

## Effect of Turkish Dental Education on The Level of Knowledge of Students About Emergency Dental Applications

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### Abstract

**Objective:** The Coronavirus Disease (COVID-19) first appeared in December 2019 and spread to many countries in a short time. Thus, it has been decided to limit dental visits only to emergency dental practices (EDA), and to postpone non-emergency and non-compulsory dental practices to a later date. In this survey study; our aim is to determine the level of knowledge of dentistry students about EDA and to contribute to the literature by determining the adequacy of dental education in this field.

**Subjects and Methods:** The questionnaire that was prepared using Google Forms was sent to dental students in Turkey by WhatsApp, email, and private social platforms. First part of the questionnaire included basic questions that provide demographic data and the questions about EDA in the second part.

**Results:** A total of 1452 dentistry students, 558 males and 894 females, with a mean age of  $\pm 21.15 \pm 1.96$ , participated in the survey study. It was found that the EDA knowledge level of female participants was significantly higher than that of male participants ( $p < 0.05$ ). The difference in knowledge score between the first, second and third grades was found to be statistically significant, while the difference between the fourth and fifth grades was not statistically significant ( $p > 0.05$ ). When the knowledge scores of the students in the 1st grade are compared with the knowledge scores of the students in the 5th grade, there is a statistically significant difference ( $p < 0.05$ ).

**Conclusion:** Education of dentistry in Turkey is contributing to the students about the EDA. It gives students the ability to evaluate acute and non-acute situations. In this way, non-acute treatments can be delayed and the risk of COVID-19 transmission can be reduced and individuals who really need treatment are not deprived of treatment.

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**Keywords:** Emergency dental applications, covid-19, pandemic.

### Introduction

The Coronavirus Disease (COVID-19) first appeared in December 2019 and spread to many countries in a short time(1).Worldwide measures have been taken to control this disease, which has been declared as a 'pandemic' by the world health organization(2-3). It was decided to postpone non-urgent and non-compulsory dental applications and the emergency dental applications (EDA) were defined as follows(4):

a) Treatment of severe toothache caused by pulpal inflammation

- b) Treatment of severe pain caused by pericoronitis or an impacted/infected 3rd molar
- c) Treatment of postoperative osteitis or alveolitis
- d) Treatment of an abscess and/or bacterial infection causing localised pain and swelling
- e) Treatment of a tooth fracture causing pain or soft tissue trauma
- f) Treatment of traumatic dental avulsion/luxation
- g) Treatment of fractures of the chin or other facial bones
- h) Treatment of acute and painful lesions/ulceration of the oral mucosa
- i) Treatment of life-threatening or uncontrolled bleeding

- j) Treatment of intraoral/extraoral infections that compromise the airway
- k) Essential treatment of patients who are receiving, or are planned for receiving, radio-and/or chemotherapy before organ transplantation
- l) Dental consultation for medical problems
- m) Suture removal procedures
- n) Treatment of injuries, by a non-aerosol generating method, that prevent the use of removable dentures and repair of loss of temporary restorations/fractures
- o) Attending to dislocation and breakage of brackets and wires in patients undergoing orthodontic treatment.

Coronaviruses are mainly transmitted through direct contact and droplets(5-6).Thus, COVID-19 is likely to be contracted by those who get exposed to high concentrations of aerosols in relatively closed environments. Consequently, such aerosols generated during routine dental treatments pose a potential risk to dentists, assistant staff, and patients(2-6-7).So, limiting dental visits to emergency dental applications only and postponing non-urgent and non-compulsory dental applications is important for controlling COVID-19.

In this survey study; our aim is to determine the level of knowledge of dentistry students about EDA and to contribute to the literature by determining the adequacy of dental education in this field.

## Subjects and Methods

The Ethics Committee of Harran University approved the study protocol and procedures, and informed consent was obtained from all participants before the formal survey was conducted (reference number: HRU/20.19.19). A new questionnaire regarding emergency applications in dentistry was developed for this study.

Three experts (one endodontist, one maxillofacial surgeon and one maxillofacial radiologist) assessed the clarity of the statements and the adequacy of the content of the questionnaire that was prepared using Google Forms. We performed a pilot survey with 5 participants who were later excluded from the final analysis. According to the suggestions of these participants, we revised the questions that those that were difficult to understand, and those with grammatical errors.

The final online questionnaire was sent to dental students in Turkey by WhatsApp, email, and private social platforms, such as Instagram and

Facebook. A stratified random sampling method was used in this cross-sectional observational study. Dental professionals were excluded from the study, and data were collected between April 1 and 7, 2020.

