Knowledge, attitude and practice of dental students and practitioners during the early days of COVID-19 pandemic in India: A cross-sectional study

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Abstract
Aim: The novel coronavirus disease-2019 (COVID-19) is a major health problem and has affected innumerable people around the world. The current online-based study was conducted to assess the knowledge, attitude and practice (KAP) of dental students and professionals during the early days of lockdown in India from 2 April to 1 May 2020.

Methodology: An online-based cross-sectional study was undertaken through WhatsApp messenger and e-mail groups among dental students and professionals. The KAP on COVID-19 was ascertained using an investigator designed and validated questionnaire. The results were stratified based on student vs professionals. The data were expressed as frequency and percentage analysed using the chi-square/Fishers exact test using IBM version 17. A probability value of <.05 was considered significant.

Results: A total of 287 complete responses from the dental students and professionals were received. The results indicated that the knowledge of both dental students and professionals were good and that the attitude and practice were in accordance with good clinical practice. No significant differences were found within the domains of KAP scores among the dental students and practitioners indicating that the study participants were abreast with the recent advances.

Conclusion: The results of this study conducted during the early stage of the lockdown indicated that the dental students and professionals who had filled the questionnaire had very good knowledge of coronavirus and COVID-19.

Clinical implications: The results of the study indicate that the volunteers had good knowledge, attitude and self-care practice, which are necessary in preventing the spread of COVID-19. It is anticipated that detailed hands-on training in practical aspects of good clinical practice with protective gears will help students and professionals perform the necessary dental procedures in accordance with the guidelines set by Centers for Disease Control and Prevention and World Health Organization.
The outbreak of COVID-19 illness caused by the new Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) belonging to the family Coronaviridae of the order Nidovirales is arguably the biggest pandemic of this century.\textsuperscript{1,2} The zoonotic infection that started in the city of Wuhan, China in December 2019 spread across the world rapidly in a short span of time.\textsuperscript{3,4} Very soon it became clear that idiopathic pneumonia caused by SARS-CoV-2 was transmissible from human to human and on 30 January 2020, the World Health Organization (WHO) declared that it as a Public Health Emergency of International Concern.\textsuperscript{5} Subsequently on 11 February 2020, WHO officially named it as COVID-19.\textsuperscript{5} In the recent past, two other strains of coronavirus have had caused similar outbreaks, the Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV-1) in 2002-2003 in China and Middle East Respiratory Syndrome Coronavirus (MERS-CoV) in 2012 in China and Saudi Arabia.\textsuperscript{6}

The virion of coronavirus is spherical in shape and is made up of outer lipid layer and a crown of club-shaped peplomers or spikes, with single-stranded RNA as their genetic material.\textsuperscript{7} On a comparative note, structurally the SARS-CoV-2 is very similar to SARS-CoV but differs in the vital spike protein(s).\textsuperscript{6} These viruses are ubiquitous in nature and found in a range of mammals and avian species and depending on the strain and host are reported to affect the respiratory, gastrointestinal and central nervous system of the host.\textsuperscript{8} The virus spreads principally through environmental contamination and being in close contact with an infected person or a carrier, touching an infected person or a contaminated surface, and inhaling of respiratory droplets containing the virions are important means of transmission.\textsuperscript{9} In lieu of these observations, the WHO has advocated the use of face masks, social/physical distancing and hand hygiene to be effective in avoiding exposure to virus.\textsuperscript{10}

The respiratory illness inflicted by COVID-19 has affected unprecedented number of individuals and has severely affected the health of millions of people in almost all countries in the five continents.\textsuperscript{10} In terms of death, as of 16 August 2021, COVID-19 has affected 208 705 980 individuals and 4 383 786 have succumbed to the disease.\textsuperscript{11} This number is more than that caused by any flu pandemics in the history of mankind\textsuperscript{2} and with the incidence and the development of new variants being reported the COVID associate seems to continue for a considerable period in the near future. Worse, at the global level the pandemic is not fully controlled and the colossal numbers of daily infection, admission to hospitals and deaths getting reported across the world is significant.\textsuperscript{12} When compared with most seasonal influenza viruses, the infection fatality rate of COVID-19 was high (1%) and a matter of concern in the public and healthcare fraternity.\textsuperscript{13}

In humans, the pathogenesis of the coronavirus depends on the virulence factor of the virus and the immunity and health status of the host.\textsuperscript{8} The most important aspect is that COVID-19 can affect and kill healthy adults depending on the virulence factor of the virus and delay in seeking timely medical care.\textsuperscript{9,14} However, reports affirm that it is extremely severe on the elderly and people with existing health problems, such as metabolic syndromes, tuberculosis, HIV, cancer, chronic liver diseases, chronic lung diseases and chronic kidney diseases, are at high risk.\textsuperscript{9,14} The incubation period of the disease ranges from 5 to 14 days during which symptoms may not be detected.\textsuperscript{14}

