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The Impact of Tell-Show-Do Technique with Audio and Audio-Visual Distraction Aids in The Anxiety and Behavior Management of Pediatric Dental Patients - A Comparative Study

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Abstract

Context: On their first appointment, children who are anxious about the dentist may find it difficult to get treatment, but distractions and the Tell-Show-Do Method can help control the pain.

Aim and Objective: The study evaluated the efficacy of tell-show-do technique with audio and audiovisual distraction aids in managing anxious pediatric patients, examining physiological and behavioural changes during treatment.

Subjects and Methods: Pre- and post-treatment anxiety levels were assessed in 150 pediatric dental patients who underwent air rotor restorative treatment. The patients were categorized into age categories and control/intervention groups.

Results: To compare quantitative data among the three study groups for both ages, Turkey post-hoc test was applied. Results revealed that audio video distraction aid group exhibited the most significant differences in behavioural and physiological indicators, followed by the audio distraction aid group. Conversely, the Tell-Show-Do Technique showed limited effectiveness in the control group.

Conclusion: The effectiveness of audio-visual distraction in calming pediatric patients was superior to auditory distraction, regardless of age. In contrast, the Tell-Show-Do Method was less effective in soothing anxious patients.

Keywords: Behaviour management, Physiological parameters, Tell-Show-Do Technique, Audio Distraction aid, Audio-Visual Distraction Aid

Introduction

Behavior management is widely acknowledged as a crucial aspect in caring for children in the realm of pediatric dentistry. (1) The first dental visit is of utmost significance as it greatly impacts a child's view of dentistry and can affect the outcome of future treatments. (2) While only a small number of children may display

uncooperative behavior during their dental appointments, their behavior can hinder the provision of top-notch dental care. [3] Therefore, skillfully handling the behavior of these patients is a vital part of pediatric dental practice. [4]

Anxiety is unexplained fear. [5] In a study by Agras, Sylvester and Olivieau (1969), dental anxiety was the fifth most common fear, reported by 20% of participants. [6] Armfield JM et al. and Gordon D et al. found that past negative experiences can cause dental fear, and ongoing support may exacerbate dental anxiety. [7] Anxiety and fear are inherently interconnected.

The American Academy Of Pediatric Dentistry has a variety of behavior management strategies including the Tell-Show-Do Technique. [8] This technique, introduced in 1959 by Addelston, involves explaining, demonstrating, and then performing the descripted procedure. [9]

The Tell-Show-Do Technique is the gold standard for behavior management, but non-aversive methods like "Distraction Techniques" are gaining popularity nowadays. Distraction is a popular technique to shift a child's attention from their current behavior to a more engaging activity. [10] It is widely accepted in modern society for its simplicity, safety, affordability, and effectiveness in calming young patients during dental procedures. [11]

McCaul and Mallot propose that distraction techniques can reduce pain perception, relieve stress and anxiety, promote treatment progress, and redirect a child's focus away from discomfort. [12]

Using music as a distraction can help alleviate anxiety associated with invasive dental procedures. A 2011 study conducted by Jindal R et al. demonstrated that incorporating music during dental procedures can effectively reduce stress and anxiety levels. [13]

On the other hand, VR technology is used in dental offices to enhance patient comfort and reduce anxiety during invasive procedures. It involves wearing a headset that allows patients to interact with a computer-generated environment, blocking out distractions and immersing themselves in a virtual world.

Insufficient previous research has impeded a thorough examination of the influence of distraction techniques on physiological factors in Himachal Pradesh. The current study sought to compare the Tell-Show-Do technique with various distraction methods to evaluate their influence on physiological parameters prior to and following dental procedures. Additionally, it aimed to explore their efficacy in alleviating dental anxiety and enhancing the behavior of pediatric patients.

Materials and Methods

Prior to commencing the research, ethical approval was granted by the institutional review board.

The study included 150 healthy children, aged 4-6 and 7-9 years old, who were new to dental checkups and needed restorative treatment with an air rotor. Children with disorientation, medical conditions or in the need for local anaesthesia were excluded. Patient's guardian's consent was duly taken on the Out Patient Department (OPD) Card.