Participants were informed of the purpose, risks, and benefits of the study, and they had the option of opting out of the study. The questionnaire comprised 2 section. The first part of the questionnaire included basic questions that provide demographic data and the questions about EDA in the second part. 21 questions evaluated the dental students' knowledge of emergency applications in dentistry (Table 1). These questions had the following three responses to choose from: "Urgent" or "Not urgent." or "I don't know". Incorrect/unknown and correct answers were assigned scores of 0 and 1, respectively. The total knowledge scores ranged from 0 to 21, and a higher score indicated better knowledge of EDA. The Cronbach's alpha coefficient (indicating acceptable internal consistency) of our questionnaire was 0.73(8).

**Table 1.** The Survey Questions

Q1	Treatment of severe toothache caused by pulpal inflammation?
Q2	Treatment of severe pain caused by pericoronitis or an impacted/infected 3rd molar?
Q3	Gingival bleeding that starts while brushing and doesn't stop for at least five minutes?
Q4	Treatment of an abscess and/or bacterial infection causing localised pain and swelling?
Q5	Bad breath?
Q6	Treatment of postoperative osteitis or alveolitis?
Q7	Treatment of a tooth fracture causing pain or soft tissue trauma
Q8	Treatment of traumatic dental avulsion/luxation
Q9	Treatment of fractures of the chin or other facial bones
Q10	Treatment of acute and painful lesions/ulceration of the oral mucosa
Q11	Treatment of life-threatening or uncontrolled bleeding
Q12	Treatment of intraoral/extraoral infections that compromise the airway
Q13	Essential treatment of patients who are receiving, or are planned for receiving, radio- and/or chemotherapy before organ transplantation.
Q14	Treatment of enamel-dentin level cavitations that do not cause spontaneous pain?
Q15	Dental consultation for medical problems
Q16	The need for implant treatment for missing teeth in the mouth?
Q17	Suture removal procedures
Q18	Treatment of stains causing aesthetic problems in anterior teeth?
Q19	Treatment of injuries, by a non-aerosol generating method, that prevent the use of removable dentures and repair of loss of temporary restorations/fractures
Q20	Attending to dislocation and breakage of brackets and wires in patients undergoing orthodontic treatment
Q21	Sensitivity in all teeth when eating or drinking something cold (ice cream, cold water)?

The power analysis estimated that surveys with 1,346 or more individuals needed to have a 98% confidence interval, a population about size of 40,000 individuals, with the real value within  $\pm 3\%$  of the surveyed value. However, in order to increase the reliability of the findings of this study, 1,452 individuals who answered the web-based questionnaire during the survey application period were included. The data were analysed using Statistical Package for Social Science version 23.0 (SPSS Inc., Chicago, IL, USA). The median, minimum-maximum, and percentage values were calculated for descriptive statistics. The normality of the data distribution was tested using histograms and the Kolmogorov-Smirnov test. As the data were normally distributed, the independent t test was used for intergroup comparisons. The one-way ANOVA test was used to compare the variables in the more than 2 groups. In all analyses, statistical significance was accepted as  $p < 0.05$ .

### Results

A total of 1452 dentistry students, 558 (38.43%) male and 894 (61.57%) female, with a mean age of  $21.15 \pm 1.96$ , participated in the survey study. 205 (14.1%) of the participants were in the first grade, 291 (20.0%) in the second grade,

354 (24.4%) in the third grade, 272 (18.7%) in the fourth grade, and 330 (22.8%) in the fifth grade (Table 2).

**Table 2.** Distribution of participants by duration of education and gender

Year of Education	Men n (%)	Women n (%)	Total n (%)
1.year	74	131	205(14,1)
2.year	107	184	291(20,0)
3.year	153	201	354(24,4)
4.year	92	180	272(18,7)
5.year	132	198	330 (22,8)
Total	558	894	1452 (100,0)

The relationship between knowledge scores in different education years is shown in table 3. The knowledge score of the first graders was calculated as  $9.75 \pm 4.37$ , the second grade as  $11.90 \pm 3.19$ , the third grade as  $13.11 \pm 3.29$ , the fourth grade as  $15.12 \pm 2.45$  and the fifth grade as  $15.39 \pm 3.34$ . The difference in knowledge score between the first, second and third grades was found to be statistically significant, while the difference between the fourth and fifth grades was not statistically significant ( $p > 0.05$ ).

