Original Article

Evaluation of Dental Fear among Pediatric Age Group and Parental Anxiety Using Validated Assessment Scales

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Abstract

Introduction: Dental fear and anxiety poses a significant problem in child patient management as such patients are more likely to avoid or delay seeking dental treatment, cancel dental appointments, and are considered to be the main barrier for successful completion of the dental treatment. Thus, early recognition and management of dental fear are imperative and the key to deliver effective dental treatment to the child patient. **Aim:** The aim of this study was to evaluate dental fear among children aged 4–12 years and parental anxiety using validated assessment scales. **Methods:** The study was conducted on 288 children who visited the Department of Pedodontics and Preventive Dentistry at Post Graduate Institute of Dental Sciences, Rohtak. The dental fear among children was measured using validated dental fear assessment scales, i.e., facial image scale and Children's Fear Survey Schedule-Dental Subscale (CFSS-DS). Parental anxiety was assessed using Norman Corah's Dental Anxiety Scale (C-DAS). Children dental fear was compared with parental anxiety. The factors associated with dental fear (age, gender, parent gender, previous dental experience, socioeconomic status, and background area), and also, the first dental visit age was assessed. **Results:** A total of 288 children showed CFSS-DS of 25.36 ± 6.130, 105 were girls (36.5%) and 183 were boys (63.5%) with CFSS-DS of 25.56 ± 6.102 and 25.25 ± 6.160, respectively. This showed that there were no significant differences in fear between boys and girls. According to the facial image scale, 0.3% of children were reported to have dental fear. Parental anxiety showed C-DAS of 7.53 ± 4.674, 163 were female (56.6%) and 125 were male (43.4%) with C-DAS 9.53 ± 5.183 and 4.94 ± 1.852, respectively. **Conclusion:** Parental anxiety was not associated with children's dental fear. Among factors, age, previous dental experience, and socioeconomic status were associated with children's dental fear. The most common first dental visit age among the three groups was 5 years.

Keywords: Children's Fear Survey Schedule-Dental Subscale, Corah's Dental Anxiety Scale, dental fear, facial image scale

INTRODUCTION

Dental fear in children has been recognized in many countries as a public health problem. This problem may lead to neglect of dental care and therefore represents a problem to both dentist and patient alike.[1] The successful completion of any dental treatment is completely dependent on the cooperative behavior of the child.[2] Therefore, it is essential to identify anxious children at the earliest age possible to be able to institute a precocious behavioral treatment.[3]

The etiology of dental fear and anxiety (DFA) in children is multifactorial. Klingberg *et al.* found that child dental fear was related to age, general fears, and dental fear in the mothers.[4] Children may develop anxiety due to the presence of anxious people around them. There is a significant relationship between parental and child dental fear.[5] Therefore, the caregiver's anxiety is considered one of the factors that influence the fear during dental treatment.

Aim

1. To evaluate the proportion of children with dental fear and parental anxiety.

Objectives

1. To compare children's dental fear with parental anxiety
2. To study the association between children's dental fear and related factors. (age, gender, parent gender, previous

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dental experience, socioeconomic status, and background area)
3. To assess the first dental visit age.

METHODS

The sample comprised 288 children aged 4–12 years both male and female. The healthy controls seeking dental health care along with the parents who visited the Department of Pedodontics, Post Graduate Institute of Dental Sciences, Rohtak, were included, for a period of 1 year. Study approval was obtained from the Institutional Ethics Committee, Post Graduate Institute of Dental Sciences, Rohtak. Children with mental retardation and sensory or motor impairment and patients and parents unwilling to participate in the study were excluded from the study.

The study subject was randomly grouped following a simple random sampling technique. The sample size of 96 children was taken in each group.

