KNOWLEDGE, ATTITUDE, AND PRACTICE TOWARDS COVID-19 PANDEMIC AMONGST UNDERGRADUATE DENTAL STUDENT: A CROSS-SECTIONAL STUDY

Raja Mohd N[1], Etajuri EA[1], S Palaniapan PLR[2], and Dziaruddin N[3].
[1]Department of Restorative Dentistry, Faculty of Dentistry, Universiti Malaya, 50603 Kuala Lumpur, Malaysia
[2]Private Dental Practitioner, Kuala Lumpur, Malaysia
[3]Department of Pediatric Dentistry & Orthodontics, Faculty of Dentistry, Universiti Malaya, 50603 Kuala Lumpur, Malaysia

Correspondence:
Noorhayati Raja Mohd,
Department of Restorative Dentistry,
Faculty of Dentistry,
Universiti Malaya,
50603 Kuala Lumpur, Malaysia
Email: hayatiraja@um.edu.my

Abstract

Background: Most undergraduate dental students were concerned regarding the transmission of the COVID-19 virus through their profession. This dread and anxiety may be attributable to a lack of comprehension regarding the necessary precautions and protocols to implement to ensure safety and limit potential infection threat. This study aims to assess COVID-19-related knowledge, attitudes, and practices (KAP) among undergraduate dental students at the Faculty of Dentistry, Universiti Malaya.

Methods: A cross-sectional study design was used, involving 166 respondents who were undergraduate dental students from years II to IV. Data collection was achieved using a pre-tested web-based questionnaire. Descriptive and inferential analyses, including independent t-tests and one-way analysis of variance (ANOVA) tests, evaluated the KAP differences related to demographic factors.

Results: There were no statistically significant differences in mean KAP associated with demographic factors such as gender, place of residence, and year of study ($p > 0.05$).

Conclusions: Dental students at the Faculty of Dentistry, Universiti Malaya, Malaysia, had adequate knowledge of COVID-19 in light of the country's quarantine status and pandemic context.

Keywords: COVID-19, Knowledge, Attitude, Dental Student

Introduction

The COVID-19 pandemic, caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is expected to be the worst global health crisis this century due to its rapid spread and elevated morbidity and fatality rates (1). As of 18 April 2022, there were 505 million reported cases of COVID-19 globally, with the World Health Organization (WHO) reporting 6.2 million deaths (2). In Malaysia, there were 4.4 million reported cases and 35,470 deaths (3). Consequently, Malaysia is facing a public health emergency and continues to struggle with the pandemic due to its extent, timeliness, and unpredictability, which are undermining the normal capacities of the Malaysian healthcare system.

Due to the complexity of dental procedures, both dental professionals and patients are at significant risk of contracting COVID-19 (4). COVID-19 is primarily spread through the inhalation of respiratory droplets expelled by infected individuals, as the virus is typically found in nose and oral cavity secretions (5, 6). Dental procedures routinely expose dental practitioners and students to aerosolized saliva, placing them at risk of contracting the virus.

There are a variety of protocols and recommendations for dental professionals to follow regarding patient screening, clinic admission, dental treatment, and post-treatment management (7, 8). WHO, the American Dental Association, and the Centers for Disease Control and Prevention (CDC), have developed recommended practices for dental practitioners to mitigate COVID-19 transmission (9-13). These recommendations involve the correct usage of personal protective equipment (PPE) for aerosol-generating operations, single-use protective gear and eyeglasses, proper and correct surface cleaning, operating

room ventilation, and hand washing with alcoholic solutions. According to the guidelines, pre-operative mouth washing with chlorhexidine or iodine can significantly lower the number of bacteria and viruses present in the oral cavity. Furthermore, dental dams are strongly advised during restorative and endodontic treatments (14-16). Dental practitioners and students must employ these recommended protocols and practices vigilantly to prevent further viral propagation.

The majority of graduating dental students are concerned about contracting COVID-19 and transmitting it to patients. This fear may be related to a misunderstanding regarding the necessary infection control measures that must be implemented to ensure safety and reduce the risk of infection. Therefore, it is important to understand and highlight the preventive actions against COVID-19 that significantly impact the dental community's awareness to contribute to changes in attitude and behaviors regarding the distribution of COVID-19. This study aims to assess the COVID-19-related knowledge, attitudes, and practices (KAP) among undergraduate clinical dental students at the Faculty of Dentistry, Universiti Malaya.

Materials and Methods

Participants

A cross-sectional study using a digital platform survey was conducted among undergraduate dental students from the Faculty of Dentistry, Universiti Malaya. In total, 200 students were invited via email to take part in this study. Participants included students from all years (year II, year III, year IV, and year V) as they have been affected by the closure of clinical training sessions due to the COVID-19 pandemic.

