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The effect of Previous Dental Treatments on Dental Anxiety in Children Aged 4-12

4-12 Yaş Arası Çocuklarda Önceki Dental Tedavilerin Dental Anksiyete Üzerindeki Etkisi

Dental anxiety in children / Çocuklarda dental anksiyete

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ÖZET

Amaç: *Başarılı bir dental tedavi için hastanın kooperasyonu önemli bir faktördür. Dental tedavilere karşı oluşan kaygıda önceki tedavi deneyimlerinin yanı sıra ailenin sosyo-ekonomik faktörleri, çocuğun yaşı, cinsiyeti, ağız hijyeni durumu gibi çeşitli faktörler de etkili olabilmektedir. Bu çalışmanın amacı önceki dental tedavi deneyimlerinin dental kaygıdaki rolünü değerlendirmektir.*

Gereç ve Yöntem: *Araştırmaya diş tedavisi için başvuran 4-12 yaş arası çocuklar ve aileleri dahil edilmiştir. Aileler, çocuklarının diş tedavisi sırasında sosyodemografik verileri ve önceki diş tedavilerine ilişkin bilgileri içeren anket formunu doldurmuştur. İşlem öncesi çocuklara Yüz Görüntü Skalasında 5 resim o andaki duygularına en yakın olan resmi seçmeleri istenmiştir. İşlem sırasındaki iş birliğinin derecesi Frankl Davranış Ölçeği ile belirlenmiştir. Hastaların dental kaygılarının çeşitli faktörlerle etkileşimi analiz edilmiştir. Sürekli varyasyon değişkenleri arasında normal dağılım gösteren değişkenlerin çoklu karşılaştırmaları için ANOVA post-hoc analizi ve Tukeys testi kullanılmıştır. Normal dağılım göstermeyenlerde Kruskal Wallis post-hoc analizi ve Man Whitney U testi kullanılmıştır.*

Bulgular: *Diş tedavilerine karşı oluşan kaygının kızlarda ve genç yaş gruplarında istatistiksel olarak anlamlı olmasa da daha yüksek olduğu belirlenmiştir. Frankl skalasına göre, rutin diş kontrolüne gelen ve daha önce diş tedavisi gören çocuklarda önceki tedavinin olumlu ya da olumsuz geçmesinden bağımsız olarak daha yüksek skorlar görülmüştür. Yüz Görüntü Skalasında ise daha önce dental tedavi görmeyen çocukların daha olumlu yüzler seçtiği, olumsuz dental tedavi deneyimi olan çocukların ise daha olumsuz yüzler seçtiği görülmüştür.*

Sonuç: *Daha önceki dental tedavi deneyimleri ve rutin kontroller; hem çocuğun kinik ortamına ve doktora aşinalık hissetmesini hem de invaziv dental işlemlere olan ihtiyacı azaltacağından dental anksiyetenin azaltılmasında önemli bir etkiye sahiptir. Bu nedenle dental kaygının olumsuz etkilerini ortadan kaldırmak için çocukları erken yaşta düzenli diş kontrollerine getirerek koruyucu dental tedaviler yapılmalı ve mümkün olduğunca invaziv diş tedavilerine olan ihtiyaç ortadan kaldırılmalıdır.*

Anahtar Kelimeler: *Dental anksiyete; Diş çürüğü; Tedavi*

ABSTRACT

Objective: *The patient's cooperation is crucial for the success of dental treatment. In addition to previous treatments, various factors such as socio-economic status, age, gender, and oral hygiene can influence dental anxiety. The aim of this study is to evaluate the impact of previous dental treatment experiences on dental anxiety.*

Material and Method: *Children aged 4-12 years who applied for dental treatment, along with their families, participated in the study. During their children's dental treatment, families completed a survey form containing sociodemographic data and information about previous dental treatments. Before the procedure, children were shown five pictures from the Facial Image Scale and asked to choose the picture that best represented their current emotion. The degree of cooperation during the procedure was assessed using the Frankl Behavior Scale. The interaction of patients' dental anxiety with various factors was analyzed. ANOVA post-hoc analysis and Tukey's test were used for multiple comparisons of normally distributed variables among continuous variation variables. Kruskal-Wallis post-hoc analysis and the Mann-Whitney U test were used for variables that did not follow a normal distribution.*

