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Assessment of Knowledge, Attitude and Practice Regarding Dental Care during COVID 19 Pandemic– A Cross Sectional Study Among Dental Health Professionals In Tertiary Care Centers Of Kerala

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Abstract
Background: *Dental health professionals (DHPs) are at very high risk of exposure for COVID 19 infection as the majority of routine dental treatments generate significant amounts of droplets and aerosols. The study was aimed to assess knowledge, attitude and practice regarding dental care during COVID 19 pandemic among DHPs in tertiary care centers (TCCs) of Kerala.*
Methods and Material: *This cross-sectional descriptive study was based on questionnaires to assess knowledge, attitude and practice with regard to COVID 19 and infection control measures. A total of 132 participants were randomly selected from all Govt dental colleges of Kerala.*
Results: *Out of all participants 83.3%, 97.7%, 85.6 % had good knowledge, attitude and practice respectively about dental care during the COVID 19 pandemic. There was a statistically significant impact of training on knowledge, attitude and practice of DHPs. There was statistically significant association between knowledge, practice and working status.*
Conclusions: *This study indicates that DHPs of TCCs of Kerala have good knowledge, attitude and practice regarding dental care and related preventive measures in the pandemic period. Still we could point out certain pitfalls in knowledge level and attitude. Therefore, this survey recommends more efficient training programs. There were differences in opinion regarding certain infection control practices. In this context, the study recommends a standard dental treatment protocol and meticulous practice of those measures by all TCCs in the state.*

Keywords:*Attitude, COVID 19, Dental health care professionals in Kerala, knowledge, Practice.*

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I. Introduction

Coronaviruses are a large family of viruses which cause mild respiratory infections to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) in humans. COVID-19 (Coronavirus disease 2019) is the infectious disease caused by a recently discovered coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It was first reported in Wuhan city in China at December 2019.[1,2] The infection began to spread rapidly all over the world and World Health Organization (WHO) declared COVID-19 infection as a public health emergency of International Concern.[1]India reported its first case of COVID-19 in Kerala on 30 January 2020 and number of cases escalated in several states thereafter.[3] Therefore, the Govt of India announced country wise lock down to prevent rapid spread of infection.

Pulpal pain and related facial space infections require emergency interventions and can't be postponed even at the time of pandemic. Most dental emergency cases got referred to tertiary care centers (TCCs) like Govt Dental Colleges, as almost all dental offices in the private sector were temporarily closed during lock down period in Kerala. Many medical staff around the world were infected by COVID-19while treating such patients.[4] Hence, this study was designed to assess knowledge (K), attitude (A) and practice (P) about dental care and infection control during the time of pandemicin a sample of DHPs in Govt Dental Colleges of

Kerala.This study also aimed to identify causes for any deficiency in knowledge, attitude, and practices and to see whether the system needs any further improvement.

II. Material and methods

The present cross-sectional study was conducted among DHPs including interns, Junior/ Senior residents & faculties in tertiary care centers (Govt Dental colleges) all over Kerala. The sample size was calculated as 132. Institutional review board gave ethical clearance for the study.

The questionnaire consisted of a series of multiple-choice questions prepared in English language. A structured online questionnaire along with informed consent was prepared and sent to DHPs through online mode. The questionnaire was anonymous to maintain confidentiality. The questionnaire consisted of dentist's demographic and professional characteristics; dentists' awareness of COVID 19 infection, symptoms, the mode of transmission, dental practice during the time of pandemic, and infection control measures to be taken to prevent spread of infection. The questionnaire also included dentists' attitude toward COVID infection, practices undertaken and stress level at the time of pandemic.

The questionnaire includes 11 questions about demographic characteristics and general treatment prospects, 6 questions about knowledge, 7 questions about attitude and 6 questions about practices undertaken by participants during the time of pandemic. Respondents were asked to choose the most appropriate answer. Anybody who scores more than 3 was considered to have good knowledge and practice. Anybody who scores ≥ 3 was considered to have a good attitude. Statistical analysis was done using Statistical Package for Social Sciences (SPSS) IBM Corp. Chi-square test and fisher's exact test was used to find association between variables.

