



Etiology and Prevalence of Dental Fear and Anxiety Analysed using Two Different Measurement Scales among Children in Chennai - A cross sectional study

Nurul Syamimi binti Mohd Azlan Sunil¹, Mahesh R²

1. Undergraduate Student, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences, Chennai, India
2. Reader, Department of Pedodontics, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences, Chennai,

Abstract

Background: Dental fear is a wide spread phenomenon in children and poses a serious problem in rendering treatment to the child. Therefore, identifying fearful children is of great importance as they present problems in patient management which will eventually affect the quality of dental treatment.

Aim: To evaluate dental fear and anxiety among children using two different fear measurement scales.

Methods and Materials: A questionnaire compiling two fear measurement scales, which are facial image scale (FIS) and children's fear survey schedule-dental subscale (CFSS-DS) were prepared. The questionnaires were distributed to a total of 106 children, age between 5 to 11 years visiting one of the three selected hospitals in Chennai, which are Saveetha Dental College, Meenakshi Ammal Dental College and Sri Ramachandra University. The questionnaires were directly distributed to the individuals one by one and filled up by the dentist. Completed questionnaire were immediately collected on site. Collected data were analysed and tabulated in Microsoft Excel 2013.

Results: The prevalence of DFA among children was 23.6% according to FIS and 17.9% according to CSFF-DS. Females have a higher frequency of dental fear compared to males. The level of dental fear is higher in patients of first dental visits than compared to patients with past dental visits. The factor which was most fearful to children were "injections" (40.6%), followed by "noise of the drill" (33%) and then "sight of the drill" (29.2%).

Conclusion: The assessment of dental fear is an extremely useful tool to identify and manage children with dental fear and anxiety. There is a need for further research to form better measurements for assessing dental fear and anxiety for understanding and management of both the patients and dentists.

Keywords: Children's fear survey schedule-dental subscale, dental anxiety, dental fear, facial image scale, prevalence

INTRODUCTION

Fear and anxiety towards going to the dentists is termed as DFA- dental fear and anxiety. Fear is an adaptive reaction towards real or imagined threat and is considered to be an integral and adaptive aspect of normal development [1]. A normal unpleasant emotional reaction to a known specific threat which is associated with dental treatment, which involves a fight-or-flight response when confronted with the threatening stimulus is known as dental fear [2][3]. Anxiety is similar to fear as it is made up of the same elements and functions similar ways. However, anxiety emotion is a feeling of fear and apprehension about what is to come and is felt even when the feared stimulus is not present. Dental anxiety is an unreasonable and exorbitant negative emotional state experienced by people coming to the dentist for dental treatment.

DFA is a widespread phenomenon and a major problem in rendering treatment for a sizeable portion of children. There are about a range of 5-20% of prevalence of DFA in children in various countries and a few cases being considered as dental phobia (severe DFA) [4-6]. Patients whom experiences DFA are more likely to avoid, delay, or even cancel dental treatment, resulting in deterioration of their oral health and this is a significant problem in patient management [7][8-10]. Dental fear in children involves

separation from their parents or guardians, encounter with new individuals and environment, fear of pain or invasive procedures and the feeling of losing control [11]. Treatments are difficult or almost impossible to conduct because children experiencing DFA are more likely to be uncooperative during dental visits [6]. These kinds of behaviour affects the treatment outcome and in addition, results in occupational stress to the dentists and other dental staffs, which is reported by a previous study, is a cause of poor rapport between dental professionals and patients, as well as patient's parents [8]. Furthermore, besides affecting dental care, DFA is also a known cause to sleep disorders and it affects children's daily life [12] as it has a negative impact on a children's psychosocial function [13]. Based on a previous survey among Dutch population, about 14% cent of children suffer from dental fear. Of the 14%, 6% of the children were reported to have high levels of dental fear and this is likely to compromise with their treatment. The remaining 8% were reported to suffer from some degree of dental fear and may be at the verge of developing high dental fear [14]. DFA procured during childhood may well persist to adulthood and this is a significant cause of avoidance of dental visits in adulthood [15][16]. This is further supported by a past research in which reported that the effects of dental fear

may persist into adolescence and in turn leads to avoidance of dental care and disruptive behaviour during treatment [17][18]. This shows that the stage of childhood is a critical stage for preventing, intercepting and overcoming DFA and thereby in the long run, assist people to take care of their oral health.

