



# Evaluation of the Risk Factors of Dental Anxiety in Children

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## ABSTRACT

**Aim:** Dental anxiety is described as state anxiety due to dental treatment procedures. The present study aimed to evaluate the etiological factors of dental anxiety in children aged 7-8 and 11-12 years old.

**Materials and Methods:** A total of 370 children of both genders were enrolled in this study. The parents' socio-economic status, education levels and family income, oral hygiene habits, and the caries status of the children were recorded on a structured questionnaire. The dental anxiety of both the children and their mothers was evaluated by the administration of a questionnaire based on Corah's dental anxiety scale (DAS). The children's fear survey schedule-dental subscale (CFSS-DS) was also used to assess the dental anxiety levels of the children. Data were analyzed using the SPSS (SPSS Inc., Chicago, IL, USA) 19.0 software program. Descriptive statistics were used for socio-demographic data. Parametric and non-parametric tests were used to compare means/medians, whereas the chi-square test was used to compare proportions. Student's t-test and one-way ANOVA with Bonferroni correction were employed to compare the anxiety scale results. All significance levels were set at 0.05.

**Results:** A negative correlation was found between the age groups and dental anxiety levels in the children ( $p=0.02$ ). The difference between gender and dental anxiety was statistically significant ( $p=0.01$ ). Boys were found to be more anxious than girls. The differences between the dental anxiety and the education levels of the mothers and the family income of the parents were not statistically significant ( $p>0.05$ ). It was detected that the maternal dental anxiety level strongly affected the anxiety level of the children in the group of 7-8 years ( $p=0.01$ ), while no significant difference was found in the group of 11-12 years ( $p>0.05$ ). A positive correlation was found between the dental caries scores of the children and their dental anxiety level ( $p=0.01$ ).

**Conclusion:** Dental anxiety is multifactorial and is far more complex than can be explained by a single contributing factor.

**Keywords:** Dental anxiety, CFSS-DS, DAS, children

## Introduction

Dental anxiety is a common problem for a considerable number of patients and often results in inadequate oral health due to less frequent dental visits, avoidance of dental treatment, and poor cooperation (1,2). It is a widespread dental health problem affecting many people worldwide.

The prevalence of dental anxiety has been reported to range from approximately 5-30%, depending on the population and measurement method (3-5).

The etiology of dental anxiety is multifactorial. It has been suggested that both exogenous and endogenous constituents play a significant role in its etiology (6,7).

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Received: 07.04.2022 Accepted: 13.04.2022

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The Journal of Pediatric Research, published by Galenos Publishing House.

Socio-economic factors, age and gender, previous traumatic experiences, environmental factors, and social interactions are the major contributing factors to dental anxiety (6-9).

The age of the subject is considered one of the factors which has a substantial impact on dental anxiety among children. There is almost total agreement in the literature that younger children tend to be more anxious in the dental office compared to older children (10,11).

Evidence regarding differences in dental anxiety between boys and girls is inconsistent (12,13). Most investigators reported higher levels of dental anxiety among girls (12-15). However, certain other studies reported that there were no differences between the genders regarding dental anxiety (16,17).

The education level and the social status of the parents have long been considered as factors which affect the dental anxiety level of children. Children from families with low socio-economic status and low educational levels tend to experience more dental anxiety. This could be due to decreased dental awareness (18,19). It was speculated that the parents' dental anxiety levels might exert an influence on their children's dental anxiety through modeling and information. It has been reported that over 40% of parents gave their children a negative attitude about their previous dental visit (20,21).

It has been stated that high dental anxiety affects the oral health of the patients and therefore causes negativity in their quality of life. Dental anxiety is associated with an increased level of dental caries and poor oral hygiene in children. Children with high dental anxiety also demonstrate poor cooperation during dental visits, which compromises the treatment outcomes, creates occupational stress on dental staff, and causes discord between dental professionals and the parents (22-24).

