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KNOWLEDGE, ATTITUDE AND PRACTICE OF MANAGING ORTHODONTIC PATIENTS AMONG ORTHODONTISTS AND ORTHODONTIC RESIDENTS IN COVID-19 PANDEMIC: A QUESTIONNAIRE STUDY

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ABSTRACT

Aim: Knowledge, Attitude and Practice of Managing Orthodontic Patients among Orthodontists and Orthodontic Residents in Covid-19 Pandemic: A Questionnaire Study. **Settings and Design:** A questionnaire comprising of 21 questions, evaluated the Knowledge, Attitude and Practice towards Covid-19. **Methods and Material:** The content validity was undertaken by seven experts specialized in Orthodontics. The final developed questionnaire survey was run using Google form, which was completed by 297 participants. The survey consisted of four aspects: Background Information, Knowledge, Attitudes, and Practice in COVID-19 Pandemic. Then data were analyzed based on their responses. The quantitative variables were tested using the Chi-square test. **Results:** There were 175 (58.90%) males and 122 (41.10%) females age group of 24 to 59 years, with an average age of 34.41 (SD, 7.11). The majority of the respondents were orthodontists 222 (74.7%), followed by orthodontic residents/postgraduate students 75 (25.3%). The mean level of knowledge of COVID-19 was 4.23 (out of 5 score). Majority of the participants had positive attitudes toward personal protective equipment (PPE) in the context of COVID-19 and willing to do orthodontic practice in this pandemic situation. **Conclusions:** Orthodontists and Orthodontic Residents demonstrated good knowledge, positive attitudes, and sensible practice regarding COVID-19 during the outbreak, gradually resuming orthodontic facilities in Gujarat, and confident enough to understand COVID-19-related risk.

KEYWORDS: Knowledge, Attitude, Practice, Covid19 Pandemic, Orthodontist.

INTRODUCTION

Coronavirus disease was discovered in Wuhan, China, December 2019, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has spread quickly to most parts of the world.[1]

The World Health Organization (WHO) officially declared the COVID-19 outbreak a public health emergency of international concern on January 30, 2020[2], and then a global pandemic on March 11, 2020.[3]

As of May 24, 2021, there have been a total of 180,370,125 laboratory-confirmed COVID-19 cases and 3,907,574 deaths in 217 countries, territories.[4]

However, those who are in close contact with confirmed cases or asymptomatic carriers, including health care workers (HCWs) and other patients within hospitals and/or clinics, are at higher risk of infection.[5] Nevertheless, the health care workers are subjected to high risk of contracting COVID-19. In many of the developed countries the frontline workers are impacted by COVID-19 infections. Many of the health care workers have lost their lives while treating COVID- 19 cases.

WHO announced that there are at least 1,15,000 COVID-19 cases prevalent among HCWs from 52 countries by June 24, 2021.[6] However, currently there is no data available for cross transmission in dental settings or cases reported among dental HCWs.[7,8] Standard protective measures employed in daily practice are

insufficient to prevent cross-infection between dental practitioners and dental patients since many dental procedures generate a considerable number of droplets and aerosols.[9]

In India majority of provinces and cities dental services were restricted to emergency care only. The restrictions in India came into force overnight on March 24, 2020[10], which at first was announced to be for 21 days following which continued to be extended due to the steady increase in incidence rates. As a result, all OPDs, dental clinics, and institutions in India have been ordered to close, with only emergency services remaining operational. As a result of these regulations, many dental professionals stayed at home during the epidemic, communicating with existing and potential new patients via smartphones and online consultation platforms. Combined, the above-mentioned changes in work and life due to COVID-19 can have a huge impact on Orthodontic treatment.

As reported till May 24, 2021, there have been a total of 8.23 lakh laboratory-confirmed COVID-19 cases and 10,037 deaths in Gujrat state.

As a result, orthodontic appointments were temporarily halted without warning or anticipation. Treatment is rarely considered an emergency in the field of orthodontics. However, the significance of frequent check-ups or monthly appointments, as well as the influence of limits placed on patients regarding accessing their orthodontists in times of necessity, are not well recognized.

