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A Cross-Sectional Study of Changes in Thai Dental Practices due to the COVID-19 Outbreak

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ABSTRACT

Since its emergence in December 2019, corona virus disease 2019 (COVID-19) has impacted numerous countries, affecting millions of patients and making it a global public threat. As of July 11, 2020, COVID-19 has been recognized in Thailand with a total of 3216 laboratory-confirmed cases and 58 deaths. [1] Infection control measures are necessary to prevent the virus from further spreading and to help control the epidemic situation. Due to the characteristics of dental settings, the risk of cross infection can be high between patients and dental practitioners. For dental practices and hospitals in areas that are (potentially) affected with COVID-19, strict and effective infection control protocols are urgently needed. [2] The current cross-sectional study was conducted to assess the changes made in Thai dental practices following the recommended guidelines of CDC, ADA, and the Thai Dental Council. A study population consisted of 70 dentists who worked in private clinics, private hospitals, and public healthcare services in Thailand. The online questionnaire was comprised of questions pertaining to infection control measures taken in dental practices due to COVID-19. The respondents were asked to describe the infection controls in their dental practices by choosing one option from a modified Likert-scale, ranging from 1 to 5; the higher the score, the more preventive measures taken. Results showed that preventive measures in most Thai dental practices are taken seriously, especially the screening of the patients (mean score of 4.57) and body temperature measurement (mean score of 4.80).

Keywords: Corona virus disease 2019 (COVID-19), Infection control, Dental practices, Medical screening, Aerosol transmission

INTRODUCTION

By the end of 2019, a pneumonia outbreak with unknown etiology occurred in Wuhan, China. Most of the cases were linked to a local seafood market selling live animals, suggesting that the pathogens were transmitted from animals to humans, soon escalating to human-to-human transmission. The pathogen was identified and named as 2019 novel coronavirus (2019- nCoV), and the disease was named corona virus disease 2019 (COVID-19), which stands for coronavirus disease 2019. [3] On January 30, 2020, the World Health Organization (WHO) announced that this outbreak had constituted a public health emergency of international concern. Based on the Department of Disease Control of Thailand (2020), a new case of COVID-19 in Thailand was confirmed on 13 January 2020, being the first country in Asia to have a confirmed case recorded outside of China. The number of new cases went up slowly (about 1-2 cases a day) but then spiked during the middle of March (76 cases) to the end of April (2687 cases), reporting up to hundreds of new cases daily. After that, the rate of new coronavirus cases confirmed in Thailand decreased. As of July 11, 2020, COVID-19 has been recognized in Thailand with a total of 3216 laboratory-confirmed cases and 58 deaths. [1]

Due to the characteristics of dental settings, the risk of cross infection may be high between dental practitioners and patients. [2] According to Centers for Disease Control and Prevention (CDC), SARS-CoV-

2, the virus that causes COVID-19, is thought to be spread primarily between people who are in close contact with one another (within 6 feet) through respiratory droplets produced when an infected person coughs, sneezes, or talks. The practice of dentistry involves the use of rotary dental and surgical instruments, such as handpieces or ultrasonic scalers and air-water syringes. These instruments create a spray that can contain particle droplets of water, saliva, blood, microorganisms, and other debris. Surgical masks protect mucous membranes of the mouth and nose from droplet spatter, but they do not provide complete protection against inhalation of airborne infectious agents. [4] For dental practices and hospitals in countries/regions that are (potentially) affected with COVID-19, strict and effective infection control protocols are needed. [2]

This cross-sectional study is therefore conducted to investigate changes in Thai dental practices according to the "Thai Dental Council's Recommended Guidelines for Dental Treatments during the COVID-19 Outbreak" in order to be aware of the precautionary measures taken on preventing the spread of COVID-19 in dental practices in Thailand.

METHODOLOGY

Study Population

Our study population consisted of dentists who work in Thailand, regardless of their place of work, in either private clinics, hospitals, or health centers. This survey was conducted in June 2020. An online questionnaire using Google Forms was used to collect the data. The sample of dentists was selected through Line groups for dentists. These groups were created by members of the Thai Dental Council, and only dentists who work in Thailand can be involved in these groups by confirming their registration with the Thai Dental Council and their places of work. Within the groups, 70 dentists participated in the study. The questionnaires were anonymous to maintain the privacy and confidentiality of all information collected in the study.

Study Instrument

The questions on the survey were developed after reviewing pertinent literature and the guidelines from CDC, ADA, and the Thai Dental Council. The questionnaire was designed in Thai and comprised of ten questions, nine pertaining to infection control measures taken in dental practices due to COVID-19, and a question asking where they worked in, whether in a private clinic, private hospital, or public healthcare services.

