PUBLIC HEALTH RESEARCH

Knowledge and Attitude about Emerging Coronavirus Disease 2019 (COVID-19) among Dental Public Health Students in Thailand

Kaewjai Maleelai and Satayu Phonkaew*

Sirindhorn College of Public Health, Ubon Ratchathani, Faculty of Public Health and Allied Health Sciences, Praboromarajchanok Institute, Thailand.

For reprint and correspondence: Kaewjai Maleelai, Sirindhorn College of Public Health, Ubon Ratchathani, Faculty of Public Health and Allied Health Sciences, Praboromarajchanok Institute, Thailand.
Email: kaewjai@scphub.ac.th

ABSTRACT

Introduction	Coronavirus disease 2019 (COVID-19) was an emerging disease outbreak. Now a pandemic, it continues threaten public health around the world. The objective of this study aimed to study knowledge and attitudes toward COVID-19 among dental public health students.
Methods	A cross-sectional study was conducted among students of the Bachelor of Public Health program in the dental public health program at the Sirindhorn College of Public Health, Ubon Ratchathani, Faculty of Public Health and Allied Health Sciences, Praboromarajchanok Institute, Thailand from May to June 2021. Our participants included 102 students from a pool of 123 eligible students. The data were collected via a self-administered COVID-19 outbreak, online questionnaire. We analysed the data using descriptive statistics and also computed the independent t-test to understand the relationship between variables.
Results	We found that the participants were primarily female (96.1%). The students were in their first year (35.3%), second year (33.3%) and third year (31.8%) of study. Their average age was 22 years old. Most of them had no underlying disease (96.1%). A majority of the participants (67.7%) reported that their knowledge of COVID-19 was at a moderate. Attitudes toward COVID-19 were at a moderate level (88.2%). There was a statistically significant difference ($p<0.05$) in the mean knowledge scores compared with and without a coexisting disease ($t=-0.138$). The mean scores for attitude towards COVID-19 were statistically significant differences ($p<0.05$) between gender ($t=-4.723$). and the participants with and without coexisting ($t=-1.041$).
Conclusions	The majority of dental public health students had moderate knowledge of COVID-19, but they had a good attitude. To prevent COVID-19 infection, we recommend promoting the spreading of knowledge about the disease.
Keywords	COVID-19 – Knowledge - Attitude - Dental public health students.

INTRODUCTION

Coronavirus disease 2019 (COVID-19) first originated from an outbreak in Wuhan, Hubei, China, in late 2019. As the outbreak of COVID-19 spread, it has raised intense attention not only within China but internationally.[1] Coronaviruses are a large family of viruses that cause a variety of respiratory disorders in humans. This diverse group of viruses can cause anything from a simple cold to more serious illnesses like Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). COVID-19 is a new species that had never been seen before in humans. It causes respiratory ailments in humans and is spread from person to person.[2,3] COVID-19 infection is also spread through inhalation or contact with contaminated droplets. It takes about 2 to 14 days for infected individuals to fully develop symptoms. Fever, cough, sore throat, shortness of breath, weariness, headache, and malaise are some of the most common symptoms.[4,5]

Globally, COVID-19 has emerged as a significant pathogen for humans.[6] It has been one of the most devastating disease outbreaks in human history, with many contagious deaths.[7] COVID-19 is a threat to public health. The pandemic caused by COVID-19 has shaken humanity to its core. COVID-19 has profoundly changed all sectors, including the higher education sector and student life, [8] and has affected people's socioeconomic conditions.[9]

COVID-19 has affected higher educational institutions in 188 countries. An essential method for preventing the transmission of this disease is social distancing.[12] Thus, many colleges and institutions canceled their in-person classes to prevent and control the spread of COVID-19 in educational institutions. They switched to online teaching and learning instead. Both the government and private universities collaborate to help students overcome academic delays as quickly as possible. The transition to online schooling had a significant influence on the education industry and the life of students.[10] Despite these dfficulties, educational countermeasures have been taken to ensure that students continue to receive an education.[11]

Sirindhorn College of Public Health, Ubon Ratchathani has taken specific preventive measures to control COVID-19 at its campus. The college required students to adjust their study life to a new normal and maintain social distancing in the College. Findings from research can be used to promote correct knowledge and attitude toward the prevention of COVID-19. Efforts can be taken to reduce the risk of infection among students and to reduce the spread of the virus within educational institutions. The objective of this study aimed to study knowledge and attitudes toward COVID-19 among dental public health students.