Sample size calculation

The formula for estimating sample size is given as: $N = Z^2pq/d^2$

p: The prevalence[1] of the condition = 0.236

q: (1-p)

d: The precision of the estimate. This could either be the relative precision or the absolute precision. Absolute margin of error was taken 5%

Z: Significance value of 95% confidence interval. The value of Z corresponding to this is 1.96 (from the standard normal variant table)

$N = 2 \times 2 \times 0.236 (1–0.236)/0.05 \times 0.05$

$N = 288$

The group was randomly divided as mentioned below, the age of 4 years has been included as the lower age limit, considering that speech and expression is developed at this age to answer the question involved in this study. The age range of 2 years with three groups each has been related as cognitive and behavioral continues to occur in children each year, and it is reasonable to restrict the range to minimum. The upper age limit is 12 years which is the uppermost age for being a child.
- Group I – Children aged 4–6 years
- Group II – Children aged 7–9 years
- Group III – Children aged 10–12 years

After receiving informed consent from the parents, the questionnaire was provided to the parents and children. The information pertaining to patient identification was entered in the patient per forma which included age, children's gender, parent's gender, previous dental experiences, area, and socioeconomic status of the patient. Furthermore, the first dental visit age of the children was assessed.

The children and their parents/legal guardian/caregivers were approached in the waiting room and facial image scale (FIS) was applied and filled thereafter. The FIS comprises a row of five faces ranging from "very happy" (1) to "very unhappy" (5). Children were given on the scale the appropriate point that best represented their fear sensation in the waiting room area.

Thereafter, the DFA levels of the test subjects were assessed using the Children's Fear Survey Schedule-Dental Subscale (CFSS-DS). The questionnaire of CFSS-DS was translated into Hindi (local language) to ascertain an understanding of the fear-related questions by the parents and children. The CFSS-DS consists of 15 question form with a 5-point response scale from 1 "not afraid at all" to 5 "very afraid". A total score ranges from 15 to 75 and a score of 38 or more has been associated with clinical dental fear. The parents were advised to complete the questionnaire on behalf of their children, as younger children may not be able to complete the questionnaire by themselves. In cases where the parents of the children were illiterate, the questionnaire was filled by the dentist with the help of parents.

Thereafter, parents' dental anxiety was assessed using the Corah's Dental Anxiety Scale (C-DAS) Revised which consists of four questions to be answered by the parents. The values assigned to each question are 1–5 from 1 "relaxed" to 5 "so anxious" with anxiety rating from 9 to 20.

Data obtained were compiled on a MS Office Excel Sheet (Version 2010, Microsoft Redmond Campus, Redmond, Washington, United States). Data were subjected to statistical analysis using Statistical Package for the Social Sciences (SPSS v 21.0, IBM). For all the statistical tests, $P < 0.05$ was considered to be statistically significant.

RESULTS

In FIS, it was observed that maximum respondents (49%) showed FIS score 1. The choice of FIS score 4 and 5 was considered to be indicative of dental fear in children. Thus, 0.3% of children were reported to have dental fear according to the FIS [Table 1]. Among the three groups and among males and females, there was a statistically nonsignificant difference seen for the frequencies between the groups ($P > 0.05$) using Chi-square test.

The mean CFSS-DS score in Group 1 was 28.42 ± 6.926, Group 2 was 25.57 ± 5.117, and Group 3 was 22.10 ± 4.378. It was found that as the age increased, the mean scores decreased [Figure 1]. The mean CFSS-DS score for males

Table 1: Frequency and percentage of facial image scale scores

	Frequency (%)
1	141 (49.0)
2	126 (43.8)
3	20 (6.9)
4	1 (0.3)
Total	288 (100.0)

was 25.25 ± 6.160, and for females, it was 25.56 ± 6.102. There was a statistically nonsignificant difference seen for the values between the groups ($P > 0.05$) for males and females [Table 2].

For C-DAS, the mean score in Group 1 was 7.10 ± 4.440, Group 2 was 8.04 ± 4.914, and Group 3 was 7.46 ± 4.656. The mean scores were found to be almost similar in all the three groups [Figure 2]. The mean value of C-DAS for males (fathers) was 4.94 ± 1.852, and for females (mothers), it was 9.53 ± 5.183. There was a statistically significant/ highly significant difference seen for the values between the groups ($P < 0.01$, 0.05) for C-DAS with higher values for females (mothers) [Table 2].

There was a statistically nonsignificant difference seen for the values between the groups ($P > 0.05$) for CFSS-DS with parent gender.

