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Cognizance of Dentists and Dental Students Regarding Infection Control Practices in the Wake of COVID-19 Pandemic

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Abstract

Introduction: Novel Coronavirus Disease (COVID-19) pandemic began in China in December 2019 and was reported as a cluster of pneumonia cases of unknown aetiology from Wuhan, Hubei. Its origin is believed to be from an animal source in an individuals after he visited the local seafood and animal market in Wuhan and after which community transmission led to the initial endemic turning into a pandemic. Infection prevention and control (IP&C) practices are said to upmost important in maintaining a safe environment for everyone by reducing the risk of the potential spread of the disease. Such practices are designed so as to reduce the risk of hospital-associated infections and also to ensure a safe and healthy environment for patients, healthcare providers and visitors. **Aim and Objectives:** The aim of this study was to determine and understand the knowledge, attitude, and practices regarding infection control among dental practitioners and dental students during the ongoing pandemic. **Materials and Methods:** A total of 1005 responders participated and completed a structured questionnaire based online survey. Convenient sampling was adopted for data collection and the distribution of responses was presented as frequencies and percentage. Descriptive statistics were carried out for all groups and subgroups. **Results:** Overall awareness for all subgroups was found to be adequate with 90% reporting correct answers. More than three-fourths of the responders were aware of the importance of infection control in dental clinics and 95% of responders were aware about the WHO guidelines. Only 0.7% of responders were unaware of the importance of hand hygiene and other infection control practices. **Conclusion:** Even though the study results shows a satisfactory level of cognizance among the participants, the need for periodic educational interventions and training programs regarding infection control practices pertaining to COVID-19 across all healthcare professions should not be overlooked. Occupational health and safety is always considered of paramount importance to minimize the risk of transmission to healthcare students and professionals and provide optimal care for patients.

Keywords: Corona Virus, COVID-19, Dentistry, Infection Control, Oral Health, Occupational Hazards.

INTRODUCTION

Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) is a new coronavirus that emerged in 2019 and causes Coronavirus Disease 2019 (COVID-19). SARS- CoV-2 is highly contagious. It varies from other respiratory viruses in that it appears that human-to-human transmission occurs 2 to 10 days prior to the individual becoming symptomatic [1, 2].

Person to person transmission of the virus is mainly through hand contact on a contaminated surface then touching the mouth, nose or eyes. During a sneeze or cough the aerosol airborne infected particles created remain viable in the air for at least three hours. These particles of SARS- CoV-2 can then be inhaled by another person or land on the mucosal membranes of the eyes [2, 3].

Individuals with COVID-19 can present with influenza like illness and respiratory tract infection demonstrating fever (89%), cough (68%), fatigue (38%), sputum production (34%) and/or shortness of

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breath (19%). Anosmia (loss of smell) and Ageusia (loss of taste) are also common findings [1].

The disease spectrum in terms of severity ranges from an asymptomatic infection, mild upper respiratory tract illness, and severe viral pneumonia with respiratory failure and/or death. Reports currently estimate that 80% of cases are asymptomatic or mild; 15% of cases are severe (infection requiring oxygen); and 5% are critical requiring ventilation and life support. Presently the mortality rate is 3 to 5% with new reports of up to 9%, in contrast to influenza which is around 0.1% [3].

In dentistry, the patient's saliva mixed with blood, pus, plaque and crevicular fluid is often aerosolized and spattered, thus exposing the dental professional to potential infectious agents. Micro-organisms are always mixed with these body materials and they cause infectious and transmissible diseases. It therefore becomes mandatory for the dental professional to follow the universal precautions and treat every patient as being potentially infectious [4, 5].

With this concern, a questionnaire based cross-sectional study was done to determine and understand the knowledge, attitude, and practices regarding infection control among dental practitioners and dental students during the ongoing pandemic.

MATERIALS AND METHODS

The study was conducted among dental practitioners and dental students from various parts of South India. It was a descriptive, online based, cross-sectional study. A total of 1005 subjects based on the study inclusion and exclusion criteria were selected at random and the participants were provided with a brief explanation note about the objectives of the study and only with a prior informed consent progressed to answering the questionnaire. Ethical clearance was obtained from the Institutional Ethics Committee prior to onset of the study.

Qualitative interview with the focus group of 20 participants was conducted to establish a conceptual equivalence and content validity of the present questionnaire. Internal reliability of the questionnaire was pretested using Cronbach's alpha on a pilot sample of 20 participants and α values was found to be 0.73.