As in unlocking procedure dental clinics, and institutions have been started again. There is little clear scientific information to refer to or guidelines to follow because the situation around SARS-CoV-2 is new and continuously evolving. In a single day, an orthodontist may see hundreds of patients. This fact makes strict infection control measures with the highly transmissible SARS-CoV-2 and area of concern. The great majority of orthodontic patients are children. Asymptomatic children infected with COVID-19 have been identified in studies.[11] The virus is still highly contagious during this latency period.[12] This finding rings the alarm bell of a potential hazard: treating asymptomatic patients and spreading infection within the orthodontic clinic. Furthermore, aerosol generation a routine occurrence in the orthodontic clinic is a confirmed route of infection transmission.[12]

There was a need to develop a tool for evaluating current COVID-19-related Knowledge, Attitudes, and Practice of managing orthodontic patients among Orthodontists and Orthodontic Residents in Gujarat.

MATERIAL AND METHODS

This questionnaire study was started after obtaining the ethical approval from University Institutional Ethical committee.

The sample size for the study was determined by using 'G power software'. A total sample size of 289 participants considering a dropout of 20% was determined by keeping the effect size fixed at 0.50 with an alpha error of 0.05, and a Power of 0.95. Participants included in the study were seven experts specialized in Orthodontics, Orthodontist and Orthodontic Resident of Gujarat state were included. Participants who were not willing to be a participant in the study were excluded.

A questionnaire that assessed the Knowledge, Attitude and Practice of managing Orthodontic patients among Orthodontists and Orthodontic Residents in COVID-19 Pandemic was devised by the primary investigator and it was subjected to content validity. The formulated questionnaire was given to a group of seven orthodontists. Each reviewer independently rated the relevance of each question using a 4-point Likert scale (1=not relevant, 2=somewhat relevant, 3=relevant, 4=very relevant). The Content Validity Index (CVI) developed by Mary R Lynn (1986)[17] was used to estimate the validity of the items. A rating of three or four indicates the content is valid and consistent. Further, suggestion for improvement was accepted with final questionnaire modified based on content validity.

Before the final questionnaire survey was initiated, changes were made as required to enable a better understanding of the questions by the respondents, and the arrangement of the questions was ensured for its efficiency.

The survey consisted of four aspects: Background Information, Knowledge, Attitudes, and Practice in COVID-19 Pandemic. The first 9 questions were regarding the Background characteristics, including demographics, workplace information, and COVID-19 related personal experience. Finally, a 30 questions survey instrument was developed. (Table 1).

Sr No.	Questions
1.	Name
2.	Email Id
3.	Age
4.	Gender a. Male b. Female
5.	Profession a. Orthodontist b. Orthodontic Resident / Postgraduate student
6.	Zone of practice a. North Gujarat b. East Gujarat c. West Gujarat d. South Gujarat e. Central Gujarat
7.	Years of orthodontic practice (including postgraduate education period) a. ≤ 5 years b. 6 to 10 years c. 11 to 15 years d. > 15 years
8.	Setting of your workplace a. Private b. Academic Institution c. Both Private & Institution d. Visiting Consultant
9.	Number of patients handled per day in this COVID-19 epidemic? a. 0-5 b. 6-10 c. 11-15 d. >15
10.	What is the common mode of transmission SARS-Cov2? (Severe Acute Respiratory Syndrome Coronavirus 2) a. Respiratory droplets b. Droplets Nuclei c. Airborne d. Direct/Indirect contact
11.	How long do you think SARS Cov2 remains infectious on contacts/objects made of stainless steel? a. 1 day b. 3 days c. 5 days
12.	How long do you think viral particles of SARS Cov2will remain in aerosols? a. ½ hour b. 3 hour c. 5 hour
13.	The source of your knowledge about COVID-19 includes: (Multiple choices are allowed) a. Television b. Newspaper c. Internet d. Medical journals e. Hospital training program Any Other Please Specify:
14.	Personal Protective Equipment (PPE) includes: (Multiple choices are allowed) a. Surgical mask b. N95 mask c. Isolation gown d. Protective clothing e. Gloves

