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Original Research Article

Pediatric headgear: a game changer

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ABSTRACT

Background: The American academy of pediatric dentistry has recently suggested conducting additional research on nonpharmacologic therapies, despite the fact that dental clinics employ a variety of strategies to manage anxious children, including communicative, pharmacologic, and nonpharmacologic interventions. Aim of the effectiveness of two nonpharmacologic behavior management techniques, pediatric headgear (PH) and tell-show-do (TSD) technique, on dental anxiety in children.
Methods: Thirty children aged between 2-5 years who were on their first dental visit were split into 2 groups. group I PH and group II with TDS. The anxiety levels were recorded at different intervals with the help of 4 criteria-Visual analogue scale (VAS), Facial image scale (FIS), heart rate and oxygen saturation while performing class 1 gic restoration. Student's t-test was done to compare these criteria between two groups at various time intervals.
Results: Statistically significant reduction in the anxiety level was seen in children who received PH ($p=0.001$) and TSD technique ($p<0.001$).
Conclusions: The PH was found to be more capable in reducing anxiety than TSD.

Keywords: Pediatric headgear, Tell-show-do, Behaviour management

INTRODUCTION

The prevalence of dental fear in children has been reported to range from 5% to 20%, with a mean prevalence of 11%, making it a significant factor in the providing of pediatric oral health care.[1] When it comes to a child's attitude toward dentistry as well as the outcome of subsequent treatments, the initial dental appointment is frequently pivotal. A child's anxiety level and avoidance behaviour are elevated during an unpleasant dental appointment. The most frightening stimuli for kids were found to be the look, feel, and fear of needle pain, as well as the sound and vibration of the airotor.

Disruptive behaviour can hinder quality dental care, leading to longer delivery times and higher risk of damage for the kid. Effective behavior control in pediatric dentistry practice has become essential for good treatment outcomes. Numerous pharmacological and nonpharmacological strategies have been developed to regulate children's behavior in the dental office.[2]

TSD is a popular non-pharmacological behavior control method. Addleston first presented it in 1959. This method involves the dentist explaining the process to the child in terms that they understand, showing them exactly how it will be done, and then carrying out the procedure precisely as it was explained and illustrated.[3] Distraction is one of the most commonly used non-pharmacological methods used for behaviour management in pediatric dentistry.

There is multiple method used for distraction such as-music, cartoons projected on a monitor, Storytelling,

Audio presentation through headphones or presentation of audiovisual stories on a television, multisensory adapted dental environment that features a partially dimmed room with lighting effects. One of the most recently invented distraction technique is-PH which when by worn by dentists can engage children and divert their attention from the dental work being carried out. The headgear is designed with playful elements, such as colourful pom-poms that the child is invited to press. This colourful designs and novelty of wearing headgear can transform the experience into a less intimidating one for young patients.

This distraction technique helps reduce anxiety and fear, fostering a more positive dental visit. Furthermore, it encourages cooperation from the child, making it easier for dentists to perform essential treatments while ensuring the child feels comfortable and secure throughout the process.

Mechanism of action of PH

Visual distraction: When the dentist dons the headgear, the child is immediately drawn to the vibrant colours and unique design of the apparatus. This visual stimulus serves to shift their focus away from the dental equipment and procedures, reducing anxiety and fear.

Tactile engagement: The pom-poms become a focal point for the child, allowing them to engage physically. By pressing the pom-poms, they create a sense of control and fun during the visit, which can significantly ease any tension they may feel.

Positive reinforcement: The dentist can use the pom-poms as a reward mechanism. For instance, every time the child presses a pom-pom, the dentist can offer praise or encouragement, further fostering a positive atmosphere in the dental office.

Enhanced communication: The headgear serves as a unique conversation starter, enabling dentists to engage with the child in a playful manner. This interaction can help build rapport and trust, making the child more willing to cooperate during examinations or treatments.

Mindfulness through play: By channelling their attention to the headgear and the action of pressing the pom-poms, children can enter a state of mindfulness, temporarily distancing themselves from any discomfort or anxiety associated with the dental procedure.

