

Awareness And Practice Of Infection Control Protocol During Covid-19 Pandemic In Dental Clinics In Southern India- An Original Research

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ABSTRACT: Introduction: COVID-19 pandemic has forced dentists to prepare themselves by updating their knowledge and receive training to face the present and after effects of COVID-19. The present survey was thus conducted to assess the knowledge, risk perception, attitude, and preparedness of the dentists in India about COVID-19.

Materials and Methods: A cross-sectional online survey was carried out among registered dentists in south India. A self-administered, anonymous, questionnaire comprising of 25 close-ended questions was circulated to gather the relevant information. A total of 1120 dentists submitted a response, out of which 1000 complete responses were included in the statistical analysis. Pearson's Chi-square test was used for inter-group statistical comparison.

Results: 80% of the dentists had a fair knowledge about the characteristics of COVID-19. 61% and 50% of the dentists had taken infection control training and special training for COVID-19, respectively. 52% of the dentists had the perception that COVID-19 is very dangerous. Only 42% of the dentists were willing to provide emergency services to patients. Most of the dentists had an opinion that there is a need to enhance personal protective measures.

Conclusion: In the present study, South Indian dentists have presented satisfactory knowledge with adequate awareness as the majority of them had a fair level of knowledge with significantly higher knowledge among female respondents and those with post-graduation studies. As we are going through an evolutionary phase where new advances are expected to evolve, dentists will definitely emerge successfully out from the crisis of the COVID-19 pandemic.

Keywords: COVID 19, Knowledge, Awareness, Dentists, South Indian.

1. INTRODUCTION

Coronavirus has so far influenced an enormous number of health professionals around the world.¹ Since the dental specialist works in nearness to body liquids, for example, saliva and

blood in the oral cavity; they are at a high danger to get infected.² The development of COVID-19 caused us to understand that despite the fact that we have been working in the field of dentistry, we were never ready for a pandemic with a particularly high effect on community health. The uses of universal precautionary measures were discovered to be sufficient for contamination control.³ To secure the dental network, the American Dental Association has given rules to has issued guidelines to suspend elective or planned dental treatment and carry out only emergency procedures.⁴ To have negligible or no contact with patients, telemedicine or telephonic correspondence is being advised.⁵ Dentists are in a condition of mental trouble and dread while working in a particularly exceptional situation.^{6,7} This study was directed to survey the awareness and knowledge about COVID-19 among dentists. The current overview likewise evaluated the readiness of dental experts towards overseeing and treating patients in the current emergency.

2. MATERIALS AND METHODS

We directed a prospective, cross-sectional study among dentists in south India. A simple, online questionnaire involved 25 close ended questions was readied utilizing Google forms to survey knowledge, attitude, and preparedness of COVID-19 among Indian dentists. The questionnaire was planned in the English language and was arranged into four sections: 1) demo-illustrations and general attributes (8 things) of the members; 2) information (10 things) of the members about COVID-19; 3) Risk discernment and disposition (10 things) of the members about COVID-19; and 4) Preparedness (5 things) of the members against COVID-19. Cronbach's alpha test was utilized to evaluate the dependability of the questionnaire. Knowledge score was determined by granting "1" point for every certain/right reaction and "0" focuses for each negative/wrong reaction. The last scores were introduced as rate by adding all the purposes of the respondents followed by figuring the rate. The determined information score was isolated into three classifications dependent on rate: poor knowledge (- 0–40%), fair knowledge (41<70%) and good knowledge (70% and above).⁸ The inter-group statistical comparison of the distribution of categorical variables was tested using Pearson's Chi-square test. *P*-value less than 0.05 were considered to be statistically significant. Statistical Package for Social Sciences (SPSS ver 22.0, IBM Corporation, USA) was used to analyze the data

3. RESULTS

Distribution of Demographic Parameters

A total of 1000 respondents submitted the form, 541 were male and 459 (45.8%) were female. The majority of the respondents, 469 had an age range of 30–39 years. While considering the duration of practice, only 156 had recorded experience of above 15 years. The majority (585) of the respondents were from the private sector, remaining from the public sector, university clinics. Majority were BDS degree holders (Table 1). Only half of them reported a special training in the or informative lectures on COVID-19.