Formal assessment measures are essential to identify DFA. Various measures have been developed to provide a uniform method of assessing dental fear in children. Two assessments scales were used in this study to assess DFA, which are facial image scale (FIS) and children's fear survey schedule-dental subscale (CFSS-DS). These assessment scales are inexpensive, flexible, and easy to apply and the results are easily compiled, processed statically and assessed. More than one questionnaire is commonly applied in DFA assessment related research because each questionnaire has limits to what it covers and do not completely cover the concept of anxiety [19]. The advantages of using FIS is that it can be employed with very young children as it does not require verbal self-report like other methods. Results from a past study indicated that FIS is a valid measuring scale of dental anxiety for employment with young children in the clinical context [20]. CFSS-DS was initially presented by Cuthbert and Melamed [21]. CFFSS-DS is a well-known measuring scale to assess dental fear in children [22]. Aartman et al. [23] reported that the self-report CFSS-DS was preferred because it does have a more superior psychometric properties, it measures dental fear more accurately, and it takes on more aspects of the dental circumstances than other surveys.

Early recognition and management of dental fear are imperative. This is so that dentist are able to recognize child patient who require special need with regards to their fear and anxiety. Etiology of DFA in children is complex and multifactorial and involves multiple factors which leads to procurement and development of dental fear in children. Children have a relatively limited communication skills which leads to their limited ability to express dental fear and anxiety in contrast to adults [24]. Their manifestation of behaviour management problems is often due to not being able to cope with threatening dental stimuli. One of the most important skills for a paediatric dentist the assessment of children based on their behaviour [25]. Managing dental anxiety and fear is considered to be the main obstacle for a successful completion of dental treatment and forms a major aspect of a child's dental care [26]. Thus, it is of great importance for a dentist to assess dental fear and anxiety in child patient as early as possible as it is the key to delivering an effective dental treatment to the child patient. Hence, this study aims to evaluate dental fear and anxiety among children using two different fear measurement scales.

METHODS AND MATERIALS

The survey was conducted with a total of 106 child patients, with age range of 5 to 11 years, visiting one of the three selected hospitals in Chennai which are Saveetha Dental College, Meenakshi Ammal Dental College and Sri Ramachandra University. Both genders were included in

the survey. The sample size of this questionnaire-based study is 109. This study was conducted with 106 participants, thus, it is sufficient for the required sample size (Figure 1). Collected data were analysed and tabulated in Microsoft Excel 2013.

After obtaining a consent from the participants and their parents, the questionnaires were asked one by one to them and completed questionnaires were collected immediately on site. The prepared questionnaire consist of demographic details of patient such as age and gender, chief complaint and whether or not they have visited a dental clinic for treatment before. The next portion of the questionnaire is a compilation of two fear measurement scales, which are separated into two sections. Under Section A is the facial image scale (FIS) and Section B involves the children's fear survey schedule-dental subscale (CFSS-DS) survey.

First, the FIS was applied. FIS comprises of a row of five faces ranging from very unhappy to very happy. From the five images, the children were asked to point out at which face they most likely feel at that moment. Next, CFSS-DS was applied. CFSS-DS includes specific dental fear items as one of its subscale and is a modification of CFSS by Cuthbert and Melamed. The CFSS-DS consist of 15 items related to different aspects of dental treatment, such as injections, choking and drilling. Each item can be scored from 1 (not afraid at all) to 5 (very afraid). Total scores range from minimum of 15 to maximum of 75. Significant dental fear is when the score is above 38.

The inclusion criteria were children between 5 to 11 years of age with good health who visited the department to seek dental care along with a parent or a guardian. The exclusion criteria were children below 5 years of age and above 11 years of age, and mentally challenged children.