Clinically, the symptoms usually appear when the infection has spread to the lower part of the respiratory tract and the development of pneumonia that may be mild to severe. When the infection is mild, the patients normally present with fever, dry cough, lymphopenia, diarrhoea, myalgia or fatigue, sputum production and headache as symptoms.\textsuperscript{15} However, when the infection is severe and mostly when unattended patients, the disease worsen and features such as hypoxemia, septic shock, hemoptysis and acute respiratory distress syndrome (ARDS) because of damage to alveolar system may be seen.\textsuperscript{15} The severe respiratory distress can increase hypertension, cardiovascular risk, multiorgan failure and all these factors can lead to death of the individual.\textsuperscript{14,15}

When compared with the general people who are restricted to home because of lockdown, healthcare workers working in the front lines such as the physicians, nurses, physiotherapists, pharmacists, technologists working in laboratory and radiology setup in a hospital are at increased risk to get infected.\textsuperscript{16} When compared with other healthcare professionals the dentists are not involved in the care of people affected by the SARS-CoV-2 virus during the outbreak of the pandemic.\textsuperscript{17,18} However, a dentist professional duty is at very high risk to get infected principally because of the nature of procedures that involve aerosol production, handling of sharp instruments and dentist’s proximity to the oropharyngeal area of the patient.\textsuperscript{18}

The generation of aerosols is a major risk factor as it increases the chances of acquiring infection from the micro-droplets of an infected patient and also favours cross-transmission.\textsuperscript{17} In lieu of these observations a dental clinic is a more dangerous place to spread the virus between professionals or individuals.\textsuperscript{18} Dentists should be aware of the biology and transmission of infectious diseases that can affect them and their patient and ascertaining this is important from the purview of dental education. The present study was undertaken with dental students and practitioners to understand the knowledge, attitude and practices (KAP) of dental professionals towards COVID-19 during the early days of lockdown in India.


2 | MATERIALS AND METHODS

The study was submitted online to the secretary of the research ethics committee of the institute to ensure the ethics committee procedure. It was specified that the study would be anonymous and that no personal details (such as e-mail, address, telephone number, name, designation, caste, etc) were required. The ethics committee members had an online meeting and decided to approve the study considering the need, suitability of the study and ethical issues if any in accordance with the standard operating procedure (ABSMIDS/142/2021).

This was a cross-sectional survey dedicated to study the KAP of dental students and professionals and conducted from 2 April 2020 to 29 April 2020 during the COVID-19 lockdown in India through an online survey. The questionnaire was structured in English, and the content was validated by microbiology and public health experts. Subsequently, the questionnaire was formatted in Google forms, an internet-based software commonly used for data collection via personalised survey. This was preferred for its convenience, efficiency and high popularity especially in the current scenario where all educational institutions of the country were closed by the government as a part of the lockdown. After formatting the questionnaire in Google forms, a link was generated for the same and randomly distributed online among dental students and professionals.

Prior to the initiation of the study, the questionnaire design, validation and strategies to recruit the dental students and professionals for maximal participation were telephonically discussed by the investigators because of lockdown being enforced in India. The inclusion criteria followed was that the participants had to be dental students/practitioners regardless of their specialisation in dentistry, living in India, have an active WhatsApp or e-mail account and who consented to be a part of the study. The exclusion criteria consisted of people from healthcare professionals, such as medical, nursing and allied health sciences; the general public, candidates who gave incomplete data and those not consenting, were excluded from the study. The study intent was communicated to all qualifying participants and the informed consent was labelled obligatory in the questionnaire.

2.1 | Questionnaire components and assessment

The main instrument to collect data was an online questionnaire in Google forms. On clicking the link, the volunteer was directed to a page that comprised the need for the study and informed consent. The participants were informed that their participation was voluntary and that the information provided by them would be confidential with only the principal investigator having access to the data. The volunteers were informed that no personal details (such as e-mail, address, telephone number, name, etc) were required and their consent to be a part of the study in accordance with the inclusion criteria and to affirm it by clicking yes. It was also informed that they had freedom to either accept or decline answering the questionnaire and at any point in the subsequent sheets.

The online questionnaire was composed of four different parts. The first part included demographic data of the participants (sex, age, education level, and work experience). The second was knowledge part, which included questions on virology, transmission and pathogenesis, and safety practices to be followed while treating COVID-19 patients. The third part included the belief and attitude