METHODS

Study Design and Sample
We conducted a cross-sectional study between May to June 2021. We recruited 102 participants from a pool of 123 eligible students. The study participants included both male and female dental public health students at the Sirindhorn College of Public Health, Ubon Ratchathani, Faculty of Public Health and Allied Health Sciences, Praboromarajchanok Institute, Thailand.

Research tools
We gathered data through online questionnaires during the COVID-19 outbreak from May to June 2021 in order to measure participants' knowledge about COVID-19 and the attitude toward COVID-19. The three parts of the questionnaire were:

Part 1: Study participant characteristics; gender, age, year of study, and whether students had a coexisting disease.

Part 2: Knowledge about COVID-19. We defined the scoring system in the knowledge test as: correct answer (1 point) versus incorrect answer (0 points). The internal reliability of this part of the questionnaire was good. The Kuder-Richardson 20 statistic was 0.90). The knowledge test included 28 questions about COVID-19 symptoms, incubation period, modes of transmission, prevention methods and treatment. The total score for each participant was categorized into one of three levels: 1) Good: Score ranging from 20-28 points was a high level of knowledge, 2) Fair: Score ranging from 10-19 points was a moderate level of knowledge, and 3) Poor: Score ranging from 0-9 points was a low-level knowledge.

Part 3: Attitude toward COVID-19. Respondents choose only one answer from five levels of a rating scale. Scoring for each item was based on the response and type of item (positive versus negative). To categorize attitude toward COVID-19, we used the following five-item rating scale: 5=strongly agree; 4= agree; 3=not sure; 2=disagree, and 1=strongly disagree. There were 15 items to evaluate the attitude towards COVID-19. Thus, the total possible score for the 15 items ranged from 1-75 points. The total score for attitude towards COVID-19 was divided into three levels: 1) high: score ranged from 51-75 points, 2) moderate: score ranged from 26-50 points, and 3) low: score was 25 or fewer points. The Cronbach's alpha coefficient was 0.89.

Statistical analysis
We analyzed data using program Microsoft Excel. Descriptive statistics including frequency, mean, percentage, and standard deviation. We performed compared different variables using the independent t-test. Significant factors predicting the comparison of mean scores for COVID-19 knowledge and attitude by participant personal characteristics

(p value <0.05). An alpha level of $p < 0.05$ is considered to be statistically significant.

RESULTS

Demographic characteristics of participants
The total number of potentially eligible students was 123. The 102 students participated (82.9%) in our study. Participants were either in their first year (35.3%), second year (33.3%), or third-year (nearly 31.4%) of study. None of the participants was in their fourth year of study. Most of the participants were female (96.1%), and only 3.9% of participants were male. The mean age of participants was 22 years (S.D.=2.2). Most of them had no underlying disease (n=98, 96.1%), while only four people had the underlying disease (3.9%)

Knowledge about Coronavirus disease 2019 (COVID-19)
About 73.5% of participants knew the correct causes of the COVID-19. Regarding COVID-19, 67.9% of participants knew about correct methods of prevention, 66.9% knew a treatment, 61.1% knew a symptom, 57.1% knew the correct incubation period, and 44.3% knew an accurate mode of transmission. (Table 1).
.

Table 1 Knowledge about COVID-19 among dental public health students

Knowledge about COVID-19	Correct answer N (%)	Incorrect answer N (%)
Causes	75 (73.5)	27 (26.5)
Symptoms	62 (61.1)	40 (38.9)
Incubation period	58 (57.1)	44 (42.9)
Modes of transmission	45 (44.3)	55 (55.7)
Prevention methods	69 (67.9)	33 (32.1)
Treatment	68 (66.9)	34 (33.1)
Mean	63 (61.8)	39 (38.2)

Most of the participants (67.7%) had knowledge about COVID-19 2019 at a moderate level. About 32.3% of participants had knowledge about COVID-19 at a high level. None of the participants had a low level of COVID-19 knowledge. (Table 2).

