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Covid-19- Knowledge And Practice Among Dentists- A Questionnaire Based Study

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ABSTRACT:

AIM: To assess the level of knowledge and attitude regarding COVID-19 infection in clinical practice among Bangalore dentists.

MATERIALS AND METHODS: The study population consisted of 25 specialists, 65 post graduate students and 60 general dentists who work in Bangalore. An online questionnaire was sent to the dentists in October 2021. The questionnaire comprised of three sections: Section A comprised of socio-demographic and professional details of the subjects, Section B comprised of questions representing knowledge and awareness regarding COVID-19, Section C comprised of questions about working condition and practices adopted after the outbreak of the infection.

RESULTS: Statistically there was no significant difference (p-0.201) of mean knowledge scores between all three groups of participants. Among 150 participants 85% used PPE measures. Almost two-third of the participants agreed that the number of patients in waiting area and the time they spend there should be minimized (GD-73.3%, PG-84.6%, Specialists-68%)

CONCLUSION: The findings of the present study showed that dentists had fair knowledge regarding some vital aspects of COVID-19 and also they have incorporated extra precautionary measures in their practice. National and international guidelines should be sent by the regional and national dental associations to all registered dentists during any crisis, including the COVID-19 pandemic, to make sure that dentists are well informed and aware of best practices and recommended disease management approaches.

KEYWORDS: COVID-19, questionnaire based study, Dentists, knowledge, infection control.

INTRODUCTION:

SARS-CoV-2 is the highly infectious coronavirus which causes COVID-19 disease and lead to outbreak of pneumonia. Humanity fought back in various ways and produced the vaccines in the shortest period. (1) Corona virus is primarily transmitted through droplets - released by coughing, sneezing,

exhalation or speech, aerosols and mists in air by contact from humans to humans. [2] Sars-CoV-2 expresses membrane proteins which binds to specific receptors known as angiotensin-converting enzyme 2 (ACE-2) which are present at high concentrations in lungs, myocardial cells and kidney and oral mucosa (especially of the salivary glands and tongue) in humans. [3] The virus has shown mutations as we have seen in second wave (delta variant) and presently witnessing the third wave (omicron variant). [4] According to Occupational Safety and Health Administration (OSHA), dental health care personnel (DHCP) are placed in very high exposure risk category as they work in close proximity to the patient's oral cavity, and come in direct contact with saliva. [5,6] Airrotor hand pieces, ultrasonic scalers and three way syringes can produce aerosols wherein, micro-organisms remain suspended in the air for a prolonged time and so there is a risk of cross infection between dentists and patients. [7] Thus, it is of paramount importance for the dentists to keep updating their knowledge about the disease, prevention guidelines and recommendations as given by the Centers for Disease Control and Prevention (CDC) and various health organizations to control its spread and rule out the infection. [8-10] This study aimed to assess the level of awareness, perception regarding COVID-19 infection and practices adopted during COVID-19 among Bangalore dentists.

MATERIALS AND METHODS:

Study design and population

We conducted an online cross-sectional survey using the snowball-sampling technique during October 2021 among Bangalore dentists. 150 subjects returned the questionnaire that constituted the final study sample. Our study population consists of 25 specialists, 65 Post Graduate students (PG) and 60 General Dentists (GD) who work in Bangalore regardless of their workplace. An online questionnaire using Google Forms was used to collect the datas. The questionnaires were anonymous to maintain the privacy and confidentiality of all information collected in the study.

Questionnaire

A self-designed online questionnaire was developed using Google forms in English language specifically for the study after reviewing the relevant published literature and the most recent available information on COVID-19 from the international guidelines. The questionnaire was divided into three sections: (1) Section A was 'General section' which comprised of socio-demographic and professional details of the subjects (gender, educational status, type of practice etc.) (2). Section B comprised of 10 questions representing knowledge and awareness regarding COVID-19 (duration of virus on surfaces, availability of vaccine, various preventive measures, disinfection protocols, etc.) (3) Section C comprised of 9 questions about working condition and practices adopted after the outbreak of the infection. The questionnaire was delivered to the study subjects via email and whats app (Social Media Application). Total knowledge/ awareness score was calculated on the basis of each subject's response. Each positive response was awarded a score of '1' and negative response as '0'. Therefore, the maximum score will be 10 and minimum will be 0 as there are 10 knowledge questions and the data were tabulated. For practice based questions frequency was calculated and tabulated.