Overall, the use of PH in this innovative manner not only enhances the dental experience for children but also promotes cooperative environment, enabling dentists to perform necessary treatments more effectively.

Thus, this study aims to compare two behaviour modification technique that is-TSD and PH.

METHODS

A original research study was conducted in children between the ages of 2-5 who had visited the outpatient department, department of pediatric and preventive dentistry, K. D dental college and hospital, Mathura from October to December (2024).

Total 30 children were taken, divided into two groups, group I (Tell show do) and group II (PH). Anxiety level was evaluated by FIS and visual analogue scale, oxygen saturation (SpO_2) and heart rate were measured with the help of pulse oximetry.

This nonrandomized clinical trial was approved by the institutional ethics committee.

Statistical analysis was done using ‘student t test’-group I-TSD and group-II-PH

Inclusion criteria

Children aged 2-5-year, Frankl behavior rating 2 and 3, first dental visit and class 1 carious lesion limited to enamel and two-third of dentin requiring restorative treatment were included.

Exclusion criteria

Patients with Frankl behavior rating 1 and 4, extensively damaged teeth, medically and developmentally compromised patients and patients without parent consent were excluded.

Child anxiety level was assessed by the combination of anxiety rating parameters before and after the procedure. FIS comprises of a row of five faces ranging from very happy to very unhappy.

The child was asked to point at which face or the emotion they felt most like at that moment before the start of procedure and also after the completion of treatment. The scale is scored by giving the value of one (1) to the most positive effect face and five (5) to the most negative effect face.

The VAS is a pain rating scale. Based on self-reported symptom measures, scores are calculated by placing a single handwritten mark at one point along a 10-cm line that depicts a continuum between the two ends of the scale, with "no pain" at the left end (0 cm) and the "worst pain" at the right end (10 cm).

Heart rate and oxygen saturation were measured using pulse oximeter.

Data were entered in Microsoft excel version 2012 and SPSS software version 20.0. And student t test were used for the evaluation of all the 4 criteria.