Table 2 Level of knowledge about COVID-19

Level of knowledge about COVID-19	Score	N	%	Mean	S.D.
High (Good)	20-28	33	32.3	21.5	0.41
Moderate (Fair)	10-19	69	67.7	15.2	0.50
Low (Poor)	1-9	0	0.0	0.0	0.00
Minimum score=10, Maximum score=27, Mean score=17					

Attitude toward Coronavirus disease 2019 (COVID-19)
Most of the participants (69.6%) strongly agreed that everyone is at risk of infection with Coronavirus 2019. A majority of the participants (60.8%) agreed that a 14-day quarantine in the case of high-risk contact with confirmed cases can reduce the spread of COVID-19. A sizable percentage of the participants (35.3%) were undecided about whether or not teenagers are less likely to be infected with COVID-19 than working-age people. Nearly 39.2% of the participants disagreed that COVID-19 is out of control. Most participants (59.8%) strongly disagreed that the vaccines provided to vaccinated people in Thailand were ineffective in preventing COVID-19. (Table 3).

Table 3 Attitudes of dental public health students towards COVID-19

No.	Attitude toward COVID-19	strongly agree N (%)	agree N (%)	undecided N (%)	disagree N (%)	strongly disagree N (%)
1	Coronavirus disease 2019 is out of control.	6 (5.9)	27 (26.4)	20 (19.6)	40 (39.2)	9 (8.8)
2	Patients with high fever and runny nose may be infected with Coronavirus	11 (10.)8	48 (47.1)	30 (29.1)	9 (8.8)	4 (3.9)

	disease 2019.					
3	Everyone is at risk of infection with Coronavirus 2019.	71 (69.6)	31 (30.4)	0 (0.0)	0 (0.0)	0 (0.0)
4	There is only one way to prevent Coronavirus 2019 infection: getting vaccinated.	16 (15.7)	39 (38.2)	14 (13.7)	18 (17.6)	15 (14.7)
5	Wearing a mask can reduce the risk of infection with Coronavirus 2019.	44 (43.1)	56 (54.9)	2 (2.0)	0 (0.0)	0 (0.0)
6	Regular exercise can help prevent infection with Coronavirus 2019.	9 (8.8)	51 (50.0)	27 (26.5)	11 (10.8)	4 (3.9)
7	Washing your hands frequently with soap can help to reduce the spread of the Coronavirus disease 2019.	41 (40.2)	57 (55.9)	4 (3.9)	0 (0.0)	0 (0.0)
8	There will be many waves of Coronavirus disease 2019 outbreaks, if everyone is not yet vaccinated.	22 (21.6)	43 (42.2)	20 (19.6)	15 (14.7)	2 (2.0)
9	A 14-day quarantine of people with high-risk contact with confirmed cases can help reduce the spread of the Coronavirus disease 2019.	34 (33.3)	62 (60.8)	2 (2.0)	2 (2.0)	2 (2.0)
10	People who live at home and do not go out have no chance of infection of the Coronavirus disease 2019.	5 (5.0)	28 (27.4)	29 (28.4)	32 (31.4)	8 (7.8)
11	Vaccines available to people in Thailand do not actively prevent Coronavirus disease 2019.	0 (0.0)	4 (4.0)	14 (13.7)	23 (22.6)	61 (59.8)
12	Travelling to areas where Coronavirus disease 2019 cases have been reported can lead to infection.	47 (46.1)	50 (49.0)	5 (4.9)	0 (0.0)	0 (0.0)
13	Wearing a face mask or cloth mask does not reduce the spread of the Coronavirus disease 2019.	30 (29.4)	37 (36.3)	16 (15.7)	14 (13.7)	5 (4.9)
14	Teenagers are less likely to be infected with Coronavirus disease 2019 than working-age people.	18 (17.6)	38 (37.2)	36 (35.3)	8 (7.8)	2 (2.0)
15	Studying online does not help to reduce the spread of the Coronavirus disease 2019.	23 (22.5)	28 (27.4)	25 (24.5)	12 (11.8)	14 (13.7)

Most of the participants (88.2%) had an attitude towards COVID-19 at a high level. About 11.8% had an attitude toward COVID-19 at a moderate level. None of the participants had an attitude toward Coronavirus disease 2019 at a low level. (Table 4).

