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Comparative Assessment Of Animated Emoji Scale And Chota Bheem Chutki Scale With Venhams Pictorial Scale And Facial Image Scale For Children Dental Anxiety

Mohammed Ahmed[i], Sofia Mukhtar[i], T.Arjun Singh[i], Payal Paul[i], Dr. Vinod Kumar Upadhyay[ii], Dr. Ahsan Abdullah[iii]

[i]Postgraduate Student Department Of Paediatric And Preventive Dentistry, Career Postgraduate Institute Of Dental Sciences And Hospital, Lucknow, U.P.
[ii]Professor And Head Of Department Paediatric And Preventive Dentistry, Career Postgraduate Institute Of Dental Sciences And Hospital, Lucknow, U.P.
[iii]Professor, Department Of Paediatric And Preventive Dentistry, Career Postgraduate Institute Of Dental Sciences And Hospital, Lucknow, U.P.

Abstract
Children's dental anxiety is a possible issue for patient care in pediatric dentistry. Assessing dental anxiety in pediatric patients during their initial visit not only facilitates effective management but also helps identify those requiring specialized care to address their fears..Aim and Objectives:This study aims to verify a newly developed Animated Emoji Scale (AES), Chotta Bheem–Chutki (CBC) pictorial scale and compare it with Venham's pictorial scale (VPS) and facial image scale (FIS). Fourty healthy children aged 4–12 years are randomly selected from hospital outpatient department. Four different anxiety scales—the VPS, FIS, the recently developed CBC pictorial scale, and the AES during their first dental visit, will be used to gauge the anxiety levels of the children. The children will be asked to select the figure that best reflected their current identity in order to record the scores.The findings of this study revealed that AES and FIS are significantly related, as are CBC and FIS, whereas AES and VPS show an inverse relationship.Animated emoji scale (AES) Chota Bheem Chutki Scale (CBCS) Venhams Pictorial Scale (VPS) And Facial Image Scale (FIS) revealed the following relationships:AES showed a positive but non-significant correlation with CBC (rho = 0.224, p = 0.164), a significant negative correlation with VPS (rho = -0.388, p = 0.013), and a significant positive correlation with FIS (rho = 0.320, p = 0.044). CBC demonstrated a non-significant correlation with VPS (rho = -0.119, p = 0.466) but had a significant positive correlation with FIS (rho = 0.331, p = 0.037).
Category: Dentistry

Keywords: *Anxiety Scale, Children, Paediatric Dentistry.*

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I. Introduction

Dental anxiety is described as an intense, often irrational fear or dread of visiting the dentist for preventive care or treatment, accompanied by heightened anxiety around dental procedures. This condition can have significant psychological, cognitive, and behavioral impacts[1]. Studies indicate that dental anxiety often continues into adulthood, which can lead to neglect or avoidance of dental care, severely affecting oral health. Among children and adolescents, dental anxiety is prevalent, with epidemiological studies showing rates of approximately 6–20%, regardless of culture or country[1]. Research highlights that dental anxiety frequently persists into adulthood, contributing to the neglect or avoidance of dental care and significantly impacting oral health. In children and adolescents, dental anxiety is commonly observed, with epidemiological studies reporting prevalence rates ranging from 6% to 20%, irrespective of cultural or geographical context [2].

A suggested model indicates that dental fear may contribute to the avoidance of dental appointments, ultimately leading to a decline in oral health. This deterioration prompts more problem-focused visits, further reinforcing the individual's dental fear[3]. Neglecting dental care can lead to emotions such as shame, guilt, and a sense of inferiority, perpetuating a negative cycle that reinforces fear and avoidance behaviors. To tackle this problem, the American Academy of Pediatric Dentistry (AAPD) has recommended various behavior management strategies, including voice control, distraction, and physical restraint. However, contemporary practices increasingly favor non-aversive behavior management approaches, which are often equally effective and tend to be more acceptable to parents, children, and dental professionals [3].