There are many methods for determining dental anxiety, such as physiological, psychometric, projective tests and observing and scoring behaviors (13,16,25,26). Corah's dental anxiety scale (CDAS), developed by Corah in 1969, is one of the most common methods used to assess the dental anxiety of patients. It consists of four questions, each question containing five answers. Items are scored on a scale of 1 (no anxiety) to 5 (extreme anxiety) and summed to give an overall anxiety score ranging from 4 to 20. The cut-off points for the CDAS were as follows: dental anxiety of the study participants was classified as low (4-12) or high ( $\geq 13$ ) (25). The children's fear survey schedule-dental subscale (CFSS-DS), proposed by Cuthbert and Melamed (26) in 1982, is another widely used measure of dental

anxiety in children. It consists of 15 items, including various aspects of dental and medical situations, and scored from 1 (not afraid) to 5 (very afraid) on a 5-point Likert scale, with total scores ranging from 15 to 75. The cut-off points for the CFSS-DS are as follows; dental anxiety of the children was classified as low (15-38) or high ( $>38$ ) (26).

The present study aimed to evaluate the etiological factors of dental anxiety in children aged 7-8 and 11-12 years old.

The null hypotheses to be tested were as follows;

- 1) Gender has no influence on the presence of dental anxiety in children.
- 2) There is no statistically significant difference between socio-demographic factors and dental anxiety.
- 3) Maternal dental anxiety level does not correlate with the dental anxiety level of their children.

## Materials and Methods

The present study was approved by the Ethical Committee of the Ege University Faculty of Medicine (approval no: 17-4/18, date: 20.04.2017). A total of 370 children aged 7-8 and 11-12 years old of both sexes were enrolled in this study. All children and their parents received written and verbal information about the procedure, and written informed consent was obtained before the study.

The study was carried out among patients who were referred for their first dental visit to Ege University Pediatric Dentistry Department. Patients with any systemic or genetic diseases were not included in this study.

The survey consisted of two sections. The first section requested socio-demographic and dental information of the patient, including age, gender of the children, socio-economic status, education level (low:  $\leq 8$  years, high:  $>8$  years), and family income (low, moderate, high) of the parents, oral hygiene (brushing regularly twice a day, irregular, none) and dental caries scores [Caries free: decayed, missing, and filled teeth (DMFT + dmft)=0, low caries: DMFT + dmft=1-4, high caries: DMFT + dmft $>4$ ] of the children. The second section comprised the CDAS (low, high) for both the children and their mothers and the CFSS-DS (low, high) for only the children (Table I, II).

Data were analyzed using the SPSS (SPSS Inc., Chicago, IL, USA) 19.0 software program. Descriptive statistics were used for socio-demographic data. Parametric and non-parametric tests were used to compare means/medians, whereas the chi-square test was used to compare proportions. Student's t-test and one-way ANOVA with Bonferroni correction

were employed to compare the anxiety scale results. All significance levels were set at 0.05.

## Results

The age and gender distribution of the children in the study population are shown in Table III. 51.4% (n=190) of the 370 patients were in the group of 7-8 years, while 48.6% (n=180) were in the group of 11-12 years. 183 (49.5%) of the patients were girls, while 187 (50.5%) were boys in the present study.

The mean  $\pm$  standard deviation of the CDAS and CFSS-DS scores of the children according to their age and gender

groups are shown in Table IV. A negative correlation was found between the age groups and dental anxiety levels in the children (p=0.02). The difference between gender and dental anxiety was statistically significant (p=0.01). Boys were more anxious than girls. No significant difference was found between the CDAS and CFSS-DS scores in children (p>0.05). 88 children in the 7-8 years group and 43 children in the 11-12 years group were recorded as having high anxiety according to the results of both anxiety scales.

The differences between the dental anxiety and the education levels of the mothers and the family income of the parents were not statistically significant (p>0.05).

