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Abstract

Background - Dental anxiety among children has continued to generate a lot of curiosity in pediatric dentistry. It has been a potential problem in patient management. Storytelling is used as a tool to teach children the importance of respect through the practice of listening. Storytelling is hypothesized to distract the children during a dental procedure.

Aim and Objective – The aim of this study is to determine the effect of storytelling on child's anxiety during a pediatric dental procedure.

Material and Method - A total of 15 healthy children aged between 3-6 years in whom cross-arch dental procedure needed to be done under local anesthesia were included in this study. Child's anxiety level was measured using RMS Pictorial Scale and heart-rate was measured using finger pulse oximeter. Story books were there for story-telling during local anesthesia.

Results – The results were compiled and statistically analysed. Although, the inter-group comparison for RMS Pictorial Scale and heart-rate was not statistically significant, the storytelling was effective in reducing

anxiety during local anesthetic injection administration in children.

Conclusion- Storytelling was an effective means of managing anxiety in pediatric patients in the dental operatory. The use of storytelling as a non-drug-based, easy, inexpensive, accessible and children-favoured method can be considered for managing anxious pediatric dental patients.

Keywords: storytelling, dental anxiety, distraction, RMS Pictorial Scale.

Introduction

Management of child's behaviour is an integral component of pediatric dental practice and it can be achieved through application of various behaviour management techniques. ¹ Behaviour management techniques are meant to reduce the need for excessive and potentially unsafe use of medications. ²

Management strategies have been proposed to reduce distress during dental treatment in children and are mainly divided into two broad domains- pharmacological and non- pharmacological. The non-pharmacological domain consists of behavioural techniques including the tell-show-do technique, distraction, inspiration, modelling and

hypnotism.³ The use of non-pharmacological behaviour management techniques are more advocated as they are more acceptable to parents, patients and clinicians.²

Distraction is a useful technique of diverting the patient's attention from what may be perceived as an unpleasant procedure. Kleiber and Harper (1999) defined distraction as cognitive coping strategy that passively redirects the subject's attention or actively involves the subject with a task.⁴

The application of distraction is based on the assumption that pain perception has a large psychological component in that the amount of attention directed to the noxious stimuli modulates the perceived pain.³

Dentists use stories to distract children by diverting their mind and engaging them in story when child is found to be under stress. Stories are effective tools because they are believable, rememberable, and entertaining (Neuhauser 1993).

Story telling is a method of stress reduction and when used as a cognitive technique, it acts as a distracter. It is a way sharing of stories through words, sounds and visual images. It is a method of anxiety reduction and could be used as a non- invasive therapeutic tool to reduce the pain and anxiety of children.⁵

Anxiety is a state of uneasiness or distress regarding something with a feeling of uncertain outcome. Dental anxiety is defined as "an abnormal fear or dread of visiting the dentist for preventive care or therapy and unwarranted anxiety over dental procedures."⁶ Dental anxiety among children has continued to generate a lot of curiosity in pediatric dentistry and the effects of the dental anxiety can persist in adulthood, leading to dental neglect.⁷

A majority of pediatric dental patients reveal great anxiety and fear during routine oral procedures. The most common reason for this apprehension is the fear of

injections or local anesthesia.⁸ The inability of children to deal with threatening dental stimuli often manifests as behaviour management problems.² Dental anxiety has been a potential problem in patient management and early recognition of dental anxiety among children is essential for appropriate patient management and successful treatment.⁷

Pediatric dentists distract children by telling them anecdotes to reduce the anxiety during the dental procedure but they do not consider the changes in the subjective and objective parameters that occurs during storytelling.

An aim of the study was to determine the effect of storytelling on child's anxiety during the administration of local anesthetic injection.

Material and Method

The present study was conducted in the Department of Pediatric Dentistry. It was a split mouth study undertaken to determine the effectiveness of storytelling in reducing anxiety in the paediatric dental patients. The study protocol was approved by the ethical committee. Informed consent was obtained from the parents along with a brief medical & dental history of the child.

The present study was carried out in a total of 15 healthy children, aged between 3-6 years and were selected based on those who needed administration of local anesthesia during a pediatric dental procedure.

