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Do dental students regret the career choice because of COVID-19 pandemic?

Diş hekimliği öğrencileri COVID-19 pandemisinde meslek seçimlerinden pişman mı?

Elif YEĞİN[1]
Elif Ece KALAOĞLU[2]

[1]Department of Prosthodontics, İstanbul Medeniyet University, Faculty of Dentistry, İstanbul, Turkey
[2]Department of Pedodontics, Biruni University, Faculty of Dentistry, İstanbul, Turkey

ABSTRACT

Objective: Dentists have high risk of being infected during COVID-19 pandemic. This cross-sectional study aimed to evaluate the dental students' knowledge and anxiety levels, online education views and the rate of career choice regret associated with COVID-19.

Methods: An online questionnaire was formed on Google docs and shared only with the dental students. Questionnaires were divided into three sections as knowledge about COVID-19, anxiety against pandemic and online education feedbacks. Mann-Whitney U Test and Spearman Rho correlation Analyses were used to analyze the relationship between knowledge and anxiety levels.

Results: Knowledge level scores of the preclinical group were statistically significantly lower than the clinical group ($P = .000$; $P < .05$). Anxiety decreased as the level of knowledge increased. (r = -0,116, $P = .007$). 27.7% of the students regretted choosing dentistry and their anxiety score was found to be significantly higher than those who did not regret ($P = .000$; $P < .05$).

Conclusion: The knowledge of dental students on COVID-19 is acceptable and it reduces the anxiety. Dental students should be educated about COVID-19 infection to reduce their anxiety and regret, as well as to make them more confident and conscious. Educational policies should be determined by considering the expectations and demands of the students.

Keywords: Anxiety, COVID-19, dental students, knowledge, online education

ÖZ

Amaç: Diş hekimlerinin COVID-19 salgını sırasında enfekte olma riski yüksektir. Bu kesitsel çalışma, diş hekimliği öğrencilerinin COVID-19 pandemisi ile ilgili kaygı ve bilgi düzeylerini, online eğitime dair görüşlerini ve kariyer seçimi sebebiyle pişmanlık oranlarını değerlendirmeyi amaçlamaktadır.

Yöntemler: Google docs üzerinde online bir anket oluşturulmuş ve diş hekimliği öğrencileri ile paylaşılmıştır. Anket, COVID-19 hakkında bilgi, pandemi kaygısı ve online eğitim geri bildirimleri olmak üzere üç bölüme ayrılmıştır. Bilgi ve kaygı düzeyleri arasındaki ilişkiyi incelemek için Mann-Whitney U Testi ve Spearman Rho Korelasyon Analizleri kullanılmıştır.

Bulgular: Preklinik grubunun bilgi düzeyi klinik grubuna göre istatistiksel olarak anlamlı derecede düşüktür ($P = ,000$; $P < ,05$). Bilgi düzeyi arttıkça, kaygı düzeyi azalmıştır (r = -0,116, $P = ,007$). Öğrencilerin %27,7'si diş hekimliği seçiminden pişmanlık duymaktadır ve kaygı puanları pişmanlık duymayanlara göre istatistiksel olarak anlamlı derecede yüksek bulunmuştur ($P = ,000$; $P < ,05$).

Sonuç: Diş hekimliği öğrencilerinin COVID-19 hakkındaki bilgileri kabul edilebilir düzeydedir. Öğrencilerin daha bilinçli ve özgüven sahibi olmalarını sağlamak için, kaygı düzeylerinin ve pişmanlık oranlarının azaltılmasına yönelik COVID-19 enfeksiyonu hakkında eğitim verilmelidir. Eğitim politikaları, öğrencilerin beklenti ve taleplerini dikkate alarak belirlenmelidir.