	f. Goggles g. Face shield
15.	Methods of hand sanitation include? a. Washing hands with soap and water for 20 seconds. b. Use of an alcohol-9+based hand rub c. A & B Both
16.	In COVID-19 epidemic are you taking all the protective measures to protect yourself, patients and health care workers while orthodontic treatment? a. Yes b. No
If Yes then answer below questions	
17.	What protective gear you wear while treating patients? a. PPE Kit b. Surgical Gown Any Other please specify:
18.	Do you change your surgical gown or PPE kit with each patient? a. Yes b. No If No, then mention the number of patients you treat with one PPE/Surgical gown.
19.	Which Mask do you use while treating patients? (multiple choices are allowed) a. N95 Mask b. FFP Mask c. Respirators d. 3 Ply Mask e. Cotton Mask
20.	Do you change your mask with each patient? a. Yes b. No
21.	Do you wash your hands before and after treating patients and sanitize with alcohol-9+based sanitizer? a. Yes b. No
22.	Do you measure temperature of patients before entering into clinical area? a. Yes b. No
23.	Do you measure SpO2 level of patients before entering into clinical area? a. Yes b. No
24.	Do you get your patients hands sanitized before entering into clinical area? a. Yes b. No
25.	Do you ask patient to rinse mouth, before any orthodontic procedure? a. Yes b. No If yes then which solution do you prefer?
26.	Do you have adequate cross-ventilation at the operatory and waiting area? a. Yes b. No
27.	Have you minimized the number of appointments in a day? a. Yes b. No
28.	How do you maintain the social distancing in waiting area? (Multiple choices are allowed) a. Seating arrangements with minimum 6 feet distance to each person. b. Only Patients are allowed to the hospital. c. Relatives can wait outside the hospital. Any Other please specify:
29.	How do you sanitize your instruments? (Multiple choices are allowed)

	a. Autoclave b. Ultrasound bath c. Chemical disinfection Any other please specify
30.	How do you sanitize dental operatory after each patient's visit? a. Disinfect with Cavicide disinfectant for minimum 3 minutes. b. Flush all water line for 30 seconds c. Using Rapi-G (Rapid Oxygen Room Disinfectant) Any Other please specify:

A Google form with a link was created and sent to all of the study participants by e-mail and WhatsApp. The questionnaire's cover page featured a brief explanation of the questionnaire's goals, processes, the voluntary nature of participation, and assurances of confidentiality and anonymity. The questionnaire was answered by over 297 participants from the 22nd December 2020 to the 10th January 2021. Demographic variables were recorded along with other factors regarding the Knowledge, Attitude, and Practice concerning COVID-19 amongst Orthodontists and Orthodontic Resident.

Knowledge about COVID-19

The knowledge section of the questionnaire consisted six questions Q10 to Q15 regarding the characteristics of the disease, about the symptoms of the disease, and the prevention and control of the disease. In it five (4 single-choice (Q10, Q11, Q12, Q15) and 1 multiple-choice (Q14) questions for the assessment of actual knowledge Covid19. One semi-open question (Q13) for their source of knowledge.

Attitude towards COVID-19

To evaluate the attitude, 6 questions were asked Q16 to Q21. Questions in the attitude section to evaluate the attitudes toward personal protective equipment (PPE) in the context of COVID-19.