III. Results

The study included 132 DHPs from TCCs of Kerala (Govt dental colleges of Kerala) consisting of interns, junior & senior residents and faculties. The demographic characteristics of participants are shown in **Table 1**. General treatment prospects of respondents in the pandemic period is provided in **Table 2.**

Table 1: Demographic characteristics of respondents (n=132)

Characteristics	Frequency n (%)
Age (years)	
< 30	76 (57.6%)
31– 40	32 (24.2%)
41– 50	15 (11.4%)
>50	9 (6.8%)
Gender	
Male	50 (37.9%)
Female	82 (62.1%)
Working status	
Intern	52 (39.4%)
Junior/ Senior residency	34 (25.8 %)
Faculty	46 (34.8 %)

Table 2: General treatment prospects of DHPs during lockdown period **(**n=132)

Variables	Frequency n (%)
Utilized tele dentistry facility	59 (44.7 %)
Engaged in patient examination	108 (81.8 %)
Engaged in treatment procedures	55 (41.7 %)
Engaged in examination/ treatment procedures for COVID positive patients/ individuals under quarantine	
a) Examined/ treated COVID positive patients	0
b) Examined/ treated individuals under quarantine	6 (4.5 %)
Participation in training programs regarding COVID-19	97 (73.5 %)

Out of 132 participants 83.3%, 97.7%, 85.6 % had good knowledge, attitude and practice respectively about dental care during the COVID 19 pandemic. **Table 3** shows the percentage of knowledge, attitude and practice among DHPs.

Table 3: Percentage of knowledge, attitude and practice of dental health care professionals regarding dental treatment during COVID 19 pandemic.

Score	Knowledge (%)	Attitude (%)	Practice (%)
Good	110 (83.3 %)	129 (97.7 %)	113 (85.6 %)
Poor	22 (16.7%)	3 (2.3 %)	19 (14.4 %)

Knowledge level of DHPs about COVID-19 Infection and preventive measures

83.3 % (n= 110) of DHPs had good awareness about COVID 19 infection and preventive measures. 84.1% (n=111) of them knew about possible modes of transmission. 90.2% (n=119) knew that COVID infected patients could be asymptomatic. 90.9 % (n= 120) of them knew about precautions to be taken if there was an unprotected exposure to COVID infection.81.1 % (107) DHPs were aware of information (travel history, history of contact, possible symptoms) to be elicited from patients at entry point. Nonetheless only 77.3% (n =102) of respondents knew about latest concept about quarantine period for a person with travel history of COVID affected zone. 29.5 % of DHPs were unaware of proper steps in safe donning and doffing of Personal Protective Equipments (PPE).

Attitude towards COVID 19 infection and dental treatment at the time of pandemic

97.7 % (n= 129) of dental health professionals had a good attitude towards COVID 19 infection and dental treatments. 87.9 % (n= 116) strongly agreed novel virus infection as a serious public health issue. Out of all dental health professionals 76.5 % (n = 101) of them strongly believed that dental operatory can be a potential hub of COVID 19 spread. Most of them (98.5 %) understood that DHPs are at higher risk of COVID infection compared to other health care professionals. 99.2% (n = 131) of DHPs raised the opinion that special precautionary measures are needed in dental offices to prevent spread of infection.

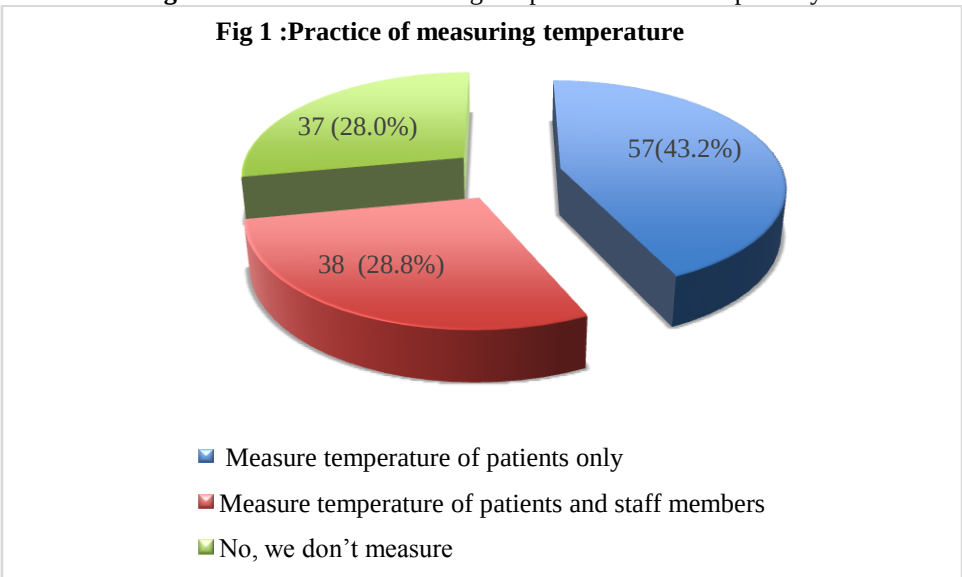
Only non- aerosol generating emergency procedures were preferred by 83.3% (n =110) of DHPs during the time of pandemic. They [87.1% (n= 115)] would like to have a full set of personal protective Equipments (Gloves, goggles, N95 mask, face shield, head cover, gown, shoe cover) while treating asymptomatic patients with positive travel/ contact history. Out of 132 respondents, 60.6% of dentists reported that they had a very important role in providing information to the public about COVID-19 infection. Among DHPs involved in patient examination/ treatment, 12.9 % of people were highly stressed. 29.5 %, 27.3% of DHPs were moderately and slightly stresses respectively.

