



Research Article

KNOWLEDGE, ATTITUDE AND PRACTICE REGARDING INFECTION CONTROL OF COVID-19 AMONG THE DENTAL SURGEONS, DENTAL STUDENTS IN PUBLIC INSTITUTION AND PRIVATE PRACTITIONERS IN CHENNAI CITY -A CROSS SECTIONAL SURVEY

Bhuvaneshwari P¹, Vanitha M^{*2}, Nandhini B³ and Thamaraiselvi R⁴

^{1,2,4}Department of Periodontics, Tamil Nadu Government Dental College & Hospital

³Department of Public Health Dentistry, Tamil Nadu Government Dental College & Hospital

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ABSTRACT

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

Objective: This study aimed to assess the level of knowledge, attitude and practice regarding infection control of COVID-19 among the dental health care personals in public institution and private practitioners at Chennai city

Methods: The study population consisted of dentists who worked in public institution and private clinics, hospitals in Chennai. An online and offline questionnaire was used. The questionnaire was comprised of a series of questions about dentists' demographic characteristics; their awareness of the incubation period, the symptoms of the disease, mode of transmission of COVID-19 and infection control measures for preventing COVID-19; and their attitude toward treating patients with COVID-19.

Results: This study included a total of 550 (58.2% females and 41.8% males) participants (dental fraternity) forming a response rate of about 93.2%. The correct incubation period of the virus was recognized by 78.4% of participants. The practice management during COVID-19 pandemic shows that, Dental surgeons (53.3%), dental students (22.9%) and private practitioners (23.8%) are correctly practice donning and doffing of personal protective equipment (PPE) according to CDC guidelines

Conclusion: Dental Surgeons and private practitioners in the present study had good knowledge and positive attitudes regarding infection control than the dental students. Improving dentists' level of knowledge could be achieved through increasing their accessibility to materials provided by dental health care authorities, which specifies the best and safest approaches for dealing with patients during and after the outbreak.

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INTRODUCTION

Background

Infection is a major problem for medical and dental fields across the world. Infection control has gained more attention in dentistry after introduction of HIV infection in 1980s. Research has proved that the oral cavity is a fertile environment for the inoculation. Growth of various infectious agents and transmission of diseases.^[1] The possibility of a high biological risk for both patient and health care professionals in dentistry has become evident. Health organization such as the ADA and European guidelines to prevent, minimize, or eliminate threats to life and health during treatment.

In another context, the outbreak of coronavirus disease (COVID-19) has evolved rapidly into a public health crisis across the globe since 2019. In April 2020 as response to the

COVID-19 pandemic, the WHO stated that dental workers and patients may be exposed to virus that infect the oral cavity and respiratory tract.^[2]

Dental practitioners are prone to high risk of infection due to face-to-face communication and procedures and frequent exposure to saliva, blood, other body fluids. Some studies suggested that COVID-19 may be airborne through aerosols formed during dental procedures.^[3] Which means that dental surgeons can become potential carrier of COVID-19.

Based on the above discussions Knowledge, Attitude and Practice among dentists and dental students are complementary issues for infection control. A few studies accurately reported the status of knowledge, Attitude and Practice of infection control among dental students in Saudi Arabia. Some limitations were observed in studies conducted

**Corresponding author: Vanitha M*

Department of Periodontics, Tamil Nadu Government Dental College & Hospital

in Saudi Arabia That are vaccination status and percentages exposure, infection control practices.

The present study aims to determine the knowledge, Attitude and Practice regarding Infection control of COVID-19 among dental surgeons, dental students, private practitioners in Chennai city.

MATERIALS AND METHODS

Study Design

This is a cross sectional survey of randomly selected dental surgeons, dental students and private practitioners from Chennai city.

Study Population

Our study population consisted of dentists who work in Chennai city, regardless of their place of work, in either private clinics, hospitals, or health centers..

The participants comprising the survey were about 550 in the following order.

1. 182 Dental surgeons working in public institution
2. 185 Dental students attending clinical posting in public institution.
3. 183 Private practitioners in Chennai city.