Practice regarding COVID-19

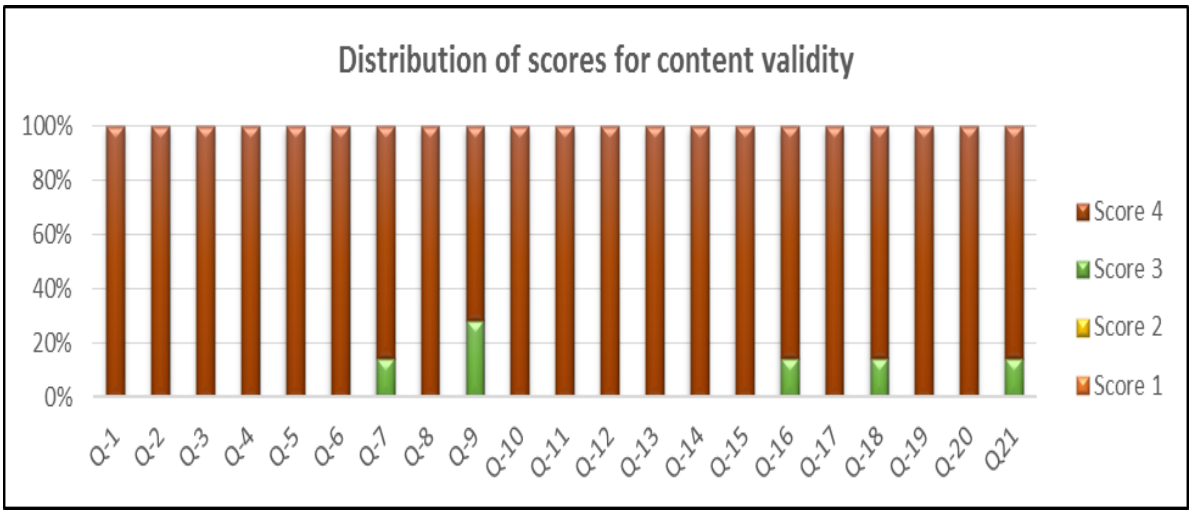
9 questions were asked Q22 to Q30 regarding Practice and approach towards the Covid-19.

The final developed questionnaire after content validity sent to Orthodontist and Orthodontic resident as Google Form link to Gujrat Orthodontic Study Group in WhatsApp. The responses of the questionnaire was accepted till 20days of period from the 22nd December 2020 to the 10th January 2021. A maximum of 3 times the reminder mail had sent to all the participants keeping an interval of 5 days. According to the answer given by Orthodontist and Orthodontic Residents responses were recorded.

Only until all of the questions had been answered could respondents submit their responses. Multiple responses from the same person were allowed, however the questionnaire could only be accessed through an email account, and each person could only respond once. The respondents were unable to amend their replies once they had been submitted.

IBM SPSS Statistics 21® was used to conduct all statistical analyses. The Chi-square test was performed to examine the significance and association between responses to each question for quantitative variables.

OBSERVATION AND RESULTS



Graph 1: Frequency of Scores for Content Validity.

Graph 1 suggests that all the 21 questions had a score of 4 and 3 for Content Validity, indicating that the content is valid and consistent.

The general characteristic details of the participants are shown in table 2.

Table 2: Demographic and workplace information of the respondents to this survey.

Characteristics	N	Percentage (%)
Age*	34.41 ± 7.11	24-59
Gender		
Female	122	41.10
Male	175	58.90
Profession		
Orthodontist	222	74.7
Orthodontic Resident/Postgraduate student	75	25.3
Zone of practice		
North Gujarat	69	23.2
East Gujarat	69	23.2
West Gujarat	67	22.6
South Gujarat	34	11.4
Central Gujarat	58	19.6
Years of orthodontic practice (Including postgraduate education period)		
≤ 5 years	147	49.5
6 to 10 years	97	32.7
11 to 15 years	36	12.1
> 15 years	17	5.7
Setting of your workplace		
Private	104	35
Academic Institution	86	29
Both Private & Institution	53	17.8
Visiting Consultant	54	18.2
Number of patients handled per day in this COVID-19 epidemic?		
0-5	234	78.8
6-10	44	14.8
11-15	11	3.7
>15	8	2.7
Total	**297**	**100**

*Displayed as mean ± SD, and range.

KNOWLEDGE

As described in Table 3, the mean level of knowledge of COVID-19 was 4.23 (out of 5 score) which means the respondents agreed that they were confident in their knowledge.