Instruments

The questionnaire comprised two main sections. The first section was designed by the author and aimed to collect demographic data (age, gender, academic year, and current residential location). The second section of the survey aimed to collect data on participants' COVID-19-related KAP. This tool was designed and validated by a previous study by Rothe et al. in 2020 (17). This section involved three subsections: (1) twelve questions assessing participants' COVID-19-related knowledge; (2) two questions assessing participants' attitudes towards COVID-19; and (3) two questions related to the participants' practical preventive behaviors towards COVID-19. The knowledge-related questions could be answered as "true," "false," or "I do not know." Every correct answer was given one point, while incorrect or "I do not know" responses were given zero points. Therefore, scores for this section could range from 0-12. Cronbach's alpha was used to assess the reliability of these questions. Based on the sample, this was 0.72.

Procedure

Ethical approval was obtained from the ethics committee of the Faculty of Dentistry, Universiti Malaya (IRB reference number: DF RD2108/0031 [L], 4 July 2021). This approval extended to the questionnaire, participant information sheet (PIS), informed consent form, and study methodology. The informed consent form contained comprehensive information about the study's purpose and importance and was displayed on the first page of the Google Form. All respondents were asked to sign the informed consent form by clicking on the agree or disagree button to indicate their willingness to participate. Respondents who selected "agree" were then directed to the next page to fill out the self-administered questionnaire. Participants in the study were guaranteed anonymity, and no personal data information was gathered, such as names, email addresses, or COVID-19 exposure details. The invitation link to the online survey was sent to 200 undergraduate students via email, and 166 responded. Therefore, the response rate was 80%. Data collection occurred from 17 May 2021 to 14 June 2021.

Data analysis

The data were analyzed using the IBM SPSS statistics 27.0 software (IBM Corp, Armonk, NY, USA). Descriptive analyses focused on frequencies, proportions, means, and standard deviations. Differences in mean scores across student groups were analyzed using independent samples t-tests and analysis of variance (one-way ANOVA) tests. Correlations between variables were determined using Pearson's correlation coefficients. Statistical significance was determined as p-values less than 0.05. All results have been reported with 95% confidence intervals.

Results

Data from 166 survey respondents were collected. Descriptive and inferential analyses were conducted to assess the correlations between KAP levels and demographic variables, such as gender, year of study, and place of residence.

Descriptive Analysis of the Respondents' Demographics

Of all respondents, 113 (68.1%) were female, and 53 (31.9%) were male (Table 1). Regarding the year of study, 15.7% of participants were in year II, 27.7% were in year III, 29.5% were in year IV, and 27.1% were in year V (Table 1). There were 106 (64.6%) students who resided at the university hostel, and 60 (35.4%) lived at home.

Table 1: Demographic characteristics of the study population (n = 166)

		Knowledge, Attitude and Practice (Range: 0–100%)	
Variables	**Characteristic**	**n (%)**	**M ± SD**
Gender	Male	53 (31.9)	1.3762 ± 0.12040
	Female	113 (68.1)	1.3767 ± 0.10968
Place of Resident	Hostel	106 (63.9)	1.3885 ± 0.10840
	Home	60 (36.1)	1.3906 ± 0.11993
Year of Study	Second Year	26 (15.7)	1.3846 ± 0.10561
	Third Year	46 (27.7)	1.4049 ± 0.12757
	Fourth Year	49 (29.5)	1.3737 ± 0.11158
	Fifth Year	45 (27.1)	1.3858 ± 0.09664

Descriptive Analysis of KAP

The correct response rate for the knowledge questions ranged from 70.2-98.6% (Table 2). Question 1 had the highest proportion of correct responses (99.4%) (Table 3). In contrast, question 5 had the lowest proportion of correct responses (50%). For the attitude questions, question 2 had the highest proportion of correct responses (66.9%), while question 1 had the lowest proportion of correct responses (58.4%) (Table 4). For the practice questions, most participants responded correctly to question 1 (95.2%), and almost all answered question 2 correctly (99.4%) (Table 5).

