



# VALIDATION OF DEEPAK - PARIMALA'S ANXIETY SCALE FOR CHILDREN – A CROSS-SECTIONAL STUDY

<sup>1</sup>Dr. Deepak Viswanath, Professor and HOD and Ph.D. Scholar, Department of Pediatric and Preventive Dentistry, RKDF Dental College and Research Centre, Hoshangabad Road, Bhopal 462026, INDIA

<sup>2</sup> Dr. Parimala Kulkarni, Dean, Professor and HOD & Ph.D. Supervisor, People's College of Dental Sciences and Research Centre, Bhanpur Road, Bhopal 462037, INDIA

## Abstract:

**Background and Aim** – Dental anxiety is a ubiquitous issue affecting both adults and children around the world. The prevalence of dentally petrified children differs by population, ranging from 3 to 55%. Dental anxiety appears to be significantly influenced by age and gender, with females being more likely than males to experience dental anxiety. There aren't many scales in the literature that focus solely on children's perceptions of their dental visit, dentist, and dental treatment. Thus, we aim to assess dental anxiety in children based on their own perceptions.

**Materials and Methods-** This cross-sectional study was conducted among 6–13-year-old school going children from Bhopal city. Study population included 397 children and questionnaire consisting of 18 questions under 6 categories was distributed after obtaining the consent.

**Results-** Our results revealed that child's perceptions towards dental treatment varies with the advancement of their age. We observed least mean dental anxiety scores in 6–7-year age group while highest in 12-13 year age group.

Key-words: Dental Anxiety, Perceptions, Pediatric Dentistry, Prevalence

## I. INTRODUCTION

Dental anxiety (DA) in children is a prevalent and potentially disconcerting issue for both the child and the dentist. <sup>[1]</sup> DA is a prevalent phenomenon that ranks fifth among the most often feared situations for individuals. It can have serious consequences in daily life and is a significant impediment to seeking and receiving dental care. It is estimated that the anxious patient requires 20% more chair time than the non-anxious patient, which affects cost. <sup>[2]</sup> The practitioner will be more capable of recognizing the anxious child, provide better anxiety management, and make the experience more enjoyable if they are aware of the level of anxiety before treatment and the factors that affect it. <sup>[1,2]</sup> For effective behaviour management in pediatric dental practice, it is crucial to have a grasp of how emotional knowledge develops as well as an understanding of age-appropriate effective milestones. <sup>[3]</sup> Most dental anxiety measures for children under the age of six should include information about underlying beliefs and anxiety. They only provide an overall estimate of perceived discomfort without understanding the underlying causes of this anxiety. <sup>[2]</sup> A scale should ideally be-, <sup>[1,2]</sup>

- brief to encourage the children's participation and reduced administration time;
- incorporate elements that are most pertinent to a child's dental experience;
- easily maintain the child's attention;
- be easy to score and understand.

Although there are many self-report inventories available, none of them fulfil all of the aforementioned requirements. There is currently no gold standard scale, and there is a need to further develop a DFA scale with a cognitive component for children and adolescents.<sup>[1,2]</sup> There aren't many scales in the literature that lay emphasis on children's perceptions of their dental visit, dentist, and dental treatment. Hence, our newer scale is the first of its kind as its prime objective is to entail the perceptions of child for better understanding of dental anxiety among children.

## II. METHODOLOGY-

This descriptive cross-sectional study was conducted to assess the perceptions of the children towards DFA and dental treatment in 6–13-year-old children and to study if there is any association between mean DA scores with Socioeconomic status (SES), Parent's educational status (PEDS), Parent's Occupational status (POS), Position of child (POC) and type of schooling (TOS). The data was collected from the children of 6-13 years of age attending the departments of pediatric and preventive dentistry, RKDF Dental college and Research Centre and People's college of dental sciences, Bhopal. The prior consent and approvals were taken from respective school authorities and the parents before handing out the questionnaires (table 1). The minimum sample size calculated was 384. Therefore, the chosen sample size for the study was 397 for DA assessment scale.

