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Evaluation of Knowledge, Attitudes and Practices of Parents in Pediatric Dentistry Regarding Cross Infection Control in COVID-19 Pandemic: Cross Sectional Research

Çocuk Diş Hekimliğinde Ebeveynlerin COVID-19 Pandemisinde Çapraz Enfeksiyon Kontrolüne İlişkin Bilgi, Tutum ve Uygulamalarının Değerlendirilmesi: Kesitsel Araştırma

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ABSTRACT Objective: Cross infection control has always been of primary importance in dentistry. This study aims to evaluate the knowledge, attitudes, and practices of a group of parents in Türkiye regarding cross infection control in pediatric dentistry during the coronavirus disease-2019 (COVID-19) period. **Material and Methods:** A total of 257 parents attended in this cross sectional study. The questions include demographic information, knowledge, attitudes and behaviors about COVID-19. Likert's 3 point Likert scale was used for answers given to questions (excluding demographic data). One way analysis of variance and Pearson correlations were used as statistical methods. $p<0.05$ was statistically significant. **Results:** One hundred thirty nine participants (54.1%) don't know that the common route of COVID-19 transmission in dentistry is through aerosol generated during dental procedures. No statistically significant difference was observed between knowledge, attitude and practice scores and sociodemographic data ($p>0.05$). The highest average score is observed in parents' attitudes (5.21±1.75), while the lowest average score is observed in practice scores (1.48±3.22). A correlation was found between knowledge, attitude and practice scores. **Conclusion:** In this study, it was observed that parents answered most of the questions correctly, which measured their knowledge and attitude on cross infection and control measures in dentistry, and their practice was at an acceptable level. However, it is important that parents are informed about the aerosol that occurs during dental practice and the potential risk of spreading COVID-19.

Keywords: COVID-19; cross infection; parents; pediatric dentistry

ÖZET Amaç: Diş hekimliğinde çapraz enfeksiyon kontrolü her zaman birincil öneme sahip olmuştur. Bu çalışma, Türkiye'de bir grup ebeveynin koronavirüs hastalığı-2019 [coronavirus disease-2019 (COVID-19)] döneminde çocuk diş hekimliğinde çapraz enfeksiyon kontrolüne ilişkin bilgi, tutum ve uygulamalarını değerlendirmeyi amaçlamaktadır. **Gereç ve Yöntemler:** Bu kesitsel çalışmaya toplam 257 ebeveyn katılmıştır. Sorular katılımcılarla ilgili demografik bilgilerle birlikte COVID-19 ile ilgili bilgi, tutum ve davranışları ölçen soruları içermektedir. Sorulara verilen cevaplar için (demografik veriler hariç) 3'lü Likert ölçeğinde değerlendirilmiş ve istatistiksel yöntemler olarak tek yönlü varyans analizi ve Pearson korelasyon analizi kullanılmıştır. $p<0,05$ istatistiksel olarak anlamlı kabul edilmiştir. **Bulgular:** Yüz otuz dokuz katılımcı (%54,1) diş hekimliğinde COVID-19'un yaygın bulaşma yolunun dental işlemler sırasında oluşan aerosol olduğunu bilmiyordu. COVID-19 ve çapraz enfeksiyon ile ilgili bilgi, tutum ve uygulama puanları ile sosyodemografik veriler arasında istatistiksel olarak anlamlı farklılık görülmemiştir ($p>0,05$). Ebeveynlerin tutum puanları en yüksek değeri (5,21±1,75) oluştururken, en düşük puan ise uygulamada (1,48±3,22) görülmektedir. Ayrıca ebeveynlerin bilgi tutum ve uygulamaları arasında korelasyon varlığı tespit edilmiştir. **Sonuç:** Bu çalışmada, ebeveynlerin diş hekimliğinde çapraz enfeksiyon ve kontrol önlemleri konusundaki bilgi ve tutumlarının ölçüldüğü soruların çoğuna doğru cevap verdikleri ve davranışlarının kabul edilebilir düzeyde olduğu görülmüştür. Bununla birlikte, ebeveynlerin diş hekimliği uygulamaları sırasında ortaya çıkan aerosol ve potansiyel COVID-19 yayılma riski hakkında bilgilendirilmesi önemlidir.

