

Determining the relationship between perceived stress and dental anxiety in children aged 8-11

Perceived stress and dental anxiety

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Abstract

Aim: This study aims to determine the relationship between perceived stress and dental anxiety in children aged 8-11.

Material and Methods: The Perceived Stress Scale (PSS) and the Children's Fear Survey Schedule-Dental Subscale (CFSS-DS) were administered face-to-face to children aged 8-11 who visited the faculty for the first time. Normality was assessed using the Shapiro-Wilk test. If normal distribution was not present, the Mann-Whitney U test or Spearman correlation test was applied. The significance level was set at $p=0.05$.

Results: The study included 266 children, with 42.5% male and 57.5% female participants. The majority of the children (55.6%) were in the 8-9 age range, while 44.4% were in the 10-11 age group. The average age was 9.4 ± 1.1 years. The mean total score of the PSS was 16.5 ± 8.6 , and the mean total score of the CFSS-DS was 33.2 ± 11.0 . A significant positive correlation was found between PSS and CFSS-DS (Spearman's $\rho=0.26$, $p<0.05$).

Discussion: It was concluded that as the level of perceived stress in children increases, dental anxiety also increases. Creating a calm and happy environment before treatment and approaching the treatment in a calming manner might help reduce dental anxiety in children visiting the dentist for the first time.

Keywords

Dental Anxiety, Perceived Stress, Pediatric Dentistry

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This study was approved by the Ethics Committee of Recep Tayyip Erdogan University, Faculty of Medicine (Date: 2023-03-16, No: 2023/79)

Introduction

Any internal or external stimulus that creates a biological response is defined as stress. Stress leads to excessive tension, hyperarousal, and discomfort [1]. Perceived stress refers to the feelings or thoughts an individual has regarding how much stress they are under during a specific period [2]. Although perceived stress in children is a widely used term in the literature, it is not sufficiently defined and is associated with adverse health outcomes throughout life [3]. Physical or environmental factors that trigger perceived stress in children can alter brain chemistry, with effects extending into adulthood [4].

A study in the literature has linked perceived stress with dental anxiety. While the relationship between perceived stress and dental anxiety has been demonstrated, it has not yet been comprehensively studied [5]. Fear and anxiety towards the dentist and dental treatment are seen as significant factors leading to avoidance of oral and dental care. Fear is a response to a known or perceived threat or danger, whereas dental fear is a reaction to threatening stimuli related to dental situations. Anxiety is described as an emotional state that occurs before encountering threatening stimuli. Negative or traumatic experiences, anxious family members, peers, or personality traits during childhood can cause dental anxiety [6]. Dental anxiety is a cycle of persistent and excessive fear of stimuli during dental procedures, leading to the avoidance of dental treatments and resulting in dental health problems [7, 8].

Understanding dental anxiety in children early and planning a solution for dental health issues can prevent the delay of treatments [7, 9]. Dental anxiety has been evaluated as a public health problem, and it has been suggested that special attention should be given to patients with dental anxiety due to its negative effects on oral health [7]. This is because avoidance of dental examination and treatment due to dental anxiety negatively impacts oral health [8]. The negative impact on oral health indirectly affects quality of life [10]. Patients with anxiety usually seek dental treatment in emergencies or when they experience toothache, leading to the skipping of primary care [11].

Considering all this information, the purpose of this study is to investigate the relationship between perceived stress and dental anxiety in children who have never had dental treatment before. The null hypothesis (H0) is that there is no relationship between perceived stress and dental anxiety, while the alternative hypothesis (H1) is that there is a relationship between perceived stress and dental anxiety.

Material and Methods

Sample Size

The effect size was calculated using G Power 3.0.10 software (University Kiel, Germany). No previous studies have examined the relationship between perceived stress levels and dental anxiety in pediatric dental treatments. Assuming dental anxiety data is categorized as present/absent and stress levels as ordinal data, a Mann-Whitney U test planned for an effect size of 0.5 with 80% power indicated that a minimum of 134 individuals would be needed. The study included 266 children (153 girls and 113 boys) aged 8-11 who were visiting

the Pediatric Dentistry Department of Recep Tayyip Erdogan University Faculty of Dentistry for the first time.

