

Effect of psychological management techniques on specific item score change during the management of dental fear in children

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The aim of the study is to determine how specific fear inducing items contribute to the overall dental fear level in Nigerian children. In addition, it looks at the specific changes that psychological management produces on each item and how variables like age, gender and type of treatment received contribute to these specific changes observed. The dental fear level of 75 children, who were attending the dental clinic for the first time were assessed pre and post-treatment using the short form of the dental subscale of the child fear survey schedule. During treatment, the children were managed using various forms of psychological management strategies. The effect of age and the gender of the children on the dental fear level were analyzed. The effect of the type of treatment received, categorized into either invasive or non-invasive, on the dental fear level was also determined. Results showed that with the use of psychological management strategies, dental fear level of the children decreased significantly post treatment (13.45 vs 12.59; $p=0.009$). However, no statistically significant difference was noted in the dental fear scores based on age, gender and type of treatment received. On the other hand, the aggregate scores for each of the possible fear inducing items highlighted in the psychometric scale varied and so did the effectiveness of psychological techniques in significantly reducing dental fear scores for each of the items. Age, gender and type of treatment did have significant effect on the fear level changes that occur with specific items. It was concluded that although a significant change occurred in the dental fear level score of the child post management with psychological techniques, this does not necessarily translate to significant changes in the scores for each fear inducing item assessed by the psychometric scale. Age, gender and the type of treatment the child received also influence the change that could occur for each item. The dental fear level of the children decreased significantly post treatment (13.45 vs 12.59; $p=0.009$).

J Clin Pediatr Dent 29(4): 335-340, 2005

INTRODUCTION

Dental fear can be defined as a dread of dental treatment or procedure and may require no prior experience of the situation. It is situation specific trait as it is seen specifically in relation to dental treatment.¹ It often occurs because the individual does not fully understanding the situation nor is able to exercise control over it. It can be said to be an adaptive process, which possess survival values.

Although fear may possess adaptive values, it may become intense and persist over time result. As shown by many studies, dental fear in childhood is frequently related to unpleasant emotions in childhood such as negative and traumatic experiences during medical treatment.^{2,4}

In addition to this, dental treatment has been shown to contribute to inducing and increasing dental fears in children. Of these, the literature showed that injection rank highest followed by the dentist drill and the feeling of choking.^{5,6} Past painful and traumatic dental experiences are also highly significant contributors to dental fears.^{2,7-9} On the contrary, Murray *et al.*³ found that children, who had non-invasive treatment, had significantly higher anxiety levels than those who undertook invasive treatment.

It is important to manage dental fear when present in children for a number of reasons. For one, children with dental fear tend to miss appointments given for dental visits^{5,10} and they do have high levels of dental

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caries^{11,12} and deteriorating dental health.^{13,14} In addition, they may grow up to become parents and end up transferring this fear to their children.

Various modalities for managing dental fear in children have been studied. These include the use of hypnosis,^{15,16} pharmacological agents¹⁷ and various psychological management techniques.^{18,19} The effective use of psychological management techniques has been demonstrated to decrease fear levels significantly.^{18,19} Its effectiveness in decreasing the dental fear level independent of the nature of treatment received had also been demonstrated.²⁰ Lidell² also noted that the type of treatment received on the first dental visit by the child did not influence dental anxiety.

Various psychometric scales have been used in the measurement of dental fear in children. The reports from Nigeria have consistently used the short form of the dental subscale of the child fear survey schedule, which had been demonstrated to be valid and reliable.²¹ This scale, just like the dental subscale of the child fear survey schedule,²² had been used in the pre and post-treatment assessment of dental fear in the child. However, investigations into how independent factors highlighted on the various psychometric scales used for the assessment of dental fear in children contribute to the general dental fear levels change following dental fear management in children have not been fully studied. An understanding of how the fear levels assessed for the individual factors on the psychometric scale is influenced by the various fear management strategies is important as this contributes to the overall successful management of dental fear in the child.

This study aims to determine how specific factors contribute to the overall dental fear level in Nigerian children thereby helping to define which children are most at risk and therefore also ensuring the cost effectiveness of the use of fear management strategies. In addition, it studies the specific changes that psychological management produces on each item and how various variables contribute to these specific changes observed. This could then help to ensure specificity in the effective use of fear management strategies. Finally, this study would help to improve the understanding of dental fear in a population of African children and thereby enhance studies on cultural variability of dental fears in children.