The selected sample size was further randomly divided as such:

The study began by measuring children's anxiety levels through observing their physiological markers after a brief relaxation period on the dental chair. This included

monitoring breathing rate, oxygen saturation levels, pulse rate, blood pressure with a sphygmomanometer, and using a child cuff. (Figure 1)

Further the Wright's modification of Frankl's Behaviour Rating Scale and Facial Image scale were used for each patient's assessment of behavioral response prior the restorative treatment. (Figure 2, Figure 3)

The patients were randomly assigned to two groups regardless of gender. Group 1, the control group, received treatment using the Tell-Show-Do Technique. They were informed about the air rotor's function in removing carious lesions, demonstrated outside the mouth, and then used in the mouth as described.

The pediatric patients who did not cooperate after the Tell-Show-Do Technique only those pediatric subjects were further allocated in Group 2 randomly to two subgroups: Group A (audio distraction) and Group B (audio-visual distraction). Before treatment, they were evaluated for anxiety levels, physiological parameters, and behavior using Wright's adaptation of Frankl's Behavior Rating Scale and Facial Image Scale.

In the intervention group's sub division Group A, patients were given Ear Pods to distract them during treatment with the air rotor. (Figure 4)

In Group B of the intervention group, patients used a VR Box to watch a cartoon episode of their choice before receiving restorative treatment with an air rotor. (Figure 5)

Regardless of the study group, the patient's physiological parameters and behavior response were recorded after the restorative treatment to observe the difference in fear and anxiety reduction in pediatric patients. (Figure 6)

The collected data was analyzed using SPSS (Version 19.0) to compute descriptive statistics such as mean, standard deviation, number, and percentage. Turkey's post-hoc test was used for multiple comparisons of quantitative data across the three study groups.

Figure 1: Armamentarium

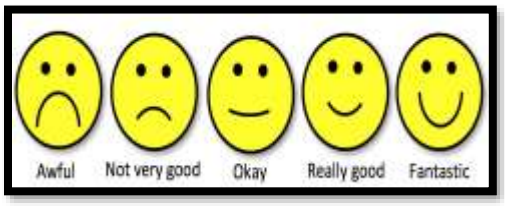

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Figure 2: Facial Image Scale

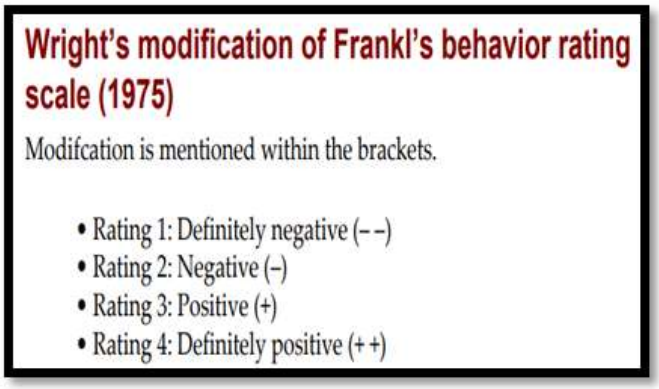


Figure 3: Wright's Modification of Frankl's Behavior Rating Scale

Figure 4: Intervention through Audio Distraction Aid

Figure 5: Intervention through Audio-Visual Distraction Aid

Figure 6: Assessment of Facial Image Scale and Behavior Rating Scale

Figure 7: A Happy Patient by the Treatment End

Results

Breathing Rate

The study found that audio and audio-visual distraction techniques were more effective in reducing pain and anxiety in children aged 4-9 compared to the control group. The audio-visual distraction method was significantly more successful than the audio distraction method in lowering breathing rates. (Graph 1, Graph 2)

Oxygen Saturation Rate

The study found that the control group in the 4-6 and 7-9 age groups had lower SpO2 levels after treatment. After using audio-visual distraction intervention, there was a significant increase in SpO2 levels compared to the audio distraction group. (Graph 3, Graph 4)

Pulse Rate

After treatment in both 4-6 and 7-9 years of age groups, the control group had a slight increase in pulse rate, while the audio distraction aid and audio-visual distraction aid groups showed a significant decrease in pulse rate for both age groups. The audio-visual distraction aid group had the largest reduction in pulse rate compared to the audio distraction aid group. (Graph 5, Graph 6)

Blood Pressure

In the investigation, the control group showed no significant increase in blood pressure for the 4-6 age group. However, 7-9 age group in the control group had a non-significant increase in systolic blood pressure and a significant increase in diastolic blood pressure.