A specially designed structured proforma in English language consisting of 40 closed ended questions was used to assess the knowledge, attitude and practices among the participants. The difficulties encountered during the pilot study were overcome during the main study. Those who participated in the pilot study were excluded from the main study.

During the study period beginning from July 20th to August 5th the questionnaire was distributed online through WhatsApp and email among the participants. Data were recorded on a researcher made checklist covering various aspects of infection control guidelines and Standard Operating Procedures (SOPs) issued by concerned bodies from time to time during the pandemic, the questionnaire also included questions related to the awareness about the hand hygiene and Personal Protective Equipments (PPEs).

Subjects were grouped and classified on the basis of gender and occupational position (faculty, private practitioner, consultant, 3rd year BDS student, 4th year BDS student, house surgeons and post graduate student). Convenient sampling method was used for data collection and the distribution of responses was presented as frequency and percentages. After collecting the responses they were entered onto Microsoft Excel sheet and subjected to descriptive data analysis using SPSS for Windows.

RESULTS

A total of 1005 dental professionals responded to the survey of whom 64.8% were female (Figure 1). Among the various subgroups 22% (n = 221), 27% (n = 271) were third and fourth BDS students respectively. House surgeons constituted 24.7% (n = 248), 12% (n = 128) were post graduate students, 8% (n = 80) were dental practitioners and 2% (n = 20) were teaching faculties, consultant dentist 15 (1.5%), the rest were faculty with practice 10 (1%), faculty and consultant 12 (1.2%) (Figure 2).

Among the participants 99.1% believed infection control should be first among all the priorities in any dental clinic. Approximately the same number also believed that the spreading of cross infection or new infection was mainly due to improper infection control. Majority i.e. 98.5% were familiar with the term PPE but only 71.8% knew what the primary components of PPE were. Around 93% of the responders felt a sense of fear of getting infected from their patients and also were anxious in carrying out treatment to those exhibiting any signs of COVID-19. A majority i.e. 95.1% were up to date regarding the SOPs and infection control guidelines given by Ministry of Health & Family Welfare, Government of India (MoHFW), Centre for Disease Control (CDC) and World Health Organization (WHO) from time to time (Table 1).

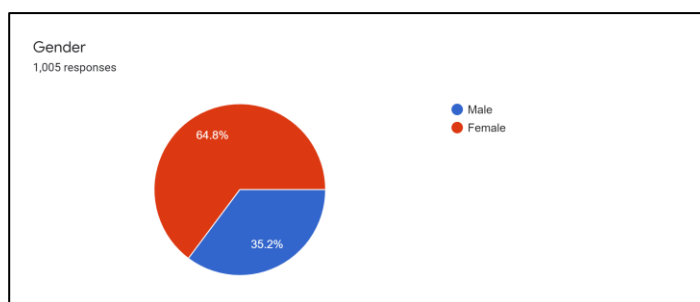


Figure 1: Distribution of study subjects based on gender.

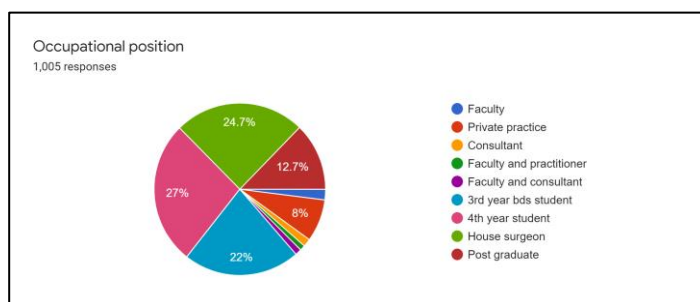


Figure 2: Distribution of study subjects based on occupation position.

Table 1: Question wise responses in numbers and percentage (%) by study subjects.