METHODOLOGY

The setting for the study is the pediatric dental section of the Dental Unit of the Obafemi Awolowo University Teaching Hospital, Ile-Ife, Nigeria. The hospital provides tertiary health coverage to 4 states in the southwestern part of Nigeria; Osun, Ondo, Ekiti and Kogi, with an approximate population of 9.2 million, of which 40-45% are children below the age of 15 years.

All children age 8 to 13 years, 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 age group 8 to 13 years had been shown in previous studies to be homogenous in their response to dental fear.²³ In addition, children in this age group have developed the cognitive ability to respond to the questions on the psychometric schedule. 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 anxiety and dental fear in these children. The instrument is an 8-item administered questionnaire with a score of between 1 (not afraid at all) and 5 (very afraid) on a likert-like scale as possible score for each individual item. Thus, a possible total for the addition of the eight items ranged from 8 to 40. For each individual item, average scores of 2 or less was classified as low dental fear, while those greater than 2 and equal to 3 were classified as moderate dental fear. Any score greater than 3 was classified as high dental fear. This instrument had earlier been previously validated in the study environment, with an acceptable internal consistency, test-retest reliability and construct validity reported.²⁰

The instrument was administered at two different times, namely, pre- and post-treatment. The children were asked to fill the schedule on either visit with assistance given by one of the authors if there was any need for clarification. The pre-treatment administration was done 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. Questionnaires of children who could not attend the clinic for follow up within the stipulated study period were excluded from analysis.

All the children were managed during the various dental treatment procedures by dentists, who were competently trained in the management of children, using one or more psychological management strategies. A past study had shown that the professional status of the attending dental operator had no significant influence on the dental fear level change post treatment but rather the training in effective use of behavioral management strategies.²⁰

Behavior management strategies used with these children varied from the tell-do-show technique to distraction, coaxing, reinforcement of good behavior, encouraging the child to participate in clinical procedure and patting and stroking. The behavioral approach involved tailoring treatment to the ability of the child to cope all aimed at minimizing fear and the elimination of pain.

Table 2. Mean Score Changes Following Psychological Management of Dental Fear

		Number	Mean	SD	t	df	P
Pre treatment score	Male	36	14.75	5.19	-1.19	73	0.24
	female	39	16.13	4.89			
	8-10yrs	43	15.09	4.80	-0.74	73	0.46
	11-13yrs	32	15.97	5.39			
	invasive	19	15.74	4.69	0.27	73	0.79
non-invasive	56	15.36	5.19				
Post treatment score	Male	36	13.67	4.11	-0.71	73	0.48
	female	39	14.33	4.00			
	8-10yrs	43	13.51	3.79	-1.24	73	0.22
	11-13yrs	32	14.69	4.41			
	invasive	19	14.00	3.73	-0.02	73	0.99
non-invasive	56	14.02	4.22				

Data entry and analysis was done using SPSS for Windows (version 11.01). Means and standard deviations of the pre and post treatment dental fear scores for the study populations determined. Wilcoxon paired t-test was done to compare the pre-and post-treatment scores. This non-parametric test was used as the sample was a convenient sample. We analyzed for the effect of age and gender of the children on the dental fear level. The effect of the type of treatment received, categorized into two either invasive (extraction, fillings and suturing) or non-invasive (examination alone, scaling and polishing and fluoride therapy), was also determined.

P values were taken as significant when the level was equal to or less than 0.05. For brevity, the items listed in the schedule used for the measure of dental fear are listed as items 1 to 8. Table 1 outline the specific references for these items.

Table 1. 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

RESULTS

The total sample included 75 children age 8 to 13 years. The mean age of the sample was 10.97 (± 1.71). There were 36 males (mean age 11.3 ± 1.7) and 39 females (mean age 10.7 ± 1.7). Forty-three of the children were between 8 to 10 years olds, while thirty-two were between 11 to 13 years old. Nineteen of them received invasive treatments while 56 had non-invasive proce-

dures done. All the children were Nigerians.

The mean dental fear score for the population pre treatment was 13.85 (± 4.41), while the mean dental fear score post-treatment was 12.59 (± 3.71). There was a statistically significant difference noted in the scores of the two measures ($t=2.67, p=0.009$). However, no statistically significant difference was noted in the scores of the two measures based on gender, age and type of treatment received. (See Table 2).