Anahtar Kelimeler: Anksiyete, bilgi düzeyi, COVID-19, diş hekimliği öğrencileri, online eğitim

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Corresponding Author/Sorumlu Yazar:
Elif Ece KALAOĞLU
E-mail: elifece.sar@gmail.com

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INTRODUCTION

Coronavirus disease (COVID-19) is a contagious respiratory disease which was recognized in Wuhan, China in December 2019 and was declared a pandemic by the World Health Organization (WHO) on March 11, 2020. Its main clinical symptoms are fever, difficulty in breathing, dry cough, malaise and myalgia.[1-3] Transmission occurs through respiratory droplets from close contact with the infected individual and the incubation period is between 2 and 14 days. Infectivity is very similar for symptomatic and asymptomatic patients with the same viral load. Because of this, the transmission potential from the infected individuals in the early days of the disease is extremely high.[4]

Dentists have high risk of being infected and spreading the infection because of the constant exposure to patient-induced droplets and aerosols.[5-8] Therefore, dentists and dental students should be very careful and develop strategies to prevent COVID-19. Hand hygiene, use of personal protective equipment (PPE),

and cross-contamination prevention procedures for all personnel should be carefully considered, especially when performing aerosol-generating procedures.[7,9] Because it is known that insufficient clinical experience will cause dental students to be more exposed to infectious diseases.[10] And this whole process is mentally challenging for both dentists, academic staff and dental students.[11]

In addition, the travel restrictions introduced during the quarantine caused international students to stay away from their country for a long time, which increased anxiety and stress. Also, online education has replaced face-to-face education.[12] The fear of inability to comprehend the desired information on time, the increased content of the curriculum, fear of making a wrong career choice, lack of professional progress, or loss of future earnings also led to increase anxiety among students.[11]

In the literature, there are few studies[2,9,13] evaluating the knowledge and anxiety levels of dental students about COVID-19, whereas there are no studies evaluating their thoughts on the online education. Therefore, the present study aims to evaluate the knowledge and anxiety levels of dental students, their views on online education, the rate of career choice regret associated with COVID-19 and to guide the education policy by correlating these data. The null hypotheses of the present study were that; 1. there was no difference between the knowledge levels of the preclinical and clinical classes, 2. there was no difference between the anxiety levels of the preclinical and clinical classes, 3. there was no correlation between the knowledge and anxiety levels of the preclinical and clinical classes 4. there was no difference between the regret of the choice of dentistry and the knowledge and anxiety levels of preclinical and clinical classes.

MATERIAL AND METHODS

Research and Publication Ethics: The ethics committee approval was obtained from Biruni University (Date: September 16, 2020, Protocol No:2020/43-09) and it was full agreement in Declaration of Helsinki.

An online questionnaire was formed on Google docs and shared only with the dental students of Biruni University. The data collected for a ten-day period. All universities closed in Turkey after the first COVID-19 case was confirmed on 11th March 2020. The education continued online until the semester ended. The study was conducted during September 2020, when all international and local students were staying with their family at their hometowns and waiting for news about opening schools in October or not. The total number of dental students in the university was 667. The sample size was calculated as 244 with a 95 percent confidence interval and a 5 percent margin of error. The online survey link was sent to every dental student of Biruni University by e-mail. Participation in this survey was anonymous. Volunteer students attended and filled the survey online. Students who dropped out of school were not included in the study to avoid bias.

Questionnaires were divided into three sections as 1) General & professional knowledge about COVID-19 2) General & professional anxiety against pandemic and 3) Online education feedbacks from students during COVID-19 outbreak. Republic of Turkey the Ministry of Health COVID-19 Guide[14] and the Turkish Dental Association's Dental Procedures in Clinics in the COVID-19 Outbreak Guide[15] were used for knowledge section. Previous studies[5,16] were referred on anxiety section. COVID-19 knowledge assessment consists of a total of 28 questions, 27 of which were true/false and 1 open-ended question. In the part where anxiety was evaluated, there were 11 general and 17 professional expressions, total of 28 questions. A 5-point Likert scale was used. Knowledge and anxiety were examined separately in three parts: general, professional and total. The classes were evaluated both as a paired group comparison among themselves and as preclinical (1st, 2nd, and 3rd Classes)/ clinical classes (4th, 5th Classes). It was checked whether there was a statistical relation between anxiety and knowledge level. Online education feedback part had two sections. First section was about online education between March-July 2020, second section was about next semester October 2020-2021 (online or face to face education). Answers were given as an overall percentage.

