

ORIGINAL RESEARCH

Determination of dental anxiety levels of primary school students evaluated at oral and dental health screening

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Abstract

Background: Determining the level of dental anxiety is crucial for the successful delivery of dental treatments in pediatric patients. Various dental anxiety scales have been developed and employed for this purpose. The aim of this study was to determine the dental anxiety levels of primary school students who underwent oral and dental health screening using The Index of Dental Anxiety and Fear Scale (IDAF-4C) and the Child Drawing: Hospital (CD:H) Scale. **Methods:** This study included 5th-grade students at primary schools who underwent oral and dental health screening. The children were asked to complete a questionnaire that included demographic information as well as the IDAF-4C scale. Visual-tactile inspection was performed to evaluate caries risk groups and treatment needs by final-year dental students under the supervision of four licensed pediatric dentists. The caries management by risk assessment (CAMBRA) form was used for caries risk assessment. Following the screening, the children were invited to draw pictures. Descriptive statistical methods and correlation analysis were used to assess the data. **Results:** Of the 146 children included in the study, 54 (37%) were girls and 92 (63%) were boys. There was no statistically significant difference in IDAF-4C or CD:H scores between children who had a previous dental visit and those who had not. While the CD:H score was significantly higher in boys, there was no significant difference in IDAF-4C scores between genders. Additionally, no correlation was found between the two anxiety scales. **Conclusions:** Both anxiety scales can be used reliably in paediatric populations. However, the child's age and ability to express themselves should be carefully considered when selecting the appropriate scale. Regular screening programs should be expanded to allow early detection of dental problems and timely preventive measures.

Keywords

Dental anxiety; Drawing; Oral and dental health; Primary school students

1. Introduction

Dental anxiety is referred to as an anxious or worrisome emotional state occurring against unknown dangers that individuals feel against all kinds of dental procedures [1]. Dental anxiety is a prevalent condition that affects individuals across different age groups and geographical regions and is one of the most important factors in avoiding dental treatment. It also negatively affects the oral health-related quality of life in children and adults [1, 2]. There are many individual, environmental and dental factors that cause dental anxiety in children, such as previous traumatic dental experience, parental anxiety, age of the child. Identifying the etiology of dental anxiety and implementing preventive measures are of great importance for effective management [3, 4]. Dental caries, periodontal problems and tooth loss are more common in children with greater anxiety [5]. It has been reported that patients with greater dental anxiety have longer treatment sessions, postpone

appointments, delay treatment and ultimately experience more complex problems [6]. There are many individual, environmental and dental factors that cause dental anxiety in children, such as previous traumatic dental experience, parental anxiety, age of the child [7].

To minimize or avoid the effect of dental anxiety on treatment, it is important to ensure that children's behavior is properly managed [8]. Determining the pretreatment dental anxiety levels of individuals, especially children, who apply to the dentist allows the pediatric dentist to be prepared for the situations encountered during treatment and to decide on the appropriate management strategy [9]. Determining the level of dental anxiety in pediatric patients is highly important for successful treatment and should be accurately assessed in all its dimensions [10]. For this purpose, many different techniques are currently used, including behavior scoring and projective, psychometric and physiological methods [7].

With picture drawing, a projective technique, the level of

fear and anxiety can be determined by depicting the object or creatures that may cause fear in the pictures drawn. Children can effectively convey their emotions through drawings. They can easily express their happiness, dreams, and unwanted emotions such as fear and anxiety through drawing [11]. The Child Drawing: Hospital (CD:H) Scale is one of the most widely used of these techniques and was developed by Clatworthy *et al.* [12] in the United States to measure the emotional state of hospitalized school-age children in 1999. This scale has recently been used in dentistry to assess dental anxiety during tooth extraction and restorative procedures [11, 13].

Psychometric tests are the most preferred tests due to their ease of application and differ according to the age at which they are applied. These methods are in the form of mutual questions and answers and are based on the child expressing himself or herself verbally [14]. The Index of Dental Anxiety and Fear (IDAF-4C+), a psychometric test, was developed by Armfield to eliminate the theoretical and practical limitations of previous dental fear scales. The IDAF-4C+ consists of 3 submodules analyzing dental anxiety, dental phobia and feared dental stimuli. This new scale is designed so that researchers can use the module related to the topic they will address [15]. Turkish validation of the IDAF-4C scale was performed by Buldur *et al.* [16] in 2018.