Distribution of Level of Knowledge

Majority showed a FAIR level of knowledge. Female dentists and post graduates showed a significant higher level of knowledge than their counter parts. However the level of knowledge did not differ significantly across the various age groups & on the duration of practice (*P*-value >0.05). A significantly higher level of knowledge was reported among respondents who had training of infection and among respondents who had training or informative lectures on COVID-19 than who didn't (*P*-value<0.05) (Table 3).

Distribution of Risk Perception and Attitude

Majority perceived COVID to be highly contagious and the dentists are at high risk. Majority knew that 80% of COVID-19-positive patients present with mild symptoms. (Table 4). 50% selected Surgical N95. 35% believed that only the fit test for proper seal should be checked before use, whereas 25% respondents selected all three options (Table 4). Majority were in favor of teleconsultation and referrals. (Table 4). Most of the respondents knew that ultrasonics spread aerosol and PPEs were protective.

Distribution of Preparedness

Distribution of Level of Preparedness According to Training Taken (Infection Control)

No significant results were obtained when two groups with and without training were compared. However when contacting the appropriate organization if they had an unprotected exposure to a known or suspected COVID-19 patient and if having signs or symptoms of COVID-19 infection were significant between the groups (P -value <0.05) (Table 5).

Distribution of Level of Preparedness According to Training Taken (COVID-19)

A significantly advanced level of preparedness in all aspects was noted among respondents in the group who had training about COVID-19 equaled to the group who never had preparation related to the COVID-19 infection.

4. DISCUSSION

Coronavirus, has affected all the areas including the dentistry. Considering the exceptionally infectious nature of COVID-19, sufficient training is needed to complete safe practice. The authorities are providing online training for diseases and their precautionary measures. Hence the present survey was therefore undertaken among dentists in India to assess the knowledge and preparedness about COVID-19. The dominant part (80.8%) of the respondents had a fair level (40–70%) of knowledge, which was significantly more among female respondents and those with post-graduation. This rate is less when contrasted with the study led by Kamate et al⁹ in which 92.7% had a fair degree of knowledge which could be because of the way that it was a worldwide report including developed nations like America and Australia.⁹ Distribution of level of information didn't vary significantly across different ages and duration of practice. Regarding the mode of transmission, virtually all respondents had a fair knowledge which implies the dental specialist realizes how to prevent the network spread of the virus. This is significant particularly to save the lives of the weak patients who are over 60 years of age and suffering from pre-existing chronic illnesses. With respect to level of preparing, the distribution of knowledge was significantly more among those having some training in infection control or those who had followed an informative lecture or training session on COVID-19. It additionally underlies the significance of keeping refreshed as the infection is ceaselessly developing and there may be changes in the conventions as more scientific evidence is gained. A greater number (81.2%) of the participants agreed that the rRT-PCR laboratory test can help in the diagnosis of the suspected and asymptomatic cases. Though a positive result is suggestive of progressive infection with SARS-CoV-2 but it does not rule out other bacterial and viral infections. Also, the negative results cannot rule out the absence of COVID-19, so proper decisions should be made following the patient's symptoms, travel history, and geographical location. Just 45% of the respondents knew about all the different types Covid and just 10% realized that MERS has the highest mortality among a wide range of Covid. On a positive note 84.2% of them were conscious that COVID-19 is more is more infectious than the others which shows the inquisitiveness that has been created by the new virus. A more prominent number (81.2%) of the members