Statistical Analysis

IBM Statistical Package for the Social Sciences version 22 (IBM SPSS Corp., Armonk, NY, USA) program was used for statistical analysis. Shapiro Wilks test was performed for the suitability of the parameters to the normal distribution. In addition to descriptive statistical methods (mean, standard deviation, frequency), Kruskal Wallis test was used to compare the parameters that did not show normal distribution in the comparison of quantitative data, and Dunn's test was used to determine the group that caused this difference. The parameters that did not show normal distribution between two groups were compared with the Mann-Whitney U test. Spearman's rho correlation analysis was used to examine the relationships between non-normally distributed parameters. Significance was evaluated at the $P < .05$ level.

RESULTS

A total of 534 dental students participated in present survey (173 men, 32.4%; 361 women, 67.6%; mean age = 21.84, SD = 1.97). The response rate was 79.7%. The demographic characteristics of the study group were given in Table 1. The monthly income of approx-

Table 1. Demographics characteristics

		Min-Max	Mean±SD
Age		18-35	21.84±1.97
		n	%
Gender	Male	173	32.4
	Female	361	67.6
University Year	1st year	109	20.4
	2nd year	165	30.9
	3rd year	132	24.7
	4th year	73	13.7
	5th year	55	10.3
Group	Preclinical (1.2.3)	406	76
	Clinical (4.5)	128	24
Monthly income of the family	Increase	15	2.8
	Decrease	269	50.4
	Same	250	46.8
You infected	Yes	26	4.9
	No	508	95.1
Someone close to you infected	No	198	37.1
	Family	59	11
	Relatives	148	27.7
	Friends	129	24.2
Information source about Covid-19	Newspaper	119	22.3
	TV	424	79.4
	Social media	466	87.3
	Ministry of health	440	82.4
	WHO	278	52.1
	Family	234	43.8
	Friend	229	42.9
	Webinar	118	22.1
	Scientific article	118	22.1
	Whatsapp	136	25.5

imately half of the participants decreased. Most of the students (95%) were not infected with COVID-19. Social media (87%), Ministry of Health (82.4%) and TV (79.4%) were the most selected source of COVID-19 information. In Table 2, there were general and professional information questions about COVID-19. Only 24% of the students knew that COVID-19 is not a DNA virus. Almost all students know the symptoms and isolation time. Less than half of the students knew that 70 percent alcohol is sufficient for disinfecting clinical surfaces. The most selected 'Don't know' question was about first choice of pain reliever during pandemic. Personal protective equipment order (wear/remove) was also confusing for students. In a suspected case; 40.3% of the students called emer-

Table 2. Distribution of answers given to knowledge questions

	True	False	Don't know
	n (%)	n (%)	n (%)
General information			
The virus responsible for COVID-19 is in the coronavirus family, in which with SARS-CoV and MERS-CoV.	411 (77)	13 (2.4)	110 (20.6)
Coronaviruses are single-stranded, enveloped, DNA viruses.	205 (38.4)	128 (24)	201 (37.6)
COVID-19 is transmitted by close contact from infected individuals or animals	375 (70.2)	137 (25.7)	22 (4.1)
Asymptomatic people cannot be infectious	45 (8.4)	444 (83.1)	45 (8.4)
The incubation period ranges from 2-14 days.	514 (96.3)	6 (1.1)	14 (2.6)
The most common symptoms are fever, cough, and shortness of breath.	534 (100)	-	-
Loss of sense of smell and taste may be observed.	515 (96.4)	3 (0.6)	16 (3)
Diarrhea may occur.	449 (84.1)	23 (4.3)	62 (11.6)
The virus cannot survive on objects for hours.	124 (23.2)	380 (71.2)	30 (5.6)
There is no specific treatment for the disease.	502 (94)	16 (3)	16 (3)
People who have come into contact with infected individuals should be isolated for 14 days.	529 (99.1)	3 (0.6)	2 (0.4)
Effective social distance in preventing transmission is 1 meter.	190 (35.6)	332 (62.2)	12 (2.2)
Professional information			
Dentists are in the high risk group for contamination.	528 (98.9)	4 (0.7)	2 (0.4)
Hand washing time is at least 20 seconds and water and soap are sufficient.	482 (90.3)	48 (9)	4 (0.7)
Cleaning the surfaces with 70% alcohol disinfectant is sufficient in clinics.	256 (47.9)	157 (29.4)	121 (22.7)
The most effective mask to prevent infection is N-95.	417 (78.1)	42 (7.9)	75 (14)
The use of surgical masks in the clinic is sufficient for dentists.	61 (11.4)	427 (80)	46 (8.6)
Ibuprofen should be the first choice as a pain reliever during the pandemic.	95 (17.8)	164 (30.7)	275 (51.5)
Order to wear personal protective equipment (multiple choice question)	227 (42.5)	307 (57.5)	-
Order to remove personal protective equipment (multiple choice question)	277 (51.9)	257 (48.1)	-
Clinics should be ventilated between patients with air conditioning or ventilators.	104 (19.5)	384 (71.9)	46 (8.6)
Aerosol-generating operations should be avoided unless urgent.	444 (83.1)	4 (0.7)	86 (16.1)
The patient's medical condition, contact or travel history is questioned and anamnesis is taken before the appointment,.	508 (95.1)	3 (0.6)	23 (4.3)
Before the procedure, patients should have a mouthwash containing 1.5% hydrogen peroxide or 0.2% povidone iodine.	240 (44.9)	26 (4.9)	268 (50.2)
Hand tools should be preferred instead of using aerators, cavitrons and micromotors.	284 (53.2)	75 (14)	175 (32.8)
Saliva absorbers with high absorption power should be used during the procedure in clinics.	422 (79)	29 (5.4)	83 (15.5)
The use of rubber dam etc. insulation products should be avoided during the process.	47 (8.8)	331 (62)	156 (29.2)