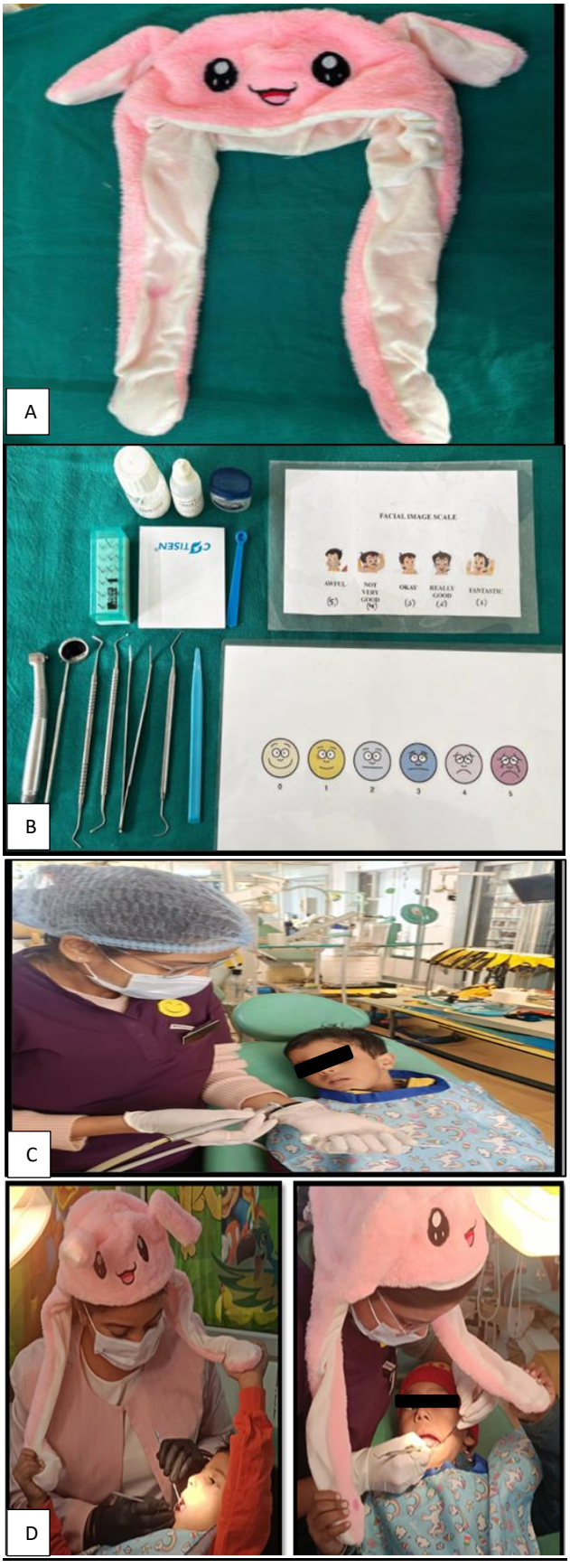

Figure 1 (A-D): PH, armamentarium used for the study and tell-show-do group and PH with 2 pom-pom which invite the child to press.

RESULTS

Comparison of mean demographic data of patient based on age and sex.

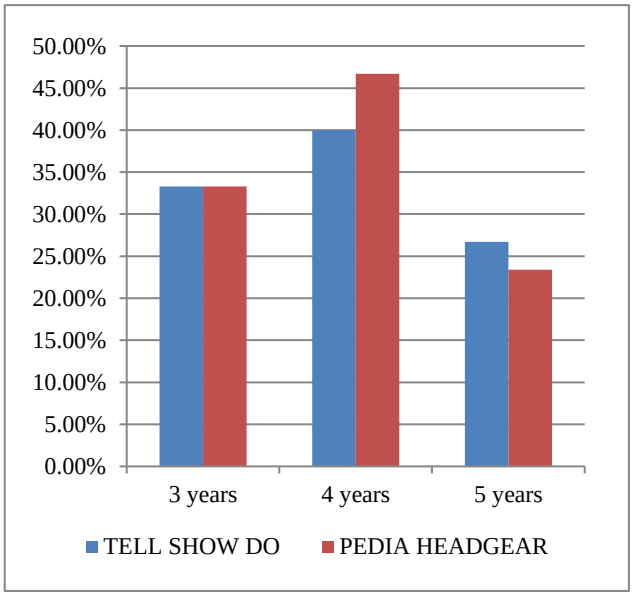

Figure 2: Age of patients.

Results were found to be insignificant when comparing age between tell show do and PH.

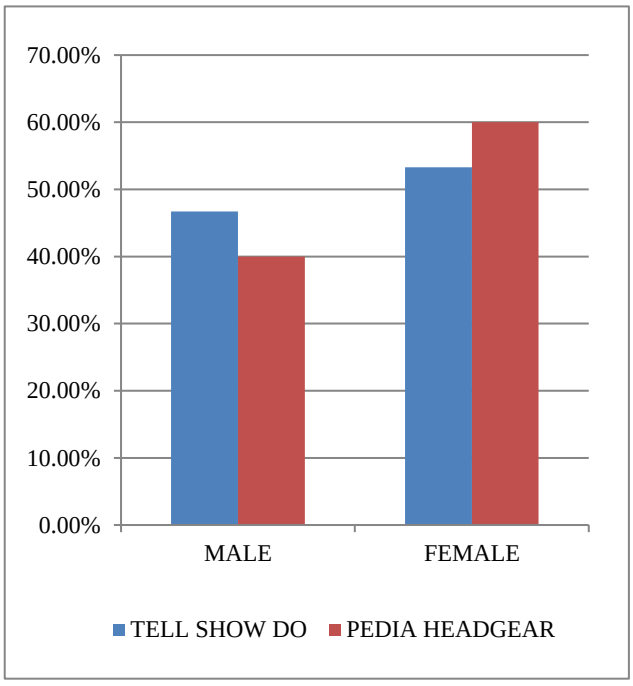

Figure 3: Sex of patients.