Practice undertaken by DHPs at the time of pandemic

All respondents (100%) took efforts to prevent overcrowding of patients near dental outpatient areas and arranged hand sanitation measures for patients before entering dental operatory.86.4 % (n = 114) of them ensured that all patients wore face masks and observed respiratory hygiene.84.8.% (n = 112) of DHPs reported that a rapid triaging system for patients was established at entrance.

28 % of DHPs did not have the facility to measure the temperature of people at the dental outpatient section. **Figure 1** shows practice of measuring temperature at dental operatory.

Figure 1: Practice of measuring temperature at dental operatory



Regarding disinfection of dental operatory during lock down period, 50.0 % (n=66) of DHPs insisted disinfection after every patient.

Chi Square analysis to determine the association between knowledge, attitude, practice and baseline characteristics was done. There was a statistically significant association between knowledge, attitude, practice and training received related to COVID 19. **Table 4** shows association of knowledge, attitude, practice and training received.

Table 4: Association of Knowledge, Attitude, Practice and training received related to COVID 19

Training received	Knowledge		Attitude		Practice	
	Poor (%)	Good (%)	Poor (%)	Good (%)	Poor (%)	Good (%)
No	22 (16.7)	13 (9.8)	3 (2.3)	32 (24.2)	13 (9.8)	22 (16.7)
Yes	0	97 (73.5)	0	97 (73.5)	6 (4.5)	91 (68.9)
P-value	**0.0001****		**0.01***		**0.0001****	

*P < 0.05, significant

A statistically significant association was seen between Knowledge, Practice and type of training obtained related to COVID 19. (p value 0.000, 0.004 for knowledge, practice respectively). Association between knowledge, practice and working status of participants were statistically significant. **Table 5** shows association of Knowledge, Attitude, Practice and working status.

Table 5: Association of Knowledge, Attitude, Practice and working status

Working status	Knowledge		Attitude		Practice	
	Poor (%)	Good (%)	Poor (%)	Good (%)	Poor (%)	Good (%)
Intern	12 (9.0)	40 (30.3)	3 (2.3)	49 (37.1)	13 (9.8)	39 (29.6)
JR/SR	9 (6.8)	25 (18.9)	0	34 (25.7)	4 (3.0)	30 (22.8)
Faculty	1 (0.8)	45 (34.0)	0	46 (34.8)	2 (1.5)	44 (33.3)
P-value	**0.004***		0.94		**0.01***	

*P < 0.05, significant

There was no significant association of KAP and age group and gender of respondents.

IV. Discussion

There is a high demand for emergency dental care in the society even at time of COVID 19 pandemic. According to Guo et al. the proportion of oral infections raised during COVID-19 period.[5]This prompted us to check knowledge, attitude and practice of DHPs to face the challenging situation.

Guo et al. reported a decrease in treatment level by 38% in dental emergency centers of China at the beginning of the COVID-19 epidemic albeit proportion of oral infection increased.[5] The present study shows that 90.9 % of dentists examined less than 10 patients per day at hospital during lock down period and 44.7 % of them utilized tele dentistry to assist patients. Among DHPs, faculties in TCCs were more involved in tele dentistry to assist patients.

Though patient flow to TCCs declined during the lockdown period, there was an effective shift in dental services by adapting new methods like tele dentistry. AlharbiA. et al, in their guidelines strongly recommended tele-screening of all patients by considering everyone as a potential COVID-19 carrier.[6]

In our study, 83.3% of DHPs had good knowledge about COVID 19 infection and preventive measures. This result is better than that obtained by Nemati M et al who conducted a surveyamong Iranian Nurses, in which 56.5% nurses had satisfactory knowledge.[7]According to the study of Huynh G et al, 88.4% of healthcare workers at District 2 Hospital, Ho Chi Minh City had sufficient knowledge regarding COVID 19 infection.[8]

The present study shows that DHPs attended training programs had better knowledge, attitude and practice. 73.5 % of respondents underwent training programs regarding COVID 19 infection and infection control. Among those participants, the majority got training from Govt health agencies. (36.4%). One third of respondents were trained by their own institution, another one third were self-trained. According to the research of Khader Y et al among Jordanian dentists, 7.6% of participants attended training/ lectures regarding COVID-19. Only 34.5 % of dental professionals knew that COVID 19 infected patients could be asymptomatic.[4]