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**Table 1** Demographic details between the two groups

| Categories | N | Students (N = 193) | Staff (N = 94) | Chi square | P value |
|------------|---|------------------|----------------|------------|---------|
| **Gender** |    |                  |                |            |         |
| Female     | 194 (67.6) | 130 (67.4) | 64 (68.1) | 0.015 | .902 |
| Male       | 93 (32.4)  | 63 (32.6)  | 30 (31.9) |            |         |
| **Marital status** |    |                  |                |            |         |
| Single     | 259 (90.2) | 192 (99.5) | 67 (71.3) | 57.118 | <.001 |
| Married    | 28 (9.8)   | 1 (0.5)    | 27 (28.7) |            |         |
| **Age**    |    |                  |                |            |         |
| 18-20 y    | 39 (13.6)  | 39 (20.2)  | 0 (0)       | 278.07    | <.001 |
| 21-26 y    | 156 (54.4) | 154 (79.8) | 2 (2.1)    |            |         |
| 27-30 y    | 66 (23)    | 0 (0)      | 66 (70.2)  |            |         |
| Above 30 y | 26 (9.1)   | 0 (0)      | 26 (27.7)  |            |         |
| **Place**  |    |                  |                |            |         |
| Village    | 95 (33.1)  | 62 (32.1)  | 33 (35.1)  | 8.204     | .017   |
| Town       | 32 (11.1)  | 15 (7.8)   | 17 (18.1)  |            |         |
| City       | 160 (55.7) | 116 (60.1) | 44 (46.8)  |            |         |

Note: P ≤ .05 is statistically significant (in bold).
towards the risk of getting infected and transmitting COVID-19 among the volunteers. The final part was on opinion about various methods of prevention and treatment of COVID-19.

2.2 | Statistical analysis

Data retrieved from the online survey was saved in Microsoft Excel 2013 and then imported into Social Sciences (SPSS) version 17 (IBM Corporation, New York, NY, USA). Output measures were presented as frequency (n) and percentage (%). The data were stratified based on whether dental students or practitioners and data were subjected to chi-square test. A probability value of ≤.05 was considered statistically significant.

3 | RESULTS

A total of 287 responses were received from the dental students and professionals. Among them, the most females were 67.6% (194/287), single/unmarried 90.2% (259/287) and younger than 30 years of age [54.4% (156/287)]. There was a statistically significant difference in the number of married individuals and in age between the students and staff (Table 1). With regard to the subject details, an overwhelming 99.7% (286/287) were aware of the COVID-19 situation prevailing in the world and in India almost 75.6% (217/287) of them expressed that they had complete information on the infection and its causes (Table 2). Majority of the participants 89.9% (258/287) expressed that the disease is preventable and there is high risk of getting infected if people avoid wearing masks (92%).

TABLE 2 | Answers expressed by the volunteers regarding updating of self on the coronavirus, awareness about the spread and opinion on the efforts of the government in controlling the pandemic

| Variables | Options | Total | Students | Practitioners | P value |
|-----------|---------|-------|----------|---------------|---------|
| How do you update yourself about coronavirus? | Telemedia | 232 (80.8) | 154 (53.7) | 78 (27.2) | .83 |
| | Friends and relatives | 9 (3.1) | 6 (2.1) | 3 (1) |   |
| | Healthcare workers | 16 (5.6) | 12 (4.2) | 4 (1.4) |   |
| | WhatsApp | 14 (4.9) | 11 (3.8) | 3 (1) |   |
| | Other | 16 (5.6) | 10 (3.5) | 6 (2.1) |   |
| I am of scared of coronavirus because | It is a deadly disease | 3 (1) | 2 (0.7) | 1 (0.3) | .775 |
| | Anyone can be affected | 67 (23.3) | 48 (16.7) | 19 (6.6) |   |
| | No vaccine | 55 (19.2) | 38 (13.2) | 17 (5.9) |   |
| | All of the above | 162 (56.4) | 105 (36.6) | 57 (19.9) |   |
| Are of aware of the current situation of coronavirus infection in the world? | Yes | 286 (99.7) | 192 (66.9) | 94 (32.8) | .48 |
| | No | 1 (0.3) | 1 (0.3) | 0 (0) |   |
| Do you feel that you know enough about the coronavirus and the disease it causes? | Yes | 217 (75.6) | 150 (52.3) | 67 (23.3) | .23 |
| | No | 70 (24.4) | 43 (15) | 27 (9.4) |   |
| I believe there is currently a high risk of coronavirus infection if we go for shopping without masks | Yes | 264 (92) | 178 (62) | 86 (30) | .83 |
| | No | 23 (8) | 15 (5.2) | 8 (2.8) |   |
| In my opinion, this coronavirus outbreak is going to continue for a long time | Yes | 249 (86.8) | 168 (58.5) | 81 (28.2) | .84 |
| | No | 38 (13.2) | 25 (8.7) | 13 (4.5) |   |
| Do you feel the government has taken enough steps to prevent the spread of the disease? | Yes | 223 (77.7) | 149 (51.9) | 74 (25.8) | .77 |
| | No | 64 (22.3) | 44 (15.3) | 20 (7) |   |
| I think that the government and media have over-exaggerated the risks of coronavirus infection? | Yes | 64 (22.3) | 43 (15) | 21 (7.3) | .99 |
| | No | 223 (77.7) | 150 (52.3) | 73 (25.4) |   |
| Coronavirus outbreak is getting unnecessary attention currently? | Yes | 34 (11.8) | 26 (9.1) | 8 (2.8) | .22 |
| | No | 253 (88.2) | 167 (58.2) | 86 (30) |   |
| Do you agree that coronavirus will finally be controlled? | True | 243 (84.7) | 165 (57.5) | 78 (27.2) | .825 |
| | False | 10 (3.5) | 6 (2.1) | 4 (1.4) |   |
| | I don’t know | 34 (11.8) | 22 (7.7) | 12 (4.2) |   |
| Do you have confidence that the world can win the battle against coronavirus? | Yes | 275 (95.8) | 184 (64.1) | 91 (31.7) | .559 |
| | No | 12 (4.2) | 9 (3.1) | 3 (1) |   |
| Do you have confidence that India can win the battle against coronavirus? | Yes | 274 (95.5) | 182 (63.4) | 92 (32.1) | .172 |
| | No | 13 (4.5) | 11 (3.8) | 2 (0.7) |   |
### TABLE 3  Knowledge of coronavirus and COVID-19 among the dental students and practitioners who participated in the study

