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Knowledge and Attitudes of Dental Students on COVID-19: A Survey Study from Türkiye

Diş Hekimliği Öğrencilerinin COVID-19 Hakkındaki Bilgi ve Tutumları: Türkiye'den Bir Anket Çalışması

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ABSTRACT Objective: This study aimed to evaluate undergraduate dental students' knowledge and attitudes about Coronavirus disease-2019 (COVID-19) under the influence of their clinical experience from different universities. **Material and Methods**: An electronic survey formed via Google Forms with 29 questions was sent to dentistry students from social media platforms. Answers were collected between May 17, 2020 and June 6, 2020 electronically. The estimated sample size with 95% significance and 5% Type II error was 382 participants. Chi-square tests were used to compare ratios and the significance level was set at $p<0.05$. **Results:** Survey was responded by 840 students. Only 37% of the students have clinical experience while the others have not. Students know symptoms, transmission routes, incubation period, and the mortality rate of COVID-19. More than 80% of students specify that the dental profession and education will change significantly because of COVID-19 ($p<0.05$) especially endodontics, conservative dentistry, and oral surgery. Production of the vaccine has a significant positive effect on the stress levels of students when treating a patient infected with COVID-19 or a patient with symptoms of COVID-19 ($p<0.05$). During the COVID-19 pandemic, online sources such as social media, scientific websites play an essential role in gathering information. **Conclusion:** Students have a good level of knowledge about COVID-19. Clinical practice has a significant effect on students' perception levels. It seems that students would be stressed even during the treatment of patients with negative COVID-19 polymerase chain reaction test until the introduction of definitive treatment.

Keywords: COVID-19; dentistry; students; vaccines

ÖZET Amaç: Bu çalışmanın amacı, farklı üniversitelerdeki diş hekimliği lisans öğrencilerinin klinik deneyimlerinin etkisi altında Koronavirüs hastalığı-2019 [coronavirus disease-2019 (COVID-19)] hakkındaki bilgi ve tutumlarını değerlendirmektir. **Gereç ve Yöntemler:** Diş hekimliği öğrencilerine, Google Formları üzerinden 29 sorudan oluşan elektronik bir anket sosyal medya platformları aracılığıyla gönderilmiştir. Cevaplar, 17 Mayıs 2020-6 Haziran 2020 tarihleri arasında elektronik ortamda toplanmıştır. Yüzde 95 anlamlılık ve %5 Tip II hata ile tahmini örneklem büyüklüğü 382 katılımcı olarak belirlenmiştir. Oranların karşılaştırılmasında ki-kare testi kullanılmış ve anlamlılık düzeyi $p<0,05$ olarak belirlenmiştir. **Bulgular:** Anket, 840 öğrenci tarafından yanıtlanmıştır. Öğrencilerin sadece %37'si klinik deneyime sahip olup; diğerleri klinik deneyime sahip değildir. Öğrenciler COVID-19'un semptomları, bulaşma yolları, kuluçka süresi, ölüm oranı hakkında bilgi sahibidir. Öğrencilerin %80'den fazlası, özellikle endodonti, konservatif diş hekimliği ve ağız cerrahisi başta olmak üzere COVID-19 nedeniyle diş hekimliği mesleğinin ve eğitiminin önemli ölçüde değişeceğini belirtmektedir ($p<0,05$). Aşı üretiminin, öğrencilerin COVID-19 ile enfekte veya COVID-19 semptomları olan hastaları tedavi ederken stres düzeyleri üzerinde anlamlı pozitif etkisi vardır ($p<0,05$). COVID-19 salgını sırasında sosyal medya, bilimsel web siteleri gibi çevrimiçi kaynaklar bilgi toplamak için önemli bir rol oynamaktadır. **Sonuç:** Öğrenciler, COVID-19 hakkında iyi düzeyde bilgi sahibidir. Klinik uygulamanın, öğrencilerin algı düzeyleri üzerinde önemli bir etkisi vardır. COVID-19 polimeraz zincir reaksiyon testi negatif olan hastaların tedavisi sırasında bile hastalığın kesin bir tedavisi bulunana dek öğrencilerin stres altında kalacağı görülmüştür.

Anahtar Kelimeler: COVID-19; diş hekimliği; öğrenciler; aşılar

Coronavirus disease-2019 (COVID-19), also known as severe acute respiratory syndrome-CoV-2 (SARS-COV-2), is a new member of the CoV family, emerging in China in December 2019 and spreading all over the world in a short time.[1] CoVs are defined by the World Health Organization (WHO) as a large family of viruses that can cause disease in animals and humans. COVID-19 causes respiratory failure,

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which can be transmitted through droplets, accompany symptoms similar to the common cold and may result in mortality, especially in older individuals and/or individuals with underlying systemic problems.[2] Incubation period is 5 days on average, but it may take 1-14 days.

