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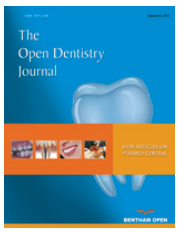

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RESEARCH ARTICLE

Knowledge, Perceptions, and Attitudes Regarding COVID-19 and Infection Control Measures Against it among Dental Students in Saudi Arabia

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Abstract:

Background

Coronavirus disease (COVID-19) is a highly infectious disease caused by an RNA virus named SARS CoV2. The increased risk of infection by this virus among dental students necessitates updated knowledge and highlights their important role in preventing and controlling its transmission.

Objective:

This study aims to assess knowledge, perceptions, and attitudes regarding COVID-19 and infection control measures among dental students in Saudi Arabia.

Methods:

A cross-sectional study was conducted among dental students in different Saudi universities using an online self-administered questionnaire. It gathered data on students' demographic information, knowledge of COVID-19 and infection control measures, risk perception and attitudes toward the disease, and their preparedness for treating infected patients.

Results:

A total of 327 dental students responded to the questionnaire. Of these students, 92.4% had received training in infection control in dental practice, but only 24.2% had attended training regarding COVID-19. The majority of students had adequate knowledge regarding the modes of transmission and the common symptoms of COVID-19, with statistically significant total mean knowledge scores among students in different academic years ($p<0.05$). A large percentage of the students (92.7%) agreed that the use of rubber dams or high-volume saliva ejectors could reduce the possibility of transmitting infection. However, 58.4% of the students disagreed that intraoral dental radiographs should be avoided to reduce the possibility of transmitting infection.

Conclusion:

Although knowledge of and risk perception concerning COVID-19 among students is good, additional training sessions integrating recent international guidelines for infection control are required to update their knowledge and achieve safe dental practice.

Keywords: COVID-19, Knowledge, Perception, Attitude, Infection control, Dental students.

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1. INTRODUCTION

A coronavirus disease (COVID-19) outbreak started in Wuhan, China and rapidly spread worldwide [1]. The novel coronavirus is an enveloped RNA virus that belongs to the family *Coronaviridae* [2]. This family is known to be zoonotic, as it can be transmitted from animals to humans [3]. Two members of the family that caused previous outbreaks were named severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV). It has been confirmed that the virus causing COVID-19 enters the cell through the same path as SARS coronavirus, *i.e.*, the angiotensin-converting enzyme 2 (ACE2) cell receptor [4]. Cells with ACE2 receptors are found throughout the respiratory tract and on cells morphologically

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compatible with the salivary gland duct epithelium in the human mouth [5]. The novel coronavirus seems to resemble SARS-CoV and MERS-CoV but has been shown to have a higher rate of infection [6]. The usual clinical symptoms of patients who suffer from the novel coronavirus are fever, cough, fatigue or myalgia, abnormal chest Computed Tomography (CT) images, and severe respiratory distress, whereas less common symptoms include sputum production, hemoptysis, diarrhea, and headache [7 - 9]. The common transmission routes of the novel coronavirus from person to person include inhalation of cough or sneeze droplets and contact transmission, such as contact with oral, nasal, and eye mucous membranes; it can also be transmitted through saliva and the feco–oral routes [10].

Previously published articles have noted that dental practitioners are at risk of being affected by COVID-19 much more than nurses and general physicians [11]. This risk can be attributed to the nature of the dental treatment, which includes frequent exposure to saliva, blood, and other body fluids and face-to-face communication with patients where close contact would be unavoidable [8, 12]. Although elective dental care of patients diagnosed with COVID-19 could be postponed, emergency dental care may be needed [13]. However, infected individuals who show no symptoms during the incubation period, which has been reported to be ~1–14 days, can transmit the virus [7, 14, 15]. Therefore, patients infected with COVID-19 during the asymptomatic incubation period are at great risk of transmitting the disease to dentists and other dental staff; this is due to the difficulty of recognizing the presence of a COVID-19 infection during this period [12]. To control the spread of COVID-19, dentists and dental staff should be aware of practical guidelines recommended by the World Health Organization (WHO), the Centers for Disease Control and Prevention (CDC), and the American Dental Association (ADA) [16 - 18].