Materials used:

1. Story books [Fig. 1]

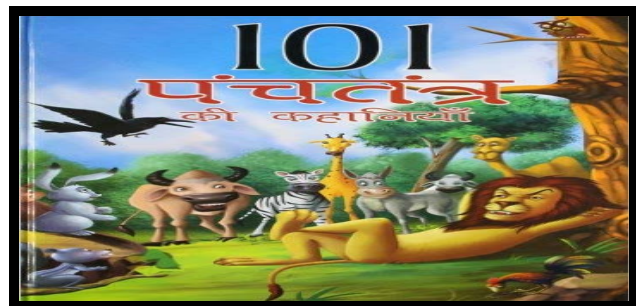


Figure 1: Story book used in the study

2. Finger pulse oximeter for measuring heart-rate [Fig. 2]



Figure 2: Finger pulse oximeter used in the study

3. RMS Pictorial scale for determining anxiety [Fig. 3, 4]

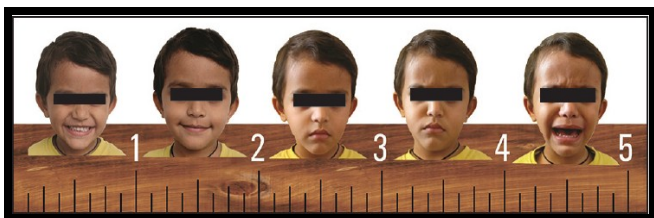


Figure 3: RMS Pictorial Scale (RMS-PS) for Boys

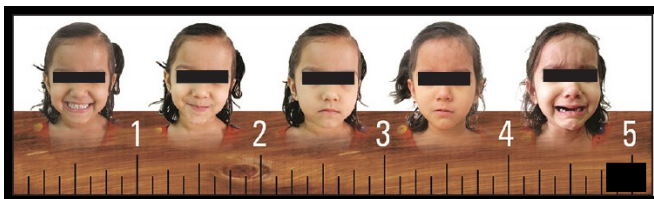


Figure 4: RMS Pictorial Scale (RMS-PS) for Girls

Methodology

As the present study was a crossover study, each patient acted as its own control.

The arch was divided into 2 groups-

1. Control arch- no storytelling carried out during local anesthesia administration.
2. Experimental arch- storytelling carried out during local anesthesia administration.

Procedure

Each patient who needed dental procedures requiring local anesthesia like extraction, pulpectomies and pulpotomies were selected for the study.

Anxiety measurement

Child's anxiety level for both control arch and experimental arch was measured using:

RMS Pictorial Scale

The RMS-PS consists of original photographs of both a boy and a girl child. The photographs in the original article were taken with parents' permission.

RMS-Pictorial Scale comprises a row of five faces ranging from very happy to very unhappy. Two separate sets of photographs were used for boys [Fig 3] and girls [Fig 4]. The children were asked to choose the face they feel like about themselves at that moment. The scale was scored by giving a value of one to the very happy face and five to the very unhappy face.

Finger pulse oximeter

For pulse rate measurement, it is a direct measure of physiological arousal since its increase is attributed to stress during dental procedures.

The patient's heart-rate was calculated during the procedure at three stages as shown in [Fig 5, 6, 7].



Figure 5: Before administration of local anesthesia



Figure 6: During administration of local anesthesia



Figure 7: After administration of local anesthesia

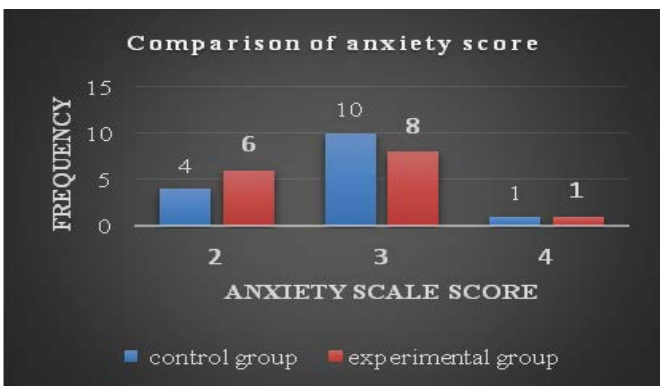
The values were tabulated & subjected to statistical analysis.

Statistical Analysis

The statistical analysis was done using SPSS (Statistical Package for Social Sciences) statistical Analysis Software. The statistical tests used were Paired sample t-test, Chi-Square test and Independent t-test.

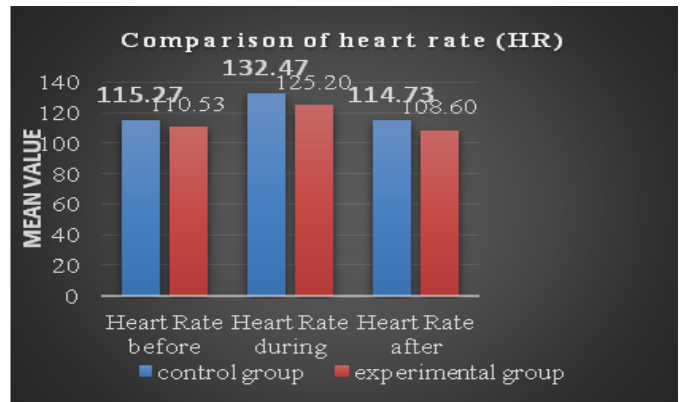
Results

In the cross-arch comparison of RMS Pictorial Scale [graph-1], the difference was not statistically significant. However, there was reduction in anxiety score and child’s behaviour turned positive during the application of storytelling compared to that of control side.



