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Awareness on Precautions and Protocols Followed during COVID-19 among Dental Students

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***Abstract*: *Background:* Health care workers, including dental professionals, oral Hygienists, are at greater risk for acquiring and transmitting infection within their work environment. The Centre for disease control and American Dental Association have proposed various several short-term guidelines, treatment protocols and it is crucial that dentist and dental students may practice prudently and be equipped once the practice recommences. *Aim*: The present study was aimed to assess the level of awareness among undergraduate dental students on COVID19 pandemics, infection control measures and various protocols. *Methodology*: The questionnaire assessed self-reported knowledge about the COVID-19 protocols, precautions and knowledge towards emergency dental care during pandemic. *Results:* Majority of the participants (87.2%) are familiar with COVID 19 infection and mode of transmission and 74.5% were aware of all the presenting symptoms. 89.1% recommend personal protective equipment (PPE) during dental treatment among which 46% of respondents recommended using 70% ethyl alcohol as the first method to disinfect surfaces in between dental visits and 40.8% opted for 1% sodium hypochlorite solution. Overall awareness about COVID-19 pandemic, precautions and protocols among dental students' scores were 94% (Interns), 88% (Final Years), 79% (Third Years), 74% (Second Years) and 92% (First Years) respectively. *Conclusion:* World Health Organization (WHO) also believes that advanced investigatory evidence is needed to consider the possibility of aerosol transmission. Despite adequate awareness, the present study emphases that orientation of undergraduate dental students by conducting social awareness programs followed by personal guidance sessions to encounter fear and improve self-confidence is needed.**

***Keywords*: Awareness, COVID19, dental students, health care workers, precautions, risk of infection.**

1. Introduction

Coronavirus disease 2019 (COVID19) is a novel highly contagious viral infection caused by severe acute respiratory syndrome-CoV2 (SARS-CoV2), which has become a global health challenge [1].Corona Viruses (CoVs), a large family of single-stranded RNA viruses, can infect animals and also humans, affecting respiratory, gastrointestinal, hepatic, and neurologic system [2]. Six human coronaviruses (HCoVs) have been identified till date among which the novel coronavirus (SARS-CoV-2), was identified to cause the COVID19 disease that affected people's lives globally, ever since its first observation by a number of local health authorities who reported clusters of patients with pneumonia of unknown cause around the end of December 2019 in Wuhan, China [3, 4]. World Health Organization (WHO) on 30th January 2020 declared COVID-19 as a "public-health emergency of international concern" [5]. Health officials have identified evidence of COVID-19 transmission as pandemic along a chain of continuous human-to-human transmission and causes flu-like symptoms like high grade fever, fatigue, dry cough and difficulty in breathing [6]. The chief route of virus entry and transmission is respiratory droplets that are expelled and absorbed by the mucous membranes, especially the nasal and larynx mucosa [7]. Recent studies have shown that viruses in feces may be re-transmitted by aerosol contamination through virus-containing droplets [8]. Health care workers, including dental professionals, oral Hygienists, are at greater risk for acquiring and transmitting infection within their work environment due to close contact with patients and instrumentations such as dental airotor hand pieces, ultrasonic scalers that spread droplets, and aerosols of blood and saliva [9]. Since the occupational viral infections risk had not changed from a decade ago, COVID-19 is an incomparable risk for both dental staff and patients [10]. However no studies have significantly shown COVID-19 transmission through aerosol contamination. WHO also believes that advanced investigatory evidence is needed to consider the possibility of aerosol transmission [11].

World health organization provides guidance on personal protection equipment in infection prevention and control when COVID-19 is suspected. Eye protection (goggles) or facial protection (face mask) should be worn, and healthcare workers are advised against touching any mucosal membranes (eyes, nose or mouth) [12]. Apart from standard guidelines, the Centre for disease control [13] and American Dental Association [14] has also proposed various several short-term guidelines and treatment protocols to be followed in dental practice to

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encounter the pandemic emergencies. Surviving with the current state is a challenging task not only for dental professionals but also for budding undergraduate dental students. Taking into consideration the severity of the COVID19 pandemic, and the provisional guidelines by health experts and dental associations, it is crucial that dentist and dental students may practice prudently and be equipped once the practice recommences. Hence, the present study was aimed to assess the level of awareness regarding, COVID19 pandemics, infection control measures and various protocols established amongst undergraduate dental students in Chennai, Tamilnadu, India.