**Table 3.** Comparison of knowledge scores in different education years

Year of Education	Total Mean±SD	1.year	2.year	3.year	4.year	5.year
1.year	9,75±4,37		p<0.001	p<0.001	p<0.001	p<0.001
2.year	11,90±3,19	p<0.001		p<0.001	p<0.001	p<0.001
3.year	13,11±3,29	p<0.001	p<0.001		p<0.001	p<0.001
4.year	15,12±2,45	p<0.001	p<0.001	p<0.001		p>0.05
5.year	15,39±3,34	p<0.001	p<0.001	p<0.001	p>0.05	

Table 4 shows the knowledge scores of the participants by gender and years of education. In the first, second, third and fourth education years, no statistically significant difference was observed between knowledge scores of women and men ( $p>0.05$ ). However, the knowledge scores of women ( $15.82 \pm 2.83$ ) in the fifth school year were higher than the knowledge scores of men ( $14.75 \pm 3.89$ ) ( $p<0.05$ ).

**Table 4.** Knowledge scores by gender in different educational years

Year of Education	Men Mean±SD	Women Mean±SD	Total Mean±SD	p
1.year	9,25±4,49	10,03±4,29	9,75±4,37	0,220
2.year	11,92±2,99	11,88±3,31	11,90±3,19	0,919
3.year	12,78±3,75	13,37±2,88	13,11±3,29	0,096
4.year	14,88±2,24	15,25±2,55	15,12±2,45	0,235
5.year	14,75±3,89	15,82±2,83	15,39±3,34	0,004*
Total	12,96±4,01	13,51±3,74	13,29±3,84	0,010*

The distribution of the answers given to the questions according to the years of education is shown in Table 5. The most "correct" answers were found in the fourth and fifth grades, and the most "incorrect / unknown" answers in the first and second grades. Q11; is the most correctly answered question in all classes. Q17; is the question most wrongly answered by dental students in fourth and fifth grades.