Anahtar Kelimeler: COVID-19; çapraz enfeksiyon; ebeveynler; çocuk diş hekimliği

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Coronavirus disease-2019 (COVID-19) is an infectious respiratory disease that is caused by the severe acute respiratory syndrome-coronavirus-2 virus. Initially identified in Wuhan, China in December 2019, COVID-19 has rapidly disseminated from Wuhan to global populations.[1] On March 11, 2020, the World Health Organization declared COVID-19 as a global pandemic.[2] As of March 22, 2022, the total number of confirmed COVID-19 cases worldwide has surpassed 468 million, with the global death toll exceeding 6 million.[3]

The transmission of the virus primarily occurs through respiratory droplets that are generated when people are in close contact, particularly during instances of coughing and sneezing. Furthermore, transmission can also transpire when individuals come into contact with an infected person or a contaminated surface and subsequently touch their mouth, nose, or eyes.[4]

The COVID-19 case in Türkiye was first reported on March 10, 2020. Since that day, various measures have been taken throughout the country in order to manage the crowded of patients, especially in the health sector. Elective dental treatments in dentistry were delayed, and appointments for patients who needed emergency and compulsory treatment were organized. In pediatric dentistry, patients for whom dental consultation is requested for medical problems, patients with a severe toothache, dental trauma, and life threatening intraoral/extraoral infections have been defined as emergency treatments.[5,6] After the first stage of these restrictions applied in dentistry, as of June 1, all emergency and non-emergency dentistry treatments were started by taking infection precautions in accordance with the guideline published by The Turkish Ministry of Health. These precautions include screening patients, prioritizing emergency treatments, restricting aerosol operation as much as possible, using comprehensive protection, and environmental disinfection.[7]

Dental treatments are, by their nature, a working environment in which the dentist and the patient are in close contact. Medical procedures often generate aerosols that may contain substantial quantities of saliva or blood from patients, thereby posing a risk of viral transmission. It has also been reported that these aerosols can survive up to 72 hours on different surfaces. Therefore, aerosols can be an important source of infection in the treatment of infected patients.[8]

In dentistry, ensuring cross infection control has always been of paramount importance. It is regarded as indispensable, not only for the safety of patients but also for the well being of dentists and staff. Considering the asymptomatic course of COVID-19, especially in children, each patient should be evaluated as potential COVID-19 positive, and personal protective equipment should be used at the maximum level.[9]

Parents are exposed to a lot of information about COVID-19 transmission and cross infection in dentistry, especially through social media. This study aims to evaluate the knowledge, attitudes, and practices of a group of parents in Türkiye regarding cross infection control in pediatric dentistry during the COVID-19 period.

MATERIAL AND METHODS

The proposed protocol for the cross sectional study received approval from the Clinical Research Ethics Committee of Kütahya Health Science University (date: June 30, 2021; number: 2021/11-06). The study was carried out between July 1, 2021-January 1, 2022. The authors affirm that this study was carried out in complete accordance with the Declaration of Helsinki of the World Medical Association. Additionally, the study adhered to the guidelines set forth by the Strengthening the Reporting of Observational Studies in Epidemiology framework.

Questionnaires were answered by the parents of the pediatric patients (aged 0-15 years) who applied to the department of pediatric dentistry and visited for a dental examination. An informed consent form was signed by the participants before filling out the questionnaire. All questions were answered anonymously.

The questionnaire was designed based on similar research.[10-12] The questionnaire was evaluated by two pediatric dentists in terms of expressing the questions clearly. As a result of the examinations, the questions were formed with 23 questions (Table 1).

TABLE 1: Knowledge, attitude and practice about COVID-19.