Inclusion Criteria

- Not having any systemic disease
- Not presenting with severe symptoms such as trauma, acute apical abscess, or pain
- No syndrome
- No prior dental treatment experience
- Children aged 8-11 who voluntarily participated

Exclusion Criteria

- Children with systemic disease
- Presenting with acute symptoms like trauma, pain, or acute apical abscess
- Having any syndrome
- Prior dental treatment experience
- Not consenting to participate
- Not within the age range of 8-11 years

Study Design

Children included in the study were administered the Perceived Stress Scale (PSS) face-to-face, validated by Oral et al.[12]. The unidimensional scale consists of 9 items rated on a 4-point Likert scale [2, 13]. The Cronbach's alpha internal consistency reliability coefficient was found to be 0.76, and the test-retest correlation was 0.79. According to the PSS instructions, the child was asked to respond based on how well each item applied to them in the past week. Higher scores on the scale indicate higher levels of perceived stress. The total scores range from 0 to 27 [2].

Subsequently, the child was administered the Children's Fear Survey Schedule-Dental Subscale (CFSS-DS)[14] face-to-face. The CFSS-DS is a scale measuring dental anxiety related to dentist visits and treatments. The Turkish validity and reliability study was conducted by Seydaoğlu et al.[15]. Each item was scored between 1 and 5 based on the response (1 = Not at all, 2 = A little, 3 = Fairly, 4 = Quite a lot, 5 = Very much). The total score ranges from 15 to 75, with children scoring 38 and above on the CFSS-DS defined as having dental anxiety [14]. The questionnaire was administered face-to-face in the waiting room before the examination, and the demographic data of the children were recorded in the scale file.

Statistical Analysis

The statistical analysis was conducted using Jamovi version 2.3.28. Descriptive analysis was conducted, and variables were presented using the median (min-max) format. Normality was assessed using the Shapiro-Wilk test. If the data did not follow a normal distribution, either the Mann-Whitney U test or Spearman's correlation test was conducted. The significance level was set at $p=0.05$.

Ethics Approval

The study received ethical approval from the Non-Interventional Clinical Research Ethics Committee of Recep Tayyip Erdogan University, Faculty of Medicine (Date: 2023-03-16, No: 2023/79). Informed consent was obtained from both parents and children before the study.

Results

The demographic characteristics of the participants are presented in Table 1. The study included a total of 266 children,

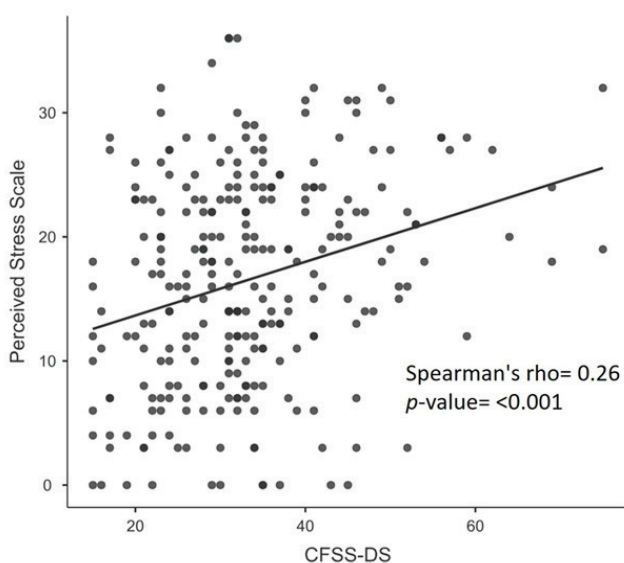


Figure 1. Correlation between Children's Fear Survey Schedule – Dental Subscale (CFSS-DS) and Perceived Stress Scale Scores