The mean value of CFSS-DS scores was highest for the children with not good and average previous dental experience (28.82 ± 4.889), followed by children who had first dental visit (27.18 ± 4.615), and the mean value of CFSS-DS scores was least (24.97 ± 6.235) for the children who had a good previous dental experience. There was a statistically significant/highly significant difference seen for the values between the groups ($P < 0.01$, 0.05) for CFSS-DS with the highest values for the not good and average previous dental experience group using anova test [Figure 3].

The mean scores for the residence (both rural and urban) were almost equal. There was a statistically nonsignificant difference seen for the values between the groups ($P > 0.05$) [Table 3].

Between socioeconomic status (SES) and CFSS-DS, there was a statistically significant/highly significant ($P < 0.01$, 0.05) slight and negative correlation which indicates that as the value of one variable increases, the other decreases ($r = -0.178$, $P < 0.01$) (Pearson correlation) [Figure 4].

Between CFSS-DS and C-DAS, there was a statistically nonsignificant correlation (Pearson correlation) [Table 4].

In the first dental visit age, there was a statistically significant/highly significant difference seen for the frequencies

between the groups ($P < 0.01$, 0.05). Higher frequencies of subjects in age group 1 were seen with first dental visit age 5 years, while higher frequencies of subjects in age group 2 were seen with first dental visit age 7 years and higher frequencies of subjects in age group 3 were seen with first dental visit age

Table 2: Mean values of Children's Fear Survey Schedule-Dental Subscale and Corah's Dental Anxiety Scale with gender of parent

	Parent gender	n	Mean±SD	SEM	T	P value of t-test
CFSS-DS	Male	125	25.19±6.065	0.542	−0.418	0.676#
	Female	163	25.50±6.195	0.485		
C-DAS	Male	125	4.94±1.852	0.166	−9.449	0.000**
	Female	163	9.53±5.183	0.406		

#Statistically non-significant difference. ($P>0.05$) **Statistically highly significant difference. ($P<0.01$) C-DAS: Corah's Dental Anxiety Scale, CFSS-DS: Children's Fear Survey Schedule-Dental Subscale, SEM: Standard error of mean, SD: Standard deviation

Table 3: Mean values of Children's Fear Survey Schedule-Dental Subscale with residence

	Residence	n	Mean±SD	SEM	T	P value of t-test
CFSS-DS	Rural	166	25.40±6.598	0.512	0.126	0.900#
	Urban	122	25.31±5.455	0.494		

#Statistically non-significant difference ($P>0.05$). CFSS-DS: Children's Fear Survey Schedule-Dental Subscale, SEM: Standard error of mean, SD: Standard deviation

Table 4: Bivariate correlation between Children's Fear Survey Schedule-Dental Subscale and Corah's Dental Anxiety Scale

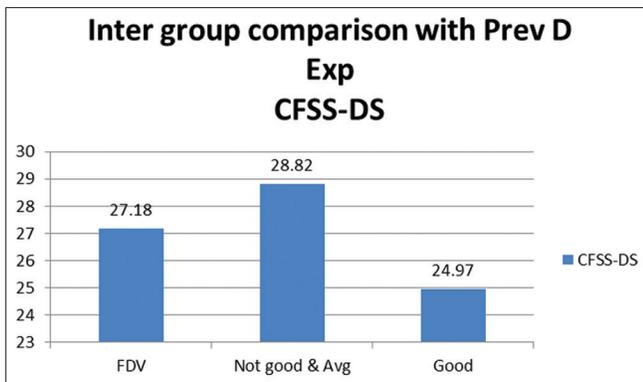|	C-DAS
CFSS-DS	
Pearson correlation	−0.029
Significant (two-tailed)	0.626
n	288