Data Analysis

Data were analyzed using Microsoft Excel. Descriptive statistical analysis was used to describe items included in the survey. Means and standard deviations were used to describe the variables, and percentages were used to describe the categorical data. The respondents were asked to describe the infection controls in their dental practices by choosing one option from a modified Likert-scale, ranging from 1 to 5; the higher the score, the more preventive measures taken. All of the choices in most questions contain intervals of frequencies in a percentage scale: 1 (0-24%), 2 (25-49%), 3 (50-74%), 4 (75-99%), and 5 (100%). The reason that the interval between the choices are unequal (5 with only 100% frequency) is to be able to separate the precautionary measures that are always taken and "almost" always taken.

RESULTS

This study included a total of 70 dentists. The participants' workplaces are shown in Table 1. A total of 43 (61.4%) perform dental treatments in a private clinic, 18 (25.7%) work in public healthcare services, and 9 (12.9%) work in a private hospital.

Table 1. The workplace of the 70 dentists enrolled in the study.

Workplace	Dentists, n (%)
Private Clinic	43 (61.4%)
Private Hospital	9 (12.9%)
Public Healthcare Services	18 (25.7%)

Scores for each of the nine statements on preventive infection control measures and their workplaces are characterized in Table 2. It was found that the measurement of the body temperature for patients and their followers with rules to have them wear masks at all times while at the clinic is taken most seriously (4.8) followed by the cleaning of the surface and surrounding areas after treatment using disinfectant agents (4.73). Usage of intraoral high power suction together with extraoral suction with HEPA filter in cases with high diffusion rates has the least amount of score (3.06).

Table 2. Mean and standard deviation of scores of infection control measures taken in Thai dental practices, assessed by nine statements on a 5-point modified Likert scale, later scored as frequencies: 1= 0-24%, 2 =25-49%, 3= 50-74%, 4=75-99%, and 5=100%; the greater the scores the higher preventive measures taken (the scale of statement 3 is different)[1]. The data are also characterized by the participants' workplace.

Questionnaire Statements	All (n=70)		Private Clinic (n=43)		Private Hospital (n=9)		Public Healthcare Services (n=18)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1. Usage of medical screening forms for dental treatments (such as the form provided by Thai Dental Council).	4.57	1.00	4.37	1.20	5.00	0.00	4.83	0.51
2. Measurement of the body temperature for patients and their followers and have them wear a mask at all times while waiting for service.	4.80	0.63	4.70	0.77	5.00	0.00	4.94	0.24
3. Safety Level of Personal Protective Equipment (PPE).[1]	3.27	1.17	3.12	1.22	3.22	1.39	3.67	0.84
4. Usage of 0.2% Povidone Iodine or 1% Hydrogen Peroxide as mouthwash for patients to gargle for 1 minute before starting treatment.	4.54	1.05	4.35	1.27	5.00	0.00	4.78	0.43
5. Usage of intraoral high power suction together with extraoral suction with HEPA filter in cases with high aerosol diffusion rates.	3.06	1.78	3.21	1.74	3.22	2.11	2.61	1.75
6. Appropriate treatment time for no more than 1 hour for each patient.	4.34	0.68	4.21	0.74	4.56	0.53	4.56	0.51
7. Wiping of the surface and surrounding areas using a surface disinfectant suitable for killing COVID-19 pathogens after completion of treatment for each patient.	4.73	0.56	4.77	0.53	4.89	0.33	4.56	0.70
8. Soaking the workpiece in the disinfectant agent properly before adjustment combined with the use of extraoral high power suction, or adjustment in a closed box to reduce aerosol transmission.	3.76	1.45	3.60	1.47	4.44	1.33	3.78	1.44
9. Wiping of the surface of other service areas, such as meeting areas or payment areas every hour, also providing hand sanitizers at every service area.	4.10	1.18	4.21	1.15	4.44	1.01	3.67	1.28

[1]Choices for safety level of PPEs differ from the normal scale: 1=Normal Gown + Surgical Mask, 2=Normal Gown + N95 or Normal Gown + Face Shield or Normal Gown + N95 + Face Shield, 3=Standard PPE, 4=Standard PPE + N95 or Standard PPE + Face Shield or Standard PPE + N95 + Face Shield, and 5=Full PPE (Figure 1).