The virus can pass into the saliva through the upper and/or lower respiratory tract or gingival sulcus fluid.[3] In a recent study, 91.7% of the infected patients have been shown to have live viruses in their saliva.[4] Most dental treatments require interfering with enamel and dentine, which are among the most calcified tissues of the body. In this case, dental interventions are carried out with high-pressure rotating dental handpieces under cold water to protect dental tissues, which causes droplets and aerosols containing oral bacteria, viruses, fungi, and blood intensely.[5] Isolation of COVID-19 from saliva and the duration of aerosol-forming dental procedures put dentists and dental patients in a high-risk group for the COVID-19.[4,6] It has been suggested to postpone dental treatments of COVID-19 patients with symptoms, however; it has been shown that the virus was transmitted by the asymptomatic patients as well.[7] Furthermore, it has been reported that asymptomatic patients are responsible for 79% of the spread of the infection.[8] As a result of a questionnaire on Jordanian dentists, it was reported that the dentists knew the transmission routes and the symptoms of COVID-19 and the precautions that should be taken in clinics in a possible situation, but they did not have sufficient information about how to protect the assistant staff and other patients.[9] During the pandemic, telemedical dental services were also suggested for patients with complaints before coming to the hospital, especially in resolving complaints of soft tissues in the mouth.[10,11]

Strict measurements of cross-contamination are taken during treatments especially for patients with infectious diseases, which may spread by bloodborne or dental aerosols such as severe acute respiratory syndrome, tuberculosis, hepatitis B or C and human immunodeficiency virus (HIV) etc. Although dental students were more enthusiastic about treating HIV-positive patients than the graduated ones, more than 60% of them mentioned that they were stressed during this treatment in both groups.[12] It has been reported that knowledge level played an important role in willingness to treat patients with a contagious disease such as HIV.[13] It is clear that the higher infectiousness of COVID-19, especially when compared to SARS-CoV and Middle East respiratory syndrome-CoV, increases the stress levels of dentists during dental treatments.[14] There are more than 200,000 studies according to PubMed search about COVID-19. Knowledge and attitudes of dental students about COVID-19 are popular study topics. Different national results have been reported from India, Nigeria, Saudi Arabia, Austria, and Croatia regarding knowledge and attitudes about COVID-19.[15-20] The purpose of this study was to further evaluate undergraduate dental students' knowledge and attitudes about COVID-19 from different Turkish universities and the effect of their clinical experience on their attitudes.

MATERIAL AND METHODS

The study was conducted according to the criteria set by the Declaration of Helsinki and each subject signed informed consent before participating in the study. Following approval of the ethics committee (Hacettepe University Non-invasive Clinical Research Ethics Committee, date: May 22, 2020, number: 2020/10-46), an online survey of 29 questions was created by researchers using Google documents. The questions are shown in Table 1. Answers were collected between May 17, 2020 and June 6, 2020 electronically via a link that was shared on social media platforms. The estimated sample size with 95% significance and 5% Type II error was 382. Possible answers were created using checkboxes and free text options. Multiple responses were allowed in 11 questions. The questions were based on information collected from the recent literature about COVID-19.[15-20] If one or more questions were left unanswered, except question 17B, an error message was sent to the participants to ensure that all questions were completed. To facilitate the collection of unbiased data, participants were informed that the questionnaire was completely anonymous and the identity of the participant was not linked to individual responses.

TABLE 1: Questionnaire.

Number	Question	Answer Options
1	Gender	☐ Female ☐ Male
2	How many years have you been at the university?	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 and more
3	Your current grade	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
4	From where did you get information about COVID-19?	☐ I did not get information ☐ Media (TV, newspaper) ☐ Social media ☐ Internet (scientific) ☐ Internet (general) ☐ Friends, family ☐ Courses ☐ Education, meeting ☐ Other
5	Are you afraid of becoming infected with COVID-19?	☐ 1 ☐ 2
6	When do you think the COVID-19 outbreak will end?	☐ When the air temperature rises ☐ Within 1-2 months ☐ Within 6 months-1 year ☐ Within 1-2 years ☐ Within 2-5 years ☐ Within 5-10 years ☐ Within more than 10 years ☐ Other
7	In which way or ways is COVID-19 transmitted?	☐ With kissing ☐ With a handshake ☐ Sexually ☐ With blood ☐ By inhalation ☐ During birth ☐ Other
8	What is the first contamination source of COVID-19?	☐ Not known ☐ Bats ☐ Human ☐ Camels ☐ Penguins ☐ Other
9	What is the incubation period of COVID-19?	☐ 1-2 days ☐ 2-14 days ☐ 14-28 days ☐ More than 28 days
10	Which of the following are the signs of COVID-19?	☐ Fever ☐ Cough ☐ Runny nose ☐ Shortness of breath ☐ Pneumonia ☐ Kidney failure ☐ Bleeding ☐ Diarrhea ☐ Sudden loss of consciousness ☐ Other

continue...→

TABLE 1: Questionnaire (*continued*).