concluded that the rRT-PCR lab test can help in the analysis of the suspected and asymptomatic cases. Despite the fact that a positive outcome is suggestive of progressive infection with SARS-CoV-2 but it does not rule out other bacterial and viral infections. Additionally, the negative outcomes can't preclude the absence of COVID-19, so legitimate choices should be made after the patient's side effects, travel history, and topographical area. Almost half of the respondents saw COVID-19 as risky. This can be associated to the way that almost similar number of members feels that practically 80% of the patients can present with mild or no symptoms.¹⁰ Such patients represent the highest risk as these practically asymptomatic ones can not only act as carriers of infection to others but also can be the reservoirs of the disease triggering reinfection involuntarily. This is as per the examination by De Stefani et al where the dental specialists perceived COVID-19 to be a profoundly hazardous viral infection.¹¹ This caused 87% of the dental specialists to accept that their employment falls under exceptionally high risk category of exposure. It is as per an investigation by Cagetti et al¹² where most of the respondents accept that the danger of contamination transmission is high in the dental practice.¹² Nearly 85% of the dental specialists were knowledgeable with the type of mask and were ready to use the N95 mask especially when dealing with COVID-19 patients. If there is a shortage of surgical N95 respirators then standard N95 respirators can be used with a face shield. In spite of the fact that the vast majority of the respondents concurred with wearing a N95 respirator, 35.8% felt that only a fit test should be done to check the seal and just 27.6% realized that they should be medically assessed and appropriately prepared to ensure that it feels comfortable wearing the respirator and additionally realize how to carry on a user seal check. This implies the significance of the complete protocol when using N95 respirators. Essentially all the dental specialists thought that it is not a good idea to examine the patient directly as about 46.3% respondents agreed for teleconferencing with the patients and delaying the treatment if the problem can be resolved by advising medications. Furthermore, 30.8% felt that any patient requiring a visit to the dental office for any issue that can't be dealt with meds should be referred to better equipped higher centers which can facilitate such cases in a superior manner. 73.7% of the dental specialists knew that the dental procedures including the utilization of ultrasonic scalers and high-speed hand pieces convey the greatest danger of transmission of the infection alongside aerosol particles. The virus can support on inanimate surfaces for just about 3 days making rigorous disinfection protocol a mandate for every dental office.¹³ 78.6% of the dental specialists concurred that wearing personal protective equipment like gloves, cover and goggles can be effective in preventing transmission of COVID-19 which was as per the investigation by Khader et al¹⁴ where 92.9% of respondents felt the same. Almost 42% of the respondents were happy to give emergency treatment to patients having COVID-19. It is as opposed to the investigation by Khader et al¹⁴ in which 82.6% of the dental specialists avoided to treat a suspected COVID-19 patient as most of these patients will have no or gentle manifestations during the incubation periods however can be exceptionally viable in communicating the disease.¹⁴ There are some dental crises particularly Orofacial fractures and space infections which require surgical intervention and can't be dealt with alone by medication. Treating COVID-19 patients requires the dental specialist to follow and keep refreshed with the new rules referenced by the Centers for Disease Control and Prevention (CDC) and World Health Organization (WHO).^{15,16} In actuality, 83% of the respondents of the study were prepared to treat the patients who had gotten the disease previously but are disease free now. To assess the readiness in the current investigation, a large portion of the dentists consented to give sufficient training to their staff. Many dentists in the current overview knew about the careful steps to be taken while treating COVID-19 positive patients, irrespective of their training status. These outcomes are in concurrence with the study conducted by Ahmed et al.⁷ The pre-procedural rinsing should be

done with 0.2% Povidone-iodine or 0.5–1% hydrogen peroxide as an antimicrobial mouth wash can bring down the viral load in the mouth.¹⁷ Airborne Infection Isolation Rooms (AIIRs) should be arranged for patients.¹⁸ Air from these rooms should be removed by high-effectiveness particulate air (HEPA) channel. Disposables and extra oral imaging should be preferred. Good awareness was exhibited by the dentists in the present study towards the preparedness to COVID 19. This could be attributed to the propaganda done by the authorities. 80–90% of the respondents knew the authorities whom to contact when exposed to COVID 19. The higher awareness level was recorded among respondents who had past training about infection control and COVID-19. However this is in contrast to the study conducted by Khader et al, which revealed that only half of the dentists (58.2%) were aware of whom to contact in such a situation.¹⁴ CDC has divided the exposures into high risk, medium risk and low risk depending upon the type of contact with COVID-19 patients. In contrast, 75.8% of Jordanian dentists reported that they knew what to do if they developed signs or symptoms of a suspected COVID-19 infection. Practically all the respondents who had past training about the infection control and COVID-19 knew about their strategy in the event that they develop signs or symptoms of COVID-19 contamination. Conversely, 75.8% of Jordanian dental specialists announced that they realized what to do on the off chance that they developed manifestations of a suspected COVID-19 infection.¹⁴

Limitations

There were few limitations in the present study. The significant constraint was brief timeframe for data collection. The information assortment was done via web-based media so it could have resulted in the exclusion of the practitioners who were not using social media. Moreover few states were impacted more than the others. Therefore, the findings of the current overview should be deciphered carefully and ought not be summed up. Based on the available study design (cross-sectional) we are not in a position to conclude a cause-effect association.

