

## Evaluation of the Applications to the Pediatric Dentistry Clinic during the COVID-19 Pandemic: A Retrospective Study

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### ABSTRACT

**BACKGROUND:** During the Covid 19 pandemic, patients' fear of contracting the virus, increased anxiety levels, social distance and isolation restrictions have resulted in changes in their approaches to their health.

**Objectives:** The purpose of this study is to examine the records of patients in the pediatric dentistry clinic and to evaluate the effect of pandemic conditions on the general reasons for admission during the pandemic period.

**METHODS:** Age, gender, place of residence, parental education, frequency of brushing teeth and visiting the dentist, age of first visit to the dentist, reason for application and the child's behavior score records according to the Frankl Behavior Scale were evaluated of 1761 patients who applied to the pediatric dentistry clinic during the pandemic. Chi-square test and descriptive statistics were used in statistical analysis. The significance level was determined as 0.05.

**Results:** It was observed that 55% of the participants brushed their teeth once a day and 21.7% went to the dentist for the first time. The reason for admission was mostly pain (48.4%), and when the child's behavior at the first examination was examined according to the Frankl Behavior Scale, it was determined that 5.5% of the children were "absolutely negative". The mean DMFT of the patients was calculated as  $7 \pm 3.92$ .

**CONCLUSION:** It was observed that the reason for the patients' application during the pandemic was mostly due to pain, their parents had low education and income levels, and most of them did not have their children's first dental examination.

**KEYWORDS:** Covid 19, child, dental health, sociodemographic, pandemic

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### I. INTRODUCTION

A pandemic is an important health event that spreads simultaneously over a large area of the world, is contagious and threatens the lives of a large number of people. In the last quarter of 2019, in Wuhan, China, COVID-19 (Coronavirus Disease 2019) was defined as a "public health emergency of international scale" by the WHO on January 30, 2020, and this definition was expanded to a "pandemic" on March 11, 2020, due to the increase in the spread, severity and mortality rates of the virus [1]. Coronaviruses are positive polarity, single-stranded, enveloped RNA viruses and cause mainly respiratory diseases, including fever, body pain, fatigue, loss of appetite, and smell [2]. The disease is mainly transmitted by droplets. Transmission is also observed when a person comes into contact with the viruses, spread by the infected person through coughing, sneezing, and talking, and they touch their hands to the mouth, nose, or ocular mucosa [3].

Dentists and auxiliary staff are at high risk due to the usage of high-speed instruments, air-water spray, and ultrasonic instruments in the clinic and the formation of aerosols that spread around as a result of the patient's sneezing, coughing, and talking, in addition to being in close contact with the patient [4]. Many SARS-CoV and MERS-CoV were reported to be associated with hospital-acquired transmission due to aerosol-generating processes [5]. If adequate precautions are not taken by the dentist and auxiliary staff during treatment, dental clinics can become a source of infection instead of a treatment center. The American Dental Association (ADA) and other dental associations worldwide limited routine dental procedures during the pandemic, allowing only emergency cases. Emergency cases are defined as ongoing tissue bleeding, trauma, severe pain, cellulitis, and life-threatening infection [6]. In a study, it was shown that dental visits decreased by 90% compared to normal days during the pandemic period. Of the treatments performed, 51.9% were endodontic treatments, 22.1% were extractions and other surgical cases, 8.4% were restorative procedures, 0.2% were orthodontic treatments and 17.3% were other procedures [7]. Patients should apply to dental clinics in many cases such as protection of oral and dental health and maintenance of the current healthy state, caries that need to be treated, preventive

applications, injuries requiring emergency treatment, and protection of occlusion during growth and development [8]. During this period, patients disrupted their applications to dental clinics due to fear of being caught by the disease, increased anxiety levels, economic difficulties during the pandemic period, social distance, and isolation restrictions [9]. Therefore, the aim of this study was to retrospectively review the examination records of patients who were examined in the pediatric dentistry clinic during the pandemic period and whose routine examination records were kept, and to evaluate the effects of pandemic conditions on the general reasons for admission during the current period.