Table 1. Demographic Features of Participants

| Overall (n=266) | |
|------------------|-------------|
| Gender | |
| Male | 113 (42.5%) |
| Female | 153 (57.5%) |
| Age range | |
| 8-9 | 148 (55.6%) |
| 10-11 | 118 (44.4%) |
| Age | |
| Mean (SD) | 9.4±1.1 |
| Range | 8.0- 11.0 |
| CFSS-DS | |
| Mean (SD) | 33.2 ±11.0 |
| Range | 15.0- 75.0 |
| PSS | |
| Mean (SD) | 16.5±8.6 |
| Range | 0.0- 36.0 |

* Number of samples: n, percent: %, SD: Standard deviation, Children's Fear Survey Schedule – Dental Subscale: CFSS-DS, Perceived Stress Scale: PSS

Table 2. Comparison of Perceived Stress Scale Scores between genders and age-ranges

| PSS | Gender | | | Age Range | | |
|-------|-----------|-----------|--------------------|-----------|-----------|--------------------|
| | Male | Female | p-value | 8-9 | 10-11 | p-value |
| Q1 | 0 (0-4) | 0 (0-4) | 0.810 ¹ | 0 (0-4) | 2 (0-4) | 0.543 ¹ |
| Q2 | 0 (0-4) | 2 (0-4) | 0.539 ¹ | 0 (0-4) | 0 (0-4) | 0.573 ¹ |
| Q3 | 2 (0-4) | 2 (0-4) | 0.276 ¹ | 0 (0-4) | 2.5 (0-4) | 0.149 ¹ |
| Q4 | 0 (0-4) | 0 (0-4) | 0.391 ¹ | 0 (0-4) | 0 (0-4) | 0.527 ¹ |
| Q5 | 3 (0-4) | 3 (0-4) | 0.311 ¹ | 3 (0-4) | 3 (0-4) | 0.466 ¹ |
| Q6 | 3 (0-4) | 3 (0-4) | 0.988 ¹ | 3 (0-4) | 3 (0-4) | 0.501 ¹ |
| Q7 | 3 (0-4) | 3 (0-4) | 0.918 ¹ | 3 (0-4) | 3 (0-4) | 0.713 ¹ |
| Q8 | 2 (0-4) | 3 (0-4) | 0.178 ¹ | 2 (0-4) | 2.5 (0-4) | 0.106 ¹ |
| Q9 | 0 (0-4) | 2 (0-4) | 0.848 ¹ | 0 (0-4) | 2 (0-4) | 0.015 ¹ |
| Total | 16 (0-36) | 17 (0-36) | 0.495 ¹ | 15 (0-36) | 19 (0-36) | 0.160 ¹ |

*: Median (Min-Max), 1 Mann-Whitney U test, Perceived Stress Scale: PSS
 **: p values in bold indicate a statistically significant difference

comprising 113 males (42.5%) and 153 females (57.5%). The majority of the children (55.6%) were aged between 8 and 9 years, while 44.4% were aged between 10 and 11 years. The average age of the children was 9.4 ± 1.1 years. The mean total score on the Perceived Stress Scale (PSS) was 16.5 ± 8.6, and on the Children's Fear Survey Schedule-Dental Subscale (CFSS-DS), it was 33.2 ± 11.0 (Table 1). The comparison of the PSS with age and gender in this study is shown in Table 2. There was no significant difference in perceived stress scale scores between genders or age groups (p>0.05). However, children aged between 10 and 11 scored higher on the 9th question compared to those aged between 8 and 9 (p<0.05) (Table 2). The relationship between the CFSS-DS scale and age and gender in this study is shown in Table 3. There was no significant difference between genders in terms of the CFSS-DS total score or any of the questions (p>0.05). However, children in the 8-9 age group scored significantly higher on the 3rd question "Fear of getting an injection" and the 12th question "Fear of something going down their throat" compared to the 10-11 age group (p<0.05). There were no significant differences in the remaining questions (p>0.05) (Table 3). A significantly positive correlation was found between PSS and CFSS-DS scores (p<0.05) (Figure 1).

