

Evaluation of Dental Student's Feedbacks on Clinical Education Practices During the COVID-19 Pandemic

Diş Hekimliği Öğrencilerinin COVID-19 Pandemisi Sırasında Yürütülen Klinik Eğitim Uygulamaları Hakkındaki Geri Bildirimlerinin İncelenmesi

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ABSTRACT

Introduction: The aim of this study was to examine the impact of COVID-19 pandemic on dental education and investigate the dental students' contentment and comment about the oral diagnosis and dentomaxillofacial radiology (ODR) clinical courses after the reopening.

Material and Method: All fourth grade-year and fifth grade-year dental students who completed their ODR clinical skill training course were invited to fill out an online questionnaire.

Results: Seventy-nine students responded the survey, 34 (43%) of students have satisfied with post-pandemic clinical courses and there was a statistically significant relation between the satisfaction and supporting by teaching staff ($p=0.001$). Students stated that number of clinical works were inadequate and there was a statistically significant relation between the number of patients examined and having adequate skill at patient examination and treatment planning ($p=0.001$). 33 (41.8%) dental students found online clinical courses satisfactory but 69 (87.3%) students preferred clinical skill training courses instead of online.

Conclusion: During the COVID-19 pandemic dental schools must plan their clinical courses and make arrangements to allow the students to care as many as patients possible and education staff should be in close contact with students at each step of the clinical courses.

Keywords: COVID-19; Dental education; Dental students; Dentistry

ÖZET

Amaç: Bu çalışmanın amacı COVID-19 pandemisinin diş hekimliği eğitimine etkisi ile diş hekimliği öğrencilerinin, kliniklerin yeniden açılmasının ardından oral diagnosis ve radyoloji (ODR) klinik uygulama eğitimi hakkındaki memnuniyet ve yorumlarının incelenmesidir.

Gereç ve Yöntem: ODR klinik uygulama eğitimini tamamlamış tüm dördüncü ve beşinci sınıf diş hekimliği öğrencileri çevirim içi anket doldurmaya davet edildi.

Bulgular: Yetmiş dokuz dördüncü ve beşinci sınıf öğrenci çalışmaya katıldı. Öğrencilerin 34'ü (%43) pandemi sonrası klinik eğitimden memnundu ve memnuniyet ile öğretim elemanları tarafından destek görmek arasında istatistiksel olarak anlamlı ilişki vardı ($p=0.001$). Öğrenciler klinik uygulama sayısının yetersiz olduğunu bildirdi ve muayene edilen hasta sayısı ile hasta muayenesi ve tedavi planlaması hakkında yeterli donanıma sahip olma arasında istatistiksel olarak anlamlı ilişki vardı ($p=0.001$). Otuz üç (%41.8) diş hekimliği öğrencisi çevirim içi klinik uygulama derslerinden memnun kaldı ancak 69 (%87.3) öğrenci klinik uygulama derslerini çevirim içine tercih ettiğini bildirdi.

Sonuç: COVID-19 pandemisi sırasında diş hekimliği fakülteleri klinik uygulamalarını ve ayarlamalarını öğrencilerin olabildiğince fazla sayıda hasta muayene edebileceği şekilde planlamalı ve öğretim elemanları klinik uygulamaların tüm aşamalarında öğrenciler ile yakın ilişkide olmalıdır.

Anahtar Kelimeler: COVID-19; Diş hekimliği; Diş hekimliği eğitimi; Diş hekimliği öğrencileri

