

Dental practitioner's Knowledge, attitude and infection control practices amid COVID-19 outbreak in India.

Running title : Indian Dental practitioner's Knowledge, attitude and infection control practices amid COVID-19 outbreak

Mishra Supriya

MDS, Government Dental College and Hospital, Raipur, Chhattisgarh
Department of Periodontics, Government Dental College and Hospital, Raipur, Chhattisgarh
E-mail address dr.supriya4@gmail.com

ABSTRACT: Background: Ever since the World Health Organization (WHO) has declared the recent spread of SARS-CoV-2 a global public health concern, efforts at every level are being done to contain the spread of the disease. Owing to its route of transmission, dental professionals are at a very high risk of getting infected and resulting in nosocomial infection. Hence, the dentists should have apt knowledge about the COVID-19 disease so that they can be sedulous enough in not only preventing the spread of the disease but also helping in early identification of the suspected patient for timely and optimum management.

Materials and methods: A cross-sectional online questionnaire based survey was done among 1925 private dental practitioners to assess their knowledge, attitude and infection control practices (KAP) regarding COVID-19 flare-up. A descriptive analysis was carried out and chi-square test was done to compare the KAP with respect to different participant characteristics.

Results: With a response rate of 64.15%, the overall knowledge of the participants was sufficient (89.5%). However, the negative attitude regarding COVID-19 outbreak was reported in about 74.08% of responders. Majority of the dentists were aware of extended safety protocols owing to COVID-19 crisis but most of them were hesitant to follow it in a fully fledged manner. The female dentists, graduate dental practitioners with less clinical experience and dentists practicing in rural areas, in particular, lacked the confidence and perseverance to endure with the current impasse.

Conclusion: It is highly recommended that the competent authorities in India should come up with some visible policies and provide support to the dental practitioners, especially to a certain demographic group amid COVID crisis so that the dentists keep themselves up-to-date about this evolving disease and provide safe and effective dental care while containing the spread of the disease.

Key words: *COVID-19, dental professionals, knowledge, attitude, infection control practices.*

1. INTRODUCTION

In late December 2019, a novel viral pneumonia outbreak originated in Wuhan City, China [1], which later came to be known as “Corona Virus Disease (COVID19)”[2]. As the epidemic spread rampantly to other parts of the world, becoming a major public health problem not only for China but also countries around the world, the World Health Organization (WHO) announced this outbreak a pandemic [3]. India reported its first confirmed COVID-19 case on January 30th 2020 and the cases thereby continued to rise [4].

A suggested route of human-to-human transmission of this zoonotic disease is through airborne droplets, touching or coming into contact with an infected person or a contaminated surface [5]. In addition, there is a potential for transmission of COVID-19 via aerosol, fomites or the faecal-oral route [6]. There are reports that confirm the widespread transmission of SARS-CoV-2 and spread to a large number of health care providers who came in direct contact with the infected individuals [7]. Dental professionals are no exception and invariably carry the risk of nosocomial spread of 2019-nCoV who can become potential carriers of the disease [8]. The high risk is due to the specificity of its procedures, which involves face-to-face communication with patients, proximity to the patient’s oropharyngeal region, exposure to saliva, blood, and other body fluids, aerosol generation and the handling of sharps [9]. Also, there are high chances of exposure of patients to cross contamination. Moreover, the relatively prolonged incubation period of upto 14 days make it challenging for the dental staff to recognize the existence of covid-19 infection [10]. Such asymptomatic but potentially infected patients could pose a great threat to the entire dental personnel and the community.

As the understanding of this novel disease is still at a bud stage, dental practices should entail a high level of awareness and preparedness to identify a possible COVID-19 infection, and refer such potential patients to appropriate treatment centres in order to control and manage the spread of the disease [6]. Furthermore, it is extremely important to implement effective infection control measures in dental practices of countries that are potentially affected with COVID -19 which many dental practices lack owing to the low interest in taking the mandatory precautions [10].

To the best of our knowledge this study is the first of its kind in Indian scenario that aimed to assess the level of knowledge about novel coronavirus disease, attitude and infection control practices during and post COVID-19 outbreak among Indian dental practitioners.

2. MATERIALS AND METHODS

Study design

A cross-sectional online questionnaire based survey was conducted during a period of one month from 20 March 2020 to 20 April 2020. The study population consisted of private dental practitioners working in various regions of India. It is estimated that around 1, 25,000 dentists are actively serving over 1.2 billion Indian populations through their clinics [11].