	Agree n (%)	Don't know n (%)	Disagree n (%)
Knowledge			
A common route of COVID-19 transmission in dentistry is through aerosol (water droplets) generated during dental procedures.	106 (41.2)	139 (54.1)	12 (4.7)
Daily screening of staff, dental assistants, dentists and patients are necessary.	155 (60.3)	57 (22.2)	45 (17.5)
Body temperature and health screening are the first step of identifying the suspected individual.	210 (81.7)	20 (7.8)	27 (10.5)
Sterilization of instruments and disinfection of the dental operatory is mandatory	255 (99.2)	2 (0.8)	-
Extraoral suction or cross ventilation could control aerosol (water droplets) spread.	104 (40.5)	133 (51.8)	20 (7.8)
Hand gloves, face mask, and protective clothing are necessary for a dentist.	248 (96.5)	8 (3.1)	1 (0.4)
Proper disposal of waste is of utmost importance for cross infection control.	232 (90.3)	25 (9.7)	-
Attitude			
Dentists should keep and update records of daily staff and patient screening for COVID-19.	193 (75.1)	39 (15.2)	25 (9.7)
The dentist and dental assistant should discard worn facemask, gloves, and protective clothing after every patient.	236 (91.8)	13 (5.1)	8 (3.1)
High volume suction should be used in dental practice for every patient.	113 (44.0)	140 (54.5)	4 (1.5)
Dental surgery should have extraoral dental suction or cross ventilation to control aerosol (water droplets) spread.	183 (71.2)	70 (27.2)	4 (1.6)
Dental chair and accessories should be disinfected after every patient.	238 (92.6)	8 (3.1)	11 (4.3)
The dentist should regularly monitor the performance of sterilizer.	210 (81.7)	43 (16.7)	4 (1.6)
The patient's waiting area should be marked with social distancing sign.	234 (91.1)	11 (4.3)	12 (4.6)
Practice			
The dentist should be asked, how they are screening dental staff and patients for COVID-19.	141 (54.8)	58 (22.6)	58 (22.6)
The dentist should be asked about sterilization protocols.	138 (53.7)	73 (28.4)	46 (17.9)
The dentist should be asked about the disinfection of the dental operatory.	151 (58.8)	48 (18.7)	58 (22.6)
The dentist should be asked about the management of patient appointments to avoid crowding.	150 (58.4)	43 (16.7)	64 (24.9)
The dentist should be asked about the waste disposal protocols.	99 (38.5)	85 (33.1)	73 (28.4)

The questions were designed to test the parent's knowledge, attitudes, and practices regarding cross infection control in pediatric dentistry during the COVID-19 period. To ensure the validity of the questions, the questions were reviewed by 8 additional pediatric dentists according to the Lawshe method and their suitability was confirmed with a coefficient of 0.789.[13] The reability of questionnaire was assessed through Cronbach's α (α=0,784).

The questionnaire comprised of 4 sections. The first section pertained to demographic information, encompassing age, gender, education level, and economic status (4 questions). Demographic data were obtained according to parents' self report. The economic situation was determined based on the statements of the parents and the hunger and poverty limits of the Turkish Statistical Institute at the time the study was conducted. The rest of them were composed of questions about knowledge about COVID-19 (7 questions), attitude toward COVID-19 (7 questions), and practice toward COVID-19 (5 questions). Likert's 3 point Likert scale (disagree, don't know, and agree) was used for answers to questions other than demographic data.

The total knowledge score and attitude scores ranged from -7 to 7. A mean knowledge and attitude scores ≥3.5 represent good knowledge and attitude. The total practice score ranged from -5 to 5. A mean practice score ≥ 2.5 represents good practice.[11] A score of 1 point was assigned for a correct response, a score of 0 point was assigned for an answer indicating uncertainty (i.e., "I don't know") and a score of -1 points were assigned for an incorrect response.

The data were analyzed using the statistical software program SPSS Statistics for Windows, Version 26.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were employed to calculate frequencies and percentages for categorical variables. One way analysis of variance was conducted to assess the variations in parents' knowledge, attitude, and practice based on demographic characteristics. Additionally, Pearson correlation analysis was performed to exam-

ine any associations between knowledge, attitude, and practice. A p value of ≤0.05 was considered as statistically significant.

RESULTS

Twenty of the participants refused to complete the questionnaire and fifty eight participants did not complete the questionnaire. The number of participants who filled out the questionnaire was 257 (Figure 1). The demographic information of the participants is given in Table 2. 60.7% (n=156) of the participants were female, and 39.3% (n=101) were male. When the education status data was examined, 14.4% (n=37) of the parents were primary and secondary school graduated, 50.2% (n=129) were high school graduated, and 35.4% (n=91) were university graduated.