**Table 1- Study Questionnaire**

<b>Questionnaire – Part A</b>
<b>Category I: Child's perception of visiting a dental clinic</b>
1. Do you like to visit the dentist on your own?
2. How do you feel about the dental clinic location
3. Are you comfortable visiting a pediatric dentist for your treatment needs
<b>Category II: Child's perceptions of the dentist when he/she sees him for the first time</b>
4. How did you feel when you met the dentist for the first time
5. Do you prefer the dentists wearing colourful/ cartoonistic masks and aprons instead of white?
6. Were you comfortable/ threatened by the dentist voice/tone
<b>Category III: Child's perceptions on the dentist examining with dental instruments</b>
7. How will you react on seeing dental mirror/ dental instruments
8. Will you feel comfortable with one of your parents holding your hands during dental examination
9. What were your thoughts when you see too many instruments on the instrument trolley
<b>Category IV: Child's perceptions of airtoror drills and water spray</b>
10. What came to your mind with the sight of motor/airtoror drill used by the dentist

11. How did you felt with the sound of the motor drill or size of the drill with a sharp needle/pin or water jetting out from the drill or high-speed buzzing motion from tooth drill?
12. What was your reaction when dentist used airtor drill with water spray on your teeth
<b>Category V: Child's perceptions of taking local anesthetic injection</b>
13. What came to your mind with the thought of needle or injection
14. How do you feel when dentist inserted/ removed the syringe
15. What was your reaction when you felt sensation of numbness/ heaviness on your lips/ tongue/cheeks/teeth?
<b>Category VI: Child's perceptions of tooth removal</b>
16. What is the first thing that comes to your mind upon hearing tooth removal from the dentist?
17. How do you feel about getting your tooth removed
18. What did you felt before getting your teeth removed
<b>PART -B</b>
<b>I- Child</b>
1. By Nature, are you shy and timid/ strong and bold/ depends on the situation
2. Did you feel like having a sudden outburst/ loosing temper during the course of dental treatment?
3. Overall were you happy with the dentist/ dental clinic/ support dental staff/ timing of treatment?
<b>II- Parents</b>
4. Are you both (Parents) able to give sufficient time to your child's needs/demands?
5. Is your child active and socialises with other children of his age group?
6. Were you happy with the dental treatment offered by the dentist
<b>III- Dentist</b>
7. Did you noticed any change in the behaviour of the child before/during/after the treatment?
8. Which type of behaviour modification technique you applied for the child? a) Distraction b) Tell show do/tell play do c) Modelling d) Voice control
9. How will you rate the overall behaviour of the child in the dental clinic?

### Self- Reporting Dental Anxiety Assessment Scale

Self-reporting DA scales are mostly used because of their ease of administration and less time consuming. Pictorial scales or facial analogue scales are mostly used as children can corelate their emotional state through the pictures shown. Hence, considering these facts, we are introducing a newer scale based exclusively on child's perceptions towards various stimuli and factors that are related to dental anxiety, which consisting of 5 pictograms for scoring the dental anxiety. Our unique scale has two parts-,<sup>[4]</sup>

**Part A-** Dental part- contains 18 questions and 5 pictograms to elicit the answers.<sup>[4]</sup>

**Part B-** Cognitive part- contains 9 questions, further subdivided into 3 categories and the given responses will be recorded appropriately. <sup>[4]</sup>

**Part A:** This section contains the main questionnaire and 5 pictograms to be marked as answers for scoring/assessing the dental anxiety. We have formulated the present questionnaire emphasising on child's perceptions and have further subdivided them into 6 categories each containing 3 questions. <sup>4</sup> We have formulated the pictograms keeping in mind the impact of colors on dental anxiety. Upon critical analysis, we arrived at a decision to choose 5 colors and included 4 additional factors (animal, weather and emoji images with the images of boys and girls), that are closely interlinked with colors to form one set of complete image. This newer methodology could be an innovative tool to assess the dental anxiety in a child. <sup>[4]</sup> The child will be made to answer these questions with the help of the given pictograms. The main advantage of our questionnaire is that it is gender friendly and can be answered with ease by both boys and girls alike. <sup>[4]</sup>