Table 3: Respondents correct answer for COVID-19 related Knowledge.

Questions about knowledge	Overall (n=297)	Orthodontists (n=222)	Orthodontic residents (n=75)
Q10: What is the common mode of transmission SARS-Cov2? (Severe Acute Respiratory Syndrome Coronavirus 2)	228 (76.8%)	157 (70.72 %)	71 (94.66%)
Q11: How long do you think SARS Cov2 remains infectious on contacts/objects made of stainless steel?	242 (81.5%)	173 (77.92%)	69 (92%)
Q12: How long do you think viral particles of SARS Cov2will remain in aerosols?	241 (81.14)	170 (76.57%)	71 (94.66%)
Q14: Correct Personal Protective Equipment (PPE) includes	251 (84.51%)	185 (83.33%)	66 (88%)
Q15: Methods of hand sanitation include?	296 (99.7%)	221 (99.54%)	75 (100%)
Total Knowledge score (out of 5)	4.23	4.07	4.69

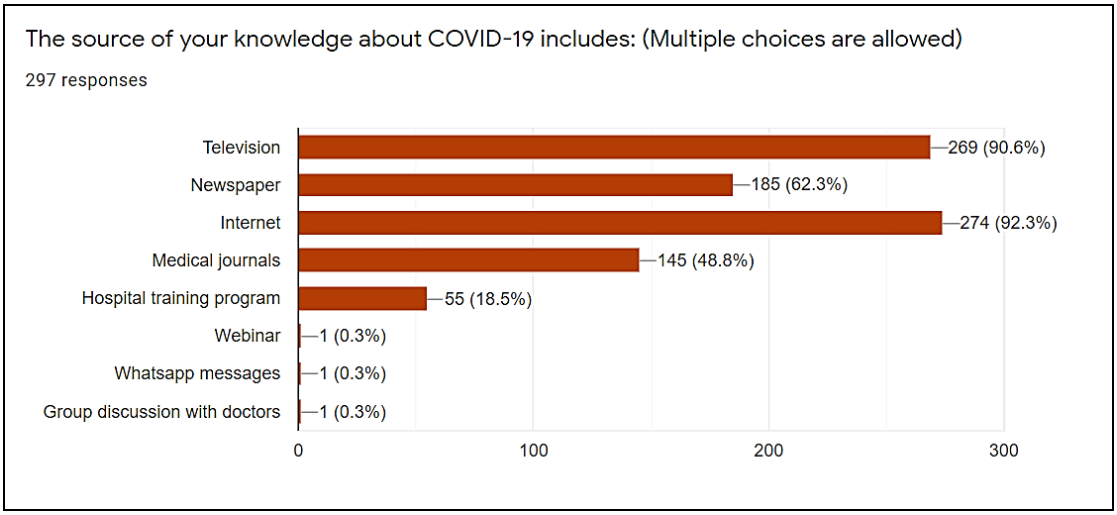


Fig 1: Source of Knowledge about Covid-19.

Fig 1 shows the sources of information about the disease and virus. For the Q13 from where they gained information about COVID-19. Majority of them 269 (90.6%) and 274 (92.3%) respondents gained knowledge from Television and Internet respectively.

Answer for the correct Personal Protective Equipment (PPE) include for the Q14, Overall 251 (84.51%) respondents selected surgical mask, N95 mask, Isolation gown, Protective clothing, Gloves, Goggles and Face shield.

When participants asked for correct hand sanitation method for the Q15, overall 296 (99.7%) respondents had selected washing hands with soap and water for at least 20 seconds and use of an alcohol 9+ based hand rub sanitizer.

Total of 295 (99.3%) respondents were agreed for taking all the protective measures for Orthodontic treatment to protect themselves, Patients and Health care workers for Q16.

Attitude

Questions in the attitude section to evaluate the attitudes toward personal protective equipment (PPE) in the context of COVID-19.

