

## ORIGINAL ARTICLE

# THE EFFECTIVENESS OF PSYCHOMETRIC SCHEDULES IN MEASURING DENTAL FEAR TREATMENT OUTCOME IN CHILDREN

**M. O. Folayan, E. E. Idehen**

Department of Child Dental Health, Obafemi Awolowo University, Ile-Ife, Nigeria  
Department of Psychology, Obafemi Awolowo University, Ile-Ife, Nigeria.

### ABSTRACT

**Objectives:** This study tries to assess the effectiveness of the DFSS-SF in measuring treatment outcome in children managed using psychological techniques.

**Methods:** Seventy four children aged 8-13 years who were attending the dental clinic for the first time were recruited into the study. The Short Form of the Dental Subscale of the Child Fear Survey Schedule was administered to them before and after dental treatment. During the treatment procedure the children were managed with various forms of psychological management strategies.

**Results:** Fear level in these children decreased significantly post treatment ( $p < 0.001$ ). However this observation was not reflected on the item by item analysis based on the various forms of treatment the children undertook.

**Conclusion:** The DFSS-SF may be a good epidemiological tool but may not be effective in diagnosing and measuring treatment outcomes of dental fear in children. The same observation may be generalized to psychometric schedules which measure dental fear using summation of score results.

**Key Words:** Dental fear, Children, Treatment, Schedules

### INTRODUCTION

The terminologies “dental anxiety” and “dental fear” are often used interchangeably in the literature; the two are distinct but interconnected entities. Fear is a dread of something specific in the external environment<sup>1</sup>. It is evoked by real, specific stimulus. On the other hand, anxiety is a general non-specific feeling of apprehension<sup>1</sup>. It arises from within the patient’s psyche as a reaction to an undefined, unrealistic anticipated stressor<sup>2</sup>. Oftentimes, dental fear is measured using

Schedules. These schedules are inexpensive flexible, easy to administer and often result in continuous score ranges that can easily be compiled and processed statistically.

Examples of psychometric measures used in the measurement of dental fear in children include the children’s fear survey schedule (CFSS) developed by Scherer and Nakamura<sup>3</sup>. It consists of 80 items on a 5-point likert-scale. It has been demonstrated to have high reliability and validity for measuring dental fear in children. The cumbersome nature of the questionnaire designed to be filled by the child patient has limited its use despite established validity report<sup>3</sup>.

### Correspondence: Dr MO Folayan

Department of Child Dental Health, Faculty of Dentistry, Obafemi Awolowo University, Ile-Ife, Nigeria.

[mukpong2@yahoo.com](mailto:mukpong2@yahoo.com)

The Dental Subscale of Children’s Fear Survey Schedule (CFSS-DS) developed by Cuthbert and Melamed<sup>4</sup> consists of fifteen items and each item can be given five

different scores ranging from “not afraid at all (1)” to “very much afraid (5)”. It is a well known instrument for measuring dental anxiety in children. The CFSS-DS has a total score range of 15 to 75 and a score of 38 or more has been associated with clinical dental fear<sup>4-6</sup>. It can be used to differentiate patients with high and low dental fears. Its reliability and validity has been aptly demonstrated<sup>7-9</sup>.

There is also a constructed Short Form of the Dental Subscale of the Children’s Fear Survey Schedule (DFSS-SF) earlier used in the study by Carson and Freeman<sup>10</sup> based on knowledge from other scales. It is a shorter form of the CFSS-DS consisting of only eight items, with a possible total score ranging from 8 to 40. It measures dental fears in children. The schedule was tested for reliability and validity by Folayan and Otuyemi<sup>11</sup>. It was found to be highly reliable and had moderate significant correlation with the Frankl’s behavioural scale and a dichotomy scale measuring dental anxiety.

The CFSS-DS is quite popular and has been used for epidemiological studies of dental fear in a number of studies. Very few studies have however been done to critically appraise it as well as appraise other psychometric schedules used in the measure of dental fear and dental anxiety in children. An analysis of the CFSS-DS done by ten Berge et al<sup>12</sup> suggest that the instrument essentially measures a one dimensional concept of dental fear; fear of invasive dental procedures. No study has however shown its effectiveness or the effectiveness of any of other psychometric scale in the diagnosis and measurement of treatment outcome in patients.

This study tries to assess the effectiveness of the DFSS-SF in measuring treatment outcome in children managed using psychological techniques.

## METHODOLOGY

The setting for the study is the paediatric dental section of the Dental Unit of the Obafemi Awolowo University Teaching Hospital, Ile-Ife, Nigeria. The hospital provides tertiary health coverage to 3 states in the south-western part of Nigeria – Osun, Ondo, Ekiti – with an approximate population of 9.2 million, about 40-45 % of which are children below the age of 15 years.