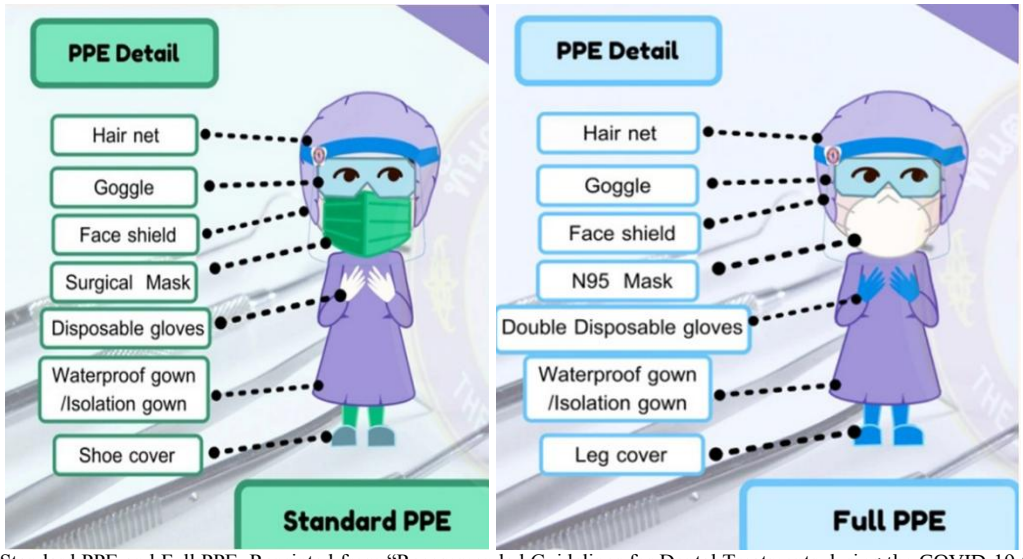

Figure 1. Standard PPE and Full PPE. Reprinted from "Recommended Guidelines for Dental Treatments during the COVID-19 Outbreak," by Thai Dental Council, 2020, p. 16. [8]

Practice in private hospitals scored higher than public healthcare services or private clinics in all cases except for treatment time and safety level of PPEs. Accordingly, public healthcare services scored higher than private clinics in all cases excluding these statements: wiping of the surface and surrounding areas using a surface disinfectant, wiping of the surface of other service areas and also providing hand sanitizers at every service area, and usage of intraoral high power suction together with extraoral suction with HEPA filter.

In Table 3, there is a description of infection control measures and the scores scaled by how often/serious the measures are taken; 80% always used the medical screening forms for dental treatments, and 87.1% always measured patients and their followers' body temperature, having them wear masks at all times while waiting for service. As for the safety levels of PPEs, 11.4% wore a full PPE, 18.6% wore a standard PPE, and 8.6% wore a normal gown with surgical masks. Accordingly, 77.1% used 0.2% Povidone Iodine or 1% Hydrogen Peroxide as mouthwash for patients before starting treatment at all times. However, 38.6% hardly used the intraoral high power suction together with extraoral suction with HEPA filter. Fifty-four percent of dentists almost always treated each patient for no more than 1 hour, while 41.4% of participants did it every time. Although the majority (78.6%) had wiped the surface and surrounding areas using a surface disinfectant every time after treatment, only 52.9% had wiped the surface of other service areas, such as meeting areas or payment areas every hour, also provided hand sanitizers at any service area. Forty-three percent had soaked the workpiece in the disinfectant agent properly before adjustment combined with the use of extraoral high power suction, or adjustment in a closed box to reduce aerosol transmission.

Table 3. Scores of infection control measures taken in Thai dental practices, assessed by nine statements on a 5-point modified Likert scale, later scored as frequencies: 1= 0-24%, 2 =25-49%, 3= 50-74%, 4=75-99%, and 5=100%; the greater the scores the higher preventive measures taken (the scale of statement 3 is different)[1].