RESULTS

A total of 106 child patients whom visited one of the three selected hospitals in Chennai for dental treatment participated in this study. The response rate of the participants were 100%. Out of the total 106 respondents, 62 (58.5%) of them were females and 44 (41.5%) of them were males, aged between 5 to 11 years with a median age of 7.9 years. 35 (33%) out of the 106 participants reported of having their first visit to the dentist while the remaining 71 (67%) have visited a dentist in the past for dental treatment. Most of the common chief complaints reported by the parents of the child participants were experience of tooth pain, presence of caries and a feeling of discomfort around the tooth region. The results were gathered through the questionnaire and the results are as followed.

Figure 2 shows the graph of threshold facial image scale score selected by the participants. The most commonly selected score by the respondents was FIS score 2, in which was the score given by 44 (41.5%) of the participants, indicating that they were feeling happy. 26 (24.5%) out of the 106 children selected score 1, indicating that they were very happy. Score 3 was chosen by only 11 (10.4%) respondents. The minimum respondents out of the population was score 5. 16 (15.1%) and 9 (8.5%) of the participants selected score 4 and 5,

respectively. 23.6% of the children were recognize to suffer from dental fear according to FIS since FIS score 4 and 5 are considered to be indicative of dental fear in children.

Figure 3 shows a comparison of threshold of facial image scale score between the male and female participants. As seen in figure 3, the most commonly selected score by the male participants was FIS score 2, which was 13 (30%) of the male participants. 43.2% of the male participants (n=19) selected score 1, indicating that they were very happy and 18.2% selected score 3 which indicates they were in between of feeling happy and unhappy. However, only 3 (6.8%) and 1 (2.8%) of the respondents showed dental fear with FIS score of 4 and 5 respectively. FIS score 2 was also found to be the most commonly selected score among female participants, which is about 40.3% (n=25). Among the females, 13 of them (21%) were very happy at the moment of visit (FIS score 5). There were a small number of female participants about 4.8% (n=3), who chose score 3. Dental fear was shown by 21 female participants whom chose score 4 and 5 (21% and 13% respectively).

A comparison between children of first visit to the dentist and children with past experience of dental visits is tabulated in Figure 4. 35 out of 106 participants had their first dental visit when the survey was conducted. As for patients with past experience of dental visits, 26.8% of them selected score 1. A majority of these participants (51%) chose FIS score 2 while only 8.5% went with score 4. Both score 3 and 5 were chosen by 7% of these participants each. On the other hand, FIS score 4 was the most selected among participants of first dental visit. 10 out of 35 of them (28.6%) selected score 4, indicative of dental fear. 20% and 22.9%, respectively, went with FIS score 1 and 2. 17.1% went with score 3 and 11.4% went with score 5. There was a no statistically significant difference in FIS scores among males and females using Pearson's Chi-square test (P = 0.010013). However, here was also a statistical significant difference in FIS scores among participants of first visit and participants of past dental visits using Pearson's Chi-square test (P = 0.0074). All statistical levels were made at P < 0.01.

Sample Size for Frequency in a Population	
Population size (for finite population correction factor or fpc)(N):	150
Hypothesized % frequency of outcome factor in the population (p):	50% +/- 5
Confidence limits as % of 100 (absolute +/- %)(d):	5%
Design effect (for cluster surveys-DEF):	1
Sample Size(n) for Various Confidence Levels	
Confidence Level (%)	Sample Size
95%	109
80%	79
90%	97
97%	114
99%	123
99.9%	132
99.99%	137
Equation	
Sample size $n = [DEF * N * p(1-p)] / [(d^2 / Z^2)_{1-\alpha/2} * (N-1) + p*(1-p)]$	