SL. No.	Questions	Options	Responses in numbers	Responses in %
1	Infection control should be first among all the priorities	Yes	996	99.1%
		No	9	0.9%
2	Cross infection happens primarily due to improper infection control	Yes	996	99.1%
		No	9	0.9%
3	Methods of sterilization	Yes	992	98.7%
		No	9	0.9%
		Don't know	4	0.4
4	Importance of hand hygiene	Yes	794	79%
		No	204	20.3%
		Don't know	7	0.7%
5	Alcohol as an acceptable disinfectant for any surface	Yes	635	63.2%
		No	313	31.1%
		Don't know	57	5.7%
6	Familiarity with nosocomial infections	Yes	971	96.6%
		No	21	2.1%
		Don't know	13	1.3%
7	Minimizing nosocomial infections through infection control protocols	Yes	956	95.1%
		No	19	1.9%
		Don't know	30	3%
8	Regular disinfection in dental clinics	Yes	983	97.8%
		No	13	1.3%
		Don't know	9	0.9%
9	Disinfectant as a holding solution	Yes	723	71.9%
		No	106	10.5%
		Don't know	176	17.5%
10	Disinfecting the operating surface between each patients	Yes	916	91.1
		No	29	2.9%
		Not always	60	6%
11	Washing hands before and after every patient examination	Yes	971	96.6%
		No	14	1.4%
		Not always	20	2%
12	Disposable gowns help in infection control	Yes	943	93.8%
		No	35	3.5%
		Don't know	27	2.7%
13	Disposable gowns need to cover the torso from neck to knee and should be fastened	Yes	892	88.8%
		No	96	9.6%
		Don't know	17	1.7%
14	Covering of wrist area of disposable gowns by gloves will create a seal	Yes	889	88.5%
		No	55	5.5%
		Don't know	61	6.1%
15	Changing of gloves, mask, face shield and disposable gowns for each patients	Yes	902	89.8%
		No	49	4.9%5
		Not always	54	5.4%
16	face shields are more effective than masks	Yes	862	85.8%
		No	96	9.6%
		Don't know	47	4.7%
17	Familiarity with the term PPE	Yes	990	98.5%
		No	15	1.5%

18	Full form of PPE	Correct response	990	98.5%
		Incorrect responses	8	0.8%
		Don't know	7	0.7%
19	Components of PPE	Correct response	722	71.8%
		Incorrect responses	283	28.2%
20	Using PPE in routine dental practice during the pandemic	Yes	795	79.1%
		No	75	7.5%
		May be	135	13.4%
21	PPE kit is cost effective	Yes	503	50%
		No	363	36.1%
		May be	139	13.8%
22	Fair to include the cost of PPE kit in the patient's treatment charges	Yes	635	65%
		No	352	35%
23	PPE is reusable	Yes	208	20.7%
		No	692	68.9%
		Don't know	105	10.4%
24	Sequence of donning and doffing of PPE	Yes	693	69%
		No	312	31%
25	Major risk factor for self-contamination regarding the usage of PPE	Out-of-date PPE	32	3.2%
		Error in removing PPE	28	2.8%
		Errors in putting PPE	23	2.3%
		Ill-fitting PPE	21	2.1%
		All of the above	876	87.2%
		None of the above	2	0.2%
26	Do you laminate headrest, light holder and tray holder before starting any procedure	Yes	844	84%
		No	41	4.1%
		Not always	120	11.9%
27	To stop the spread of infection, we must break the chain of infection	Yes	976	97.1%
		No	13	1.3%
		Don't know	16	1.6%
28	Quarantining / isolation of infected patient aids to breaking the chain of infection	Yes	984	97.9%
		No	12	1.2%
		Don't know	9	0.9%
29	Mode of spread of COVID-19	Yes	986	98.1%
		No	7	0.7%
		Don't know	12	1.2%
30	COVID-19 is a contagious infection	Yes	984	97.9%
		No	10	1%
		Don't know	11	1.1%
31	Fear of getting infected COVID-19 from patients	Yes	937	93.2%
		No	68	6.8%
32	Anxious when you are providing treatment/doing examination to a patient who is coughing or sneezing periodically	Yes	941	93.6%
		No	64	6.4%
33	Stopping your practice/ consultation/ treatment till the issue of corona virus case declined	Yes	565	56.2%
		No	369	36.7%
		Don't know	71	7.1%
34	Fear of carrying infection to your home from workplace	Yes	956	95.1%
		No	49	4.9%
35	Updated on guidelines issued by the government, CDC and WHO	Yes	956	95.1%
		No	32	3.2%