Total of 119 (40.3%) respondents were agreed for were agreed for PPE kit, 172 (58.3%) Autoclavable Surgical Gown, 1 (0.3%) Double face mask, face shield, head cap, gloves and 1 (0.3%) of them wearing Impermeable surgical gown while treating patients for Q17.

255 (85.9%) respondents were agreed for changing their PPE kit and surgical gown after doing patients. 42 (14.1%) were not changing their protective gear. After doing any aerosol procedure they were immediately changing their PPE kit and Surgical Gown. And some of them were changing their PPE kit after doing 3 to 4 patients and one respondents was changing each half of the day in the answer of Q18.

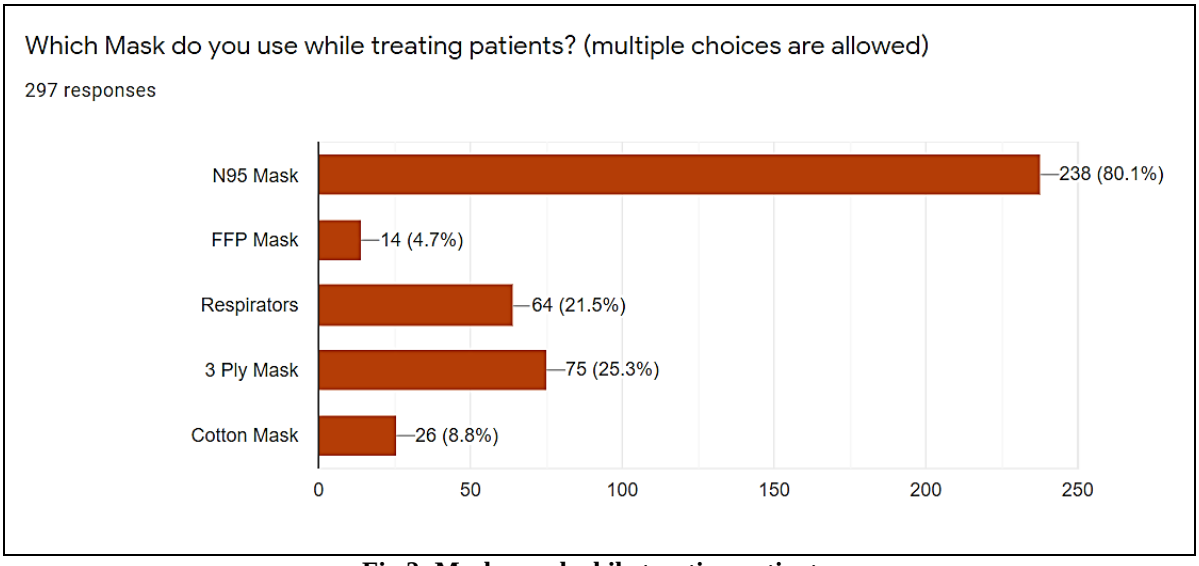


Fig 2: Masks used while treating patients.

Fig 2 for Q19 shows that majority of them 238 (80.1%) respondents were agreed to use N95 Mask while treating patients.

Majority of them 264 (88.9%) respondents were agreed to change their mask every patients. Using N95 Mask while treating patients they were agreed to wear 3 Ply mask on it and every patients they were agreed to change only 3 ply mask. 33(11.1%) were not changing their mask because of using FFP and respirators while treating patients for answer of Q20.

All Orthodontist and Orthodontic Resident were washing hands before and after treating patients and sanitize with alcohol-9+based sanitizer. (Q21).

Practice

9 questions were there in this section regarding Practice and approach towards the Covid-19.

For answering of Q22, majority of the respondents 289(97.3%) were agreed measuring temperature of patients before entering into clinical area. For Q23 286(96.3%) were agreed checking SpO_2 level of patients before entering into clinical area.

Almost all 296 (99.7%) respondents were agreed to sanitize patient's hands before entering them into clinical area for answer Q24.