Table 3. Distribution of answers given to anxiety questions

Anxiety	Never	Rarely	Sometimes	Usually	Always
	n (%)	n (%)	n (%)	n (%)	n (%)
General anxiety					
It worries me that people die from COVID-19.	8 (1.5)	28 (5.2)	71 (13.3)	124 (23.2)	303 (56.7)
When I go to public places. I feel worried about getting COVID-19.	19 (3.6)	25 (4.7)	78 (14.6)	121 (22.7)	291 (54.5)
I see a high probability of getting COVID-19.	19 (3.6)	75 (14)	174 (32.6)	87 (16.3)	179 (33.5)
I am often worried that I will catch COVID-19.	47 (8.8)	121 (22.7)	121 (22.7)	67 (12.5)	178 (33.3)
Thoughts about COVID-19 affect my sleep patterns.	235 (44)	97 (18.2)	67 (12.5)	38 (7.1)	97 (18.2)
I often avoid talking about COVID-19 as it will create tension / fear for me.	182 (34.1)	107 (20)	76 (14.2)	49 (9.2)	120 (22.5)
I am afraid that I will catch COVID-19 when someone I don't know comes near me.	43 (8.1)	76 (14.2)	113 (21.2)	98 (18.4)	204 (38.2)
As my knowledge of COVID-19 increases. so does my anxiety.	81 (15.2)	72 (13.5)	140 (26.2)	88 (16.5)	153 (28.7)
COVID-19 has affected my personality.	183 (34.3)	98 (18.4)	76 (14.2)	56 (10.5)	121 (22.7)
When someone near me sneezes / coughs. I am afraid that I will get COVID-19.	22 (4.1)	63 (11.8)	107 (20)	115 (21.5)	227 (42.5)
I often think about COVID-19 during the day.	75 (14)	147 (27.5)	105 (19.7)	72 (13.5)	135 (25.3)
Professional anxiety					
I'm afraid to get infected from a patient.	39 (7.3)	50 (9.4)	81 (15.2)	88 (16.5)	276 (51.7)
I'm afraid that my social environment outside of school will get COVID-19.	40 (7.5)	93 (17.4)	111 (20.8)	97 (18.2)	193 (36.1)
I'm afraid to get infected from a schoolmate.	39 (7.3)	61 (11.4)	84 (15.7)	90 (16.9)	260 (48.7)
If my patient coughs / suspicious findings occur during the procedure. I am worried that COVID-19 will be transmitted.	19 (3.6)	29 (5.4)	55 (10.3)	107 (20)	324 (60.7)
It worries me that my theoretical education is in classrooms.	78 (14.6)	38 (7.1)	62 (11.6)	75 (14)	281 (52.6)
n the new academic year. my preclinical education worries me about the risk of transmission.	95 (17.8)	51 (9.6)	70 (13.1)	64 (12)	254 (47.6)
In the new school year. my clinical training worries me about the risk of transmission.	78 (14.6)	44 (8.2)	61 (11.4)	70 (13.1)	281 (52.6)
If the number of cases increases in the new academic year. I would like the clinical internships to be postponed.	101 (18.9)	45 (8.4)	59 (11)	79 (14.8)	250 (46.8)
If the number of cases increases in the new academic year. I would like the education to be postponed.	136 (25.5)	41 (7.7)	76 (14.2)	56 (10.5)	225 (42.1)
I am worried if my patients talk to me at close range.	23 (4.3)	47 (8.8)	95 (17.8)	100 (18.7)	269 (50.4)
I am afraid of carrying the COVID-19 infection to my family due to my preclinical education.	56 (10.5)	40 (7.5)	43 (8.1)	48 (9)	347 (65)
I am afraid of carrying the COVID-19 infection to my family due to my clinical internships.	56 (10.5)	28 (5.2)	44 (8.2)	45 (8.4)	361 (67.6)
If I get infected I am afraid of being quarantined.	82 (15.4)	56 (10.5)	70 (13.1)	73 (13.7)	253 (47.4)
I'm afraid of doing aerosol procedures (using aerator. cavitron. micromotor) in the clinic.	75 (14)	57 (10.7)	119 (22.3)	73 (13.7)	210 (39.3)
I'm afraid of doing aerosol-free procedures in the clinic.	99 (18.5)	72 (13.5)	129 (24.2)	80 (15)	154 (28.8)
I am afraid dentistry is a profession that requires close contact.	59 (11)	60 (11.2)	76 (14.2)	76 (14. 2)	263 (49.3)
I regret choosing dentistry because of the COVID-19 pandemic.	323 (60.5)	63 (11.8)	55 (10.3)	19 (3.6)	74 (13.9)