**Part B-** This is the cognitive part that consists of questionnaire to be answered by the child, child's parents, and also the dentists and the responses will be recorded appropriately. <sup>[4]</sup>

**Scoring Pattern of the scale is as follows:**

- 1- Happy/ relaxed
- 2- Least anxious
- 3- Moderately anxious
- 4- Highly anxious
- 5- Furious/ extremely anxious

Minimum Score of the scale was 18 (total category score) and 9 (cognitive score) while maximum score was 90 and 18 for total category score and cognitive score. <sup>[4]</sup>

We also assessed the dental health status (DHS-I) of children using WHO criteria (2013) and compared the SES of study population with modified Kuppaswamy Scale where 0 indicates lower SES, 1- indicates middle SES and 2 indicates upper SES. We compared the educational status of the parents with modified Kuppaswamy Scale where 0 stands for illiterate; 1- stands for high school or metric pass and 2- shows graduated. <sup>[5]</sup> we also compared the occupational status of study population's parents with modified Kuppaswamy Scale where 0 indicates unemployed, 1- indicates daily wages or part time workers and 2 indicates official or government jobs. <sup>[5]</sup> We evaluated the impact of POC on DA prevalence in children; we used 0 as an indication of younger child with siblings; 1 shows eldest child with siblings and 2 shows only child in the family. We compared the effect of school and education on the prevalence of DA; where 0 stands for state board (government school) while 1 and 2 stands for CBSE board and ICSE board (private schools) respectively.

**Statistical Analysis-** Statistical Package for Social Sciences [SPSS] for Windows, Version 22.0. was used to perform statistical analyses. One way ANOVA test was used to compare the mean anxiety value in different age groups of the study (6-7; 8-9; 10-11; 12-13

year). Unpaired student t test was used to compare the mean dental anxiety score between boys and girls of different age groups. Spearman Correlation test was used to assess the relationship between mean DA score and age; Point Biserial correlation test was used to assess the relationship between mean DA score and the gender of child. Pearson correlation test was used to assess the relationship between mean DA score and DHS-I, DHS-II, SES, PEDS, POS, POC and TOS.

### III. RESULTS:

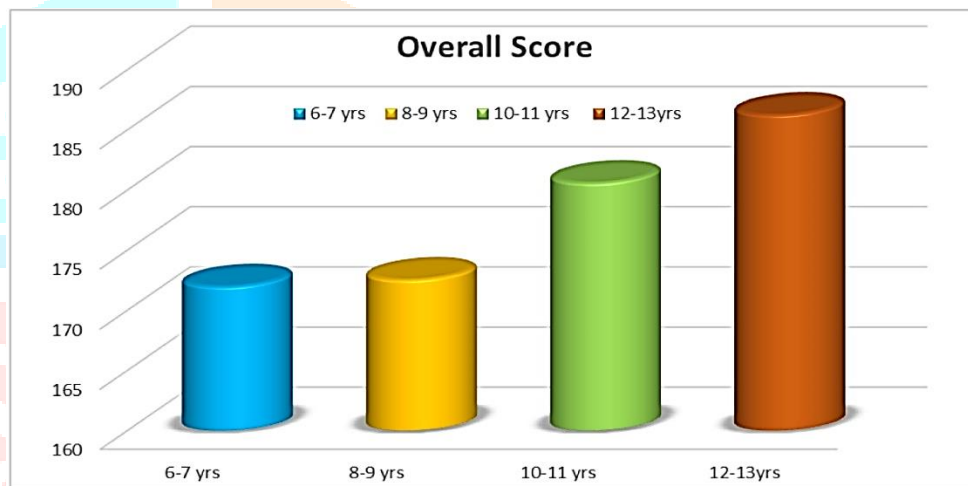
Our findings showed statistically significant p value of 0.01 while comparing the overall anxiety value in all the age groups. The mean value of dental anxiety observed in 6-7, 8-9, 10-11, 12-13-year age groups was 171.96, 172.52, 180.58, and 186.24 respectively (table 2 and figure 1). Statistically significant p value was noticed between different age groups with respect to the questionnaire in 6 categories while non-significant value was observed with respect to the cognitive part. (table 3, figure 2 A and 2B). Spearman correlation test