Using an online sample size calculator [12] at 95% confidence level and 3% sampling error, the required sample size was calculated making sure it was large enough for precise estimation and a sample size of 1059 was found to be sufficient to give adequate results. On piloting on 30 dentists, the response rate came to be 40%, . Hence, based on this response rate the number of invites required to achieve the required sample size was 2648. In the present study, a list of private dental practitioners was obtained from Indian Dental Association's dentists' directory. Randomly selected 3000 private dentists were invited to participate out of which 1925 responders completed the survey, which was well above the required sample size, with a response rate of 64.16%.

Preparation of questionnaire

In order to oblige by the current circumstances where all the dental clinics were closed by the government in order to curtail the spread of the disease, an online questionnaire designed in English using Google forms was used for the purpose of the study. An online pilot study was done on 30 responders to test the reliability and validity of the questionnaire. The Cronbach's alpha was used to assess the internal reliability of questionnaire and was found to be satisfactory (0.80). The questions were developed according to practical guidelines recommended for dentists and dental staff by the Centres for Disease Control and Prevention (CDC), the American Dental Association (ADA), the World Health Organization (WHO) and the Dental Council of India (DCI) to control the spread of COVID-19[13,14,15,16]. Mean content validity ratio was 0.84 which was based on the expert opinion of a team of 5 subject experts.

The self administered structured questionnaire comprised of two parts (detailed information in the supplementary file). The first part assessed about the general information of the dentist – age, gender, area of practice – rural/urban, qualification and years of experience. The second part was a 22 item survey instrument that had questions with multiple choice answers or in the form of Yes or No pertaining to the knowledge of dentists about the novel disease (K1-K7 with only one correct answer), and their attitudes (A1-A7) and infection control practices (P1-P8) in dental clinics during and post COVID -19 outbreak. The approximate time to completely fill the questionnaire was 6 minutes.

Data collection

The invited dental practitioners across the country were contacted through emails and social media platforms like Whatsapp and Facebook. The link to the survey was generated and sent to them and the participants needed to click over it and start filling the questionnaire. A second reminder was sent to the invitees after 48 hours of the first invite. A brief introduction and objective of the study was provided at the start of the survey. Participation in the study was entirely voluntary and participants were allowed to withdraw anytime during the study, if they wished to do so. Identity of the participating individuals was kept anonymous. Complete filling up of the questionnaire and submission was considered as the written informed consent of the participant for the study. Ethical clearance was obtained from the Institutional Ethical Committee.

Statistical analysis

All the data recorded were subjected to analysis using SPSS package version 22. Descriptive statistical analysis was obtained in the study. The responses to the questions were calculated in frequency and percentage distribution. Chi-square test was used to determine the private dental practitioner's KAP regarding COVID-19 outbreak among the different participant characteristics. A p - value < 0.05 was considered as statistically significant

3. RESULTS

Participant characteristics

Most of them were males (1241, 64.46%) practicing in urban areas (1027, 53.35%) with a minimum qualification of Bachelors in Dental Surgery (BDS) (995, 51.69%) and experience of 5-10 years (724, 37.61%). The mean age of the responders was 37.64 ± 7.25 years while mean years of clinical experience was 9.25 ± 4.67 years. About 99.89% of responders were aware that the COVID-19 outbreak is happening globally in the year 2020. The other details have been presented in Table 1.

Dental practitioner's knowledge regarding COVID-19 disease

Table 2 and table 3 provide assessment of dental practitioner's knowledge regarding COVID-19 disease and comparison among the various participant characteristics. Most of the participants (89.5%) possessed sufficient knowledge about COVID-19. Regardless of various participant characteristics, most of them knew about the viral etiology of the disease. Significantly higher number of dentists with masters degree were well informed about the source of infection ($n= 929$; $p = 0.04$) and its routes of transmission in dental settings ($n = 927$, $p = 0.0002$) along with those practicing in the urban areas ($n = 1023$, $p < 0.0001$). The incubation period for COVID-19 (1-14 days) was well known by significantly higher number of MDS dentists and practicing in urban areas ($n=1022$, $p < 0.0001$; $n=925$, $p = 0.0007$ respectively). The knowledge about the most common symptoms of the novel disease and about the unavailability of vaccine and standardized treatment protocol for the disease were very well appreciated by more number of male dentists ($n= 1172$, $p = .04$) ($n = 1084$, $p < 0.0001$) practicing in the urban areas ($n= 986$, $p < 0.0001$) ($n = 779$, $p < 0.0001$), with a higher degree ($n= 882$, $p = 0.03$) ($n = 779$, $p = 0.0009$) and experience of 5-10 years ($n = 692$, $p = 0.002$) ($n = 621$, $p < 0.0001$). Significantly more number of females ($n = 681$, $p < 0.0001$) were aware that dentists are vulnerable to be affected by COVID-19.