2. Methodology

The present cross-sectional questionnaire survey was conducted amongst the dental students to determine their awareness about COVID-19 pandemic, precautions and protocols. The required information was collected from various articles pertaining to the study and a self-administered structured questionnaires, which consisted of 20 questions in English language was prepared and evaluated. The questionnaire had both combination of selected response to the certain questions and also few close ended questions (Yes / No/ don't know). Ethical clearance was obtained from the Institutional Review Board (IRB) and all the participants were informed about the purpose of the study and assured that their participation was purely voluntary. A total of 285 randomly selected dental students across Chennai participated in this survey. Since this study was conducted during COVID-19 Pandemic lockdown period, online Google forms were generated and distributed through social media platforms.

3. Statistical Analysis

Non-probability, convenient sampling technique was employed that yielded information from 282 dental students were taken into this observational study having a cross-sectional design. The study comprises of 206 female and 67 male participants along with 9 participants who preferred not to reveal their gender category. Responses were recorded among the selected population group under the study and evaluated for statistical analysis by SPSS software Version 19.0. On statistical evaluation it was observed all 282 samples were valid for the study with Cronbach's alpha reliability score being 0.863 (Significant score).

4. Results

On analysis of the given data the mean age of the study population was observed to be 20.45 years of age with minimum being 18yrs and maximum being 36yrs of age showing S.D of 2.4465 with 0.28677 at 95% confidence interval. The distribution of the study sample showed majority of the study participants 34.7% are First year undergraduates (98 out of 282) followed by 25.17% (71) were 3rd year students, 23.75% (67) were final year, 12.76% (36) were pursuing internship program, with least being 3.54% belong to 2nd year undergraduates (10 out of 282) (Graph 1). Chi-square test analysis to correlate interrelationship between the year wise distribution of the study participants showed chi-square statistic of 80.019 with p values <0.0001. The result is significant at $p < .05$. One way ANOVA analysis was performed to identify the interrelationship between and among the study groups. The analysis shows F value of 21.3749 with p value of <0.0001(significant at $p<0.05$) suggesting significant relationship (Table 1).

In the present study it was observed that 86.4% participants answered correctly for acronym SARS-COV2, about 87.2% are familiar with COVID 19 infection and mode of transmission, 91.8% responded on incubation period and 74.5% were aware of all the presenting symptoms. Only 44.2% strongly agreed using a high speed hand piece (or) ultra sound scaling in performing the dental treatment can increase the risk of transmission of COVID19 between patient and dentist however 40.7% prefer Chlor-hexidine and 31.4% prefer betadine mouth washes before procedure. On evaluating awareness about protocols and precautionary measures 78.5% were aware that proper hand hygiene actions prevents transmission of the virus to the health care worker and 79.8% follow before and after every dental procedures. Majority of the participants (89.1%) use personal protective equipment's as recommended by Center for Disease control (CDC) among which 57.9% prefer N95 masks for all dental procedures. When questioned about N95 respirators 51.5% were aware of material and their advantages over surgical mask with 67.9% do not recommend re-using of surgical masks. 46% of participants prefer 70-80% alcohol solution for surface cleaning and 40.8% opted for 1% sodium hypochlorite solution as an effective surface disinfectant. 79.7% preferred all history relating to travel, symptoms, contacts have to be obtained before treating a patient on account of COVID-19 among which 37.1%prescribe the necessary drugs and postpone the treatment in case of emergency whereas only 27.1% instruct the patient to call his or her primary care provider. Only 65.35% and 59.4% of participants were aware of all diagnostic methods and vaccination respectively.

In the descriptive statistics, "yes" or correct responses were given a score of 1 and "no" or incorrect responses were given a score of 0; the scores were summed to obtain the overall scores in each group and they were then converted into percentage for all the questions. The associations between the percentages and the dental students were studied using chi-square tests. The median percentage scores were computed for between-group comparison (Table 2) and were found to be 94% (Interns), 88% (Final Years), 79% (Third Years), 74% (Second Years) and 92% (First Years) respectively (Graph 2).