was applied to analyze the correlation of dental anxiety with age and a significant p value of 0.001 was observed. Point Biserial correlation test was used for analyzing the correlation between dental anxiety and gender, and a statistically significant p value of 0.001 was observed. The Pearson correlation test gave statistically significant p value of 0.001, with respect to dental anxiety and DHS-I, DHS-II, SES, PEDS, POS, POC and TOS. Hence, significant positive correlations were observed between overall dental anxiety scores and other variables (age, gender, DHS-I, DHS-II, SES, PEDS, POS, POC and TOS) (table 4 and figure 3).

**Table 2: Comparison of Overall Score for mean dental anxiety between different age groups**

Age Group	N	Mean	Std. Deviation	F value	P value
6-7 years	95	171.96	6.14	70.31	0.001**
8-9 years	107	172.52	7.69		
10-11 years	113	180.58	8.51		
12-13 years	82	186.24	8.71		
<b>Total</b>	<b>397</b>	<b>177.52</b>	<b>9.66</b>		

\*\*Highly Significant

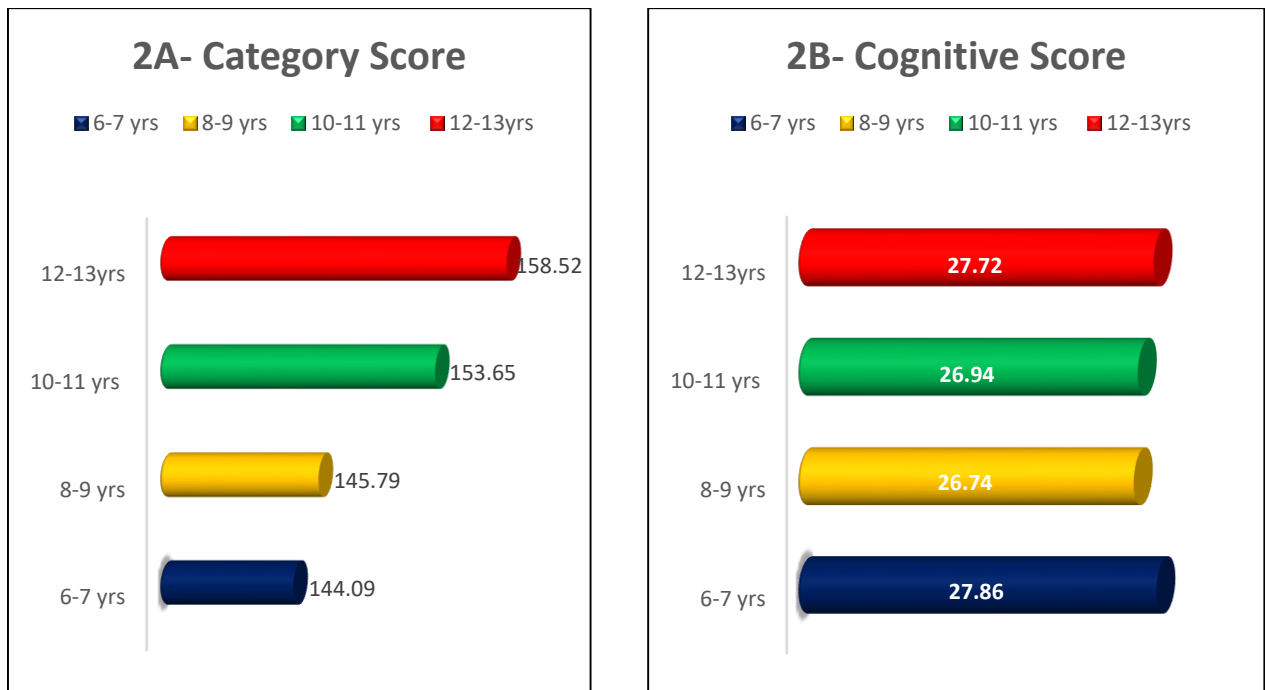


**Figure 1- Comparison of dental anxiety scores in different age groups**

**Table 3: Comparison of category wise and cognitive score for DA between different age groups**

	Age Group	N	Mean	Std. Deviation	F value	p value
<b>Total all Categories</b>	6-7 yrs	95	144.09	7.03	88.00	0.001**
	8-9 yrs	107	145.79	6.88		
	10-11 yrs	113	153.65	6.95		
	12-13yrs	82	158.52	6.81		
	Total	397	150.25	8.92		
<b>Cognitive</b>	6-7 yrs	95	27.86	2.17	2.30	0.077
	8-9 yrs	107	26.74	2.52		
	10-11 yrs	113	26.94	4.18		
	12-13yrs	82	27.72	5.21		
	Total	397	27.27	3.68		

\*\*Highly Significant



**Figure 2-** Comparison of category wise anxiety score (2A) and cognitive score (2B) between different age groups.

**Table 4- Correlations between Overall dental anxiety score and Different variables affecting dental health**

Variable I	Variable II	Type of Correlation	Correlation value	P value
Overall Dental Anxiety Value	Age	Spearman	$p = 0.553$	0.001 **
	Gender	Point Biserial corelation	$r_{pb}=0.313$	0.001 **
	DHS-I	Pearson	$r=0.799$	0.001 **
	DHS-II	Pearson	$r=0.619$	0.001 **
	SES	Pearson	$r=0.615$	0.001 **
	PEDS	Pearson	$r=0.586$	0.001 **
	POS	Pearson	$r=0.581$	0.001 **
	POC	Pearson	$r=0.612$	0.001 **
	TOS	Pearson	$r=0.599$	0.001 **

\*\*Highly Significant



Figure 3- Correlation of DA with other variables

