Prevalence of Dental Anxiety in 7- to 11-Year-Old Children and Its Relationship to Dental Caries

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Key Words

Child · Dental anxiety · Dental caries

Abstract

Objectives: The aims of this cross-sectional study were to evaluate the level of fear of dental procedures among schoolchildren and assess the relationship between caries experience and fear of dental procedures. **Subjects and Methods:** 275 children aged 7–11 years were recruited for the study. Before conducting a dental examination, each subject was asked to independently complete a Children's Fear Survey Schedule – Dental Subscale (CFSS-DS) questionnaire. Children having a score of ≥ 38 were included in the group 'with dental fear' while those scoring < 38 were placed in the 'without dental fear' group. All dental examinations were performed on the school premises according to WHO criteria. **Results:** Mean CFSS-DS value was 28.1, and the number of children who experienced dental fear was 40 (14.5%). It was found that Decayed, Missing and Filled Surface Index (DMFS-dfs) increased significantly with increasing CFSS-DS values. Fear scores were highest for 'Choking' (3.3), 'Injections' (2.6) and 'Having somebody put instruments in their mouth' (2.6). No significant differences in fear scores between boys and girls were found in this study. **Conclusions:** The data showed prevalence of dental fear in the 7–11-year-old children of this study. Dental fear scores decreased with increasing age.

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Introduction

Dental fear in children has been recognized in many countries as a public health problem [1, 2]. This problem may lead to neglect of dental care and therefore represents a problem to both dentists and patients alike [2, 3]. Research has shown that the effects of children's dental fears may well persist into adolescence and, in turn, may lead to avoidance of seeking dental care or disruptive behavior during treatment [4]. Therefore, it is of great importance that the dental health professional is able to identify children who have dental fear and apply appropriate pediatric management techniques at the earliest age possible [5, 6].

The etiology of dental fear in children is multifactorial. Dental fear has been related to personality, increased general fears, previous painful dental experiences, parental dental fear, age and gender [4, 7]. Girls and younger children are most often reported as more fearful than boys and older children [7, 8]. Prevalence estimates of childhood dental fear vary considerably, from 3 to 43% in different populations [8]. These differences in prevalence estimates may be due to several parameters, such as methodological or cultural variables in the populations surveyed [8]. Cultural variables like endurance to stress in African culture manifest as self-control and self-repression; however in American or European culture people can more easily express their feelings [9].

Four types of measurements have been used for assessing dental fear in children: rating behavior during dental visits (e.g. Frankl scale), physiological measures (e.g. pulse rate, basal skin response and muscle tension), projective techniques (e.g. children's dental fear picture test) and psychometric scales [5, 10].

The Dental Subscale of the Children's Fear Survey Schedule (CFSS-DS) is a well-known psychometric scale that was developed in 1982 for assessing dental fear in children. It has been shown to have good reliability-validity, and recently has been used in several countries and translated into several languages [10, 11]. CFSS-DS is used to register differences in dental fear between experimental and control groups to select fearful and non-fearful children from a larger reference population and to estimate the prevalence of dental fear in children [8, 11]. CFSS-DS has been shown to be better in some situations than other scales such as the Venham Picture Test and the Dental Anxiety Scale [12].

Associations between children's dental fear and oral health status have been reported [3, 13, 14]. Dental fear has been reported to be associated with a range of adverse behavioral and dental health characteristics. Studies of children and adults have shown that dental fear is associated with less favorable self-care behavior, avoidance of dental care and also with poorer health outcomes [13]. Nevertheless, some studies have shown that there was no correlation between dental fear and caries [2, 15]. The aims of this cross-sectional study were to evaluate the level of dental fear among 7- to 11-year-old schoolchildren and to assess the relationship between dental caries and dental fear.

Subjects and Methods

Subjects

The sample comprised 275 children (126 girls and 149 boys) in a primary school in Kırıkkale, Turkey who were 7–11 years old. The school was in the city centre and it is a good example of a school population with moderate to high socio-economic status. Children for the study were randomly selected from children with good general health and those that cooperated. Children who had toothache (pulpitis, pericoronitis) and teeth with dysplasia and who had received dental treatment were excluded from the study. The study was approved by the Institutional Review Board and carried out with the permission of the National Educational Directorship of the city of Kırıkkale. The parents of the children were fully informed of the nature of the study and consent for participation of the children in the study was obtained from all parents.

Table 1. The CFSS-DS

Items
1 Dentists
2 Doctors
3 Injections
4 Having somebody examine your mouth
5 Having to open your mouth
6 Having a stranger touch you
7 Having somebody look at you
8 The dentist drilling
9 The sight of the dentist drilling
10 The noise of the dentist drilling
11 Having somebody put instruments in your mouth
12 Choking
13 Having to go to the hospital
14 People in white uniform
15 Having the dentist clean your teeth

Survey Instrument

The CFSS-DS consists of 15 items related to different aspects of dental treatment which were scored as follows: not afraid = 1; a little afraid = 2; fairly afraid = 3; quite afraid = 4; very afraid = 5. Total scores thus ranged from 15 to 75 (table 1). Children with CFSS-DS ≥ 38 were defined as dentally anxious [16]. To obtain a valid instrument for use in Turkey, the CFSS-DS was translated into Turkish by a native speaker and then back-translated for quality control. To fit the conditions of dental procedures in Turkey, the item 'Having the nurse clean your teeth' was changed to 'Having the dentist clean your teeth' [5, 17]. The questionnaire was completed by children at home before dental examination.