C-DAS: Corah's Dental Anxiety Scale, CFSS-DS: Children's Fear Survey Schedule-Dental Subscale
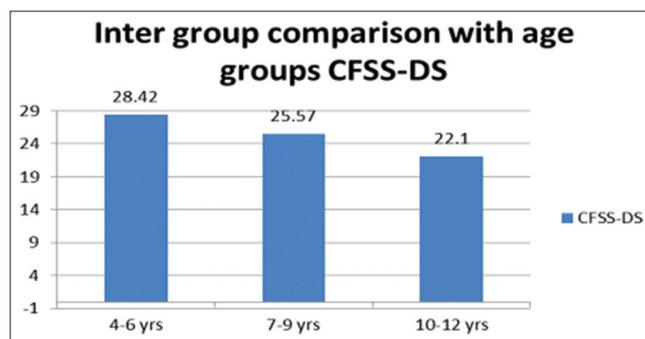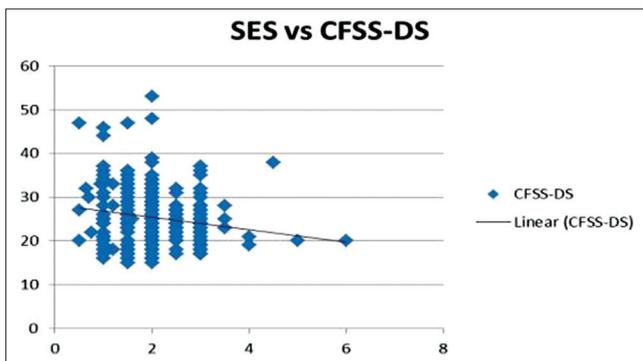

Figure 1: Mean value of Children's Fear Survey Schedule-Dental Subscale in Group 1, Group 2, and groups.
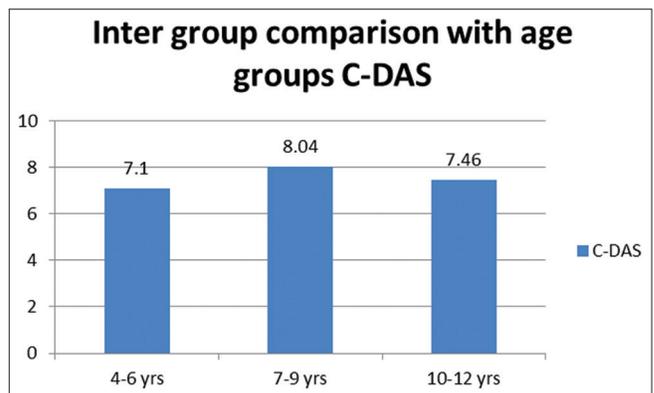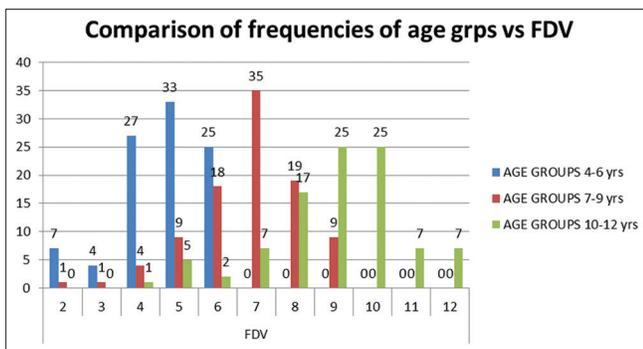

Figure 2: Mean value of Corah's Dental Anxiety Scale in Group 1, Group 2, and Group 3.

Figure 3: Mean values of Children's Fear Survey Schedule-Dental Subscale as per the previous dental experience.

Figure 4: Depicting correlation between socioeconomic status and Children's Fear Survey Schedule-Dental Subscale.

Figure 5: Depicting frequencies of the first dental visit age in Group 1, Group 2, and Group 3.

9 and 10 years. Among the three groups most common first dental visit age was 5 years [Figure 5].

Discussion

Children with DFA often try all means to avoid or delay dental treatment, resulting in deterioration of their oral health. The need assessing childhood fear for dental treatment is to identify the children with high dental fear and subsequently to prevent the adverse consequences of the unwanted dental fear among them.[6] It is essential to identify anxious children at the earliest age possible to be able to institute a precocious

behavioral treatment.[3] Dental fear has been related to personality, increased general fears, previous painful dental experiences, parental dental fear, age, and gender.[1] It is therefore imperative to access factors associated with dental fear. The aim of the present study was to evaluate the proportion of children with dental fear and parental anxiety to study the factors (age, gender, area, socioeconomic status, and previous dental experience) associated with dental fear in children to compare dental fear of children with parental anxiety and to access the first dental visit age.