| Variables                                                      | Options                  | Total N (%) | Students N (%) | Practitioners N (%) | P value |
|---------------------------------------------------------------|--------------------------|-------------|----------------|---------------------|---------|
| **Do all people infected with coronavirus die?**               | Yes                      | 4 (1.4)     | 3 (1)          | 1 (0.3)             | .74     |
|                                                               | No                       | 283 (98.6)  | 190 (66.2)     | 93 (32.4)           |         |
| **Is the disease caused by coronavirus preventable?**          | Yes                      | 258 (89.9)  | 172 (59.9)     | 86 (30)             | .53     |
|                                                               | No                       | 29 (10.1)   | 21 (7.3)       | 8 (2.8)             |         |
| **Coronavirus was first reported in Wuhan City of**           | Japan                    | 6 (2.1)     | 5 (1.7)        | 1 (0.3)             | .544    |
|                                                               | India                    | 1 (0.3)     | 1 (0.3)        | 0 (0)               |         |
|                                                               | China                    | 280 (97.6)  | 187 (65.2)     | 93 (32.4)           |         |
|                                                               | Singapore                | 0 (0)       | 0 (0)          | 0 (0)               |         |
| **The route of entry of coronavirus is through all except**   | Nose                     | 24 (8.4)    | 19 (6.6)       | 5 (1.7)             | .035    |
|                                                               | Mouth                    | 10 (3.5)    | 8 (2.8)        | 2 (0.7)             |         |
|                                                               | Eyes                     | 36 (12.5)   | 30 (10.5)      | 6 (2.1)             |         |
|                                                               | Skin                     | 217 (75.6)  | 136 (47.4)     | 81 (28.2)           |         |
| **The most common organ involved in severe coronavirus is**   | Liver                    | 1 (0.3)     | 1 (0.3)        | 0 (0)               | .629    |
|                                                               | Lungs                    | 282 (98.3)  | 187 (65.9)     | 93 (32.4)           |         |
|                                                               | Kidneys                  | 2 (0.7)     | 1 (0.3)        | 1 (0.3)             |         |
|                                                               | Brain                    | 2 (0.7)     | 2 (0.7)        | 0 (0)               |         |
| **The main symptoms of coronavirus infection are fever,**     | True                     | 279 (97.2)  | 187 (65.2)     | 92 (32.1)           | .452    |
| tiredness, dry cough and body ache                           | False                    | 5 (1.7)     | 3 (1)          | 2 (0.7)             |         |
|                                                               | I don’t know             | 3 (1)       | 3 (1)          | 0 (0)               |         |
| **Currently, there is no effective cure for COVID-19, but**   | True                     | 269 (93.7)  | 184 (64.1)     | 85 (29.6)           | .132    |
| early medical care can help most patients recover             | False                    | 4 (1.4)     | 1 (0.3)        | 3 (1)               |         |
| from the infection                                           | I don’t know             | 14 (4.9)    | 8 (2.8)        | 6 (2.1)             |         |
| **In most cases, the aged, people having chronic**           | True                     | 278 (96.9)  | 187 (65.2)     | 91 (31.7)           | .999    |
| illnesses (such as diabetes, hypertension, etc) are more     | False                    | 3 (1)       | 2 (0.7)        | 1 (0.3)             |         |
| likely to be severely affected                               | I don’t know             | 6 (2.1)     | 4 (1.4)        | 2 (0.7)             |         |
| **The coronavirus spreads via respiratory droplets of**      | True                     | 278 (96.9)  | 186 (64.8)     | 92 (32.1)           | .478    |
| infected individuals                                          | False                    | 6 (2.1)     | 4 (1.4)        | 2 (0.7)             |         |
|                                                               | I don’t know             | 3 (1)       | 3 (1)          | 0 (0)               |         |
| **Common people can wear general medical masks to prevent**  | True                     | 228 (79.4)  | 149 (51.9)     | 79 (27.5)           | .276    |
| the infection by coronavirus                                  | False                    | 46 (16)     | 33 (11.5)      | 13 (4.5)            |         |
|                                                               | I don’t know             | 13 (4.5)    | 11 (3.8)       | 2 (0.7)             |         |
| **It is necessary for children and young adults to take**    | True                     | 283 (98.6)  | 191 (66.6)     | 94 (32.1)           | .357    |
| precautions to prevent the coronavirus infection             | False                    | 1 (0.3)     | 1 (0.3)        | 0 (0)               |         |
|                                                               | I don’t know             | 3 (1)       | 1 (0.3)        | 2 (0.7)             |         |
| **To prevent the infection by coronavirus, individuals**     | True                     | 286 (99.7)  | 192 (66.9)     | 94 (32.8)           | .484    |
| should avoid/minimise/reduce going to crowded places such as | False                    | 0 (0)       | 0 (0)          | 0 (0)               |         |
| market                                                       | I don’t know             | 1 (0.3)     | 1 (0.3)        | 0 (0)               |         |
| **Isolation and immediate medical treatment of people**      | True                     | 285 (99.3)  | 192 (66.9)     | 93 (32.4)           | .281    |
| who are infected with the coronavirus are effective ways to  | False                    | 1 (0.3)     | 0 (0)          | 1 (0.3)             |         |
| reduce the spread of the virus                               | I don’t know             | 1 (0.3)     | 1 (0.3)        | 0 (0)               |         |
| **People who have been in contact with a person**           | True                     | 283 (98.6)  | 190 (66.2)     | 93 (32.4)           | .536    |
| infected with the coronavirus should be immediately isolated| False                    | 2 (0.7)     | 1 (0.3)        | 1 (0.3)             |         |
| in a safe place for 14 d                                     | I don’t know             | 2 (0.7)     | 2 (0.7)        | 0 (0)               |         |