Dental practitioner's attitude towards COVID-19 disease

Although the participants had good knowledge about the disease but, the attitude during and post COVID-19 outbreak was found to be mostly negative (74.08%). Negative attitudes included unawareness (60.2%) and reluctance to practice teledentistry (36.2%), prediction of reduced number of patients even after the curve flattens, financial instability due to closing of clinics owing to COVID-19 spread (92.7%), feeling depressed being at home during the

lockdown (53.19%) and reluctance to provide treatment even after the outbreak gets contained. This negative attitude was highly significant ($p < 0.0001$) with almost all participant characteristics (female gender, rural area of practice, bachelors degree and less than 5 years of work experience). Further details have been presented in table 2 and table 4. 87.3% participant's clinic remained closed during the outbreak. Significantly more females ($n=113$, $p < 0.0001$) practicing in urban areas ($n=143$, $p < 0.0001$) with MDS degree ($n=155$, $p < 0.0001$) rendered emergency and urgent dental treatment. Nearly 2/3rd of the participants were unaware about teledentistry involving significantly higher number of males ($n=868$, $p < 0.0001$) with BDS degree ($n=669$, $p < 0.0001$) having < 5 years of clinical experience ($n=384$, $p=0.0001$). 92.7% of participants thought that the outbreak would have a negative impact on their financial stability, females with BDS degree practicing in rural areas and having <10 years of experience had a significant difference in the thought process. 53.19% constituting a significant number of males practicing in urban areas with BDS degree and having less than 5 years of experience were feeling depressed at home during the outbreak and lockdown. Nearly 35.5% of the participants agreed that they would definitely be anxious and restrain treating patients even after the outbreak stops.

Dental practitioner's infection control practices during and after COVID-19 outbreak

Table 2 shows the results of dental practitioner's infection control practices during and post COVID-19 outbreak. At least 95.42% of practitioners of which most of them possessed MDS degree and had experience of greater than 10 years knew that protective eyewear, masks (N95, FFP-3, 2), gloves, headcap, face shields and protective outerwear are various personal protective equipments (PPEs) used during COVID-19 outbreak but nearly one-third of them (30.5%) said that they won't be able to use all the PPEs after the outbreak. Significantly more number of males qualified in BDS and practice experience of 5-10 years in the rural areas had this negative infection control practice. Before the outbreak, about 40.5% practitioners particularly males practicing in rural areas having BDS degree and experience of greater than 10 years, used only mouth mask and gloves as PPEs while 26.3% used head cap as well. Approximately one-half of the private dentists comprising of more number of males, practicing in rural areas with BDS degree and less than 5 years of experience were aware of the current infection control measures like frequent handwashing, social distancing, covering the mouth and nose while coughing or sneezing, decontamination of inanimate surfaces and objects, use of standardized PPEs and taking complete case history of the patient regarding travel and signs and symptoms of COVID-19 but did not have sufficient protective measures in the clinic and they might not be able to invest in and practice all of the measures in their clinics even after the lockdown. Nearly 56% of practitioners were unaware (significant number of male dentist practicing in the rural areas, those having BDS degree with clinical experience of more than 10 years) while 29.14% of responders (greater number of female dentists, those practicing in urban areas, having BDS degree and with clinical experience of less than 5 years) were aware about the AIIRS- Airborne infection isolation rooms or negative pressure rooms but said that they might not get their clinic equipped with such rooms. When asked about what will they do if they come across a COVID-19 suspect in their

clinic about 43.74% of participants that included significantly more number of female dentists, dentists working in the urban areas and those having an experience of 5-10 years said that they would not do any treatment and would refer the patient to concerned hospital and inform the authority regarding the patient. However, around 36.15% also said that they will treat the patient first and then ask him/her to go to the concerned hospital. When asked whether they have acquired sufficient knowledge (through online lectures, seminars, information leaflets, etc) in how to maintain a safe working environment during and post covid-19 outbreak , only 18.8% said they gained sufficient knowledge while 42.2% of participants said that they could get only a little bit of knowledge. Significantly higher number of females didn't get much of it through online lectures, seminars, articles etc. Likewise, dentists practicing in rural areas, those with BDS degree and with greater than 10 years of experience could attain little knowledge through online lectures and seminars. Comparative analysis of dental practitioner's infection control practices among different patient characteristics is given in table 5.

4. DISCUSSION

The present study included a sample of 1925 private dental practitioners across India. Despite the greater female to male dentists in India, there was low response of female dental practitioners in the present cross-sectional online survey. The reason could be attributed to the double work burden that they face due to simultaneous work on professional front along with complete or greater share of the domestic work load resulting in less time being active on social media.