Results were found to be insignificant when comparing gender between tell show do and PH.

Comparison of mean VAS in between tell show do and PH.

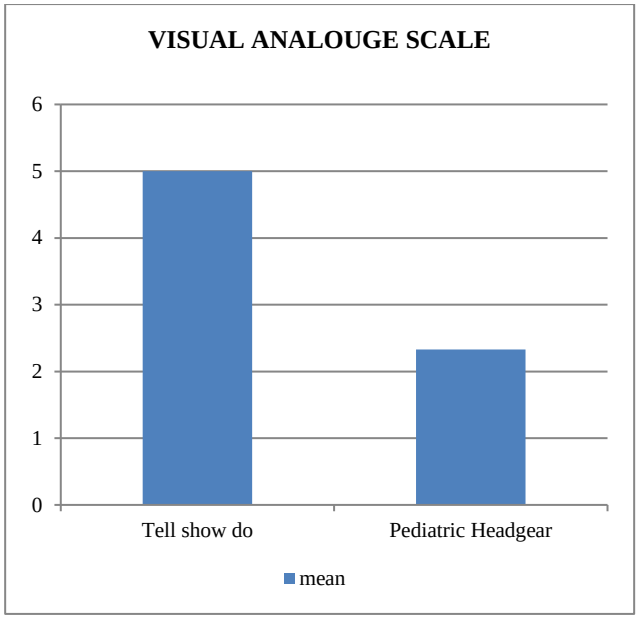

Figure 4: VAS.

Results were found to be statistically highly significant when comparing VAS in between tell show do and PH. It was clear in graph that VAS score was minimum in PH in comparison to tell show do, which is indicative of that PH was highly accepted by the children.

Comparison of mean FIS in between tell show do and PH.

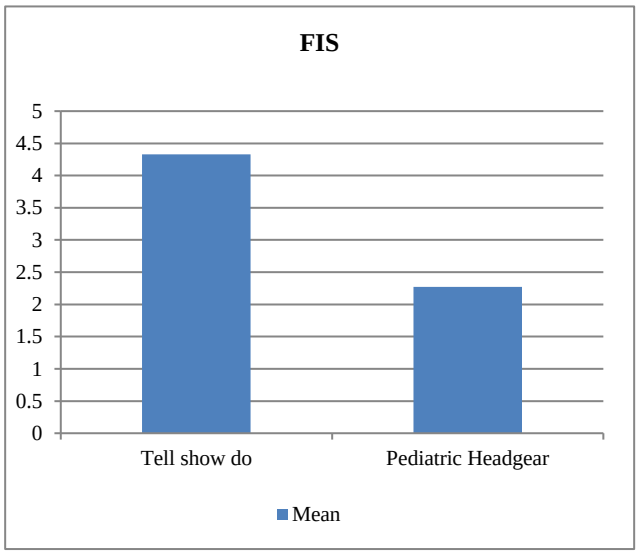

Figure 5: Facial image scale.

Results were found to be statistically highly significant when comparing FIS in between tell show do and PH. It was clear in graph that FIS was minimum in PH in comparison to tell show do.

Comparison of mean heart rate at pre-op, intra-op and post-op in between tell show do and PH.