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INTRODUCTION

A new pneumonia-like illness was first identified in Wuhan, China, spread to other countries and the World Health Organization (WHO) on 11 March 2020 has declared this current novel corona virus disease (COVID-19) as global pandemic.¹⁻³ The global COVID-19 pandemic has affected every aspect of human life all around the world.^{4,5} At all levels education systems have affected, dental education is also without any exception, many dental schools locked down and most lectures are pursued online.⁶⁻¹⁰ Besides the dental practitioners facing great risk for coronavirus infection during healthcare activities, the risk of cross-infection among dental educators and dental students is high due to the characteristics of dental education.¹¹ Dental education is not only a profession that necessitates close contact between human beings but also includes the dental procedures that generate aerosols. While airborne, droplet, contact with contaminated surfaces, oral and fecal secretions were identified as transmission modes of COVID-19, the most frequent transmission modes were droplet and contact with contaminated surfaces.¹² The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that caused the COVID-19, is abundantly found in nasopharyngeal and salivary secretions of affected patients.¹³ As most dental procedures generate aerosols that are contaminated with saliva and blood, dentists, dental students, and dental assistances work under high risk of COVID-19.

To control and prevent the spread of the disease our country took a series of precautions and restrictions like the rest of the world. For this purpose, according to the Council of Higher Education¹⁴ our university locked down and switched to distance education (e-learning) mode as other dental schools.^{6,9,11,15} Online learning enables to continue the learning regardless of time and place.¹⁶ During the outbreak according to stay-at-home orders, dental education was implemented as distance education including the clinical skill training courses to keep on the learning progress of dental students. The classes are divided into small groups and case discussions and assessments were done online as synchronous teaching. It was reported that dental students found effective the online case discussion lessons with small groups however they found online dental education

inadequate as they were unable to implement clinical courses.^{11,15} On the contrary in a different study, it was reported that small group discussion could be better in the physical classroom because of the better interaction between teachers and students.¹⁶ Also it was reported that distance education negatively effects students' motivations.¹⁵

After the stay-at-home orders ended our faculty reopened and started to routine patient care and face-to-face clinical skill training courses under the novel scientific findings with smaller groups. During the Spring of 2021 dental students came to clinical practices in smaller groups and full five days instead of half fifteen days. This minimized traffic in the building, elevator usage, and student turnover. Patients were examined at two meters minimum distances. Dental students wear personal protective equipment (PPE) which includes examination gloves, surgical gown, face shield, surgical cap (bonnet), and surgical mask and follow the Ministry of Health's novel rules and recommendations.¹⁷ To reduce the incidence of patient gagging (aerosol production) extraoral imaging techniques, especially panoramic imaging, has been encouraged.

The aim of this study was to examine the impact of COVID-19 pandemic on dental education and investigate the dental students' contentment and comment about the oral diagnosis and dentomaxillofacial radiology clinical courses after the reopening. Understanding the students' perspective is crucial as dental education is innovating rapidly in a new reality.

MATERIALS AND METHODS

The study was conducted at Hacettepe University Faculty of Dentistry, Department of Dentomaxillofacial Radiology and was reviewed and approved by the Non-Interventional Clinical Research Ethics Board of Hacettepe University with project number: GO 21/830. At Hacettepe University undergraduate dental students have lectures and simulated training courses on their first, second and third years, and clinical skill training courses are implemented on the fourth and fifth years. All fourth grade-year and fifth grade-year dental students who completed their oral diagnosis and dentomaxillofacial radiology clinical skill training course during the Spring of 2021, were invited to fill out the questionnaires. All dental stu-

dents were invited to join this questionnaire survey at their free will to fill out the questionnaires without the pressure from the investigators. The questionnaire was posted to the students who accepted to answer the survey online. A structured questionnaire-based online survey (Google form) was used as the survey tool to evaluate the undergraduate dental students' views about the oral diagnosis and dentomaxillofacial radiology clinical skill training courses that were implemented during the COVID-19 pandemic. At the beginning of the questionnaire, there is a description of the survey and an assurance that participants were voluntary and responses would be kept anonymous. The questions included the demographic findings and (investigated questions) students' views about the oral diagnosis and dentomaxillofacial radiology clinical course. The detailed survey questionnaire is available in Appendix 1.