## II. MATERIALS AND METHODS

Within the scope of the study, the examination forms kept for each patient examined in the Department of Pedodontics Clinic of Zonguldak Bülent Ecevit University Faculty of Dentistry, Department of Pedodontics Clinic between March 2020 and March 2022, belonging to patients who applied from Zonguldak and surrounding provinces for various reasons and underwent routine examination procedures, were retrospectively examined. Ethics committee approval dated 14.12.2022 and numbered 22/2022 was obtained from Zonguldak Bülent Ecevit University Non-Interventional Clinical Research Ethics Committee to conduct the study. The examination forms of 1761 patients evaluated within the scope of the study were filled out by the physicians on duty for each patient who applied to the clinic, accompanied by family or companions. Age, gender, place of residence, parental education, mother's and father's education, mother's occupation and medical anamnesis, frequency of tooth brushing and dental visits, time of dental visit, age at the first visit, reason for dental visit and the child's score according to the Frankl Behavior Scale showing the child's behavior at the first visit were recorded within the scope of the study. Chi-square test and descriptive statistics (number, percentage, mean, standard deviation, median, minimum, maximum, and median) were used to analyze the data obtained in the study. The significance level of the analysis was taken as  $p < 0.05$ .

## III. RESULTS

Of the 1761 pediatric patients evaluated in the study, 51% were girls and 49% were boys. There was no significant difference in the number of girls and boys in patient participation ( $p > 0.05$ ). The mean age of the participants was  $8.32 \pm 2.51$  years. When the distribution of the place of residence was examined in the study, it was found that 51.1% lived in the district. When the educational status of the mothers of the participants was analyzed, it was seen that 0.4% had no education and 15.9% were educated at a higher education level. When the educational status of the fathers of the participants was analyzed, it was determined that 21.8% of them had a higher education level. When the occupational distribution of the mothers of the participants was analyzed, it was determined that 80.4% of them were housewives and did not work (Table 1).

**Table 1.** Distribution of participants according to demographic characteristics

		n	%
Gender	Female	898	51,0
	Male	863	49,0
Place of residence	Province	807	45,8
	District	899	51,1
	Village	55	3,1
Mother's educational status	No Education	7	0,4
	Primary School	547	31,1
	Middle School	409	23,2
	High School	512	29,1
	Collage	280	15,9
	No response	6	0,3
Father's education status	No education	1	0,1
	Primary School	342	19,4
	Middle School	349	19,8
	High School	675	38,3
	Collage	384	21,8
	No response	10	0,6
Mother's occupation	Working	338	19,2
	Housewife	1417	80,4
	Deceased	1	0,1
	No response	5	0,3

		Total	1761	100,0		
n	Minimum	Maximum	Mean	Standard Deviation	Median	
Age	1761	1,30	12,90	8,32	2,51	8,10

When the distribution of the participants according to their clinical characteristics was analyzed, it was found that 55% of them brushed their teeth once a day. Regarding the frequency of visits to the dentist, 77.4% had visited the dentist for a period of one year or more, while 0.1% had never visited the dentist. It was seen that 21.7% of the participants visited a dentist for the first time. When the reason for the application of the participants during the pandemic period was evaluated, it was determined that the reason was mostly pain (48.4%) and 29.4% of them applied for the examination. When the behavioral status of the child at the first examination was examined according to the Frankl behavior scale, 5.5% were "definitely negative" 13.7% were "negative", while 65.9% were "positive" and 15% were "definitely positive". The mean DMFT of the patients was calculated to be  $7\pm 3.92$  (Table 2).

**Table 2.** Distribution of participants according to clinical characteristics

		n	%			
Frequency of tooth brushing	None	454	25,8			
	Once a day	969	55,0			
	Two or more times a day	338	19,2			
Frequency of visiting the dentist	None	1	0,1			
	6 months	119	6,8			
	6 months - 1 year	278	15,8			
	1 year and above	1363	77,4			
First-time visit to the dentist	Yes	382	21,7			
	No.	1378	78,3			
Age at first dental examination	0-1 year old	24	1,4			
	0-3 years old	401	22,8			
	3-6 years old	885	50,3			
	6-9 years old	377	21,4			
	9 years old and older	74	4,2			
Systematic disease	No	1594	90,5			
	Yes	167	9,5			
Reason for application	Pain	853	48,4			
	Abscess	85	4,8			
	Decay	5	0,3			
	Tooth eruption problems	81,0	4,6			
	Control	84,0	4,8			
	Examination	517	29,4			
	Orthodontic problems	87	4,9			
	Treatment repetition	19	1,1			
	Trauma	19	1,1			
	Soft tissue problems	11	0,6			
Behavior of the child at the first examination	Definitely negative	96	5,5			
	Negative	241	13,7			
	Positive	1160	65,9			
	Definitely positive	264	15,0			
n	Minimum	Maximum	Mean	Standard Deviation	Median	
DMFT	1761	0	22	7	3,92	7