This study aimed to determine the dental anxiety levels of primary school students who underwent oral and dental health screening using the IDAF-4C and the Child Drawing: Hospital (CD:H) Scale and to evaluate the relationship between dental anxiety levels and dental treatment needs. In addition, the correlation between two different anxiety scales used in children was also evaluated.

2. Methodology

2.1 Sample size calculation

The sample size was determined using G*Power software version 3.1.9.2 (Heinrich Heine University Düsseldorf, Düsseldorf, NRW, Germany). Based on the power analysis using the “Independent Sample *T*-Test”, a minimum of 142 children were required to participate in the study, with a significance level of 0.05 (α), a power of 90% ($1 - \beta$), and an effect size of 0.55 [17]. However, the study was planned with 156 children by increasing the sample size by 10%, considering potential refusals that may be encountered in cross-sectional studies.

2.2 Participant selection criteria

5th-grade students at primary schools in the city center of Tokat, where oral and dental health screening will be performed, participated in this study. After the study was explained to the school principals, informed consent forms were sent to the parents of the students. The study was conducted in conference halls or classrooms within the schools between January and June 2022.

The inclusion criteria for the study were as follows: permission from the family of children without any mental, visual or auditory disability to participate in the Oral and Dental Health screening and study, completion of the IDAF-4C anxiety scale by the children, and willingness to draw pictures and allow

interpretation of the CD:H scale. The exclusion criteria for the study were as follows: children with functional impairment, children with insufficient hand coordination, students who do not understand the language of the IDAF-4C anxiety scale, children who incompletely completed the IDAF-4C anxiety scale, and children drawing pictures without a dentist.

2.3 Study design

Children whose families permitted oral and dental health screening were asked to fill out a form containing demographic information (gender, dentist visit) and the IDAF-4C scale, which is used to evaluate dental anxiety and fear before screening. The dental examinations were performed by final-year dental students under the supervision of four licensed pediatric dentists. A dental mirror and explorer (probe) were used during the assessments, and all students wore gloves in accordance with infection control protocols. The screening focused on visual-tactile inspection to evaluate caries status and treatment needs.

The IDAF-4C scale consists of 8 questions and has been translated into many languages. The answers to the IDAF-4C scale, which uses a 5-point Likert scale, range from “disagree” (1) to “agree” (5) (Fig. 1, Ref. [16]). Higher scores indicate greater dental fear. After they were summed and averaged, the scores were evaluated as follows: “No or very little dental anxiety” (score range 1–1.5), “Low dental anxiety” (score range 1.51–2.5), “Average dental anxiety” (score range 2.51–3.5) and “High dental anxiety” (score >3.5) [15]. During the oral and dental health screening, the children’s caries risk groups and dental treatment needs were also recorded on the relevant form. Caries risk was determined according to American Academy of Pediatric Dentistry (AAPD) guideline “Caries-Risk Assessment and Management for Infants, Children and Adolescents” and Caries Management by Risk Assessment (CAMBRA) form was used [18]. It was given scores for each “yes” checked on the risk assessment form with a score of –1 for yes’s in column protective factors, and +2 and +3, respectively, for yes’s in columns risk factors, social/behavioral/medical and disease indicators. The caries risk level was determined based on the final total. Low = –8 to –2; Moderate = –1 to +2; High = +3 and/or more [19].