After using the audio distraction aid, the 4-6 age group had a non-significant decrease in systolic blood pressure and a significant decrease in diastolic blood pressure. However, 7-9 age group experienced a significant decrease in both systolic and diastolic blood pressure with the audio distraction aid.

When the audio-visual distraction aid was used, there was a highly significant reduction in blood pressure for both the 4-6 and 7-9 age groups. (Graph 7, Graph 8, Graph 9, Graph 10)

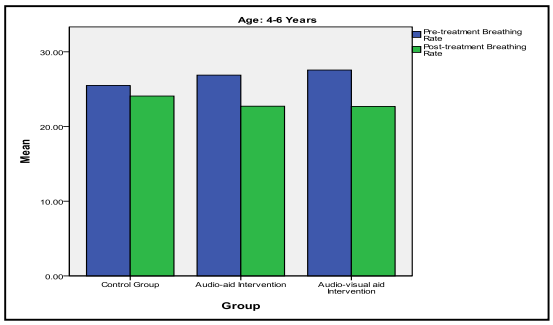
Facial Image Scale

The anxiety levels in Pediatric patients in the control group for both 4-6 and 7-9 years of age increased before and after treatment during a dental visit. However, using an audio distraction aid led to a significant reduction in anxiety levels for both the 4-6 and 7-9 age groups. Comparing the audio-video distraction aid to the audio distraction aid, the most significant decrease in anxiety

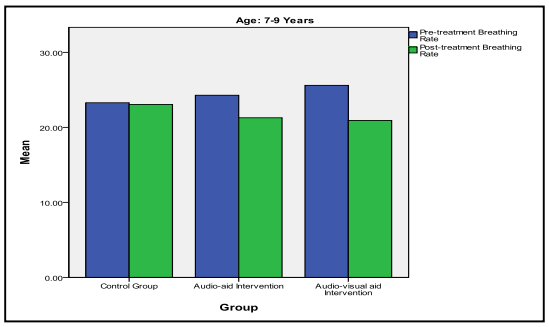
levels was seen in both age groups. (Graph 11, Graph 12)

Behavior Rating Scale

In this study, child patients in the control group aged 4-6 and 7-9 years showed increased disruptive behavior post-treatment compared to groups using audio and audio-visual distraction aids. However, the audio distraction aid led to a decrease in behavior ratings, while the audio-video distraction aid showed the most improvement in pediatric patient behavior. (Graph 13, Graph 14)

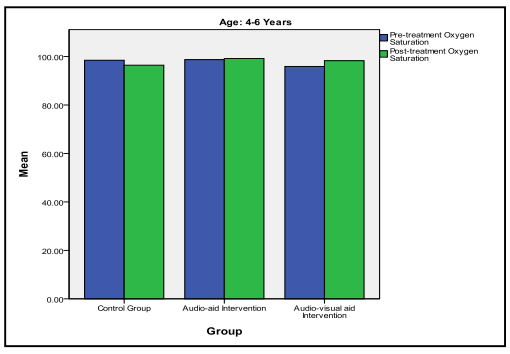


Graph 1:

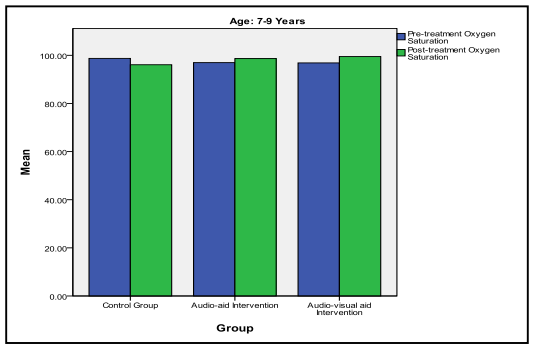


Graph 2:

Assessment of Breathing Rate in 4-6 and 7-9 years of age

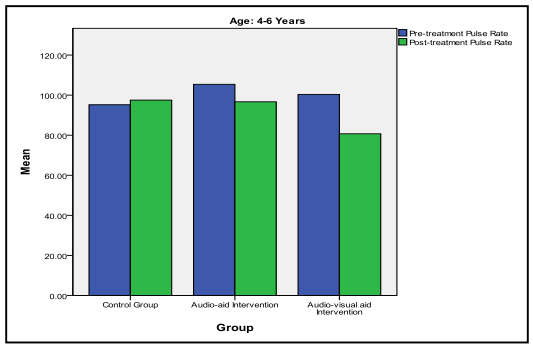


Graph 3:

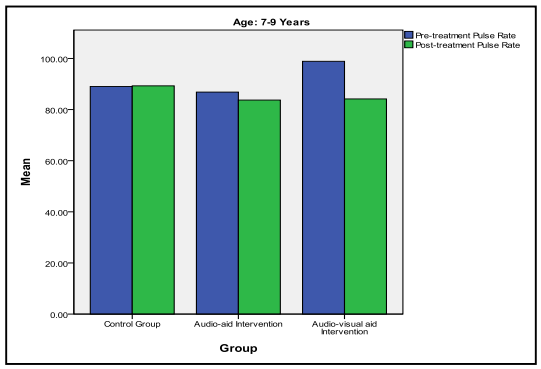


Graph 4:

Assessment of Oxygen Saturation Level in 4-6 and 7-9 years of age

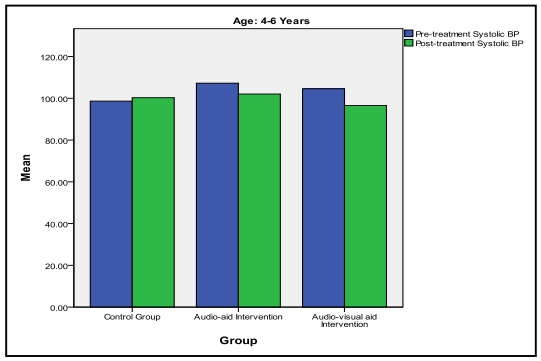


Graph 5:

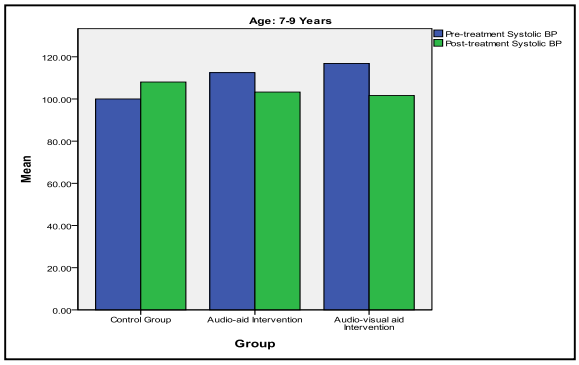


Graph 6:

Assessment of Pulse Rate in 4-6 and 7-9 years of age

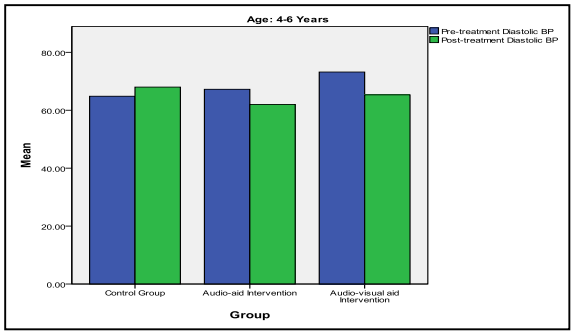


Graph 7:

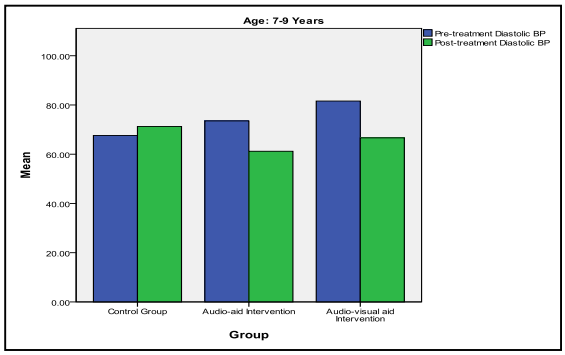


Graph 8:

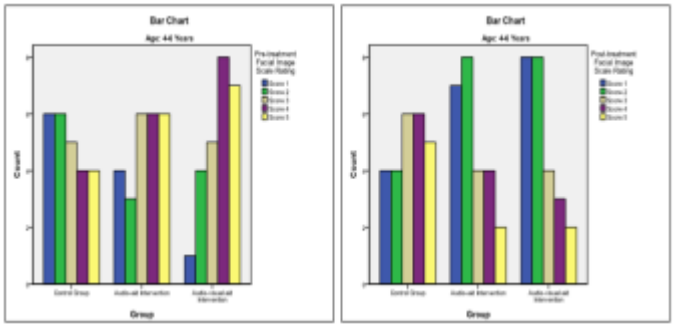
Assessment of Systolic Blood Pressure in 4-6 and 7-9 years of age



Graph 9:

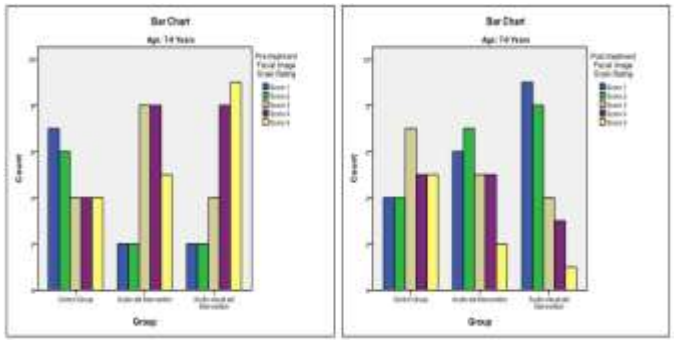


Graph 10:



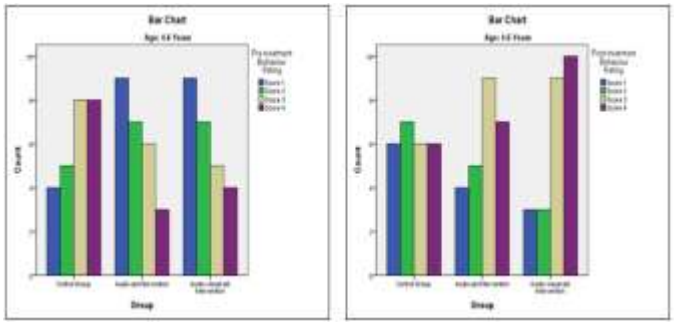
Graph 11:

Assessment of Facial Image Scale Rating in 4-6 years of age group



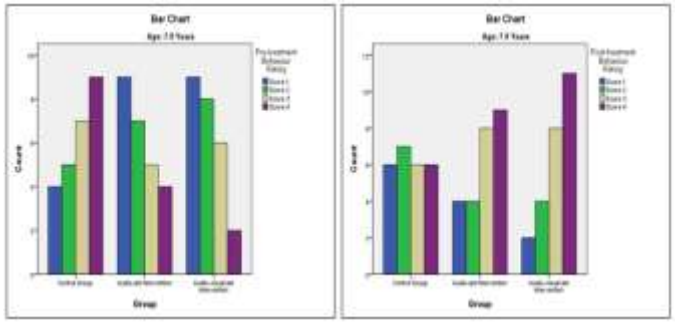
Graph 12:

Assessment of Facial Image Scale Rating in 7-9 years of age group



Graph 13:

Assessment of Behavior Rating Scale in 4-6 years of age group



Graph 14:

Assessment of Behavior Rating Scale in 7-9 years of age group

Discussion

Paediatricians face the challenge of easing children's anxiety during dental procedures, a common emotion. Innovative strategies to address this fear are always in demand.

Children aged 4 to 7 are considered preoperational according to Piaget. Their development of vocabulary,

focus, and attention span indicates social progress. This study focused on patients aged 4 to 9 due to their tendency to display destructive behavior and dental anxiety, making them difficult to manage in a dental environment. Pediatric patients often feel anxious and hesitant during their first visit to the dental operatory due to the unfamiliarity with equipment and the newness of the experience. [14] Our study aimed to examine patient anxiety during this initial visit.

Messer JG found that stress and anxiety during dental treatment cause physiological changes in the body. [15] Hence, the aim of current research was to examine the correlation between physiological indicators (Breathing Rate, Oxygen Saturation Rate, Pulse Rate, Blood Pressure) pre and post treatment in pediatric patients making their initial visit to the department.