A total of 139 (54.1%) participants were unaware that aerosols (water droplets) generated during dental procedures are the primary route of COVID-19 transmission in dentistry. Among the participants, 60.3% (n=155) agreed that daily screening of staff, dental assistants, dentists, and patients is necessary, while 81.7% of them were aware that body temperature and health screening are the initial steps in identifying suspected individuals. Additionally, 99.2% of the participants acknowledged the mandatory nature of instrument sterilization and dental practice disinfection. One hundred ninety three (75.1%) participants agreed that dentists should keep and update records of daily staff and patient screening for COVID-19. Additionally, 236 (91.8%) participants agree that the dentist and dental assistant should discard worn facemask, gloves, and protective clothing after every patient. Likewise, 183 (71.2%) agreed that dental surgery should have extraoral dental suction or cross ventilation to control aerosol (water droplets) spread. Two hundred thirty eight (92.6%) believed that dental chairs and accessories should be disinfected after every patient. Also, 210 (81.7%) participants opted that the dentist should regularly monitor the performance of the sterilizer. Furthermore, 234 (91.1%) participants recognized that the patient's waiting area should be marked with a social distancing sign. Regarding the practice related questions on COVID-19, a total of 141 (54.8%) participants agreed that it is important to inquire with the dentist about the screening measures employed for dental staff and patients in relation to COVID-19. Moreover, 138 (53.7%) participants expressed the necessity of inquiring about the sterilization protocols. In terms of disinfection of the dental operatory, 151 (58.8%) participants considered it crucial to ask the dentist. Furthermore, 150 (58.4%) participants agreed that the dentist should be questioned regarding the management of patient appointments to prevent overcrowding. The detailed data on "knowledge, attitude and practice about COVID-19" can be found in Table 1.

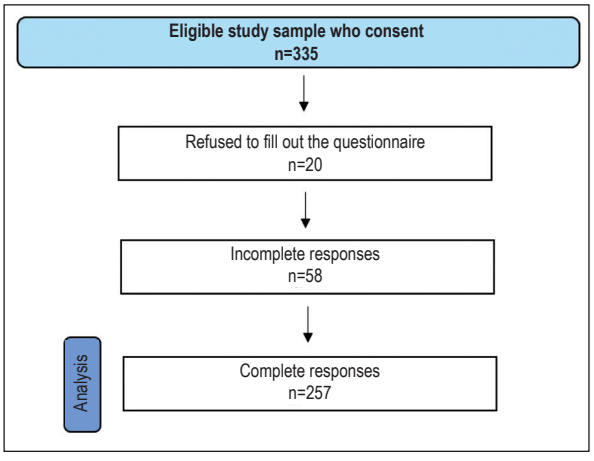


FIGURE 1: Study diagram.

TABLE 2: Demographics characteristics of the participants (n=257).

	n	%
Age		
20-29	25	9.7
30-39	147	57.2
40-49	69	26.8
≥50	16	6.2
Gender		
Female	156	60.7
Male	101	39.3
Education level		
Primary and secondary school	37	14.4
High school	129	50.2
University	91	35.4
Economic status		
Lower income	59	23.0
Middle income	166	64.5
High income	32	12.5

TABLE 3: Relationship between the sociodemographic data and knowledge, attitude, and practices scores about COVID-19.