#### IV. DISCUSSION:

Dental Fear and anxiety (DFA) is a ubiquitous condition among patients. The prevalence and incidence of this generally ranks among the top three clinical issues in dentistry. <sup>[6]</sup> Anxiety levels and a child's age may be related to their perception of the dental environment, and it is critical to determine how these dental surroundings can induce anxiety in children. <sup>[6,7]</sup> In order to diagnose and plan effective treatments for DFA, an accurate assessment of the condition is necessary in addition to determining its prevalence. <sup>[8-10]</sup> Paglia et al. (2017), <sup>[11]</sup> observed that self-assessment scales completed by children are significantly more accurate than those completed by parents, though the latter may be thought of as a good substitute in circumstances where direct assessment of the child is challenging. <sup>[11]</sup> It's crucial to identify children who have dental anxieties or fears at a young age in order to lessen the population-wide effects of these emotional disturbances. Because there is increasing evidence from the literature that interconnects dental anxiety to poor oral health. <sup>[12]</sup> This is due to the fact that as children age, they physically, mentally, emotionally, and socially mature. <sup>[12-15]</sup> Suprabha et al (2011), <sup>[16]</sup> revealed that the age of a child has a crucial role to play in affecting his/her perceptions towards dental clinics, dentists, and the fear of treatment. <sup>[16]</sup> Our findings of the study varies from the studies of Saxena N et al (2023), <sup>[12]</sup> and Bajric E et al (2023), <sup>[6]</sup> as we observe a significant increase in mean dental anxiety score with the advancement in the age, we found lowest mean DA values in 6-7 year age group while highest values were observed in 12-13 year age group. This variation is observed based on child perceptions, as older children are more likely to have a better comprehension of their surroundings and the associated perceived threats or dangers. Oliveira LB et al (2020), <sup>[17]</sup> also discovered that children's reactions

to the dental environment are varied and complex. It's important to note that children behave differently depending on their age, behavioural maturity, experience, family background, culture, and health. [17]