Statistics

Normality of the age distribution was evaluated using Kolmogorov-Smirnov normality test. Median (minimum-maximum) were given as descriptive statistics since age is not normally distributed. Frequency and percentage (n,%) were given as descriptives for categorical variables. Association between categorical variables was evaluated using Pearson Chi-square test when the test requirements were met. Otherwise, Fisher-Freeman-Halton Exact test was used for evaluation of the relationship between categorical variables. All analysis was conducted using IBM SPSS Statistics for Windows, Version 23.0 (IBM Corp. Released 2015, Armonk, NY: IBM Corp.). Significance level was set at $p < 0.05$ for all analysis.

Appendix 1 Survey questionnaire

Sex	
Age	
Grade	
Questions	Agree Indecisive Disagree
1. The clinical education was different after the outbreak compared to before	
2. The outbreak negatively affected my dental education	
3. I satisfied with the online clinical training courses during the outbreak	
4. I prefer to examine even limited number of patients at clinical skill training courses instead of online	
5. I had adequate academic knowledge about how I would examine the patient at clinical courses after the reopening	
6. I had adequate knowledge about the clinical applications after the reopening	
7. I had adequate knowledge and training about the usage of personnel protective equipment that I would use in clinical skill training courses during the patient examination	
8. Post-outbreak stress and anxiety that I felt while I started to clinical skill training courses was more than the pre-outbreak	
9. I satisfied with the post-outbreak clinical skill training courses	
10. Teaching staff interested with us at post-outbreak clinical training courses	
11. The patient number that I examined during the post-outbreak clinical skill training course was adequate	
12. I examined adequate number of patients with teaching staff at post-outbreak clinical skill training course	
13. I took adequate number of intraoral radiographs at post-outbreak clinical skill training courses	
14. The teaching staff supported me at intraoral radiographic projections at post-outbreak clinical skill training course	
15. I interpreted adequate number of intraoral radiographs at post-outbreak clinical skill training course	
16. I interpreted adequate number of extraoral radiographs at post-outbreak clinical skill training course	
17. The teaching staff supported me at interpretation of radiographs at post-outbreak clinical skill training course	
18. I had adequate skill at patient examination and treatment planning after the post-outbreak clinical skill training course	

RESULTS

Seventy-nine fourth and fifth grade-year dental students answered the survey, 28 (35.4%) were male and 51 (64.6%) were female. Among 79 respondents 21 (26.6%) were fourth grade-year and 58 (73.4%) were fifth grade-year dental students and ranging in age from 21 to 25 years (median: 23 years). Respondents' answers are shown in Table 1.

Table 1. Respondents' answers to the survey

Questions	Agree n (%)	Indecisive n (%)	Disagree n (%)	Total n (%)
1	72 (91.1)	5 (6.3)	2 (2.5)	79 (100)
2	72 (91.1)	6 (7.6)	1 (1.3)	79 (100)
3	33 (41.8)	22 (27.8)	24 (30.4)	79 (100)
4	69 (87.3)	6 (7.6)	4 (5.1)	79 (100)
5	53 (67.1)	16 (20.3)	10 (12.7)	79 (100)
6	44 (55.7)	21 (26.6)	14 (17.7)	79 (100)
7	76 (96.2)	1 (1.3)	2 (2.5)	79 (100)
8	42 (53.2)	16 (20.3)	20 (25.3)	79 (100)
9	34 (43)	22 (27.8)	23 (29.1)	79 (100)
10	64 (81)	10 (12.7)	4 (5.1)	78 (98.7) †
11	14 (17.7)	11 (13.9)	54 (68.4)	79 (100)
12	16 (20.3)	16 (20.3)	47 (59.5)	79 (100)
13	20 (25.3)	10 (12.7)	49 (62)	79 (100)
14	54 (68.4)	17 (21.5)	8 (10.1)	79 (100)
15	24 (30.4)	20 (25.3)	35 (44.3)	79 (100)
16	19 (24.1)	21 (26.6)	39 (49.4)	79 (100)
17	64 (81)	6 (7.6)	9 (11.4)	79 (100)
18	24 (30.4)	34 (43)	21 (26.6)	79 (100)

† 1 Participant didn't answer this question.