After the screening, the children were asked to provide a picture to evaluate anxiety during the oral and dental health screenings. For the pictures drawn, the statements “Your teeth were checked by the dentists today. I would like you to draw a picture with you and the dentist in it, thinking about the time you spent here today and what you experienced”. On a table and chair at an appropriate height, they were asked to draw on blank A4 paper with dry paints containing 8 basic colors. They were told that they could start when they were ready and stop drawing whenever they wanted, and their papers were collected when the drawing was finished (Fig. 2). The Child Drawing: Hospital (CD:H) Scale was used in the evaluation. According to the score calculated for each child, the anxiety level specified in the scale was obtained (Fig. 3, Ref. [12]). Anxiety levels based on the total score obtained in CD:H were as follows: 43 points or less, very low stress; 44–83 points, low stress; 84–129 points, average stress; 130–167 points, above

How much do you agree with the following statements?	Disagree (1)	Agree a little (2)	Somewhat agree (3)	Moderately agree (4)	Strongly agree (5)
(a) I feel anxious shortly before going to the dentist.					
(b) I generally avoid going to the dentist because I find the experience unpleasant or distressing.					
(c) I get nervous or edgy about upcoming dental visits.					
(d) I think that something really bad would happen to me if I were to visit a dentist.					
(e) I feel afraid or fearful when visiting the dentist.					
(f) My heart beats faster when I go to the dentist.					
(g) I delay making appointments to go to the dentist.					
(h) I often think about all the things that might go wrong prior to going to the dentist.					

FIGURE 1. The index of dental anxiety and fear (IDAF-4C) [16].