			Knowledge score		Attitude score		Practices score	
		n (%)	X̄±SD	p value	X̄±SD	p value	X̄±SD	p value
Age	20-29	25 (9.7)	4.48±1.42	0.475	5.12±1.51	0.103	1.04±3.12	0.884
	30-39	147 (57.2)	4.62±1.68		5.25±1.72		1.52±3.29	
	40-49	69 (26.8)	4.77±1.79		4.94±1.94		1.59±3.15	
	≥ 50	16 (6.2)	5.25±1.65		6.13±1.09		1.25±3.34	
Gender	Female	156 (60.7)	4.65±1.80	0.626	5.24±1.73	0.703	1.49±2.99	0.926
	Male	101 (39.3)	4.75±1.50		5.16±1.78		1.46±3.57	
Education level	Primary and secondary school	37 (14.4)	4.62±1.95	0.899	5.24±2.00	0.758	1.81±2.84	0.708
	High school	129 (50.2)	4.74±1.59		5.13±1.68		1.51±3.23	
	University	91 (35.4)	4.65±1.72		5.31±1.74		1.30±3.37	
Economic status	Lower income	59 (23)	4.46±1.56	0.182	4.97±1.88	0.167	1.20±3.31	0.746
	Middle income	166 (64.6)	4.83±1.68		5.36±1.63		1.58±3.19	
	High income	32 (12.5)	4.38±1.91		4.88±2.03		1.47±3.35	
	Total		4.69±1.69		5.21±1.75		1.48±3.22	

One way analysis of variance was used; SD: Standard deviation.

TABLE 4: The correlation between knowledge score, attitude score and practices score.

		Knowledge score	Attitude score	Practices score
Knowledge score	r value	1	0.471*	0.305*
	p value		<0.001	<0.001
Attitude score	r value	0.471*	1	0.389*
	p value	<0.001		<0.001
Practices score	r value	0.305*	0.389*	1
	p value	<0.001	<0.001	

*Correlation is significant at the 0.05 level; Pearson correlation coefficient was used; SD: Standard deviation.

The statistical relationship between knowledge, attitude, and practice scores about COVID-19 and sociodemographic data are shown in Table 3. No statistically significant difference was observed between knowledge, attitude and practice scores and sociodemographic data (p>0.05). The highest average score is observed in parents' attitudes (5.21±1.75), while the lowest average score is observed in practice scores (1.48±3.22).

According to the Pearson correlation coefficient, the correlation between knowledge scores and attitude scores was found to be at a moderate level (r=0.471; p<0.001). The correlation between knowledge scores and practice scores was observed to be at a low level (r=0.305; p<0.001). Furthermore, the correlation between attitude scores and practice scores was determined to be at a low level (r=0.389; p<0.001) (Table 4).

DISCUSSION

Pediatric dentistry involves a range of procedures that can generate blood, saliva, and aerosols, consequently posing a potential risk of COVID-19 cross infection.[8] In order to ensure the continuous delivery of high quality dental care to children, it is imperative to assess the awareness and comprehension of patients and their parents regarding the modes of COVID-19 transmission.[10] With the current pandemic that has affected the whole world, studies have been conducted to evaluate the views of parents about their children's oral hygiene, dental issues, and pharmaceutical usage.[14-16] However, the number of studies

evaluating parents' views on COVID-19 transmission in dental practices is limited.[10-12,14,16] Our research represents a pioneering effort aimed at evaluating the knowledge, attitudes, and behaviors of parents in relation to cross infection control within the realm of pediatric dentistry amidst the COVID-19 pandemic and examines the relationship between them.

In contemporary times, with the increasing prevalence and accessibility of modern multimedia, individuals are exposed to a greater influx of up to date information concerning COVID-19, thereby enhancing their overall knowledge base.[12] In the context of our study, it was observed that parents exhibited high level of knowledge regarding the transmission of COVID-19 in dental settings. No statistically significant difference was observed between the parents' sociodemographic data and their knowledge levels. However, although the difference is not significant, it appears that the knowledge scores of parents over the age of 50 are higher than those of parents in other age groups. It is estimated that parents in this age group are likely to have more children than other age groups and may know the ways of transmission due to the diseases their children have had in previous periods. The virus can spread through saliva, body fluids, feces, and airborne droplets when people cough or sneeze; this is the main route of transmission.[17] Dental treatment may involve a significant amount of saliva or blood spatter from the patient, thus carrying a high risk of virus transmission.[18] Given the diverse array of hand instruments, air water sprays, and mechanical devices such as ultrasonics and high speed rotary instruments used in dentistry, infections may be transmitted from patients to dental professionals, staff members, and other patients.[12] In addition, the mostly asymptomatic course of COVID-19 in children increases the risk of transmission in dental clinics.[19] In the study by Sun et al., the majority of parents correctly identified the aerosol and cited it as a potential source for spread in dentistry.[12] However, in our study, it was observed that 58.8% of the parents did not know that the transmission could occur due to aerosol created in dental treatments, and 59.6% did not know how to prevent the spread of aerosol. Thanks to the public service announcements broadcast in Türkiye, the majority of parents are not aware of the aerosol formed during dental treatments, even though they know that COVID-19 spreads through droplets. It is thought that the lack of information among parents can be eliminated by announcing posters, brochures, and propaganda about contamination that may occur during dental treatments by the dental societies in public media channels.