Graph-1: Comparison of anxiety score.

In the cross-arch comparison of the heart rate with and without storytelling [graph-2], a non-significant difference in both groups was observed ($p>0.001$).



Graph-2: Comparison of heart rate.

Statistical analysis of changes in heart rate (HR) were precluded by the small sample size. However, visual inspection of the means and standard deviations for change scores (basal reading minus procedure reading) did not appreciably differ from pre- to post-intervention. During the baseline condition, the mean change in HR from basal to dental treatment was 17.20 beats per minute (bpm) (SD = 13.79), whereas during the distraction condition it was 14.67 bpm (SD =12.02).

Discussion

The age group of 3-6 years was selected for the present study as this is the time the child would have the initiation of anxiety, so to co-relate the presence of general fears and anxiety with dental anxiety this is the best age. The rate of prevalence of dental anxiety is 5-20% in children and this tends to decrease as age advances.⁹ Storytelling has a significant impact in decreasing anxiety in preschool children.¹⁰

Stories serve as a model, teach values and skill, and can provide insight on both a conscious and unconscious level.⁵ They enable the listeners to imagine new perspectives, inviting a transformative and empathetic experience. The narratives make things easier to remember and understand.¹¹

In the present study, the famous “PANCHATANTRA” stories were told to the patients during local anesthetic administration. The collections of these stories are based

on human behaviours portrayed by animal characters with the moral at the end of story. They give the kids an early footing onto moral and social values, shaping the young minds into an ethical future.

Storytelling improves the children's positive response through two mechanisms as psychological pathways and physiological pathways. It has a relaxing effect on the body and decrease anxiety, provide comfort, and improve memory. Relaxation effect activates brain structures such as the limbic area, suggesting an important role of emotion.¹⁰

The science behind the storytelling explains various processes like neural coupling in which a story activates parts in the brain that allows listener to turn the story into their own ideas and experience. Brain also releases dopamine into the system during an emotionally charged event like storytelling, making it easier to remember and with greater accuracy. A well-told story engages various areas of cortex like Broca's area and Wernicke's area, sensory cortex, motor cortex and frontal cortex. Mirroring is another mechanism, in which listeners not only experience the similar brain activity as each other, but also to the speaker.

Subjective measure of anxiety was taken using RMS Pictorial scale and objective measure was taken as heart-rate using pulse oximeter.

A limitation of the present study was the small sample size. The use of storytelling warrants further research as a behaviour management tool. Although the anxiety scores decreased in the experimental group, the differences were not significant. It may have clinical usefulness for controlling the anxiety of children in the dental setting, especially when undergoing an injection.¹²

The reason for increased anxiety during the operative stage could be because of exposure to the anxiety provoking dental equipments and local anesthetic

injection. It was also observed by Kleinknecht et al (1978) that the sight of the anesthetic needle and the sight, sound, and sensation of the drill were the most fear-eliciting stimuli.¹³ Prabhakar et al. (2007) found that the increase in anxiety in the last visit was due to the sight of injection.

¹⁴ A study done by Singh RK et al. (2015) found significant decrease in anxiety of patients with audio-visual distraction as compared to control group.¹⁵

The pulse rate is governed by the nervous system, especially the autonomic nervous system (ANS) which reflects negative emotions in terms of physiological parameters such as heart -rate, respirations and body temperature. The physiological responses of the ANS are indicators used to tell if a person is under stress or relaxation.²

A study by Sullivan et al. (2000) found that the pulse rate of the subjects in the distraction group were significantly lower than pulse rate of subjects who did not receive distraction.¹⁶ Aitken et al. (2002) found an increase in heart rate during the injection phase in the children with age group of 4-6 years.¹² The results of the present study were in consonance with Marwah et al. (2005) who concluded that pulse rate was more in the control group as compared to the music distraction group but the differences were not statistically significant.¹⁷

So far very few studies have been undertaken clinically to evaluate the efficacy of storytelling as a distraction technique using control and experimental group in the management of dental anxiety.