Discussion

In the present study, the effect of behavioral changes due to perceived stress on dental anxiety was investigated in children aged 8-11. According to this study's results, as perceived stress increased, dental anxiety also increased. That is, as PSS scores increased, CFSS-DS scores also increased, and there was a statistically significant relationship between them. In this study, the average PSS was 16.5±8.6, while the average CFSS-DS was 33.2±11.0. No significant relationship was found between the PSS and CFSS-DS scales and genders. When

Table 3. Comparison of CFSS-DS Scores between genders and age-ranges

| CFSS-DS | Gender | | | Age Range | | |
|---------------------|------------|------------|--------------------|------------|------------|--------------------|
| | Male | Female | p-value | 8-9 | 10-11 | p-value |
| Q1 | 2 (1-5) | 2 (1-5) | 0.220 ¹ | 2 (1-5) | 2 (1-5) | 0.182 ¹ |
| Q2 | 1 (1-5) | 1 (1-5) | 0.267 ¹ | 1 (1-5) | 1 (1-5) | 0.266 ¹ |
| Q3 | 3 (1-5) | 2 (1-5) | 0.222 ¹ | 3 (1-5) | 2 (1-5) | 0.016 ¹ |
| Q4 | 1 (1-5) | 1 (1-5) | 0.359 ¹ | 1 (1-5) | 1 (1-5) | 0.519 ¹ |
| Q5 | 1 (1-5) | 1 (1-5) | 0.244 ¹ | 1 (1-5) | 1 (1-5) | 0.338 ¹ |
| Q6 | 2 (1-5) | 2 (1-5) | 0.827 ¹ | 2 (1-5) | 2 (1-5) | 0.456 ¹ |
| Q7 | 1 (1-5) | 1 (1-5) | 0.885 ¹ | 1 (1-5) | 1 (1-5) | 0.861 ¹ |
| Q8 | 2 (1-5) | 2 (1-5) | 0.300 ¹ | 2 (1-5) | 2 (1-5) | 0.266 ¹ |
| Q9 | 1 (1-5) | 1 (1-5) | 0.481 ¹ | 2 (1-5) | 1 (1-5) | 0.340 ¹ |
| Q10 | 2 (1-5) | 2 (1-5) | 0.825 ¹ | 2 (1-5) | 2 (1-5) | 0.969 ¹ |
| Q11 | 2 (1-5) | 2 (1-5) | 0.452 ¹ | 2 (1-5) | 2 (1-5) | 0.614 ¹ |
| Q12 | 5 (1-5) | 5 (1-5) | 0.208 ¹ | 5 (1-5) | 4 (1-5) | 0.003 ¹ |
| Q13 | 2 (1-5) | 2 (1-5) | 0.121 ¹ | 2 (1-5) | 2 (1-5) | 0.053 ¹ |
| Q14 | 1 (1-5) | 1 (1-5) | 0.820 ¹ | 1 (1-5) | 1 (1-5) | 0.634 ¹ |
| Q15 | 1 (1-5) | 1 (1-5) | 0.489 ¹ | 1 (1-5) | 1 (1-5) | 0.713 ¹ |
| CFSS-DS Total Score | 32 (15-75) | 32 (15-75) | 0.627 ¹ | 33 (15-69) | 31 (15-75) | 0.034 ¹ |

*: Median (Min-Max), 1 Mann-Whitney U test, Children's Fear Survey Schedule – Dental Subscale: CFSS-DS
 **: p values in bold indicate a statistically significant difference

comparing the total CFSS-DS scores of the 8-9 and 10-11 age groups, a statistically significant relationship was found between them. Considering these findings, the null hypothesis (H₀) stating there is no relationship between perceived stress and dental anxiety was rejected. The data from the presented study support the alternative hypothesis (H₁), which highlights a relationship between perceived stress and dental anxiety.