Dental Examination

All dental examinations were conducted in school by one calibrated examiner (Ç.T.D.), who was unaware of the results of the questionnaire survey at the time of examination. The diagnostic criteria used for caries were the same as those published by the WHO [18]. All decay-missing-filling teeth (DMF-T and DMF-S) were registered in permanent teeth, only decay-filling teeth (df-t and df-s) were registered in deciduous teeth.

Data Analysis

Data management and analyses were conducted using SPSS version 15.0. (SPSS, Inc., Chicago, Ill., USA). χ^2 , t tests, and Pearson correlation were used in statistical analysis. ANOVA was performed to test for group differences in the CFSS-DS scores for children of different age groups and differences in the dental fear between genders.

Results

Of the 275 children examined, dental fear was identified in 40 children (CFSS-DS ≥ 38); 50% of these were girls and the proportion of children with CFSS-DS ≥ 38

Table 2. Mean scores and standard deviations of CFSS-DS, and proportion of individuals with CFSS-DS ≥ 38 and CFSS-DS < 38 according to age group

Age, years	CFSS-DS		CFSS-DS ≥ 38		CFSS-DS < 38	
	n	mean	n	mean	n	mean
7	51	33.1 $\pm$ 11.145	16	45.8 $\pm$ 10.061	35	27.3 $\pm$ 5.309
8	58	27.7 $\pm$ 7.829	6	43.8 $\pm$ 5.382	52	25.8 $\pm$ 5.616
9	43	29.1 $\pm$ 8.477	6	44.0 $\pm$ 5.060	37	26.7 $\pm$ 6.135
10	57	27.4 $\pm$ 10.038	10	45.1 $\pm$ 7.078	47	23.7 $\pm$ 5.577
11	66	24.6 $\pm$ 6.373	2	38.0 $\pm$ 0.00	64	24.2 $\pm$ 6.009
Total	275	28.1 $\pm$ 9.193	40	44.6 $\pm$ 7.780	235	25.3 $\pm$ 5.866
p < 0.05.						

Table 3. Mean scores and standard deviations of CFSS-DS

Items	Girls (n = 129)	Boys (n = 146)	All (n = 275)
1 Dentists	1.9 $\pm$ 1.26	2.0 $\pm$ 1.32	1.9 $\pm$ 1.29
2 Doctors	1.4 $\pm$ 0.83	1.5 $\pm$ 0.01	1.5 $\pm$ 0.93
3 Injections	2.6 $\pm$ 1.59	2.6 $\pm$ 1.63	2.6 $\pm$ 1.61
4 Having somebody examine your mouth	1.3 $\pm$ 0.73	1.4 $\pm$ 0.83	1.3 $\pm$ 0.78
5 Having to open your mouth	1.1 $\pm$ 0.57	1.1 $\pm$ 0.51	1.1 $\pm$ 0.54
6 Having a stranger touch you	2.1 $\pm$ 1.47*	1.8 $\pm$ 1.23*	1.9 $\pm$ 1.36
7 Having somebody look at you	1.8 $\pm$ 1.29*	1.4 $\pm$ 0.92*	1.6 $\pm$ 1.13
8 The dentist drilling	1.9 $\pm$ 1.23	1.9 $\pm$ 1.28	1.9 $\pm$ 1.25
9 The sight of the dentist drilling	1.7 $\pm$ 1.06	1.7 $\pm$ 1.07	1.7 $\pm$ 1.06
10 The noise of the dentist drilling	1.7 $\pm$ 1.06	1.7 $\pm$ 1.13	1.7 $\pm$ 1.10
11 Having somebody put instruments in your mouth	2.6 $\pm$ 1.49	2.6 $\pm$ 1.59	2.6 $\pm$ 1.54
12 Choking	3.5 $\pm$ 1.74	3.1 $\pm$ 1.81	3.3 $\pm$ 1.78
13 Having to go to the hospital	1.4 $\pm$ 0.93	1.4 $\pm$ 0.97	1.4 $\pm$ 0.95
14 People in white uniform	1.3 $\pm$ 0.86	1.3 $\pm$ 0.82	1.3 $\pm$ 0.84
15 Having the dentist clean your teeth	1.7 $\pm$ 1.19	1.6 $\pm$ 1.08	1.7 $\pm$ 1.14
* p < 0.05.			

