



Research Article

ISSN: 2581-3218

IJDR 2022; 7(2): 34-43

Received: 24-07-2022

Accepted: 22-09-2022

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www.dentistryscience.com

doi: 10.31254/dentistry.2022.7203

Dentist's preparedness in practice management during COVID-19 pandemic in Tamil Nadu – A cross sectional survey

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Abstract

Background: COVID 19 has created a major havoc amongst healthcare professionals, mainly Dental surgeons. However, it shall be difficult that Dental services would be denied to the people for long while. Hence, Dental practitioners must be fully prepared before resuming the services. Aim: Thus, the present survey was carried out to evaluate the attitude and preparedness of Dentist in clinical practice during pandemic. Materials and method: This online mode of cross-sectional survey was conducted through google forms among Dentists of Tamil Nadu. A pretested and validated questionnaire comprising 25 questions were used to enquire the sociodemographic details (5), attitude (7), and preparedness (13) regarding practising Dentistry during pandemic. 453 participants responded back and 52 respondents were rejected due to incomplete response. Data collected was entered in Excel sheet, coded, and analysed using SPSS software. Categorical variables are represented as N (%) and Pearson's Chi-square test was carried out for inter-group comparison with p-value < 0.05. Results: Majority of the Dentists seemed to present with good attitude to face pandemic situations in an appropriate way. It was also found that a statistically significant difference exists among various aspects of preparedness of Dentists in terms of work experience and gender with p (<0.005). Conclusion: In the present survey, the attitude and preparedness of Dentists were found to be satisfactory concerning COVID-19, but some pitfalls exist in the preparedness necessitating the need for approaching towards essential preparedness to handle the pandemic in best possible way.

Keywords: Dentists, Attitude, Preparedness.

INTRODUCTION

On 30th January 2020, COVID-19 emerged as a zoonotic infectious disease by SARS-CoV-2 virus. World Health Organization (WHO) declared it as a Public Health Emergency of International Concern [1]. This infection affects respiratory tract resulting in higher rate of mortality and morbidity [2]. By 11th March 2020, due to its rapid transmission across the globe, COVID-19 has been declared officially as a pandemic by WHO [3].

COVID 19 has created a major havoc amongst healthcare professionals, mainly Dental surgeons [4]. As per WHO, "Dental surgeons are at higher risk of being infected by COVID than their counterparts due to their close proximity to patients and in addition, most of their works are aerosol based which is the primary route of transmission of infection" [5]. Despite the strict adherence to personal protection protocol, Dentists are at higher risk of acquiring COVID-19 infection that eventually affects their well-being.

Amidst this pandemic, WHO advised Dentists to treat only emergency cases until the transmission rates have significantly decreased in order to reduce exposure. In India, after the announcement of complete lockdown by 25th March 2020, majority of government and private Dental institutions as well private clinics were partially closed as a measure of preventing COVID-19 exposure under the recommendation issued by Indian Dental Association (IDA) [6].

This led to a surge of Dental needs of the population along with difficulty in delivering the essential services to the public, imposing psychosocial challenges for Dentists. Dentists also strive hard to restart their practice providing all necessary treatments including aerosol generating procedure under complete protection. This requires complete physical, mental, and financial preparedness of the Dentists in continuing their practice amidst this pandemic.

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However, availability of limited evidence in the literature regarding the preparedness of Dentists, particularly in patient management during pandemic, requires more exploration in order to gain clear guidelines pertaining this pandemic situation. This gave us an impetus to conduct the present study to assess the Dentists' preparedness in practice management during COVID-19 pandemic in Indian scenario using a cross sectional survey.

MATERIALS AND METHODS

This was a cross-sectional survey conducted to assess the preparedness of Dentist in practice management during COVID-19 pandemic across Tamil Nadu. It was based on the Strengthening the Reporting of Observational studies in Epidemiology (STROBE) guidelines. In order to avoid exposure and contact amidst COVID-19 pandemic, online survey method with list-based sampling frame was conducted (Copper et al) [7]. Around 6033 E-mail addresses of the Dentists were collected from the Tamil Nadu state Dental council and approval was also acquired from the Institutional Review Board (IRB) (reference number: 4/IRB/2021). All registered Dentists in Tamil Nadu who matched the eligibility criteria and who consented to participate were included in the study. The selected participants were clearly explained about the purpose of the study and assured their identity confidentiality. Data pertaining to socio-demographic details, Dentists' attitude, and preparedness on practice management during COVID-19 pandemic were collected using a pre-validated and pre-tested questionnaire. Online questionnaire (Google Forms) was sent to all participants through E-mail. The items for this instrument were customized with the help of expert opinion which measured the attitude and preparedness of the participating Dentists. Questionnaire had 25 closed ended questions pertaining to socio-demographic details, attitude, and preparedness of Dentists. The questionnaire had five questions relating to Dentist's profile (age group, sex, and type of clinical activity-private/ government or both). Assessment of attitude included seven questions regarding opinion towards active involvement on the management and prevention of COVID-19. The assessment of preparedness included 13 questions. The content validity of the questionnaire was tested by an expert panel. Reliability of the questionnaire was tested by test-retest method with a sample of 30 participants (Cronbach's alpha = 0.851). Data collection was initiated from 1st March to 30th April, 2021. Reminder mails were

sent after 3 days, after one week and lastly after two weeks to the non-respondents. Dentists who responded to the questionnaire at the end of 3 months were the final respondents. Among 1,253 sent mails, 453 members responded back with a response rate of 36% with 52 respondents rejected due to incomplete response. Accordingly, the study population comprised of 401 Dentists (age group of 20–60 years). Data obtained from the study participants were coded and entered in Microsoft excel sheet. Categorical variables are represented as *N* (%) and Pearson's Chi-square test was employed for inter-group comparison with *p*-value <0.05 (SPSS version 21.0).