gency, 33.5% referred to doctor, 19.3% asked for a vacation/contact with an infected person, 6.9% did not know what to do.

The general, professional and total knowledge level scores of the preclinical group were statistically significantly lower than the clinical group (P = .000; P < .05). There was a statistically significant difference between the classes in terms of general knowledge, professional knowledge and total knowledge scores (P = .000; P < .05). As a result of the paired comparisons made to detect the difference; The all knowledge level scores of the 1st year students were found to be statistically significantly lower than the 2nd, 3rd, 4th and 5th years ($P1$ = .000; $P2$ = .002; $P3$ = .000; $P4$ = .000; P < .05).

Only the professional anxiety score of the preclinical group was found to be statistically significantly lower than the clinical group (P = .039; P < .05). There was no statistically significant difference between the classes in terms of general anxiety score, professional anxiety score and total anxiety scores (P > .05).

Overall, the relationship between knowledge level and anxiety was examined. A reverse relationship was found between them. Anxiety decreased as the level of knowledge increased (r = -0,116, P = .007).

Most of the students (72.3%) did not regret choosing dentistry. The knowledge and anxiety levels of the students who regret choosing dentistry and those who do not have been compared. There was no statistically significant difference between those who regret and those who do not in terms of professional knowledge level and total knowledge level scores (P > .05) however the general knowledge score of those who regret was found to be statistically significantly lower (P = .001; P < .05). The general, professional and total anxiety scores of those who regretted of dentistry was found to be statistically significantly higher than those who did not regret (P = .000; P < .05).