The findings in our study revealed that most of the Indian dental practitioners possess sufficient knowledge about the general nature of the COVID- 19 disease which was similar to HCWs of Veitnam, Jordanian medical students, health care students and professionals of Mumbai and Chinese residents. This positive approach to the novel disease is highly commendable as it would not only help in early identification of the asymptomatic patients infected with SARS-CoV-2 and distinguishing between the suspected or confirmed cases from healthy ones but also help in taking timely and appropriate action to contain the spread of the disease. It was noted that most of the dentists of urban areas with higher qualification and more years of experience in clinics had better knowledge about the disease than their respective counterparts necessitating greater spread of information about the COVID-19 disease equally among all the dental practitioners regardless of their area of practice, qualification and years of experience.

The government of India (GoI) announced total lockdown in the country on 25th march 2020[21] which is continuing since then and during this period most of the state governments as well as DCI placed an advisory to all the private dental clinics for total shut down except performing emergency and urgent dental procedures [19] which most of the Indian dentists followed as revealed by the present study. Restrictions to perform only emergency procedures have not only led to serious financial implications but also psychological distress among dental practitioners which might continue post COVID-19 outbreak as exhibited by the results of the present study. The government and dental health related regulatory bodies of developed countries like Canada, UK and Ireland have offered financial support in the

form of loans or credit to standalone dental practices affected by COVID-19 outbreak [22]. It is highly recommended that the competent authorities in India too should come up with some visible policy and provide support to dental clinics which could be in the brink of closure amid COVID crisis. Other reasons attributed to distress could be fear of patient going to other practice or fear of other dental practitioner opening his/her clinic and earning, losing track of work schedule, lack of other work at home, void in ambitions or the dentist just unable to understand the threat the pandemic can pose on life. Most dentists felt that they would or might feel anxious and restrain treatment to patients post outbreak which could be due to the fear of contracting and spreading the virus, knowing that no vaccine and specific treatment protocol has been developed yet []. When asked about the practice of teledentistry, very few dentists were aware about it and those who knew were not practicing it. Unlike the ADA, which has encouraged dentists to practice teledentistry and issued new interim guidelines regarding the same [23], reluctance to practice teledentistry in India might be due to the lack of any standard guidelines issued by the concerned authorities and lack of training to deal with the legal, technological and ethical issues associated with it. However, it should be noted that teledentistry can act as a viable tool in not only containing the spread of virus but also as an alternative possibility of continuing the practice thereby alleviating the financial burden to some extent and also as a coping mechanism to handle the distress due to shutdown of the clinical practice [24].

Regarding dental practitioner's infection control practices before, during and post COVID-19 outbreak the results of the present study showed that although most of the practitioners are well aware of the current infection control and safety measures issued by several health regulatory bodies, nearly half of them were reluctant to follow them completely. The reasons could be several, to name a few, that certified and standardized infection control kits and equipments are very costly so that most of the practitioners with new setups and working in rural areas cannot afford to buy these essential commodities. The government and concerned authorities should set up specific centres from where the practitioners could buy these essential commodities at subsidized rates. The government should set up its own interim guidelines on infection control practices according to its needs and expenditure rather than relying on the guidelines recommended by health authorities from the developed nations where the total expenditure on oral health care is much higher and the clinics and institutions are already equipped with latest technologies and equipments. Furthermore, higher investments in making the setup well equipped and spacious enough to prevent the spread amid the scenario of low returns have fuelled up the reluctance towards following infection control protocols. Moreover, according to the present study about two-third of dental practitioners, particularly female dentists and those practicing in rural areas are not confident enough that they have gained sufficient knowledge regarding effective infection control protocols through online lectures, webinars and study articles owing to which most of them might not be trained for equipment maintenance, to protective attire and to work with PPEs and N95. Due to limited access to internet and online health information resources, dentists practicing at grass-root level are less likely to gain knowledge online. Also, females with dual work load are less likely to be active online and hence gained either no or slight knowledge. Alternative methods of providing distance education should be considered for these

vulnerable groups. Looking into the grave situation of the present scenario, gravity of the illness and severity of its spread, dental practitioners should also try to be more buoyant in availing knowledge about the novel disease

Also, it is worth noting that a significant number of participating dentists who are less qualified, work in rural areas and have less clinical experience are less aware, have more negative attitude and insufficient infection control practices.