Procedure

The questionnaire was designed in English language and comprised of a series of 30 questions pertaining to sociodemographic characteristics, knowledge, attitude and practice towards COVID-19 infection control measures. The questions on the survey was developed after reviewing pertinent literature and the international guidelines. The questions were prepared both online and offline format. The survey was structured as multiple-choice questionnaire which was divided into following sections:

- Demographic data and profession-related characteristics
- Awareness of infection control measures
- Attitude toward treating patients with COVID-19.

All the subjects were contacted in person and explained about the protocol of the study. After getting their willingness to be part of the study was obtained through informed consent. After which the questionnaire was issued either through online or offline mode and data was collected.

Inclusion Criteria

- Dental surgeons work at Tamil Nadu government dental college and hospital.
- Private practitioners at Chennai city
- Dental students studied at Tamil Nadu government dental college

Exclusion Criteria

- Under graduate students those who are not entered clinical postings
- Private practitioners from other districts are excluded.

Data Analysis

Data were analyzed using SPSS (IBM Corp version 22). Descriptive statistical analysis was used to describe items included in the survey. Means and standard deviations were used to describe the continuous variables, and percentages

were used to describe the categorical data. Chi-square test was used to compare the mean of knowledge, Attitude and Practice scores with P value of <0.05 considered to be statistically significant.

Ethical Clearance

Ethical committees’ approval was obtained from institutional review board at Tamil Nadu Government Dental College.(IERB Reference No:4/IERB/2021).

RESULTS

Participant’s Characteristics

This study included a total of 550 (58.2% females and 41.8% males) participates (dental fraternity) forming a response rate of about 93.2%(550 out of 700dental health care workers). The age ranged from 20-30 years (36.5%), 30 -40 years(15.3%), 40-50 years (26.4%), 50-60 years (21.8%). Experience of the participants ranges from less than 10 years (66.7), & More than 10 years (33.3%).Dental surgeons, Dental students and private practitioners’ frequency distributions are 156(28.4%) , 279(50.7%), 115(20.9%). The participant’s characteristics are shown in table 1

Table 1 Demographic Data

Demographicvariables	Number(Percentage)
1..Gender	
a)Female	320(58.2%)
b)Male	230(41.8%)
2. Age	
a)20-30 years	220(36.5%)
b)30-40 years	100(15.3%)
c)40-50 years	130(26.4%)
d)50-60 years	110(21.8%)
2.Job category	
a)Dental surgeons	159(28.4%)
b)Dental students	279(50.7%)
c)Private practitioners	115(20.9%)
3. Experience	
a) Less than 10 years	367(66.7%)
b)More than 10 years	183(33.3%)

Knowledge Regarding Covid-19

In order to assess knowledge regarding covid-19 on various domains, it was found that a statistically significant difference exist in terms of incubation period (P=0.001), Route of transmission (P=0.000), virus stay on various surfaces (P=0.001), screening measues (P=0.001), filtration efficiency of N-95(P=0.001),What is mask mouth(P=0.800). It could be seen that dental surgeons had good knowledge when compared to dental practitioners and dental students. It was shown in table 2.

Table 2 Knowledge Towards COVID-19

	Iperiod	Route	Stay	Reliabletest	Filtartion efficiency	Mask mouth	
		4	1	1	1	1	
Surgeon		94	48	101	114	53	95
		21.8%	19.6%	22.5%	24.3%	16.2%	27.1%
Student		97	42	105	105	71	92
		22.5%	17.1%	23.4%	22.3%	21.7%	26.2%
Practitioner		240	155	242	251	203	164
		55.7%	63.3%	54.0%	53.4%	62.1%	46.7%
Total		431	245	448	470	327	351

Attitude Regarding Covid-19

From the responses recorded regarding the attitude, it was observed that 21.3% of dental students, 23.2% of dental surgeons and 55.5% of private practitioners have accepted that periodontal disease as risk factor for covid-19

Also 52.6% of private practitioners, 22.6% of dental surgeons and 24.8% of dental students felt financial burden to use various kind of masks regularly. It was shown in table 3.