According to Davis and Turner-Cobb's study, girls perceive stress more than boys [13]. Another study involving adults reported that perceived stress was higher in women [16]. It is suggested that women show higher emotional development and significantly higher awareness in understanding and expressing emotions compared to men [17]. In the current study, no significant difference was found in perceived stress levels between girls and boys. The higher number of girls in this study might explain the close mean perceived stress levels between genders.

Studies in the literature have reported that gender affects dental anxiety [5, 18]. In a study by Alvaselo et al. conducted on Finnish children, the average dental fear scores of girls were calculated as 23.2±6.9, slightly higher than boys [18]. Similarly, another study investigating the relationship between dental anxiety and gender found that anxiety levels in women were significantly higher than in men [5]. Additionally, while one study reported that dental anxiety was higher in boys [19], another study found no significant difference in dental anxiety levels between boys and girls [20]. In the current study, no significant difference was found between CFSS-DS scores and genders.

Davis and Turner-Cobb, in a study using the PSS scale, reported that age is not a factor for stress [13]. Similarly, White, in a study using the PSS to determine stress in children, reported no differences between ages [21]. In the current study, no significant difference was found between the average PSS scores of the "8-9" and "10-11" age groups. Only the children aged "10-11" scored significantly higher on the PSS question "Were you easily upset last week?" compared to children aged "8-9". Additionally, the PSS scores of children aged "10-11" were higher than those of children aged "8-9", but the difference was not significant.

In the literature, a study on the relationship between age and dental anxiety in adults found that dental anxiety decreases with increasing age [22]. In a study by Yahyaoglu et al., the average CFSS-DS scores of children aged "6-8" were found to be higher than those of children aged "9-12" [23]. It was reported that the reason for the decrease in dental anxiety with increasing age is that children learn to cope with the situation [7]. In a study by Khanduri et al., evaluating CFSS-DS scores of children aged 4-14, children in the "4-7" age group had the highest anxiety scores, indicating that anxiety decreases with increasing age [14]. In a study by Raj et al., measuring dental anxiety using CFSS-DS in children visiting a dentist for the first time, it was found that dental anxiety decreased with increasing age. Children reported being most afraid of "getting an injection" and "the sound of the dentist's drill," followed by "something going down their throat and not being able to breathe," and least afraid of "doctors" [7]. In the current study, children reported being most afraid of "something going down their throat and not being able to breathe," followed by "getting

an injection." No significant difference was found between CFSS-DS scores and age in this study.

In studies on stress in the literature, Davis and Turner-Cobb [13] found the average PSS score to be 26.34, and White [21] found the average PSS score to be 11.73. There are not many studies in the literature reporting the average stress levels of children. One study reported the average CFSS score as 28.1 [9]. Similarly, Khanduri et al. found the average CFSS-DS score to be 28.18±11.21 [14]. In a study on English children, the average CFSS score was 37.0 [24]. Barauskas et al. reported a positive significant relationship between PSS and dental anxiety in their study on dental anxiety and stress [5]. In this study, the average PSS score was 16.5±8.6, and the average CFSS-DS score was 33.2±11.0, and a positive correlation was found between them. It has been reported that dental anxiety is related to the frequency of dental visits and negative experiences during previous treatments [25]. The fact that the children participating in the study had no previous dental treatment experience may have led to lower perceived stress levels.

There are some limitations to the study. The inclusion criteria of our study may have resulted in a relatively small sample size, as children aged 8-11 years old who had their first dental experience were required. This is because the vast majority of these school-aged children who applied to our clinic had dental experience once in their lives. Multicenter studies can be conducted in different age groups, with larger sample sizes and where socioeconomic and cultural diversity are not limited. In the future, conducting studies on larger populations where past experiences are questioned will contribute to the literature.

Conclusion

The limitations of the presented study include working with a specific region and a limited number of children. According to this study's results, it was determined that as the perceived stress levels of children increased, their dental anxiety also increased. Based on the study results, we can say that implementing approaches to reduce perceived stress in children receiving dental treatment for the first time, such as creating a calm and happy environment before treatment, is predicted to reduce dental anxiety and improve the quality of dental treatment for both the child and the dentist.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and Human Rights Statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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