Forty-two (53.2%) students reported that they were more stressed and nervous at the post-pandemic clinical skill training course than the pre-pandemic clinical skill training course. Among male respondents 11 (40.7%) stated that they felt more stressed and nervous while nine (33.3%) were indecisive. Although 31 (60.8%) of female respondents stated that they were more stressed and nervous only seven (13.7%) were indecisive, there was not a statistically significant relationship ($p=0.099$) between gender and feeling stressed and nervous at the post-outbreak clinical skill training course.

Males were more satisfied with the clinical skill training course (50%) compared to females (39.2%) but that was not statistically different ($p=0.264$).

There was a statistically significant relationship between gender and question 13 ($p=0.005$). Females stated that they have not taken adequate number of intraoral radiographs at post-outbreak clinical skill training courses while males stated that they have (Table 2).

There was a statistically significant relationship between gender and question 15 ($p=0.010$). Males stated that they have interpreted adequate number of intraoral radiographs at post-break clinical skill training courses while females stated that they have not (Table 3).

Table 2. Relationship between the gender and taking adequate number of intraoral radiographs

Took adequate number of intraoral radiographs	Agree n (%)	Indecisive n (%)	Disagree n (%)	Total n (%)	p-value
Males	10 (35.7)	7 (25)	11 (39.3)	28 (100)	p=0.005*
Females	10 (19.6)	3 (5.9)	49 (74.5)	51 (100)	
Total	20 (25.3)	10 (12.7)	49 (62)	79 (100)	

* $p<0.005$ statistically significant relation

Table 3. Relationship between the gender and interpretation of adequate number of intraoral radiographs

Interpreted adequate number of intraoral radiographs	Agree n (%)	Indecisive n (%)	Disagree n (%)	Total n (%)	p-value
Males	12 (42.9)	10 (35.7)	6 (21.4)	28 (100)	p=0.010*
Females	12 (23.5)	10 (19.6)	29 (56.9)	51 (100)	
Total	24 (30.4)	20 (25.3)	35 (44.3)	79 (100)	

* $p<0.005$ statistically significant relation

There was a statistically significant relationship between question 3 and 18 ($p=0.008$) (Table 4). Students who were satisfied with the online clinical training courses during the outbreak thought that they had adequate skill at patient examination and treatment planning after the post-outbreak clinical skill training course.

There were statistically significant relations between question 18 and questions 11, 12, 13, 15, and 16

($p=0.000$, $p=0.000$, $p=0.000$, $p=0.000$, $p=0.000$ respectively) (Table 5). Students who thought they examined adequate number of patients, examined adequate number of patients with teaching staff, took adequate number of intraoral radiographs, interpreted adequate number of intraoral and extraoral radiographs felt that they had adequate skill at patient examination and treatment planning after the post-outbreak clinical skill training course.

Table 4. Relationship between the satisfaction with online clinical skill training courses and having adequate skill at patient examination and treatment planning after the post-outbreak clinical skill training course

		Satisfied with the online clinical training courses during the outbreak				p-value
		Agree n (%)	Indecisive n (%)	Disagree n (%)	Total n (%)	
Had adequate skill at patient examination and treatment planning after the post-outbreak clinical skill training course	Agree	12 (50)	9 (37.5)	3 (12.5)	24 (100)	p=0.008*
	Indecisive	13 (38.2)	12 (35.3)	9 (26.5)	34 (100)	
	Disagree	8 (38.1)	1 (4.8)	12 (57.1)	21 (100)	
	Total	33 (41.8)	22 (27.8)	24 (30.4)	79 (100)	

* $p<0.005$ statistically significant relation

Table 5. Relationship among having adequate skill at patient examination and treatment planning and number of clinical works