Results: *Dental anxiety was found to be higher in girls and younger age groups, although this difference was not statistically significant. According to the Frankl scale, children who attended routine dental check-ups and had previous dental treatment experiences had higher scores, regardless of whether the previous treatment was favorable or unfavorable. Based on the Facial Image Scale, it was observed that children with no previous dental treatment selected more positive faces, whereas children with negative dental treatment experiences selected more negative faces.*

Conclusion: *Previous dental treatment experiences and routine check-ups significantly impact reducing dental anxiety by familiarizing the child with the clinical environment and the dentist, as well as by reducing the need for invasive dental procedures. Therefore, to eliminate the negative effects of dental anxiety, preventive dental treatments should be emphasized by bringing children to regular dental check-ups at an early age, thus minimizing the need for invasive dental treatments.*

Keywords: *Dental anxiety; Dental caries; Treatment*

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Introduction

Children form a group of individuals that show great diversity in terms of age, adaptation, maturity, personality, emotions, experience, oral health, family background, and culture. All these factors affect a child's cooperation during dental treatment. Some children are more tolerant of stressful situations and are less likely to cause problems for the dentist, while others are more sensitive and require more attention and time to feel comfortable and cooperative during dental treatment.[1] One of the cornerstones of pediatric dentistry is the ability to positively guide children through their dental experience.[2] Therefore, it is important for dentists to identify anxious patients who need special attention as early as possible to ensure a comfortable dental treatment.[3]

Various rating scales have been developed to evaluate a child's behavior during dental visits.[4] Among these methods, projective methods are used more frequently because they can be applied to younger age groups. In our study, we preferred the Facial Image Scale (FIS) and the Frankl Behavior Rating Scale because they provide faster results, especially for the younger age group.[5]

Dental anxiety causes children to avoid dental treatments, resulting in the deterioration of oral and dental health and an increased prevalence of caries.[6] Patients with high dental anxiety usually come to the clinic only in cases of emergency and toothache. This situation leads to skipping initial treatments and starting dental care with more difficult procedures.[7] Consequently, previous dental experiences may result in fear and anxiety in later appointments.[8] This study aimed to assess the effect of previous dental treatment experiences on dental anxiety. The H0 hypothesis of the study is that previous dental treatment experiences have no effect on dental anxiety, and the H1 hypothesis is that previous dental treatment experiences reduce dental anxiety.

Methods

Study Design

The study was a cross-sectional descriptive study conducted at Karabük Oral and Dental Health Training and Research Hospital and was approved by the Ethics Committee of the University of Karabük (approval no: 2023/1437). A pilot study was conducted to evaluate the feasibility of the study, clarify the questionnaire design, and determine the sample size. The sample size was determined to be 140 children.

The inclusion criteria were the willingness of the families to complete the questionnaire and the children's consent for intraoral examination and procedures. Families who were not willing to complete the questionnaire, uncooperative children, and children with mental disabilities were excluded.

Subjects and Procedure

Children aged 4-12 years and their parents participated in the study. Throughout the children's treatments, families were asked to complete questionnaires consisting of four parts. The first part included questions about the child's sociodemographic data and their experiences with previous dental treatments. The second part contained general information about the sociodemographics and oral hygiene habits of the family. The third section included tables for recording the DMFT/dft scores (caries, missing, and filled teeth) noted by the physician. The fourth section included scores from the Frankl Behavior Rating Scale and Facial Image Scale.

Facial Image Scale (FIS)

The Facial Image Scale (FIS) is a visual scale comprising faces used to assess dental anxiety in children. The scale consists of a series of 5 faces depicting emotions ranging from very happy to very unhappy. In the scoring process, the happiest face is assigned a score of 1, while the most unhappy face corresponds to a score of 5 (Figure 1).[9] Before dental treatment, pediatric patients were asked to select the face that best represented their emotional state, and their dental anxiety score was determined accordingly.