Therefore, an accurate evaluation of dental anxiety is essential, as the literature lacks sufficient reports that distinguish between the impact of previous dental experiences and their correlation with children's behavior[4]. Despite recent scientific and technological advances, dental treatment remains largely unpleasant for many individuals, with dental visits frequently causing significant anxiety and stress[3]. Fear and anxiety related to dental procedures are frequently associated with the use of needles and syringes for administering local anesthesia. The perception of pain during anesthetic administration is a common trigger for anxious and defensive responses. This can be attributed to factors such as tissue puncture, the pressure and speed of fluid injection, the temperature of the anesthetic solution, and the clinician's precision and control during needle insertion. [2,5]. The intimidating visual appearance of dental syringes can significantly contribute to or amplify fear, especially in children who experience anxiety related to dental treatments.

Fear and anxiety-related behaviors have consistently been among the most challenging aspects of managing patients, especially in children, as they can interfere with the provision of effective dental care [3]. Simple and straightforward methods, such as self-report questionnaires, have been designed to assess anxiety. However, an ideal measurement tool should be simple to administer, demand minimal expertise, and be suitable for individuals with restricted cognitive or language abilities. [2,4,5]. Picture-based tests are particularly appropriate for meeting these criteria. Among the widely used tools for assessing dental anxiety before treatment are the Venham Pictorial Test (VPT) and the Facial Image Scale (FIS). However, these scales have certain drawbacks. For instance, the VPT exclusively features male figures, which may pose challenges when applied to young female patients [5].

In this study we have compared newly developed animated emoji scale, chota bheem chutki scale with existing VPI & FIS scale for assessment of anxiety level among children before dental treatment[6].

II. Material And Methodology

Study Design

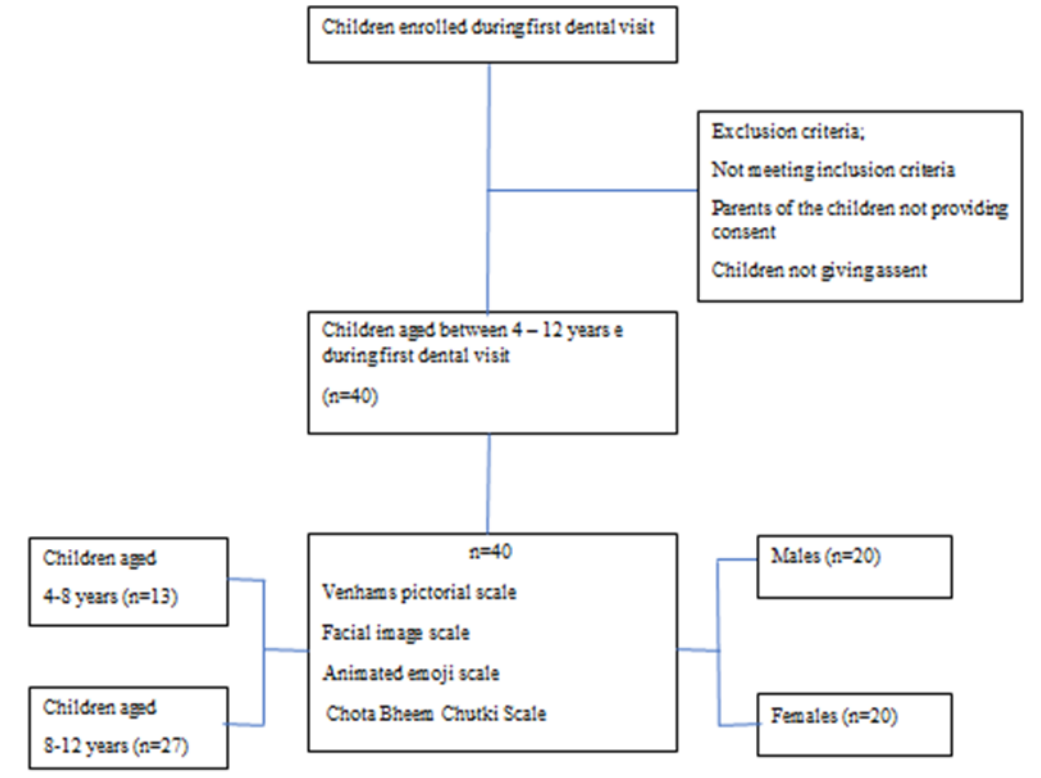


Fig.1

Inclusion Criteria –

✓ Healthy children of age between 4-12 years without any systemic illness.
✓ First dental visit
✓ Accompanied by the parent or guardian