Conclusion

Storytelling was an effective means of managing anxiety in pediatric patients in the dental office. The use of storytelling as a non-drug-based, easy, inexpensive, accessible and children-favoured method can be considered for managing anxious pediatric dental patients.

Further research should be done on a large sample size to determine the efficacy of storytelling as a means of distraction technique in pediatric dentistry.

REFERENCES

1. Hassan Mohamed Kawia, Hawa Shariff Mbawalla, Febronia Kokulengya Kahabuka. Application of Behavior Management Techniques for Paediatric Dental Patients by Tanzanian Dental Practitioners. *The Open Dentistry Journal* 2015; 9: 455-461.
2. Saumya Navit et al. Effectiveness and Comparison of Various Audio Distraction Aids in Management of Anxious Dental Pediatric Patients. *Journal of Clinical and Diagnostic Research* 2015 Dec; 9(12): ZC05-ZC09.
3. Naser Asl Aminabadi, Leila Erfanparast, Azin Sohrabi, Sina Ghertasi Oskouei, Armaghan Naghili. The Impact of Virtual Reality Distraction on Pain and Anxiety during Dental Treatment in 4-6 Year-Old Children: a Randomized Controlled Clinical Trial. *Journal of Dental Research, Dental Clinics, Dental Prospects* 2012; 6(4): 117-124.
4. Donna Koller, Ran D. Goldman. Distraction Techniques for Children Undergoing Procedures: A Critical Review of Pediatric Research. *Journal of Pediatric Nursing* 2012; 27: 652-681.
5. Lata Kanchan, Sharma Mukesh Chandra, Sareen Aarti. A Randomized Clinical Trial to Evaluate the Effectiveness of Storytelling by Researcher on the Hospitalization Anxiety of Children Admitted in Pediatric Ward of Selected Hospitals of District Patiala, Punjab. *International Journal of Science and Research (IJSR)* 2015 Oct; 4(10): 706-709.
6. Gunmeen Sadana, Rashu Grover, Manjul Mehra, Sunil Gupta, Jasmeet Kaur, Sukhmani Sadana. A novel Chotta Bheem-Chutki scale for dental anxiety determination in children. *Journal of International Society of Preventive and Community Dentistry* 2016 May-June; 6(3): 200-205.
7. Shetty RM, Khandelwal M, Rath S. RMS Pictorial Scale (RMS-PS): An innovative scale for the assessment of child's dental anxiety. *Journal of Indian Society of Pedodontics and Preventive Dentistry* 2015 Jan- Mar; 33(1): 48-52.
8. Jyoti Oberoi, Anup Panda, Iti Garg. Effect of Hypnosis during Administration of Local Anesthesia in Six- to 16-year-old Children. *Journal of Pediatric Dentistry* 2016 Mar-Apr; 38(2): 217-20.
9. Anant Gopal Nigam, Nikhil Marwah, Puneet Goenka, Ajay Chaudhry. Correlation of general anxiety and dental anxiety in children aged 3 to 5 years: A clinical survey. *Journal of International Oral Health* 2013 Nov-Dec; 5(6):18-24.
10. Arie Kusumaningrum, Evy Anggraini Gultom, and Nia Risa Dewi. Physiological and Psychological Benefits of Therapeutic Storytelling to Inpatient Children. *ICPMHS* 6: 71-74.
11. Marsha Rossiter. Narrative and Stories in Adult Teaching and Learning. *ERIC DIGEST* 2002; EDO-CE-02-241.
12. Aitken JC, Wilson S, Coury D, Moursi AM. The effect of music distraction on pain, anxiety and behavior in paediatric dental patients. *Paediatr Dent.* 2002; 24(2):114- 18.
13. Kleinknecht RA, Klepac RK, Alexander LD. Origins and characteristics of fear of dentistry. *J Am Dent Assoc.* 1973 Apr; 86(4): 842-8.
14. 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; 25: 177-82.

15. Rahul Kumar Singh, Vinay Kumar Gupta, Ashok Kumar, Amitu singh, Rakshith Shetty, Vijayendra Pandey. Effectiveness and Comparison of Various Audio Distraction Aids in Management of Anxious Dental Paediatric Patients. *International Journal of Contemporary Medical Research* 2015 May; 3(5): 1532-34.
16. Kochhar GK, Chachra S, Vij N, Kaur T, Duhan H, Kaur K. Execution of Children with Dental Heebie-Jeebies by Alchemic Delusional Dissipation. *J Clin Trials* 2015; 5(3): 223.
17. Marwah N, Prabhakar AR, Raju OS. Music distraction – It's efficacy in management of anxious paediatric dental patients. *J Indian Soc Pedod Prev Dent.* 2005; 23(4):168-70.