RESULTS

Altogether, 453 submitted forms were received, out of which 401 complete responses were taken for the analysis. From this present survey it was observed that the mean age of Dentists was 33.21±6.38 years. Out of whom 175(43.8%) and 225(56.2%) were males and females, respectively. Based on the work experience, 158(39.5%) had 0–5 years of experience, 120(30%) with 6–10 years of experience, 82(20.5%) had 11–15 years of experience and 40(10%) had >16 years of experience (Table 1).

The level of attitude and preparedness of Dentists on various aspects of COVID-19 pandemic were taken in for analysis and Chi-square test was employed to evaluate the strength and significance of the relationship between two domains of variables (gender and work experience) with *p*-value set to <0.05 as significant.

A statistically significant difference showed that cost and treatment patterns were one among the problems that influenced the practice management among the Dentists (Table 2) and further Dentists with >16 years of work experience were well prepared with operatory area modification (Table 3). Apart from this, Dentists having more than 16 years' experience had taken essential steps to reduce exposure to infection (Table 4) and there exists a statistically significant difference indicating that Dentist with >16 years were much prepared than with 5–15 years of experience in-patient management (Table 5). The results showed that various infection control protocols influenced the practice management among the Dentists belonging to various work experience (Table 6).

Table 1: Socio-demographic distribution

Socio-demographic details	Category	Dentists N (%)
Age	Mean±SD	33.21±6.38
Gender	Male	175(43.8)
	Female	225(56.2)
Work setting	Private	356(89)
	Public	27(6.75)
	Both	17(4.25)
Work experience	0-5years	158(39.5)
	6-10 years	120(30.0)
	11 - 15 years	82(20.5)
	>16 years	40(10)

Table 2: Comparison of various problems of Dental practitioners during COVID pandemic

	Problems experienced	Total %	Gender (%)		p value	Work experience in years (%)				p value
			M	F		5	10	15	>16	
General problems	Risk	90.2	89.4	91.7	0.057	89.5	91.5	90.2	94.3	0.159
	Stress	72	62.9	61.3		63.8	55.9	65.9	65.7	
	Economic constraints	61	71.2	73.3		78.3	75.4	62.2	60	
	Drain out of savings	60.2	65.3	56.7		59.2	66.1	56.1	57.1	
	Insufficient flow of wages	53.5	52.9	54.4		59.2	53.4	46.3	48.6	
Cost of treatment	5%	30.1	23.1	37.2	0.015*	34.1	34	23.9	23	0.090
	10%	27.2	28.7	27.9		30.9	28.3	28.4	16.7	
	More than 20%	24.7	23.1	13.7		12.2	16	23.9	33.3	
	No change	15.6	35	33.9		36.6	38.7	26.9	26.7	
Change in Manpower allocation	Extra	48.9	19	18.1	0.008*	18.8	17.2	18.8	21	0.405
	Same	34.4	57.1	42.4		46.5	48.3	48.8	60.5	
	Decrease	18.5	28	39.5		41	35.3	27.5	21.1	
	No	12.7	12.5	12.9		13.2	14.7	12.5	25.3	

Note: Test of significance: Chi-square test, $p < 0.05$ is considered significant. *M-Male; *F-Female

Table 3: Comparison of preparedness with operatory area of Dental practitioners

	Preparedness	Total (%)	Gender (%)		p value	Work experience (%)				p value
			M	F		0-5	6-10	11-15	>16	
Modification of waiting area	Social distancing	92.2	93.6	91.5	0.123	89.8	94.8	93.8	92.5	0.045
	Removal of unwanted things	69.6	65.5	63.4		57.1	63.8	69.1	82.5	
	Display visual alerts	66.5	70.2	62		67.3	59.5	66.7	75	
	Install Hand sanitizer	65.5	56.1	68.1		68	59.5	51.9	75	
	Install Hand wash area	64.2	68.4	70.9		72.8	63.8	70.4	75	
	Install Foot operated Dustbins	62.6	64.9	68.1		66	64.7	67.9	72.5	
Ventilation	Natural air	85.4	89.4	83.8	0.258	86.4	84.2	86.1	92.5	0.591
	By Exhaust fan	47.1	54.7	36.2		33.3	35.1	39.2	37.5	
	By table Fan	35.2	34.7	27.1		27.2	34.2	30.4	32.5	
	Avoid Ceiling fan	30.2	48.8	46.7		53.7	46.5	36.7	50	
Ac usage	Avoid AC use	80.3	81.2	81.9	0.795	83.5	81.6	81.3	75	0.405
	Filters to be serviced	40.3	52.7	46.7		54.7	48.2	40	52.8	
	Electrostatic filters usage	31.4	23.6	22.6		26.6	21.9	18.7	22.2	
	Retain AC use	22.7	33.3	30.7		36	33.3	20	36.1	

Note: Test of significance: Chi-square test, $p < 0.05$ is considered significant. *M-Male; *F-Female

Table 4: Comparison of preparedness of Dental practitioners on risk exposure reduction

	Preparedness	Total %	Gender (%)		P value	Work experience in years (%)				P value
			M	F		0-5	6-10	11-15	>16	
Risk exposure	Tele screening	57.3	59	56	0.969	53.9	60.7	53.7	67.5	0.617
	Triage	82.9	84.4	81.7		82.9	91.2	84.1	85	
	Scheduling appointment	89	89	90		88.8	88	86.6	97.5	
	Strict protocol	88.5	89.6	87.6		87.5	88	87.8	95	
	Defer practice	65.5	65.9	65.1		99.2	66.7	70.7	75	
	Complete closure	53.5	52.6	54.1		50.7	54.7	57.3	52.5	
Scheduled appointment	Crowd reduction	96.7	96	97.3	0.390	96.1	97.4	95.1	100	0.177
	Contact reduction	88.5	91.4	86.3		89	86.3	76.6	97.5	
	Waiting time Reduction	86.5	86.2	86.8		84.4	87.2	84.1	97.5	
	Time to treat	78.9	81.6	76.7		76	78.6	81.7	85	