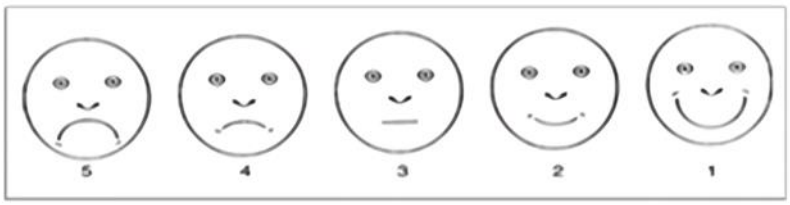
Exclusion Criteria –

× Medically compromised children.

× Children with history of previous dental visit

Fourty healthy children aged 4–12 years were randomly selected from hospital outpatient department. Four different anxiety scales—the FIS and VPS, the recently developed CBC pictorial scale, and the AES during their first dental visit, were used to gauge the anxiety levels of the children. The children were asked to select the figure that best reflected their current identity in order to record the scores.

Facial image scale
- This scale comprises a series of five pictures showing very happy to very unhappy faces.
- For the study, the scale was shown to children and they were asked to choose the image they identified with at that instant.
- The scores were recorded by assigning a value of one to the very happy face and five to the very unhappy face. (Fig.2)



(Fig.2) Facial image scale

Venham's pictorial test
- This scale comprises eight cards with two figures on each, depicting one anxious and one non anxious figure.
- The children were shown all the cards in an ordered sequence and were instructed to choose the image they closely identified with at that point.
- A score of one was recorded on choosing an anxious figure and zero was recorded if the child chose a non anxious figure. The total score was added to obtain a final score out of eight. (Fig.3)

(Fig.3) Venham's pictorial Scale

Chotta Bheem–Chutki scale
- This is a newly designed scale developed in the Department of Pedodontics, Sri Guru Ram Das Institute of Dental Sciences and Research, Amritsar.
- This scale comprises two separate cards.
- Chotta Bheem cartoon character was chosen to depict various emotions, and Chutki cartoon character was chosen to depict various emotions
- Each card consists of a series of six figures depicting happy to unhappy and running emotion by the cartoon character.
- Children were asked to choose the face they identified with at that instant.
- To record on the scale, a score of one was assigned to a happy face and six to an unhappy face and running. (Fig.4)

(Fig.4) Chota Bheem Chutki Scale

The Animated Emoji Scale

- The AES has five graphic interchange formats of animated emoji faces showing different feelings ranging from very happy/laughing to very unhappy/sad and crying (most positive to most negative feelings).
- The child was asked to choose one of these animated emojis on the electronic display that best matched their feelings at that moment.
- The scale had scores from 1 (very happy emoji) to 5 (very unhappy emoji). (Fig.5)

(Fig.5) Animated Emoji Scale

III. Result

Table 1: Comparisons between Different Children Dental Anxiety Scales

Scales	N	Mean	SD	Min	Max	Comparison with VPS (Wilcoxon test)	Comparison with FIS
AES	40	1.95	1.06	1	5	z=2.91, p=0.004	z=3.38, p=0.001
CBC	40	1.23	0.48	1	3	z=5.13, p<0.001	z=1.50, p=0.134
VPS	40	2.98	1.25	1	7	-	z=4.78, p<0.001
FIS	40	1.38	0.59	1	3	z=4.78, p<0.001	-