5. Discussion

Ever since the outbreak of COVID19 across the globe, health care professionals are facing life threatening risks constantly. Very few cases of COVID19 infecting the dental practitioners have been reported in the earlier publications at the initiation of this pandemic in china. Centre for Disease Control (CDC) American Dental Association (ADA), has issued several provisional guidelines over a period of time and

protocols to prevent the spread of COVID19 in dental clinics and at hospitals. Local governing authorities have issued guidelines, only to provide emergency treatment and all aerosol generating procedures to be avoided. The American Dental Association (ADA), teaming up with leading infection control experts from the Organization for Safety, Asepsis, and Prevention (OSAP), on March 2020 issued standard guidelines to provide the dental society with practical guidance and education during COVID-19 pandemic [15]. The present study provides a brief perception into undergraduate dental student knowledge and awareness about COVID-19, transmission, protocols, control methods and safety measures towards treating patients during the COVID-19 pandemic. Questionnaire-based surveys are established as highly effective for collecting information regarding the awareness and knowledge of the dental students about COVID-19 however, cautious data collection and interpretation is required.

About 74.5% of respondents were aware about most common presenting symptoms like fever, Gastro-intestinal symptoms and difficulty in breathing similar to Princeton et al [16], Sharaf et al (89.4%)[17] and Raza et al [18]. Majority of the participants (89.1%) use personal protective equipment's (PPE) as recommended by Center for Disease control (CDC) similar results were observed by Sharaf et al (98.6%) [17], Alawia et al (84.3%) [19] , Khader et al [20], odeh et al [21] among which 57.9% prefer N95 masks for all dental procedures as shown by Sharaf et al (88.4%) [17], Princeton et al (85%) [16], Alawia et al (59%) [19]. These higher results also indicate the significant role of social media platforms, online training courses, educational awareness programs performed effectively by several educational institutions and major organizations to convey their main awareness information about the pandemic disease. 79.7% preferred recording complete history among which 37.1%prescribe the necessary drugs and postpone the treatment in case of emergency whereas 27.1% instruct the patient to call his or her primary care provider. Alawia et al [19], Ahmed et al [22], Kanaparthi et al [23] in accordance with their studies also showed only few dentists prefer working with suspected COVID-19 patients. it was clearly evident from these results that students' conservative approaches towards treating emergency patients during the pandemic is mainly due to the fear of transmitting the infection from local or at community level.

Only 44.2% strongly agreed using a high speed hand piece (or) ultra sound scaling in performing the dental treatment can increase the risk of transmission of COVID19 between patient and dentist in accordance with results by Sharaf et al (61.7%) [17], Ahmed et al [22], Peng et al [24], Xu et al [25], and Fallahi et al [26].This clearly showed the overall lack of awareness about the role of aerosols in the way of contamination and spreading of COVID-19infection. Chuaybamroong et al [27], Ge ZY et al [28] recommended the use of expensive high-efficiency particulate arrestor (HEPA) filters as an effective air filtration device that can remove 99.97% of the particles measuring 0.3μm in diameter during aerosol generating procedures. Amato et al [29] also suggested that disinfection of the treatment room can be achieved by uninterrupted air exchange through the use of air suction, filtration, and sanitary fixed device system with plasma cluster ion technology or UV lights and portable air cleaner with HEPA filters. Furthermore, an additional high-volume evacuation device could help to reduce aerosol formation and droplet emissions during ultrasonic scalar use. It is evident that steps need to be taken immediately to ensure proper dental management for a suspected COVID patient by organizing dental awareness programs, continuing dental education (CDE) programs to increase the knowledge about aerosol contamination and sterilization protocols among the dental students'. About 46% of respondents recommended using 70% ethyl alcohol as the first method to disinfect surfaces in between dental visits followed by 40.8% opted for 1% sodium hypochlorite solution. These results were contrast to studies by Sharaf et al (84.8%) [17], Jamal et al [30], and Princeton et al [16]. This could be attributed as most of the dental institutions are accustomed with the principle of universal precautions for cross-infection control given by CDC during previous pandemic infectious break outs like H1N1, Swine-Flu but are unfamiliar with standard disinfection techniques for COVID19.