#### **IV. DISCUSSION**

A list of procedures was published by the Ministry of Health of the Republic of Turkey in order to limit the procedures to be applied in dentistry during the pandemic period to emergency treatments and to keep protective measures at the highest level during these procedures. Emergency treatments in pediatric dentistry were limited to dental trauma, persistent and severe toothache, and extraoral swelling in the Coronavirus Scientific Committee decision published by the ministry [10,11]. It is important to postpone dental treatments other than these conditions in order to prevent the risk of transmission. Accordingly, it was expected that the number of patients applying to dental centers would decrease. Moreover, avoiding applying to dental centers with the fear of being caught by the disease was also considered as another issue that would reduce the number of patients. Avoidance of routine dental treatments may lead to deterioration of oral health, dental caries and infections, neglect of dental traumas, and increased periodontal diseases [12]. In a study conducted by Motta et al. [13] in Brazil, it was observed that there was a 62% decrease in treatment procedures for primary teeth during the pandemic period compared to the pre-pandemic period. The greatest decrease in these procedure types was observed in restorative treatments. The decrease in the treatment procedures of primary teeth leads to a lack of preventive treatments. Failure to perform minimally invasive or restorative procedures can lead to future dental caries lesion formation, dental pain, functional and aesthetic problems, and thus a lower quality of life for children. During the pandemic period, efforts were made to avoid aerosol-forming procedures during dental procedures according to the recommendations of the Ministry of Health worldwide. The result of the study, a decrease in endodontic procedures and an increase in tooth extractions is thought to be an attempt to reduce aerosol formation during endodontic treatment. Yang J et al. [14] compared the distribution of children who applied to the pediatric dentistry clinic at equal time intervals in 2019 and 2020 according to demographic and clinical characteristics in a study they conducted in 2022. It was reported that there was a decrease in the number of patients who applied to the dentist in 2020 and there was no statistically significant difference between the genders of the patients who applied. On the other hand, when the age groups were examined, it was observed that the incidence of admission in the 0-6 age group increased in 2020 [14].

The reason for this is thought to be the psychological effects of young children during the quarantine period at home, causing inadequate personal care and oral hygiene, predisposition of children to dental diseases, and staying away from regular dental examinations and preventive practices. In the same study, it was reported that the risk of dental trauma decreased due to the inability of children to perform outdoor activities [14]. Furthermore, Fleagle et al. [15] compared the rates of sports/school-related oral trauma in 2019 and 2020 in their study. They stated that the oral trauma rate of 21.8% in 2019 decreased to 1.9% during the curfew period in 2020. Similarly, in our study, it was observed that 1.1% of the patients in this period applied to the clinic due to trauma. Hopcraft and Farmer [16] emphasized that there was a decrease in the number of patients who applied to the clinic in their study, in which they investigated the impact of the COVID-19 pandemic on dental practices, and that the patient group with low socioeconomic status, who had a high risk of caries and limited access to dental treatments, was affected by this situation. Due to the chronic and progressive nature of dental diseases, it is thought that the effect of delayed dental care on oral health as a result of the COVID-19 pandemic is important. Similarly, in our study, it was observed that families with low education levels applied to the dentistry clinic more frequently in this period compared to families with high education levels, and 80% of the mothers who applied did not have a profession. In a study conducted in Spain and Portugal, it was reported that demographic factors such as family income and education level affected oral hygiene habits during the quarantine period, and children of families with low education levels had worse oral hygiene habits. In the same study, it was observed that children with untreated dental caries had worse oral hygiene habits and consumed more snacks during the day. Additionally, it was reported that oral hygiene habit is a subjective parameter, it can be interpreted differently by families, and the important thing is the duration and quality of brushing rather than the frequency of tooth brushing [17]. Similarly, Brondani et al. [18]

stated in their study that the frequency of tooth brushing decreased during the pandemic period. In our study, it was observed that only 19.2% of the patients who applied to the clinic brushed their teeth twice a day, whereas 55% did not brush their teeth once a day and 22.8% did not brush their teeth at all. In a study published in 2022, it was stated that the frequency of tooth brushing decreased during the curfew, and this effect was higher, especially in older children who tend to brush their teeth alone. While an average decrease of 21-25% in tooth brushing frequency was observed, it was reported that there was a decrease of 43% in children aged 3-15 years. In the same study, it was observed that both the number of daily meals and the frequency of sugar consumption increased during this period, and as a result, the prevalence of caries increased. The main reason for these results described in the study was explained as the failure of families to maintain their daily routines and sleep patterns during the quarantine period, and consequently, most children stayed awake until late, sleeping more in the