Interscales (Friemann test) : chi sq=61.0, p<0.001

The comparison of different scales, including the Animated Emoji Scale (AES), Chotta Bheem–Chutki Scale (CBC), Venham's Pictorial Scale (VPS), and the Facial Image Scale (FIS), was conducted using a sample of 40 respondents. The mean scores for each scale were as follows: AES (1.95 ± 1.06, range 1-5), CBC (1.23 ± 0.48, range 1-3), VPS (2.98 ± 1.25, range 1-7), and FIS (1.38 ± 0.59, range 1-3). (Table.1)

Statistical comparisons using the Wilcoxon test revealed significant differences between AES and VPS ($z = 2.91$, $p = 0.004$), and between AES and FIS ($z = 3.38$, $p = 0.001$). There was also a significant difference between CBC and VPS ($z = 5.13$, $p < 0.001$), while the comparison between CBC and FIS did not yield significance ($z = 1.50$, $p = 0.134$). The comparison between VPS and FIS was significant ($z = 4.78$, $p < 0.001$).

The interscale comparison using the Friedman test showed a significant difference across all scales (chi sq = 61.0, $p < 0.001$). (Table.1)

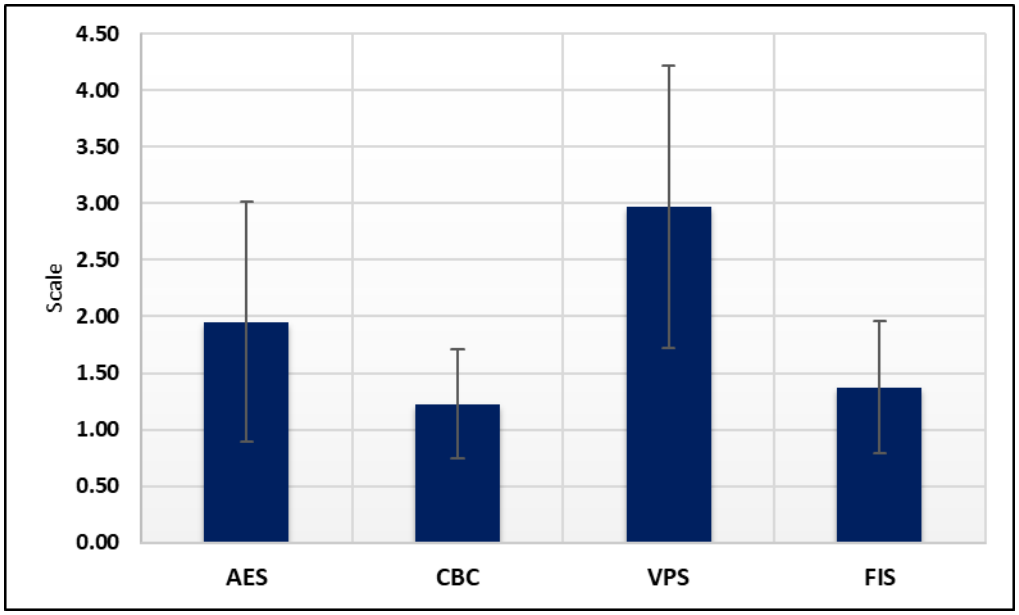


Table 2: Correlations between Different Children Dental Anxiety Scales

Spearman Correlation	AES		CBC		VPS		FIS	
	rho-value	p-value	rho-value	p-value	rho-value	p-value	rho-value	p-value
AES	1.000	-						
CBC	0.224	0.164	1.000	-				
VPS	-0.388	**0.013**	-0.119	0.466	1.000	-		
FIS	0.320	**0.044**	0.331	**0.037**	-0.127	0.435	1.000	-

The Spearman correlation analysis between the various scales—Animated Emoji Scale (AES), Chotta Bheem–Chutki Scale (CBC), Venham's Pictorial Scale (VPS), and Facial Image Scale (FIS)—revealed the following relationships:

AES showed a positive but non-significant correlation with CBC (rho = 0.224, p = 0.164), a significant negative correlation with VPS (rho = -0.388, p = 0.013), and a significant positive correlation with FIS (rho = 0.320, p = 0.044).