Table 4 Level of attitude toward COVID-19

Level of attitude towards COVID-19	Score Range	N	(%)	Mean	S.D.
High/Good	51-75	90	88.2	54.9	1.19
Moderate/Fair	26-50	12	11.8	47.5	1.18
Low/Poor	1-25	0	0.0	0.0	0.00

Comparison of the knowledge and attitude toward COVID-19
There was no statistically significant difference in the mean knowledge scores comparing males and females. We also observed a statistically significant difference in mean knowledge scores when comparing participants with and without a coexisting disease. When comparing mean scores for attitude towards COVID-19, there was a statistically significant difference between males and females. In addition, the mean scores for attitude towards COVID-19 among the participants with and without coexisting disease were statistically significantly different. (Table 5)

Table 5 Comparison of mean scores for COVID-19 knowledge and attitude by participant personal characteristics

Factors	Variables	N	Mean	S.D.	t	p-value
Knowledge about COVID-19	Gender					
	Male	4	16.8	4.3	0.458	0.335
	Female	98	17.3	15.2		
	Coexisting disease					
	Yes	4	17.2	14.9	-0.138*	0.445
	No	98	17.0	12.0		
Attitude toward COVID-19	Gender					
	Male	4	3.7	0.0	-4.723*	0.000
	Female	98	3.6	0.1		
	Coexisting disease					
	Yes	4	3.7	0.0	-1.041*	0.178
	No	98	3.6	0.1		

*p-value< 0.05

DISCUSSION

During the initial stages of the COVID-19 pandemic, the general public understands regarding the nature of disease, including the cause of disease, symptoms, incubation period, modes of transmission, prevention methods, and treatment were lacking. Thus, we believe it is appropriate that our study found that the participants' level of knowledge about COVID-19 tended to be moderate. On average, we found participants provided the correct answers for 61.8% of questions across 6 different areas of knowledge about COVID-19 (causes, symptoms, incubation periods, modes of transmission, prevention methods, and treatment). Only 44.3% of the participants had correct knowledge about modes of transmission; more than half of them didn't know about the modes of viral modes of transmission. It is worth noting that there are many routes for transmission for COVID-19, including direct transmission through respiratory contact, inhalation of droplet aerosols, and contact with infectious surfaces. Human-to-human contact, hand contact, and other endogenous mechanisms are among the many routes by which COVID-19 can infect humans. If participants not wearing masks are in close contact with other people and not aware of the social distancing, their contact with each other can result in a cluster of COVID-19 infections among their group. There have been increasing numbers of group or cluster infections of COVID-19. Therefore, at present, the number of reported infections of COVID-19 remains high.

COVID-19 can be spread by touching with a patient's secretions. If people came into contact with an infected person's secretions, they could become infected as well. If people were not careful, they could touch their face or eyes with their hands that may have infected secretions.

Additionally, frequent handwashing provides a route for the infection to enter. Cleaning your hands with alcohol gel, on the other hand, will help lower the number of viruses on your hands, while also eradicating them. This action can reduce the risk of COVID-19 infection. Another way that COVID-19 can spread is by eating with close friends or family members, resulting in a risk of catching the COVID-19. Eating together with friends or family does put an individual at risk of contracting COVID-19. There have been reports of some cases that arose from viral infections occurring in clusters among family members that have shared meals together. Avoiding sharing meals with others is one way to protect themselves from infection with the Coronavirus. It is important to note that some people who are infected with COVID-19 do not have any symptoms to indicate they have been infected. Though COVID-19 infected people may not display any symptoms, they can still transmit the virus to others.

Student participants became more aware of the dangers of the virus. They were able to prevent themselves from being infected by adopting a positive attitude regarding COVID-19. Many educational institutions transitioned to online teaching and learning during the mid-2021 phase of the pandemic. As a result, there was a decrease in the number of infections at many educational institutions. In 2021, there were no reports of pupils afflicted with COVID-19 at the Sirindhorn College of Public Health, Ubon Ratchathani, Thailand. We felt it was important to encourage students to develop a body of knowledge to protect oneself from infection with COVID-19. This was crucial whether students were in school studying, or creating public relations using various media at the college. Students should become well-versed in the causes, symptoms, incubation periods, transmission

modes, prevention methods, and treatment of infectious diseases. Then they can gain knowledge that leads to appropriate infection prevention behaviors. In addition, they can help others prevent the spread of COVID-19 in schools, families, and communities. It is vital to minimize infection within Thailand as well as globally.