Table 3 Attitude Towards COVID-19

Designation		Risk factor		Financialburden	
		Yes	no	yes	No
		Student	21.3%	45.1%	24.8%
Surgeon		111	11	114	8
		23.2%	15.5%	22.6%	17.4%
private practitioner		266	28	265	29
		55.5%	39.4%	52.6%	63.0%

Practice towards Infection Contal of COVID-19

When assessing practice regarding infection control of COVID-19 on various aspects in terms of 1. Donning of PPE according to CDC guidelines (P=0.000), 2.Doffing (P=0.001), 3. To reduce aerosol infection during cavity preparation (p=0.000),4. Agent is most effective in disinfecting operative surfaces (P=0.000), 5. Waste management in suspected COVID-19 cases (0.004), 6. Agent used for dental unit water line disinfectant(P=0.000), are statistically significant. It shows that dental surgeons and private practitioners practice infection control measures in COVID-19 compared to dental students. It was shown in table 4.

Table 4 Practice Management

Designation		Aerosol infection	FDA Emergency	Recommend Method	Strategy	AIR	
		Surgeons	103	85	108	114	118
Student		22.3%	19.8%	26.5%	24.1%	25.3%	18.9%
		105	94	94	106	110	87
Practitioner		22.8%	21.9%	23.0%	22.4%	23.6%	21.3%
		253	250	206	253	238	244
Total		54.9%	58.3%	50.5%	53.5%	51.1%	59.8%
		461	429	408	473	466	408

Designation		Donning	Doffing	Agent	Reduce aerosol	Waste	Waterline
		Surgeons	83	88	69	91	110
Students		22.9%	21.0%	17.6%	20.9%	25.3%	17.5%
		86	90	87	100	103	82
Practitioners		23.8%	21.4%	22.3%	22.9%	23.7%	22.7%
		193	242	235	245	222	216
Total		53.3%	57.6%	60.1%	56.2%	51.0%	59.8%
		362	420	391	436	435	361

Intergroup Comparison

Overall the dental surgeons and dental private practitioners had good knowledge compared to the dental student at public institution. It was explained in table 5