In the present study only 65.35% of participants were aware of all diagnostic methods, similar to the results observed by Alawia et al [19], Ammar et al [31], Preethi et al [32]. These observations showed that understanding the importance of serological and immunological testing of infected asymptomatic and symptomatic individuals in order to limit the spread as well as to appropriately treat those patients who have a serious infection is needed. Only 59.4% of participants were aware of vaccination and 40.6% hesitate to accept dental personnel's must take precautions towards patients to limit the spread of infection. This Vaccine hesitancy could be due to lack of knowledge, awareness, past experiences, apparent significance of vaccinations, subjective norms, religious and moral beliefs, opinions, mistrust of those involved in producing and selling vaccinations, and risk perception [33]. Steps need to be taken to remove practical barriers of immunization, to conduct immunization programs, to accept and present vaccination as a social norm by encouraging individuals from different health care sector to express the positive impact vaccines have had on their lives and to carry out evidence based research in improving uptake of the vaccines which are currently available. Within the limitation of the study, we recommend further research on a larger scale and steps have to be undertaken to update and ensure preparedness of the budding undergraduate dental students with evidence based information against prevention of COVID19 in the present scenario and also at the near future.

6. Conclusion

Dental practice have evolved as one of the highest risks of infection transmission, and the major dental health educational institutions have adopted strict measures to allow for recommencing routine care for patients despite challenges faced by incorporating online education platform and dilemma of undergraduates towards clinical training. The present study emphasis that orientation of dental students to the updated

infection control measures is mandatory despite adequate awareness was observed in this study. Nonetheless efforts have to be taken to periodically assess their knowledge and adopt guidelines fear and improve self-confidence to encounter this pandemic.

Table 1
Table showing the maximum responses n (%) among the study population

Question	Responses	I year	Ii year	Iii year	Final year	Interns	p-value
Acronym "SARS-COV2"	Severe Acute Respiratory Syndrome-Coronavirus 2	85 (84.79)	2 (8.65)	67 (61.43)	59 (57.97)	31 (31.15)	< 0.0001*
COVID19 transmission	From one infected person to other	86 (85.49)	6 (8.72)	63 (61.94)	60 (58.45)	31 (31.40)	.7772
Period of incubation of COVID19 virus	2-14 days	92 (87.57)	6 (8.94)	63 (63.45)	59 (59.87)	32 (32.17)	.3746
Symptoms of COVID19	Fever, Gastro-intestinal symptoms, Respiratory failure	90 (71.59)	5 (7.30)	54 (51.87)	40 (48.94)	17 (26.30)	<0.0001*
Using a high speed hand piece (or) ultra sound scaling causes transmission	Strongly agree	62 (42.40)	3 (4.33)	17 (30.72)	22 (28.99)	18 (15.57)	.000019*
Recommended mouth-rinse before dental procedure	Betadine	11 (28.15)	3 (2.87)	30 (20.39)	29 (19.24)	8 (10.34)	.000021*
Protective equipment's you use while treating patients	PPE + N95 MASK +FACE SHIELD	90 (85.49)	3 (8.72)	61 (61.94)	61 (58.45)	31 (31.40)	.000078*
Procedures require the mandatory use of respirators N95	Aerosol generating procedures, N2O sedation, Ultrasonic driven procedures	47 (53.52)	2 (5.46)	51 (38.77)	37 (36.59)	17 (19.66)	.000906*
Feature of N-95 respirators	Designed to achieve a very close facial fit, filtering face piece, made of non-woven polypropylene fabric	65 (47.96)	4 (4.89)	20 (34.74)	34 (32.79)	15 (17.62)	.002198*
Effective concentration disinfectant	1% of Sodium hypochlorite	29 (34.40)	7 (3.51)	24 (24.93)	23 (23.52)	16 (12.64)	.028053*
False about a surgical mask	Can be re-used	72 (63.94)	5 (6.52)	38 (46.33)	47 (43.72)	22 (23.49)	.15436
True about the transmission of COVID-19	Transmitted asymptomatically, 6 feet social distance, alcohol based hand rubs for prevention	76 (69.85)	6 (7.13)	50 (50.61)	49 (47.76)	20 (25.66)	.45397
True about vaccination against COVID-19?	Contain viral particles, preservative and causes low-grade fever, pain or redness at injection site	74 (57.69)	6 (5.89)	46 (41.79)	21 (39.44)	19 (21.19)	< 0.0001*
Hand hygiene actions to prevents transmission of the virus to the health care worker	Hand wash using soap for 20 seconds or more, Use of hand rub containing 69-80% alcohol content, Use of gloves whenever in contact with a patient	80 (74.02)	6 (7.55)	53 (53.63)	51 (50.61)	23 (27.19)	.51926
Diagnostic methods for assessing COVID-19	RT-PCR, CT Lungs, Antibody testing	76 (61.51)	6 (6.28)	42 (44.56)	30 (42.05)	23 (22.60)	.002222
Patient with symptoms of COVID-19 comes to your clinic for an emergency dental treatment	Prescribe the necessary drugs and postpone the treatment	42 (35.45)	6 (3.62)	27 (25.68)	11 (24.23)	16 (13.02)	< 0.0001*
History obtained before treating a patient on account of COVID-19	Travel history, symptoms, record temperature, P02, direct contact with suspect patient	79 (75.06)	4 (7.66)	52 (54.38)	53 (51.32)	28 (27.57)	.25012
Disinfection protocol after an Aerosol generated procedure	Disinfectant defogging	21 (30.23)	3 (3.09)	28 (21.90)	24 (20.67)	11 (11.11)	.0003
How do you clean the surface at your clinic after each patient?	Using 70-80% alcohol solution	49 (48.30)	5 (4.93)	19 (35.00)	42 (33.02)	24 (17.74)	.002119
When all do you recommend performing a hand hygiene practice?	Examination, exposure to body fluids, PPE/Gloving	82 (79.23)	7 (8.09)	58 (57.40)	56 (54.17)	25 (29.11)	.44258