Children from age group 4–12 years were selected in the present study as patients of younger age group exhibit more disruptive behavior and anxiety during dental treatment. Furthermore, it is largely known that at the age of 5 years, the children have the cognitive ability to verbalize and express their feelings, which justifies the choice of this age group for this study. In addition, these ages are most commonly studied in the literature, which makes it easier for the comparison of the findings of this research with other studies within this field.[7]

A wide range of dental questionnaires for the assessment of dental fear are available. The availability of so many dental anxiety/fear questionnaires may be interpreted as representing dissatisfaction with the existing list. Furthermore, all the questionnaires are open to criticism. Each questionnaire has its own restrictions because they do not completely cover the concept of anxiety; hence, the use of more than one questionnaire is advocated in research related to DFA assessment.[6] In this study, we have used two fear assessment scales, i.e., FIS and CFSS-DS in children and C-DAS for accessing anxiety of parents. The CFSS-DS is one of the most widely used scales for children and has better psychometric properties than other scales, as it measures dental fear more precisely and covers most aspects of dental situations. In the present study, children with CFSS-DS scores >38 were considered as dentally anxious, in accordance with Klingberg and Broberg[8] FIS was used which can be employed even with young children and it becomes easier to assess them objectively through this scale. Furthermore, it takes very less time to administer. The C-DAS was developed in 1969 and it is the most widely used measure of dental anxiety.[9]

The mean CFSS-DS value for females was 25.25 ± 6.160 and males was 25.56 ± 6.102, and the difference was not found to be statistically significant. This was not in accordance with the studies done by Nakai *et al.*,[10] Raadal *et al.*,[11] and Alvesalo *et al.*[12] who reported higher dental fear levels in girls than in boys. Klingberg and Broberg in contrary found higher anxiety levels in boys than in girls.[13] The findings of this study were, however, consistent with the findings of Singh *et al.*[14] and Ganapathi and Jeevanandan[6] who found no significant difference in fear scores of girls and boys. It was observed that the age group increased and dental fear decreased. The influence of age can be explained by the immature psychological development of children and lack of cognitive maturity because the children have not a clear

perception of real fear at younger age.[15] The result was similar to the findings of Lee *et al.* that younger children express higher dental fear.[16] Raj *et al.*[17] also found that dental fear in 4–14 year olds reduced with the increase in age and not similar to Arapostathis *et al.*[18] where mean scores were not related to age differences.

Of 288 parents, 163 were mothers and 125 were fathers. C-DAS revealed that 19.8% parents had severe anxiety, 5.2% had high anxiety, and 3.4% had moderate anxiety. Majority of the parents had no or low anxiety, i.e., 71.6%. The mean C-DAS score was found to be 7.53 ± 4.674; in mothers, it was $9.53 + 5.183$ and in fathers, it was 4.94 ± 1.852. There was a statistically significant difference for values between the groups ($P < 0.01, 0.005$) for C-DAS with higher values for mothers. This findings are in accordance with findings by Folayan *et al.*,[19] Coric *et al.*[9] where they also found high level of dental anxiety among mothers as compared to fathers. Dikshit *et al.*[20] in contrary found no significant differences in mothers' and fathers' overall anxiety levels. In intergroup comparison, the C-DAS scores for Group 1, Group 2, and Group 3 were found to be 7.10 ± 4.440, 8.04 ± 4.914, and 7.46 ± 4.656, respectively, and were found to be statistically nonsignificant.

Of 288 children, 166 children were from rural areas with a mean value of $25.40 + 6.598$ and 122 children were from urban areas, with a mean value of $25.31 + 5.455$. However, the difference was statistically nonsignificant ($P > 0.05$).

Most of the children reported to have good previous dental experience (86.5%), followed by first dental visit (7.6%), not good (5.6%), and average 0.3%. However, there was a statistically significant/highly significant difference seen for the values between the groups ($P < 0.01, 0.05$) for CFSS-DS, with highest values for the not good and average previous dental experience group. Similar findings were reported by Lee *et al.*[16] who also found that invasive dental treatment and painful experience during first dental visit were predictors of CFSS-DS score. Versloot *et al.*[21] also found that a child with a previous negative dental experience displayed more anxiety and uncooperative behavior. Dental fear due to previous visit to dental clinic could be due to stressful events that might have occurred during previous appointments.