Table 5 Intergroup Comparison

Dependent Variable		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval		
					Lower Bound	Upper Bound	
					Group-1: Dental surgeons Group 2: Dental students Group 3: Dental private practitioners		
Ipperioid	1.00	2.00	.23183 [*]	.09114	.034	.0130	.4507
		3.00	.28759 [*]	.07591	.001	.1053	.4699
	2.00	1.00	-.23183 [*]	.09114	.034	-.4507	-.0130
		3.00	.05576	.07843	1.000	-.1326	.2441
	3.00	1.00	-.28759 [*]	.07591	.001	-.4699	-.1053
		2.00	-.05576	.07843	1.000	-.2441	.1326
Route	1.00	2.00	-.05261	.17371	1.000	-.4697	.3645
		3.00	-.54681 [*]	.14469	.001	-.8943	-.1994
	2.00	1.00	.05261	.17371	1.000	-.3645	.4697
		3.00	-.49420 [*]	.14950	.003	-.8532	-.1352
	3.00	1.00	.54681 [*]	.14469	.001	.1994	.8943
		2.00	.49420 [*]	.14950	.003	.1352	.8532
Stay	1.00	2.00	.29594 [*]	.10525	.015	.0432	.5487
		3.00	.27531 [*]	.08766	.005	.0648	.4858
	2.00	1.00	-.29594 [*]	.10525	.015	-.5487	-.0432
		3.00	-.02063	.09058	1.000	-.2381	.1969
	3.00	1.00	-.27531 [*]	.08766	.005	-.4858	-.0648
		2.00	.02063	.09058	1.000	-.1969	.2381
Reliabetest	1.00	2.00	-.00416	.06737	1.000	-.1659	.1576
		3.00	-.01508	.05612	1.000	-.1197	.1498
	2.00	1.00	.00416	.06737	1.000	-.1576	.1659
		3.00	.01924	.05798	1.000	-.1200	.1585
	3.00	1.00	-.01508	.05612	1.000	-.1498	.1197
		2.00	-.01924	.05798	1.000	-.1585	.1200
Screen	1.00	2.00	.23428	.11182	.110	-.0342	.5028
		3.00	.35796 [*]	.09313	.000	.1343	.5816
	2.00	1.00	-.23428	.11182	.110	-.5028	.0342
		3.00	.12368	.09623	.598	-.1074	.3548
	3.00	1.00	-.35796 [*]	.09313	.000	-.5816	-.1343
		2.00	-.12368	.09623	.598	-.3548	.1074
Filtartion efficiency	1.00	2.00	.27612 [*]	.09137	.008	.0567	.4955
		3.00	.35095 [*]	.07611	.000	.1682	.5337
	2.00	1.00	-.27612 [*]	.09137	.008	-.4955	-.0567
		3.00	.07483	.07864	1.000	-.1140	.2637
	3.00	1.00	-.35095 [*]	.07611	.000	-.5337	-.1682
		2.00	-.07483	.07864	1.000	-.2637	.1140
Time for hand wash	1.00	2.00	.22743	.10072	.073	-.0144	.4693
		3.00	.26774 [*]	.08389	.004	.0663	.4692
	2.00	1.00	-.22743	.10072	.073	-.4693	.0144
		3.00	.04031	.08668	1.000	-.1678	.2485
	3.00	1.00	-.26774 [*]	.08389	.004	-.4692	-.0663
		2.00	-.04031	.08668	1.000	-.2485	.1678
Mask mouth	1.00	2.00	.16198	.12789	.618	-.1451	.4691
		3.00	-.01071	.10652	1.000	-.2665	.2451
	2.00	1.00	-.16198	.12789	.618	-.4691	.1451
		3.00	-.17269	.11006	.352	-.4370	.0916
	3.00	1.00	.01071	.10652	1.000	-.2451	.2665
		2.00	.17269	.11006	.352	-.0916	.4370

**. The mean difference is significant at the 0.05 level.*

Dependent Variable		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval		
					Lower Bound	Upper Bound	
					Group-1: Dental surgeons Group 2: Dental students Group 3: Dental private practitioners		
Fda	1.00	2.00	.43755 [*]	.11169	.000	.1693	.7058
		3.00	.60622 [*]	.09257	.000	.3839	.8285
	2.00	1.00	-.43755 [*]	.11169	.000	-.7058	-.1693
		3.00	.16867	.09600	.238	-.0619	.3992
	3.00	1.00	-.60622 [*]	.09257	.000	-.8285	-.3839
		2.00	-.16867	.09600	.238	-.3992	.0619
Emergency	1.00	2.00	.02753	.14538	1.000	-.3216	.3766
		3.00	.23546	.12109	.157	-.0553	.5262
	2.00	1.00	-.02753	.14538	1.000	-.3766	.3216
		3.00	.20793	.12512	.291	-.0925	.5084
	3.00	1.00	-.23546	.12109	.157	-.5262	.0553
		2.00	-.20793	.12512	.291	-.5084	.0925
Recommend method	1.00	2.00	.01762	.09629	1.000	-.2136	.2488
		3.00	.07260	.08020	1.000	-.1200	.2652
	2.00	1.00	-.01762	.09629	1.000	-.2488	.2136
		3.00	.05498	.08287	1.000	-.1440	.2540
	3.00	1.00	-.07260	.08020	1.000	-.2652	.1200
		2.00	-.05498	.08287	1.000	-.2540	.1440
Airexchange	1.00	2.00	.41669 [*]	.12669	.003	.1124	.7209
		3.00	.80790 [*]	.10553	.000	.5545	1.0613
	2.00	1.00	-.41669 [*]	.12669	.003	-.7209	-.1124
		3.00	-.39121 [*]	.10903	.001	-.1294	.6530
	3.00	1.00	-.80790 [*]	.10553	.000	-1.0613	-.5545
		2.00	-.39121 [*]	.10903	.001	-.6530	-.1294

Strategy	1.00	2.00	-.10105	.11293	1.000	-.3722	.1701
		3.00	.16002	.09406	.268	-.0659	.3859
	2.00	1.00	.10105	.11293	1.000	-.1701	.3722
		3.00	.26107*	.09719	.022	.0277	.4945
	3.00	1.00	-.16002	.09406	.268	-.3859	.0659
		2.00	-.26107*	.09719	.022	-.4945	-.0277

*. The mean difference is significant at the 0.05 level.