The recommended guidelines for infection control and preventive measures in dental practices during the COVID-19 pandemic include careful patient evaluation and appropriate hand hygiene, donning Personal Protective Equipment (PPE) such as protective eyewear, surgical masks, gloves, caps, face shields, and protective outwear, and providing treatment in negative-pressure rooms, especially in confirmed or suspected patients. To minimize saliva-contaminated aerosol or spatter, especially when high-speed handpieces and dental ultrasonic devices are used, rubber dam isolation and high-volume saliva ejectors are recommended. Moreover, guidelines include the use of anti-retraction handpieces to reduce the backflow of oral microbes into the tubes of the handpiece and dental unit and the use of antimicrobial mouth rinses before dental procedures for the purpose of reducing the salivary load of oral microbes. The guidelines also include disinfection of clinic surfaces, proper management of medical waste, and the use of extraoral radiographs to avoid gag or cough reflexes that may occur with intraoral imaging [6, 8, 16].

The high risk of COVID-19 infection among dental staff emphasizes their equally important role in preventing and controlling its transmission. Although dental students have learned how to deal with infectious diseases and take preventive measures, the need to be aware of a new protocol adjusted for COVID-19 is of great importance, and this depends on their level of awareness of the disease. Hence, this study aimed to assess knowledge, perceptions, and attitudes regarding COVID-19 and infection control measures against it among dental students in Saudi Arabia.

2. MATERIALS AND METHODS

2.1. Study Design

A cross-sectional study was conducted among dental students from different Saudi universities that offer bachelor's degrees in dentistry. Students who had reached the clinical years (4th year, 5th year, 6th year, and dental intern) were included in the study. Students in preclinical years were excluded as the study targeted students learning in clinical practice.

2.2. Ethical Considerations

The study protocol was approved by the Institutional Review Board (IRB) of the Faculty of Dentistry, Umm Al-Qura University (No. 177–20). Questionnaire submission by the students was considered as consent from their side to participate in this study.

2.3. Sampling

The sample included 327 dental students in Saudi Arabia recruited using both convenience sampling and snowball sampling techniques. The researchers asked the students individually to participate in the study, while at the same time, the participating students were asked to send the questionnaire to their colleagues to ensure a maximum number of participants.

2.4. Study Questionnaire

An online self-administered questionnaire using Google forms was used. It has been modified from a previous survey study [12] that was chosen after reviewing related literature and the international guidelines. The questionnaire was distributed anonymously from the 17th of June to the 25th of July 2020 through various social media platforms like Twitter and WhatsApp to maintain the privacy of the participants. The questionnaire was designed in English and divided into four sections, consisting of a total of 29 questions. The first section contained six questions related to socio-demographic and general characteristics, such as gender, educational level, university name, and whether they attend training regarding infection control in dental practice and COVID-19. The second section contained ten questions assessing the knowledge of students about COVID-19 (the symptoms of the disease, the mode of its transmission, and diagnosis information). The third section had nine questions assessing students' attitudes toward and perceptions of COVID-19 and infection control measures against it. Finally, the last section contained four questions pertaining to the preparedness of students for treating patients with COVID-19. A pilot study was conducted among a small group of colleagues before starting the study to test the validity and reliability of the questionnaire.

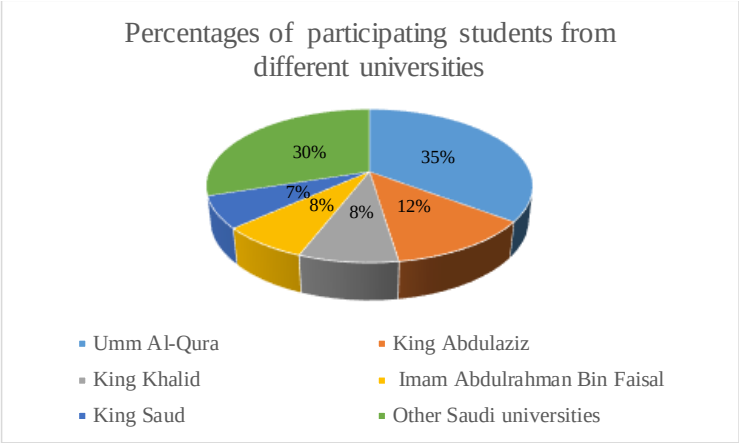

Fig. (1). The percentages of participating students from different universities.