5. CONCLUSION

In the current study, Indian dentists have revealed satisfactory knowledge about the COVID-19 etiology, side effects, conclusion and method of transmission as most of them had a fair level of knowledge with significantly higher knowledge among female respondents and those with post-graduation studies. The respondents have recorded a good judgment about the risk perception as they know they fall in the very high risk exposure category and showed a positive attitude towards performing dental treatment in the current COVID-19 crisis. At last, all the dental experts attend the COVID-19 training program to improve their knowledge and to be well aware of the best practices and recommended approaches for infection control.

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Table 1 Distribution of Demographic Parameters of the Respondents Participating in the Study

Parameter	Distribution of Respondents’ n (%)
Age group	
<30 years	356 (35.6%)
30–39 years	469 (46.9%)
40–49 years	124 (12.4%)

>50 years	51 (5.1%)
Gender	
Male	541 (54%)
Female	459 (46%)
Duration of practice	
<5 years	418 (41.6%)
5–15 years	430 (42.9%)
>15 years	156 (15.5%)
Organization	
Private sector	585 (58.5%)
Public sector	192 (19.0%)
University Clinics	224 (22.4%)
Educational status	
BDS	441 (44.1%)
MDS	421 (42.1%)
Post-graduate students	116(11.7%)
Doctoral (PhD)	20 (2.0%)
Training taken (Infection control)	
Yes	597 (60.7%)
No	403 (39.3%)
Training taken (COVID-19)	
Yes	497 (49.7%)
No	503 (50.3%)

Table 2 Distribution of Level of Knowledge Recorded by Respondents According to Questions

No.	Question	Correct Answer Respondents [n (%)]
1.	Among these which is Coronavirus? a) Common cold, b) Middle East Respiratory Syndrome (MERS), c) Severe Acute Respiratory Syndrome (SARS), d) COVID-19, e) All, f) Do not know	452 (45.20%)
2.	Which is more deadly (High mortality)? a) SARS, b) MERS, c) COVID-19, d) Do not know	100 (10%)
3.	Which is more infectious? a) SARS, b) MERS, c) COVID-19, d) Do not know	843 (84.2%)
4.	COVID-19 is caused by virus a) SARS-CoV-2, b) SARS-CoV, c) MERS-CoV, d) Do not know	847 (84.5%)

5.	What is the incubation period of COVID-19 virus? a) 2–7 days, b) 2–14 days, c) 1–5 days, d) 1–21 days, e) Do not know	910 (90.8%)
6.	What is the overall mortality rate of COVID-19 disease? a) 3.2%, b) 6.8%, c) 10.4%, d) 12.6%, e) Do not know	121 (12%)
7.	What is the basic reproduction number (R0-R naught) for COVID-19? a) 2.2, b) 5.3, c) 1.6, d) 4.2, e) Do not know	106 (10.6%)
8.	What is the laboratory test available to diagnose COVID-19? a) rRT-PCR, b) ELISA, c) Western Blot, d) DNA hybridization, e) Do not now	812(81.2%)

Table 3 Distribution of Level of Knowledge According to Various Demographic Characteristics of Respondents who participated in the Study

Characteristics	Level of Knowledge								P-value
	Poor (n=62)		Fair (n=522)		Good (n=62)		Total (n=646)		
	n	%	n	%	n	%	n	%	
Age group									
<30 years	26	7.8	298	83.9	35	8.3	356	100.0	0.348
30–39 years	56	11.2	396	76.9	57	11.9	469	100.0	
40–49 years	9	8.8	86	83.8	8	7.5	124	100.0	
>50 years	4	9.1	47	87.9	2	3.0	51	100.0	
Gender									
Male	63	12.9	395	76.3	55	10.9	541	100.0	0.003**
Female	31	5.7	435	86.1	41	8.1	459	100.0	
Duration of practice									
<5 years	36	8.6	356	83.6	28	7.8	418	100.0	0.603
5–15 years	40	10.5	359	79.1	42	10.5	430	100.0	
>15 years	15	10.0	82	78.0	17	12.0	156	100.0	
Organization									
Private sector		10.3		83.1		6.6		100.0	0.001***
Public sector		9.3		72.2		18.5		100.0	
University Clinics		9.0		84.1		6.9		100.0	
Educational status									
BDS	61	10.2	430	84.9	32	4.9	585	100.0	0.001***
MDS	0	0.0	176	88.2	22	11.8	192	100.0	
Post-graduate students	23	11.8	132	74.3	29	14.0	224	100.0	
PhD	2	7.7	16	84.6	2	7.7	20	100.0	