STATISTICAL ANALYSIS:

The Normality tests Kolmogorov-Smirnov and Shapiro-Wilks tests results revealed that total knowledge score did not follow Normal distribution. Therefore, to analyse the data non-parametric methods were applied. To compare total score between practice types Kruskal Wallis test was used

followed by Bonferroni adjusted Mann Whitney test for multiple pair wise comparison. To compare total score between age groups Mann Whitney U Test was used. To analyse the data SPSS (IBM SPSS Statistics for Windows, Version 26.0, Armonk, NY: IBM Corp. Released 2019) was used. Significance level is fixed as 5% ($\alpha = 0.05$). The results were tabulated.

RESULTS:

Socio-demographic and professional characteristics:

"The demographic data of the subjects are shown in Table-1." This study included a total of 150 dentists in which 60 were General dentists, 65 were Post graduates and 25 were Specialists. More than half of the participants (n=125) were between 25-35 years.

TABLE -1 SOCIO DEMOGRAPHIC DATA

Profile	Answer	Number	Percentage
Age group	25-35 yrs	125	83.3
	> 35 yrs	25	16.7
	Total	150	100.0
Practice type	General	60	40.0
	PG Student	65	43.3
	Specialist	25	16.7
	Total	150	100.0

Knowledge:

"Participants response to knowledge based questions (n=10) is tabulated in table-2." Majority of the participants had adequate knowledge about PPE measures, donning and doffing order of PPE and also about respirators. When asked about preventive measures like HEPA and ACH during COVID-19 only one-third of participants answered correctly whereas about negative pressure rooms almost one-half of the participants answered correctly (GD-51.7%, PG-50% Specialists-68%).

Percentage of subjects who answered correctly regarding COVID-19 vaccines was less than 5% in all three groups.

TABLE-2 KNOWLEDGE BASED QUESTIONS

	Practice type					
	General		PG Student		Specialist	
	Correct answer		Correct answer		Correct answer	
	N	%	N	%	N	%

N95 respirators belongs to	35	58.3	44	67.7	12	48.0
What is the donning order of PPE	44	73.3	42	68.1	18	72.0
What is the doffing order of PPE?	41	68.3	34	51.5	14	64.0
Negative pressure room implies	31	51.7	32	50	17	68.0
HEPA stands for	17	28.3	24	36.9	5	20.0
ACH stands for	16	26.7	12	18.5	9	36.0
What is the average ACH recommended for dental clinic?	22	36.7	26	40.0	12	48.0
What is the disinfection protocol recommended outside the operatory during this pandemic?	36	60.0	34	52.3	11	44.0
How many hours will SARS COV-2 will remain on inanimate surfaces and in aerosols?	36	60.0	32	49.2	10	40.0
What are the different types of vaccines and manufacturing companies for COVID-19?	3	5.0	3	3.2	1	4.0

KNOWLEDGE SCORE:

Kruskal-Wallis Test to compare total score between types of practice

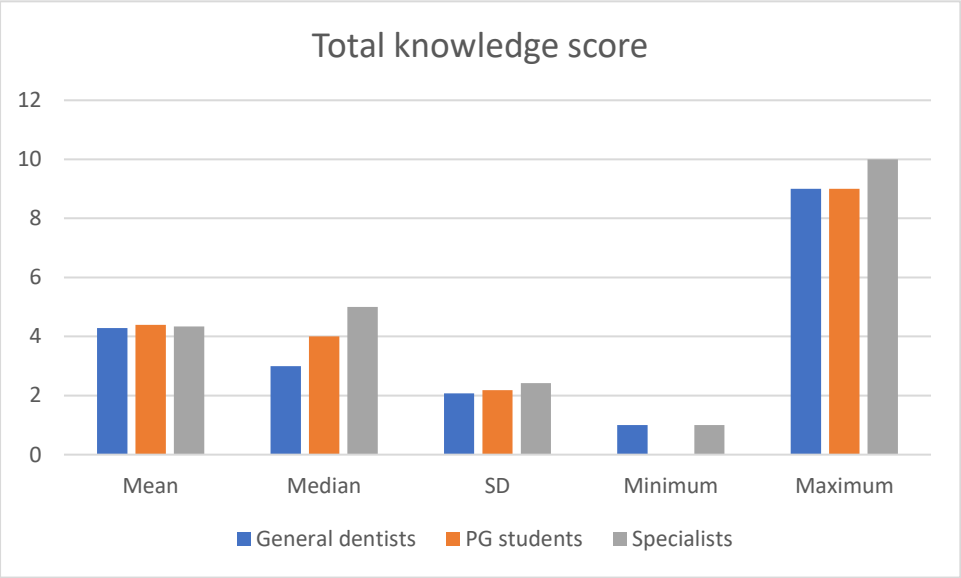
Total score (Total knowledge score has been calculated as 1 if answered correct for any question; 0 if the answer is wrong. Therefore, the maximum score will be 10 and minimum will be 0 as there are 10 knowledge questions. “Statistically there was no significant difference (p-0.201) of mean knowledge scores between all three groups of participants but when compared to GD-4.29; PG -4.39 and specialists-4.34 had little more mean knowledge score and depicted in table-3 & graph-1”