Figure 23 for the Q25 shows that almost all 276 (92.92%) respondents were agreed to rinse their patient mouth. In it 256 (92.75%) rinse with help of Chlorhexidine and 20 (7.24%) were using Betadine. 21(7.07%) respondent were not agreed rinse their patient's mouth before starting the orthodontic treatment.

292 (98.3%) respondent do have adequate cross ventilation at the operatory and waiting area for the prevention of the infection. Only 5 (1.7%) didn't have the cross ventilation for the answer Q26.

289 (97.3%) respondents minimized the number of appointments in day in the Covid-19 pandemic. Only 8(2.7%) didn't minimized the number of patient as they are taking all the proper precautions during the treatment to prevent the infection for the answer o Q27.

Majority 262 (88.2%) were maintaining social distancing by seating arrangements with minimum 6 feet distance to each person. 137 (46.1%) were agreed to allow only patients to the hospital. For relative of the patients 70 (23.6%) respondent allow them to wait outside the hospital and 1 (0.3%) was giving appointment in such a manner that only single patient was allowed at the specific time for answering Q28.

290 (97.6%) respondents were agreed doing autoclave to their instrument for disinfection and prevent cross contamination to each patients. 75(25.3%) respondents were agreed for using Ultrasound bath and 102 (34.3%) respondents were agreed to use Chemical disinfection for disinfection of their instruments. Two (0.6%) of them were using Glass bead sterilizer and hot air oven for sanitize their instrument for answering Q29.

For the Q30 when asked about how do they sanitize dental operatory field, majority 277 (93.3%) were agreed to use with Cavicide disinfectant for minimum 3 minutes. 80 (26.9%) along with Cavicide disinfectant they were flushing all water line for 30 seconds. 59 (19.9%) were agreed to use Rapi-G (Rapid Oxygen Room Disinfectant) for oxygen saturation. In others some of them 6 (2.02%) were agreed to use Sodium hypochlorite, spraying 70% alcoholic solution (Bacillol spray) on the dental operatory.

DISCUSSION

Changes in work and life due to COVID-19 can have a huge impact on Orthodontists and Orthodontic resident in their practice, there is still lack of information relating to Knowledge, Attitude and Practice among Orthodontists and Orthodontic Residents in Gujarat during COVID-19 Pandemic. Thorough search of the literature very few studies were observed, regarding orthodontic treatment in this pandemic.[18] Hence there was a need to develop a tool and evaluate Knowledge, Attitude and Practice among Orthodontists and Orthodontic Residents in Covid19 pandemic.

Dentists, Dental Students, and auxiliary staff are at more risk of encountering pathogens Transmitted through blood or other body fluids than the normal population.[18] Infection control techniques must be strictly followed to reduce and avoid contamination of various pathogens. As A result, understanding it, developing positive attitudes on Covid-19 infection, and putting it into practice during clinic treatment processes are critical.[19]

The present study provides valuable insights into the COVID-19-related experiences, knowledge, attitudes, and practice of orthodontic professionals during such a period of transition. In this study, a majority of the respondents (78.8%) stated that, during the epidemic, appointments of patients were reduced.

Responses to our questions regarding knowledge have shown that the sources of information about COVID-19, majority of them 274 (92.3%) gained knowledge from Television and Internet. Few respondents gained from Newspaper, Medical Journals and Hospital training program. Some of them attended group discussions along with other doctors.

Majority of respondents (99.3%) stated that they understood COVID-19-related knowledge, risks, and protective measures very well, their total knowledge score was generally high (4.23 out of 5). The completion of relevant training programs was significantly associated with more confidence in knowledge mastery

and a higher total knowledge score. This is consistent with previous studies, which suggested additional training and education improved dental practitioners' knowledge of infection control.[20, 21]