**Table 5.** The distribution of the answers given to the questions according to the years of education

	1. year			2. year				
	Correct	Incorrect	Unknown	Correct	Incorrect	Unknown		
Q1	89 (43.4)	12 (5.9)	104 (50.7)	198 (68.0)	12 (4.1)	81 (27.8)	306 (86.4)	
Q2	61 (29.8)	31 (15.1)	113 (55.1)	144 (49.5)	36 (12.4)	111 (38.1)	186 (52.5)	
Q3	44 (21.5)	119 (58.0)	42 (20.5)	186 (63.9)	58 (19.9)	47 (16.2)	199 (56.2)	
Q4	118 (57.6)	32 (15.6)	55 (26.8)	207 (71.1)	54 (18.6)	30 (10.3)	245 (69.2)	
Q5	149 (72.7)	27 (13.2)	29 (14.1)	242 (83.2)	34 (11.7)	15 (5.2)	302 (85.3)	
Q6	35 (17.1)	14 (6.8)	156 (76.1)	69 (23.7)	24 (8.2)	198 (68.0)	154 (43.5)	
Q7	60 (29.3)	35 (17.1)	110 (53.7)	125 (43.0)	46 (15.8)	120 (41.2)	166 (46.9)	
Q8	72 (35.1)	12 (5.9)	121 (59.0)	141 (48.5)	22 (7.6)	128 (44.0)	202 (57.1)	
Q9	61 (29.8)	30 (14.6)	114 (55.6)	145 (49.8)	23 (7.9)	123 (42.3)	204 (57.6)	
Q10	76 (37.1)	21 (10.2)	108 (52.7)	157 (54.0)	33 (11.3)	101 (34.7)	207 (58.5)	
Q11	182 (88.8)	4 (2.0)	19 (9.3)	283 (97.3)	4 (1.4)	4 (1.4)	341 (96.3)	
Q12	157 (76.6)	9 (4.4)	39 (19.0)	249 (85.6)	6 (2.1)	36 (12.4)	329 (92.9)	
Q13	126 (61.5)	33 (16.1)	46 (22.4)	189 (64.9)	50 (17.2)	52 (17.9)	228 (64.4)	
Q14	105 (51.2)	17 (8.3)	83 (40.5)	215 (73.9)	20 (6.9)	56 (19.2)	292 (82.5)	
Q15	43 (21.0)	41 (20.0)	121 (59.0)	73 (25.1)	105 (36.1)	113 (38.8)	140 (39.5)	
Q16	27 (13.2)	149 (72.7)	29 (14.1)	33 (11.3)	242 (83.2)	16 (5.5)	308 (87.0)	
Q17	50 (24.4)	26 (12.7)	129 (62.9)	48 (16.5)	90 (30.9)	153 (52.6)	85 (24.0)	
Q18	161 (78.5)	11 (5.4)	33 (16.1)	264 (90.7)	13 (4.5)	14 (4.8)	319 (90.1)	
Q19	41 (20.0)	53 (25.9)	111 (54.1)	72 (24.7)	116 (39.9)	103 (35.4)	165 (46.6)	
Q20	116 (56.6)	49 (23.9)	40 (19.5)	154 (52.9)	104 (35.7)	33 (11.3)	177 (50.0)	
Q21	129 (62.9)	48 (23.4)	28 (13.7)	188 (64.6)	80 (27.5)	23 (7.9)	235 (66.4)	
	3. year			4. year			5. year	
	Incorrect	Unknown	Correct	Incorrect	Unknown	Correct	Incorrect	Unknown
	19 (5.4)	29 (8.2)	257 (94.5)	10 (3.7)	5 (1.8)	295 (89.4)	15 (4.5)	20 (6.1)
	69 (19.5)	99 (28.0)	197 (72.4)	54 (19.9)	21 (7.7)	239 (72.4)	64 (19.4)	27 (8.2)
	111 (31.4)	44 (12.4)	130 (47.8)	103 (37.9)	39 (14.3)	144 (43.6)	151 (45.8)	35 (10.6)
	69 (19.5)	40 (11.3)	216 (79.4)	42 (15.4)	148 (5.1)	263 (79.7)	51 (15.5)	16 (4.8)
	26 (7.3)	26 (7.3)	244 (89.7)	14 (5.1)	14 (5.1)	300 (90.9)	20 (6.1)	10 (3.0)
	44 (12.4)	156 (44.1)	207 (76.1)	37 (13.6)	28 (10.3)	246 (74.5)	40 (12.1)	44 (13.3)
	76 (21.5)	112 (31.6)	174 (64.0)	67 (24.6)	31 (11.4)	245 (74.2)	64 (19.4)	21 (6.4)
	42 (11.9)	110 (31.1)	226 (83.1)	34 (12.5)	12 (4.4)	288 (87.3)	13 (3.9)	29 (8.8)
	38 (10.7)	112 (31.6)	217 (79.8)	28 (10.3)	27 (9.9)	279 (84.5)	23 (7.0)	28 (8.5)
	60 (16.9)	87 (24.6)	176 (64.7)	56 (20.6)	40 (14.7)	217 (65.8)	75 (22.7)	38 (11.5)
	4 (1.1)	9 (2.5)	289 (98.9)	1 (0.4)	2 (0.7)	319 (96.7)	7 (2.1)	4 (1.2)
	6 (1.7)	19 (5.4)	286 (97.8)	4 (1.5)	2 (0.7)	312 (94.5)	11 (3.3)	7 (2.1)
	75 (21.2)	51 (14.4)	198 (72.8)	57 (21.0)	17 (6.3)	267 (80.9)	46 (13.9)	17 (5.2)
	30 (8.5)	32 (9.0)	253 (93.0)	12 (4.4)	7 (2.6)	298 (90.3)	21 (6.4)	11 (3.3)
	127 (35.9)	87 (24.6)	116 (42.6)	112 (41.2)	44 (16.2)	149 (45.2)	144 (43.6)	37 (11.2)
	27 (7.6)	19 (5.4)	257 (94.5)	9 (3.3)	6 (2.2)	310 (93.9)	14 (4.2)	6 (1.8)
	157 (44.4)	112 (31.6)	66 (24.3)	178 (65.4)	28 (10.3)	69 (20.9)	217 (65.8)	44 (13.3)
	22 (6.2)	13 (3.7)	256 (94.1)	12 (4.4)	4 (1.5)	316 (95.8)	9 (2.7)	5 (1.5)
	107 (30.2)	82 (23.2)	100 (36.8)	127 (46.7)	45 (16.5)	111 (33.6)	185 (56.1)	34 (10.3)
	135 (38.1)	42 (11.9)	109 (40.1)	130 (47.8)	33 (12.1)	155 (47.0)	149 (45.2)	26 (7.9)
	82 (32.2)	37 (10.5)	208 (76.5)	49 (18.0)	15 (5.5)	259 (78.5)	58 (17.6)	13 (3.9)

## Discussion

The oral cavity, which is an important part of the upper respiratory and digestive system, is thought to play an important role in the transmission of COVID-19(9-10). For this reason, it is believed that limiting dental procedures involving the oral cavity with EDA during the pandemic will reduce the spread rate of the

epidemic(11).Therefore, if the pandemic continues or new outbreaks are encountered in the upcoming years, the knowledge level of future dentists about EDA will play an important role in controlling the epidemics. While evaluating the level of knowledge of dental students about EDA, our study also sheds light on the deficiencies of dental education in this regard. As far as we know, our study is the first study in which dental students and dental education system are evaluated regarding EDA.