Figure 1 – Sample Size for Frequency in a Population

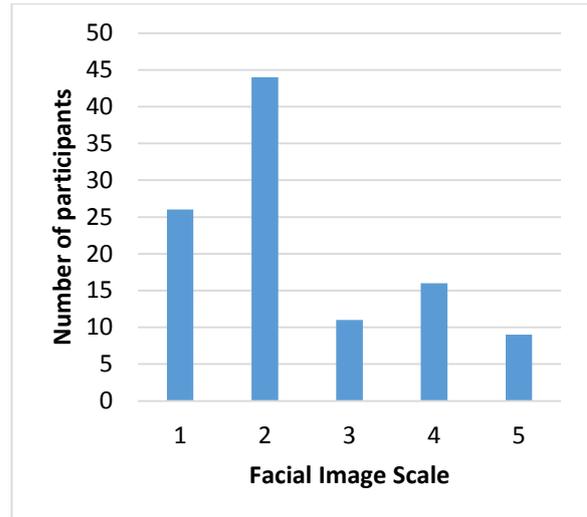


Figure 2 – Frequency of Facial Image Scale score

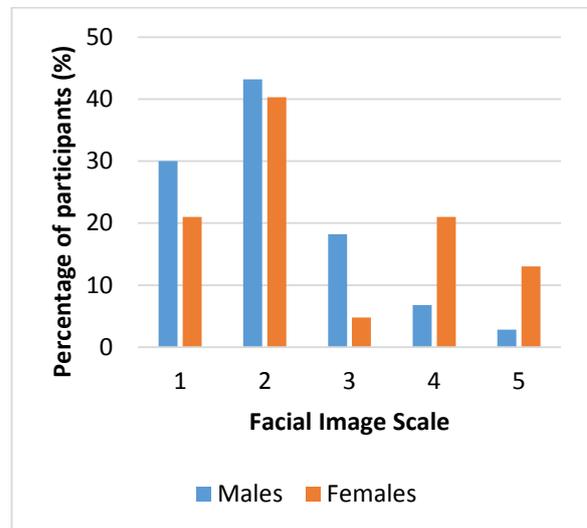


Figure 3 - Percentage of results between male and female participants on Facial Image Scale score

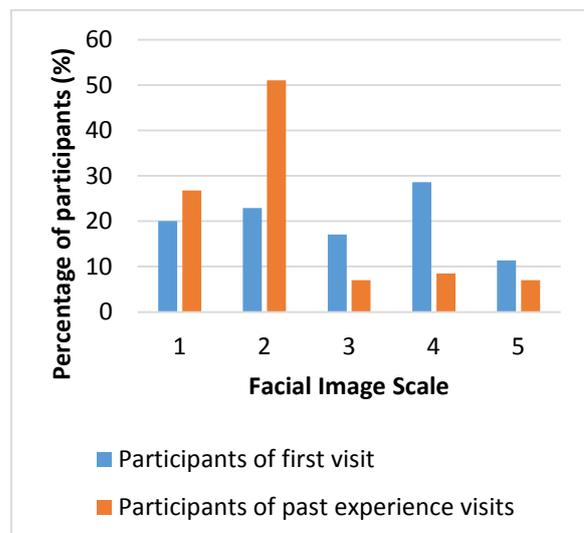


Figure 4 - Percentage of results between participants of first visit and participants with past experience dental visits on Facial Image Scale score

The maximum CFSS-DS score obtained was 60 and the minimum score was 17. The overall average mean CFSS-DS score was 29.8 ± 8.9 . The mean CFSS-DS scores for males was 28.5 ± 7.1 and for females was 30.8 ± 9.6 . Using the paired Student's t-test ($P=0.0016$), it was observed that there is a statistically significant difference between males and females and mean CFSS-DS scored. It was observed that females showed the highest CFSS-DS scores, with a maximum score of 60. The mean CFSS-DS scores for patients of first visit and patient with past dental visits were 34.2 ± 10.9 and 27.7 ± 6.5 respectively. It has been observed that highly significant difference was seen between the two groups using the paired Student's t-test ($P<0.0001$). Comparison between patients of first visit and patient with past dental visits show that the former have the highest CFSS-score of 60. Children are considered to be under high-fear group if the CFSS-DS scores were ≥ 38 . 19 out of 106 (17.9%) participants were under high fear group and the remaining 87 (82.1%) were under low fear group. With regards to gender, 5 out of 44 (11.4%) male respondents and 14 out of 62 (22.6%) female respondents were under high fear group. With regards to status of visit, about 34.3% ($n=12$) of 35 participants of first visit were classified under high fear group, whereas only 7 out of 71 (9.9%) participants who had past dental visits were classified as children under high fear group. Upon the evaluation of CFSS-DS, it was found that the factor which caused the most fear was "injections" (40.6%), followed by the "noise of dentist drilling" (33%) and the "sight of dentist drilling" (29.2%).