Asiri RS et al (2020), [18] found that the perceptions of the children varied as per their gender and age. [18] The findings of our study shows that the anxiety level of Girls was comparatively higher than the Boys. Our study confirmed that girls experienced higher levels of anxiety. Our findings are in agreement with the study of Vlad R et al (2020), [9] who discovered that girls (48.75%) had a statistically significant higher percentage of anxiety than boys (38.29%) and with Saxena N et al (2023), [12] where mean anxiety level of Girls ( $32.72 \pm 1.26$ ) was comparatively higher than the Boys ( $29.27 \pm 2.18$ ). [9,12]

In our study, we observed that children prefer colored aprons instead of white (category II- Child's perceptions of the dentist when he/she sees him for the first time). Asokan et al (2017), [19] also reported that anxiety levels play an important role in children's preferences. Anxious children preferred colored attires while non anxious ones preferred conventional attires. It is believed that a pleasant and colourful environment relieves the children's anxiety. [19] AlSarheed et al (2011), [20] in their earlier study observed that the children cited injection, tooth extraction and dental tools as most scary and symbol of fear from dentistry and they suggested to use only the necessary instruments during treatment and the use of tell-show-do technique systemically during treatment. [20] Similarly, in our study we noticed significant p value with respect to children's reactions towards dental instruments (category III- Child's perceptions on the dentist examining with dental instruments).

The relationship between dental anxiety and decay, missed, or filled teeth is depicted in different ways by specialists; some claimed that children with a high number of decayed teeth had lower levels of dental anxiety, while others demonstrated that children with a greater number of dental lesions had higher levels of dental anxiety. This discrepancy is most likely brought on by the children's preceding dental experiences. [7,12,21] Thus, oral or dental health status significantly affects prevalence of DA in children. The results of our study showed highly significant positive correlation between DA score in children and DHS-I. The results are in agreement with the studies of Howard KE et al (2007), [21]; Pradhan P et al (2023), [22] and Saxena N et al (2023). [12]

Our results showed that SES is a crucial factor that affects the level of DA in children, we have observed a positive correlation between DA and SES. Slabšinskiene E et al (2021), [23] in their study found that the children and adolescents from rural areas, living in unaffluent families and who had mothers with a low education level were more likely to have dental fear and anxiety because participants from rural areas having minimal access to dental care in general, or children from low-income families having less access to higher-quality dental care. [23]

AlSarheed et al (2011), [20] emphasized the importance of ensuring that children are comfortable during their visit to the dental office and have a positive experience; in their study 10% of patients reported that a sibling did not like their visit to the dentist and 18% reported that a sibling was afraid of the dentist. [20] Sangeetha et al (2016), [24] also reported that children's pleasant perceptions toward a dentist and clinic are formed with the positive experiences shared by their siblings. [24] Children who have negative impressions of the dentist are likely to spread these impressions to other children. These negative impressions are difficult to overcome, especially if they form a child's first perception of a dentist. [20,24,25] Hence, position of the child in family impacts the perceptions of a child towards the dentist and dental treatment. Considering this we analyzed the correlation between DA and position of child and observed positive correlation between them. In contrast to our findings Aminabadi NA et al (2011), [26] reported that a single child in a family had higher dental anxiety than children with siblings, and that the first-born child had higher dental anxiety than children with siblings. [26]

Alasmari AA et al (2018), [25] reviewed the factors that contributes to the prevalence of DFA and described that the education level of parents and the social class of the child's family have long been considered as the crucial factors that affect the dental anxiety level of children. [25] Busato et al (2017), [27] reported that high education level of parents is associated with severe dental anxiety. [27] Hence, PEDS and POS are factors that



impacts the DA. Our results showed that there is strong positive correlation between mean DA scores in children and PEDS and POS.

Our results showed that type of school significantly affects DA. We observed a strong positive correlation with respect to DA and TOS. Our results are in tandem with the earlier studies of Pradhan P et al (2023),<sup>[22]</sup> Saxena N et al (2023),<sup>[12]</sup> and Shrivastava A et al (2019),<sup>[28]</sup> where they reported that the anxiety of Private school children were higher than the Government school children.

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