There are certain limitations of the study too. Due to the scarcity of literature in specifically assessing the KAP of dental practitioners, we were unable to perform any comparative analysis of the results. The only study done among Jordanian dentists involves a very different set of questionnaire and hence couldn't be compared with. Moreover, owing to specific reasons, the low response of the female dentists in the present study couldn't match up with the current female- male dentist ratio of the country which could have led to the under estimated knowledge, negative attitude and preventive practices of the female dentists regarding COVID-19 outbreak. We encourage other researchers to carry out further studies assessing the same.

5. CONCLUSION

Within the limitations of the study, it can be concluded that Indian dental practitioners were well acquainted with the general information about the recently emerged COVID-19 outbreak. However, they still have limited understanding about the extra precautionary measures required to effectively deal with the spread of the disease, the most prominent reasons could be the financial and legal constraints. Hence, the regulatory bodies should come up with good efforts, new policies, amend the existing ones and plan campaigns in delivering adequate knowledge, instilling positive attitude and providing cost-effective infection control means regarding COVID-19 to the entire dental community in general and target the certain demographic groups in particular. Moreover, dentists should also cooperate and remain diligent so that optimistic control and effective management of the disease can be visualised in the near future.

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Data availability statement: The questionnaire based survey data used to support the findings of this study are available from the corresponding author upon request.

Table 1: Participant characteristics

S.NO	PARTICIPANT CHARACTERISTICS	FREQUENCY (%)
1.	Total Participants	1925/3000 (64.16%)
2.	Mean Age	37.64±7.25 Years
3.	Gender Male Female	1241 (64.46%) 684 (35.54%)
4.	Area Of Practice Rural Urban	898 (46.65%) 1027 (53.35%)
5.	Qualification BDS MDS/Phd.	995 (51.69%) 930 (48.31%)
6.	Years Of Experience < 5 Years 5-10 Years >10 Years Mean Years Of Experience	596 (30.96%) 724 (37.61%) 605 (31.43%) 9.25±4.67 Years
7.	Number Of Responders Who Were Aware About The COVID-19 Outbreak	(98.53%)

Table 2: Assessment of dental practitioner's KAP regarding COVID-19 outbreak

S.NO*	Freq. Of option (a)	Freq. Of option (b)	Freq. Of option (c)	Freq. Of option (d)
K1	00	00	1921 (99.79%)	04
K2	03	05	1917 (99.58%)	00
K3	1896 (98.49%)	15	11	03
K4	05	1802 (93.61%)	98	20
K5	1920 (99.74%)	00	05	-----**
K6	21	04	00	1900 (98.7%)
K7	1553 (80.67%)	372 (19.33%)	-----	-----
A1	04 (0.20%)	1687 (87.63%)	234 (12.15%)	-----
A2	66 (27.73%)	00	169 (71%)	03 (1.26%)
A3	69 (3.58%)	697 (36.2%)	1159 (60.2%)	-----
A4	1783 (92.62%)	142 (7.37%)	-----	-----
A5	1024 (53.19%)	901 (46.81%)	-----	-----
A6	685 (35.58%)	280 (14.54%)	960 (49.87%)	-----
A7	512 (26.59%)	821 (42.64%)	592 (30.7%)	-----
P1	1837 (95.42%)	76 (3.98%)	12 (0.62%)	-----
P2	506 (26.28%)	319 (16.57%)	778 (40.491%)	322 (16.72%)
P3	641 (33.2%)	589 (30.59%)	695 (36.10%)	-----
P4	429 (22.28%)	481 (24.98%)	943 (48.98%)	72 (3.74%)
P5	529 (27.48%)	606 (31.48%)	790 (41.03%)	-----
P6	1077 (55.94%)	561 (29.14%)	287 (14.91%)	-----
P7	842 (43.74%)	387 (20.10%)	696 (36.15%)	-----
P8	362 (18.8%)	591 (30.7%)	814 (42.28%)	158 (8.2%)

* :Details given in the supplementary file **: no options available

Table 3 :Comparison of knowledge of dental practitioners regarding COVID-19 among different participant characteristics