DISCUSSION

The survey was conducted to identify DFA among children as it has been reported to be associated with a range of adverse behavioural and dental characteristics. According to the FIS conducted in this study, the prevalence of dental fear was found to be 23.6%. It was observed that the majority of the overall respondents (41.5%) had selected FIS score 2, indicative of feeling happy. With regards to gender, 43.2 percent of the male respondents selected FIS score 2, which showed a higher frequency than compared to female respondents which was 40.3%. 34% of the female respondents had chosen FIS score 4 and 5, which showed a higher frequency than compared to male respondents (9.6%). This indicates that females have higher dental fear level than compared to males. However, there is no statistically significant difference ($P=0.010013$) to be observed at $p<0.01$. A previous study by Raducanu et al. support this finding, where he reported that the dental fear in girls was 1.63 times greater than boys [27]. Another study also reported of a higher prevalence of dental fear among female children than compares to males [28]. In this study, it was also reported that the children who were having their first visit to the dentist showed maximum response (28.6%) of FIS score 4, i.e., unhappy. The prevalence of dental fear among this group was found to be 40%. As for participants who have had past visits to the dentist showed maximum response (51%) of FIS score 2. This may be explained due to the fact that dental experience appear to sensitize the

child to dental procedure. Through experience, the children are able to distinguish between stressful procedure and non-stressful procedure. This finding was supported by Shinde et al. where a significant decrease in fear level was seen with subsequent visits to the dentist [29].

According to Singh et al [30] and Klingberg [31], children with CFSS-DS scores ≥ 38 were classified as children of high dental fear group. From this survey, 17.9% of the children were observed to be under the high fear group, whereas 82.1% were under the low fear group. The mean CFSS-DS scores for males (28.5 ± 7.1) were lower than females (30.8 ± 9.6) and the difference was observed to be statistically significant ($P=0.0016$). This was in accordance with the studies done by Surabhi et al [32] and Shehanaz [33], who reported higher dental anxiety levels in females than in males. On the opposite scope, Klingberg and Broberg [6] found higher anxiety levels in males than in females. The mean CFSS-DS scores for patients of first visit (34.2 ± 10.9) were higher than patients with past dental visits (27.7 ± 6.5) it has been observed that highly significant difference was seen between the two groups ($P<0.0001$). The results were similar to the findings of Shinde et al [29] that at first dental visit, children express higher dental fear and showed decrease in anxiety levels over time. In assessment of the various factors which caused the most fear in children, it was observed that according to CFSS-DS, the factors which caused the most fear was "injections", followed by the "noise of dentist drilling" and then the "sight of dentist drilling". This finding was similar to Domoto et al. which observed that injections and drilling were most fearful stimuli to children [34]. Injections are also reported to be the most feared item by Nakai et al [35] and Rajwar et al [28].

A previous study have shown that dental fear associates to less favourable self-care behaviour, negligence of dental care and with poorer health consequence [23]. Dental fear is also considered to be the main challenge to a successful completion of dental treatment of child patients [36]. Thus, early recognition and management of dental fear in children is imperative as it is the key to successfully delivering effective dental treatment to the child patient. Today, an extensive range of dental questionnaire for the evaluation of dental fear is made available. The accessibility to such significant number of dental fear and anxiety questionnaire might be due to dissatisfaction with the lack of certain criteria in the existing questionnaire as all questionnaires are open to criticism and feedback. Therefore, the use of more than one questionnaire is recommended in research related to dental fear assessment [19].

CONCLUSION

Based on the results of this survey, it can be concluded that the prevalence of dental fear and anxiety among children was 23.6% according to FIS. According to CSFF-DS, the prevalence of dental fear was found to be 17.9%. In the assessment of gender and numbers of dental visits, it was found that females have a higher frequency of dental fear than compared to males and the level of dental fear is

higher in patients of first dental visits than compared to patients of past dental visits. The factor which was most fear provoking to child patients were “injections” (40.6%), followed by “noise of the drill” (33%) and then “sight of the drill” (29.2%). The assessment of dental fear is an extremely useful tool to identify and manage children with dental fear and anxiety. There is a need for further research to form better measurements for assessing dental fear and anxiety for understanding and management of both the patients and dentists.

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