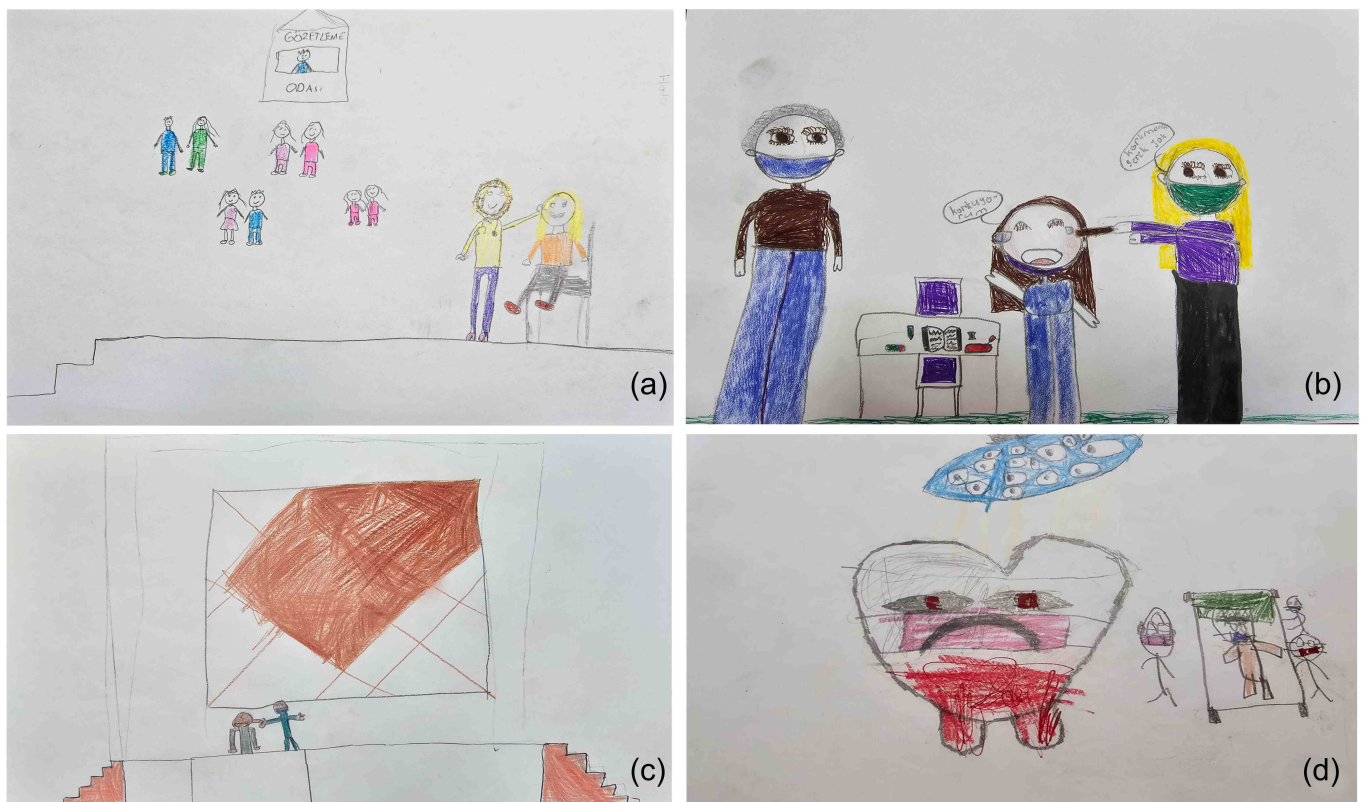


FIGURE 2. Sample pictures corresponding to varying levels of stress and their associated CD:H scores. (a) This picture indicates very low stress, and the CD:H score was 39. (b) This picture indicates low stress, and the CD:H score was 76. (c) This picture indicates the average stress, and the CD:H score was 116. (d) This picture indicates above average stress, and the CD:H score was 139.

SECTION A	1	2	3	4	5	6	7	8	9	10
1. Position of person	Standing - grounded	Standing - not grounded	Standing with crutches	Standing on bed	Sitting in chair	Sitting in bed	Sitting in bed, covered	Lying in bed	Lying in bed, covered	Floating or no person
2. Action - Life	Visibly moving		Person or picture lively		Shows some life	Potential for movement	No movement, but life			Rigid, no life
3. Length of person	Body tall, occupies whole paper	Tall body appropriate to picture	Short body appropriate to picture		Short people, bodies exposed	Very small, constricted people	Upper torso only	Head only, body covered	Floating head, no body	
4. Width of person related to length	Width appropriate to length	Width slightly reduced compared to length	Width thin compared to length, clothed	Body thin, not clothed, or appropriate, but not clothed	Appropriate body size, covered	Stick figures with clothing	Stick figures, no clothing	Very thin body or stick figure, covered	Ambiguous body shapes	No body, floating head, no evidence of body under covers
5. Facial expression	Smile 		1/2 smile 		Neutral 		1/2 Frown 	Frown 	No face, no expression	
6. Eyes/pupils	Visible 		Visible 		Visible 	Piercing 	Pin point 	Closed 	Vacant 	No eyes
7. Size of person in comparison to environment	Appropriate size		Medium to small		Small		Very small			Tiny, overwhelmed
8. Color predominance	Yellow	Green			Blue	Orange	Purple	Brown	Red	Black
9. Number colors used	8	7	6		5	4	3			1
10. Use of paper	All		3/4		1/2			1/4		Restricted 1/8
11. Placement on paper										
12. Quality of strokes	Firm, dark		Dark, some light		Medium, equal light and dark		Light			Very light
13. Hospital equipment	None included		Proportional in size		Slight increase in size			Larger equipment		Large and threatening
14. Developmental level	Above normal		Normal			Slightly below normal		Below normal		Markedly below normal

FIGURE 3. Children Drawing: Hospital (CD:H) rating scale [12].

average; and 168 points or above very high stress [12, 20]. The drawings included in the study were interpreted by two different observers.

2.4 Evaluator calibration and training procedure

Two independent pediatric dentists evaluated the children's drawings using the Child Drawing: Hospital (CD:H) Scale. Both evaluators were pediatric dentists with additional training in the interpretation of children's drawings. As part of the calibration process, they assessed a set of 10 sample drawings not included in the study. These drawings were scored independently, and then results were compared to identify inconsistencies and resolve interpretation differences through discussion. This ensured a shared understanding of the scoring criteria.

2.5 Statistical analysis

The data were analyzed with IBM SPSS V23 (IBM Corp., Armonk, NY, USA). The descriptive statistics are presented as the mean, standard deviation, median, minimum, maximum and percentage. Compliance with a normal distribution was analyzed using the Kolmogorov-Smirnov test. The Mann-Whitney U test was used to compare IDAF-4C and CD:H scores that were not normally distributed according to gender and frequency of dental visits, and the Independent Sample *T*

Test was used for those that were normally distributed. A *p* value < 0.05 was considered to indicate statistical significance in all tests. The correlations among the parameters are shown with a heatmap. The consistency between the values obtained in the drawings included in the study were evaluated with the intra-class correlation coefficient.