**Table I.** Corah's dental anxiety scale (CDAS) (25)

1. If you had to go to the dentist tomorrow, how would you feel? (1) Look forward to it as a reasonably enjoyable experience (2) I wouldn't care one way or the other (3) I would be a little uneasy about it (4) I would be afraid that it would be unpleasant and painful (5) I would be very frightened of what the dentist might do
2. When you are waiting in the dentist's office for your turn in the chair, how do you feel? (1) Relaxed (2) A little uneasy (3) Tense (4) Anxious (5) So anxious that I sometimes break out in a sweat or almost feel physically sick
3. When you are in the dentist's chair waiting while he gets his drill ready to begin working on your teeth, how do you feel? (Same alternatives as Q.2)
4. You are in the dentist's chair to have your teeth cleaned. While you are waiting and the dentist is getting out the instruments which he will use to examine your teeth around the gums, how do you feel? (Same alternatives as Q.2)

**Table II.** The children's fear survey schedule-dental subscale (CFSS-DS) (26)

	Not afraid	A little afraid	Fairly afraid	Quite afraid	Very afraid
Dentists					
Doctors					
Injections					
Having somebody examine your mouth					
Having to open your mouth					
Having a stranger touch you					
Having somebody look at you					
The dentist drilling					
The sight of the dentist drilling					
The noise of the dentist drilling					
Having somebody put instruments in your mouth					
Choking					
Having to go to the hospital					
People in white uniform					
Having the dentist clean your teeth					

No significant association was found between the oral hygiene habits of the children and their dental anxiety level ( $p>0.05$ ). It was detected that the maternal dental anxiety level strongly affected the anxiety level of the children in a group of 7-8 years ( $p=0.01$ ), while no significant difference was found in a group of 11-12 years ( $p>0.05$ ). The distribution of the dental anxiety levels of the patients according to their caries index scores is given in Table V. A positive association was found between the dental caries scores of the children and their dental anxiety levels ( $p=0.01$ ).

## Discussion

Dental anxiety regarding dentists and dental treatment is one of the most common dental treatment problems. Although dental anxiety can be observed at any age, it can usually be seen in childhood (1-3). Despite technological

developments and a modern approach to the prevention and management of oral diseases, dental anxiety is still one of the main reasons for avoiding dental treatment (4,5).

The etiology of dental anxiety is complex and multifactorial. Many different factors have been discussed as influences on dental anxiety in children, including socio-demographic factors, oral hygiene habits, oral health, parental dental anxiety level, etc. (6-9). This study explored the possible associations between dental anxiety in children and its related factors.

Several valid psychometric questionnaires can be used to evaluate dental anxiety levels. Assessing the level of anxiety can be very useful in providing good quality dental services and to allow for the better management of the behavior of patients. The ideal measurement methods should be valid, allow for limited cognitive and linguistic skills, and be easy to administer and score in a clinical situation (13,16). According to these, the CDAS and the CFSS were used to assess dental anxiety levels in the present study. Both scales have demonstrated good reliability and acceptable validity and have been used to estimate the prevalence of dental anxiety and evaluate the behavior management procedures used for children in previous reports (13,16,25,26).

Several studies have suggested the relationship between age and dental anxiety to be a decrease in dental anxiety with increasing age (10,11). The contributing factors to dental anxiety in children were studied in two different age groups in the present study. According to the results of the present study, it was seen that dental anxiety seems to decrease with increasing age ( $p=0.01$ ). This finding is in agreement with previous studies (10,11).

Relating dental anxiety to gender is a controversial issue in the literature (12,13). Dental anxiety has been linked more to girls than boys, as reported by some studies (12-15). Only a few studies showed no significant relationship between dental anxiety and gender (16,17). The difference between gender and dental anxiety was found statistically

**Table III.** The distribution of the age and gender of the patients

Age groups			
Gender	7-8 years group	11-12 years group	Total
Girls	92	91	183
Boys	98	89	187
Total	190	180	370

**Table IV.** The mean  $\pm$  standard deviation scores of the CDAS and CFSS-DS anxiety scales according to the age and the gender of the patients

Age groups				
Anxiety scales		7-8 years group (Mean $\pm$ SD)	11-12 years group (Mean $\pm$ SD)	p-value
CDAS	Girls	13.75 $\pm$ 7.02	11.56 $\pm$ 6.12	0.01
	Boys	15.91 $\pm$ 8.22	13.45 $\pm$ 7.18	
CFSS-DS	Girls	29.12 $\pm$ 12.35	23.92 $\pm$ 10.60	0.01
	Boys	32.52 $\pm$ 14.23	28.86 $\pm$ 11.07	