All children who were attending the clinic, over an 11-month period, and who have had no previous contact with the dentist were considered eligible for inclusion in the study. The presence of mental defect in any of the children was used as an exclusion criterion. The approval of the ethical committee of the institution was secured before the study, while the consents of the parents of the children were duly obtained before the enrollment of the individual child into the study.

The short form of the dental subscale of the children fear survey schedule was used for the measure of dental fear in these children. The instrument was administered at two different times – pre and post-treatment. The pre-treatment administration was carried out in the waiting room by one of the dentists in the unit, before any form of dental treatment was instituted. The same instrument was re-administered to the child again two weeks later during a follow-up visit. All the children were managed using one form of psychological management strategy.

Data entry and analysis was carried out using SPSS for Windows (version 11.01). Means and standard deviations of the fear scores for the study populations were determined. Paired t-test was carried out to compare the pre-and post-treatment scores. The effect of the type of treatment received on the fear score changes was determined. P values were taken as significant when the level was equal to or less than 0.05.

**RESULT**

The total sample included 74 children aged 8 to 13 years. . There were 36 males and 38 females Twenty-eight of the children were aged 8 to 10 years olds while forty-six were from 11 to 13 years old. Seventeen had extraction, suturing or amalgam restoration done during the first dental visit, nine had scaling and polishing done while 48 had only examination and or impression.

**Table 1:** Number of children which undertook specific treatment.

For analysis numbers 1, 2 and 3 were classified as examination, 4 and 5 as scaling and polishing, 6 and 7 as extraction.  $P < 0.05$ .

	Type of treatment	Number of children (%)
1	Examination only	45
2	Examination and	1
3	radiographs	2
4	Impression	8
5	Scaling and polishing (s & P)	1
6	and topical fluoride	14
7	extraction with suturing	2

All the children were Nigerians.

**Table 3:** Specific score changes for each item listed on the DFSS-SF for patients who had examination done (N=48)

	Items on the psychometric scales							
	1	2	3	4	5	6	7	8
Pre treatment score	2.79	2.39	2.38	1.67	1.39	1.23	1.15	1.52
Post treatment score	2.35	2.50	1.75	1.25	1.19	1.23	1.17	1.35

(see Table 1).

**Table 2:** Short Form of the Dental Fear Subscale of the Child Fear Survey Schedule

Item	Specific question
1	Having teeth out
2	Injections
3	The dentist drilling
4	Meeting the dentist
5	Having someone look into my mouth
6	Having my teeth cleaned
7	People in white uniform
8	Having to open my mouth wide

The mean dental fear score for the population pre treatment was 15.01 ( $\pm 5.05$ ) while the mean dental fear score post - treatment was 13.18 ( $\pm 4.03$ ). There was a statistically significant difference noted in the scores of the two measures ( $p < 0.001$ ).

Tables 3 to 5 shows specific score changes for the items listed on the psychometric scale. For brevity, the items listed in the schedule used for the measure of dental fear are listed as items 1 to 8. Table 2 outline the specific references for these items

P	0.08	0.58	0.009*	0.008*	0.049*	1.00	0.82	0.19
---	------	------	--------	--------	--------	------	------	------

**Table 4: Specific score changes for each item listed on the DFSS-SF for patients who had scaling and polishing (N=9)**

	Items on the psychometric scales							
	1	2	3	4	5	6	7	8
Pre treatment score	1.89	2.33	3.11	2.00	1.44	1.44	1.89	2.22
Post treatment score	2.11	1.89	2.00	1.00	1.56	1.11	1.11	2.11
P	0.51	0.43	0.07	0.08	0.35	0.50	0.17	0.86

**Table 5: Specific score changes for each item listed on the DFSS-SF for patients who had extraction (N=17)**

	Items on the psychometric scales							
	1	2	3	4	5	6	7	8
Pre treatment score	2.88	2.65	1.59	1.52	1.35	1.41	1.53	2.88
Post treatment score	2.94	2.18	1.35	1.16	1.41	1.11	1.06	3.06
P	0.92	0.19	0.43	0.18	0.83	0.26	0.12	0.67

## DISCUSSION

The effectiveness of various techniques in improving dental fear levels in children had been based on the summation of scores on the various measures used. In this study, psychological management strategies are apparently effective measures for decreasing dental fear in this group of children based on the analysis of the summation of the scores on the scale.