TABLE-3 KNOWLEDGE SCORE

Total score	Practice type			
	General	PG Student	Specialist	Total
N	60	65	25	150
Mean	4.29	4.39	4.34	4.32
Std Dev	2.09	2.18	2.42	2.20
Median	3.00	4.00	4.00	4.00
Minimum	1.00	.00	1.00	.00
Maximum	9.00	9.00	10.00	10.00

p-value	0.201	

GRAPH-1 TOTAL KNOWLEDGE SCORE



PRACTICES:

"Details regarding personal and clinic hygiene practices are mentioned in table-4." When asked about PPE measures majority of the participants (85%) used N95/FFP2, face shield, gown and cap in their practice. In the present study it was reported that one-half of the population used isolation rooms, extra oral high suction high suction and natural air ventilation. The frequent washing of the hands before and after each procedure was done by 78.3% GD, 64.6% PG and 68% Specialists. Surprisingly, only one-third of the population used rubber dam. Routine cleaning and disinfection of clinic surfaces were done by 50% GD and PG and 60% specialists. 70% of the dentists (GD-71.7%, PG-72.3%, and Specialists-72%) used 0.2% povidone iodine as pre procedural mouth rinse. Almost two-third of the participants agreed that the number of patients in waiting area and the time they spend there should be minimized (GD-73.3%, PG-84.6%, Specialists-68%)

TABLE 4- PERSONAL AND CLINIC HYGIENE PRACTICES

		Practice type							
		General		PG Student		Specialist		Total	
		N	%	N	%	N	%	N	%
Which type of masks do you recommend in your practice	N95/FFP2	38	63.3	45	69.2	17	68.0	100	66.7
	N95/FP3	13	21.7	9	13.8	3	12.0	25	16.7
	P100/FFP3	13	21.7	23	35.4	8	32.0	44	29.3

during this pandemic?	N95/P2 particulate respirator	8	13.3	6	9.2	2	8.0	16	10.7
What are the other PPE measures recommended in your practice in COVID-19?	Face shield	53	88.3	55	84.6	25	100.0	133	88.7
	Double gloves	42	70.0	40	61.5	15	60.0	97	64.7
	Goggles	35	58.3	28	43.1	15	60.0	78	52.0
	Overshoes	26	43.3	29	44.6	16	64.0	71	47.3
	Gown	54	90.0	51	78.5	21	84.0	126	84.0
	Cap	50	83.3	52	80.0	22	88.0	124	82.7
What are the measures taken to prevent nosocomial transmission in your practice during this pandemic?	Isolation room – negative pressure rooms	29	48.3	31	48.0	12	48.0	62	41.3
	Natural air ventilation	30	50.0	28	43.1	14	56.0	72	48.0
	Rubber dam	23	38.3	30	46.2	10	40.0	63	42.0
	Extra oral high vacuum suction	29	48.3	36	55.4	14	56.0	79	52.7
	Air disinfection/ HEPA filters	35	58.3	43	66.2	18	72.0	96	64.0
	Hand hygiene measures	47	78.3	42	64.6	17	68.0	106	70.7
What are the changes in your practice after COVID-19 announcement?	Reducing the number of patients in waiting area and reducing the time spent for each patient	44	73.3	55	84.6	20	80.0	116	77.3
	Treatment in negative pressure rooms	18	30.0	14	21.5	9	36.0	41	27.3