3. Results

Parents of 853 children consented to participate in the study and the oral and dental health screening. A total of 156 children who agreed to draw were included in the study. However, 10 children who incompletely completed the IDAF-4C scale were excluded and the study was completed with 146 children. Of the 146 children in the study, 54 (37%) were girls, and 92 (63%) were boys. The children were 5th-grade students aged between 10 and 12. The number of those who had visited a dentist before was 126 (86.3%), and the number who had never visited a dentist was 20 (13.7%). When the caries risk group distribution of the children was analyzed, 64 children (43.8%) were in the high caries risk group (Table 1).

The mean IDAF-4C score of the children participating in the study was 2.15 ± 0.71 . There was no significant difference between girls and boys ($p = 0.735$) among those who had visited a dentist before and those who had not visited a dentist before in terms of IDAF-4C scores ($p = 0.948$).

The agreement between the first observer (HA) and second

observer (NG) on the Child Drawing: Hospital (CD:H) Scale was 0.998.

The median Child Drawing: Hospital (CD:H) score was 88 (min: 28–max: 145). There was a significant difference among the medians of the CD:H scores as a result of the evaluation by the dentist according to gender ($p < 0.001$). The median CD:H score of the girls was “low stress” (median: 63.5), and the median CD:H score of the boys was “average stress” (median: 99). No significant difference was found among the medians of the CD:H scores of students who had or had not visited a dentist before ($p = 0.876$) (Table 2).

According to the IDAF-4C score distributions, 67 (45.9%) of the 146 students who participated in the study were found to have low dental anxiety, and 42 (28.8%) were found to have average dental anxiety. It was observed that girls and boys, those who had visited a dentist before and those who had not, mostly showed “low dental anxiety” (Table 3).

When CD:H score distributions were evaluated, 67 (45.9%) and 55 (37.7%) children showed “average stress” and “low

stress” values, respectively. “Low stress” scores were higher in girls, and “average stress” scores were greater in boys and in those who had visited a dentist before and those who had not (Table 4).

Correlation relationships shown in the heatmap: A significant relationship was found between gender and CD:H score. Male gender significantly increased the CD:H ratio ($p < 0.001$). No significant relationship was found between gender and the IDAF-4C score ($p = 0.38$). No correlation was found between the IDAF-4C anxiety scale and the CD:H anxiety scale. There was a significant relationship between dental treatment needs, caries risk group and anxiety scale score (Fig. 4).

4. Discussion

Children are often limited in verbalizing feelings and emotions due to cognitive development. When children cannot express certain emotions, a method is needed to reflect their feelings

TABLE 1. Distribution of demographic characteristics of the children participating in the study.

	n (%)
Girl	54 (37%)
Boy	92 (63%)
Previous dental visit? (Yes)	126 (86.3%)
Previous dental visit? (No)	20 (13.7%)
Caries risk group	
Low caries risk group	35 (24%)
Moderate caries risk group	47 (32.2%)
High caries risk group	64 (43.8%)

TABLE 2. Values of the IDAF-4C and CD:H scales according to participants.

	IDAF-4C	<i>p</i>	CD:H	<i>p</i>
Total				
Mean $\pm$ SD	2.15 $\pm$ 0.71		87.23 $\pm$ 29.45	
Median (Min–Max)	2.13 (1–3.75)		88.00 (28.00–145.00)	
Girl				
Mean $\pm$ SD	2.12 $\pm$ 0.67	^a $p = 0.735$	70.21 $\pm$ 26.27	^b $p < 0.001^*$
Median (Min–Max)	2.19 (1.00–3.38)		63.50 (28.00–138.00)	
Boy				
Mean $\pm$ SD	2.16 $\pm$ 0.74	^a $p = 0.735$	97.22 $\pm$ 26.59	^b $p < 0.001^*$
Median (Min–Max)	2.13 (1.00–3.75)		99.00 (29.00–145.00)	
Previous dental visit? (Yes)				
Mean $\pm$ SD	2.14 $\pm$ 0.70	^b $p = 0.948$	87.05 $\pm$ 29.67	^b $p = 0.876$
Median (Min–Max)	2.13 (1–3.75)		88.00 (28.00–143.00)	
Previous dental visit? (No)				
Mean $\pm$ SD	2.17 $\pm$ 0.81	^b $p = 0.948$	88.40 $\pm$ 28.70	^b $p = 0.876$
Median (Min–Max)	2.06 (1.00–3.75)		91.50 (39.00–145.00)	

^aIndependent Sample T Test; ^bMann-Whitney U test; * $p < 0.05$.

