

**Assessing the severity of anxiety using the novel Shin-Chan dental anxiety scale among orphanage children aged 10-15 years in Pondicherry - A Cross sectional study**

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**Conflicts of Interest:** Nil

**Abstract**

**Background:** The aim of this study was to assess the severity of dental anxiety using the novel Shin-Chan dental anxiety scale among orphanage children aged 10-15 years in Pondicherry.

**Methodology:** A Sample size consisting of 162 children aged 10-15 years from five different orphanages was randomly selected for the study and the severity was assessed using 12-closed ended Shin-Chan dental anxiety (SDA) questionnaires using an open-interviewer method. Scoring criteria begin from 1 and end at 4. Descriptive statistics were carried out to calculate the responses for each question, Chi-square and ANOVA was used keeping level of significance at  $p \leq 0.05$ . Data analysis was done using the Statistical package for social sciences (IBM SPSS Statistics version 21.0).

**Result:** The total number of children who participated in the study was 162. The mean age of children was 12.93 years. Most of the children fall in the category of moderate level of anxiety (65.4%). Male children were more anxious as compared to female children with a level of percentage varying from 10 to 70%. Children falling in the age group of 13 years were 42 with a mean value of  $3.19 \pm 0.50$  while only 12 children were in the age group of 10 years with a mean of  $3.00 \pm 0.60$  and results were nonsignificant with a p-value greater than 0.05

**Conclusion:** Children were highly anxious about the dental environment, specifically seeing the drills and instruments used by the dentist, as well as the sounds they hear from the dental environment, and they were highly willing to accept preventive dental treatments such as scaling and restorations. SDA is a novel,

convenient, and child-friendly tool to assess the severity of dental anxiety.

**Keywords:** Children, Orphanage, Dental-anxiety, Shin-Chan scale.

### Introduction

Despite emerging trends in dentistry, anxiety towards dental care persists in the general population, especially among children and adolescents. Anxiety is a feeling of apprehension or distress over something with a bleak prognosis<sup>(1)</sup> Dental anxiety is an abnormal fear or dread of visiting the dentist for preventive care and unwarranted apprehension about the dental procedures<sup>(1)</sup>. Previous studies have found a prevalence rate of dental anxiety of 6–20 %, regardless of culture or region.

It has been proposed that dental anxiety causes a vicious loop, leading to avoidance behavior and perpetuation of the treatments<sup>(2)</sup>. The consequences of dental anxiety persist from childhood, till adulthood leading to dental neglect for several years, and it was highly difficult for the dentist while managing the patient<sup>(3)</sup>.

It is a common condition that ranks 5<sup>th</sup> on the list of the most feared circumstances.<sup>(4)</sup>Dental anxiety causes 6-15% of children to delay routine dental treatments. Dental anxiety has a multifactorial etiology like attitude, familial development, home, and school environment all appears to play an important role<sup>(3,1)</sup> Since orphan children lack necessary parental care and guidance during a crucial time of their lives, anxiety levels are likely to differ between orphan and non-orphan children, which contributes to the development of psychological problems<sup>(4)</sup> The type of orphanage living pattern has a significant impact on the degree of behavioral changes<sup>(4)</sup> Several assessment tools have been introduced to investigate the psychological or behavioral changes due to dental anxiety<sup>(5)</sup> The most common anxiety assessment measures belong to the self-report type<sup>(5)</sup>.

Alternatively, a visual analog scale may assist in pointing out the severity of anxiety<sup>(6)</sup>. Other methods were questionnaires, pictorial scales, and guided assessments of children's artwork<sup>(2)</sup>

The scales used in the previous studies were the Children's Dental Fear Picture Test, which includes a segment of cartoons with contrasting emotions<sup>(6)</sup>, and the Facial Image Scale, which includes five faces with facial expressions ranging from very sad to happy<sup>(7)</sup>. At the instructor's cue, a child simply points to the cartoon that best reflects him or herself at that time<sup>(7,8)</sup>. Very few studies have been conducted towards assessing the severity of dental anxiety among the orphanage children in Pondicherry. Hence, the present study has been carried out to determine the severity of dental anxiety using the novel Shin-Chan dental anxiety scale among orphanage children aged 10-15 years in Pondicherry.

### Materials & Methods

Ethical permission was obtained from Institutional Review Board, of Indira Gandhi Institute of Dental Sciences, Puducherry. [IGIDSIEC 2021 NRP 41 PGKAPHD]

### Study setting and design

A descriptive cross-sectional study was conducted among 162 orphanage children aged 10-15 years in Pondicherry in May 2021 for 2 weeks duration. Simple-random sampling methodology was used to select the different orphanages in Pondicherry.