A comparison of mean score on each item revealed that pre treatment item 1 had the highest mean score on the scale 1 – 5 (2.81) followed by item 2 (2.69) and item 3 (2.52). Post-treatment, a change was noticed with item 2 having the highest mean dental fear score (2.69) and there been no changes in the score on the item pre and post-treatment. Also, post-treatment a large number of children had the high dental fear reduced on item 3 compares when compared to the pretreatment figure (10.7% vs 28.0%). (See Tables 3 and 4).

Table 4 shows a detailed comparison of the changes in mean scores on each item based on age, gender and type of treatment received. This gives a better reflection of the effect of psychological management on mean score changes for each item.

The dental fear scores obtained for both gender were quite similar to the overall values. The males recorded no significant changes in the dental fear scores for each of the eight items post treatment, while the females recorded a significant decrease on items 4 and 5. (See table 4)

Agewise, children 8 to 10 years old were noticed to have high dental fear scores for item 1. This was quite different from the overall general score for the item (2.81 vs 3.80). Score significantly decreased following psychological management. This was also observed for item 4 for this age group. On the other hand, children age 11 to 13 years recorded significant increase in dental fear post treatment on items 1 and 2 and a signifi-

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Table 3. Number of Children Rating Each Score for Each Item

Items	Scores				
	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)
Pre-treatment					
1	23 (30.7)	18 (24.0)	6 (8.0)	6 (8.0)	22 (29.3)
2	29 (33.3)	19 (25.3)	6 (8.0)	4 (5.3)	21 (28.0)
3	26 (34.7)	20 (26.7)	8 (10.7)	6 (8.0)	15 (20.0)
4	46 (61.3)	18 (24.0)	3 (4.0)	3 (4.0)	5 (6.7)
5	55 (73.3)	12 (16.0)	4 (5.3)	1 (1.3)	3 (4.0)
6	62 (82.7)	10 (13.3)	0 (0.0)	0 (0.0)	3 (4.0)
7	65 (86.7)	3 (4.0)	3 (4.0)	0 (0.0)	4 (5.3)
8	53 (70.7)	12 (16.0)	1 (1.3)	2 (2.7)	7 (9.3)
Post-treatment					
1	22 (29.3)	24 (32.0)	7 (9.3)	7 (9.3)	15 (20.0)
2	22 (29.3)	20 (26.7)	10 (13.3)	5 (6.7)	18 (24.0)
3	30 (40.0)	23 (30.7)	14 (18.7)	2 (2.7)	6 (8.0)
4	55 (73.3)	17 (22.7)	3 (4.0)	0 (0.0)	0 (0.0)
5	63 (82.7)	9 (12.0)	3 (4.0)	0 (0.0)	1 (1.3)
6	57 (76.0)	14 (18.7)	3 (4.0)	0 (0.0)	1 (1.3)
7	63 (84.0)	10 (13.3)	2 (2.7)	0 (0.0)	0 (0.0)
8	56 (74.7)	12 (16.0)	2 (2.7)	2 (2.7)	3 (4.0)

cant decrease post treatment on item 5. (See table 4).

Psychological management strategies did not produce any significant changes on dental fear level post treatment on any of the items in children who undertook invasive treatment. However, for those who undertook non-invasive treatment, there was a significant decrease on item 3. (See Table 4).

DISCUSSION

Generally, psychological management of dental fear in children has been shown to produce significant reduction in fear levels.^{18,19} This effect is more dramatic when techniques are combined.¹⁸ However, the effectiveness of each technique is also affected by the coping mechanism of the child; children who are 'blunters' would benefit from distractive techniques, while 'monitors'

would benefit from techniques which give information.²¹

Past studies have shown that extractions, injections and the dentist drill are major fear provoking factors in child.^{5,6} This study also shows that these invasive procedures do produce similar results in Nigerian children. Not only does it produce moderate to high anticipatory fear, the level may also be sustained post-treatment even when the patients are managed using psychological management strategies. In addition, the effect of psychological management strategies in significantly changing the dental fear score on these fear-provoking items was only found for the item 'the dentist drilling'. The effect is also age dependent as well as dependent on the type of treatment received. Children ages 8 to 10years had a decrease in the dental fear score post