DISCUSSION

Since the dentists and dental students are at more risk of contamination with pathogens than the normal population[17], they should be very cautious about COVID-19 pandemic and their knowledge of the disease should be sufficient. In our study, the knowledge scores of both preclinical and clinical classes were high enough which is in accordance with the literature.[4,13,18,19] Clinical classes had higher general and professional knowledge scores than preclinical classes. This result was confirmed by Quadri et al.[13] as they stated that the qualification level (interns, auxiliaries, specialists) had a significant effect on the knowledge on COVID-19. Nevertheless, in a study of Alharbi et al.[20], they evaluated the knowledge and attitude on recommended infection control guidelines among dental faculty members and students of Saudi Arabia and concluded no statistically significant difference between the level of knowledge among them. Saddik et al.[21] evaluated the levels of anxiety and knowledge of medical and non-medical universi-

Table 4. Online education feedbacks

A) Education between March-July 2020

Education between March-July 2020	Never n (%)	Rarely n (%)	Sometimes n (%)	Usually n (%)	Always n (%)
I attended the online education of my theoretical lessons	5 (0.9)	14 (2.6)	41 (7.7)	79 (14.8)	395 (74)
I found the online training of my theoretical courses efficient.	92 (17.2)	47 (8.8)	105 (19.7)	100 (18.7)	190 (35.6)
I think I have received sufficient theoretical education.	78 (14.6)	62 (11.6)	114 (21.3)	100 (18.7)	180 (33.7)
I think I have received adequate training in practical terms.	243 (45.5)	109 (20.4)	71 (13.3)	25 (4.7)	86 (16.1)
The online exams made me anxious.	131 (24.5)	62 (11.6)	134 (25.1)	61 (11.4)	146 (27.3)
I wish the exams would be face to face by taking the necessary precautions.	187 (35)	49 (9.2)	109 (20.4)	56 (10.5)	133 (24.9)

B) Education for next semester (September 2020-2021)

	Yes n (%)	No n (%)
I want my theoretical lessons to be online.	425 (79.6)	109 (20.4)
I want my practical lessons online.	184 (34.5)	350 (65.5)
I want my exams to be online.	336 (62.9)	198 (37.1)
I want my practical trainings that could not be made to be compensated in preclinics / clinics.	446 (83.5)	88 (16.5)
If adequate precautions are taken. I want my theoretical training to be in the lecture halls.	204 (38.2)	330 (61.8)
If adequate precautions are taken. I want my preclinical education to be in laboratories.	357 (66.9)	177 (33.1)
If adequate precautions are taken. I want my clinical training to be in laboratories.	342 (64)	192 (36)
If adequate precautions are taken. I want my clinical training to be in clinics.	365 (68.4)	169 (31.6)
I want seminars. lectures. conferences. webinars etc. related to Covid 19 to be organized.	365 (68.4)	169 (31.6)
I think my clinical education is sufficient to take care of patients during the pandemic.	144 (27)	390 (73)

Table 5. Evaluation of knowledge and anxiety scores among students

	Class groups		
	Preclinics	Clinics	
	Mean±SD (median)	Mean ± SD (median)	*P*
Knowledge level			
General knowledge point (%)	78.06 ± 12.66 (83.3)	85.29 ± 8.4 (83.3)	.000*
Professional knowledge point (%)	64.53 ± 17.28 (66.7)	76.09 ± 12.59 (80)	.000*
Total knowledge point (%)	70.54 ± 12.52 (70.4)	80.18 ± 8.5 (81.5)	.000*
Anxiety			
General anxiety point	26.08 ± 11.94 (25)	26.19 ± 11.02 (25.5)	.953
Professional anxiety point	44.41 ± 19.36 (50)	48.78 ± 16.24 (53)	.039*
Total anxiety point	70.5 ± 29.62 (73)	74.97 ± 24.25 (78)	.238

Mann-Whitney U Test, *P < .05

ty students during the COVID-19 pandemic and concluded that both the anxiety and knowledge levels were high. Dental students had higher anxiety levels in comparison to medical students. It has been explained by the close contact of dental students with the patient and the high risk of constant exposure to the virus. This is known by almost all students in our study as they knew the dentists are in the high risk group (98.9%).