### Sample size estimation

The sample size estimation was done using G Power software, version 3.1.9.2. With the power of the study at 95% and alpha error at 0.05, the total sample size was calculated to be 162, based on the mean difference of anxiety scores from the study conducted by S. Jakkola et. al<sup>(9)</sup>, on Dental Fear. A pilot study was done on 25 subjects to assess the feasibility of the study, to

pre-test the questionnaire towards dental anxiety, and to test items' understandability and content validity. The clarity of the questionnaire and the time required for filling it up were noted and Cronbach's alpha value of 0.88 was obtained. Questionnaires were assessed for face and content validity. Face validity was checked among the technically untrained observers and assessed for the clarity of wording, layout, and style and the target audience was able to answer the major part of the questions. Content validity is determined by the viewpoints of 4 experts in the field. Content validity was assessed at the item level and the score was found to be CVI- 0.857 [appropriate].

Inclusion criteria consisted of children in the 10-15 years of age group with previous dental exposure and who volunteered to take part in the study. Exclusion criteria consisted of children with no previous dental history, severe systemic illness, oro-facial deformities, and those who are physically and mentally challenged.

#### **Data collection**

The data acquired was primary in nature. A pretested self - administered questionnaire by using a face-to-face interview method was used to collect the data which includes 12 close-ended questions about the severity of dental anxiety. Dental anxiety was assessed by the Shin-Chan dental anxiety [SDA] scale. The children received a full explanation of how to fill out the questionnaire. The scale consists of 4 pictorial representations that elucidate the anxiousness level, whether the children are not anxious, mildly anxious, moderate anxious, or severely anxious. The scores were ranged from 1-to 4. To record the scale, a score of one was assigned to not anxious and four to highly anxious.

#### **Statistical analysis**

Descriptive statistics were carried out to calculate the responses for each question and summarized the results

based on it. Data analysis was done with the help of a computer using Statistical Package for Social Sciences (SPSS) IBM SPSS statistics version 21.0. Armonk, New York. Chi-square and ANOVA were used keeping the level of significance at  $p \leq 0.05$ .

#### **Results**

The present study was an attempt to evaluate the severity of anxiety using the Shin-Chan dental anxiety scale among orphanage children. The total number of children who participated in the study was 162. Males comprise 63.6% and females comprise about 36.4%. The majority of the participants in the study were males. The mean age of children was 12.938years [Table 1].

The severity of dental anxiety towards the dentist, dental environment, and dental treatments was explained in detail [Table 2]. Children were asked questions like, how do they feel when they see dentists, 30.8% responded as highly anxious followed by 29% as moderately anxious and 24.7% as not anxious, and 15.4% as mild anxious. Response to questions like how do they feel when they go for dental treatment tomorrow out of all 35.8% responded as not anxious followed by 23.5% as moderately anxious and 22.2% as highly anxious and 18.5% as mild anxious. When the children were enquired about a question like how do they feel when they sit in the dental chair, 37.7% responded as highly anxious followed by 23.5% as not anxious and 21.6% as moderately anxious, and 17.3% as mild anxious. On questions about how do they feel when they are about to do tooth filling, 54.3% responded as not anxious followed by 18.5% as highly anxious and 14.8% as moderately anxious, and 12.3% as mild anxious. How do they feel about the sounds that they hear from the dental environment, majority of them (100%) answered the questions, 52.5% responded as highly anxious followed

by 21.6% as mild anxious and 17.9 % as moderately anxious, and 8.0% as not anxious.

Most of the children fall in the category of the moderate anxious level of anxiety (65.4%). Male children were more anxious as compared to female children with a level percentage varying in each category of anxiety

scale from 10 to 70%. The results were non-significant with a p-value equal to 0.197 (Table 3).

Out of 162 children, 42 children fall in the age group of 13 years with a mean value of  $3.19 \pm 0.50$  while only 12 children were in the age group of 10 years with a mean of  $3.00 \pm 0.60$  and the results were non-significant with a p-value greater than 0.05.

Table 1: Demographic characteristics of study participants

Demographic profile	Number of respondents (%)
N=162	
Gender:	
Male	103(63.6)
Female	59(36.4)
Total	162(100)
Age:	
10 years	12 (7.4)
11 years	14(8.64)
12 years	35(21.6)
13 years	42(25.9)
14 years	29(17.9)
15 years	30(18.5)

Table 2: Dental anxiety of study participants towards Shin-Chan dental anxiety scale

How Do You Feel?

Questions	Not anxious N (%)	Mild anxious N (%)	Moderate anxious N (%)	Highly anxious N (%)
1 When you see the dentist?	40 (24.7)	25(15.4)	47(29.0)	50(30.8)
2 When you go for dental treatment tomorrow?	58(35.8)	30(18.5)	38(23.5)	36(22.2)
3 When you were waiting in the reception area?	18(11.1)	57(35.2)	33(20.4)	54(33.3)
4. When you were about to wait for dental treatment before starting the procedure?	21(13.0)	31(19.1)	44(27.2)	66(40.7)
5. When you sit in the dental chair?	38 (23.5)	28(17.3)	35(21.6)	61(37.7)
6. When the dentists give subsequent appointments for dental treatments?	47(29.0)	23(14.2)	33(20.4)	59(36.4)