		Have adequate skill at patient examination and treatment planning				p-value
		Agree n (%)	Indecisive n (%)	Disagree n (%)	Total n (%)	
The patient number that examined was adequate	Agree	11 (78.6)	2 (14.3)	1 (7.1)	14 (100)	p=0.000*
	Indecisive	5 (45.5)	6 (54.5)	0 (0)	11 (100)	
	Disagree	8 (14.8)	26 (48.1)	20 (37)	54 (100)	
	Total	24 (30.4)	34 (43)	21 (26.6)	79 (100)	
Examined adequate number of patients with teaching staff	Agree	13 (81.3)	3 (18.8)	0 (0)	16 (100)	p=0.000*
	Indecisive	5 (31.3)	10 (62.5)	1 (6.3)	16 (100)	
	Disagree	6 (12.8)	21 (44.7)	20 (42.6)	47 (100)	
	Total	24 (30.4)	34 (43)	21 (26.6)	79 (100)	
Took adequate number of intraoral radiographs	Agree	14 (70)	4 (20)	2 (10)	20 (100)	p=0.000*
	Indecisive	3 (30)	7 (70)	0 (0)	10 (100)	
	Disagree	7 (14.3)	23 (46.9)	19 (38.8)	49 (100)	
	Total	24 (30.4)	34 (43)	21 (26.6)	79 (100)	
Interpreted adequate number of intraoral radiographs	Agree	14 (58.3)	8 (33.3)	2 (8.3)	24 (100)	p=0.000*
	Indecisive	7 (35)	12 (60)	1 (5)	20 (100)	
	Disagree	3 (8.6)	14 (40)	18 (51.4)	35 (100)	
	Total	24 (30.4)	34 (43)	21 (26.6)	79 (100)	
Interpreted adequate number of extraoral radiographs	Agree	13 (68.4)	5 (26.3)	1 (5.3)	19 (100)	p=0.000*
	Indecisive	5 (23.8)	12 (57.1)	4 (19)	21 (100)	
	Disagree	6 (15.4)	17 (43.6)	16 (41)	39 (100)	
	Total	24 (30.4)	34 (43)	21 (26.6)	79 (100)	

* $p<0.005$ statistically significant relation

Table 6. Relationship among satisfaction and supporting by teaching staff

		Satisfied with the post-outbreak clinical skill training courses				
		Agree n (%)	Indecisive n (%)	Disagree n (%)	Total n (%)	p-value
Teaching staff interested with us	Agree	32 (50)	19 (29.7)	13 (20.3)	64 (100)	p=0.001*
	Indecisive	1 (10)	3 (30)	6 (60)	10 (100)	
	Disagree	0 (0)	0 (0)	4 (100)	4 (100)	
	Total	33 (42.3)	22 (28.2)	23 (29.5)	78†(100)	
Examined adequate number of patients with teaching staff	Agree	14 (87.5)	1 (6.3)	1 (6.3)	16 (100)	p=0.000*
	Indecisive	12 (75)	4 (25)	0 (0)	16 (100)	
	Disagree	8 (17)	17 (36.2)	22 (46.8)	47 (100)	
	Total	34 (43)	22 (27.8)	23 (29.1)	79 (100)	
The teaching staff supported me at intraoral radiographic projections	Agree	29 (53.7)	12 (22.2)	13 (24.1)	54 (100)	p=0.004*
	Indecisive	5 (29.4)	8 (47.1)	4 (23.5)	17 (100)	
	Disagree	0 (0)	2 (25)	6 (75)	8 (100)	
	Total	34 (43)	22 (27.8)	23 (29.1)	79 (100)	
The teaching staff supported me at interpretation of radiographs	Agree	33 (51.6)	17 (26.6)	14 (21.9)	64 (100)	p=0.001*
	Indecisive	1 (16.7)	3 (50)	2 (33.3)	6 (100)	
	Disagree	0 (0)	2 (22.2)	7 (77.8)	9 (100)	
	Total	34 (43)	22 (27.8)	23 (29.1)	79 (100)	

* p<0.005 statistically significant relation, † 1 Participant didn't answer this question.