*Significant at p<0.05

Table 2
Table showing the awareness evaluation scores

Awareness	I Year	II Year	III Year	Final Year	Interns	X2	P
≤50 (low)	4 (4.08%)	1 (10%)	3 (4.22%)	2 (2.98%)	1 (2.77%)	73.3111	< 0.0001.
50-70 (average)	8 (8.16%)	4 (40%)	20 (28.16%)	16 (23.88%)	5 (13.88%)		
70-90 (good)	19 (19.38%)	2 (20%)	37 (52.11%)	34 (50.74%)	7 (19.44%)		
≥90 (very good)	67 (68.36%)	3 (30%)	11 (15.49%)	15 (23.38%)	23 (63.88%)		
Total	98 (100)	10 (100)	71 (100)	67 (100)	36 (100)		
Median score	92	74	79	88	94		

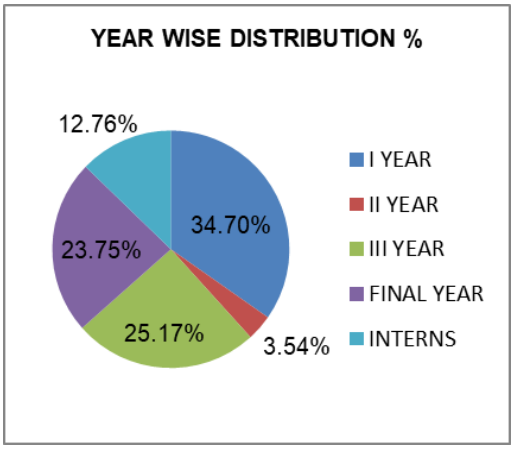

Fig. 1. Graph showing the distribution of the study sample

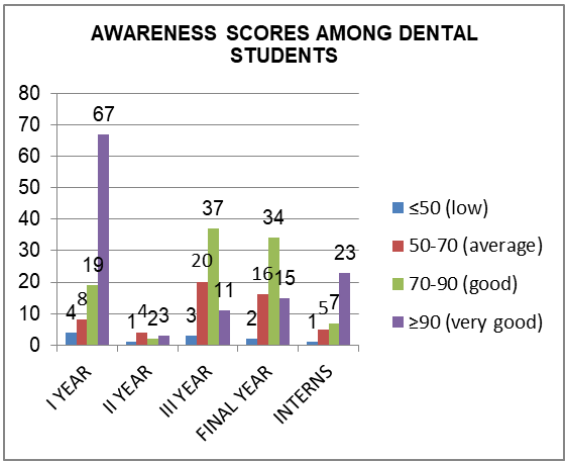

Fig. 2. Graph showing the awareness scores among the dental students

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