Number	Question	Answer Options
11	Who is/are more affected by COVID-19?	☐ Older individuals
		☐ Those with chronic disease
		☐ Children
		☐ Young adults
		☐ Pregnants
		☐ Other
12	What is the mortality rate of COVID-19?	☐ 0-1%
		☐ 1-5%
		☐ 5-10%
		☐ 10-25%
		☐ More than 25%
13	Which of the following can be applied to protect against COVID-19 virus?	☐ Washing hands with soap
		☐ Avoiding contact with sick people
		☐ Using a surgical mask
		☐ Wearing protective eye glasses
		☐ Wearing protective clothing
		☐ Using hand sanitizer
		☐ Closing the nose and mouth with tissue paper
		☐ Using N95 respirators
		☐ Using gloves
		☐ Other
14	Do you wear a mask against COVID-19? When?	☐ I do not use
		☐ On street
		☐ On public transport
		☐ Out of the house
		☐ Traveling
		☐ In crowded environments
		☐ Other
15	Which of the following can prevent COVID-19 infection?	☐ Washing nose with salt water
		☐ Mulberry molasses
		☐ Pomegranate peel
		☐ Ginger
		☐ Vinegar
		☐ Echinacea
		☐ Turmeric
		☐ Other
16	Which of the following behaviors do you avoid during COVID-19?	☐ I cancel my collective meetings and activities with my friends
		☐ I reduce my use of public transportation
		☐ I go to shopping malls less
		☐ I participate less in indoor activities such as theater and cinema.
		☐ I'm trying to stay away from coughing people
		☐ I touch less where people touch frequently
		☐ I'm washing my hands more than ever
		☐ Other
17A	Is there an effective antiviral drug for COVID-19 virus?	☐ Yes ☐ No
17B	If yes, which one? (optional)	☐ Lamivudin
		☐ Ritonavir
		☐ Rifampisin
		☐ Oseltamivir
		☐ Lopinavir
		☐ Other

continue...→

TABLE 1: Questionnaire (*continued*).

Number	Question	Answer Options
18	Do you get flu vaccine every year regularly?	☐ Yes ☐ No
19	Did you get flu vaccine this year?	☐ Yes ☐ No
20	Did you get hepatitis B vaccine this year?	☐ Yes ☐ No
21	Do you have a test measuring hepatitis antibody level every year regularly?	☐ Yes ☐ No
22	"When COVID-19 vaccine is produced, I will get it."	☐ Strongly agree ☐ Agree ☐ Neither agree nor disagree ☐ Disagree ☐ Strongly disagree
23	Do you think COVID-19 disease will affect dentistry profession?	☐ Too much ☐ Much ☐ Medium ☐ Less ☐ Too less
24	Do you think COVID-19 disease will affect dental education?	☐ Too much ☐ Much ☐ Medium ☐ Less ☐ Too less
25	Which branch of dentistry do you think will be affected most by COVID-19?	☐ Conservative dentistry ☐ Endodontics ☐ Oral radiology ☐ Oral surgery ☐ Orthodontics ☐ Pedodontics ☐ Periodontology ☐ Prosthetic dentistry
26	Which topics do you think will be prominent in your education because of COVID-19 in the new education term?	☐ Rubber-dam ☐ 4 handed dentistry ☐ Infection and prevention methods ☐ Sterilization and disinfection ☐ I think it will continue without a change ☐ Other
27	Which personal protective equipment do you use when applying aerosol-containing procedures to a patient infected or suspected with COVID-19?	☐ Mask ☐ Gloves ☐ Eye glasses ☐ Face shield ☐ Surgical mask ☐ N95 ☐ Surgical overalls ☐ Surgical box
28	From where did you get information about personal protective equipments that have to be used during dental treatments of patients with COVID-19?	☐ I did not get information ☐ Media (TV, newspaper) ☐ Social media ☐ Internet (scientific) ☐ Internet (general) ☐ Friends, family ☐ Courses ☐ Education, meeting ☐ Other

continue...→

TABLE 1: Questionnaire (*continued*).

		Too much	Much	Medium	Less	Too less
29	"I will be stressed.....during the aerosol forming dental procedures of patient:					
	a. infected with COVID-19	☐	☐	☐	☐	☐
	b. with negative PCR test for COVID-19	☐	☐	☐	☐	☐
	c.with fever and cough symptoms and unknown PCR test result	☐	☐	☐	☐	☐
	d. without symptoms and unknown PCR test	☐	☐	☐	☐	☐
	e. infected with COVID-19 when a COVID-19 vaccine is produced.	☐	☐	☐	☐	☐
	f. with negative PCR test for COVID-19 when a COVID-19 vaccine is produced.	☐	☐	☐	☐	☐
	g. with fever and cough symptoms and unknown PCR test result when a COVID-19 vaccine is produced.	☐	☐	☐	☐	☐
	h. without symptoms and unknown PCR test when a COVID-19 vaccine is produced.	☐	☐	☐	☐	☐

PCR: Polymerase chain reaction.