There was a statistically significant/highly significant ($P < 0.01$, 0.05) slight and negative correlation between SES and CFSS-DS which indicates that as the value of one variable increases, the other decreases ($r = -0.178$, $P < 0.01$). This is in accordance with Assunção *et al.*[22] who found a significant difference in dental anxiety scores in relation to socioeconomic status. Silveira *et al.*[23] also found a significant association between family income and the presence of dental fear. Children from poorer families had higher prevalence of dental fear.

Suprabha *et al.*[24] (2011) examined the association between age, gender, family characteristics, previous medical experience and previous dental experience with dental fear, and behavior of the child and concluded that in 7–14-year-old children, although dental fear can significantly influence dental behavior, the factors affecting them were not the same. The past medical experience and dental experience had significant influence on dental fear. This is in accordance with previous studies, wherein the multifactorial etiologies of dental fear and direct conditioning due to past medical and dental experiences were shown as the most prominent factors. Furthermore, socioeconomic status had a significant influence on dental fear. Children from poorer families have less access to dental care and experience higher loads of dental diseases, contributing probably to higher loads of dental fear which is similar to this study.[25]

The complex and multifactorial etiology of dental fear in children requires analysis of numerous factors and use of sophisticated instruments for assessment of children with behavior problems.[26]

Between C-DAS and CFSS-DS, it was found to be statistically nonsignificant. The findings of this study is in accordance with study conducted by Klaassen *et al.*,[27] Wu *et al.*,[28] who also found that parental fear and anxiety do not have significant effects on their child's anxiety and fear. In a study conducted by Coric *et al.*,[9] a significant correlation was found between children's CFSS-DS score and CDAS score of mothers ($r = 0.35$, $P. 0.001$) but not with CDAS score of fathers ($r = 0.17$, $P. 0.08$).

However, Themessl *et al.*[29] did a review on the relationship between parental and child dental fear, among the 43 studies investigating the link between parental and child dental anxiety, 34 established a relationship between it. Moreover, on this same review, all studies investigating children under 8 years ($n = 14$) reported a significant relationship between parental and child dental fear. It is known that the degree of association between parental and child dental anxiety may vary depending on the context of the dental visit and the types of measures used. Two of five studies including children up to the age of 10 years reported a significant association between parental and child dental fear. Neither of these studies used established assessment tools. The three studies reporting no relationship between parental and child dental anxiety all used either established behavior rating or dental anxiety scales (Frankl's, Pictorial DAS, VPT, CFSS-DS).

The most common first dental visit age among the three groups was 5 years. There was a statistically significant/highly significant difference seen for the frequencies between the groups ($P < 0.01, 0.05$) with the inference that higher frequencies of subjects in Group 1 were seen with FDV 5, while higher frequencies of subjects in Group 2 were seen with FDV 7 and higher frequencies of subjects in Group 3 were seen with FDV 9, 10. Such findings confirm the lack of awareness among masses about visiting dentists for regular dental checkups of their children to prevent the occurrence of ailments such as dental caries and its associated complications. Atulkar *et al.*[30] in their studies found that most commonly

children reported for their first dental visit only after 5 years for the complaints such as pain, malocclusion, and trauma giving the impression that preventive dentistry program is still to reach the rural population of India. Meera *et al.*[31] in a prospective and retrospective study concluded that that the awareness level regarding the importance of the first dental visit is very low in the Indian population, with an average age of the child's first dental visit being at more than 6 years of age which is contradictory to the American Academy of Pediatric Dentistry Guidelines (2004–2005) which suggests that the first dental visit of a child should be at the first year of their life.[32]

To reduce the level of dental fear among children, early intensive preventive effects such as fissure sealants, routine oral health examination, oral hygiene instruction, and parental education should be advised to prevent the child from experiencing pain and reduce the need for injections and extensive dental treatment at very early age.

Conclusion

The following conclusions can be drawn from the present study:
1. Parental anxiety was not associated with children's dental fear
2. Among factors related with children's dental fear, age, previous dental experience, and socioeconomic status were associated with children's dental fear. It was found that as age increased children's dental fear decreased
3. The most common first dental age visit was 5 years.

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Conflicts of interest
There are no conflicts of interest.

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