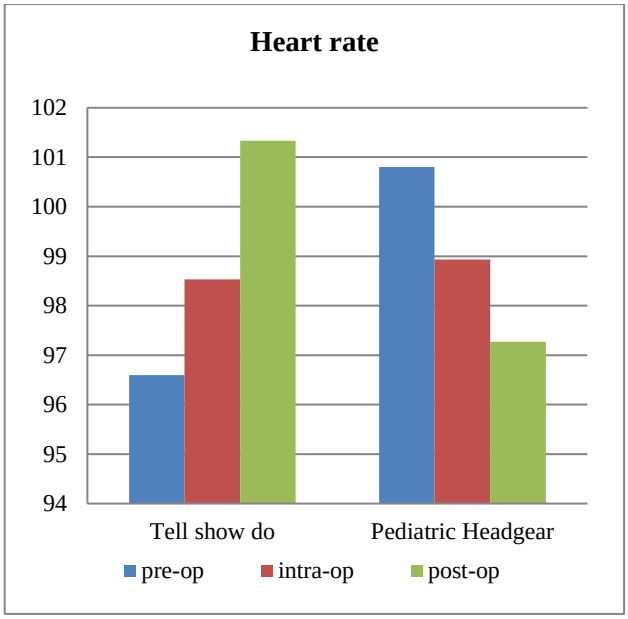

Figure 6: Heart rate.

Pre-operatively and intra-operatively heart rate was maximum for PH while comparatively lessen in TDS, whereas heart rate got decreased in PH post-operatively and rise in TDS.

Comparison of oxygen saturation at pre-op, intra-op and post-op in between tell show do and PH.

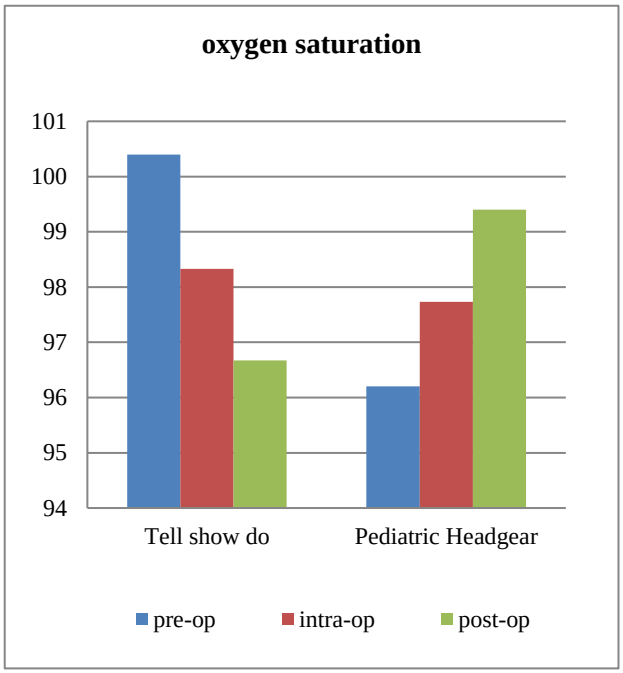

Figure 7: Oxygen saturation.

Pre-operatively and intraoperatively, oxygen saturation was maximum in tell show do in comparison to PH, while post-operatively oxygen saturation was maximum in PH.

DISCUSSION

Preoperative anxiety in children can lead to compromising the quality and effectiveness of dental care. Therefore, it is crucial to lower the child's anxiety levels. Early dental anxiety reduction in children not only lessens immediate fear but also avoids apprehension that may persist into adulthood. According to reports, patients who are extremely afraid need 20% more chairside time than those who are not, which raises concerns for the dentist.[4] Pediatric dental success relies on behaviour management methods (BMTs) that teach children acceptable conduct, coping skills, reduce anxiety, and provide basic oral health care. Because of the endless demands placed on parents, society, and children, the use of BMTs in dental clinics has been continuously evolving.[5]The dentist uses a variety of behaviour management strategies to change the child's attitude in the dental office. Since "TSD and Distraction is the least invasive and safest behaviour control method, it is the most widely used approach."[4] There are multiple method used for distraction such as-music, cartoons projected on a monitor, storytelling, Audio presentation through headphones or presentation of audiovisual stories on a television. By incorporating PH-a game-changer in pediatric dentistry, this innovative device to fosters a positive dental experience in children. The headgear features playful elements like colourful pom-poms that children can press, making the experience more engaging. Its vibrant design and novelty help reduce fear, transforming dental visits into a fun and less intimidating experience.