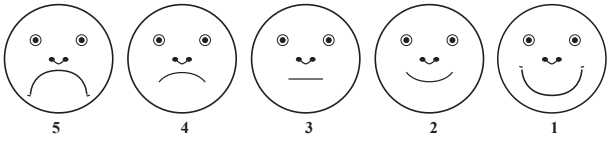

Figure 1: *Facial Image Scale*

Frankl Behaviour Rating Scale

Developed in 1962, the Facial Image Scale (FIS) is commonly utilized in the clinical behavior evaluation of pediatric patients. This visual scale categorizes the child's behavior during dental treatment into four groups: absolutely negative, negative, positive, and definitely

positive (see Figure 2).[10] In this study, the child's behavior was evaluated according to the Frankl Behavior Rating Scale during the examination prior to proceeding to the dental treatment stage, aiming to assess the impact of previous treatments.

Frankl Behavior Rating Scale		
1	Definetely Negative	Refusal of treatment, severe crying and fear, clear evidence of extreme negativity
2	Negative	Reluctance to accept treatment, unwillingness to cooperate, with some negative behaviors present but not highly pronounced.
3	Positive	Acceptance of treatment but cautious, approaching the dentist with reservations, yet cooperating with the dentist's instructions.
4	Definetely Positive	Complete harmony with the dentist, showing interest in dental treatment, and enjoying the treatment process.

Figure 2: Frankl Behavior Rating Scale

Statistical Analysis

Descriptive statistics were used to analyze frequency and percentage distributions. The chi-square test was employed to evaluate two-way tables. For normally distributed continuous variables, ANOVA post-hoc analysis and Tukey's test were conducted for multiple comparisons. For variables that did not follow a normal distribution, Kruskal-Wallis post-hoc analysis and the Mann-Whitney U test were utilized. Statistical significance was set at $p < 0.05$.

Results

Our study included 140 parents and their children. Among the parents, 76.4% were women (mothers) and 23.6% were men. The mean age of the parents was 37.4 ± 5.9 years, while the mean age of the children was 7.7 ± 0.8 years. Sociodemographic data regarding the children and their parents are detailed in Table 1 and Table 2.

The dental anxiety of the children was assessed using the Facial Image Scale (FIS) and the Frankl Behavior Rating Scale. When evaluating the relationship between patients' age and gender with dental anxiety, no significant relationship was found using the Frankl Behavior Rating Scale (age p=0.373, gender p=0.954) or the FIS (age p=0.425, gender p=0.493). However, despite the lack of statistical significance, dental anxiety tended to be higher in girls and younger children. Significant relationships were observed with parents' educational status (Frankl p=0.02, FIS p=0.002) and the number of children at home (Frankl p=0.03, FIS p=0.04). Dental anxiety was less common in children whose families had higher education levels, whereas it increased with the number of children in the household (Table 3).

A high percentage (90.7%) of the children had previous dental treatment, and it was observed that receiving treatment from pediatric dentists significantly reduced dental anxiety. The time elapsed since the last appointment and the experience of that appointment did not significantly affect the Frankl Behavior Scale, but they did have a significant effect according to the FIS. Dental anxiety was found to increase with time since the last dental treatment based on the FIS. Moreover, while the specific procedure at the previous appointment did not affect the Frankl Behavior Scale, children who received preventive dental treatments at their previous appointment showed significantly lower dental anxiety according to the FIS. A significant relationship was identified between children's dft/DMFT scores and negative dental treatment experiences within their families, and their dental anxiety levels. Children with higher dft/DMFT scores or a family history of negative dental experiences tended to score lower on the Frankl Behavior Rating Scale (predominantly in categories 1 and 2, indicating negative behavior) and higher on the FIS (indicating more negative responses). As the number of dental caries increased, children were more likely to choose negative faces on the scale (Table 4).

Discussion

The study observed that children with previous dental treatment experience, particularly those who had positive

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Table I. Socio-demographic data of parents

Variables	N=140	%
Age		
<30	10	7.1%
30-40	92	65.7%
More than 40	38	27.2%
Gender		
Female	107	76.4%
Male	33	23.6%
Educational Level		
Primary School	33	23.6%
High School	50	35.7%
University / Postgraduate	57	40.7%
Monthly Income		
Low	39	27.9%
Medium	81	57.9%
High	20	14.2%
Number of Children		
1	19	13.5%
2	72	51.5%
3 or more	49	35.0%
Tooth brushing frequency		
Sometimes	13	9.3%
Once in a day	75	53.6%
Twice or more in a day	52	37.1%
Previous negative dental treatment experience		
Yes	29	20.7%
No	111	79.3%