Training taken (Infection control)									0.001***
Yes	38	6.1	493	82.4	72	11.5	597	100.0	
No	62	15.0	307	78.3	40	6.7	403	100.0	
Training taken (COVID-19)									0.002**
Yes	25	5.6	423	83.5	52	10.9	497	100.0	
No	82	13.5	396	78.2	42	8.3	503	100.0	

Notes: *P*-value for Chi-square test. *P*-value <0.05 is considered to be statistically significant. ***P*-value <0.01, ****P*-value<0.001. Higher mean score indicates higher level of knowledge and vice-versa.

Table 4 Distribution of Risk Perception and Attitude of the Respondents who Participated in the Study

Risk Perception	Response	n	%
Perception about COVID-19	Highly contagious	509	50.9
	Moderately contagious	466	46.6
	Non contagious	25	2.5
% COVID-19 +ve patients shows mild symptoms	80%	494	49.4
	60%	255	25.5
	40%	152	15.2
	Do not know	99	9.9
Under which category do dentists fall in the risk of exposure?	Very high exposure risk job	870	87.0
	High exposure risk job	124	12.4
	Low exposure risk job	06	0.6
Which mask should generally be used by dentists?	A1	500	50.0
	A1 + A2	206	20.6
	A2	142	14.2
	A1+A2=A3	53	5.3
	A1 +A3	37	3.7
	Other	56	5.6
	Do not know	06	0.6
Which of the following needs to be checked before wearing N95?	B1	358	35.8
	B1+B2+B3	276	27.6
	B1+B2	161	16.1
	B2	57	5.7
	B1+B3	45	4.5
	Other non-relevant combination	40	4.0

	Do not know	63	6.3
What would you do for a dental problem of a confirmed/suspect COVID-19 patient?	C1	463	46.3
	C1+C2	308	30.8
	C2	221	22.1
	C3	08	0.8
What dental procedures carry the maximum risk of virus transmission while treating a COVID-19-positive patient?	D1+D2	737	73.7
	D2	50	5.0
	D1+D2+D3	88	8.8
	D1+D2+D4	40	4.0
	D1	31	3.1
	D1+D2+D5	39	3.9
	Other non-relevant combination	12	1.2
	Do not know	03	0.3
Are the personal protective equipments useful in protecting from confirmed/suspected COVID-19 patients?	Agree	786	78.6
	Disagree	118	11.8
	Do not know	96	9.6
Will you provide emergency dental treatment to a COVID-19-positive patient?	Yes	418	41.8
	No	409	40.9
	Do not know	173	17.3
Will you provide dental treatment to a previous COVID-19-positive patient?	Yes	830	83.0
	No	124	12.4
	Do not Know	46	4.6

A1- Surgical N95 (Medical respirator)

A2 -Standard N95 (Unvalved)

A3 -Surgical Mask

C1-Use teleconference and if the dental treatment can be delayed give advice about pharmaceuticals

C2 -Refer the patient directly to the higher center

C3 -Examine the patient directly in your dental office to check the severity of the dental condition

B1- Fit test for proper seal

B2 - User should have prior training

B3 - Certain medical condition

D1 - Ultrasonic scaling

D2 - Use of high speed headpiece

- D3- Dental procedures under rubber dam
- D4- Crown cementation
- D5- Use of lasers

Table 5 Distribution of Level of Preparedness According to Training Taken (Infection Control/COVID-19) Among the Respondents who participated in the Study