	Time to disinfect	89.8	91.4	88.6		86.4	88.9	93.9	97.	
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Note: Test of significance: Chi-square test, $p < 0.05$ is considered significant. *M-Male; *F-Female

Table 5: Comparison of Dental practitioners' preparedness on patient management

Preparedness on patient's safety		Total (%)	Gender (%)		p value	Work experience in years (%)				p value
			M	F		5	10	15	>16	
History obtaining	Travel history	92.5	92.4	92.6	0.630	94.6	92.4	87.7	95	0.724
	Covid symptoms	97.2	95.9	98.1		95.9	97.5	97.5	100	
	Covid neighbours	81.6	81.2	81.9		83.7	80.5	79	82.5	
	Family history	79.5	77.1	81.5		78.2	83.9	75.3	80	
	Relative history	74.1	75.9	72.7		74.1	78	69.1	72.5	
Prior to treatment	Restrict visitors	81.1	80.6	81.5	0.241	81.2	81	77.8	87.5	0.005*
	Pre-screen metrics	70.6	74.1	67.8		67.4	66.4	75.3	85	
	Questionnaire	63.5	62.9	64		52.8	68.1	74.1	67.5	
	Pre-procedure mouthwash	79	84.1	74.9		75	75.9	82.7	95	
	Hand hygiene	88.5	89.4	87.7		86.8	86.2	90	97.5	
At the time of treatment	Surgical gown	69.5	68.7	82.4	0.000*	78.4	80.2	66.7	75.7	0.027
	Four handed Dentistry	39.2	49.3	38		40	43.5	43.5	51.4	
	High volume evacuation	46.8	58	46		44	53.8	49.3	73	
	HEPA	27.3	36	25.1		28	28.3	27.5	45.9	
	Negative pressure room	18.4	21.3	19.3		26.4	18.9	15.9	10.8	

Note: Test of significance: Chi-square test, $p < 0.05$ is considered significant. *M-Male; *F-Female

Table 6: Comparison of Dental practitioners' preparedness on infection control

Preparedness on infection control		Total %	Gender (%)		p value	Work experience in years (%)				p value
			M	F		5	10	15	>16	
Sterilization	Washing	84.1	92.4	92.6	0.010*	94.6	92.4	87.7	95	0.192
	Boiling	37.7	95.9	98.1		95.9	97.5	97.5	100	
	Chemical method	49.5	81.2	81.9		83.7	80.5	79	82.5	
	Autoclave	93.6	77.1	81.5		78.2	83.9	75.3	80	
	UV sterilizer	49	75.9	72.7		74.1	78	69.1	72.5	
Disinfection	Spraying	67.1	80.6	81.5	0.193	81.2	81	77.8	87.5	0.009*
	Surface disinfection	87.7	74.1	67.8		67.4	66.4	75.3	85	
	Fumigation	47.3	62.9	64		52.8	68.1	74.1	67.5	
	UV irradiation	31.4	84.1	74.9		75	75.9	82.7	95	
	All	19	89.4	87.7		86.8	86.2	90	97.5	
Waste disposal	Waste transport	69.1	96.7	82.4	0.849	78.4	80.2	66.7	75.7	0.910
	Storage	27.7	49.3	38		40	43.5	43.5	51.4	
	Yellow bag	41.5	58	46		44	53.8	49.3	73	
	Gooseneck ligate	29	36	25.1		28	28.3	27.5	45.9	

Note: Test of significance: Chi-square test, $p < 0.05$ is considered significant. *M-Male; *F-Female