(Continues)
Also, in people's opinion the virus is going to last for a long time (77.7%) (Table 2).

In the domain that addressed understanding the knowledge of the participants on the biology of the virus and its pathogenesis, it was observed that for majority of the questions the volunteers answered the questions correctly by all groups of volunteers (Table 3). With regard to the question on the mode of transmission of SARS-CoV-2 in community, 77.5% of the volunteers answered correctly that it does not spread through skin with a significance of \( P = .035 \) (Table 3). With regard to the questions on the symptoms, most of the participants answered correctly (93.7%) (Table 3). Majority of the volunteers (96.9%) answered people with chronic illness such as hypertension, bronchial asthma and diabetes mellitus and aged people are at high risk (Table 3). Also 96.9% of participants correctly answered about the spread of infection through droplets and the origin is from bats (59.6%) (Table 3). Additionally, 98.6% of participants emphasised on preventive measures to combat infection, and 99.7% believed that avoiding crowded places and isolation of person who is a primary contact (98.6%) would limit the spread of infection (Table 3).

With regard to the domain on attitude towards COVID-19, majority of the participants have a positive attitude towards the infection. 84.7% of people believed that this situation can be brought under control and 95.8% have the confidence of winning against pandemic (Table 4). Although dental professionals are at risk majority believe that vaccine is the best way to prevent infection (35.9%) (Table 4). With regard to questions addressing opinion on prevention and prophylaxis measures, preventive measures such as quarantine, hand washing and wearing face masks were agreed by 68.3%, 51.4% and 48.1% of the volunteers, respectively (Table 4). The opinions on preventive medication, practicing doctors agreed that gargling of mouth with salt water is the best way to prevent coronavirus infection (30%) (Table 4). Similarly, most of the participants (38%) were unsure about Ayurvedic drugs for treatment purposes. For safety measures, participants agree that they never leave the house without a mask (96.2%), deliberately cancelled social events and functions (97.2%), reduced the shopping time (98.6%), cleaned or disinfected doorknobs, call bells and common landline phones (80.5%), washed hands with soap and water more often than usual (98.3%), kept slippers and shoes outside the house after returning from market/outside (86.1%) and 95.1% of participants after returning home from market/outside, directly go and wash thier hands and then took a bath (Table 4).

When chi-square test was used to compare the demographic data as well subject-specific questions such as participants in private practice and students, there was no significant difference in both except few categories such as the route of entry which was answered correctly by students with \( P = .035 \) (Table 4). Other ways of contacting infection such as rear animals were answered mostly by student category with a significant difference of \( P = .027 \). There was a positive attitude with COVID affecting the health if contact of the virus happens with significance of \( P = .015 \) (Table 4).