Questionnaire Statements	Scores				
	5 n (%)	4 n (%)	3 n (%)	2 n (%)	1 n (%)
1. Usage of medical screening forms for dental treatments (such as the form provided by Thai Dental Council).	56 (80.0%)	5 (7.1%)	5 (7.1%)	1 (1.4%)	3 (4.3%)
2. Measurement of the body temperature for patients and their followers and have them wear a mask at all times while waiting for service.	61 (87.1%)	6 (8.6%)	2 (2.9%)	0 (0.0%)	1 (1.4%)
3. Safety Level of Personal Protective Equipment (PPE).[1]	8 (11.4%)	29 (41.4%)	13 (18.6%)	14 (20.0%)	6 (8.6%)
4. Usage of 0.2% Povidone Iodine or 1% Hydrogen Peroxide as mouthwash for patients to gargle for 1 minute before starting treatment.	54 (77.1%)	9 (12.9%)	2 (2.9%)	1 (1.4%)	4 (5.7%)
5. Usage of intraoral high power suction together with extraoral suction with HEPA filter in cases with high aerosol diffusion rates.	25 (35.7%)	10 (14.3%)	6 (8.6%)	2 (2.9%)	27 (38.6%)
6. Appropriate treatment time for no more than 1 hour for each patient.	29 (41.4%)	38 (54.3%)	2 (2.9%)	0 (0.0%)	1 (1.4%)
7. Wiping of the surface and surrounding areas using a surface disinfectant suitable for killing COVID-19 pathogens after completion of treatment for each patient.	55 (78.6%)	11 (15.7%)	4 (5.7%)	0 (0.0%)	0 (0.0%)
8. Soaking the workpiece in the disinfectant agent properly before adjustment combined with the use of extraoral high power suction, or adjustment in a closed box to reduce aerosol transmission.	30 (42.9%)	18 (25.7%)	8 (11.4%)	3 (4.3%)	11 (15.7%)
9. Wiping of the surface of other service areas, such as meeting areas or payment areas every hour, also providing hand sanitizers at every service area.	37 (52.9%)	15 (21.4%)	9 (12.9%)	6 (8.6%)	3 (4.3%)

[1]Choices for safety level of PPEs differ from the normal scale: 1=Normal Gown + Surgical Mask, 2=Normal Gown + N95 or Normal Gown + Face Shield or Normal Gown + N95 + Face Shield, 3=Standard PPE, 4=Standard PPE + N95 or Standard PPE + Face Shield or Standard PPE + N95 + Face Shield, and 5=Full PPE (Figure 1).

DISCUSSION

The present cross-sectional study reported the infection control measures taken in Thai dental practices while working during the current viral outbreak. For this purpose, a questionnaire focusing on closed-ended questions was used to gather information about practice modifications made by dental practitioners to prevent the risk of cross infection between dental practitioners and patients. Questionnaire-based studies are proven for gathering information regarding preferences, attitudes, opinions, and experiences of participants; however, careful data collection and interpretation is required. [5]

There has been no evidence-based specific treatment for COVID-19, and management of COVID-19 has been largely supportive. The current approach to COVID-19 is to control the source of infection; use infection prevention and control measures to lower the risk of transmission; and provide early diagnosis, isolation, and supportive care for affected patients. [6]

Screening patients is one of the most recommended guidelines to prevent the spread of the virus since it limits interpersonal contact, the waiting time of patients in dental cabinets and, in general, the conditions predisposing patients to be infected. [7] Seeing high mean scores of using medical screening forms (4.57) and body temperature checked frequently (4.80), it expresses that the dental practices are aware of the situation and are taking it seriously. Usage of 0.2% Povidone Iodine and 1% Hydrogen Peroxide as mouthwash is also very commonly practiced (77.1%) before starting treatment, to kill harmful pathogens in the oral cavity. More than half (54.3%) used the appropriate time (for no more than 1 hour) to treat the patients. However, they didn't do it every time. Further treatments should always be done for no longer than an hour. The score of cleaning the surface in dental practices is relatively high. On the other hand, the safety levels of PPE used are scattered among dentists. This depends on the workplace, the background of the patients, and the treatments that were being done. Cases that generate a high aerosol diffusion rate must be done in a closed room with good airflow and suitable pressure, whether positive or negative, with a high ACH (Air Change per Hour) rating. [3] Interestingly, 38.6% didn't use intraoral high power suction combined with extraoral suction with HEPA filter. The case might be that most dentists used intraoral high power suction but didn't have the external aerosol suction installed in their practices. Workpieces are advised to be done in a laboratory to control aerosol transmission. [3] Forty-three percent always soaked the workpiece in the disinfectant agent before adjustment, combined with the use of the extraoral suction.

Despite the findings introduced here, it is important to stress that this survey had limitations, including the relatively low response rate, which resulted in a smaller than expected sample size. This could have been caused by the short period of data collection. Moreover, this pandemic has caused many to be busy watching the news and taking care of personal affairs. This means that those who were active on social media during the short period of data collection were the only ones that had the chance to participate in the study. This could result in selection bias and sampling error, which prevents the ability to generalize our results.

CONCLUSIONS

There are changes in Thai dental practices due to the COVID-19 outbreak according to the Thai Dental Council's recommended guidelines, and the infection control measures such as patient screening, surface cleaning, and usage of aerosol suction are taken more seriously to prevent the spread of the coronavirus disease.

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