Dependent Variable		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval		
					Lower Bound	Upper Bound	
Donning	1.00	2.00	.03719	.08664	1.000	-.1709	.2452
		3.00	.09468	.07216	.570	-.0786	.2680
	2.00	1.00	-.03719	.08664	1.000	-.2452	.1709
		3.00	.05749	.07456	1.000	-.1216	.2365
	3.00	1.00	-.09468	.07216	.570	-.2680	.0786
		2.00	-.05749	.07456	1.000	-.2365	.1216
Doffing	1.00	2.00	.16479	.09207	.222	-.0563	.3859
		3.00	.31952*	.07669	.000	.1354	.5037
	2.00	1.00	-.16479	.09207	.222	-.3859	.0563
		3.00	.15473	.07924	.154	-.0355	.3450
	3.00	1.00	-.31952*	.07669	.000	-.5037	-.1354
		2.00	-.15473	.07924	.154	-.3450	.0355
Agent	1.00	2.00	.32004*	.09859	.004	.0833	.5568
		3.00	.42314*	.08212	.000	.2259	.6203
	2.00	1.00	-.32004*	.09859	.004	-.5568	-.0833
		3.00	.10310	.08485	.674	-.1006	.3068
	3.00	1.00	-.42314*	.08212	.000	-.6203	-.2259
		2.00	-.10310	.08485	.674	-.3068	.1006
Reduce aerosol	1.00	2.00	.23709	.09947	.052	-.0018	.4760
		3.00	.33785*	.08285	.000	.1389	.5368
	2.00	1.00	-.23709	.09947	.052	-.4760	.0018
		3.00	.10076	.08561	.719	-.1048	.3063
	3.00	1.00	-.33785*	.08285	.000	-.5368	-.1389
		2.00	-.10076	.08561	.719	-.3063	.1048
Wastemgmt	1.00	2.00	-.11842	.13111	1.000	-.4333	.1964
		3.00	.15296	.10920	.486	-.1093	.4152
	2.00	1.00	.11842	.13111	1.000	-.1964	.4333
		3.00	.27138*	.11283	.049	.0004	.5423
	3.00	1.00	-.15296	.10920	.486	-.4152	.1093
		2.00	-.27138*	.11283	.049	-.5423	-.0004
Waterline	1.00	2.00	.41803*	.11374	.001	.1449	.6912
		3.00	.60544*	.09474	.000	.3779	.8329
	2.00	1.00	-.41803*	.11374	.001	-.6912	-.1449
		3.00	.18741	.09789	.168	-.0477	.4225
	3.00	1.00	-.60544*	.09474	.000	-.8329	-.3779
		2.00	-.18741	.09789	.168	-.4225	.0477

*. The mean difference is significant at the 0.05 level.

DISCUSSIONS

COVID-19 is an emerging endemic infectious disease and presents as a considerable threat to the human being. Preventive tools along with vaccination play an effective role in decreasing rates of infection and controlling the spread of the virus.^[10] Therefore, it is necessary for public health to target on dental healthcare workers in order to assess the knowledge, attitude and practice regarding preventive and control measures taken to combat COVID 19 infection

The transmission of COVID-19 poses a risk for people who come in close contact with an infected individual, and the risk is greater among those who are in close proximity to or work near the patient, i.e., relatives and healthcare workers.^[14]

It is high time to be aware regarding the current situation that drains dental practice so a good response rate of (93.2%) was observed in the present study.

