

A Study of Variables Affecting Child Fear on Successive Dental Office Visits

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ABSTRACT

Aim: To study influence of age, gender of the children, and their accompanying person's characteristics in managing fear of children on successive visits to the dental office.

Materials and methods: An observational study was conducted in 50 children (5–8 years) and the accompanying persons. Children were divided into two groups according to their age: Group I: 5–6 years old and group II: 7–8 years, who required multiple visits for restorative treatment. The modified dental anxiety scale (MDAS) and children's fear survey schedule-dental subscale (CFSS-DS) questionnaires were used to evaluate accompanying person anxiety and child fear, respectively. Other factors like accompanying person, their education, age and sex of the child, and their relation to child fear level were also evaluated.

Results: The child fear level was observed to significantly decrease on successive three visits (p value < 0.001) using the *post hoc* comparison test. Parental (accompanying person) anxiety (p value = 0.044) and parent education level (p value = 0.048) were observed to be two factors affecting child anxiety significantly. Also, educational level and area of residence were observed to affect parental anxiety significantly (p value = 0.001).

Conclusion: Dental fear among children was observed to significantly decrease on successive visits. Age and sex of the child were observed to have no effect on child fear. Parent anxiety and their education level were observed to directly affecting child's behavior in the dental office.

Keywords: Child–maternal anxiety relationship, Children's fear survey schedule-dental subscale, Dental fear, Modified dental anxiety scale, Parental anxiety.

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INTRODUCTION

Klingberg and Broberg described dental fear and anxiety (DFA) as strong negative feelings associated with dental treatment among both children and adolescent age-groups, whether or not the criteria for dental phobia is met.¹ During dental procedures, dental fear stands out as a key influencing factor for negative experiences. Etiology of dental fear is multifactorial as type of personality, increased general fears, previous experiences, parental anxiety, socioeconomic status, age, and gender are known factors to be affecting dental anxiety.² Also, the dental fear level is observed to directly affect caries experience especially in children.³

Attitude of the parents toward dental treatment is known to influence child behavior toward the same. Various authors have observed a significant correlation between parental and child dental fear in children younger than 8 years of age.^{4,5} Though mothers are known to exert more influence on their child behavior, other family member's impression on the child cannot be neglected.^{6–8} However, limited dental literature is available about their influence relationship.

As child's behavior during dental treatment is related to their fear level, understanding the role of various factors in influencing fear level in children is helpful to the dentist to provide better dental care.⁹

To assess dental anxiety levels, various questionnaire-based scales have been developed. Dental fear survey, modified dental anxiety scale (MDAS), general Geer fear scale, Corah's dental anxiety scale, and so forth are some of the commonly used scales.¹⁰ In the present study, MDAS was used to assess parental anxiety toward dental treatment. This very scale was preferred because of its popularity and established psychometric properties (reliability and validity) in both English and Hindi languages.^{10,11}

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Another scale used in the present study was children's fear survey schedule-dental subscale (CFSS-DS). This scale is a preferred psychometric method for assessment of dental anxiety in young children, shown to be better than the Venham's picture test and the dental anxiety scale.¹² Also, because of its established reliability (0.92) and validity (Hindi language) in India, the scale was preferred in the study.^{12,13}

Hence, the present study was conducted with the aim to evaluate and understand influence of parental anxiety and other socioeconomic determinants on child behavior. The objectives for the study were to evaluate the correlation between parental anxiety and child fear levels during dental treatment and also determining child's fear levels on subsequent dental visits.

MATERIALS AND METHODS

An interview-based observational study was carried out in the Department of Pediatric and Preventive Dentistry, between October 2017 and January 2018, with an aim to evaluate influence of various factors such as accompanying person, parental anxiety and education level, area of residence, and age and sex of the child on child behavior and to evaluate child fear levels on subsequent visits to dental operator (Table 1). Study protocol, design, and methodology were approved by the university ethical committee (Project No. 988).