We compared our study results to other research studies examining the knowledge and attitude of higher education students regarding COVID-19. Yakar et al [13] studied the knowledge, attitude and anxiety of medical students about the current COVID-19 outbreak in Turkey. They found that the medical students had a mean score of knowledge and attitude of 7.8±1.3 and 45.2±5.1, respectively. These medical students demonstrated good knowledge and a positive attitude towards COVID-19. Another study by Elhadi et al [14] examined the self-reported knowledge, preventive behavior and risk perception regarding COVID-19 among college students. They found that the mean knowledge score on COVID-19 was 8.6 (S.D.=1.26, range: 0-12). While, Alsoghair et al[15] found that the total mean knowledge score was 12.5 out of 15 possible points; 83.9% achieved a high score. The mean score of self-reported preventive behavior was 8.4; 94.1% achieved a high score. The overall mean risk perception score was 5.3 out of 8 possible points; 31.6% achieved a high score. A previous study by Albaqawi et al[16] found that the average score in the knowledge questionnaire was 9.8 (S.D.=1.62, range=0-12). Another study by Kalliath et al [17] studied the knowledge, attitude, and practices regarding COVID-19 pandemic among medical students of Ernakulam, India. They found that most medical students had sufficient knowledge (81.6%) and attitudes (91.3%) on the COVID-19 pandemic. At least 83.0% of the participants were aware of the main signs of COVID-19 infection. Sazali et al[18] looked ats knowledge, attitude and practices regarding COVID-19 among students during the early phase of pandemic in a university in Borneo, Malaysia. They found that median score of knowledge domain was 78.0, while the median attitude score was 49.0. Mean knowledge, attitude, and practice scores were significantly higher among diploma holders (versus degree holders, p<0.05), those residing in main Kota Kinabalu campus (vs non-KK campus, p<0.001), those studying in medical faculty (vs. non-medical faculty, p<0.001), and those who attended COVID-19 education (vs. non-attendance; p<0.05). A previous study of Padmanaban et al[19] explored the knowledge, attitude, and practices (KAP) of higher education students towards COVID-19. They reported that 71.0% of the participants had a positive attitude towards COVID-19. Meanwhile, Maheshwari et al [20] studied knowledge, attitude, and practice towards COVID-19 among medical students. This cross-sectional study found that the majority of the participants had good knowledge and positive attitude toward COVID-19.

CONCLUSION

Coronavirus disease 2019 (COVID-19) is an emerging disease that has had a global impact on human history. Our study participants' level of knowledge about COVID-19 was moderate, while the attitude was at a high level.

RECOMMENDATION

Our results emphasize the significance of precise and targeted health education to raise awareness of suggested steps to prevent the spread of COVID-19. This research could help the Sirindhorn College of Public Health and other institutions establish innovative strategies to improve knowledge about COVID-19, especially in the event of this pandemic. Health promotion and education should be prioritized.

ACKNOWLEDGEMENTS

REFERENCES
1. Wang C, Horby PW, Hayden FG, Gao GF. A novel coronavirus outbreak of global health concern. Lancet. 2020;395(10223):470-473.
2. World Health Organization. Coronavirus disease (COVID-19). [cited 2022 April 2]. Available from: https://www.who.int/health-topics/coronavirus#tab=tab_1.
3. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, Zhang L, Fan G, Xu J, Gu X, Cheng Z, Yu T, Xia J, Wei Y, Wu W, Xie X, Yin W, Li H, Liu M, Xiao Y, Gao H, Guo L, Xie J, Wang G, Jiang R, Gao Z, Jin Q, Wang J, Cao B. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet 2020;395(10223):497-506.