Table 2: Correct answers rate

Number of correct answers	Frequency	Percentage
8/12	7	4.2
9/12	14	8.4
10/12	55	33.1
11/12	58	34.9
12/12	32	19.3
Total	166	100

Table 3: Assessment of knowledge related to COVID-19 (n = 166)

	Items (True or False); Possible Range: (0.0–100.0%)	Correct Answer Rate (Range 0.0–100.0%)
1	The main clinical symptoms of covid-19 are fever, fatigue, dry cough and myalgia	94.6%
2	Unlike the common cold, stuffy nose, runny nose, and sneezing are less common in persons infected with the covid-19 virus	62.0%
3	There currently is no effective cure for covid-19, but early symptomatic and supportive treatment can help most patients recover from the infection	96.4%
4	Not all persons with covid-19 will develop to severe cases. Only those who are elderly, have chronic illnesses, and are obese are more likely to be severe cases	74.7%
5	Eating or contacting wild animals would result in the infection by the covid-19 virus	50.0%
6	Persons with COVID-19 cannot infect the virus to others when a fever is not present	95.2%
7	The COVID--19 spreads via respiratory droplets of infected individuals	94.0%
8	Ordinary residents can wear general medical masks to prevent the infection	92.2%
9	It is not necessary for children and young adults to take measures to prevent the infection by the COVID-19 virus	95.8%
10	To prevent the infection by COVID-19, individuals should avoid going to crowded places such as train stations and avoid taking public transportations	98.8%
11	People who have contact with someone infected with the COVID-19 virus should be immediately isolated in a proper place. In general, the observation period is 14 days	99.4%

Table 4: Assessment of attitude related to COVID-19 (n = 166)

	Items (True or False); Possible Range: (0.0–100.0%)	Correct Answer Rate (Range 0.0–100.0%)
1	Do you agree that COVID-19 will finally be Successfully Controlled?	58.4%
2	Do you have Confidence that Malaysia can win the Battle against the COVID-19 Virus?	66.9%

Table 5: Assessment of practice related to COVID-19 (n = 166).

	Items (True or False); Possible Range: (0.0–100.0%)	Correct Answer Rate (Range 0.0–100.0%)
1	In recent days, have you gone to any crowded place?	95.2%
2	In recent days, have you worn a mask when leaving home?	99.4%

Table 6 shows the correlations between COVID-19 KAP levels. There were no statistically significant correlations between the mean KAP scores and the demographic factors of gender, place of residence, and year of study ($p > 0.05$).

Table 6: Correlation between COVID-19 knowledge, attitude, and practice (n = 166)

Variables	Knowledge, Attitude and Practice
Gender	0.98
Place of resident	0.226
Year of Study	0.093

* $p > 0.05$

Discussion

This study aimed to assess COVID-19-related KAP levels among undergraduate dental students at the Faculty of Dentistry, Universiti Malaya. There were more female respondents to the study survey. This is similar to previous research that has demonstrated female predominance in the Malaysian dental profession (18, 19). When compared to a similar and recent study involving dental professionals, where females comprised 71.3% of respondents, the percentage of female dental students who participated in this study (68.1%) is slightly lower (20). This finding was supported by similar study on medical and dental students at a local university in Malaysia showed a relatively higher number of female students than male students who practiced positive attitudes and preventive behaviors (21). The data revealed no gender-related variances, indicating that KAP levels did not differ significantly between male and female students. Therefore, both males and females had the same fundamental knowledge, which is consistent with prior research in other countries that have found no significant gender-related differences regarding COVID-19-related knowledge and attitudes.

Participants demonstrated excellent comprehension of COVID-19 information, and most students possessed adequate COVID-19 knowledge. This is consistent with a study by Quadri et al. (22), who investigated COVID-19 awareness in the general population of Saudi Arabia and found a satisfactory level of understanding. Studies undertaken in various countries such as India, Bangladesh, and Turkey have revealed a similar degree of awareness and knowledge among oral healthcare providers (23-25). Similar study revealed that the average knowledge scores from India, Saudi Arabia, Malaysia, and Turkey were all higher than 7, despite the fact that the maximum possible score was 10. This suggests that individuals from these countries have a satisfactory awareness of COVID-19 (26).

However, a low correct answer rate was observed for question 5. This finding is comparable to those of other studies (27-30) and could be related to the scarce information regarding the exact origin and reservoir of the virus itself. Previous epidemiologic studies have mentioned multiple natural reservoirs for SARS-CoV-2 and MERS-CoV, such as bats, raccoons, dogs, and dromedary camels; bats are regarded as the natural reservoir for coronaviruses similar to COVID-19 (31, 32). During the initial outbreak of COVID-19, it was reported that animal-human virus transmission occurred due to infected wild animals in a wet market (33, 34). However, as epidemic clusters among family members emerged, the concept of person-to-person transmission became more acknowledged (35, 36). This may have contributed to the low correct response rate seen in the current study.