Considering the gender, the female health care workers are more than the males. This may be attributed to Indian dental practice that is pooled with female dentist which is accordance with Elagib et al.,2020.^[15]

Roughly present study included almost young dentist to older age groups.

Looking at the dental health care worker groups private practitioners responded more(50.7%) than dental surgeons(28.4%) and students(20.9%). This shows that private

practitioners faced little difficulty than other groups in opening their clinics as per DCI guidelines but, government colleges are opened during COVID-19 period.

The estimated incubation period of COVID-19 is up to 14 days. Dentists in this study varied in their knowledge about the incubation period of the disease, 55% of the dental surgeons responded correctly compared to dental practitioners(22.5%) and dental students(21.8%).but it is essential to know the right incubation period because of its role in determining the safe period to treat suspected patients. It's important for dentists to carry on with preventive measures for all their patients, all the time. In this study ,dental surgeons(53.4%) ,dental students(22.3%) and private practitioners(24.3%)had known the reliable test of COVID 19.this shows that private practitioners have to improve their knowledge regarding reliable test of COVID-19. Mask mouth is a new phenomenon for our global culture. Mask mouth describes the variety of oral side effects from wearing a mask for an extended time.^[9] Most common symptoms of mask mouth includes xerostomia, bleeding gums and bad breath. It could be favour the growth of anaerobic organism which cause periodontal tissue destruction.^[11] Among the participant, dental surgeons (46.7%), dental students (26.2%) and private practitioners (27.1%) knew about mask mouth. This shows that dental professionals have to be improve their knowledge about mask mouth.

The attitude of dentists in accepting periodontal disease as a risk factor for COVID-19,was found to be 55.5% among dental surgeons, 21.3% among dental students and 23.2% in private practitioners. Some evidene shows that, There is a direct association between periodontal disease and COVID-19-related outcomes and the results of the present study indicates that dental professional were not much aware.In this study, dental surgeons(22.6%), dental students(24.8%) and private practitioners(52.6%)of the dental health care workers felt financial burden while using various kind of masks regularly. This shows that government colleges are provided with masks regularly and private practitioners are unable to afford the various kind of masks regularly.

The practice management during COVID-19 pandemic shows that, Dental surgeons(53.3%),dental students(22.9%) and private practitioners(23.8%) are correctly practicing donning and doffing of personal protective equipment(PPE) according to CDC guidelines which is in accordance with yousef khader et al.,2020.^[12]

To reduce aerosol production during cavity preparation, 20.9% of dental surgeons, 22.9% of dental students , 56.2% of private practitioners use rubber dam and high volume evacuators . This shows that private practitioners are highly equipped. Among the participants, 60% of private practitioners ,23.3% of dental surgeons, 17.6% of dental students use chlorine based disinfectant to disinfect the operating surfaces. This shows that dental surgeons and dental students use other chemical agents.59.8% of private practitioners, 22.7% of dental surgeons, 17.5% of dental students use 1% sodium hypochlorite as a dental unit waterline disinfectant.

It is important to stress that this survey had limitations, with a smaller than expected sample size. This could have been caused by the short period of data collection. Moreover, this pandemic has caused many to be busy with watching the news and taking care of personal affairs. This means that those who

were active on social media during the short period of data collection were the only ones that had the chance to participate in the study. This could result in selection bias and sampling error, which prevents the ability to generalize our results.

CONCLUSION

From the present survey, dental Surgeons and private practitioners had good knowledge and positive attitudes regarding infection control than the dental students.

Dentists and dental students are more prone to infection by COVID-19 virus in this pandemic than any other profession. Precautions, proper PPE, and infection control protocols should be strictly followed when treating any patient. Despite surface infection and hand piece or bur sterilization are important infection control practices in dental settings, previous studies did not consider these practices. The current study has addressed these practices. As those two practices are usually the task of dental nursing or dental assistant, dental students may not take care of following up these practices. Dental students in the present study had good knowledge and positive attitudes regarding infection control in general, but showed poor compliance with the recommended infection control guidelines. Hence the dental fraternity must be made to be updated with recent protocol guidelines that have to be followed then and there to prevent disease transmission.

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