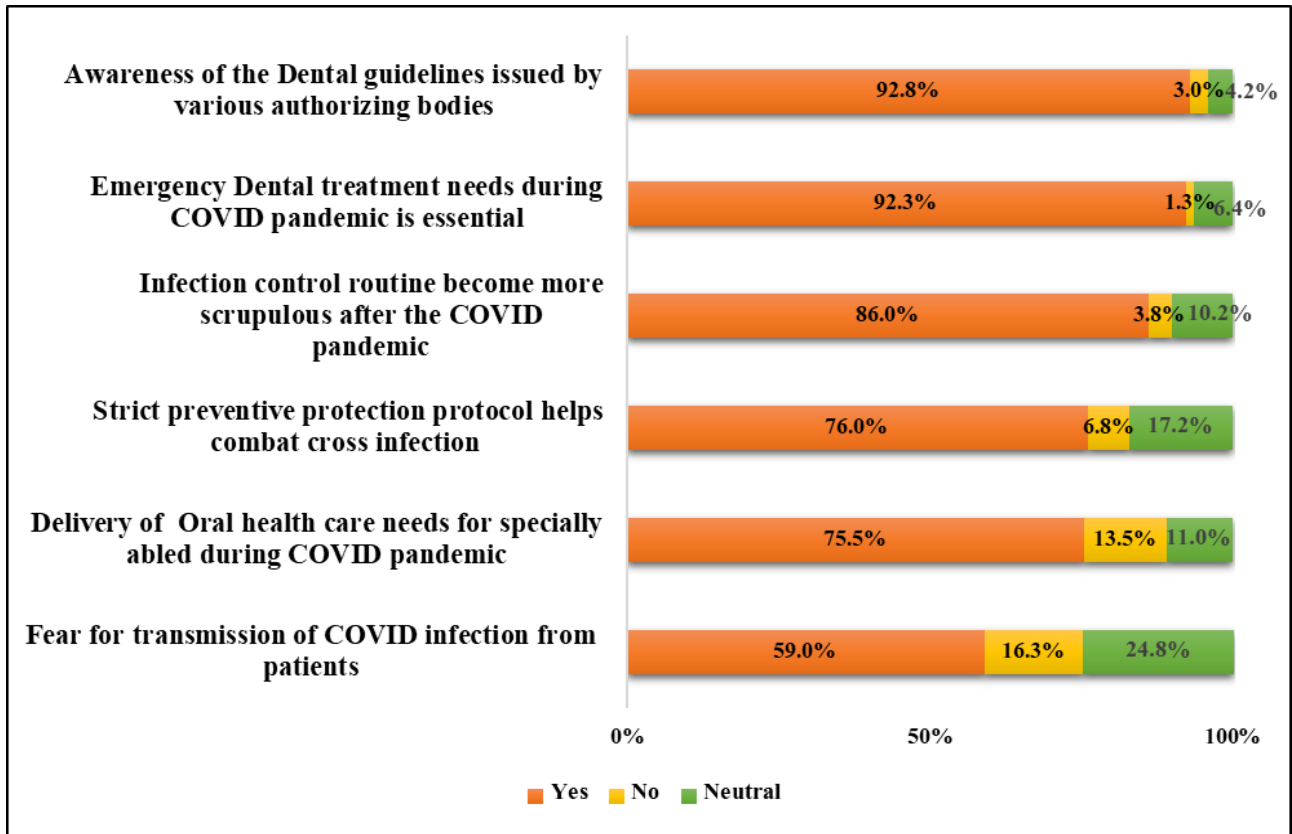


Figure 1: Dentists' attitude towards various aspects of COVID-19 pandemic

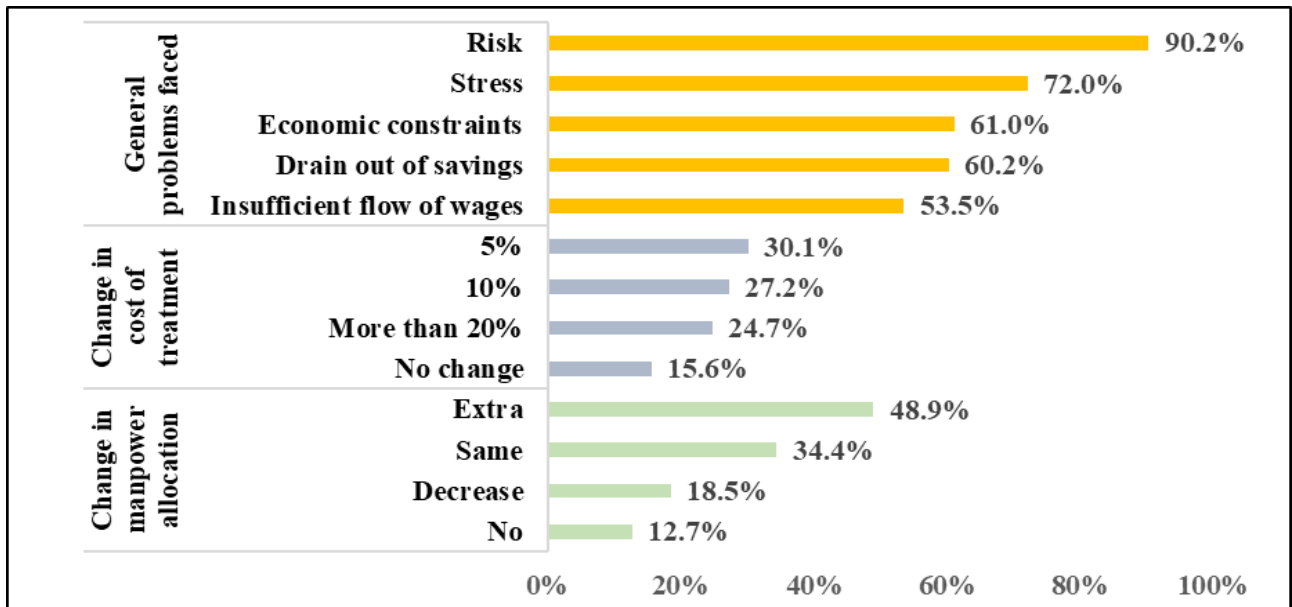


Figure 2: Various problems encountered by Dentists' during COVID-19 pandemic

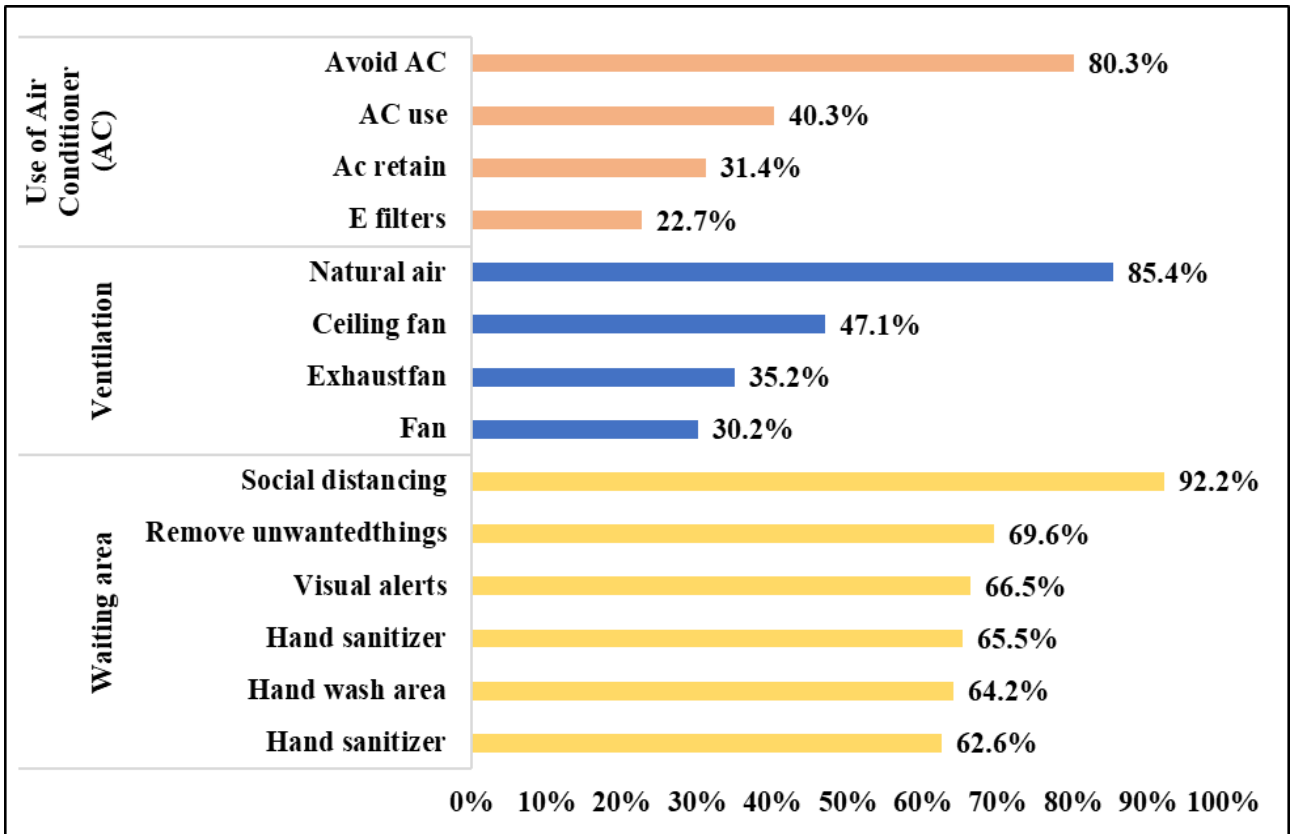


Figure 3: Dentists' preparedness towards operatory area during COVID-19 pandemic

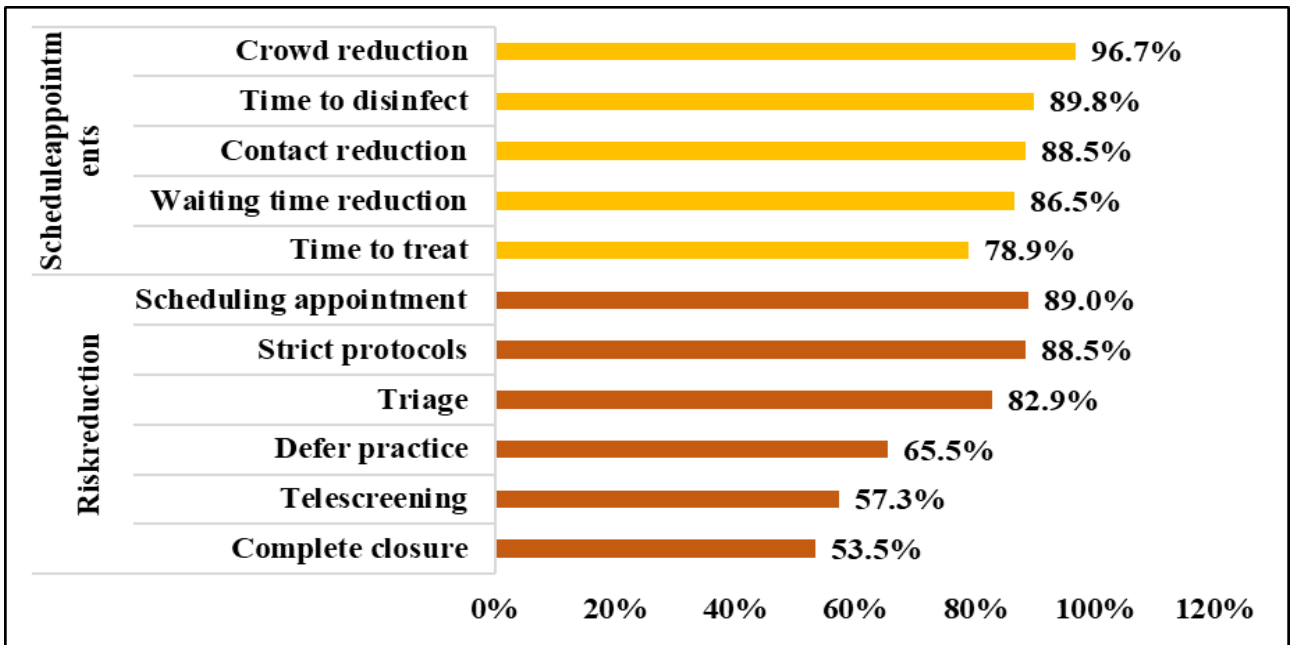


Figure 4: Dentists' preparedness on exposure reduction during COVID-19 pandemic

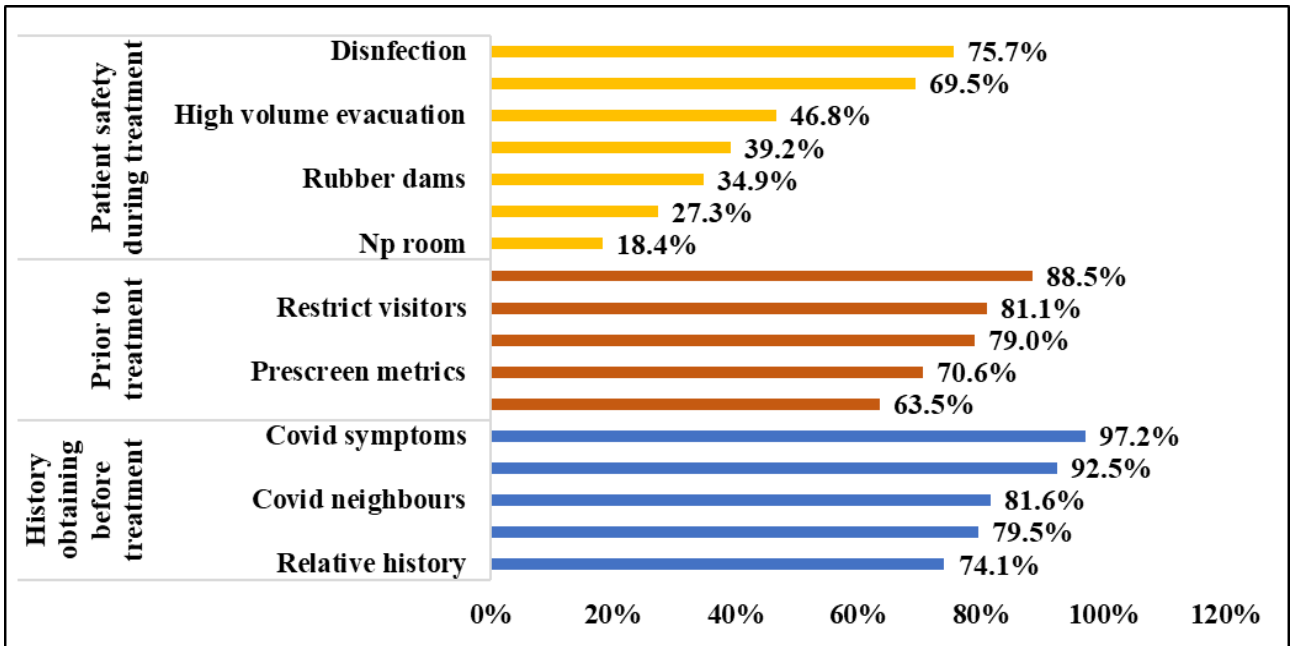


Figure 5: Dentists' preparedness on patient management during COVID-19 pandemic

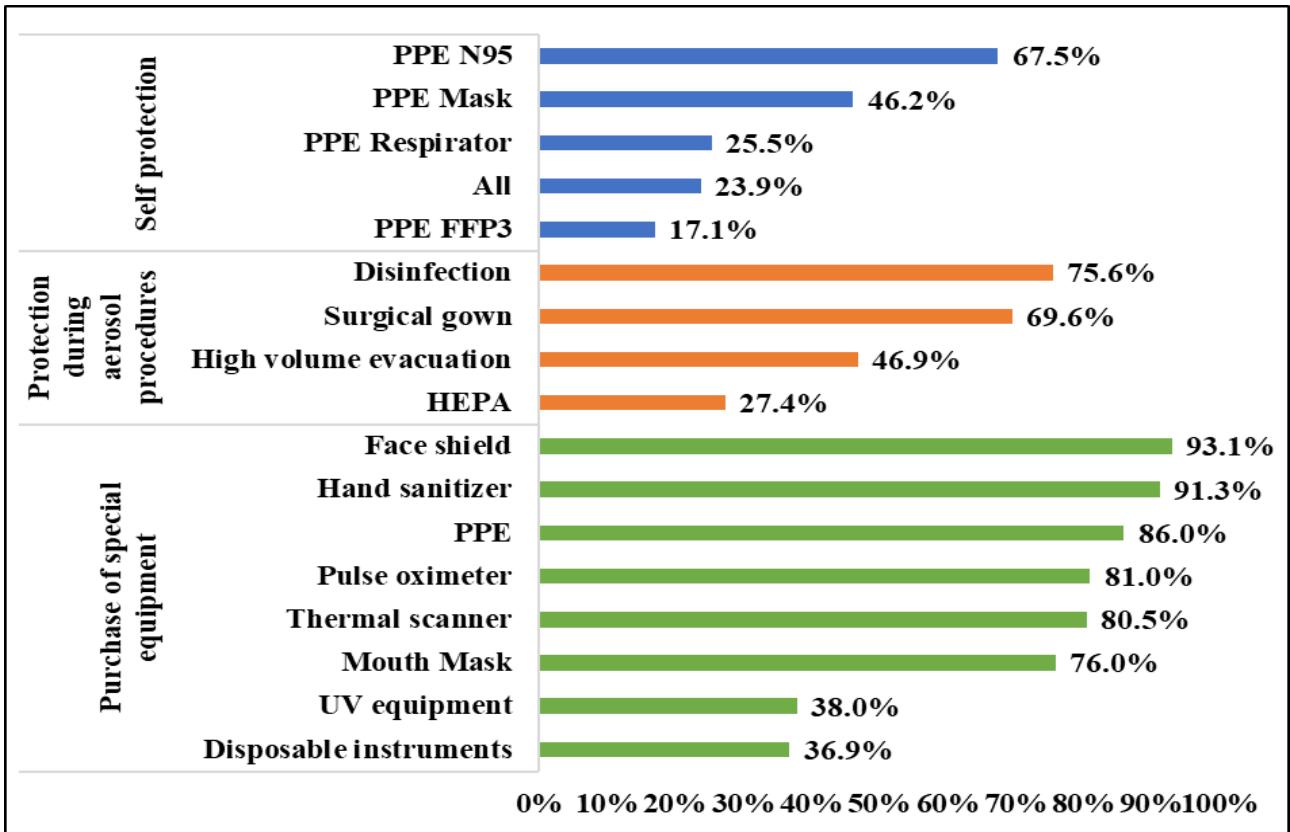


Figure 6: Dentists' preparedness on self-protection during COVID-19 pandemic

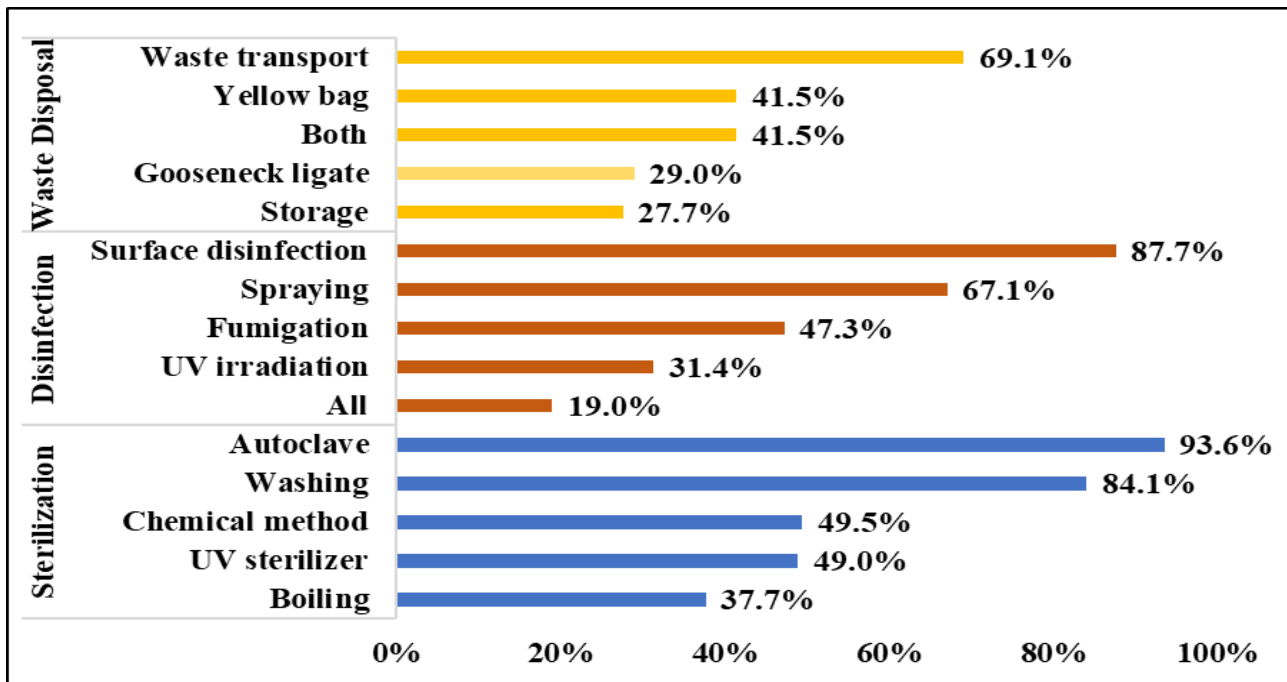


Figure 7: Dentists' preparedness on infection control during COVID-19 pandemic

DISCUSSION