	Scheduling aerosol appointments on alternate days	20	33.3	16	24.6	18	72.0	54	36.0
	Emergency treatments only and non-emergencies through tele screening an pharmacologic management	22	36.7	22	33.8	9	38.0	56	37.3
	No changes	15	25.0	22	33.8	13	52.0	50	33.3
	No treatment done	1	1.7	3	4.6	1	4.0	5	3.3
	G	3	5.0	0	.0	1	4.0	4	2.7
What will you do for patient to patient disinfection in your practice during this pandemic?	Change PPE	38	63.3	35	53.8	13	52.0	86	57.3
	Use air purifier	25	41.7	25	38.5	10	40.0	60	40.0
	Change barriers	33	55.0	26	40.0	10	40.0	69	46.0
	Use UV sterilizer	33	55.0	41	63.1	17	68.0	91	60.7
	No disinfection	1	1.7	5	7.7	1	4.0	7	4.7
What is the recommended Pre procedural mouth rinse to reduce the load of corona virus in saliva?	0.5%-1% H2O2	19	31.7	25	38.5	9	36.0	48	32.0
	0.2% povidone iodine	43	71.7	47	72.3	18	72.0	108	72.0
	0.2% chlorhexidine	25	41.7	28	43.1	10	40.0	63	42.0
	Betadine mouthrinse	2	3.3	3	4.6	1	4.0	6	4.0
What is the disinfection protocol recommended inside the	A) ethanol – 62%-71%	6	10.0	8	12.3	1	4.0	15	10.0
	B) NaOCl- 0.05%-1% & H2O2- 0.5%	14	23.3	21	32.3	7	28.0	42	28.0

operatory during this pandemic?	C) Chlorhexidine	7	11.7	4	6.2	2	8.0	13	8.7
	A & B	30	50.0	41	53.0	15	60.0	76	50.7
	B & C	6	10.0	2	3.1	0	.0	8	5.3
What is the sterilization protocol followed in your practice during this pandemic?	Autoclave together	19	31.7	39	60.0	12	48.0	70	46.7
	Autoclave each set separately	34	56.7	17	26.2	11	44.0	62	41.3
	Hot air oven	6	10.0	7	10.8	2	8.0	15	10.0
	Hot water bath for emergency	4	6.7	5	7.7	1	4.0	10	6.7
	UV sterilizer and chamber	21	35.0	24	36.9	10	40.0	55	36.7
Aerosol generated procedures were	Performed even during 1st wave	10	16.7	14	21.5	3	12.0	27	18.0
	Stopped during 1st wave	20	33.3	16	24.6	6	24.0	42	28.0
	Stopped during 2nd wave	4	6.7	9	13.8	5	20.0	18	12.0
	Performed less during 1st wave and more during 2nd wave	26	43.3	25	38.5	16	64.0	67	44.7
	Stopped during 1st wave and performed during 2nd wave	10	16.7	11	16.9	3	12.0	24	16.0

DISCUSSION:

The recent spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and its associated coronavirus disease has gripped the entire international community and caused widespread public health concerns. So it is necessary for the health personnel's to be aware about the symptoms, vaccines and measures to prevent COVID-19. The present study provides an insight on the level of awareness and clinical measures taken during this outbreak. It was observed in the study that majority

of the subjects had fair knowledge (mean score-GD-4.29, PG-4.39, Specialists-4.34) regarding COVID-19 and the preventive measures and the difference between the groups were not statistically significant although PG and Specialists had little more mean knowledge score than GD.