DATA ANALYSIS

Responses including all questions of the survey (except for question 17B) were considered for the evaluations. The data were exported to a Microsoft Excel (Microsoft Corp, Redmond, WA, USA) worksheet and formatted to allow analysis using both SPSS package version 22 (SPSS Inc, Chicago, IL, USA) and Microsoft Excel. Eleven of the questions in the present survey included the "other" option, allowing participants to give a clear written response. If more than 5% of respondents gave the same response in this area, this response was integrated into the data set for statistical analysis as a new category. Chi-square tests, correlation coefficients, and differences in ratios were used for the analysis. The significance level was set at <0.05 and the results were reported only when this level was reached.

RESULTS

Eight hundred forty responses meeting the consideration criteria were collected and analyzed. Almost a quarter of the students was female (71%). More than half of the students were attending university for at least 3 years and most of them were in grade 2 and 3. Demographics of the students were shown in Figure 1.

Responses of dental students related to their knowledge and attitudes about COVID-19 are presented in Table 2. Social media, TV, and newspapers were popular as information sources about COVID-19 amongst the students. Almost three-quarters of the students (74%) were afraid of being infected with

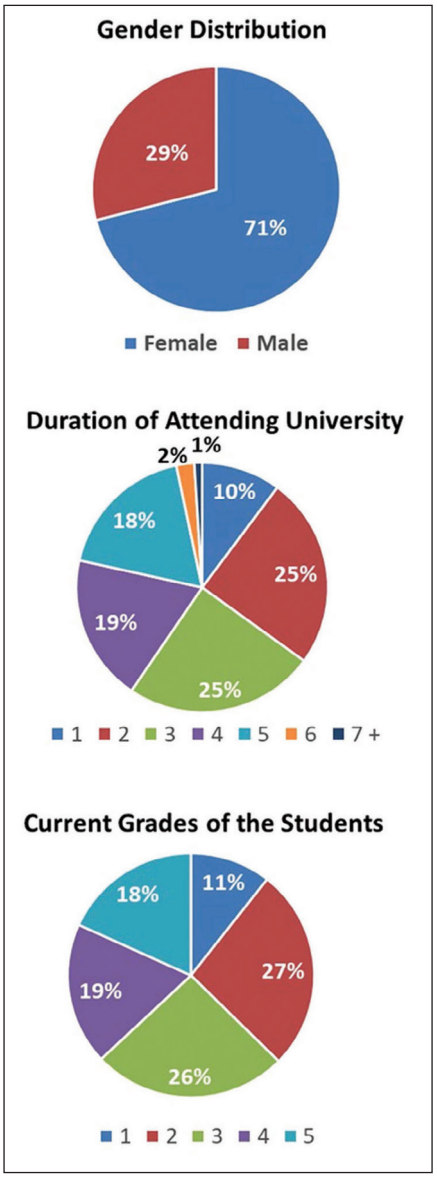

FIGURE 1: Demographics data of the respondents.

TABLE 2: Responses of dental students related to their knowledge and attitudes about COVID-19 virus and infection.

No	Questions	Answers	n (%)
4	From where did you get information about COVID-19?	I did not get information	4 (0.5)
		Media (TV, newspaper)	696 (82.9)
		Social media	633 (75.4)
		Internet (scientific)	605 (72.0)
		Internet (general)	632 (75.2)
		Friends, family	387 (46.1)
		Courses	267 (31.8)
		Education, meeting	201 (23.9)
		Other	6 (0.7)
5	Are you afraid of becoming infected with COVID-19?	Yes	617 (73.5)
		No	223 (26.5)
6	When do you think the COVID-19 outbreak will end?	When the air temperature rises	6 (0.7)
		Within 1-2 months	30 (3.6)
		Within 6 months-1 year	335 (39.9)
		Within 1-2 years	246 (29.3)
		Within 2-5 years	133 (15.8)
		Within 5-10 years	17 (2.0)
		Within more than 10 years	12 (1.4)
		With vaccine	24 (2.9)
		Other	37 (4.4)
7	In which way or ways is COVID-19 transmitted?	With kissing	714 (85.0)
		With a handshake	570 (67.9)
		Sexually	299 (35.6)
		With blood	281 (33.5)
		By inhalation	817 (97.3)
		During birth	294 (35.0)
		Other	8 (1.0)
8	What is the first contamination source of COVID-19?	Not known	456 (54.3)
		Bats	366 (43.6)
		Human	10 (1.2)
		Other (pangolins, penguins)	8 (1.0)
9	What is the incubation period of COVID-19?	1-2 days	3 (0.4)
		2-14 days	762 (90.7)
		14-28 days	74 (8.8)
		More than 28 days	1 (0.1)
10	Which of the following are the signs of COVID-19?	Fever	829 (98.7)
		Cough	804 (95.7)
		Runny nose	187 (22.3)
		Shortness of breath	809 (96.3)
		Pneumonia	397 (47.3)
		Kidney failure	60 (7.1)
		Bleeding	17 (2.0)
		Diarrhea	345 (41.1)
		Sudden loss of consciousness	78 (9.3)
		Other	18 (2.1)
11	Who is/are more affected by COVID-19?	Older individuals	816 (97.1)
		Those with chronic disease	834 (99.3)
		Children	78 (9.3)
		Young adults	9 (1.1)
		Pregnants	195 (23.2)
		Other	8 (1.0)

continue...→

TABLE 2: Responses of dental students related to their knowledge and attitudes about COVID-19 virus and infection (*continued*).