was 14.5%. Among the 235 children who were found to be nonanxious (CFSS-DS < 38), 109 were boys and 126 were girls (39.6 and 45.8%, respectively). No significant differences in mean dental fear scores between boys and girls were found in this study ($p > 0.05$). The general average of the CFSS-DS value was 28.1. The distribution of CFSS-DS value of anxious (CFSS-DS ≥ 38) and non-anxious (CFSS-DS < 38) children according to age group is shown in table 2. Significant differences in mean fear scores between fear level and age group were found in this study ($p < 0.05$). Average values of the answers in scale are given in table 3. Although there were no significant differences in mean fear scores between boys and girls, for the 'Having a stranger touch you' and 'Having some-

Table 4. Mean DMFS-dfs and proportion of individuals with CFSS-DS ≥ 38 and CFSS-DS < 38 according to age group

Age, years	CFSS-DS ≥ 38		CFSS-DS < 38	
	n	DMFS-dfs	n	DMFS-dfs
7	16	12.2	35	5.3
8	6	9.0	52	7.6
9	6	2.6	37	7.9
10	10	7.1	47	4.7
11	2	8.0	64	2.9
Total	40	8.8*	235	5.4*
* p < 0.05.				

body look at you' items the fear scores were significantly higher in girls than boys ($p < 0.05$). However, significant differences between fear level and age group were found in items 1, 2, 4, 5, 8, 9 and 10 of the CFSS-DS ($p < 0.05$). The DMFS-dfs value was 8.8 and 5.4 in anxious and non-anxious children, respectively. The difference between fear level and DMFS-dfs score was statistically significant ($p < 0.05$; table 4). Pearson correlation test showed correlations between dental fear and age and between dental fear and DMFS-dfs ($p < 0.01$, 2-tailed).

Discussion

Fear of dental treatment in children has been recognized as a source of serious health problems and it may persist into adolescence, which may lead to an avoidance of seeking dental care or disruptive behavior during treatment [12]. In order to prevent this health-threatening process from occurring, preferably by means of appropriate pediatric management techniques, it is imperative to identify the dentally anxious child at the earliest age possible [12]. The aims of this cross-sectional study were to evaluate the level of dental fear among 7- to 11-year-old schoolchildren and assess the relation of dental caries to dental fear. Previous dental fear studies conducted in pre-adolescent Turkish children showed oral health to be poor by self-assessment [19]. Using a cut-off of ≥ 38 , the mean dental score of CFSS in our study (28.1) basically confirmed the previous score of 30.6, in which the cut-off was ≥ 42 [1].

Community-based and other large studies conducted in schools or clinics typically rely on questionnaire data to assess the prevalence of dental fear. School-based samples offer the advantages of faster data collection (because the children can be surveyed in groups) and better representation of children of that locale (because even dental avoiders are likely to attend school) [10].

Research on dental fear in children has been carried out in a number of countries. CFSS-DS scores in the present study were similar to data (28.7) of a previous study in the USA [20] and the mean score was higher than the findings in Finland (22.1) [21], Sweden (23.1) [16] and the Netherlands (23.2) [8], but lower than the findings in Singapore (30.6) [1], Canada (for Chinese children, 31.9) [22] and China (35.7) [23]. Some prevalence studies have shown that girls score higher on the CFSS-DS [1, 8], while others have found no difference [11, 22, 23].

No significant differences in fear scores between boys and girls were found in the present study. Several studies

have reported that dental fear seems to decrease with increasing age [8, 16]. However, Rantavuori et al. [14] reported that dental fear was higher among 12- and 15-year old children than among younger ones. It was reported that this relation may not be a linear one [22, 24]. Despite the fact that the dental fear scores decreased with increasing age, the scores between the age groups were irregular in the present study. That children were most afraid of 'choking', 'injections' and 'having somebody put instruments in your mouth' in our study confirmed studies from other cultures [1, 5, 8, 10, 14].

Kruger et al. [13] stated that dental fear is likely to be a significant predictor of dental caries and may be a risk factor for incidence of dental caries. The present study showed significant correlation between dental fear and DMFS-dfs scores. It was found that DMFT-dfs increased significantly with increasing CFSS-DS values. The findings of our study are similar to some previous studies [3, 13, 14, 21], but not to others [2, 15, 25] in which no association was found between dental fear and caries. A probable explanation is that the caries experience of anxious individuals in some studies is not markedly worse than that of non-anxious counterparts, but the negative dental health attitudes and behavior of the former suggested that their dental health might have deteriorated over time had repeated observations been made [13].

Dental anxiety is a serious problem which negatively affects the oral health of children and adults. Early detection of the causes of fear is very important in the solution of the problem. It is recognized that children who witness fear in their parents are likely to acquire that outlook and as a result experience painful experiences at an early age and that this is an important factor related to the problem. To reduce the level of dental fear among children, attention needs to be paid to the use of epidemiologic concepts of clinical risk ascertainment using caries activity tests and early intensive preventive efforts such as fissure sealants, routine oral health examinations, oral hygiene instructions and parental education to prevent the child from experiencing pain and reduce the need for injections at a very early age [1]. However, more studies should be carried out with greater sample sizes encompassing larger geographic areas and wider age groups.

Conclusion

The data showed prevalence of dental fear in the 7- to 11-year-old children of this study. Dental fear scores decreased with increasing age.

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