### 4 | DISCUSSION

The outbreak of COVID-19 pandemic has created a lot of apprehension and fear in healthcare professionals who are at increased risk to get infected in the line of duty. Under these circumstances, awareness regarding the pathogen and ways of preventing infection is vital in safeguarding self while managing asymptomatic people. Dentistry is an important stream of healthcare and although not in the forefront of COVID care, dental professionals have a very important role in society. Knowledge, attitudes, perception and preventative practices are very important in healthcare professionals as they help in adopting and practicing safety guidelines for the betterment of the professional as well as to the patient they are attending to. Considering this the current study attempt was made at understanding the knowledge, belief, attitude and opinion of the virion, the aetopathogenesis disease and prevention were assessed in dental students and professionals.

The results of the study clearly indicated that the knowledge on viral pathogenesis and safety practices was high in the participants irrespective of whether they were students or professionals. The possible reason for this is that majority of the participants 80.8%
### TABLE 4  Practice of personal hygiene and opinion on the use of preventive prophylaxis/medication by the volunteers who participated in the study

| Variables                                                                 | Options                      | Total | Qualification N (%) | P value |
|---------------------------------------------------------------------------|------------------------------|-------|----------------------|---------|
|                                                                           |                              |       | Students | Practitioners |       |
| In the last month when you suddenly felt, such as sneezing, where did you sneeze? | In to your hands | 69 (24) | 48 (16.7) | 21 (7.3) | .299 |
|                                                                           | In to open air               | 5 (1.7) | 4 (1.4)   | 1 (0.3)   |       |
|                                                                           | In to a cloth                | 121 (42.2) | 86 (30)   | 35 (12.2) |       |
|                                                                           | In to shoulders              | 92 (32.1) | 55 (19.2) | 37 (12.9) |       |
| If you were infected by coronavirus, how seriously do you think it would affect your health? | Not at all                   | 8 (2.8)  | 6 (2.1)   | 2 (0.7)   | .362 |
|                                                                           | Somewhat                    | 131 (45.6) | 82 (28.6) | 49 (17.1) |       |
|                                                                           | Very seriously               | 89 (31)  | 67 (23.3) | 22 (7.7)  |       |
|                                                                           | Extremely                    | 22 (7.7)  | 14 (4.9)  | 8 (2.8)   |       |
|                                                                           | Don’t know                   | 37 (12.9) | 24 (8.4)  | 13 (4.5)  |       |
| Please indicate your level of risk of being infected by coronavirus       | Very high                    | 20 (7)   | 8 (2.8)   | 12 (4.2)  | .015  |
|                                                                           | High                         | 44 (15.3) | 28 (9.8)  | 16 (5.6)  |       |
|                                                                           | Medium                       | 85 (29.6) | 59 (20.6) | 26 (9.1)  |       |
|                                                                           | Low                          | 64 (22.3) | 44 (15.3) | 20 (7)    |       |
|                                                                           | Very low                     | 50 (17.4) | 41 (14.3) | 9 (3.1)   |       |
|                                                                           | Don’t know                   | 24 (8.4)  | 13 (4.5)  | 11 (3.8)  |       |
| Do you think vaccine is the best way to prevent coronavirus infection?     | Strongly yes                 | 93 (32.4) | 57 (19.9) | 36 (12.5) |       |
|                                                                           | Yes                          | 103 (35.9) | 66 (23)   | 37 (12.9) |       |
|                                                                           | Unsure                       | 71 (24.7) | 53 (18.5) | 18 (6.3)  |       |
|                                                                           | No                           | 16 (5.6)  | 13 (4.5)  | 3 (1)     |       |
|                                                                           | Strongly no                  | 4 (1.4)   | 4 (1.4)   | 0 (0)     |       |
| Do you think being at home (or quarantine) is the best way to prevent coronavirus infection? | Strongly yes                 | 196 (68.3) | 136 (47.4) | 60 (20.9) | .134 |
|                                                                           | Yes                          | 73 (25.4) | 45 (15.7) | 28 (9.8)  |       |
|                                                                           | Unsure                       | 13 (4.5)  | 9 (3.1)   | 4 (1.4)   |       |
|                                                                           | No                           | 3 (1)     | 3 (1)     | 0 (0)     |       |
|                                                                           | Strongly no                  | 2 (0.7)   | 0 (0)     | 2 (0.7)   |       |
| Do you think hand washing is the best way to prevent coronavirus infection? | Strongly yes                 | 148 (51.6) | 96 (33.4) | 52 (18.1) | .063 |
|                                                                           | Yes                          | 124 (43.2) | 90 (31.4) | 34 (11.8) |       |
|                                                                           | Unsure                       | 10 (3.5)  | 6 (2.1)   | 4 (1.4)   |       |
|                                                                           | No                           | 5 (1.7)   | 1 (0.3)   | 4 (1.4)   |       |
|                                                                           | Strongly no                  | 0 (0)     | 0 (0)     | 0 (0)     |       |
| Do you think wearing a face mask is the best way to prevent coronavirus infection? | Strongly yes                 | 113 (39.4) | 72 (25.1) | 41 (14.3) | .35  |
|                                                                           | Yes                          | 138 (48.1) | 93 (32.4) | 45 (15.7) |       |
|                                                                           | Unsure                       | 21 (7.3)  | 18 (6.3)  | 3 (1)     |       |
|                                                                           | No                           | 14 (4.9)  | 9 (3.1)   | 5 (1.7)   |       |
|                                                                           | Strongly no                  | 1 (0.3)   | 1 (0.3)   | 0 (0)     |       |
| Do you think gargling mouth/throat with salt water is the best way to prevent coronavirus infection? | Strongly yes                 | 48 (16.7) | 33 (11.5) | 15 (5.2)  | .111 |
|                                                                           | Yes                          | 86 (30)   | 56 (19.5) | 30 (10.5) |       |
|                                                                           | Unsure                       | 82 (28.6) | 63 (22)   | 19 (6.6)  |       |
|                                                                           | No                           | 58 (20.2) | 35 (12.2) | 23 (8)    |       |
|                                                                           | Strongly no                  | 13 (4.5)  | 6 (2.1)   | 7 (2.4)   |       |
| Do you think taking homemade herbal drink or Ayurvedic drugs is the best way to prevent coronavirus infection? | Strongly yes                 | 21 (7.3)  | 15 (5.2)  | 6 (2.1)   | .697 |
|                                                                           | Yes                          | 39 (13.6) | 25 (8.7)  | 14 (4.9)  |       |