		Training Taken (Infection Control)			Training Taken (COVID-19)		
		No (n=597)	Yes (n=403)	P-value	No (n=497)	Yes (n=503)	P-value
Level of Preparedness	Response	%	%		%	%	
Dentist should provide adequate training to their staff to promote many levels of screening and preventive measures.	Agree	97.6	99.5	0.081 ^{NS}	97.0	100	0.018*
	Disagree	0.8	0.0		1.0	0.0	
	Do not know	1.6	0.5		2.0	0.0	
What precautions should the dental practitioners take when treating COVID-19-positive patients?	E1	74.8	78.3	0.070 ^{NS}	71.2	79.7	0.026*
	E2	5.9	4.6		7.4	2.4	
	E3	5.5	1.5		2.8	2.8	
	E4	6.7	6.1		22.6	15.3	
	E5	2.4	2.3		16.1	9.2	
	E6	4.7	7.1		5.5	6.2	
How to prepare your body to prevent and avoid getting COVID-19 infection?	F1	75.2	78.1	0.242 ^{NS}	76.9	76.9	0.001***
	F2	11.0	9.9		11.1	9.7	
	F3	5.5	6.9		5.2	7.5	
	F4	4.3	1.3		4.3	0.6	
	F5	1.6	1.8		0.0	3.4	
	F6	2.4	2.0		2.8	1.9	
Do you know whom to contact if you have an unprotected exposure to a known or suspected COVID-19 patient?	Yes	81.1	92.3	0.001** *	83.1	92.8	0.001***
	No	18.9	7.7		16.9	7.2	

Do you know what to do if you have signs or symptoms suspected of COVID-19 infection?	Yes	92.1	98.7	0.001** *	93.8	98.4	0.002**
	No	7.9	1.3		6.2	1.6	
Key elaboration for Table 5							
E1	AIIRs should be reserved for patients, Air from these rooms should be extracted directly by high-efficiency particulate air (HEPA) filter, Pre-procedural mouth rinse with 0.2% povidone- iodine, Extra-oral imaging should be preferred to intra-oral imaging						
E2	AIIRs should be reserved for patients, Air from these rooms should be extracted directly by high-efficiency particulate air (HEPA) filter, Pre-procedural mouth rinse with 0.2% povidone- iodine, Rubber dam should be used to minimize splatter generation						
E3	AIIRs should be reserved for patients, Air from these rooms should be exhausted directly by high-efficiency particulate air (HEPA) filter, Pre-procedural mouth rinse with 0.2% povidone- iodine, Extra-oral imaging should be preferred, Rubber dam should be used. Minimize the use of ultrasonic instruments, high-speed headpieces, and 3-way syringes.						
E4	AIIRs should be reserved for patients						
E5	AIIRs should be reserved for patients, Air from these rooms should be extracted directly by high-efficiency particulate air (HEPA) filter.						
E6	Other						

Table 5 (Continued).

		Training Taken (Infection Control)				P-value	Training Taken (COVID-19)				
		No (n=597)		Yes (n=403)			No (n=497)		Yes (n=503)		P-value
Level of Preparedness	Response	n	%	n	%		n	%	n	%	
F1	Take proper rest and sleep, Daily intake of vitamin C in the form of citrus fruits, Drinking warm water and doing gargles with warm water mixed with povidone-iodine, salt etc., Exercise routinely to keep the body fit, Avoiding panic and psychological negative effects of the disease										

F2	Daily intake of vitamin C in the form of citrus fruits, Drinking warm water and doing gargles with warm water mixed with povidone-iodine, salt etc., Avoiding panic and psychological negative effects of the disease
F3	Drinking warm water and doing gargles with warm water mixed with povidone-iodine, salt etc.
F4	Take proper rest and sleep, Drinking warm water and doing gargles with warm water mixed with povidone-iodine, salt etc., Exercise routinely to keep the body fit, Avoiding panic and psychological negative effects of the disease
F5	Take proper rest and sleep
F6	Other

Notes: *P*-value for Chi-square test. *P*-value <0.05 is considered to be statistically significant. **P*-value <0.05, ***P*-value <0.01, ****P*-value <0.001, NS-statistically non-significant. Higher mean score indicates higher level of knowledge and vice-versa.

Abbreviation: AIIRs, airborne infection isolation rooms