SD: Standard deviation; Min: Minimum; Max: Maximum.

TABLE 3. The index of dental anxiety and fear scale scores according to students demographic.

n (%)	No or very little dental anxiety (1–1.5)	Low dental anxiety (1.51–2.5)	Moderate dental anxiety (2.51–3.5)	High dental anxiety (>3.5)
Total	34 (23.3%)	67 (45.9%)	42 (28.8%)	3 (2.0%)
Girl	12 (22.2%)	29 (53.7%)	13 (24.1%)	-
Boy	22 (23.9%)	38 (41.3%)	29 (31.5%)	3 (3.3%)
Previous dental visit? (Yes)	29 (23.0%)	57 (45.2%)	38 (30.2%)	2 (1.6%)
Previous dental visit? (No)	5 (25.0%)	10 (50.0%)	4 (20.0%)	1 (5.0%)

TABLE 4. Children Drawing: Hospital scores according to students demographic.

n (%)	Very low stress (<43)	Low stress (44–83)	Average stress (84–129)	Above average stress (130–167)	Very high stress (>167)	Total
Total	9 (6.1%)	55 (37.7%)	67 (45.9%)	14 (9.6%)	1 (0.7%)	146
Girl	6 (11.1%)	32 (59.3%)	14 (25.9%)	2 (3.7%)	-	54
Boy	3 (3.3%)	23 (25.0%)	53 (57.6%)	12 (13.0%)	1 (1.1%)	92
Previous dental visit? (Yes)	8 (6.3%)	47 (37.3%)	57 (45.3%)	13 (10.3%)	1 (0.8%)	126
Previous dental visit? (No)	1 (5.0%)	8 (40.0%)	10 (50.0%)	1 (5.0%)	-	20