When respondents were asked about the general symptoms of COVID-19 in question 2, a high correct answer rate was observed, which differed from the results of other studies (37, 38). This discrepancy could be due to these previous studies being undertaken during the early stages of the pandemic when various epidemiological aspects of COVID-19 were still unknown. Although the current survey was conducted fact during the later stages of the pandemic in Malaysia, the knowledge regarding COVID-19 is continuously changing knowledge as new variants emerge. As healthcare providers are considered high-risk individuals for getting infected, it is critical that undergraduate students are educated, empowered, and

equipped with adequate and pertinent knowledge about COVID-19.

Participants' perceptions regarding preventive measures related to personal care and social distancing were excellent. To prevent COVID-19 infections, the majority of participants followed the suggested procedures of wearing face masks and social distancing. In the current study, 95.2% of participants avoided crowded places, and 99.4% reported they wore a mask when leaving the house. These findings were concurrent with a previous study, where 90% of respondents followed preventative measures (39). However, wearing face masks is becoming contentious among some parts of the global population. With the emergence of new variants, the CDC has recommended the use of double face masks. The CDC conducted tests to evaluate two approaches for increasing medical procedure mask performance by improving fit and filtration: knotting and tucking the medical mask and double masking. Exposure levels were lowered by 96.4% and 95.9% when participants were fitted with double masks or knotted and tucked masks, respectively (40). This study was in contradictory with other study where the practice score is rather low which is very likely due to the unpreparedness to face the critical situation of this pandemic (41). Nevertheless, the practice of both masks wearing and avoiding crowded places will definitely reduce the risk of infection.

Many of the participants expressed their discontent with government sectors, while 66.7% were confident that they could defeat the virus. Moreover, 58.4% believed that the pandemic would disappear at some point in the future. The pandemic has been ongoing for almost three years. This, in combination with the emergence of new variants, could cause these skeptical responses. Such perceptions may impact global efforts to limit the pandemic, as they may influence an individual's degree of commitment to following preventive measures.

Participants' perceptions of the COVID-19 pandemic's influence on academics in Malaysia are cause for concern. Many schools and universities worldwide shifted to online instruction to eliminate face-to-face contact. Unfortunately, in Malaysia, some public universities were unable to do so. In medical and dental teaching, some of the practical and clinical skills were suspended. However, some of the clinical sessions ran as usual to permit ongoing education, as suspending these sessions may have affected students' clinical performances, particularly final year students. This created mixed feelings among students, as they were both worried and anxious about potential exposure to the virus during these clinical sessions.

The Malaysian Ministry of Health authorized all healthcare practitioners to deliver their services during the pandemic and provided guidelines and protocols for practitioners to adhere to (42). The ministry provided adequate information regarding COVID-19, including precautions recommended by the WHO and the United Nations International Children's Emergency Fund (43-47). Various educational guideline papers were published to provide public information about the pandemic. Such contributions are beneficial and may have contributed to resolving the healthcare professional shortage by enabling patients to receive extensive care in a safe manner (48). The is a need for heightened awareness and rapid advancement of infection prevention techniques among healthcare staff, particularly dental students, which could be achieved through the adoption of mandatory emergency training and hands-on preventative measures.

This study has several limitations. First, the sample was taken from a single dental institution in Malaysia; therefore, the results cannot be generalized as accurately reflecting dentistry students; awareness throughout Malaysia. Additionally, evaluating outcomes via virus-related information that is regularly updated basis is a limitation, as many prevention efforts remain under global evaluation. There were also several limitations associated with the research. Enrolment and reporting biases may have been introduced due to an online survey being used, as this may have been non-representative. Due to the nationwide lockdown, randomization was impossible, which could have reduced some of the bias. The flexibility and voluntary nature of the non-probabilistic sample approach may have led to an uneven distribution (coverage and participation) of the students surveyed. Additionally, as some students claimed, Malaysia's low internet connectivity (which may have differed by institutional location) and a lack of credit to purchase data may have contributed to a lack of access to and participation in the online questionnaire. Due to these limitations, caution must be taken in generalizing the findings to the entire dentistry student population in Malaysia.

Conclusion

Dental students at the Faculty of Dentistry, Universiti Malaya, had adequate knowledge of COVID-19, considering the country's quarantine status and pandemic scenario. This study has emphasized the importance of enhancing governing bodies' knowledge regarding alternative security and safety measures for students who are subjected to extreme and high-risk scenarios. Future researchers should provide online courses to educate dentistry students and other dental healthcare practitioners about current COVID-19 knowledge and advancements in prevention strategies, particularly as they relate to dental clinics.

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Competing interests

The authors declare that they have no competing interests.

Ethical Clearance

We obtained approval from the Ethics committee at Faculty of Dentistry, Universiti Malaya registered under DF RD2108/0031.

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