		Don't know	17	1.7%
36	Spending more time in recording medical history and in finding signs and symptoms now than before	Yes	935	93
		No	34	3.4%
		Not always	36	3.6%
37	Deferring treatment of any of your patients having suspicious COVID-19 related symptoms	Yes	807	80.3%
		No	114	11.3%
		Not always	84	8.4%
38	Informing concerned authorities if u suspect any one of your patient has COVID-19 related symptoms	Yes	905	90%
		No	100	10%
39	Informing the patient details to authorities is a violation of medical code of conduct	Yes	572	56.9%
		No	281	28%
		Don't know	152	15.1%
40	Patient asked to rinse his/her mouth using antimicrobial mouthwash before treatment	Yes	823	81.9%
		No	138	13.7%
		Not always	44	4.4%

DISCUSSION

This study was carried out to assess the knowledge, attitude and practices among dentists & dental students regarding infection control practices in the wake of COVID-19 Pandemic. A total of 1005 responses were received during the course of the study period of whom 651 (64.8%) were female and 354 (35.2%) were male. Among the participants faculty were 20 (2%), private practitioners 80 (8%), consultant dentist were 15 (1.5%), faculty with practice 10 (1%), faculty and consultant 12 (1.2%), third BDS students were 221 (22%), final year BDS students 271 (27%), house surgeons 248 (24.7%) and post-graduate students were 128 (12.7%).

Majority of the participants 99.1% believed infection control should be first among all the priorities in any dental clinic and also believed that the spreading of cross infection or new infection was mainly due to improper infection control. This results is similar to studies done by Mohammad Abdul Baseer *et al* [6], Coulthard P [7], Diaz K T *et al* [8], Szymanska J [9].

Though majority of the respondents had the knowledge regarding standard sterilization procedures (98.7) these results are in accordance with Harte JA [10], Azodo CC *et al* [11], Ibrahim NK *et al* [12], Yamalik N *et al* [13]. But, there was slight lack of understanding when it came to hand hygiene (79%) and surface disinfection (63.2%) this was in contrast to the findings reported by Moradi Khangahi B *et al* [14], Tada A *et al* [15], Al-Maweri S.A *et al* [16], Ahmad IA *et al* [17], Sudeep C B *et al* [18].

Among the participants 98.5% were familiar with the term PPE but only 42.7% knew the primary components of PPE were. Only 79.1% used PPE in their routine practice with 50% responding as the use was not cost effective for them this was accordance to results published by Binalrimal S *et al* [19], Assiri KI *et al* [20]. Among the respondents only 69% said to know the proper sequence of donning and doffing the PPE.

To stop the spread of infection 97.1% believed we must break the chain of infection and 97.9% agreed that quarantining / isolation of infected patient aids to break the chain [21].

Around 93% of the responders felt a sense of fear of getting infected from their patients and also were anxious in carrying out treatment to those exhibiting any signs of COVID-19, and 95.1% feared of carrying infection to their home from workplace.

Patient were asked to rinse his/her mouth using antimicrobial mouthwash before treatment by 81.9% of the participants. But, 56.2%

recommended stopping the practice/ consultation/ treatment till the issue of corona virus case declined. And 80.3% agreed to deferring treatment of any of their patients having suspicious COVID-19 related symptoms.

A majority i.e. 95.1% were up to date regarding the SOPs and infection control guidelines given by Ministry of Health & Family Welfare, Government of India (MoHFW), Centre for Disease Control (CDC) and World Health Organization (WHO) from time to time.

All the results from this study could not be compared with existing literature due to the scarcity of published results and a major limitation to this study was that the practical skills of the participants could not be assessed. It is recommended that such studies need to be carried out in various parts of the country among dentists and to assess their cognizance. The participation of educational institutions, dental associations and professional bodies to improve the training of students and professionals in updated SOPs and infection control practices from time to time is also utmost necessary.

CONCLUSION

The results from the present study is shows that dental students and dentists have a good level of knowledge regarding appropriate practices for infection control. Our questionnaire was similar to previously carried out local and international studies, with some variations that can be attributed to differences in policies, culture and more importantly the influence of ongoing COVID-19 Pandemic.

Future studies should be implemented with more samples from other parts of the country, and it is also recommended to investigate organizational policies to understand their effects on dental students and dentists in terms of compliance with infection control guidelines.

The study only indicates that regular educational interventions and training programs are a need and should be carried out periodically on updated infection control practices for COVID-19 across all healthcare professions. Occupational health and safety always remain of paramount importance so as to minimize the risk of transmission to healthcare students and professionals and also to provide optimal care for patients.

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Conflicts of Interest

The authors declare no conflict of interest.

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