A total of 250 children between the age-group of 5 and 8 years who visited the department between the specified time period were randomly selected from the daily reporting lot to be included in the study. Out of these, 50 child and parent pairs were included based on their willingness to participate and who returned the signed consent form. The selected children were divided into two groups according to their age-groups—Group I: 5–6 years and group II: 7–8 years.

Inclusion and Exclusion Criteria

Children between the age-group of 5 years and 8 years, who were accompanied by their parents or grandparents, having their first dental visit, requiring multiple dental visits and multiple restorations, with no history of posttraumatic or specific dental phobia, and no unpleasant medical experiences were included.

Children who themselves or their parents were not willing to participate, with any systemic disease, mentally disabled child or who had any past dental experiences were excluded from the study.

Questionnaires Used

In the present study, two questionnaires were used, MDAS¹⁴ and CFSS-DS.¹⁵ Both the questionnaires were made available in English and Hindi languages.

The CFSS-DS was used to measure the child fear level. It consists of 15 items covering different aspects of the dental situation; responses use a five-point Likert scale, ranging from 1 (not afraid) to 5 (very afraid). Dental fear is indicated by total score of 38 and more.¹⁵

The MDAS was used to estimate parental anxiety. It is a brief, five-item questionnaires with a Likert five-point answering scheme for each item ranging from “not anxious” to “extremely anxious.” A cutoff value of 19 and above is indicative of high dental anxiety.¹⁶

In addition to the two questionnaires, a demographic sheet was also prepared using the Kuppuswamy socioeconomic status scale to be used in the study. This scale remains the most widely used scale all over the republic of India for rural, urban, and semi-urban areas.¹⁷

Various components of the scale, such as education, occupation, and income were included. This scale helps in socioeconomic stratification of the population and understanding the affordability of health services.¹⁸

Procedure

After a brief introduction to the operatory, initial examination was conducted by the operator without the use of diagnostics in the reception area. The brief demographic data sheet regarding their area of residence, income and education of the parent was given to the parent to be completed. These data were utilized to establish relationship between various demographic factors to child fear.

The questionnaire was available in Hindi language for better understanding of the parents and the children. Parents were asked to fill in the MDAS questionnaire and children were handed the CFSS-DS questionnaire. After answering the questionnaire, the child was taken into the operatory while the parents were asked to wait outside and allowed to observe the treatment through glass panels.

On both the second and third visits held mostly 3–4 days after the previous visit, only the child was asked to complete the CFSS-DS questionnaire in the reception area followed by the treatment.

On all the three visits, only restorative treatment was carried out for the children. Total number of restorations required varied among the children but number of restorations done was limited to two per visit.

Statistical Analysis

The statistical analysis was done using the Statistical Package for Social Sciences (SPSS) (IBM Corporation, SPSS Inc., Chicago, IL, USA) version 17.0 software package. The correlation between parental anxiety and child fear at different dental visit was compared using the Pearson’s correlation test. The relationship of child fear (at first visit) to various predictors such as gender and age of child, area of residence, and accompanying person was also compared using the binominal logistic regression test. Also the change in the fear level of the children on subsequent visits was analyzed using the *post hoc* comparison test. The correlation between area of residence, education level of the parents, and their dental fear was analyzed using the logistic regression test.

RESULTS

The present study included a total of 50 pairs of children and their accompanying person (24 males and 26 females) with a mean age of 6.88 ± 1.002 years and were divided into two groups on the basis of their age-group I: 5–6 years and group II: 7–8 years, with more number of anxious children observed in group II as compared to group I. However, no statistically significant relationship was observed between age-group and dental fear level on all three visits (Table 2).

In the present study, correlation between child’s fear level and accompanying person (mother, father, or grandparents), parental anxiety (anxious or not anxious), and education level (illiterate, primary to high school, or diploma to graduate), area of residence (urban or semi-urban), age, and sex of the child were observed.