As a result of pandemic, recessions leading to a frailty in economic conditions are seen. Further, global trade including healthcare is also impacted greatly. Due to proximity with infected patients, the threat of contracting the infection among the healthcare personnel remains higher [8]. Especially, Dentists are considered as having the highest risk [9]. Uniqueness of Dental services like aerosol generation, handling of sharps and caregiver's immediacy to patient's oropharyngeal region might be attributed to these risks [10]. This gave us an imperative to evaluate the attitude and preparedness of the Dentists during the pandemic situations.

From this study, it was evident that Dentists with increasing years of experience were well prepared. However, it could be seen that younger generation tend to adapt to newer technology with lesser impact on technostress than elders (Table 6). With regards to gender-wise distribution it was evident that Dentists were equally prepared to combat the infection (Tables 2–7).

Among various problems, it was found that most of the Dentists encountered the following problems: risk of transmission (90.2%), economic constraints (72%), stress (61.7%), drained out of savings (60.2%) and insufficient flow of wages (53.5%) (Figure 2). Fear of risk of contracting the infection has led many clinicians to drain their practice for a short while. Economic impact of COVID-19 had more potential influence on Dentists. Dentist's reporting economic constraint were severely affected, this coincides with the study by Khanal Singh et.al [11].

In regards to problems related to cost acquired for treatment it was found that 30.1% retained with the same cost and 27.2% of Dentists made a 5% increase in their usual procedural cost (Figure 2). It could be due to long-term shutdown of clinic, where only treatments have been reserved for emergency procedures, financial crisis, increased need to procure essential protective equipment and due to increased fear of risk of transmission of infection for both patients as well Dentists.

In the view of manpower allocation, it was found that 48.9 % retained with the same number of manpower whereas a 34.4% decrease was found on the other hand (Figure 2). The reason for this difference could

be due to the financial burden imposed on Dental practitioners amidst the pandemic that they were unable to pay the staffs efficiently.

Preparedness of clinic including alteration of waiting area revealed that Dentists were eager to upgrade their practices amidst the COVID-19 outbreak. Dentists also seemed to be highly motivated in bringing a total change in the functioning and setup of their clinic by including: visual alert posters (65.5%), hand hygiene protocol (69.6%), installing hand sanitizer at the entrance (62.6%) and avoiding air conditioners (Figure 3).