Quest. No. §	Gender			Area of practice			Qualification			Yrs of experience				
	M	F	P-Value	R	U	P-value	BD S	MD S	P-Value	<5	5-10	>10	P-value	
K1	C	123	68	0.65	89	102	0.25	992	929	0.35	59	72	60	0.70
		8	3		5	6					4	3	4	
	IC	03	01		03	01		03	01		02	01	01	
K2	C	123	68	0.90	89	102	0.10	988	929	0.04*	59	72	60	0.13
		6	1		2	5					1	3	3	
	I	05	03		06	02		07	01		05	01	02	
	C													
K3	C	122	67	0.78	87	102	<0.0001	971	925	.0007	58	71	59	0.25
		3	3		4	2	*			*	3	6	7	
	I	18	11		24	05		24	05		13	08	08	
	C													
K4	C	117	63	0.04*	81	986	<0.0001	920	882	0.03*	54	69	56	0.002*
		2	0		6		*				2	2	8	
	I	69	54		82	41		75	48		54	32	37	
	C													
K5	C	123	68	<0.0001	89	102	0.54	991	929	0.20	59	72	60	0.84
		9	1	*	5	5					4	2	4	
	I	62	03		03	02		04	01		02	02	01	
	C													
K6	C	122	67	0.37	87	102	0.0001	973	927	.0002	58	71	60	0.09
		7	3		7	3	*			*	5	3	2	
	I	14	11		21	04		22	03		11	11	02	
	C													
K7	C	108	46		66	889		774	779		45	62	47	
		4	9	<0.0001	4		<.0001			.0009	7	1	5	<.0001
	I	157	21	*	23	138	*	221	151	*	13	10	13	*
	C		5		4						9	3	0	

* : P-Value <0.05 is significant, §: Details of questions is given in supplementary file

M- Male, F – Female, R- Rural, U-Urban, BDS – Bachelors in Dental Surgery, MDS- Masters in Dental Surgery , C- Correct answer, IC – Incorrect answer

Table 4 :Comparison of attitude of dental practitioners regarding COVID-19 among different participant characteristics

Quest No. [§]	Gender			Area of practice			Qualification			Yrs of experience				
	M	F	P-Value	R	U	P-value	BD S	MD S	P-Value	<5	5-10	>10	P-value	
A 1	a	04	00		03	01		01	03		00	01	03	
	b	113	55	<.0001*	82	85	<.0001	949	738	<.0001	53	65	50	.002*
	c	5	2		8	9	*			*	1	0	6	
		102	13		67	16		45	189		65	73	96	
			2			7								
A 2	a	47	19		41	25		30	36		19	23	24	
	b	00	00	<.0001*	00	00	<.0001	00	00	<.0001	00	00	00	0.65
	c						*			*				
		56	11		26	14		14	155		46	50	73	
			3			3								
	d	03	00		03	00		02	01		00	01	02	
A 3	a	48	21		4	65		14	55		19	26	24	
	b	325	37	<.0001*	19	49	<.0001	312	385	<.0001	19	24	26	.0001
	c						*			*				*
		868	29		69	46		669	490		38	45	31	
			1		6	3					4	7	8	
A 4	a	111	67		88	89		959	824		52	67	58	
	b	1	2		9	4					7	5	1	
	c													
	b	130	12	<.0001*	09	13	<.0001	36	106	<.0001	69	49	24	<.0001
							*			*				*
	a	942	82		45	57		681	343		42	38	21	
					2	2					7	7	0	

A	b	299	60	<0.0001	44	45	0.01*	314	587	<0.0001	16	33	39	<0.0001
5			2	*	6	5				*	9	7	5	*
A	a	348	33		44	24		326	359		34	20	13	
			7		3	2					4	9	2	
6	b	226	54	<0.0001*	71	20	<0.0001	149	131	.02*	39	11	12	<0.0001
						9	*				2	9		*
	c	667	29		38	57		520	440		21	40	34	
			3		4	6					3	3	4	
A	a	407	10		20	31		221	291		96	17	24	
	b		5		1	1					4	2		
7	c	354	46	<0.0001*	43	39	<0.0001*	527	294	<0.0001	34	26	21	<0.0001
			7		1	0				*	1	2	8	*
		480	11		26	32		247	345		15	28	14	
			2		6	6					9	8	5	

* : P-Value <0.05 is significant

§: Details of questions is given in supplementary file

Table 5 :Comparison of infection control practices of dental practitioners regarding COVID-19 among different participant characteristics

Question No. §	Gender			Area of practice			Qualification			Yrs of experience				
	M	F	P-Value	R	U	P-value	BD S	MD S	P-Value	<5	5-10	>10	P-value	
P1	a	118	65		85	98		928	909		55	69	58	
		5	2		0	7					5	9	3	
	b	49	27		42	34		59	17		36	21	19	
	c	7	5	0.90	06	06	0.29	08	04	.0001*	5	4	3	0.02*
P2	a	208	29		28	22		284	222		16	16	17	
			8		1	5					3	9	4	
	b	141	17	<0.0001	23	29	<0.0001*	117	202	.0001*	79	11	12	<0.0001
			8	*		6	1*				3	7		*
	c	614	16		56	21		466	312		26	22	28	
			4		3	5					5	9	4	
	d	278	44		31	29		128	194		89	21	20	
						1					3			
P3	a	318	32		23	40		291	350		16	19	28	
			3		7	4					4	7	0	
	b	429	16	<0.0001	42	16	<0.0001*	278	311	<0.0001*	19	17	22	<0.0001
			0	*	2	7	1*			*	1	6	2	*
	c	494	20		23	45		426	269		24	35	10	