No	Questions	Answers	n (%)
12	What is the mortality rate of COVID-19?	0-1%	91 (10.8)
		1-5%	536 (63.8)
		5-10%	148 (17.6)
		10-25%	51 (6.1)
		More than 25%	14 (1.7)
13	Which of the following can be applied to protect against COVID-19 virus?	Washing hands with soap	824 (98.1)
		Avoiding contact with sick people	821 (97.7)
		Using a surgical mask	732 (87.1)
		Wearing protective eye glasses	613 (73.0)
		Wearing protective clothing	629 (74.9)
		Using hand sanitizer	789 (93.9)
		Closing the nose and mouth with tissue paper	301 (35.8)
		Using N95 respirators	658 (78.3)
		Using gloves	613 (73.0)
		Other	11 (1.3)
14	Do you wear a mask against COVID-19? When?	I do not use	7 (0.8)
		On street	363 (43.2)
		On public transport	322 (38.3)
		Out of the house	567 (67.5)
		Traveling	252 (30.0)
		In crowded environments	430 (51.2)
		Always	322 (38.3)
		Shopping	7 (0.8)
		Other	15 (1.8)
15	Which of the followings can prevent COVID-19 infection?	Washing nose with salt water	297 (35.4)
		Mulberry molasses	54 (6.4)
		Pomegranate peel	23 (2.7)
		Ginger	99 (11.8)
		Vinegar	278 (33.1)
		Echinacea	39 (4.6)
		Turmeric	75 (8.9)
		Hygiene, isolation	67 (8.0)
		None	185 (22.0)
		Other	54 (6.4)
16	Which of the following behaviors do you avoid during COVID-19?	I cancel my collective meetings and activities with my friends	745 (88.7)
		I reduce my use of public transportation	755 (89.9)
		I go to shopping malls less	732 (87.1)
		I participate less in indoor activities such as theater and cinema.	725 (86.3)
		I'm trying to stay away from coughing people	733 (87.3)
		I touch less where people touch frequently	774 (92.0)
		I'm washing my hands more than ever	767 (91.3)
		Other	98 (11.7)
17A	Is there an effective antiviral drug for COVID-19 virus?	Yes	113 (13.5)
		No	727 (86.5)
17B	If yes, which one? (optional)	Lamivudin	132 (15.7)
		Ritonavir	296 (35.2)
		Rifampisin	272 (32.4)
		Oseltamivir	148 (17.6)
		Lopinavir	226 (26.9)
		Remdesivir	62 (7.4)

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TABLE 2: Responses of dental students related to their knowledge and attitudes about COVID-19 virus and infection (*continued*).

No	Questions	Answers	n (%)
18	Do you get flu vaccine every year regularly?	Yes	12 (1.4)
		No	828 (98.6)
19	Did you get flu vaccine this year?	Yes	17 (2.0)
		No	823 (98.0)
20	Did you get hepatitis B vaccine this year?	Yes	176 (21.0)
		No	664 (79.0)
21	Do you have a test measuring hepatitis antibody level every year regularly?	Yes	294 (35.0)
		No	546 (65.0)
22	"When COVID-19 vaccine is produced, I will get it."	Strongly agree	211 (25.1)
		Agree	287 (34.2)
		Neither agree nor disagree	292 (34.8)
		Disagree	35 (4.2)
		Strongly disagree	15 (1.7)
23	Do you think COVID-19 disease will affect dentistry profession	Too much	402 (47.9)
		Much	303 (36.1)
		Medium	104 (12.4)
		Less	21 (2.5)
		Too less	10 (1.2)
24	Do you think COVID-19 disease will affect dental education?	Too much	437 (52.0)
		Much	311 (37.0)
		Medium	77 (9.2)
		Less	11 (1.3)
		Too less	4 (0.5)
25	Which branch of dentistry do you think will be affected most by COVID-19?	Conservative dentistry	165 (19.6)
		Endodontics	181 (21.5)
		Oral radiology	52 (6.2)
		Oral surgery	158 (18.8)
		Orthodontics	27 (3.2)
		Pedodontics	17 (2.0)
		Periodontology	109 (13.0)
		Prosthetic dentistry	131 (15.6)
26	Which topics do you think will be prominent in your education because of COVID-19 in the new education term?	Rubber-dam	518 (61.7)
		4 handed dentistry	203 (24.2)
		Infection and prevention methods	712 (84.8)
		Sterilization and disinfection	723 (86.1)
		I think it will continue without a change	63 (7.5)
		Other	20 (2.4)
27	Which personal protective equipment do you use when applying aerosol-containing procedures to a patient infected or suspected with COVID-19?	Mask	669 (79.6)
		Gloves	814 (96.9)
		Eye glasses	732 (87.1)
		Face shield	823 (98.0)
		Surgical mask	518 (61.7)
		N95	666 (79.3)
		Surgical overalls	665 (79.2)
		Surgical box	568 (67.6)
28	From where did you get information about personal protective equipments that have to be used during dental treatments of patients with COVID-19?	I did not get information	198 (23.6)
		Media (TV, newspaper)	323 (38.5)
		Social media	308 (36.7)
		Internet (scientific)	424 (50.5)
		Internet (general)	331 (39.4)
		Friends, family	139 (16.5)
		Courses	216 (25.7)
		Education, meeting	198 (23.6)
		Other	10 (1.2)

continue...→

TABLE 2: Responses of dental students related to their knowledge and attitudes about COVID-19 virus and infection (*continued*).