Table 1: Distribution of sample in various parameters of the study

Age-groups of children (years)		Sex of the child		Accompanying person			Area of residence		Parental education		
5–6 years, n (%)	7–8 years, n (%)	Male, n (%)	Female, n (%)	Mother, n (%)	Father, n (%)	Grand parent, n (%)	Urban, n (%)	Semi-urban, n (%)	Illiterate, n (%)	Primary–high school, n (%)	Diploma–graduate, n (%)
18 (36%)	32 (64%)	24 (48%)	26 (52%)	21 (42%)	18 (36%)	11 (22%)	22 (44%)	28 (56%)	13 (26%)	20 (40%)	17 (34%)

Table 2: Correlation of child fear score (mean CFSS-DS score) and child age, gender, and accompanying person

Visits	Age-group					Gender			Accompanying person			p value (Chi-square test)
	5-6 years	7-8 years	Total	p value (Chi-square test)	Male	Female	Father	Mother	Grandparents			
First visit	17	28	45	0.432	21	24	15	20	10			0.463
Fearful children (score ≥38) (N)												
Unfearful children (score <38) (N)	1	4	5		3	2	3	1	1			
Mean ± SD (CFSS-DS score)	51.7 ± 11.5	47 ± 11	48.7 ± 11.3		47.0 ± 12.8	57.3 ± 9.73	43.5 ± 11.1	51.9 ± 10.2	50.5 ± 12			
Second visit	15	20	35	0.123	15	20	9	18	8			0.051
Fearful children (score ≥38) (N)												
Unfearful children (score <38) (N)	3	12	15		9	6	9	3	3			
Mean ± SD (CFSS-DS score)	44.4 ± 9.44	38.8 ± 8.07	40.8 ± 8.91		39.2 ± 9.90	42.3 ± 7.77	37.1 ± 9.36	43.5 ± 7.1	42.5 ± 9.97			
Third visit	11	13	24	0.164	8	16	7	12	5			0.515
Fearful children (score ≥38) (N)												
Unfearful children (score <38) (N)	7	19	26		16	10	11	9	6			
Mean ± SD (CFSS-DS score)	38.1 ± 8.99	33.8 ± 7.55	35.4 ± 8.28		33.9 ± 8.94	36.7 ± 7.54	32.8 ± 8.22	37.1 ± 8.13	35.4 ± 8.14			

*Denotes statistically significant using the Chi-square test

Table 3: CFSS-DS questionnaire items along with mean CFSS-DS score at each visit

S. no	Questionnaire items	First visit mean CFSS-DS score (n = 50)	Second visit mean CFSS-DS score (n = 50)	Third visit mean CFSS-DS score (n = 50)	t test (p value)
1	Dentist	3.56 ± 1.01	2.28 ± 0.904	2.14 ± 0.756	5.89 (0.028*)
2	Doctor	3.56 ± 0.907	2.40 ± 0.857	2.60 ± 0.808	7.97 (0.015*)
3	Injection	3.86 ± 0.969	3.10 ± 1.04	2.24 ± 0.771	6.55 (0.023*)
4	Somebody examines your mouth	3.54 ± 0.908	2.92 ± 0.665	2.40 ± 0.728	8.98 (0.012*)
5	Having to open your mouth	3.72 ± 0.991	3.10 ± 1.02	2.44 ± 0.812	8.35 (0.014*)
6	Having a stranger touch you	3.38 ± 0.945	2.52 ± 0.677	2.46 ± 0.762	9.38 (0.011*)
7	Having somebody look at you	3.02 ± 0.869	2.88 ± 0.594	2.50 ± 0.707	18.02 (0.003*)
8	The dentist drilling	3.58 ± 1.09	2.72 ± 0.832	2.04 ± 0.699	6.24 (0.025*)
9	The sight of dentist drilling	2.88 ± 0.982	2.40 ± 0.833	2.46 ± 0.813	17.09 (0.003*)
10	The noise of dentist drilling	2.88 ± 0.849	2.88 ± 0.558	2.48 ± 0.814	20.60 (0.002*)
11	Instruments in your mouth	2.70 ± 0.789	2.96 ± 0.570	2.68 ± 0.551	30.83 (0.001**)
12	Choking	2.88 ± 0.746	2.92 ± 0.566	2.68 ± 0.551	38.08 (<0.001**)
13	Having to go to hospital	2.84 ± 0.817	2.42 ± 0.642	2.14 ± 0.405	12.13 (0.007*)
14	People in white uniform	2.92 ± 0.829	2.38 ± 0.602	2.08 ± 0.444	10.01 (0.010*)
15	Dentist cleaning your teeth	3.42 ± 0.971	2.92 ± 0.601	2.16 ± 0.44	7.31 (0.018*)
	Total score	48.7 ± 11.3	40.8 ± 8.91	35.4 ± 8.28	10.8 (0.008*)