Advanced dental tools tend to scare children and can make them feel more anxious. The Tell-Show-Do Technique was used in the study to introduce patients to the air rotor and was demonstrated before using for treatment. Music is seen as a key element in psychobiological treatment. Its direct impact on our physical and mental state is well-known. In current research, music was used to distract children and observe changes in their physical and clinical signs before and after the treatment through intervention with music.

Slifer J et al. [16] found that an optimal attention strategy should include visual, auditory, and kinaesthetic elements. This approach distracts from negative stimuli and promotes emotional engagement. Thus, in the present study Virtual Reality Box was used as audio-visual distraction, that is an innovative way to reduce fear and anxiety in pediatric patients.

As per McDonald and Avery [17], children aged 3-6 years should breathe 20-25 times per minute, while those aged 6-12 should breathe 14-22 times per minute. Present study took these ranges into account.

Leupoldt et al. (2011) [18] explains the variations in breathing rates among the study groups, suggesting that these fluctuations could be due to perceived threat of unknown, which can further increase anxiety levels and the tell-show-do approach requires multiple dental sessions, explaining why the control group's breathing rate decreased insignificantly. Prayab and Arab [19] reached similar conclusions in their studies. Statistical analysis of the current study showed that both audio and audio-visual distraction aids were more effective than the control group in reducing pain and anxiety.

Mehrotra D. and Manju R. [20] stated that evaluating a child's oxygen saturation is simple and safe. Fouzas S. [21] noted that there is no established range for normal SpO2 levels in pediatric patients, but research on healthy children suggested, levels can range from 93% to 100% depending on their activity and emotional state. Xue XJ et al. [22] suggested that mental and environmental factors can affect physiological well-being, potentially explaining the decrease in oxygen saturation levels observed in the control group for both the age groups. The decrease in oxygen saturation levels after the audio intervention in both age groups resulted similar to Baghdadi ZD's study (23), which showed that using music as an audio distraction can help reduce anxiety in children during dental procedures. Marwah et al. (24) allowed young patients to choose their own music, which influenced the current research methodology.

Using an audio-video distraction tool improved patient compliance and reduced anxiety in children during dental procedures in the current study. Kaur et al. [14], Prabhakar AR et al. [10], Mehrotra D and Manju R. [20] also found that engaging patients with a cartoon movie

or other distractions effectively diverted attention from the dental work, leading to decreased anxiety.

McCarthy (1957) [25] found that measuring pulse rate is a reliable indicator of stress and anxiety in a dental setting. McDonald and Avery's [17] in their study showed that children aged 3-6 have a pulse rate of 65-110 beats per minute, while children aged 6-12 have a pulse rate of 60-95 beats per minute.

The rise in heart rate in the control group across both age groups can be attributed to Howitt's explanation implying that the rise in heart rate may be due to the uncertainty experienced in the dental operatory. This is backed up by Shannon et al. (26), who found that prolonged waiting times before dental procedures can lead to increased stress levels in the body due to release of hydrocortisone.

Research by Kaur et al. [14] suggests that music can reduce unpleasant sounds, while audio-visual aids can minimize both discomforting sights and sounds. Studies by Khandelwal M et al. and Gurav KM. supports this, showing that audio-visual distraction aids were effective in lowering pulse rate compared to other groups in the present study.

McDonald and Avery [17] recommended a blood pressure range of 95-110/60-75 for children aged 3-6 and 100-120/60-75 for children aged 6-12 in their study. The same was considered in this study.

Blood pressure variations in control group across different age groups can be explained by Kaur R et al. [14], indicating that pediatric dental patients who are receiving treatment for the first time often anticipate pain, triggering the release of corticoids and leading to increased blood pressure. Sanadhya and team found a correlation between anxiety and changes in vascular, hemodynamic, and respiratory functions. They also observed that children experienced comparative higher surges in systolic and diastolic blood pressure than adults. Bilo G et al. [27] discovered that age-related differences in blood pressure are influenced by individual variations in cardiovascular control mechanisms, responses to substances, and reactions to environmental stimuli.

Pande et al. found audio distraction helpful in reduction of anxiety in children, while Seyrek et al. [28] concluded video distraction as more effective for managing stress in children during dental procedures confounding to the present study.