2.5. Statistical Analysis

Data were collected, tabulated, and statistically analyzed using Statistical Package for Social Sciences (SPSS) software v. 22.0 (IBM Corp). A P-value < 0.05 was considered significant. Descriptive statistical analysis, including means and Standard Deviations (SD) was used to describe the continuous variables, and percentages were used to describe the categorical data. A chi-square test was used to compare the dependent and independent variables.

3. RESULTS

3.1. Socio-Demographic and General Characteristics

This study included a total of 327 Saudi students (193 females and 134 males), of whom 69 (21.1%) were in the 4th year, 94 (28.7%) were in the 5th year, and 67 (20.5%) and 97 (29.7%) were in the 6th year and internship year, respectively. The percentages of participating students from different Saudi universities are shown in Fig. (**1**).

3.2. Previous Training

A total of 302 (92.4%) participants had received training in infection control in dental practice, while 79 students (24.2%) had attended training regarding COVID-19, and 83 (25.4%) had participated in disease outbreaks or health emergencies.

3.3. Students' Knowledge of COVID-19

Regarding knowledge about modes of transmission, 96% of participants mentioned that transmission occurs via coughing and sneezing, 94.2% reported that the elderly are considered a risk group, 92.4% to 98.2% responded that shortness of breath, cough, and fever are the main symptoms of COVID-19, and 85% reported that asymptomatic patients could transmit the infection to others. With respect to COVID-19 diagnosis, the greatest percentage of participants (79.2%) mentioned that it is done by real-time PCR with respiratory material, while 82.9% and 97.2%, respectively, realize that antibiotics are not useful for the treatment and that there is no vaccine for COVID-19. The majority of participants (87.5% to 96.3%) correctly knew the measures for preventing COVID-19 transmission, and 67.6% of them reported that they were up to date on the latest information about case definitions for COVID-19 (Table **1**).

The overall mean knowledge scores among the academic years were found to be 20.08±3.06 in the interns and 20±2.24 in the 6th year students, while they were found to be lower in the 5th and 4th year students—19.33±3.28 and 19.23±3.55, respectively—with statistically significant differences (P-value < 0.05). The difference in mean knowledge scores by academic year is shown in Fig. (**2**).

Table 1. Students' knowledge of COVID-19.

		N	%
Mode of Transmission of COVID-19 Infection (multiple responses)	*Via* coughing and sneezing	314	96.0%
	Hand Shaking	268	82.0%
	Touching surfaces like doorknobs and tables	233	71.3%
High-Risk Groups (multiple responses)	Healthcare providers	210	64.2%
	Elderly	308	94.2%
	Male gender	21	6.4%
	Children	86	26.3%
	People with immune system deficiency	305	93.3%
	Travelers	59	18.0%
	People with chronic diseases	305	93.3%

(Table 1) contd.....

		N	%
Symptoms of COVID-19 infection (multiple responses)	Fever	321	98.2%
	Cough	305	93.3%
	Runny nose	90	27.5%
	Sore throat	222	67.9%
	Shortness of breath	302	92.4%
	Joint/muscle pain	151	46.2%
	Red eyes	27	8.3%
	Rash	43	13.1%
	Diarrhea	131	40.1%
	May present with no symptoms	268	82.0%
Asymptomatic patients could transmit infection to others	Yes	278	85.0%
	No	49	15.0%
Diagnosis of COVID-19 infection (multiple responses)	Real-time polymerase chain reaction (PCR) with respiratory material	259	79.2%
	Real-time PCR with serum sample	130	39.8%
	Chest X-ray	71	21.7%
Antibiotics are useful for the treatment of COVID-19	Yes	56	17.1%
	No	271	82.9%
There is a vaccine available for COVID-19	Yes	9	2.8%
	No	318	97.2%
Measures for preventing COVID-19 transmission (multiple responses)	Frequently clean hands by using alcohol-based hand rub or soap and water	315	96.3%
	Eat boiled and cooked food	85	26.0%
	Put facemask on known or suspected patients	300	91.7%
	Maintain social distance	310	94.8%
	Routinely clean and disinfect surfaces	286	87.5%
Are you up to date on the latest information about case definitions for COVID-19?	Yes	221	67.6%
	No	106	32.4%

3.4. Students' Attitudes Toward and Perceptions of COVID-19 and Infection Control Measures Against it

More than half of the students (58.1%) perceived COVID-19 as moderately dangerous, while very few (3.7%) perceived it as not dangerous at all. The majority of participants (80.7%) agreed that COVID-19 is a serious public health issue, with a significant percentage of them being in the 5th year students and interns. Regarding the significance of the dental staff's role in teaching others about COVID-19, almost two-thirds of the students (62.4%) mentioned that it is very significant. The majority of students (97.2%) believed it was necessary to decrease disease transmission by asking the patients to sit far from each other, wear a mask, and wash their hands before getting on the dental chair. The difference between different grades regarding the previous questions is highly significant (p=0.00), with the highest percentage among interns. When asked about the extent of their confidence in handling suspected COVID-19 patients, 13.5% of the students responded that they were not confident at all (Table **2**).