7. When the dentist checks your teeth with the mirror?	17(10.5)	28(17.3)	51(31.5)	66(40.7)
8. When you are about to clean your teeth?	109(67.3)	13(8.0)	17(10.5)	23(14.2)
9. When you see the drills & instruments used by dentists?	12(7.4)	22(13.6)	34(21.0)	94(58.0)
10. When you are about to drill your teeth?	21(13.0)	23(14.2)	32(19.8)	86(53.1)
11. When you are about to do tooth filling?	88(54.3)	20(12.3)	24(14.8)	30(18.5)
12. About the sounds that you hear from the dental environment?	13(8.0)	35(21.6)	29(17.9)	85(52.5)

Table 3: Comparison of SDA scores with gender

SDA score	Gender		Chi-square test
	Males	Females	
Mildly anxious	12(85.7%)	2(14.3%)	0.197
Moderately anxious	65(61.3%)	41(38.7%)	
Highly anxious	26(61.9%)	16(38.1%)	

$\chi^2$ - test, p not statistically significant.

### Discussion

Dental anxiety starts from childhood and has the tendency to increase over time. It has been shown to be induced and increased by dental treatments. It is critical for dentists to identify the severity of anxiety among the children using an acceptable method of measurement at the earliest age, to prevent further problems, preferably through the appropriate counseling and treatments<sup>(10)</sup>, or else it may persist into adolescence and lead to an avoidance behavior which tends to aggravate the existing problem.

In this present study, children from various orphanages were evaluated for anxiety toward the dentist, dental treatment, and dental environment. Based on the findings of our study, we observed a higher prevalence of dental anxiety among orphanage children aged 10-15 years. This could serve as a starting point for the development of prophylactic strategies aimed at reducing dental anxiety. In this study, children were

highly anxious about the dental environment when compared to dentists and dental treatments which was in agreement with the study conducted by Kakkar et. al<sup>(10)</sup> Some children were highly anxious when they see the dentist, which was in agreement with the study conducted by Chellappah et. al<sup>(11)</sup> and they were highly anxious when they are about to wait for dental treatment before starting the procedure and when they sit in the dental chair and when the dentist examines their oral cavity with the mouth mirror and when the dentist give subsequent appointment for dental treatments and by seeing the drills & instruments used by the dentist<sup>(3)</sup> and about the sounds and vibrational sensation of the rotary dental drills which they hear from the dental environment.

The majority of them were not anxious about cleaning and restorative procedures performed by the dentists which were in agreement with the study conducted by Taani et.al <sup>(12)</sup> and they were ready to accept the

preventive dental treatments. Dental anxiety levels were more in males when compared to females which were in agreement with the study conducted by Stenebrand et. al<sup>(3)</sup> but in contrast to other findings, some studies have revealed that higher level of anxiety was present among female children<sup>(6)</sup> this could be due to the fact that males have the ability to mask their problems very quickly.

In the current study, we found that the maximum number of children who had anxiety from dental treatment fall in the category of 13 years of age group, and the minimum was found at 10 years of age as the age group of children increases the no children to fall in the age group decreases. The results of our study provide more conclusive evidence for several transitions regarding anxiety scores. Scores may wear off with increasing age and cognitive development, but they may also develop during this period, depending on family factors and factors related to poor oral health and dental treatment. At lower age children are easy to convince of various treatments and also as age increases it is easy for children to understand the procedure and these results were similar to a study done by Appukuttan<sup>(13)</sup>.

In this study, the severity of anxiousness level was assessed by Shin-Chan dental anxiety scale. Shin-Chan is one of the well-known & most widely viewed cartoons in South India & it occupies the top 3<sup>rd</sup> position in the cartoonish list. Children were very much familiar with the cartoon used in this study. The questionnaire was framed & the options were formulated using the Shin-Chan images, which usually consist of four different types of emojis with different expressions like not anxious, mildly anxious, moderate anxious, severe anxious by the Cartoonish characters, and the scores were assigned from not anxious to highly anxious [minimum score -1; maximum score-4]. This scale is

newer, convenient & easier for answering as well as interpreting in the clinical context.

The SDA scale provides the dentist with immediate feedback, allowing them to design appropriate treatment plans and appropriate behavior management in children. This scale is sufficiently brief and it can be used in clinical settings for assessment of the severity of anxiety<sup>(1)</sup>. Furthermore, the SDA scale has the potential to assess not only the degree of negativity but also the level of positivity among the children and it is a reliable tool for detecting dental anxiety among children. Limitations of the study involve a smaller sample size as well as the use of cartoon characters that are universally known, which is required for more favorable results.

### **Conclusion**

The study concludes that children were highly anxious towards the dental environment that is by seeing the drills and instruments used by the dentist and the sounds they hear from the dental environment when compared to the dentist and dental treatments and they were highly ready to accept the preventive dental treatments like scaling and restorations and also Shin-Chan dental anxiety scale (SDA) is a novel, convenient and child-friendly tool to assess the severity of dental anxiety in the clinical practice.

Programs have to be planned for providing behavioral counseling to the children towards reducing their anxiousness level and by incorporating various methods like Atraumatic restorative treatment, Cognitive therapy, Aromatherapy, Acupuncture, Hypnosis, Music therapy to improve the oral health-related quality of life of the orphanage children.

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