Social distancing was recommended as a crucial step in preventing COVID-19 transmission. It was evident from this survey that 92.2% Dentists pointed out that the most important measure in the prevention of COVID-19 transmission was reducing patients at waiting area through social distancing (Figure 3).

It was found from this study that majority of Dentists (89%) underwent scheduling appointments as an eventual step to reduce exposure that in turn led to reduction of crowding (96.7%), waiting time (86.5%) and contact between patients (88.5%) (Figure 4). However, most of the Dentists agreed to the fact that it was not healthy to examine patients directly in the clinic and nearly 57.3% agreed for tele screening and delaying treatment by simply prescribing medications (Figure 4). This measure is based on the recommendation by authorizing dental bodies like Centre for Disease Control (CDC) and Dental Council of India (DCI) [12] to avoid contact with patients. This finding was in relevance to Giudice et al [13] who stated that practicing tele-Dentistry permits Dentists to screen as well monitor patients thereby limiting human contact to reduce the risk for transmission of COVID -19 (Figure 4).

On the other hand, Dental practices would necessitate to consider the usage of questionnaire-based screening of the patients before their admission to Dental clinics. In the present survey, nearly two-thirds of the Dentists (81%) admitted that their practice involved the usage of questionnaire for screening and identifying high-risk patients (Figure 5).

Furthermore, most of the Dentists showed awareness towards undertaking precautionary measures prior patients' treatment, which was in agreement with the study done by Ahmed et al [14]. Apparently,

the pre-procedural rinsing (reduce viral load in the oral cavity) was employed by 79% of participating Dentists in an attempt to ensure patient's safety (Figure 5). Nearly 70.6% of the Dentists indicated that the body temperature of the patients must be measured before performing any kind of dental treatment. This measure has been stated by Consolo et al [15]. In another survey conducted among Dentists of various countries, 81% of Dentists specified that the measurement of patient's body temperature remains compulsory prior performing any Dental treatment [16].

Further, it was also anticipated that every clinic and hospital begin with triaging of all patients beforehand inspecting their travel history. In the present survey, 92.5% Dentists enquired on travel history which has become paramount during this pandemic. This is in accordance with the studies done by Kamate et al [17] and Indu et al [18]. Their studies indicated that 96.2% and 81% of Dentists gathered patients travel history, respectively. Moreover, this measure shall play a significant role in timely diagnosis, that can prevent further dissemination of infection (Figure 5).

It was reassuring to see that a majority of Dentists understood the importance of every component including N95 face masks, protective equipment, high volume evacuation, and negative pressure rooms for treating patients during such outbreaks ensuring their established scientific knowledge and eagerness to provide evidence-based oral healthcare to the community (Figure 6).

On account of infection control with respect to sterilization procedures, disinfection and waste disposal, it was evident from this survey that majority of Dentists were prepared to combat infection transmission with strong adherence to autoclaving procedures (93.6%). However, few of the Dentists followed the new preventive strategy of using UV sterilization technique (49%) to achieve high level of infection control (Figure 7).

These findings support that increasing age as well as experience led the Dentists, to implement judicious and evidence-based approach to handle any kind of circumstances. In the present survey, it was probably reflected that Dentists were more likely to be updated with recent knowledge. Also, it requires Dentists to be updated with recent guidelines as well as the techniques for promotion of a positive approach towards infection control procedures.

MERITS AND DEMERITS

Some of the merits of this study include: (1) online survey aided in covering larger Dentist population of Tamil Nadu irrespective of the geographical boundaries within a stipulated period and (2) selection bias was eliminated in the present survey, as we have used list-based sampling frame. Some of the demerits of this study includes: (1) frame coverage bias is seen as those Dentists with valid E-mail addresses were included. This naturally eliminates those who do not have E-mail addresses or those who have switched their E-mail addresses after the registration at Tamil Nadu DCI. Failure to cover this subset of Dentists affects generalizability of the survey; and (2) although three reminder mails were sent there is only a little improvement in the response rate.

CONCLUSION

In the present survey, the attitude and preparedness of Dentists were found to be satisfactory concerning COVID-19, but some pitfalls exist necessitating the need for essential preparedness to handle the pandemic in best possible way. As evident from the present survey, the various problems encountered by Dentist must be resolved through strict adherence to guidelines and preventive strategies through practical approaches such as scheduling appointments, following tele dentistry. Whenever possible minimal intervention Dentistry shall be implemented, for reduction of spread of infection. Before handling

patients in the current situations, it must be made mandatory that patients should be pre-screened to prevent transmission of infection. Following this installation of separate rooms to perform aerosol and non-aerosol-based procedures shall be implemented with provision of all necessary protective equipment to ensure patients safety. Any treatment in the clinic it should be considered "potentially infectious" and ensure thorough fumigation to control infection. Thus, Dental needs should be delivered with utmost care and infection control protocols following proper recommendations. Further, necessary training in preventive measures and usage of current methods employed in screening shall be suitable during situations like this pandemic. Hence, the regulatory bodies should come up with good efforts, new policies, amend the existing ones and plan campaigns to deliver adequate knowledge, provide positive attitude and cost-effective infection control means pertaining to COVID-19 to the entire dental community in general and 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.

Conflict of Interest

None declared.

Financial Support

None declared.

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HOW TO CITE THIS ARTICLE-

Nandhini B, Kumar SGR, Selvamary LA, Sujatha A, Narayanan MBA. Dentist's preparedness in practice management during COVID-19 pandemic in Tamil Nadu – A cross sectional survey. *Int J Dent Res* 2022; 7(2):34-43. doi: 10.31254/dentistry.2022.7203

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