"I will be stressed.....during the aerosol forming dental procedures of patient:	Too much	Much	Medium	Less	Too less
i. infected with COVID-19	421 (50.1)	286 (34.0)	104 (12.4)	22 (2.6)	7 (0.8)
j. with negative PCR test for COVID-19	63 (7.5)	139 (16.5)	373 (44.4)	184 (21.9)	81 (9.6)
k. with fever and cough symptoms and unknown PCR test result	370 (44.0)	302 (36.0)	122 (14.5)	38 (4.5)	8 (1.0)
l. without symptoms and unknown PCR test	115 (13.75)	189 (22.5)	345 (41.1)	138 (16.4)	53 (6.3)
m. infected with COVID-19 when a COVID-19 vaccine is produced.	87 (10.4)	186 (22.1)	287 (34.2)	204 (24.3)	76 (9.0)
n. with negative PCR test for COVID-19 when a COVID-19 vaccine is produced.	23 (2.7)	62 (7.4)	200 (23.8)	288 (34.3)	267 (31.8)
o. with fever and cough symptoms and unknown PCR test result when a COVID-19 vaccine is produced.	93 (11.1)	216 (25.7)	305 (36.3)	153 (18.2)	73 (8.7)
p. without symptoms and unknown PCR test when a COVID-19 vaccine is produced.	47 (5.6)	87 (10.4)	294 (35.0)	239 (28.5)	173 (20.6)

PCR: Polymerase chain reaction.

COVID-19. Most of the students thought that the COVID-19 outbreak would end within 6 or 12 months ($p<0.05$).

Inhalation (97%) and kissing (85%) were the most popular transmission routes for COVID-19 according to the students ($p<0.05$). Most of the students mentioned that the first contamination source of COVID-19 is not known yet ($p<0.05$). Most of them mentioned that the incubation period of the virus is 2-14 days ($p<0.05$). Fever, cough, and shortness of breath were significantly the most popular responses about the signs of COVID-19 ($p<0.05$). Older individuals and those with chronic diseases were the ones affected more by COVID-19 ($p<0.05$) and the mortality rate was 1-5% ($p<0.05$) according to the students.

In terms of protective precautions, 68% of the students wore a mask when they leave home. Besides washing hands with soap, avoiding contact with sick people were the most popular ways for protecting against COVID-19. Most of them thought that washing their nose with saltwater and using vinegar for cleaning could prevent COVID-19. During the pandemic, social activities, transport ways, and hand washing habits have abruptly changed for almost 80% of the respondents.

Only 14% said that there was an effective antiviral drug for COVID-19. Amongst the 108 participants who responded to this optional question; ritonavir (35%) and rifampicin (32%) were the most popular drugs while remdesivir (7%) was the least.

Almost none of the students were getting flu vaccines yearly. However, only 2% of the students got the flu vaccine while 21% got the hepatitis B vaccine through this year. Thirty-five percent had a test for measuring hepatitis antibody levels yearly. In terms of the introduction of a vaccine for COVID-19 in the future; 60% of the respondents mentioned that they would get it, while only 6% would not ($p<0.05$). Besides, 35% were undecided about getting a vaccine.

In terms of the possible effects of COVID-19 on dentistry and dental education, respondents thought that both would be affected much by COVID-19 ($p<0.05$). Students having clinical experience (4th and 5th grade) thought that dentistry and dental education would be affected more than the ones without clinical experience (1st, 2nd, and 3rd grade) ($p<0.05$). Results were shown in Figure 2. Students thought that pedodontics, oral radiology, and orthodontics would be affected less when compared to the other specialties ($p<0.05$). Having clinical experience or not resulted in statistically significant different thoughts about the vulnerability of some specialties. Results were shown in Figure 3. In terms of the new education period, students thought that infection prevention methods, sterilization/disinfection, rubber-dam, and four-handed dentistry would be more prominent with significant differences related to their clinical experience. Results were shown in Figure 4.

More than 60% of the respondents knew necessary personal protective equipment that should be used during dental treatments of COVID-19 patients.