morning, and increased frequency of eating and frequency of tooth brushing in the rest of the time [19]. Fleagle et al. [15] compared the patients who applied to the pediatric emergency department with orofacial complaints during the pandemic (the year 2020) with the period before the pandemic (2019). In this period, they observed that the rates of total pediatric emergency department admissions decreased by 41% in terms of general complaints, while the rates of patients presenting with oral complaints among these patients increased. They explained this by the closure and restriction of some dental clinics during the lockdown period and the temporary postponement of general anesthesia/sedation procedures, resulting in more patients presenting to emergency departments for evaluation. From 2019 to 2020, they reported that although oral ulcers decreased from 47.6% to 19.4%, those presenting with dental abscesses increased from 40% to 68.1% and those presenting with dental swelling/pain increased from 22.7% to 25.2%. In our study, a total of 53.2% of the patients admitted to the clinic complained of dental pain and abscesses.

In Romania, Moca et al. [20] examined the sociodemographic characteristics of patients who applied to the emergency dentistry center in 2019, 2020, and 2021. They observed that the majority of the patients who applied in all three years were between the ages of 7-12, the majority of them came from the urban environment, and in 2020, more girls were admitted, and in 2019 and 2021, more boys. In all years, the most frequently affected and treated teeth were the lower posterior region and the least affected area was the lower anterior region. According to the reason for admission, the most common type of emergency was pulpitis, followed by acute apical abscess in 2019 and 2020, and acute apical abscess followed by pulpitis in 2021. When they looked at the relationship between age groups and the most common reason for admission, it was seen that the 7-12 age group most frequently presented with apical periodontitis, while the 0-6 age group presented with trauma most frequently in 2019, and abscess in 2020 and 2021.

Dental anxiety in children has been associated with the child's personality traits, past dental experiences, and parents' projection of their own anxieties to their children. However, in a study conducted by Olszewska et al. [21], it was proved that there was no change in the level of dental anxiety experienced by the child, despite the increased level of anxiety in the parents during the pandemic period. In a study conducted in 2022, it was reported that there was an increase in dmft/DMFT scores in children during the pandemic period compared to the pre-pandemic period [22]. As a result of a study conducted in Israel, it was reported that 14% of patients who visited the dentist after the pandemic were diagnosed with more caries lesions than the previous dental examination [23]. Dental caries greatly affects the health, development, and quality of life of children. Some social and economic conditions may lead to inequalities in children's access to health opportunities throughout their lives. As a result of the studies, it is seen that there is a close connection between the socioeconomic conditions of a family and the oral health outcomes of the child [24]. According to a study conducted in the United States, it was reported that oral health inequalities in children are exacerbated for disadvantaged children during the pandemic period [24]. A study conducted in 2023 examined sociodemographic factors affecting children's oral health during the COVID-19 outbreak. In the current study, 72.1% of parents observed that their child had 1 or more untreated dental caries and that children whose parents were divorced or unemployed were more likely to need emergency dental treatment. Education and awareness of parents play an important role in deciding whether to take their child to the dentist for disease-related or preventive treatment. In the study, being the child of uneducated, unemployed, widowed/divorced, or low-income parents was associated with poor oral health and inadequate dental visits [25]. Factors related to the oral health needs observed in children during COVID-19 should be identified, the usage of preventive treatments should be increased, and precautions should be taken, especially for children from families with a high risk of oral disease.

## **V. CONCLUSION**

During the COVID-19 epidemic, which affected the whole world, it was observed that pediatric patients were insufficient in providing oral hygiene. Moreover, it is among the information obtained in this study that the families who applied to the clinic had low education and income levels. It was observed that half of the patients came with complaints of pain and abscess, and most of the patients did not have their first dental examination. Consequently, it is thought that long-term studies are needed to determine the socio-demographic factors affecting the oral health of children and to apply treatment strategies to address future epidemic and pandemic emergencies.

## **AVAILABILITY OF DATA AND MATERIALS**

The data used to support the findings of this study is available from the corresponding author upon request.

**CONFLICT OF INTEREST :** The authors have no conflicts of interest to declare.

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