In our study revealed that parents exhibited a high level of positive attitude scores, indicating their awareness and approval of the COVID-19 precautions implemented within the field of dentistry.[5,6] In light of the highly contagious nature of COVID-19, dental clinics must institute a range of measures to mitigate the virus's transmission. To control the spread of aerosols, high volume aspirations, use of personal protective equipment, correct and regular sterilization of dental equipment, disinfection of the clinic after each patient, and implementation of social distance rules in the waiting area are the most basic precautions.[20] In our study, the majority of parents displayed positive attitudes towards all measures except the use of high volume aspirations to control the spread of aerosols. It is thought that the negative attitudes of parents about high volume aspiration are due to the lack of knowledge observed in the previous part of our study. In addition, due to the fact that the treatments were carried out in isolated areas under the conditions of the COVID-19 pandemic, parents could not always accompany their children's treatment. This situation may have caused the high volume aspirations used during treatment to be overlooked by the parents.

In dentistry practices, the precautions taken against cross infection are followed carefully. Besides, it is the dentist's responsibility to update the measures in light of The Turkish Ministry of Health's status updates.[10] In our study, parents' behavioural scores were found to be acceptable at 1.48±3.22. This shows that the precautions taken against the risk of cross infection are carefully questioned by the majority of parents.

Knowledge exerts a profound influence on individual behaviors. In this context, an examination of the interplay between parents' knowledge, attitudes,

and practices in our study reveals a positive correlation among these variables. As knowledge levels increase, attitudes and practices also exhibit a corresponding increase ($p<0.05$). This observation underscores the manifestation of parents' knowledge concerning the transmission of COVID-19 in dental settings in their attitudes and behavioral patterns.

The major limitation of this study is that the sample size could not be kept large due to the fact that it was conducted in a single city centre dental hospital in Türkiye and the patient circulation was limited during the period of restrictions.

BULLET POINTS

- This article highlights the importance of cross infection awareness of parents who applied to the pedodontics department for their children during the COVID-19 pandemic in Türkiye.
- The article also highlights the influence of parents' knowledge, attitudes and behaviors regarding cross infection.
- It also highlights the importance of cross infection during the COVID-19 pandemic.

CONCLUSION

In this study, it was observed that parents answered most of the questions correctly, which measured their knowledge and attitude on cross infection and control measures in dentistry, and their practice was at an acceptable level. It is seen that as the level of knowledge of the parents increases, their attitudes and practices also increase positively. However, it is important that parents are informed about the aerosol that occurs during dental practice and the potential risk of spreading COVID-19. Thus, the risk of infection for the patient and parents during dentistry practices will be reduced.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

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.

Authorship Contributions

Idea/Concept: *Canan Bayraktar Nahir, İrem Bağ;* ***Design:*** *Canan Bayraktar Nahir, İrem Bağ;* ***Control/Supervision:*** *Canan Bayraktar Nahir, İrem Bağ;* ***Data Collection and/or Processing:*** *Canan Bayraktar Nahir, İrem Bağ;* ***Analysis and/or Interpretation:*** *Canan Bayraktar Nahir;* ***Literature Review:*** *Canan Bayraktar Nahir;* ***Writing the Article:*** *Canan Bayraktar Nahir;* ***Critical Review:*** *Canan Bayraktar Nahir, İrem Bağ;* ***References and Fundings:*** *Canan Bayraktar Nahir, İrem Bağ;* ***Materials:*** *Canan Bayraktar Nahir, İrem Bağ.*

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