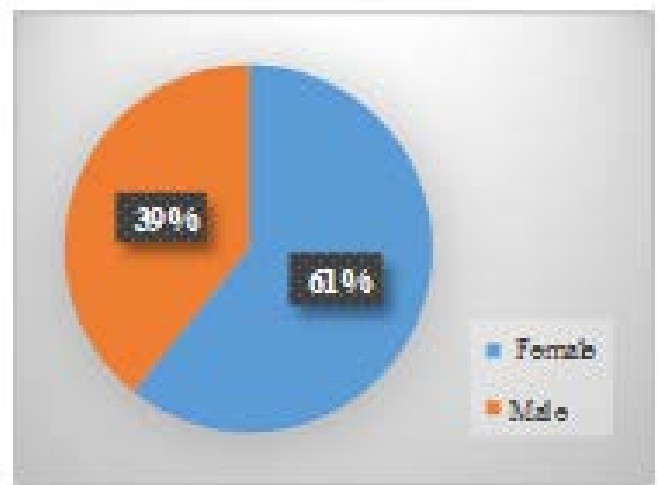
Knowledge score	Number	Percentage
Low (0-8)	18	14.4%
Moderate (9-11)	35	28%
High (12-15)	72	57.6%
Total	125	

Table 4: Subjects mean knowledge score according to different socio demographic variable

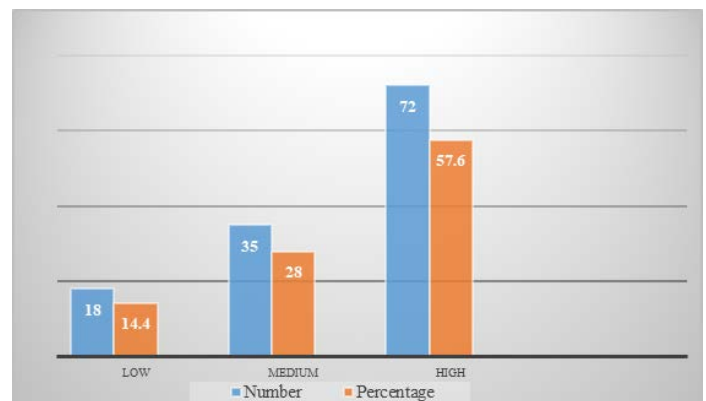
Age/ gender	No. of participants	Mean of average score ± SD
<b>AGE</b>		
Below 40	69 (55.2%)	10.46 ± 2.31
Above 40	56 (44.8%)	11.21 ± 1.62
P value	-	0.00
<b>GENDER</b>		
Female	76 (60.8%)	13.80 ± 1.67
Male	49 (39.2%)	12.25 ± 2.78
P value	-	0.001



Graph 1: Distribution of response for individual questions



Graph 2: Gender distribution chart



Graph 3: Knowledge score graph regarding COVID 19 among study participants

**Discussion**

The transmission of COVID-19 poses a risk for people who come in close contact with an infected individual, and the risk is greater among those who are in close proximity

to or work near the patient, i.e., relatives and healthcare workers. The distance between the working field and the dentist is approx. 35–40 cm, and certain procedures can be very time-consuming, which puts the dentist at a higher risk of contacting COVID-19.<sup>7</sup>

Few cases of COVID19 infecting the dentist have been reported in the previous publications at the inception of this pandemic in china. Post which Centre for Disease Control (CDC) American Dental Association (ADA), has issued several interim guidelines and protocols to prevent the spread of COVID19 in dental set up.<sup>10,11</sup> Local governing authorities have issued guidelines, only to provide emergency treatment and all aerosol generating procedures to be avoided.<sup>12</sup> Until now, in India there are several reports disclosing mortality and morbidity among medical health-care workers and no reports related to dental practitioner.

COVID-19 has reshaped the working environment for dentists. Routine calls have been suspended during the pandemic period and appropriate measures to prevent infection have been implemented for attending dental emergencies. The priority is deemed to protect patients and DPs.<sup>13</sup> During the last month, emergency dental care was provided with advice on strict personal protection, and measures to reduce and avoid production of droplets and aerosols were adopted, with the use of high-volume aspiration. In such unprecedented times, it is perfectly plausible to witness a general frustration among DPs. Indeed, they are concerned about the safety of patients as well as of themselves, when so little is known about treatment of COVID-19 infections, contamination, and possible recontamination. The study revealed that majority of the subjects had high (57.6%) and moderate(28%) level of knowledge, yet there were notable deficiencies in some of the important aspects.