There were statistically significant relations between question 9 and questions 10, 12, 14, and 17 (p=0.001, p=0.000, p=0.004, p=0.001 respectively) (Table 6). Students who thought that they examined adequate number of patients with teaching staff, the teaching staff were interested with them, supported them at intraoral radiographic projections, and supported them at interpretation of radiographs, stated that they satisfied with the post-outbreak clinical skill training courses.

DISCUSSION

The COVID-19 pandemic has become a major public health threat across the globe and affected all walks of life.^{4,5} Dental education carries a high risk of cross-infection between not only teachers and students but also among students as dental procedures generate aerosols and dental education necessitates close contact between dental student and teacher.¹¹ During the COVID-19 pandemic, it is imperative that dental schools make modifications to their teaching and learning methods to ensure the continuity of the education and also to protect the students, staff and patients.^{4,6} On March 16 2020 the ADA recommended the dental offices to restrict patient care to emergency cases¹⁸ and a similar recommendation was offered by our

Ministry of Health on March 17 2020.¹⁹ According to these recommendations, our faculty served only the emergency cases, locked down, and switched to distance education (e-learning) mode. Not only lecture courses but also clinical skill training courses had to be conducted online. After the stay-at-home orders ended routine patient care and face-to-face clinical courses restarted.

Students' opinions about distance education applied during the pandemic have been reported in many studies.^{8,15,20,21} Different from these studies the views of the students in face-to-face education, after the reopening, were examined in the present study. Seventy-nine fourth and fifth grade-year dental students participated in the survey and the percentage of females (64.6%) was higher than males (35.4%). This may be due to there are more female dental students in our school like there are more females nowadays in dental schools.²² Among 79 respondents 21 (26.6%) were fourth grade-year and 58 (73.4%) were fifth grade-year dental students.

There are many studies reported the students' satisfaction with online education.^{20,21,23} The present study was focused on the students' opinions, including the satisfaction, on clinical courses after the reopening. Thirty-four (43%) of students stated

that they have satisfied with post-pandemic clinical courses, 22 (27.8%) were indecisive and 23 (29.1%) unsatisfied. Males were more satisfied with the clinical skill training course compared to females but this difference was not statistically significant. There was a statistically significant relationship between the satisfaction and the students who thought were supported by teaching staff ($p=0.001$). Sixty-four (81%) students thought that teaching staff interested in them at post-outbreak clinical training courses. Fifty-four (68.4%) students stated that they were supported at intraoral radiographic projections and 64 (81%) thought they were supported at interpretation of radiographs during post-outbreak clinical skill training course. Although 16 (20.3%) students thought that they examined adequate number of patients with teaching staff, 14 (87.5%) of them felt satisfied with the post-outbreak clinical skill training courses. During our clinical courses each working day dental students study with two teaching staff. Teaching staff regularly changes so students are able to benefit from different experiences and perspectives. Under the teaching staff's guidelines students examine their patients, obtain radiographs, interpret the radiographs and make treatment planning. It was reported that inadequate number of instructors in relation to students and decreased support from teaching staff is a stress factor for dental students.^{20,24} During the COVID-19 pandemic teaching staff's support and guidance is positively influenced the students' morale.⁸ The present study showed a significant relation between the students who thought were supported by teaching staff and were satisfied with the post-outbreak clinical courses. This reveals the necessity and importance of active attention to students by teaching staff.

Most of the students (91.1%) thought the clinical education was different after the outbreak compared to before. Also 54 (68.4%) students stated that the number of patients examined was inadequate, 49 (62%) students thought they didn't take adequate number of intraoral radiographs, 35 (44.3%) students thought they have not interpreted adequate number of intraoral radiographs, and 39 (49.4%) students thought they have not interpreted adequate number of extraoral radiographs at post-outbreak clinical skill training course. There was a statistically significant relationship between gender and taking adequate number of intraoral radiographs ($p=0.005$). Females

stated that they have not taken adequate number of intraoral radiographs at post-outbreak clinical skill training course while males stated that they have (Table 2). Also, there was a statistically significant relationship between gender and interpretation of adequate number of intraoral radiographs ($p=0.010$). Males stated that they have interpreted adequate number of intraoral radiographs at post-break clinical skill training course while females stated that they have not (Table 3). Female students are more rigorous and experience more stress than males^{20,25} and this may cause more time on a patient so fewer number of intraoral radiographs taken. This could cause the difference between females and males.