		1		9	6					1	1	3		
P4	a	218	21		22	20		172	257		14	22	59	
			1		6	3					3	7		
	b	323	15	<0.0001	29	18	<0.0001	267	214	<0.0001	18	14	14	<0.0001
			8	1*	6	5	*				8	5	8	*
	c	650	29		31	63		497	446		21	33	39	
			3		2	1					8	1	4	
	d	50	22		64	08		59	13		47	21	04	
P5	a	383	14		16	36		208	321		93	21	21	
			6		4	5						9	7	
	b	285	32	<0.0001	22	37	<0.0001	267	339	.0001*	19	22	19	<0.0001
			1	1*	9	7	*				3	1	2	*
	c	573	21		50	28		520	270		31	28	19	
			7		5	5					0	4	6	
P6	a	793	28		58	48		576	501		24	43	40	
	b		4	<0.0001	9	8	<0.0001			<0.0001	3	3	1	<0.0001
	c	278	28	*	21	34	*	335	226	*	30	13	11	*
			3		9	2					9	8	4	
		170	11		90	19		84	203		44	15	90	
			7			7						3		
P7	a	526	31		22	61		423	419		22	35	26	
			6	<0.0001	6	6	<0.0001			0.38	2	5	5	<0.0001
	b	215	17	1*	28	10	*	198	189		13	97	15	*
			2		1	6					4		6	
	c	500	19		39	30		374	322		24	27	18	
			6		1	5					0	2	4	
P8	a	271	91		18	27		176	186		11	14	97	
				<0.0001	4	8					7	8		
	b	357	23	*	29	29	<0.0001	286	305	0.04*	17	20	20	<0.0001
			4		2	9	*				8	4	9	*
	c	567	24		39	41		449	365		24	30	26	
			7		6	8					5	8	1	
	d	46	11		12	32		84	74		56	64	38	
			2		6									
Question	Gender			Area of practice			Qualification			Yrs of experience				
	No. §	M	F	P-Value	R	U	P-value	BD S	MD S	P-Value	<5	5-10	>10	P-value
P1	a	118	65		85	98		928	909		55	69	58	
			5		0	7					5	9	3	
	b	49	27		42	34		59	17		36	21	19	
	c	7	5	0.90	06	06	0.29	08	04	.0001*	5	4	3	0.02*
P2	a	208	29		28	22		284	222		16	16	17	
			8		1	5					3	9	4	
	b	141	17	<0.0001	23	29	<0.0001	117	202	.0001*	79	11	12	<0.0001
			8	*		6	1*				3	7	*	

	c	614	16		56	21		466	312		26	22	28
			4		3	5					5	9	4
	d	278	44		31	29		128	194		89	21	20
						1						3	
P3	a	318	32		23	40		291	350		16	19	28
			3		7	4					4	7	0
	b	429	16	<0.0001	42	16	<0.0001	278	311	<0.0001	19	17	22
			*	2	7	1*			*	1	6	2	
	c	494	20		23	45		426	269		24	35	10
			1		9	6					1	1	3
P4	a	218	21		22	20		172	257		14	22	59
			1		6	3					3	7	
	b	323	15	<0.0001	29	18	<0.0001	267	214	<0.0001	18	14	14
			8	1*	6	5	*				8	5	8
	c	650	29		31	63		497	446		21	33	39
			3		2	1					8	1	4
	d	50	22		64	08		59	13		47	21	04
P5	a	383	14		16	36		208	321		93	21	21
			6		4	5					9	7	
	b	285	32	<0.0001	22	37	<0.0001	267	339	.0001*	19	22	19
			1*	9	7	*				3	1	2	
	c	573	21		50	28		520	270		31	28	19
			7		5	5					0	4	6
P6	a	793	28		58	48		576	501		24	43	40
			4	<0.0001	9	8	<0.0001			<0.0001	3	3	1
	b	278	28	*	21	34	*	335	226	*	30	13	11
			3		9	2					9	8	4
	c	170	11		90	19		84	203		44	15	90
			7			7						3	
P7	a	526	31		22	61		423	419		22	35	26
			6	<0.0001	6	6	<0.0001			0.38	2	5	5
	b	215	17	1*	28	10	*	198	189		13	97	15
			2		1	6				4		6	
	c	500	19		39	30		374	322		24	27	18
			6		1	5					0	2	4
P8	a	271	91		18	27		176	186		11	14	97
				<0.0001	4	8					7	8	
	b	357	23	*	29	29	<0.0001	286	305	0.04*	17	20	20
			4		2	9	*				8	4	9
	c	567	24		39	41		449	365		24	30	26
			7		6	8					5	8	1
	d	46	11		12	32		84	74		56	64	38
			2		6								

* : P-Value <0.05 is significant, §: Details of questions is given in supplementary file

Research highlights

Most of the participating dentists were aware about the general characteristics of the COVID-19 but had more negative attitude and insufficient infection control practices. Hence, the government should come up with good efforts, and policies in delivering adequate knowledge, instilling positive attitude and providing cost-effective infection control means to the entire dental community.