Buchanan and Niven [29] developed a Facial Image Scale using emojis to measure anxiety levels in pediatric patients. The scale ranged from a happy face (no pain) to a sad face (severe pain), and was found to be effective in evaluating emotional states. The current study aimed to assess the scale's efficiency in measuring dental anxiety, with results showing negative changes in both age groups in control group pre and post treatment. Factors like dental visit frequency and age at first visit attributed to Carrillo-Diaz's research were found to play a crucial role in managing fear and anxiety. Studies by Kaur et al., [14] support the use of interactive techniques like pictures and videos to reduce anxiety, with improved scores seen after implementing audio-visual distraction aids.

In the present study patient's anxiety levels were assessed using the Behavior Rating Scale, a reliable measure based on Wright's Modification [30]. It includes four rating categories (--, -, +, ++) corresponding to Scores 1 to 4.

The pediatric patients of the control group of both ages displayed somewhat disruptive behaviour from pre to post treatment. A study conducted by Ingersoll, Nash, and Gamber, also found that children displayed increased disruptive behavior (31-37%) during their first dental visit due to unfamiliarity.

The introduction of audio distraction aid resulted in a significant decrease in disruptive behavior. Music has been shown to promote relaxation and reduce anxiety levels in patients. Similar results were also reported by Jindal and Kaur [14] indicating that music can help reduce stress and anxiety levels by minimizing surrounding noise.

The use of audio-visual distraction aid resulted in maximum improvement in behavior of pediatric patients, as evidenced by lower behavior rating scale scores. This finding aligns with previous studies highlighting the positive impact of audio-visual distraction aids on behavior.

References

1. J.F. Roberts, et al: Behavior Management Techniques In Paediatric Dentistry (Review); European Archives Of Paediatric Dentistry//11 (Issue 4) 2010; p- 166
2. Raseena KT, Jeeva PP, Kumar A, Balachandran D, Anil A, Ramesh R. A Comparative Study Of Tell-Show-Do Technique With And Without The Aid Of A Virtual Tool In The Behavior Management Of 6–9-Year-Old Children: A non-randomized clinical trial. J Indian Soc Pedod Prev Dent 2020; 38:393-9
3. Carr. K.R, Wilson S, Nimer S, Thornton Jr. J.B. Behavior Management Techniques Among Pediatric Dentists Practicing In The South Eastern United States; AAPD, 21:6, 1999; p- 347
4. Meghpara M, Marwah N, Sharma Y, Paliwal A, Godhani S. Modifications of behavior management strategies pre- and post-covid-19 scenario: A survey among pediatric dentists. J Indian Soc Pedod Prev Dent 2022; 40:260-4.
5. Agarwal M, Das UM. Dental anxiety prediction using Venham Picture Test: A Preliminary Cross-Sectional Study. J Indian Soc Pedod Prev Dent. 2013; 31:22-4.
6. A. De Jongh, P. Muris, G. Ter Horst and M. P. M. A. Duyx. Acquisition and maintenance of dental anxiety: the role of conditioning experiences and cognitive factors. Behav. Res. Ther. Vol. 33; 2, pp. 205-210, 1995
7. Armfield JM, Spencer AJ, Stewart JF. Dental Fear In Australia: Who's Afraid Of The Dentist? Aust Dent J. 2006; 51: 78-85
8. American Academy of Pediatric Dentistry. Behavior guidance for the pediatric dental patient. The Reference Manual of Pediatric Dentistry. Chicago, Ill.: American Academy of Pediatric Dentistry; 2021:306-24.
9. Machen JB, Johnson R. Desensitization, Model Learning, and the Dental Behavior of Children. Journal of Dental Research. 1974;53(1):83-87. doi:10.1177/00220345740530013701
10. Prabhakar AR, Marwah N, Raju OS. A comparison between audio and audiovisual distraction techniques in managing anxious pediatric dental patients. J Indian Soc Pedod Prev Dent. 2007 Oct-Dec;25(4):177-82. doi: 10.4103/0970-4388.37014. PMID: 18007104.
11. Shah Urvi, Bhatia Rupinder. Effectiveness of audiovisual distraction eyeglass method compared to Tell-Play-Do Technique among 4–7-year-old children: A randomized controlled Trial. International journal of oral care and research, April-June 2018;6(2): 1-7
12. McCaul KD, Malott JM. Distraction and coping with pain. Psychol Bull 1984; 95:516-33.
13. Jindal R, Kaur R. Can we tune our pediatric patients? Int J Clin Pediatr Dent. 2011; 4(3):186-9.