Table II. Socio-demographic data of children

Variables	N=140	%
Age		
4-6	43	30.7%
7-9	66	47.2%
10-12	31	22.1%
Gender		
Female	75	53.6%
Male	65	46.4%
Tooth brushing frequency		
Sometimes	35	25.0%
Once in a day	59	42.1%
Twice or more in a day	46	32.9%
Routine dental check-up?		
Yes	79	56.4%
No	61	43.6%

Table III. Relationship between Dental Anxiety Scales of Children (p values)

Variables	Frankl Behaviour Rating Scale	FIS
Age	0.373	0.954
Gender	0.425	0.493
Family income	0.161	0.28
Educational level of parents	0.02	0.002
Number of children	0.03	0.04

Table IV. Previous dental treatments

Variables	N=140	%	Frankl (mean values)	FIS (mean values)
Have you had dental treatment before?				
Yes	127	90.7%	3.45	2.32
No	13	9.3%	2.07	4.30
p			0.001	0.001
How were previous treatments?				
Positive	92	72.5%	3.54	2.12
Not so good	29	22.8%	3.41	2.41
Negative	6	4.7%	2.83	3.83
p			0.18	0.04
Who did the previous treatment?				
General dentist	24	18.9%	1.88	4.83
Pedodontist	103	81.1%	3.82	1.70
p			0.000	0.000
Time since last treatment				
More than 1 year	12	9.5%	3.30	2.40
6 ay – 1 year	14	11.0%	3.54	2.20
In the last 6 months	101	79.5%	3.51	1.76
p			0.43	0.04
At what age did she/he receive his first dental treatment?				
4-6 years	85	66.9%	3.44	2.29
7-9 years	38	29.9%	3.61	2.23
10-12 years	4	3.2%	3	2.25
p			0.32	0.30
Treatment performed in the previous dental appointment				
Filling	73	57.5%	3.37	1.96
Extraction	23	18.1%	3.45	2.41
Root-canal treatment	28	22.0%	3.62	2.37
Fissure sealant/flour application	3	2.4%	3.66	1.66
p			0.08	0.001

Routine dental check-up?				
Yes	79	56.4%	3.4	2.3
No	61	43.6%	3.2	2.7
p			0.09	0.07
Did she/he see the syringe during anesthesia?				
Yes	52	40.9%	3.51	2.23
No	75	59.1%	3.46	2.30
p			0.257	0.262
dft Scores			0.01	0.004
DMFT Scores			0.006	0.01
Previous negative dental treatments of parents				
Yes	29	20.7%	2.17	3.53
No	111	79.3	3.36	2.41
p			0.01	0.007

experiences during these treatments, exhibited lower levels of dental anxiety. Additionally, children whose treatments were conducted by pediatric dentists showed lower dental anxiety compared to those treated by other types of dental professionals. Interestingly, the type of treatment performed in previous sessions was found to have a lesser impact on anxiety levels compared to these other factors.

Although dental anxiety can affect individuals of all age groups, it is more prevalent in younger children.[11,12] Given the widespread occurrence of early childhood caries globally, it is crucial to prevent situations that may induce dental anxiety and promote cooperation in children to ensure successful dental treatments. Numerous studies have explored dental anxiety in children, often utilizing the Children's Fear Survey Schedule - Dental Subscale (CFSS-DS) questionnaire, which assesses anxiety levels related to dental procedures and situations.[13-15] However, administering this questionnaire to younger children may be challenging due to comprehension issues and the accuracy of responses. Therefore, in this study, the Facial Image Scale (FIS) and the Frankl Behavior Rating Scale were chosen for their suitability in younger age groups, allowing for easier assessment of dental anxiety levels.

Studies have indicated that dental anxiety tends to be higher in girls compared to boys, possibly because girls are more likely to openly express their emotions, while boys may tend to suppress their fears.[16,17] However, in this study, similar to the findings of Coric et al.[18] and Majstrovic et al.[17] no significant relationship was observed between dental anxiety and gender.