4. Singhal T. A Review of Coronavirus Disease-2019 (COVID-19). Indian J Pediatr. 2020;87(4):281–286.

5. Bolay H, Gül A, & Baykan B. COVID-19 is a real headache! Headache: J Head Face Pain. 2020; 60(7): 1415-1421.

6. Chakraborty C, Sharma AR, Bhattacharya M, Sharma G, Lee SS. The 2019 novel coronavirus disease (COVID-19) pandemic: A zoonotic prospective. Asian Pac J Trop Med. 2020; 13:242-6.

7. Rayani M, Rayani S, Najafi-Sharjabad F. COVID-19-related knowledge, risk perception, information seeking, and adherence to preventive behaviors among undergraduate students, southern Iran. Environ Sci Pollut Res. 2021;28(42):59953-62.

8. Peng Y, Pei C, Zheng Y, Zhang K, Zheng Z, Phu Z. A cross-sectional survey of knowledge, attitude and practice associated with COVID-19 among undergraduate students in China. BMC Public Health. 2020; 20: 1292.

9. Kaushal CP, Kaushal V. Impact of COVID-19 on Higher Education in India: Lessons Learned and Mitigation Measures. J Nature Sci Tech. 2021; 1:10-13.

10. Nimnee NN and Abdul Halim A. Impact of COVID-19 on Higher Education System: University Student's Perspective. J Inter Educ Prac. 2021;4(01&02):1-15.

11. Toquero CM. Challenges and Opportunities for Higher Education amid the COVID-19 Pandemic: The Philippine Context. Pedagog Res. 2020; 5(4), em0063.

12. Sahi PK, Mishra D, Singh T. Medical Education Amid the COVID-19 Pandemic. Indian Pediatr. 2020; 57:652–657.

13. Yakar B, Öztürk Kaygusuz T, Pirinçci E, Önalan E & Ertekin YH. Knowledge, attitude and anxiety of medical students about the current COVID-19 outbreak in Turkey. Fam Prac Palliative Care. 2020;5(2):36-44.

14. Elhadi M, Msherghi A, Alsoufi A, Buzreg A, Bouhuwaish A, Khaled A, Alhadi A, Alameen H, Biala M, Elgherwi A, Elkhafeefi F, Elmabrouk A, Abdulmalik A, Alhaddad S, Khaled A, Elgzairi M. Knowledge, preventive behavior and risk perception regarding COVID-19: a self-reported study on college students. The Pan African Med J. 2020;35(Suppl 2):75.

15. Alsoghair M, Almazyad M, Alburaykan T, Alsultan A, Alnughaymishi A, Almazyad S, Alharbi M, Alkassas W, Almadud A, Alsuhaibani M. Medical Students and COVID-19: Knowledge, Preventive Behaviors, and Risk Perception. Int J Environ Res Public Health. 2021;18(2):842.

16. Albaqawi HM, Alquwez N, Balay-odao E, Bajet JB, Alabdulaziz H, Alsolami F, Tumala RB, Alsharari AF, Tork HMM, Felemban EM and Cruz JP. Nursing Students' Perceptions, Knowledge, and Preventive BehaviorsToward COVID-19: A Multi-University Study. Front. Public Health. 2020; 8:573390.

17. Kalliath JD, Kizhatil A, Rose BM, Kuncheria AM, John A. Knowledge, attitude, and practice regarding COVID-19 pandemic among medical students od Ernalam, India. JID Health. 2021; 4(Special1):337-342.

18. Sazali MF, Rahim SSSA, Mohamed MH, Omar A, Pang NTP, Jeffree MS, Tat YB, Giloi N, Mohd Bahar FH, Afridah W, Zakkiy Fasya AH, Hassan MR, Madrim MF, Mokti K, Ramdzan AR, Sidek Ahmad ZN, Atil A, Abd Rahim MA, Ibrahim MY. Knowledge, attitude and practice on COVID-19 among students during the early phase of pandemic in a university in Borneo, Malaysia. J Public Health Res. 2020; 10(3).

19. Padmanaban S, Rajendran P, Davis P, Velayutham P. Knowledge, attitude and practices towards COVID-19 among higher education students in India: a cross sectional study. J Public Health. 2021; 13:1-13.

20. Maheshwari S, Gupta PK, Sinha R, Rawat P. Knowledge, attitude, and practice towards coronavirus disease 2019 (COVID-19) among medical students: A cross-sectional study. J Acute Dis. 2020; 9:100-4.