**Statistically highly significant (p value < 0.001), *Statistically significant (p value < 0.05)

Table 4: Correlation (r) between anxiety score of parent (MDAS) and children fear survey schedule-dental subscale score during subsequent dental visits

	Pearson's r value	p value
First visit	0.122	0.400
Second visit	0.416	0.003*
Third visit	0.250	0.080

*Statistically significant

Observing the correlation between gender of the child and fear score. Fear scores were significantly higher in females towards the dental treatment as compared to males with no statistically significant difference between them (Table 2).

Fear score of the child was also correlated to the person accompanying them. Children accompanied by their mothers displayed more fear on all three visits and children accompanied by their grandparents displayed the least. No statistically significant correlation was observed between child's fear levels and type of accompanying person at all three subsequent visits (Table 2).

In the present study, children from semi-urban background exhibited more dental fear (24) compared to children from urban background (21). However, place of residence was not observed to significantly affect the level of fear in children (p value 0.254).

Observing the change in mean children fear score (CFSS-DS) of each of 15 items at subsequent visits, a gradual decrease in mean fear score was observed at each visit. On the first visit the mean CFSS-DS score was 48.7 ± 11.3, followed by mean score of 40.8 ± 8.91 on second visit and 35.4 ± 8.28 on the third visit (Table 3). Though, all items of the questionnaire had significant difference at three subsequent visits. The most frightening item for children during the first and second visit was "injections." However, on the third visit, children were more afraid of "having instruments in their mouth" and "choking" with statistically highly significant values (p value 0.001) followed by "fear of injection." (Table 3).

When comparing parental anxiety and child's fear status at three subsequent dental visits, a decrease was observed in child fear level on second and third visits (Table 3). The mean parental anxiety was observed to be 18.2 ± 2.85 for all accompanying persons. When applying the Pearson's correlation test, a statistically significant relation was observed between parental anxiety and child's fear status during the second visit (p value 0.003) and was nonsignificant during first and third visit (p value 0.400 and 0.080) respectively (Table 4).

Also, when the change in child fear score was compared between the visits (first and second visits, first and third visits, or second and third visits) using the *post hoc* comparison test. A statistically significant difference was observed among all in terms of decrease in fear with each added visit (p value < 0.001) (Table 5). Hence, determining that fear in children decreases significantly as the visits goes on.

Observing the accompanying person anxiety score for items of the MDAS questionnaire. For father and mother, fifth item "injections" showed maximum anxiety score (mean ± SD) with father scoring 4.06 ± 0.639 and mother 4.76 ± 0.625. Grandparent showed highest score for "scaling and polishing," 4.91 ± 0.302. Also, the first item "planning visit tomorrow" had the least score (mean ± SD) with father scoring 2.33 ± 0.767, mother 2.90 ± 0.70, and grandparent 2.82 ± 0.751 (Table 6).

In the present study, correlation between parental anxiety score and their area of residence and education level was observed. Maximum persons accompanying the children had education between primary and high school level (20). Analyzing the correlation between education status and their anxiety score, a significant correlation was observed with the least anxiety (mean ± SD) in accompanying persons who had education till diploma or graduate level (16.7 ± 2.44) and maximum in accompanying persons who were illiterate (19.8 ± 0.927). Also, observing the correlation of parental anxiety score to area of residence, a significant correlation was seen (p value = 0.031) with parents from urban area having an anxiety score (mean ± SD) of 18.8 ± 2.56 and from semi-urban area having 17.8 ± 3.04 score (Table 7).