There was a statistically significant relation between the number of patients examined and having adequate skill at patient examination and treatment planning. Also, students who thought they examined adequate number of patients with teaching staff, took adequate number of intraoral radiographs, interpreted adequate number of intraoral and extraoral radiographs felt that they had adequate skill at patient examination and treatment planning after the post-outbreak clinical skill training course. After the reopening the time allocated for one patient increased due to ambient ventilation, donning and doffing PPE, controlled entrance-exit and this reduced the number of examined patients. Only 24 (30.4%) students felt that they had adequate skills therefore increasing the examined patient number can support students to feel better skilled. Dental schools can make arrangements at their clinical courses to increase the number of patients examined by students.

There was a statistically significant relationship between satisfaction with the online clinical training courses during the outbreak and having adequate skill at patient examination and treatment planning after the post-outbreak clinical skill training course ($p=0.008$) (Table 4). Students who were satisfied by the online clinical training courses during the outbreak thought that they had adequate skill at patient examination and treatment planning after the post-outbreak clinical skill training course. Students who made benefit from the online clinical training courses during the outbreak may had started the face-to-face clinical courses more positively and after the clinical courses felt more skilled.

Supporting to this, 53 (67.1%) students stated that they had adequate academic knowledge about how to examine the patient at clinical courses after reopening, 44 (55.7%) had adequate knowledge about the clinical applications, and 76 (96.2%) had adequate knowledge and training about the usage of PPE.

Dentistry can be a stressful profession, and in addition to the professional stress dental students have to carry the difficulties of education life.^{24,26} Nowadays COVID-19 pandemic and its effects on dental education have been added to these stress factors. Some studies reported that dental students are experiencing increased levels of stress and diminished morale because of the impact of COVID-19 pandemic on dental education.^{8,11,20,27,28} Similarly, in the present study 42 (53.2%) dental students stated that they felt more stressed and nervous at the post-outbreak clinical courses. Consideration of disrupting of education, fear of being exposed to the COVID-19, and fear of infecting family members could cause stress to the students.^{8,27,29} During the SARS outbreak in 2003, it was suggested that dental schools can offer psychological counselling for students to cope with the situation.³⁰ A similar suggestion may be done for dental students to deal with the COVID-19 pandemic-related stress.

Studies showed that dental students easily adapted to technology and found online lecture courses effective.^{7,11} Prati *et al.*³¹ reported that dental students declared that online education encourages self-education. Contrary to this some studies results showed that students were unsatisfied in doing online learning.^{20,32} Sarialioğlu GÜNGÖR *et al.*²¹ investigated the perceptions of dental students towards online education during the COVID-19 pandemic and in their study most students expressed that distance learning was not as effective as traditional face-to-face education. Similarly, in Loch *et al.*'s²⁹ study students reported that they had fears of not meeting clinical requirements to achieve competence if clinical activities suspend. The present study showed that 33 (41.8%) dental students found online clinical courses satisfactory but 22 (27.8%) were indecisive and 24 (30.4%) were unsatisfied. Also, 69 (87.3%) students preferred to examine even limited number of patients at clinical skill

training courses instead of online. The reason of this preference was not investigated in the present study, as the questionnaire didn't include open questions. But we know that even the most sophisticated and effective online clinical skill training course cannot compensate the face-to-face clinical skill training learning as the cognitive skills can be developed and assessed in a virtual setting but the behavioral and practical skills require interactions in the pre-clinical and clinical settings.³³