CBC demonstrated a non-significant correlation with VPS (rho = -0.119, p = 0.466) but had a significant positive correlation with FIS (rho = 0.331, p = 0.037).

VPS had a non-significant negative correlation with FIS (rho = -0.127, p = 0.435).

These correlations highlight that AES and FIS are significantly related, as are CBC and FIS, whereas AES and VPS show an inverse relationship. (Table.2)

IV. Discussion

Dental anxiety is a widespread issue among children, typically arising during childhood or adolescence, and poses challenges for children, their parents, and dental professionals alike. Studies have indicated that nearly half of children experience mild to moderate levels of dental anxiety, while 10%-20% report severe anxiety [1]. Visiting a dental clinic frequently entails engaging with unfamiliar faces and encountering potentially daunting or invasive treatments, which can intensify feelings of anxiety. Dental anxiety is particularly prevalent in children and generally decreases as they mature. According to a study by Chhabra et al., the prevalence of dental anxiety among Indian children aged 5 to 10 years was reported to be 6.3%.

Buchanan suggested that an effective scale for assessing anxiety in children should be concise to encourage participation and reduce administration time. It should focus on aspects most relevant to the pediatric dental experience, be engaging enough to capture the child's attention, and remain straightforward to score and interpret. Additionally, the scale should be designed for an easy application in younger children who may have limited cognitive and language abilities[2].

Hence in the current study, the Venhams Pictorial Scale (VPT) and Facial Image Scale (FIS) were chosen for the current study to compare their effectiveness with the Animated Emoji Scale (AES) and Chota

Bheem Chutki Scale (CBCS), as they were also picture-based scales designed to assess anxiety levels in young children prior to treatment[2]. The findings of this study revealed that AES and FIS were significantly related, as were CBCS and FIS, whereas AES and VPS showed an inverse relationship. AES, CBCS and VPS, FIS revealed the following relationships: AES showed a positive but non-significant correlation with CBCS (rho = 0.224, p = 0.164), a significant negative correlation with VPS (rho = -0.388, p = 0.013), and a significant positive correlation with FIS (rho = 0.320, p = 0.044). CBCS demonstrated a non-significant correlation with VPS (rho = -0.119, p = 0.466) but had a significant positive correlation with FIS (rho = 0.331, p = 0.037) .Notably, the AES & CBCS proved to be more effective in measuring dental anxiety state compared to the VPS.

The result of the current study showed similarity with result Jyothsana V. et al. 2019 in which AES exhibited strong correlation with VPS and FIS with increased preference for AES by participants, Gunmeen S. et al. 2016 showed comparable results of CBCS with VPT and FIS where 75% of children preferred CBCS over other scales.

In the present study, children showed a clear preference for the CBCS and AES scales over the VPT and FIS. These findings differ from many previous studies, as we introduced novel scales in comparison to traditional standard scales and allowed children the freedom to choose the gender of the cartoon characters. It was observed that children often experienced confusion when using the VPT, likely due to the repetitive use of the same cartoon image to represent different emotions within a single box. Therefore, it can be concluded that the AES and CBCS scales serve as innovative and child-friendly alternatives for assessing anxiety in children. Additionally, the measurements of dental anxiety obtained using these scales were comparable to those achieved with the FIS.AES and CBCS offers a simple, attractive, quick, easy, and efficient method for assessing dental anxiety in children during their dental visit. Thus, it helps in directing the use of appropriate behavioral management techniques in establishing a trustworthy relationship and good rapport between the child, parent, and pediatric dentist.

V. Conclusion

This study pointed out that the AES and CBCS scale yielded comparable results to the FIS and VPS. Its simplicity and familiar figures put into limelight its establishment as a benchmark to assess the level of dental anxiety faced by young children. Hence, the AES and CBCS scale can be used as a new alternative for dental anxiety assessment in young children.

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