Table 5: Comparison of decreased fear in children (CFSS-DS score) at successive visits by *post hoc* comparison

Comparison between fear level		Mean difference	SE	Pturkey	Pbonferroni
First visit	Second visit	7.86	0.704	<0.001*	<0.001*
	Third visit	13.34	0.704	<0.001*	<0.001*
Second visit	Third visit	5.48	0.704	<0.001*	<0.001*

*Denotes statistically significant using the Chi-square test

Table 6: Mean parental MDAS score for accompanying person for MDAS questionnaire items

Accompanying person (mean ± SD)	Visit tomorrow	Waiting room	Use of drill	Scale and polish	Injection
Father (18) (15.9 ± 2.74)	2.33 ± 0.767	2.50 ± 0.786	3.72 ± 0.575	3.28 ± 0.826	4.06 ± 0.639
Mother (11) (19.5 ± 2.11)	2.90 ± 0.70	3.38 ± 0.498	3.95 ± 0.384	4.52 ± 0.750	4.76 ± 0.625
Grandparent (21) (19.5 ± 1.69)	2.82 ± 0.751	3.09 ± 0.539	3.91 ± 0.302	4.91 ± 0.302	4.82 ± 0.603

Table 7: Logistic regression for parents (those at cutoff of 19 or above) on the MDAS with education level and area of residence of parent

Variables		MDAS score (mean ± SD)	Sig. (p value)	Odds ratio	95% confidence interval
Area of residence	Urban	18.8 ± 2.56	0.031*	0.0815	0.00834–0.796
	Semi-urban ¹	17.8 ± 3.04			
Education level	Illiterate ¹	19.8 ± 0.927			
	Primary–high school	18.5 ± 3.41	0.027*	14.2255	1.35732–149.092
	Diploma–graduate	16.7 ± 2.44	<0.001**	304.4403	12.849–7212.981

¹Reference category

**Statistically highly significant (p value < 0.001), *Statistically significant (p value < 0.05)

Table 8: Logistic regression for children (those at cutoff of 38 or above) on the CFSS-DS with variables

Variables		Sig. (p value)	Odds ratio	95% confidence interval
Age of the child	5–6 years ¹	0.361	0.412	0.042–3.996
	7–8 years			
Sex of the child	Male ¹	0.356	5.0	0.517–48.34
	Female			
Accompanying person	Father ¹	0.986	0.9643	0.01712–54.32
	Mother			
	Grandparents	0.522	6.2706	0.02268–1743.03
Area of residence	Semi-urban ¹	0.427	0.286	0.030–2.761
	Urban			
Parental education level	Illiterate ¹	0.508	4.5760	0.05063–413.56
	Primary–high school			
	Diploma–graduate	0.048*	2.34	0.345–15.97
Parental anxiety	Nonanxious ¹	0.044*	2.250	0.314–14.834
	Anxious			

¹Reference category

*Denotes statistically significant value

On analyzing the correlation between all factors included in the study, i.e. sex and age of the child, accompanying parent, parental education, parental anxiety and area of residence to children who scored 38 and above (on first visit) with logistic regression. A statistically significant correlation was observed between child anxiety and parental anxiety (p value = 0.044) and parent education level (p value = 0.04). And to other factors a nonsignificant correlation was observed (Table 8).