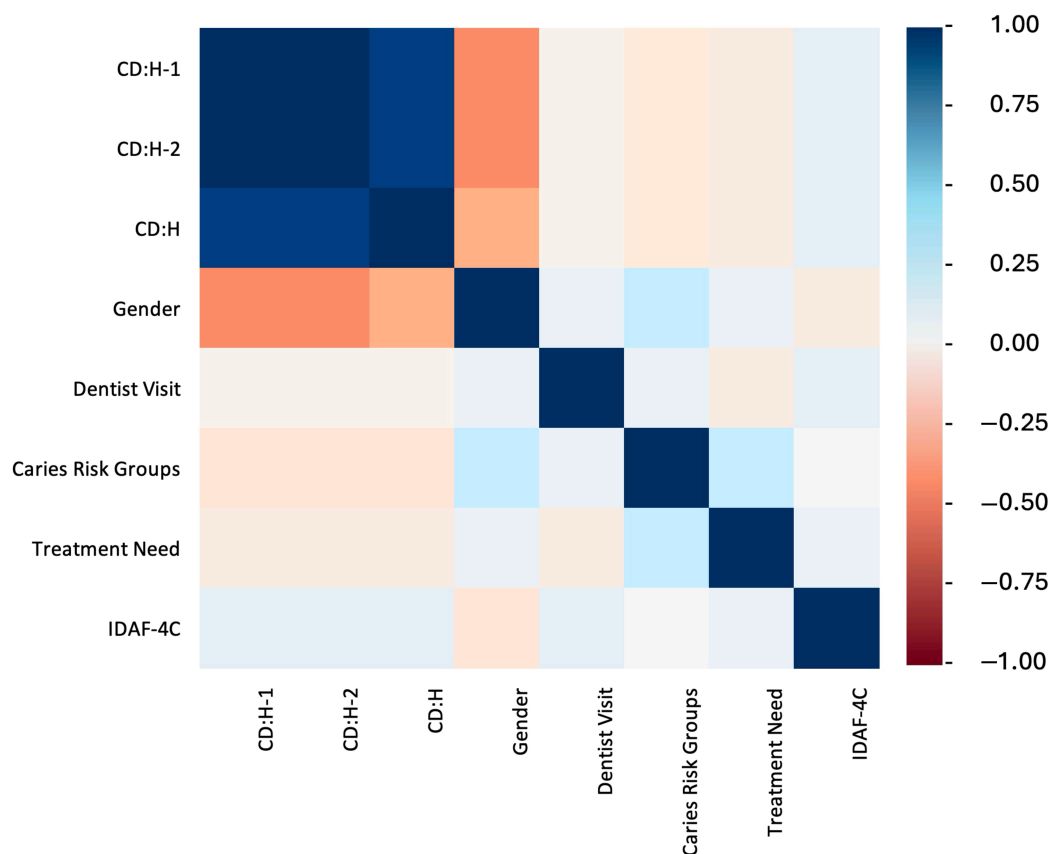


FIGURE 4. The correlation relationships are shown in a heatmap. CD:H and IDAF-4C were created to visualize the relationship between scale results and variables such as gender, frequency of dental visits, caries risk groups and treatment needs. The intensity of the colours used in the heatmap reflects the power of correlation. CD:H: Child Drawing: Hospital; IDAF-4C: Index of Dental Anxiety and Fear Scale.

and expectations. For children with limited verbal skills, drawing is a universal way to convey emotions regardless of age, gender, socioeconomic status or ethnic origin [11]. This study, which aimed to measure the dental anxiety in children undergoing oral dental health screening by using the IDAF-4C, a psychometric method, and the CD:H scale, a projective method, found for the first time that children experienced an average level of anxiety during oral dental health screening in the school environment regardless of gender.

There are a limited number of studies that have assessed dental anxiety using the CD:H scale, which has been used in dentistry in recent years. These studies measured dental anxiety in children during procedures requiring local anaesthesia, such as tooth extraction, filling and root canal treatment [11, 17, 21]. The number of dental studies conducted in the Turkish population is rather low [13]. Turkish validation was also carried out by Özdemir *et al.* [20].

One of the most important personal factors in the occurrence of dental anxiety is the child's gender, and differences have been observed between studies [16, 22, 23]. Onur *et al.* [13] reported that there was no significant difference between girls and boys when CD:H scores were evaluated according to gender, and that the mean scores of girls were considered "low stress" and those of boys were considered "average stress". Some studies concluded that although there were no significant differences between girls and boys, boys had higher CD:H scores than girls [17, 21]. Similarly, in the present study, "low stress" was observed in girls and "average stress" was observed in boys. However, CD:H scores were found to be significantly higher in boys. Studies using the IDAF-4C scale have also reported different results between the sexes. In a study by Buldur *et al.* [16], girls were found to have significantly higher IDAF-4C scores than boys. Another study suggested that dental anxiety was independent of gender [24]. Büyükbayraktar *et al.* [25] reported that IDAF-4C scores were lower in girls, although this difference was not statistically significant. Similarly, the present study found no significant difference between the IDAF-4C scores of girls and boys. The fact that the anxiety levels of boys with low anxiety levels on the IDAF-4C scale increased on the CD:H scale may be because Turkish boys have more difficulty expressing their emotions through drawing than girls.

Important determinants of dental anxiety include caries risk group, level of treatment required, first dental visit and frequency of these visits. Many people with dental anxiety postpone treatment even if they are aware of the need for treatment or only have the teeth that cause pain treated. As a result, the number of active caries lesions and the incidence of caries increase [26–28]. Many studies have reported a significant relationship between dental anxiety and caries risk [28, 29]. Padmanabhan *et al.* [30] concluded that the prevalence and incidence of caries were highest in the group with the highest dental anxiety and that there was a significant relationship between them. Vlad *et al.* [31] concluded that the number of caries or missing teeth was greater in patients with high dental anxiety. In this study, similar to the literature, a positive correlation was found between the caries risk group, dental treatment needs and anxiety levels.