CDAS: Corah's dental anxiety scale, CFSS-DS: The children's fear survey schedule-dental subscale, SD: Standard deviation

**Table V.** The distribution of the dental anxiety levels of the patients according to the caries index scores

		Caries free DMFT + dmft=0 (n)	Low caries DMFT + dmft=1-4 (n)	High caries DMFT + dmft>4 (n)	p-value
CDAS	Low anxiety	93	102	44	0.001
	High anxiety	12	23	96	
CFSS-DS	Low anxiety	101	106	32	0.001
	High anxiety	9	20	102	

CDAS: Corah's dental anxiety scale, CFSS-DS: The children's fear survey schedule-dental subscale, DMFT: Decayed, missing, and filled teeth (caries index for permanent teeth), dmft: Decayed, missing, and filled teeth (caries index for primary teeth)

significant in the present study ( $p=0.01$ ). Boys were more anxious than girls. Contradictory research findings may be explained by different study designs and methods of data collection. Moreover, gender influences should be regarded in combination with other factors such as local culture and the socio-economic status of the family. In our society, girls were thought to become more mature as they get older.

It has been reported that children from low socio-economic status families are more anxious than children of high socio-economic status families. This may be because parents from low socio-economic status transferred their fear and anxiety to their children due to a lack of awareness (18,19). The differences between dental anxiety and the education level of the mothers and the family income of the parents were not statistically significant in the present study ( $p>0.05$ ).

There are numerous studies investigating the relationship between child and parental dental anxiety. The literature has also reported a positive association between children's dental anxiety and parental, particularly maternal, anxiety. Children, especially those under 8 years old, who see dental anxiety in their parents, or learn about it through stressful information provided by parents, are more likely to develop a similar attitude, thus resulting in the development of dental anxiety. Parents have an influence on their children's anxiety level. As the child grows, they are less affected by their family and environmental factors come into play (20,21). In the present study, it was seen that the maternal dental anxiety level strongly affected the anxiety level of the children in a group of 7-8 years ( $p=0.01$ ), while no significant difference was found in a group of 11-12 years ( $p>0.05$ ).

It has been shown that there is a significant correlation between anxiety and poor oral health, poor oral hygiene, and esthetics (22,23). In the present study, no significant correlation was found between the oral hygiene habits of the children and their dental anxiety level ( $p>0.05$ ). The avoidance of dental treatment was higher in dentally anxious children, and they also had increased caries scores (22-24). A positive correlation was found between the dental caries scores of the children and their dental anxiety levels in the present study ( $p=0.01$ ).

Dental anxiety is a serious problem that negatively affects oral health in people of all ages. Early detection of the etiology of the reasons for this anxiety is the key to solving this problem.

### Study Limitations

The first limitation of this study is that the sample was from a single medical institution. The group of children represented were also more inclined to show the behavior of visiting a dentist, probably because of lower levels of dental anxiety.

The second limitation of this study was that the children included in the present study were selected among those who had their first dental visit. Therefore, only the effects of demographic and socio-economic factors and maternal dental anxiety on the dental anxiety levels of the children could be examined.

### Conclusion

Dental anxiety is multifactorial and is far more complex than can be explained by a single contributing factor.

### Acknowledgments

We would like to thank Assoc. Prof. Dr. Timur Köse for the statistical analysis.

### Ethics

**Ethics Committee Approval:** The present study was approved by the Ethical Committee of the Ege University Faculty of Medicine (approval no: 17-4/18, date: 20.04.2017).

**Informed Consent:** Written informed consent was obtained before the study.

**Peer-review:** Externally peer-reviewed.

### Authorship Contributions

Design: İ.U., B.A., A.T.A., Data Collection and/or Processing: İ.U., B.A., Analysis or Interpretation: İ.U., A.T.A., Literature Research: İ.U., B.A., Writing: A.T.A.

**Conflict of Interest:** The authors declared that there were no conflicts of interest.

**Financial Disclosure:** The authors declared that this study has received no financial support.

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