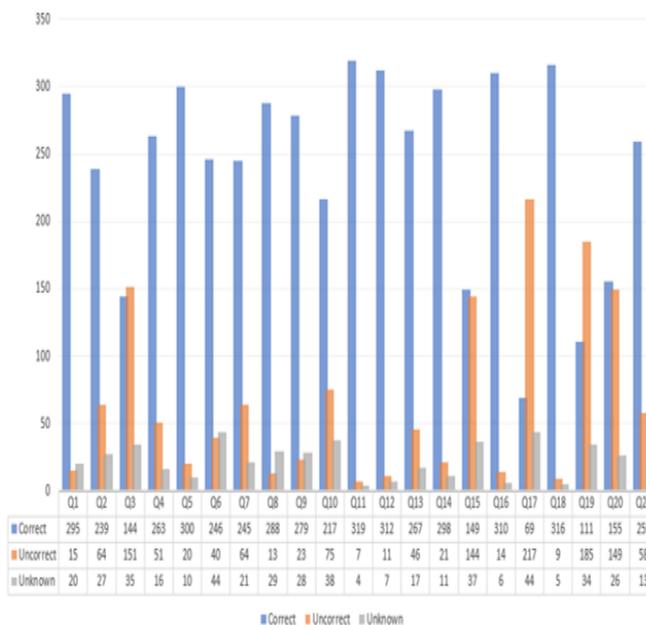
In this study, knowledge scores increase from the first grade ( $9.75 \pm 4.37$ ) to the fifth grade ( $15.39 \pm 3.34$ ). Based on the difference between the knowledge score of the first graders and the knowledge score of the fifth graders, it is possible to say that the education system contributes to the students about EDA. In present study, where the highest score was 21, the mean score of the fifth graders was calculated as  $15.39 \pm 3.34$ . This is an indication that dental students have not reached the maximum level of knowledge about EDA even in their last education years. In this way, dental students can distinguish between urgent and non-urgent situations, delay non-urgent treatments and reduce the risk of COVID-19 transmission, while intervening in emergencies and preventing urgent patients from being deprived of treatment. In our study, the difference in score between the fourth and fifth grades was not statistically significant. One of the reasons may be that the emphasis is on practical applications rather than theoretical lessons in fifth grade education.

In the first, second, third and fourth years of education, women's knowledge scores are higher than men's knowledge scores, but this difference is not statistically significant. For fifth grade students, the difference in knowledge score between female and male participants is statistically significant. Based on these results of our study, we can conclude that women benefit more from dental education than men. However, more studies are needed to elucidate the reasons for this difference between men and women.

Fifth grade students mostly answered questions Q3, Q15, Q17, Q19, Q20 incorrectly. (Grafic 1). Knowing which questions fifth grade students answered incorrectly is important in terms of seeing the shortcomings of the education curriculum about EDA. Based on the results of

this study, incorrect and unknown questions

answered by the students can be identified and the curriculum can be updated in this sense. In addition, a lesson on distinguishing between urgent and non-urgent dental practices can be added to the fifth grade curriculum. And in this way, we inform the dentists about how they should behave in case of the continuation of the pandemic process we are in or if similar situations occur in the following years.



Grafic 1. Fifth grade students' answers to the questions

In our study the education system in Turkey is evaluated. However, there is no data in the literature about the education system in different countries. EDA knowledge scores of dental students from different countries can be evaluated in future studies. EDA knowledge levels in countries affected by the epidemic process to varying degrees, can be compared.

This study has some limitations. Dentistry education is given in different countries with different methods. In our only evaluated the dental education curriculum in Turkey. Therefore, the ability of the results of this study to generalize dental education programs around the world may be limited. Another limitation of our study was the inadequate and unstandardized assessment of the knowledge of students regarding EDA. Due to the very limited time available for developing the questionnaire, dental students were assessed with only simple questions.

## Conclusions

Dentistry education in Turkey gives students the ability to distinguish between urgent and non-emergency dental practices. Differentiation and postponement of non-emergency treatments contributes to both reducing the risk of COVID-19 transmission and not depriving patients in acute conditions from treatment. In order to fight more effectively against epidemics like COVID-19 that may occur in the future, the deficiencies of education in EDA should be eliminated.

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