(Continues)
expressed that they update themselves about coronavirus through telemedia (Table 1). Previous studies have shown that the internet and associated technologies are powerful medium at delivering information and that greater accessibility to internet in the recent past has helped bridge gaps in existing knowledge.\(^9\) In addition to this, the participants upgraded their knowledge on the aetiology of the virus and its spread through scientific endeavours and by attending lectures and seminars on webinar and by listening through portals. To substantiate this, recent reports affirm that webinars are very effective in sharing information and that there was an increase in people attending them during the COVID-19 pandemic.\(^10\) These observations are not in agreement with previous studies where during the influenza A (H1N1) pandemic in Nigeria television was the primary source of information for healthcare staff.\(^11\) This could be because of the difference in the availability of the internet facility in Nigeria and the time point of study in 2011 when the internet was not as prevalent as today.

With regard to questions that ascertained the current awareness of the pandemic and the reason for fear, most of the volunteers expressed that they were and apprehensive because the aliment was deadly, anyone can be affected and non-availability of vaccine (during the early days of pandemic in April 2020) (Table 1). Also majority of the participants felt that coronavirus outbreak was not getting unnecessary attention, the government and media were not over-exaggerated the risks of COVID-19 and that the administration had taken enough steps to prevent the spread of the disease (Table 1). Public perception is an important factor especially when lockdown is imposed in the emergency situation and the response of the participants indicate that they comprehended the gravity of the situation. The other important aspect ascertained was that majority of the volunteers (86.8%) expressed that coronavirus outbreak was ongoing for a long time possibly because being healthcare professionals and having studied microbiology they were aware that virus cannot be completely eradicated and that will continue to exist in society (Table 1).

This section is planned to ascertain the knowledge of coronavirus. SARS-CoV-2 is reported to be a bat virus that got mutated and obtained the capacity to cause human to human transmission.\(^12\) The virus spreads principally through droplet and when a person is in close proximity to the patient or a carrier.\(^10\) On inhaling, the droplet reaches the lower respiratory tract and the infected individual does