DISCUSSION

Fear of dental treatment has been recognized as a source of serious health problems in children and its persistence into adolescence can

lead to a disruptive behavior during dental treatment.¹⁹ Worldwide statistical analysis has demonstrated that between 3 and 43.4% of children exhibit dental fear.^{1,20}

The etiology of child dental fear is considered to be multifactorial and different pathways of acquiring it have been described. Rachman proposed a three-pathway model of acquiring fear: directly through direct conditioning or indirectly through modeling or negative information.²¹ While dental fear in adults is found to be due to direct conditioning by their experiences.²² For children, various authors have provided support for the modeling pathway, i.e., children dental fear is been associated with dental fear in parents.²³

In the present study, the children were divided into two groups according to their age: 5–6 years and 7–8 years. This was done in order to provide better understanding about the relationship between fear level and age of the child. Even though both these age-groups are included under middle childhood years, children in both age-groups have different levels of emotional, cognitive, and communicative skills that can exert an effect on level of dental fear.²⁴

Also in the present study, girls displayed more fear towards dental treatment as compared to boys on all three visits with no statistically significant difference between them. The reason for the same can be the role males play in the society, wherein males tends to hide their fears and feelings as compared to the female counterparts.²⁵ Similar results were reported by Peretz et al.²⁶ However, Leal et al. and Milgrom et al. have reported that both boys and girls have similar fear scores.^{27,28}

The fear level in children accompanied by their mother was found to be higher on all three visits, but no statistically significant correlation was observed between child's fear level to the type of accompanying person at all three subsequent visits. The result is in accordance to various studies by Olak et al. and Boman et al.^{29,30} Also, a correlation had been established by Ripa between mother anxiety and child's negative behavior.³¹ The reason for the same is the emotional transfer of anxiety and fear from parents, especially mothers to their children. A child forms his/her perception according to what they see and hears from their parents in the early years. Thus, parental anxiety is an important factor in determining children fear towards dental treatment. Hence, it is parents' responsibility to portray dental professionals' good image to the child, explaining them that dentists are professionals who promote good oral health and not to be afraid of the dental office.³²

However, Leal et al. and Klaassen et al. have reported that parental fear and anxiety do not have any significant effects on a child's fear.^{27,33}

In the present study, a gradual improvement in the child's behavior was observed on subsequent visits. Also, the child fear for "injection," which was highest on first and second visits, decreased significantly on the third visit. However, "instrument in your mouth" and "choking" showed a highly significant difference in fear score at subsequent visits. This improvement can be suggested to be because of the experiences gained by the child during previous visits, which had helped the child to recognize the nonthreatening aspects and deal with the stressful dental procedure.^{5,34}

In the present study, a correlation between parent education status and their dental anxiety was observed. Parents with higher education (diploma–graduate) were observed to have the least dental anxiety and parents who were either illiterate or with education till high school displayed more anxiety. This can be contributed to the decreased dental awareness levels in families with low socioeconomic and education levels, which are observed to lead to increase in the anxiety levels.^{16,32}

Interestingly, the anxiety score in the parents from the urban area of residence was observed to be higher as compared to parents from the semi-urban area of residence, regardless of the educational level. Fotedar et al. reported the similar results with more anxiety in people from the urban area of residence.³⁵ In contrast, Ratson et al. who compared the dental anxiety of parents in an Israeli kibbutz population in urban and rural background reported that there was no difference between level of dental anxiety according to area of residence.³⁶

The dental anxiety levels of parents surely influence the fear level of children. Therefore, identifying anxiety levels of parents

accompanying their children can help the clinician in designing the behavior management method. Also, gradual reduction in the level of dental fear from first dental visit to subsequent dental visits can be observed because of continued exposure of child to dental environment, indicating desensitization to dental fear.

LIMITATIONS

The main limitation of the present study lies in its design. Interview-based observational studies lack reliability, as results cannot be applied over a large population. Also, the bias inherent in questionnaire studies might have occurred in the present study. In addition, social desirability bias might have occurred during answering of the questionnaire by parents and children. Hence, further longitudinal studies are recommended for a better understanding about factors affecting child behavior in the dental setting.

CONCLUSION

The paper highlights the positive correlation that exists between parental anxiety and their education level to child fear during his/her first dental visit. However, with every visit a decrease in child's fear levels was observed. Other factors explored in the study for their effect on children fear were accompanying person and their area of residence, with no significant correlation observed between them. This practice will help the pediatric dentist not only in reducing the anxiety level for both parent and the child but also providing a satisfactory treatment.

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