22 - Item survey instrument to assess the dental practitioner's KAP Regarding COVID-19 outbreak

S.No	Questions	Option (A)	Option (B)	Option (C)	Option (D)
K1	What do you think causes COVID-19?	Bacteria	Fungi	Virus	Protozoa
K2	What is the source of infection of COVID-19?	Infected person	Direct transmission through aerosol	Both (a) and (b)	Neither (a) nor (b)
K3	What is the asymptomatic incubation period for patients affected with COVID-19?	1-14 days	1-7 days	1-24 days	1-30 days
K4	What are the most common clinical symptoms for COVID-19?	Fever, breathlessness, fatigue	Dry cough, fever, breathlessness, fatigue	Cough, fever, diarrhoea, breathlessness	Cough and cold, fever
K5	Do you think dentists are vulnerable to be affected by COVID-19?	Yes	No	Might be	-----
K6	What can be the routes of transmission of COVID-19 in dental settings?	Direct communication with patient	Direct contact with blood, oral fluids or other patient material	Indirect contact with infected instruments or products	All of the above
K7	Currently there is no vaccine or standardized treatment protocol for COVID-19?	Yes	No	-----	-----
A1	Are you still opening your clinic?	Yes	No	Sometimes	-----
A2	If yes, what types of services are being rendered in your clinic during the outbreak?	Urgent care	Elective/scheduled care	Emergency care	All kinds of services

A3	Are you aware of teledentistry and are you practicing it during the outbreak?	Yes, practicing	Yes iam aware but not practicing	Not aware	-----
A4	Do you think this is going to have an impact on your financial security?	Yes	No	-----	-----
A5	Do you feel depressed at home due to the present lockdown?	Yes	No	-----	-----
A6	Will you feel anxious and restrain yourself in treating the patients post COVID-19 outbreak?	Yes	No	Might be	-----
A7	What do you think will be the impact on patient flow after the COVID-19 outbreak?	Increase in number of patients	Decrease in number of patients	No change	-----
P1	What are the PPEs used during COVID-19 outbreak?	Protective eyewear, masks (N95, FFP-3,2), gloves, headcap, face sheets and protective outerwear	Protective eyewear, headcap, masks	Headcap, masks, gloves	-----
P2	Before the outbreak which PPE you used regularly?	Headcap, mouthmask, gloves	Headcap, mouthmask, gloves, protective eyewear	Mouthmask and gloves	Headcap, mouthmask, gloves, gown
P3	Will you continue to use standard PPEs after the outbreak has been flattened?	Yes	No	Might be	-----
P4	Are you aware of the current infection control and preventive measures like frequent handwashing, social distancing, covering the mouth and nose while coughing or sneezing, decontamination of inanimate surfaces and objects, use of standardized PPEs and taking complete case history of the patient regarding travel and	Yes iam aware and will be fully practicng it.	Yes iam aware and i might be practicing all of them	Yes iam aware but might not be practicing all of them	Not aware

	signs of symptoms of covid -19? Will you be practicing it in future in your clinic?				
P5	Do you think that the Current protective measures in your clinic are sufficient to prevent the spread of COVID -19?	Sufficient	Not sufficient and will invest in	Not sufficient and won't be able to invest in	-----
P6	Are you aware of AIIRS- Airborne infection isolation rooms or negative pressure room? Will your setup be equipped with it post COVID-19?	Not aware	Aware but won't be able to invest in	Aware and will definitely add up in my clinic	-----
P7	What will you do if you happen to come across a COVID-19 suspect in your clinic in near future?	Will not do any treatment and will refer the patient to concerned hospital and inform the authority regarding the patient	Will not do any treatment and send the patient back to home	Will treat the patient first and then ask him/her to go to the concerned hospital	-----
P8	Do you feel you have acquired sufficient knowledge (through lectures, seminars, information leaflets, etc) in how to maintain a safe working environment post covid-19 outbreak?	Gained sufficient knowledge	Quite a bit	slightly	Not at all