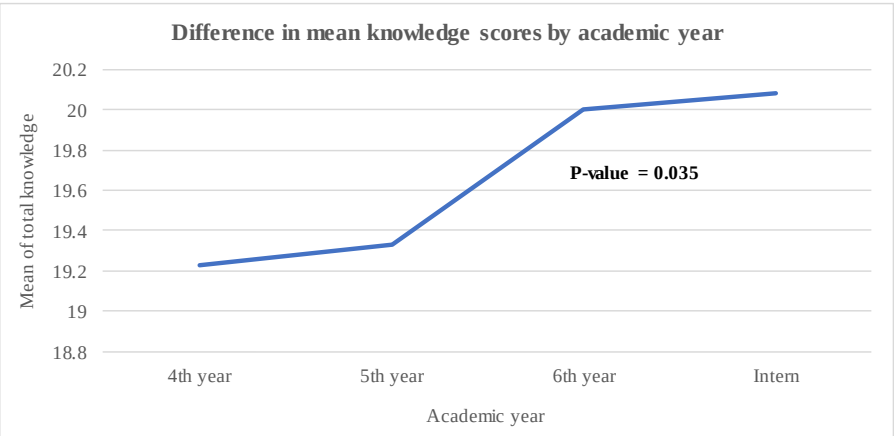

Fig. (2). The difference in mean knowledge scores by academic year.

Table 2. Students' attitudes toward and perceptions of COVID-19 and infection control measures against it.

		Academic year					Chi-squarevalue	P-value
		4th year	5th year	6th year	Intern	Total		
		N (%)	N (%)	N (%)	N (%)	N (%)		
How do you perceive COVID-19?	Very dangerous	26 (8.0)	38 (11.6)	25 (7.6)	36 (11.0)	125 (38.2)	148.68	0.000
	Moderately dangerous	41 (12.5)	51 (15.6)	40 (12.2)	58 (17.7)	190 (58.1)		
	Not dangerous	2 (0.6)	5 (1.5)	2 (0.6)	3 (0.9)	12 (3.7)		
I believe COVID-19 is not currently a serious public health issue	Yes	12 (3.7)	19 (5.8)	19 (5.8)	13 (4.0)	63 (19.3)	123.55	0.000
	No	57 (17.4)	75 (22.9)	48 (14.7)	84 (25.7)	264 (80.7)		
The dental staff's role in teaching others about COVID-19 is	Very significant	41 (12.5)	56 (17.1)	49 (15.0)	58 (17.7)	204 (62.4)	289.55	0.000
	Moderately significant	23 (7.0)	30 (9.2)	10 (3.1)	26 (8.0)	89 (27.2)		
	Mildly significant	3 (0.9)	8 (2.4)	6 (1.8)	12 (3.7)	29 (8.9)		
	Not significant at all	2 (0.6)	0 (0.0)	2 (0.6)	1 (0.3)	5 (1.5)		
I believe that asking patients to sit far from each other, wear masks while in the waiting room, and wash their hands before getting in the dental chair is	Necessary and helps to decrease disease transmission	67 (20.5)	92 (28.1)	65 (19.9)	94 (28.7)	318 (97.2)	291.99	0.000
	Not necessary and could cause panic	2 (0.6)	2 (0.6)	2 (0.6)	3 (0.9)	9 (2.8)		
In the dental clinic, to what extent do you have confidence in handling suspected COVID-19 patients?	Not at all	17 (5.2)	11 (3.4)	6 (1.8)	10 (3.1)	44 (13.5)	303.41	0.000
	To a little extent	15 (4.6)	20 (6.1)	22 (6.7)	16 (4.9)	73 (22.3)		
	To some extent	19 (5.8)	39 (11.9)	16 (4.9)	33 (10.1)	107 (32.7)		
	To a considerable extent	7 (2.1)	10 (3.1)	14 (4.3)	26 (8.0)	57 (17.4)		
	To a great extent	11 (3.4)	14 (4.3)	9 (2.8)	12 (3.7)	46 (14.1)		