4.5 % of DHPs in TCCs of Kerala examined / treated individuals under quarantine for their oral problems. 90.9 % of dental professionals knew that they should inform concerned authorities and should go in quarantine if unprotected exposure of COVID 19 occurs. According to the research of Khader Y et al, only 58.2% dentists knew whom to contact if an unprotected exposure occurred and 75.8% of them knew what to do if they have signs or symptoms suspected of COVID-19infection.[4]

97.7 % of DHPs in TCC of Kerala have a good attitude towards dental care in COVID period. In a survey by Huynh G et al. 93.3% of health care workers at District 2 Hospital, Ho Chi Minh City had a good attitude regarding COVID 19 infection.[8]

Among our participants, 87.9% considered COVID-19 as a serious public health issue, 76.5% of them contemplated that dental operatory could be a potential hub in COVID spread. 99.2 % believed that special precautionary measures were needed at dental operatory to prevent disease spread. These results can be compared with that of a survey conducted by Khader Y et al.According toKhader Y et al.17.7% of dentists in their study perceived COVID-19 as a very dangerous infection and 63.3% of dentists believed that COVID-19 is a serious public health issue. 21.7% believed that special precautionary measures at dental operatory were not necessary.[4]

Only non- aerosol generating emergency procedures were preferred by 83.3 % of DHPs during the time of pandemic in the present survey. 98.5 % participants in our survey stated that the risk level of COVID 19 infection among dental professionals was very high compared to other healthcare professionals. Most DHPs participating in this study demanded a full set of personal protective Equipments (Gloves, goggles, N95 mask, face shield, head cover, gown, shoe cover) while treating asymptomatic patients with positive travel/ contact history. This attitude could be justified by reports of To et al, who stated that SARS-CoV-2 could be isolated from the saliva of COVID- 19 patients.[9] Liu et al reported that salivary gland epithelial cells can be infected by this virus and act as a major source of the virus in saliva.[10]Rapid transmission of respiratory tract infections can occur in the dental office because the majority of dental treatments generate significant amounts of droplets and aerosols.[11] SARS-CoV-2 has been shown to survive in aerosols for hours and on some surfaces for days. [12] The Occupational Safety and Health Administration (OSHA) places Dental health professionals in the very high exposure risk category.[13]

60.6% of DHPs thought that they had a very important role in providing information and awareness about COVID 19 among the public. In a survey conducted by Khader Y et al,67.7% dentists reported that they have a very significant role in teaching others about COVID-19.[4]

In this survey, 85.6 % of dental health care workers had good practice regarding dental care in COVID 19 period. According to the research work of Zhou M et al among health care workers in Henan, China 89.7% followed correct practices regarding COVID-19. [14]

Majority of participants in our survey took efforts to prevent overcrowding of patients, arranged hand sanitation measures and ensured respiratory hygiene. Centers of disease control and prevention (CDC) guidelines (revised on April 27,2020) suggested use of facemasks for everyone entering the dental operatory regardless of whether they have COVID-19 symptoms.

CDC also recommends telephone triage for all patients in need of emergency dental care during the pandemic period.[12]In our study, 15.2% of participants didn't take measures for rapid triaging systems. Other parameters with major differences in practice were assessing temperature and regarding frequency of disinfection of operatory. Regarding disinfection of dental operatory during the lockdown period, half of DHPs insisted disinfection of operatory after every patient. Only 28.8 % of them measured the temperature of both patients and staff before entering the dental office. 43.2% of them measured the temperature of patients only. Khader Y et al, surveyed Jordanian dentists and noticed that few of dental staff were allowed to work even if they had flu-like symptoms. Therefore, Khader Y et al suggested that temperature of every staff and patients should be measured as a routine procedure to prevent COVID 19 transmission.[4]CDC also shared the same view. [12]

Among DHPs involved in patient examination/ treatment, 12.9 % of people were highly stressed. Nemati M et al reported high levels of stress in Iranian nurses during COVID 19 pandemic.

V. **Limitations**

Respondents in this survey are attached to any of Govt dental colleges of Kerala. Therefore, practices they followed in a pandemic period could be mainly according to the institutional policy rather than individual decisions.

VI. Conclusion

This study shows that majority of DHPs of TCCs of Kerala have good knowledge, attitude and practice regarding dental care and related preventive measures in the pandemic period. The dental care system in tertiary care centers is successfully adapted to the new situation to provide emergency care during lock down period. Good knowledge attitude and practice of DHPs in TCC is significantly associated with training obtained and working status of respondents. Still we could point out certain pitfalls in knowledge level and attitude in a small percentage of DHPs. For example, 29.5 % of them didn't know about steps in safe donning and doffing. 22.7 % of them were unaware of the latest quarantine period. Therefore, this survey points out the need for more efficient training programs. This survey noted differences in opinion from respondents regarding certain

infection control practices during the pandemic period. In this context, the study recommends a common standard dental treatment protocol and meticulous practice of those measures by all TCCs in the state.

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