The most used source was social media (87%) which is compatible with the previous studies.[18,21] This reveals that social media can be used as an easily accessible and reliable source of information for the COVID-19 pandemic.[18,21] On the other hand, there is a tendency for young people to obtain a huge amount of information from social media and this can be an initiator for anxiety and stress.[22] Also, it can spread false information. Therefore, coronavirus related information should be carefully evaluated by the students.[18]

All students knew the most common symptoms of COVID-19 which was higher than Ikhlaq et al.[18] (91.9%). The possible reason is that they are constantly on lots of sources. Furthermore, "Diarrhea may occur" was known by most of the students (84.1%) which was also higher than Ikhlaq et al.[18] (37.5%). The lower percentage of this question may be related to not being well presented on social media, TV or etc as it is a less common symptom. The correct response rate for the question about the specific treatment of the disease was 94% and slightly higher than Jha et al.[4] (92.2%). The accuracy rate of the other answers of general information is also very high, except for "Coronaviruses are single-stranded, enveloped, DNA viruses", which has an accuracy rate of 24%. Because they were confused about the type of virus. In the professional information section, since the correct answer percentages are so variable, almost all students knew the dentists are in the high risk group. The most unknown was about ibuprofen (51.5%) and the least known was about the order of wearing PPE (42.5%). This result has shown that the students should be educated for the use of PPE which is so important for preventing infections. These varying accuracy rates, which differ from general information, may be related to the need for professional information resources, as preclinical students may have thought that they do not need such detailed information yet. In all knowledge levels, clinical students had higher scores than preclinical students with statistical significant differences. Therefore, the first hypothesis was rejected. The anxiety caused by examining the patient may have led to this and was confirmed by the result of anxiety scores. Because the clinical students had higher professional anxiety scores with a statistical significance. And the second hypothesis was also rejected for this reason. We can say that they are aware of the fact that COVID-19 will reshape working conditions for dentists.[23] However, in total evaluation a reverse relationship was found between the anxiety and the knowledge which causes the rejection for the third hypothesis. The possible reason of the incompatibility between two evaluations is the unequal number of preclinical and clinical students as the number of preclinical students was higher. In contrast to our study, Saddik et al.[21] found a positive but weak correlation between the anxiety and the knowledge. Raja et al.[11] evaluated the stress levels of Pakistani dental students and concluded that the majority of them had moderate to high stress levels which have considerable effects on physical, emotional, behavioral and cognitive states and was corroborated to our results. Similar to this result, Li et al indicated that the symptoms of acute stress reaction and psychological distress were common within health professional students during the COVID-19 pandemic.[24] Another study, Tang et al investigated the prevalence of post-traumatic stress disorder and depression in Chinese university students and indicated that the psychological results of the COVID-19 could be severe.[25] Also, it was stated that stress negatively affects the academic success of dental students.[26] As a result, it is possible to state that anxiety and stress are so important issues that need to be eliminated.

27.7% of the students regretted choosing of dentistry which was slightly higher than Ataş and Yıldırım.[9] The general knowledge score of those who regret was found to be statistically significantly lower. This result shows that if the knowledge on COVID-19 is improved, the reasons for regrets may be disappeared. For the relation between the anxiety scores and regret, the whole anxiety scores of those who regretted of dentistry was found to be statistically significantly higher. As a result of all these statistically significant correlations, the fourth hypothesis was rejected. The anxiety may cause uncertainty and fear for the future of the career, also high contamination risk of dentists also creates hesitation in terms of career choice.

This study had limitations. First, during this pandemic, all information and processes are dynamic. In the light of new information, those that were considered correct at the beginning of the pandemic can now be considered wrong. Second, each dental faculty applied a different teaching method in Turkey during COVID-19 outbreak, some faculties only gave homework to dental students and did not provide any online education or exam. Therefore we conducted our study in just one university to avoid bias. Since the study was carried out in a single center, it did not reflect the views of all dental students in country.

Although, most of the students wanted online education for theoretical lectures, they did not want online education for practical or clinical lectures according to their experiences as they thought practical lectures need to be completed since they were insufficient for the last semester. The reply of "I think clinical education is sufficient to take care of patients during the pandemic" confirmed this as most of them (73%) selected "No". Because of this reason, they want seminars, lectures or conferences related to COVID-19.

The knowledge of dental students on COVID-19 is acceptable and it reduces the anxiety. Therefore, they should be educated about COVID-19 infection to reduce their anxiety and regret, as well as to make them more confident and conscious. In a field such as dentistry where both theoretical and practical training is very important, educational policies should be determined by not ignoring the expectations and demands of the students.

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