3.5. Students' Attitudes Towards Preventive Measures Against COVID-19 Transmission in Dental Clinics

Almost all the students (98.2%) agreed that PPE was mandatory for treating patients with suspected COVID-19. A percentage (81.7%) agreed that the use of preoperative mouth rinsing would help in reducing the salivary load of oral microbes, with a significant percentage of them (92.50%) being 6th year students (P-value < 0.05) (Fig. **3a**). The majority of students (92.7%) agreed that the use of rubber dams or high-volume saliva ejectors could reduce the possibility of transmitting the infection to dentists (Table **3**). However, 58.4% of the students disagreed that intraoral dental radiographs should be avoided to reduce the possibility of transmitting the infection to dentists, with a significant percentage of them (61.70% and 61.90%) being 5th year students and interns, respectively (P-value < 0.05) (Fig. **3b**).

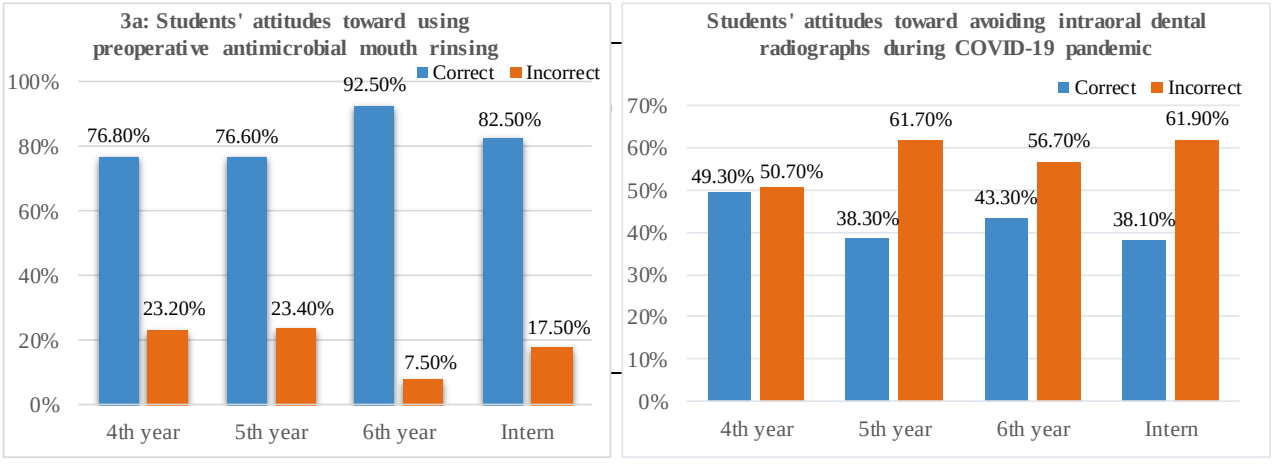

Fig. (3). The difference between grades in students' attitudes toward using preoperative antimicrobial mouth rinsing (**3a**: left side) and toward avoiding intraoral dental radiographs (**3b**: right side) during the COVID-19 pandemic.

Table 3. Students' attitudes toward preventive measures against COVID-19 transmission in dental clinics.

		Academic year					Chi-square value	P-value
		4th year	5th year	6th year	Intern	Total		
		N (%)	N (%)	N (%)	N (%)	N (%)		
In case of treating patients with suspected COVID-19, personal protective equipment (PPE) is mandatory?	Correct	67 (20.5)	92 (28.1)	67 (20.5)	95 (29.1)	321 (98.2)	291.2	0.000
	Incorrect	2 (0.6)	2 (0.6)	0 (0.0)	2 (0.6)	6 (1.8)		
The use of preoperative antimicrobial mouth rinsing will help in reducing the salivary load of oral microbes	Correct	53 (16.2)	72 (22.0)	62 (19.0)	80 (24.5)	267 (81.7)	301.44	0.000
	Incorrect	16 (4.9)	22 (6.7)	5 (1.5%)	17 (5.2)	60 (18.3)		
The use of rubber dams or high-volume saliva ejectors can reduce the possibility of transmitting infection to dentists	Correct	63 (19.3)	92 (28.1)	59 (18.0)	89 (27.2)	303 (92.7)	131.01	0.000
	Incorrect	6 (1.8%)	2 (0.6%)	8 (2.4)	8 (2.4)	24 (7.3)		
Intraoral dental radiographs should be avoided to reduce the possibility of transmitting infection to dentists	correct	34 (10.4)	36 (11.0)	29 (8.9)	37 (11.3)	136 (41.6)	238.04	0.000
	Incorrect	35 (10.7)	58 (17.7)	38 (11.6)	60 (18.3)	191 (58.4)		