First, nearly 98.9 of respondents perceived an increased potential risks mainly for dentist and staff. Such result could be expected, as many governments worldwide obliged dental offices to close, completely or partially, hence treating only emergencies. In addition, it was recommended to avoid production and spreading of droplets and aerosol, thus generating more uncertainty and concern over common dental procedures. Second, 95% participants agreed that COVID 19 has changed their perception of infection risks in a dental office. Similar results were found in a study conducted by Gambarini E. et al, where 78% and 54% participants agreed with the above two statement respectively.<sup>14</sup>

The dental settings, carries high risk of cross infection as the Aerosol and splatter, formed during the dental procedures is the potential source for the spread of infection other than direct transmission.<sup>5,8</sup> Thus, it is important to take appropriate prevention for spread of infection. In present study majority (96.6%) participants had reviewed and implemented latest guidelines and 84.3% of respondents had the policy and procedure for Infection Control and Prevention plan. In a similar study conducted by Ahmadi H. et al almost two-thirds of the participants (n = 195, 81%) have asserted that they would review the latest guidelines regarding COVID-19 pandemic regularly.<sup>15</sup>

Dental teams must ensure they remain updated in their understanding of guidance in situations of uncertainty and frequently adapt themselves to the point of care and 89.9% of the respondents were aware to optimize and train their dental assistants and staff to ensure safety for themselves and patients. The results were in accordance with a study by Khader Y et al.<sup>13</sup> We are in a learning phase, and new information's are being updated every second. Scant knowledge has led to the dependence mostly on the clinical indicators to diagnose COVID19.



At the start of any dental procedure, rinsing with an antimicrobial mouthwash also significantly reduces the microbial load.<sup>16</sup> This practice is recommended in the current pandemic. Here the majority of dentists practice pre procedural mouth wash a. At present there is no available evidence addressing the effects of commonly used antimicrobial mouth rinses on COVID 19. Hence, this recommendation could be based on the fact that gargling has been reported to decrease the viral load and spread by removing oropharyngeal protease and associated viral replication. In addition, mouthwashes containing agents with anti-viral activity such as povidone-iodine have exhibited effectiveness against various respiratory viruses. Which is stated in a study conducted by Ahmed MA et al.

During the outbreak of COVID-19, the importance of hand hygiene has been emphasized repeatedly and this is even more important in the case of dental practitioners. Studies have shown that proper hand hygiene, including handwashing with soap and water and cleaning using alcohol-based sanitizers, is an essential measure in controlling the spread of respiratory illness including SARS.<sup>17,18</sup> Therefore, WHO recommends frequent hand washing or using an alcohol-based hand sanitizer in the dental practice about which 83.1% participants were aware.

Moderate percentage of dentists (75.6%) expressed a favorable opinion on performing in office rapid tests on patients before treatments in order to avoid the risk of spreading contagion. It is interesting to know that, regardless of the contradicting opinions about efficacy and precision of rapid tests for COVID-19, these tests were perceived as a major source of prevention. Thus, probably, there is faith in a quick improvement of such screening tools and their social impact is considered valuable.

Similar results can be found in a study conducted by Gambarini E. et al.<sup>14</sup>

In countries like India where the population to doctor ratio is less, the public health care emergency may need assistance of the dental professionals who are well trained to join the force in combating against this pandemic. Dental practitioner (DPs) responded with adequate knowledge to the question about COVID19, prevention in dental settings. Gender and age of the DPs were found to show no significant association with the level of knowledge. Female DPs showed significantly higher mean knowledge compared to the male counterparts. The relationship between gender of DPs could be clarified on the basis that, in India most of the students pursuing dental education are females. The results were in correspondence with a study by Khader Y et al.,<sup>13</sup> a study by Kanaparthi A et al,<sup>19</sup> and a study by Modi Pet al.<sup>20</sup>

Dental practitioner with more age had relatively more knowledge than those with less experience. This could be, due to the fact that most of the dental practitioners, are familiar with the principle of universal precautions for cross-infection control during previous infectious break outs like H1N1 influenza and are well aware of strict disinfection techniques.

The current study emphasizes on, being updated with evidence based information and act upon their professional responsibility to ensure preparedness of the dental practitioner for current and future dental practice against prevention of COVID19 and optimize safety for the well-being of themselves and their patients. Findings of the study may aid in designing effective infection prevention and control strategies among dental practitioners.

Despite, our best efforts there are few limitations in our study firstly, the low response rate, secondly, cross-sectional nature of the study and limited time frame of

data collection. This could result in sampling error and therefore, our results might not have accurately reflected the true levels of awareness of dental practitioner across Ahmedabad district. We recommend further studies to be carried out with larger sample and multi center studies at various locations.

### Conclusion

The findings of the study revealed that most of the subjects had adequate knowledge regarding COVID19, yet there were notable deficiencies in some of the important aspects. This study shows that there is a strong need to implement periodic educational interventions and training programs on infection control practices for COVID-19 across all dental practitioners. Conducting periodic webinars for educational intervention could be a useful and safe tool to create more awareness

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