The transmission of SARS-Cov2 (76.8%) respondents had selected the correct answer respiratory droplets.[24] SARS Cov2 virus remain on the subjects made up of stainless steel (81.5%) respondents selected correct answer 3 Days. Time to SARS Cov2 virus remain in aerosols, (81.14%) respondents selected the correct answer 3 hour. Information about correct Personal Protective Equipment (PPE) include surgical mask, N95 mask, Isolation gown, Protective clothing, Gloves, Goggles and Face shield which had selected by (84.51%) respondents. 99.7% respondents had selected correct hand sanitation method which is washing hands with soap and water for at least 20 seconds and use of an alcohol 9+ based hand rub sanitizer. Hand hygiene is also considered a critical measure for infection control, with poor adherence believed to be a major contributor to disease transmission.[23]

Attitudes toward personal protective equipment (PPE) in the context of COVID-19 40.3% respondents were wearing PPE kit, 58.3% Autoclavable Surgical Gown, 0.7% Double face mask, face shield, head cap, gloves and 0.7% of them wearing Impermeable surgical gown while treating patients. 85.9% respondents were changing their PPE kit and surgical gown after doing each patients. 14.1% were changing their protective gear only after doing any aerosol procedure and some of them were changing their PPE kit after doing 3 to 4 patients and one respondents was changing each half of the day.

80.1% respondents were using N95 Mask while treating patients. Some of them using combination of N95 and 3 Ply Mask, Few respondents were wearing respirators, FFP mask, and cotton mask while treating patients. 88.9% respondents were changing their mask every patients. Using N95 Mask while treating patients they were wearing 3 Ply mask on it and every patients they were changing only 3 ply mask. 11.1% were not changing their mask because of using FFP and respirators while treating patients.

Regarding Practice and approach towards the Covid-19 majority of the respondents (97.3%) were measuring temperature and 96.3% respondents were checking SpO_2 of patients before entering into clinical area. Almost all (99.7%) respondents were sanitize patient's hands and rinse their mouth before entering them into clinical area. 92.75% rinse with help of Chlorhexidine and 7.24% were using Betadine. 7.07% respondent were not rinse their patient's mouth before starting the orthodontic treatment. 98.3% respondent do have adequate cross ventilation at the operatory and waiting area for the prevention of the infection and 97.3% respondents minimized the number of appointments in day. Only 2.7% didn't minimized the number of patient as they are taking all the proper precautions during the treatment to prevent the infection.

Majority (88.2%) respondents were maintaining social distancing by seating arrangements with minimum 6 feet distance to each person, allow only patients to the hospital, relatives of the patients can wait outside the hospital and had giving appointment in such a manner that only single patient was allowed at the specific time. Almost everyone sanitized their instrument along with autoclave using chemical disinfectant, glass bead sterilizer, ultrasound bath and hot air oven. For the sanitation of dental operatory they were using Cavicide disinfectant then flushing all water line for 30 seconds, using Rapi-G (Rapid Oxygen Room Disinfectant) for oxygen saturation and cleaning with sodium hypochlorite and spraying 70% alcoholic solution (Bacillol spray) on dental operatory for the sanitation to prevent cross contamination of the infection.

Researchers found that the implementation of recommended infection control measures varied among dentists, and those who were aware of the importance of infection control had better compliance with guidelines.[20] This implies that effective tactics and a variety of training methods are required to raise dental workers' understanding of infection prevention. The use of a checklist in a convenient location for repeating processes has been advocated to increase compliance with infection control precautions, such as what PPE should be used in particular circumstances, proper donning and doffing procedures for PPE, and recommended hand hygiene practises.[23]

A questionnaire-based survey is a useful tool to efficiently acquire information regarding knowledge, attitude and practice amongst Orthodontist and Orthodontic Resident of Gujarat.

CONCLUSION

To conclude, our findings suggest that Orthodontists and Orthodontic Residents demonstrated good knowledge, positive attitudes, and reasonable practice regarding COVID-19 during the outbreak. During the mitigation stage of the COVID-19 epidemic when orthodontic services are gradually resuming, orthodontic professionals in Gujarat are generally confident that they understand COVID-19-related risks and knowledge, and are willing to treat for COVID-19 pandemic. At the moment, it is essential to manage in the clinics with all the necessary precautions and following the guidelines dictated by the WHO and local authorities.

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