Table 4. Preparedness of students for treating patients with COVID-19.

		Academic year					Chi-square value	P-value
		4th year	5th year	6th year	Intern	Total		
		N (%)	N (%)	N (%)	N (%)	N (%)		
Do you consider yourself prepared for the COVID-19 outbreak?	Yes	30 (9.2)	58 (17.7)	31 (9.5)	58 (17.7)	177 (54.1)	2.22	0.135
	No	39 (11.9)	36 (11.0)	36 (11.0)	39 (11.9)	150 (45.9)		
Please rate how satisfied you are with the preparedness of your country to deal with the COVID-19 outbreak	Very unsatisfied	5 (1.5)	4 (1.2)	4 (1.2)	5 (1.5)	18 (5.5)	182.95	0
	Unsatisfied	7 (2.1)	6 (1.8)	1 (0.3)	3 (0.9)	17 (5.2)		
	Neutral	12 (3.7)	17 (5.2)	11 (3.4)	19 (5.8)	59 (18.0)		
	Satisfied	13 (4.0)	24 (7.3)	23 (7.0)	24 (7.3)	84 (25.7)		
	Very satisfied	32 (9.8)	43 (13.1)	28 (8.6)	46 (14.1)	149 (45.6)		
Do you know who to contact in a situation where there has been an unprotected exposure to a known or suspected COVID-19 patient?	Yes	48 (14.7)	79 (24.2)	55 (16.8)	81 (24.8)	263 (80.4)	121.1	0
	No	21 (6.4)	15 (4.6)	12 (3.7)	16 (4.9)	64 (19.6)		
Do you know what to do if you have signs or symptoms indicating COVID-19 infection?	Yes	65 (19.9)	90 (27.5)	65 (19.9)	91 (27.8)	311 (95.1)	266.13	0
	No	4 (1.2)	4 (1.2)	2 (0.6)	6 (1.8)	16 (4.9)		

3.6. Preparedness of Students for Treating Patients with COVID-19

When asked about how well they were prepared for the COVID-19 outbreak, 45.9% of the students responded that they were not prepared, while 5.5% were very unsatisfied with the preparedness of the country to deal with the COVID-19 outbreak. Among different grades, almost all students replied that they knew what to do if they had signs or symptoms indicating COVID-19 infection, while the majority of them (80.4%) knew who to contact when they were exposed to confirmed or suspected patients and were very satisfied with the preparedness of the country to deal with the COVID-19 outbreak. There was a statistically highly significant percentage between different grades, with the greatest percentage of them being 5th year students and interns (P-value =0.00) (Table **4**).

4. DISCUSSION

COVID-19 is a highly infectious disease that requires strict adherence to infection control measures. Dental students and dental staff exhibit a higher risk of pathogen transmission through blood or other body fluids than other populations [19]. Dental students in their clinical years are at an increased risk of cross-infection due to the increase of patient contact during their education [20]. Therefore, their knowledge about and attitudes toward standard and extra precautionary measures against COVID-19 are of great importance. Many previous studies have assessed the level of knowledge and attitudes of dental students regarding infectious diseases [21 - 23]. However, studies that have evaluated the level of knowledge and attitudes regarding COVID-19 among dental students are very limited. Thus, this study examined the level of knowledge, attitudes, and perceptions among dental students in Saudi Arabia.

The present study showed that 92.4% of the students had received training in infection control in dental practice. This outcome could be explained by the fact that dental schools in Saudi Arabia have provided infection control training sessions in their curriculum and that they are familiar with infection control measures and risk assessment in dental practice. In contrast, only 24.2% had attended training regarding COVID-19, which might be related to the fact that it is a new pandemic, giving the participants no chance to attend lectures

and training programs. Another explanation is the time of the questionnaire distribution, which was during final year vacation at the university.