The estimated period of COVID-19 on inanimate surfaces is up to 72 hours with a greater preference for humid conditions. [11] Dentists in this study varied in their knowledge about the survival time of the disease (GD-60%, PG-50%, Specialists-40%), but it is essential to know the right period of the virus on the inanimate surfaces because its role in causing the spread in dental set up is high. So it is mandatory that dentists sterilize and disinfect the operatory area as well as the area outside the operatory between each patient during this outbreak and maintain a dry environment to curb the spread of SARS-CoV-2. [12] Disinfecting the floor and waterline with 1% NaOCl and 0.01% NaOCl respectively is recommended. [13] For the surfaces inside the operatory NaOCl-0.05%-1% & H2O2- 0.5% and ethanol – 62%-71% is usually recommended. [13] About 50% of specialists, 53%-PG and 60% - GD were aware about it. Several measures were adopted by dentists after SARS-CoV-2 outbreak. So, it is important to know about HEPA filters and ACH (air changes per hour). [14] The ACH should be 8-10 circulation/hour with particulate matter 2.5 micro filters. The HEPA filters prevent the re-entry of virus through the vents. [13] Unfortunately only 1/3rd (26%-Specialists, 30%-PG and 36%-GD) of the participants were aware about it. Even the CDC has suggested the use of portable fan systems with HEPA filtration to provide surge capacity during a pandemic or other crises. [15-17] In general, the portable HEPA air purifier reduces aerosol dispersion via two mechanisms (a) by removing the particles from the air, and (b) by creating a negative pressure across the plastic barrier. The negative pressure forces the particles to stay within the isolation space. [18] The negative pressure rooms have low air pressure inside the room than outside, the air should exit the room through a filtered HEPA ventilation system. [19] The use of PPE, like masks (N-95), gloves, gowns, and goggles or face shields, is recommended to protect the skin and mucosa from infected blood or respiratory secretions. [20] When performing aerosol generating procedures, a particulate respirator that is at least as protective as a National Institute for Occupational Safety and Health (NIOSH)-certified N95 or FFP2 is recommended. For emergency dental treatment with suspected COVID-19 cases, a higher level of respirators should be considered, such as EU FFP3 respirators approved by European Standard 149 (EN149). The proper usage can significantly reduce risk of viral transmission through the inanimate surfaces and aerosols. [21] Almost 2/3rd of the participants used face shield, gown and headcap. But more than half of the participants did not use over shoe covers for themselves and for the patients before entering the dental clinic. This aspect needs to be highlighted since coronavirus can survive on the sole of the shoes for up to 5 days due to its ability to land on the ground surface by gravity or airflow effect.

Hand hygiene has been considered the most vital measure for minimizing the risk of transmitting microorganism to patients. [21] More than 70% of subjects cleaned their hands after treating patients in our study to avoid nosocomial transmission. Dentists should use a rubber dam to minimize splatter or aerosol during the treatment (standard measure for nonsurgical endodontic treatment). Also rubber dam covers the nose and can reduce at least 70% of patient's salivary fluids in the composition of the aerosols and thereby, significantly reduce the microorganism suspension in the environment. [12, 23, 24] But sadly only 1/3rd of the participants (GD-3.3%, PG-46.2%, Specialists-40%) used rubber dam. The majority of the respondents used dental mouthwashes before the initiation of the treatment (70%). Commonly used mouth rinses were 0.12% chlorhexidine gluconate (40%), 0.2% povidone-iodine (20%) and hydrogen peroxide (30%). There is evidence of antiviral action of antiseptic rinses like chlorhexidine, hydrogen peroxide, povidine iodine against SARS- CoV-2, but majority of the studies are in vitro and others in clinical trial stage. [13, 25]

About 80% of the participants reduced the number of patients in the waiting room, and this was according to the WHO precautions to avoid crowded places and to maintain a physical distance at least 1 m. [(26)] Dental emergencies can occur and aggrevates in a short period of time and therefore need immediate treatment. Till now, there has been no consensus on the provision of dental services during the current pandemic. [(27)] Though it is matter of personal choice, it was observed that 35% of dental practitioners were providing emergency dental services at their clinic.

Finally, the most effective and reasonable means to prevent and control infectious diseases is through vaccines. Scientists have worked day in and day out to develop various vaccines against COVID-19. To quote a few, a) mRNA vaccines - BioNTech-Pfizer, Moderna & Curevac; b) Adeno vector vaccines – Covishield, Sputnik, Janssen-Johnson & Johnson & Convidecia; c) Inactivated vaccine – Covaxin, Sinovac (CoronaVac) & Sinopharm; d) Protein subunit vaccines – Novavax. [(28)] While most of the vaccines against COVID-19 are under design and preparation, few have entered efficacy evaluation in animals and clinical trials. [(29)] Presently, this is ongoing development and it is understandable that only 5% of dental practitioners could rightly answer in this regard.

In our study subjects holding a post-graduate degree and students pursing PG were more knowledgeable as compared to graduates, stressing the positive impact of education on knowledge scores. However knowledge mean scores of subjects did not have statistical difference (p=0.201).

This survey tried to check awareness level of dentists, their knowledge upgrading, inculcating newer practice styles as world encountered novel viral disease. Definitely our knowledge about the disease has deepened from first to second and third waves of this pandemic. There is no doubt that vaccinations have been life savers. This survey gives us a glimpse of adaptations made by Bangalore dentist as they traversed this period.

CONCLUSION:

Surveyed population presented with fair amount of knowledge upgrading during the pandemic period and incorporated needed changes in their practice to treat emergencies and also prevent cross infection at the same time during the period. Therefore, dentists should update their knowledge via health education and training programs.

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