Many studies of dental anxiety have reported that people

who rarely visit the dentist have significantly greater dental anxiety than those who visit the dentist more frequently [15, 16, 32]. In addition, Appukuttan *et al.* [33] reported that there was no relationship between dental experience and dental anxiety. This study revealed no significant differences in either the IDAF-4C score or the CD:H score between those who had previously visited a dentist and those who had never visited a dentist. The reason for this finding is that no invasive procedures were performed during the oral dental health screening, only the children's teeth were examined.

Dental anxiety in children is also influenced by many environmental factors, such as the appearance of the dentist, the physical condition of the waiting room, the gender of the assistant, the waiting time, and the presence of toys, music or odours in the environment [34–36]. Shapiro *et al.* [37] investigated the effect of a sensory adapted Snoezelen environment on dental anxiety in children. The Snoezelen environment is characterised by a partially dimmed room with lighting effects, vibrating acoustic stimuli and deep pressure. The results showed that both behavioural and psychophysiological indicators of relaxation were significantly improved in the sensory-adapted environment (SDE) compared to a traditional dental environment. In a study by Jayakaran *et al.* [38] dental anxiety decreased when the clinical environment in which children were first examined was prepared with illustrated walls, pleasant smells, toys they liked, music and colours to make them feel good. In the present study, as the oral and dental health examinations were carried out in a familiar place where children felt more accessible, such as their neighbourhoods and schools, outside the dental clinic environment, we believe that they were minimally affected by environmental factors and that their dental anxiety levels may have been influenced by this situation.

As a result of the literature review, no study was found in which IDAF-4C and CD:H scales were used together. No correlation was found between the two scales in this study. The main reason for this finding is that the scales were developed using different methods. Projective methods (CD:H) assess anxiety by interpreting pictures drawn for a specific purpose and are the preferred scales for children under 6 years of age. In this way, it is possible to get an idea of the emotions hidden in the subconscious. It is also preferred for children who cannot express themselves verbally and whose mental development is not yet complete. Psychometric methods (IDAF-4C) are based on children's verbal communication skills and are question and answer scales. It can be the first choice for children over 6 years of age. Differences in the method of administration, differences in emotional expression based on culture and gender, and differences in children's communication skills may have caused the lack of correlation between the two scales.

Limitations of this study include its single-centre design, although it is a large-scale school survey. This study did not assess several known factors associated with dental anxiety, such as parental anxiety, previous negative dental experiences, socioeconomic status and family educational background. Furthermore, the lack of invasive procedures—as only oral examinations were performed—and the fact that these examinations were performed by fifth-year dental students may be considered limitations that could have influenced the measured levels

of anxiety. In addition, as this study did not compare anxiety levels between the school environment and a traditional dental clinic environment, further research is needed to investigate potential differences.

5. Conclusions

According to the present study, drawings can reveal a significant amount of information about children's emotional states, and children's drawings are a proper nonverbal self-report technique for evaluating anxiety in the dental environment. At the same time, the IDAF-4C scale is also an easy-to-apply, useful, Children can effectively, and reliable option for assessing dental anxiety in children. Age and developmentally appropriate scales should be selected to assess children's dental anxiety. The frequency of oral and dental health screening in school environments, where dental anxiety is thought to be lower, should be increased. This would allow early identification of children with dental anxiety, allowing for timely intervention and preventive measures.

AVAILABILITY OF DATA AND MATERIALS

The data used to support the findings of this study can be made available upon request to the corresponding author.

AUTHOR CONTRIBUTIONS

NDŞ—Design; Data Collection and/or Processing; Analysis and/or Interpretation Literature Review; Writing; Critical Review. CBN—Design; Data Collection and/or Processing; Critical Review. AC—Design; Data Collection and/or Processing. HA—Design; Critical Review. All authors reviewed and revised drafts and approved the final version for submission.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The ethical approval required for this study was obtained from Tokat Gaziosmanpaşa University Faculty of Medicine Clinical Research Ethics Committee (Approval No: 21-KAEK-277/Date: December 2021). Written informed consent was obtained from the children and their parents prior to the oral and dental health screening.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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