In a study which students from different departments included, reported that students found online education more effective at lecture courses than practice courses.³⁴ Online education is predicted to be used more commonly in the near future as blended learning courses, the combination of physical courses and online courses.^{16,35} However, face-to-face clinical skill training courses in dental education are inevitable. Direct patient care is a key component of the dental curriculum³⁶ and although the online education is effective for lecture courses it could only be used as supportive for practice courses especially in clinical skill training courses. Chang *et al.*³⁵ investigated the effect of online learning on dental education and reported that 62.2% dental students preferred blended learning for lecture courses and 57.2% found blended learning more effective. On the other hand, 69.5% dental students preferred physical class for simulating training and 79.2% thought clinical skill training should be carried on during the pandemic.³⁵ This was similar to our results as 87.3% of students preferred clinical skill training courses instead of online.

Seventy-two (91.1%) students thought that their dental education is adversely affected. This was similar to Chang *et al.*³⁵ study in which they evaluated the online learning effect on undergraduate students in 13 dental schools of seven Asia countries and regions. They reported that 92.7% of the students thought the pandemic adversely effected their clinical training. Similarly in a study of Hattar *et al.*¹⁵ 77% of dental students reported that they missed educational experiences as a result of the lockdown. Coughlan *et al.*²³ investigated the impact of Covid-19 on dental education in Europe and reported that the common concerns of students were clinical experience and clinical skills. Also, Loch *et al.*²⁹ reported that COVID-19 pandemic negatively affected dental students' clinical performance.

The future trend of dental education could be the combination of face-to-face courses and online courses.^{10,16,35} Schlenz *et al.*'s¹⁰ study revealed that both dental students and lecturers had a positive perspective on the implementation of online learning in the future dental curriculum. Dental students thought that viewing the procedure online before and after applying it in physical class will be helpful for learning. Chang *et al.*³⁵ declared this as a good example of blended learning for simulated training courses in dental education. Sandhue *et al.*⁸ proposed a hybrid model of patient care as a combination of tele-medicine and in-person consultation, for oral medicine clinics, which is similar to the oral diagnosis and dentomaxillofacial clinics in our faculty. Although this seems more feasible to oral medicine clinics more than the other dental specialties, students will not learn the necessary skill of comprehensive tactile assessment.^{8,37} The present study revealed that for clinical courses students prefer face-to-face learning instead of online even with a limited number of patients. Dental schools must consider this finding while planning the new education models. Blended learning can be applied both to the lecture courses and simulated training courses however traditional face-to-face clinical courses with proper PPE seems to continue.

There are some limitations to this study. Firstly, because the survey was voluntary, the respondent number was limited. Further studies with a larger number of students from different dental schools will provide more precise and useful results. Open-ended questions may be added to surveys for better evaluation of the students' comments. Also, students' stress levels can be evaluated with a scale like Perceived Stress Scale.

CONCLUSION

The results of this study showed that;

Thirty-four (43%) of students have satisfied with post-pandemic clinical courses and there was a statistically significant relationship between the satisfaction and supporting by teaching staff ($p=0.001$).

Students stated that the number of clinical works was inadequate and there was a statistically significant relationship between the number of

patients examined and having adequate skill at patient examination and treatment planning.

Forty-two (53.2%) dental students stated that they felt more stressed and nervous at the post-outbreak clinical courses.

Thirty-three (41.8%) dental students found online clinical courses satisfactory but 69 (87.3%) students preferred clinical skill training courses instead of online.

Seventy-two (91.1%) students thought that their dental education is adversely affected by COVID-19 pandemic.

The present results will provide feedback and contribution to our faculty as well as our department to understand the students' expectations after the reopening of clinical courses and planning the post-pandemic clinical skill training courses. Dental schools must plan their clinical courses and make arrangements to allow the students to care as many as patients possible and education staff should be in close contact with students at each step of the clinical courses.

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The authors declare that there is no conflict of interest.

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