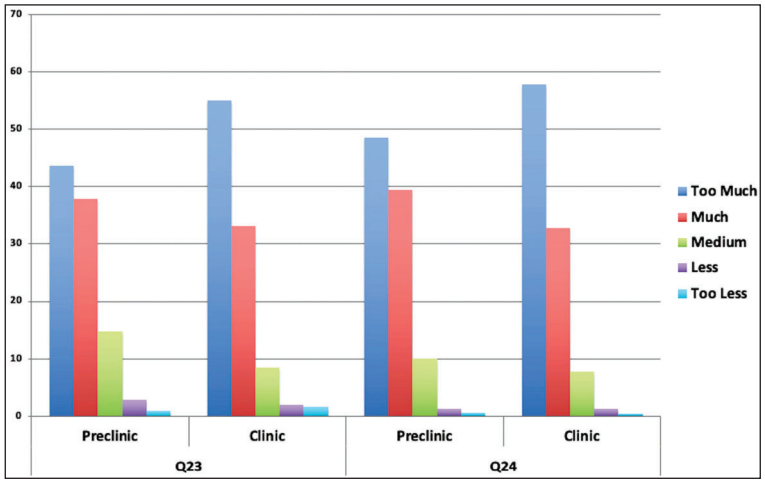

FIGURE 2: Results of responses for Q23 and Q24 depending on clinical experience.

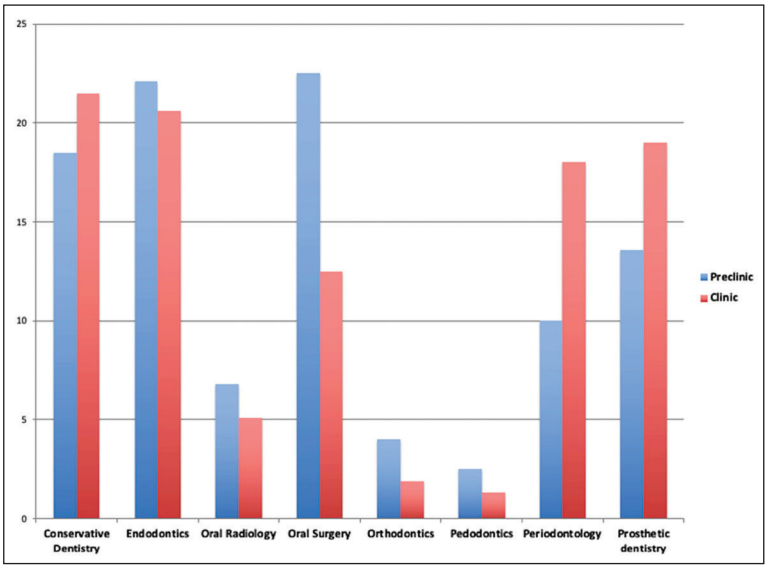

FIGURE 3: Results of response for Q25 depending on clinical experience.

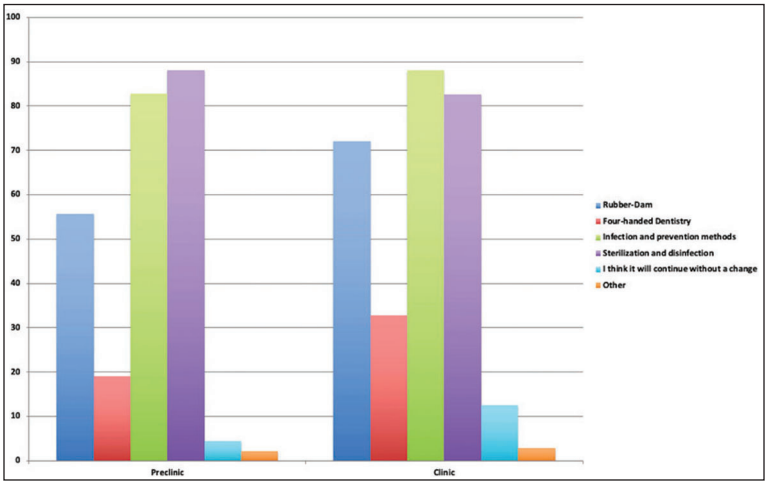

FIGURE 4: Results of response for Q26 depending on clinical experience.

Most of the students follow scientific websites for getting information about personal protective equipment ($p<0.05$).

When the stress levels of students during aerosol-forming dental treatments were evaluated by eight different scenarios, it was shown that the invention of a vaccine for COVID-19 was the most effective factor in relieving stress during treatment of patients with COVID-19 ($p<0.05$).

DISCUSSION

COVID-19 has the potential to cause severe acute respiratory tract infection and has been declared as a "Public Health Emergency of International Concern" by the WHO on January 31, 2020. The present survey aimed to evaluate the knowledge and attitudes of dental students in Türkiye on COVID-19. Survey-based studies have proven to collect information about respondents' preferences, attitudes, opinions, and experiences as in the current study; however, careful data collection and interpretation is required because of the limited accession.[21]

Complaints such as fever, dry cough, and shortness of breath are diagnosed with upper respiratory tract infections in infected patients.[2] More than 90% of the students have information about these symptoms according to the present study. A recent survey reported that 73.9%, 95.1%, and 98.4% of the dental students had positive attitudes towards infection control practices against COVID-19, respectively.[16-18] Respondents of the present survey generally stated that they get information about COVID-19 from social media, TV, and newspapers. Social media was similarly one of the most popular answers in surveys conducted in India and Nigeria.[15,17] However, scientific websites were more popular as the source of knowledge about personal protective equipment. Almost 80% of the students reported that N95 respirators and surgical overalls have to be used during dental treatments besides disposable gloves, face shields, and eyeglasses as suggested by WHO and American Diabetes Association.