| Table 4 (Continued) |
|----------------------|
| Variables           | Options       | Total       | Qualification N (%) |
|                     |               | Students    | Practitioners      | P value |
| In recent days, have you worn a mask when leaving home? | Yes           | 276 (96.2)  | 189 (65.9)  | 87 (30.3) | .026 |
|                     | No            | 11 (3.8)    | 4 (1.4)       | 7 (2.4)   |       |
| In the past 1 mo, have you deliberately cancelled or postponed social events and functions because of the coronavirus? | Yes           | 279 (97.2)  | 187 (65.2)  | 92 (32.1) | .636 |
|                     | No            | 8 (2.8)     | 6 (2.1)       | 2 (0.7)   |       |
| In the past 1 mo, have you reduced the shopping time when you went out of your house? | Yes           | 283 (98.6)  | 190 (66.2)  | 93 (32.4) | .739 |
|                     | No            | 4 (1.4)     | 3 (1)         | 1 (0.3)   |       |
| In the past 1 mo have you cleaned or disinfected doorknobs, call bells and common landline phones? | Yes           | 231 (80.5)  | 156 (54.4)  | 75 (26.1) | .834 |
|                     | No            | 56 (19.5)   | 37 (12.9)    | 19 (6.6)  |       |
| In the past 1 mo, have you washed your hands with soap and water more often than usual? | Yes           | 282 (98.3)  | 188 (65.5)  | 94 (32.8) | .115 |
|                     | No            | 5 (1.7)     | 5 (1.7)      | 0 (0)     |       |
| In the past 24 h, how many times have you washed your hands with soap and water (not including baths, showers, or washing up)? | 0-4           | 83 (28.9)   | 58 (20.2)   | 25 (8.7)  | .466 |
|                     | 5-9           | 131 (45.6)  | 91 (31.7)   | 40 (13.9) |       |
|                     | 10-14         | 55 (19.2)   | 35 (12.2)   | 20 (7)    |       |
|                     | 15-19         | 7 (2.4)     | 3 (1)       | 4 (1.4)   |       |
|                     | More than 20  | 11 (3.8)    | 6 (2.1)     | 5 (1.7)   |       |
|                   | times        |             |             |           |       |
| In the past 1 mo have you kept your slippers and shoes outside the house after coming back from market/outside? | Yes           | 247 (86.1)  | 168 (58.5)  | 79 (27.5) | .49  |
|                     | No            | 40 (13.9)   | 25 (8.7)    | 15 (5.2)  |       |
| In the past 1 mo after coming home from outside did you directly go and wash your hands and took a bath? | Yes           | 273 (95.1)  | 186 (64.8)  | 87 (30.3) | .16  |
|                     | No            | 14 (4.9)    | 7 (2.4)     | 7 (2.4)   |       |

\(^*P ≤ .05.\)
not display any clinical symptoms during the incubation period. In most cases the symptoms commonly observed are dry cough, low grade fevers, body aches, diarrhoea and dyspnea.20 When compared with children and young and healthy people, the viral pathogenesis is severe in the elderly people and in patients with underlying morbidities and mortality because of multiorgan failure was common in these people.23-25 It was observed that most of the participants were very well aware of the biology of the viruses, the transmission, pathogenesis and people at high risk and that there was no difference in the answers of dental students and professionals for most questions (Table 2).

Knowledge obtained from previous airborne pandemics has validated that transmission is effectively prevented by social distancing, frequent hand hygiene and wearing a face mask in public. Quarantine of people exposed to confirmed, travel restrictions, school closure and physical distancing are extremely useful in reducing transmission. At individual level, recommended precautions such as frequent and proper hand hygiene with soap and water or with alcohol-based hand rub is proved to be effective.26 Also, wearing of suitable mask by covering the mouth and nose snugly in public is very effective. Also the emergence of COVID-19 has shown a dramatic effect on humans, as both public meetings and social activities are curtailed to limit the transmission rates. In lieu of these observations, it is also important to adopt good clinical practices, such as wearing clean gowns, face mask/N95, goggles face/shield and clean gloves during emergency duties.27

The other important observation was that although no benefit of gargling mouth and throat with salt water or iodine solution is reported, nearly 47% of the volunteers agreed it to be useful and this may have been from their experience in Dentistry where gargling is recommended for good oral health. Nearly 68% of the participants agreed that a vaccine, when available will be very useful in mitigating the pandemic. Also 51% felt that homemade herbal drink or Ayurvedic drugs are the best way to prevent coronavirus infection. In this regard, the use of intake of home-made medication is high in India and in the study this may have had a role in the expression of the usefulness of the practice by the volunteers. Also, reports do suggest that China had approved the use of three herbal medications, the Lianhuaqingwen capsules and Jinhuqinnggan granules for mild conditions, and Xuebijing (injectable) for severe conditions for use in COVID-19 based on laboratory evidence and anecdotal clinical data.28

5 | CONCLUSION

The results of this study showed that dental students and professionals had adequate knowledge on aetiopathology, transmission and prevention of COVID-19. Previous studies have shown that the general practitioners had higher knowledge and support our observation.29 A strong positive attitude and knowledge ratings that are necessary in preventing COVID-19 was also seen. COVID-19 transmission presents a danger to individuals who come into direct contact with an infected person. Additionally, the risk is higher for family and healthcare staff working in close proximity to the patient. The gap between the field of operation and the dentist is approx. 35-40 cm, with some techniques which can be very time-consuming, which places the dentist at an increased risk of COVID-19 being approached.30 It is anticipated that training with mannequins and dummy models with protective gears will help the students and professionals perform the necessary dental procedures in accordance with the guidelines set by Centers for Disease Control and Prevention and WHO.

DISCLOSURE

The authors declare that they have no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings are available from the corresponding author (Dr Aditya Shetty) upon reasonable request.

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How to cite this article: Rao LN, Shetty A, Latha Senthilkumar P, et al. Knowledge, attitude and practice of dental students and practitioners during the early days of COVID-19 pandemic in India: a cross-sectional study. Int J Clin Pract. 2021;75:e14858. https://doi.org/10.1111/ijcp.14858