All the participants exhibited adequate knowledge related to the mode of transmission and the common symptoms of COVID-19. These outcomes are comparable to the results reported in a similar study among Jordanian dentists [12]. Awareness of the students in the present study of potential modes of transmission and main symptoms of the virus could be attributed to the efforts of the Ministry of Health in Saudi Arabia to raise awareness through social media, cell phone messages, and television programs. This awareness will help dental students recognize possible hazardous activities and urge them to follow preventive measures against the virus when performing dental procedures. On the other hand, only a few students in the current study reported that rash and red eyes are among the COVID-19 symptoms, probably because they are rare symptoms and less likely to be seen.

Similar to the percentage reported among Turkish students [24], 82.9% of students in the present study reported that antibiotics would not be useful in COVID-19 treatment, perhaps because they knew that it is a viral infection. In this study, the majority of students identified practicing frequent hand hygiene by using alcohol-based hand rubs or soap and water, putting a facemask on known or suspected patients, maintaining social distancing, and routinely cleaning and disinfecting surfaces as preventive measures for COVID-19 transmission. These findings are consistent with outcomes reported among Jordanian dentists [12]. The timing of the questionnaire distribution, which occurred early, before vaccine availability, could explain the high percentage (97.2%) who correctly answered that there was no available vaccine for the virus. It was noticed that there is a direct relation between academic year and the overall knowledge scores of this study, with highly significant percentages among interns. This finding highlights that years of practice may affect students' knowledge about infection control guidelines in dental clinics. However, the knowledge of COVID-19 being lower among the 4th and 5th grade students may be due to the likelihood that senior 6^{th} year students and interns, who have more clinical experience and are better trained at self-directed learning, get their information from scientific and authorized websites rather than TV and social media. Another possible explanation is the duration of 40 days and timing of collecting students' responses in June 2020, when the pandemic was still evolving and knowledge about it changed on a daily basis.

Regarding students' attitudes and perceptions, more than half of the students (58.1%) perceived COVID-19 as moderately dangerous. This result is similar to that reported by other studies among dentists and dental faculty [12, 25]. When questioned about their confidence in handling suspected COVID-19 patients, only 13.5% of the students responded that they were not confident at all. This finding is much lower than that reported by Ataş and Yildirim, in which 92% of clinical dental students were afraid of being infected with COVID-19 [24]. A certain percentage (18.3%) disagreed with using antimicrobial preoperative mouth rinsing. A possible explanation for this could be the knowledge gap in the fact that saliva is loaded with oral microbes or that using preoperative mouth rinsing would reduce the proportion of microorganisms in oral aerosols. The majority of the students (92.7%) agreed that the use of rubber dams or high-volume saliva ejectors could reduce the possibility of transmitting the infection to dentists. These findings highlight the good knowledge of dental students in knowing that aerosol and droplet production during dental procedures could transmit infection. However, 58.4% of the students disagreed that intraoral dental radiographs should be avoided to reduce the possibility of transmitting the infection to dentists. This result declared the poor understanding that intraoral radiographs will increase salivary secretion and stimulate gag or cough reflexes.

Regarding the question about how well they were prepared for the COVID-19 outbreak, 45.9% responded that they were not prepared. This outcome emphasizes the need for additional infection control training sessions to ensure that all students are well prepared to deal with infectious diseases.

This study may be subject to selection bias since the questionnaire was self-reported and was distributed through social media, which may limit the ability to generalize the results.

CONCLUSION

The results of the present study concluded that dental students at different Saudi universities had good knowledge of the COVID-19 pandemic. Although they had a positive attitude regarding the standard infection control measures against the virus causing that disease, much more information about preventive measures of its transmission in dental clinics is needed. This finding emphasizes the need for additional infection control training sessions to update students' knowledge about recent international guidelines to combat infection by the SARS CoV2 virus.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study received ethical approval from the Institutional Review Board (IRB) of the Faculty of Dentistry, Umm Al-Qura University (IRB No. 177–20).

HUMAN AND ANIMAL RIGHTS

No Animals were used in this research. All human research procedures were followed in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

All participants in the study agreed to study publication by answering the study questionnaire.

AVAILABILITY OF DATA AND MATERIALS

The data supporting the findings of this study are with the corresponding author, [T.M.A], and can be made available upon reasonable request.

FUNDING

None.

CONFLICTS OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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