Students have information about transmission ways as well. Inhalation was the most popular way amongst the students. Direct contact and droplet transmission as well aerosol transmission are the possible routes of COVID-19 transmission as the respondents stated.[6] The aerosols are generated by the dental high-speed handpiece, ultrasonic scaler, and air-water syringe during routine dental procedures and they are potentially hazardous for dental care staff and patients. Some dental procedures can take more than an hour and close contact (approx. 35-40 cm) between the patient and the dentist creates a high risk of infecting with COVID-19.[22] In a recent review, it has been reported that 38 types of microorganisms could be found in the air of a dental clinic besides, it was reported that COVID-19 virus could remain in the air up to 3 hours post aerosolization.[23,24] Although there is no reported case of COVID-19 transmission in the dental office, given the high contagiousness of the disease, dental staff should be alert and provide a healthy environment for patients and themselves, as well as dental students.

Most of the dental faculties have started online education, during the COVID-19 pandemic. It has been reported that online dental education has been vital to the continuation of didactic learning during the pandemic but had limitations in facilitating preclinical and clinical education.[25] Dental education is unique with the requirement of hands-on training and clinical practice. In the present survey, there are statistical differences between answers of students with and without clinical experience especially for questions about profession and education. When the topics that could be furtherly take place in new education term was asked, rubber-dam was the preference of 72% of the students with clinical experience and 56% of those without clinical experience. Rubber-dam provides barrier protection from cross-contamination and when placed correctly, it may eliminate all pathogens emerging from respiratory secretion.[26] The second most popular topic for the students was the four-handed working style especially amongst students with clinical experience compared to others.

The rate of students who thought that profession of dentistry will change much in the next few years was 90% and 80% for those with or without clinical experience, respectively. In terms of the expectation of change in specialties, conservative dentistry and endodontics are popular for students with clinical ex-

perience while oral surgery and endodontics are for those without clinical experience. Education in dentistry covers 5 years in Türkiye. Generally, students who take preclinical and basic science courses in the first 3 years follow the education program by treating patients during the 4th and 5th years. Currently, dental faculties, like all higher education institutions, have switched to online education and clinical courses were interrupted. Consequentially, the absence of practical applications and one-to-one chair-side training created questions in minds related to the completeness of dental education. A previous study, revealing the importance of clinical experience in dental education is consistent with the present study, reported that students were almost 5 times more satisfied when the clinical experience was a part of their education of implantology.[27]

Reports on previous epidemics such as SARS revealed that several factors are leading to psychological trauma in healthcare practitioners such as fear of getting infected while treating an infected patient, or infecting a family member.[28,29] In a recent survey, it has been reported that 87% of dentists were afraid of getting infected with COVID-19 from either a patient or a co-worker.[30] In the present survey, 74% of the students were also afraid to be infected with the COVID-19 virus. Age of the individuals might be one of the reasons for this difference as it is known that older are more affected by COVID-19.[2,7] Although, 74% of the students were afraid to be infected with COVID-19 in the present study, 84% of them felt stressed during dental treatment of patients with COVID-19. It has been reported that 90% of the respondents were anxious while treating a patient coughing or suspected to be infected with COVID-19.[30]

Stress levels of students about treating the patient were also evaluated via eight clinical scenarios. The main difference among these scenarios was the introduction of the COVID-19 vaccine. It has a significant positive impact on stress levels. In the case of the introduction of a vaccine, 37% of the students felt more stressed during the treatment of patients with fever and cough symptoms and unknown polymerase chain reaction tests, otherwise, the rate increased to 80%. It is clear that students are anxious about treating patients until the introduction of a vaccine, therefore, simulated patient models or virtual education may take place in dental education during this period.[31,32]

Researches about the introduction of an effective vaccine and cure for COVID-19 are being conducted all around the world however, to date there is no standard treatment protocol used. More than half of the students are in agreement about being vaccinated in case of introduction of a vaccine however, a considerable amount of them (35%) are indecisive. In a recent study from the United States of America, it has been reported that 16.3% of the respondents would not take the COVID-19 vaccine even if mandated.[33] This percentage is too high compared to current study results (nearly 5%), however, a difference between the number of respondents (248 vs 840) could be one reason for this result.

CONCLUSION

Under the limitations of this study, it can be concluded that dental students are aware of COVID-19 and think that dental education and dentistry will be affected by it. The effect of clinical experience on responses about dentistry and education revealed the efficiency of clinical experience during dental education. Considering the importance of clinical experience, faculties should review their facilities and revise their teaching models with e-learning activities.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

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