It has been observed in various studies that dental anxiety tends to decrease with age, possibly due to children's improved cognitive abilities and better understanding of their surroundings, which allows them to perceive dental procedures more accurately.[12,19] However, in this study, similar to the findings of Lima et al.[20] no statistically significant difference was found in dental anxiety based on the age of the children.

Dogan et al.[21] reported a higher prevalence of dental anxiety among children from low-income families, while Uziel et al.[22] highlighted the significant role of maternal educational status in children's dental anxiety. In this study, no relationship was found between dental anxiety and the monthly income of parents using both the Frankl Behavior Rating Scale and the Facial Image Scale (FIS). However, a significant relationship was observed between parental educational levels and dental anxiety.

The effect of the number of siblings on dental anxiety may be two-fold. On one hand, if children observe their siblings cooperating during dental treatments, it can alleviate their own dental anxiety. Conversely, witnessing the dental treatments of uncooperative siblings may significantly increase dental anxiety.[23] In this study, it was observed that dental anxiety tended to increase with the number of siblings.

It is widely accepted that previous dental treatment experiences can reduce anxiety by fostering a sense of familiarity and trust between the patient, dentist, and clinic.[24] Similarly, Abanto et al.[12] reported that previous dental experiences significantly decreased dental anxiety. However, contrasting findings were reported by Amorim et al.[13] who found no significant effect of previous dental treatments on anxiety levels.

Bajric et al.[14] suggested that individuals may develop reflexive dental anxiety as a defense mechanism against invasive dental procedures such as tooth extraction or cavity preparation. Similarly, it has been reported that children who have undergone invasive procedures like tooth extraction and cavity preparation tend to exhibit higher levels of dental anxiety.[25] In this study, it was observed that children who received preventive treatments such as fissure sealants or fluoride applications in their previous appointments had lower dental anxiety. Conversely, children who underwent procedures like

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tooth extraction and root canal treatments showed higher dental anxiety. This difference may be attributed to the relatively longer duration of treatments involving instruments like files and irrigation injectors during root canal treatments, as well as the invasive nature of tooth extraction.

It was observed that dental anxiety, as measured by the Facial Image Scale (FIS), increased with the length of time since the last dental treatment. Children may recall their experiences less vividly when a significant amount of time has passed between treatments, potentially leading to increased anxiety before the procedure (FIS). However, their behavior during the procedure, as assessed by the Frankl Behavior Rating Scale, may not necessarily reflect increased anxiety and may still exhibit positive behavior.

In this study, similar to findings in other studies, a significant relationship was observed between dmft/DMFT scores (indicating caries experience) and dental anxiety.[26,27] This association is often attributed to anxious children having inadequate oral hygiene practices and unhealthy eating habits, which can lead to higher rates of dental caries. Furthermore, anxious children may avoid dental treatments, exacerbating their oral health issues.[27]

Children take their parents as role models. Smith and colleagues[28] noted that parents can inadvertently transmit their negative dental experiences to their children through their words and behaviors. Therefore, parents' attention to oral and dental health, as well as their compliance with dental treatments, can significantly influence the prevention of dental anxiety.[29] Studies examining the role of parents in children's dental anxiety have consistently reported a positive correlation between parents' and their children's levels of dental anxiety.[18-30] In our study, we observed higher levels of dental anxiety in children whose parents had negative dental treatment experiences previously. This suggests that negative experiences may indirectly influence children's dental anxiety through parental transmission.

Limitations

The study was conducted at a hospital that serves patients from various surrounding provinces, encompassing parents with diverse socio-cultural backgrounds. However, the results obtained cannot be universally generalized worldwide. Dental anxiety poses a significant barrier to necessary treatments, emphasizing the importance of overcoming it. Therefore, ongoing research is crucial for evaluating the relationship between dental anxiety and various influencing factors.

Conclusions

When evaluating dental anxiety in children, although it appears more common in girls and younger age groups, no statistically significant difference was observed in this study. Factors such as previous dental treatments, socio-cultural conditions of families, and the incidence of dental caries are influential in dental anxiety. Particularly, children having prior dental treatment experiences are among the most significant factors in reducing anxiety towards dental treatments. Therefore, to mitigate the negative effects of dental anxiety, children should receive regular dental check-ups and necessary preventive treatments to minimize the need for invasive procedures.

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