Table 4. Comparison between Pre and Post Treatment Dental Fear Score on Each Item

Paired item	Gender						Age				Treatment			
	General		Male		female		8-10years		11-13years		invasive		Non invasive	
	Values	P	Values	P	Values	p	Values	p	Values	p	Values	p	Values	P
1	2.81 vs 2.59	.290	2.8 vs 2.3	.091	2.82 vs 2.87	.870	3.8 vs 2.25	.004	2.60 vs 2.79	.020	2.89 vs 2.84	.922	2.79 vs 2.50	.209
2	2.69 vs 2.69	1.00	2.4 vs 2.5	.639	2.95 vs 2.85	.634	2.89 vs 2.75	.526	2.57 vs 2.66	.000	3.21 vs 3.00	.520	2.52 vs 2.59	.696
3	2.52 vs 2.08	.021	2.5 vs 2.1	.161	2.56 vs 2.05	.070	2.64 vs 2.46	.597	2.45 vs 1.85	.075	2.47 vs 2.16	.411	2.54 vs 2.05	.030
4	1.71 vs 1.44	.171	1.56 vs 1.53	.933	1.85 vs 1.36	.028	1.64 vs 1.14	.028	1.74 vs 1.62	.961	1.58 vs 1.32	.331	1.75 vs 1.48	.277
5	1.47 vs 1.25	.048	1.36 vs 1.28	.539	1.56 vs 1.23	.046	1.29 vs 1.07	.056	1.57 vs 1.36	.004	1.47 vs 1.05	.176	1.46 vs 1.32	.159
6	1.29 vs 1.32	.820	1.33 vs 1.28	.891	1.26 vs 1.33	.555	1.11 vs 1.32	.161	1.40 vs 1.32	.218	11.32 vs 1.42	.682	1.29 vs 1.29	1.00
7	1.33 vs 1.19	.218	1.29 vs 1.19	.737	1.41 vs 1.18	.183	1.04 vs 1.11	.161	1.04 vs 1.11	.577	1.32 vs 1.16	.506	1.34 vs 1.20	.306
8	1.64 vs 1.45	.167	1.56 vs 1.44	.606	1.72 vs 1.46	.133	1.32 vs 1.29	.802	1.32 vs 1.29	.003	1.47 vs 1.05	.119	1.70 vs 1.59	.496

treatment in respect to item 1 (extraction), while the dental fear scores increased significantly post treatment for children ages 11 to 13 years for items 1 (extraction) and 2 (injection). The post treatment dental fear score for the item 3 (dentist drill) decreased significantly post-treatment for children, who undertook non-invasive procedures. The observed significant increase noted in dental fear scores post-treatment for 'extractions' and 'injections' for children age 11 to 13 years cannot be readily explained.

Females also appear to have anticipatory fear for items that invade privacy. Unlike males, they had significant changes in dental fear levels for items which indicated that privacy could be invaded (items 4 and 5). The changes noted may have been the result of guided exposure to these dental procedures/items, which produced anticipatory fear: The guided exposure through the use of psychological management techniques may have acted prophylactically, thereby abating the fears of the children. This observation may also support Liddell² in which he reported that girls' anxiety responses were more internally mediated and anticipatory anxiety was more related to personality factors than observed with boys.

The insignificant changes noted on a number of listed possible fear inducing items post psychological management of dental fear in children may point to the fact that although generally, psychological management strategies could produce effective results in the overall dental fear level in children, it may not produce significant changes for all the fear of specific items as highlighted in this study. There is therefore a need to study further how the specific dental fear management strategies affect dental fear score change for each dental fear-provoking item. This would help in the improved management of dental fear in children as management can then be tailored to address the specific items identified from filled schedules causing anticipatory or sustained fears in each child.

CONCLUSION

Invasive procedures like extraction, injections and dental drills produce moderate to high anticipatory and sustained dental fear in Nigerian children just like that reported in other Euro-American based studies. In addition, though psychological management techniques produce significant changes in dental fear levels post-treatment, this effect is not equally reflected for all items that could possibly produce dental fear in the child. Age, gender and type of treatment do have significant effect on the possible fear score changes that can occur with specific items. Finally, there is a need to further study how each behavioral management strategy affect dental fear score changes for specific dental fear provoking items as this would help in tailoring dental fear management for each child thereby improving the overall management of dental fear in children.

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