However, an item by item analysis of the effectiveness of the intervention on dental fear gives a clearer picture – the effectiveness of the intervention in changing the dental fear score for each item appears to

be related to the type of treatment the child undertook with greater significant changes taking place with non invasive procedures. The effectiveness of the psychological techniques in effecting significant changes in dental fear scores appear to decrease as the procedures become more invasive. The significant changes observed in the dental fear scores on the item by item analysis was item and treatment specific.

One may then query the effectiveness of using summation of scores on schedules used for the measurement of dental fear

especially when the scales are to be used for the measurement of treatment outcomes. For one, the schedules may include several different items which are assumed to affect

dental fear. Such items are only confounding when their scores are summed up as it is assumed that the outcome of managing dental fear significantly depends on them.

While the CFSS and constructs developed from it (CFSS-DS and the DFSS-SF) have been shown to be good tools for epidemiological studies, no study has yet demonstrated their effectiveness in diagnosis. The use of the CFSS-DS as a diagnostic tool is contrary to the design as it is supposed to be filled after treatment as it measure trait situation specific fear. Its use for diagnostic purposes may therefore give false results as a child may experience anticipatory fear prior to treatment that would be expressed in the filled questionnaire as opposed to fear relating to the dental procedure in the here and now<sup>10</sup>. This observation may equally be applicable to the DFSS-SF which is a shorter version of the CFSS-DS.

There may therefore be the need to develop effective tools for the diagnosis of dental fear in children which may equally be effective in measuring treatment outcomes. Such a tool/schedule should not combine or sum up scores to indicate dental fear levels for the diagnosis and measurements of

treatment outcomes in these children. These schedules could just have selected items that are important for measuring the severity of dental fear in children and are equally important and need to be addressed during dental fear management. Each child can then be specifically managed based on items which could possibly induce fear during treatment identified during the pre treatment assessment. Effectiveness of management strategies and treatment outcomes for each child can also then be computed based on individual item score change.

### CONCLUSION

Psychometric schedules developed used for the measurement of dental fear in children may be effective tools for epidemiological studies. However, the effectiveness of the DFSS-SF and probably other psychometric schedules that depends on the summation of score items in diagnosing and measuring treatment outcomes of dental fear management in individual patients is questionable. The effectiveness of the use of the schedules in the management of dental fear may be improved if item by item score are not summed. Rather, the score changes per item on the schedules may be more effective for assessing the outcome of treatment for each patient. Such scoring system may also help in identifying specific fear inducing item for the child and thereby improve the overall dental fear management in the child.

### REFERENCES

1. Firestein SK. Patient anxiety and dental practice. *J Am Dent Assoc.* 1976; 93: 1180-1187
2. Aartman IHA, van Everdingen T, Hoogstraten J and Schuurs AHB. Self-report measurements of dental anxiety and fear in children: a critical assessment. *J Dent Child* 1998; July to August:252-258.
3. Scherer MW and Nakamura CY. A fear survey schedule for children: a factor analytic comparison with manifest anxiety (CMAS). *Behav Res Ther.* 1968; 6: 173-182
4. Cuthbert ML and Melamed BG. A screening device: Children at risk for dental fear and management problems. *J. Dent. Child.* 1982; 49:432-436.
5. Klingman A, Melamed BG, Cuthbert ML and Hormecz DA. Effects of participant modeling on information acquisition and skill utilization. *J. Consult. Clin. Psychol.* 1984; 52:414-422

6. Klingberg G, Berggen U and Noren JG. Dental fear in an urban Sweden child population: prevalence and concomitant factors. *Comm Dent Hlth* 1994; 11(4):208-214.
7. Alvesalo I, Murtomaa H, Honkanen A, Karjalainen M and Tay K-M. The Dental fear survey schedule: a study of Finnish children. *Int. Paediatr. Dent.* 1993;3:193-198.
8. Milgrom P, Jie Z, Yang Z and Tay KM. Cross cultural validity of a parent's version of the Dental fear survey schedule for children in Chinese. *Behav. Res. Ther.* 1994;32:131-135.
9. Milgrom P, Mancl L, King B, et al. Origins of childhood dental fear. *Behav. Res. Ther* 1995;33:313-319
10. Carson P and Freeman R. Assessing child dental anxiety: the validity of clinical observations: *Int. J. Paed. Dent* 1997;7:171-176
11. Folayan MO and Otuyemi OD. Reliability and validity of a Short Form of the Dental Subscale of the Child fear Survey Schedule used in a Nigerian children population. *Nigerian Journal of Medicine* 2002;11:161-163
12. ten Berge M, Hoostraten J, Veerkamp JSJ, Prins PJM. The dental Subscale of the Children's Fear Survey Schedule: a factor analytical study in the Netherlands. *Comm Dent. Oral Epidermiol.* 1998;26:340-343.