A child's attitude toward dental treatment is shaped by their first dental visit, and the dentist's primary goal should be a positive and successful first visit. For this reason, children who had never had dental treatment before were included in the study to ensure that a child's behaviour would not be influenced by their prior dental experience. Children in the 2-5 age range are in the preoperational period, under Piaget's classification. This age group is ideal for evaluating the success of behaviour management approaches due to the development of vocabulary, attention, and concentration skills, which indicate preparation for social contact.[6] which was similar to the study done by Radhakrishna et al and Lekhwani et al.[7,8]

The VAS is a valuable tool for measuring and managing child anxiety during dental treatment. When used alongside other behavioural observation methods, it provides useful insights into a child's psychological response, allowing for better anxiety management strategies such as behavioural techniques, sedation, distraction methods.

In present study, it was found that score was maximum for TSD than PH, which is indicative of PH was highly accepted by the children postoperatively.

The FIS has been used in numerous research to measure children's anxiety and is repeatable, simple to apply, fast, valid, and reliable.[9] In present study, it was found that score was maximum for TSD than PH, which was clearly indicative of that PH was highly enjoyed by patients postoperatively. A study done by Raseena et al in which FIS was score was found to be decreased in intervention group (mobile dental app) than TSD.[2] And which was contrary to the study done by Shah and Bhatia which suggest that audio visual distraction aids and tell-play-do are equally effective at lowering kids' anxiety and panic related to dental procedures.[10] Another study done by Lekhwani et al the FIS readings decreased from pre- to post-operative intervention, with the exception of the ask-tell-ask group, which experienced increased anxiety levels.[8] Vishwakarma et al found a decrease in the FIS for the tell-play-do group as compared to modeling.[11]

Since the most common reactions to dental stimuli during a child's first dental visit are either fear or anxiety, measuring Heart rate with a finger pulse oximeter is an objective way of assessing a child's anxiety levels. Heart rate is a direct indicator of physiological arousal, and its rise is linked to stress during dental procedures.[7] In the present study, heart rate was significantly reduced in children while using PH than TSD in intraoperatively and post- operatively which was similar to the study done by Lekhwani et al, Radhakrishna et al, Raseena et al and Shah in which heart rate was significantly reduced while using virtual tool (mobile dental app) than TSD, whereas study done by Roshan et al shows contrary results which states that there was no profound statistical significant difference was seen in Heart rate when film modelled and TSD was compared.[2,7,8,10,12]

The oxygen saturation rate is a useful physiological marker for assessing anxiety levels in children during dental treatment. Rise in SpO_2 depicts decline in anxiety. Incorporating SpO_2 monitoring into pediatric dental practice can enhance treatment outcomes, making dental visits less stressful and more effective for young patients.[13]

In the present study, oxygen saturation increased while using PH intraoperatively and postoperatively, which is similar to the study done by Khandelwal et al in which Audiovisual distraction technique shows rise in SpO_2 when compared with TDS.[13] And in study done by Raseena et al shows contrary results in which, there was no statistically significant difference is seen in oxygen saturation while comparing TDS and virtual tool (mobile dental app).[2]

While the TSD method remains a valuable tool in pediatric dentistry, PH offers a more engaging and effective approach**.** By significantly reducing anxiety, improving cooperation, and making dental visits more enjoyable, this innovative technique is revolutionizing pediatric dental care and ensuring a more positive experience for young patients.

Limitations

However, the limitation of the present study is that PH and TSD were compared for a particular treatment (restoration) only. Future research comparing all possible treatments with PH and TSD would give better insight about the efficacy and effectiveness of a forementioned behavior management techniques

CONCLUSION

Dentists rely heavily on behavior assessment as their primary technique. This aids the dentist in carrying out the necessary treatment plan for kids in the most suitable way possible. Based on our study results, PH was found to be more effective than TSD technique.

PH is an innovative distraction technique designed to reduce anxiety and improve cooperation in young dental patients. it features playful elements such as colourful pom-poms that children can press, transforming the dental visit into a fun experience. By engaging children in a sensory-rich activity, it minimizes fear, enhances compliance, and allows for smoother procedures.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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