14. Kaur R, Jindal R, Dua R, Mahajan S, Sethi K, Garg S. Comparative evaluation of the effectiveness of audio and audiovisual distraction aids in the management of anxious pediatric dental patients. J Indian Soc Pedod Prev Dent 2015; 33:192-203.
15. Messer JG: Stress in dental patients undergoing routine procedures, IDent Res, 56(4):362 367,1977
16. Yeptho B, Emmanuel BJ, ShekhawatD, Raja J, Inda VS. A review on non-pharmacological behavior shaping in pediatric dentistry emphasized on tell-show-do and its modifications. JAdv Clin Res Insights 2021;8(4): 91-93.3
17. Slifer KJ, Tucker CL, Dahlquist LM: Helping children and caregivers cope with repeated invasive procedures: How are we doing? Journal of Clinical Psychology in Medical Settings. 2002, 9:131–152.
18. Von Leupoldt A, Chan PY, Bradley MM, Lang PJ, Davenport PW. The impact of anxiety on the neural processing of respiratory sensations. Neuroimage 2011; 55:247-52
19. Paryab M, Arab Z. The effect of Filmed modeling on the anxious and cooperative behavior of 4-6 years old children during dental treatment: A randomized clinical trial study. Dent Res J 2014; 11:502-7.
20. Mehrotra D, Manju R. Comparative evaluation of the effect of audio and virtual reality distraction on the dental anxiety of healthy and mild intellectually disabled children. J Indian Soc Pedod Prev Dent 2023; 41:43-50.
21. Sotirios Fouzas, Kostas N. Priftis, Michael B. Anthracopoulos; Pulse Oximetry in Pediatric Practice. Pediatrics October 2011; 128 (4): 740–752. 10.1542/peds.2011-0271
22. Xue, XJ., Su, R., Li, ZF. et al. Oxygen Metabolism-induced Stress Response Underlies Heart–brain Interaction Governing Human Consciousness-breaking and Attention. Neurosci. Bull. 38, 166–180 (2022). https://doi.org/10.1007/s12264-021-00761-1
23. Baghdadi ZD. Evaluation of audio analgesia for restorative care in children treated using electronic dental anesthesia. The Journal of Clinical Pediatric Dentistry. 2000 ;25(1):9-12. PMID: 11314360.
24. Marwah N, Prabhakar AR, Raju OS. Music distraction- Its efficacy in management of anxious pediatric dental patients. J Indian Soc Pedod Prev Dent 2005; 23:168-170 DOI: 10.4103/0970-4388. 19003.
25. Mccarthy FM. A clinical study of blood pressure responses to epinephrine-containing local anesthetic solutions. J Dent Res 1957; 36:132-41
26. Shannon, I. L., And Isbell, G. M. Stress in Dental Patients: Effect of Local Anesthetic Procedures. Technical Report No. SAM-TDR-63-29, USAF School of Aerospace Medicine, Brooks Air Force Base, Texas, May 1963
27. Bilo G, Dolan E, O'Brien E, Facchetti R, Soranna D, Zambon A, Mancia G, Parati G. The impact of systolic and diastolic blood pressure variability on mortality is age dependent: Data from the Dublin Outcome Study. Eur J Prev Cardiol. 2020 Mar;27(4):355-364. doi: 10.1177/ 20474873198725 72. Epub 2019 Sep 11. Erratum in: Eur J Prev Cardiol. 2020 Apr;27(6):NP2. PMID: 31510817.
28. Seyrek SK, Corah NL. Pace LF. Comparison of three distraction techniques in reducing stress in dental patients. J Am Dent Assoc 1984; 108:327-29
29. Buchanan H, Niven N. Validation of a facial image scale to assess child dental anxiety. Int J Paediatr Dent 2002; 12:47-52.

30. Wright GZ, Kupietzky A, editors. Behavior management in dentistry for children. Ames: John Wiley & Sons; 2nd Edition 2014.