ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at: www.ijdsir.com

Volume – 6, Issue – 2, March - 2023, Page No. : 172 - 177

Assessment of effectiveness of the app for comforting children using mixed reality as non-pharmacological behaviour management technique

[1]Dr. Soumya Revan Siddappa Kakkeri, Postgraduate 3rd year, Department of Pediatric and Preventive Dentistry, P.M.N.M Dental College and Hospital, Bagalkot, Karnataka-587103, India.

[2]Dr. Shivaprakash P. K, Professor and Head, Department of Pediatric and Preventive Dentistry, P.M.N.M Dental College and Hospital, Bagalkot, Karnataka-587103, India

[3]Dr. Hina Noorani, Professor, Department of Pediatric and Preventive Dentistry, P.M.N.M Dental College and Hospital, Bagalkot, Karnataka-587103, India.

[4]Dr. Priya. Belagal, Postgraduate 3rd year, Department of Pediatric and Preventive Dentistry, P.M.N.M Dental College and Hospital, Bagalkot, Karnataka-587103, India.

Corresponding Author: Dr. Soumya Revan Siddappa Kakkeri, Post-Graduate 3rd year, Department of Pediatric and Preventive Dentistry, P.M.N.M Dental College and Hospital, Bagalkot, Karnataka-587103, India.

Citation of this Article: Dr. Soumya Revan Siddappa Kakkeri, Dr. Shivaprakash P. K, Dr. Hina Noorani, Dr. Priya. Belagal, "Assessment of effectiveness of the app for comforting children using mixed reality as non-pharmacological behaviour management technique", IJDSIR- March - 2023, Volume – 6, Issue - 2, P. No. 172 – 177.

Copyright: © 2023, Dr. Soumya Revan Siddappa Kakkeri, et al. This is an open access journal and article distributed under the terms of the creative commons' attribution non-commercial License. Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: Young children are more fond of cartoon characters, using mixed reality cartoon characters, can be brought as virtual objects into the real world where they co-exist, which helps children to improve their behaviour during dental procedure.

Aim: To evaluate the effectiveness of the app for comforting children which presents cartoon characters as virtual objects using mixed reality as non - pharmacological behaviour management technique.

Methods: Thirty children in the age group of 3–8 years who visited to dental clinic for the first time and fulfilled the inclusion criteria were randomly selected from the Outpatient Department of Pediatric and Preventive dentistry and divided into two groups 15 each (Group I – control group, Group II – study group).

Selected subjects were made to use the mobile application which was based on mixed reality (unity software was used). The mobile application was used as relaxation aid while performing dental procedure. Their anxiety levels were noted before and after playing cartoon video using the facial imaging scale.

Results: Majority of the study participants were of mean age 5 years old [5.07]. Wilcoxon Signed Rank Test was

used to Compare the mean Facial Image scale scores between before & after treatment in Control with mean difference 0.54 at p-value 0.006 & study group mean difference 2.53 at significant p—value<0.001.

Conclusion: Results of this study showed that app distraction technique was effective in reducing anxiety during LA injection as seen on facial image scale of anxiety.

This tool can be effectively used for comforting children.

Keywords: Anxiety, Mixed reality, cartoon character, Mobile app, Pediatric patient.

Introduction

Several factors, such as sound of a dental drill, aerator noises, dread of needles, prior negative dental experiences, the odor of a dental office, and pain, are the reason for child's dental anxiety and phobia.[1]

One of the most important determining factors associated with desired outcomes after dental treatment in Pediatric patients is dental anxiety control.

Fear and anxiety are the most common factors among Pediatric patients visiting the dentists, and these factors lowers the demand for Pediatric dental care. [2]

Numerous linguistic, pharmaceutical and advanced therapies have been developed to manage children's anxiety, fear and uncooperative behaviour.

The tell-show-do method, modelling, and positive or negative reinforcement which are most frequently employed techniques by Pediatric dentists to decrease children's anxiety prior to the treatment.3 so,

before starting any dental treatment children should be well explained about the treatment and introduced to dental instruments.

Figure 1:

Several advanced interventions have been developed in audio visual distraction techniques based on virtual reality, augmented reality and mixed reality. Mixed reality is newer technology in which the real and virtual worlds are combined in such a way that a mixed reality environment is created between them. This concept helps children to feel more real. [4]

Based on mixed reality several dental applications have been created. As we have seen these days children from all the age groups, be it a young child to youths preoccupied by mobile phone for entertainment purpose, playing games or listening music. Nowadays we have wide variety of apps for doing anything related to education, marketing, health assistance, dental treatment. Considering this fact, a small attempt was made to create an app and to evaluate its effectiveness in the management of dental anxiety and behaviour in children.[3]

Methods

The present short term clinical study was conducted in the department of Pediatric and preventive dentistry. The study subjects were included healthy children, in the

©2023 IJDSIR, All Rights Reserved

age-group 3– 8 years, requiring any dental treatment under local anesthesia.

The minimum sample size was statistically calculated as total 30 children and were divided into 2 groups 15 in each group (Group I-Control group, Group II study group). Healthy children with moderate level of anxiety requiring dental treatment under local anesthesia were included in the study.

Children with special health care needs were not included in the study. Before the treatment children were subjected to facial image scale to know their anxiety level (figure1).

Inclusion criteria

• Children aged 3-8 years old

• Healthy children without any

• Relevant medical history

• Patient with Frankl image score scale 3 & 4

• Patients with first dental visit

Exclusion criteria

• Children with multiple visits

• Children with special health care needs

In this study Group I – control group was subjected to Tell-show-do technique which is the most common traditional technique.

Cartoon character (teddy bear) image print was taken. Group II – study group was subjected to the app; the mobile camera was focused on paper which has teddy bear cartoon image (figure1) which is projected in front of child as 3D character in mobile (figure3).

The cartoon has features like waving and moving so the child feels the cartoon exists in real.

Dental treatment was done under local anesthesia and child's anxiety level was measured with facial image scale (figure4) after treatment and readings were noted.

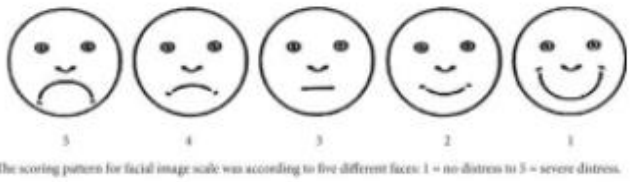
Figures

Fig 1: cartoon image

Fig 2: Asking patient about his anxiety level by showing facial image scale.

Fig 3: Using software application in mobile during procedure.

©2023 IJDSIR, All Rights Reserved



The scoring pattern for facial image scale was according to five different faces: 1 = no distress to 5 = severe distress.

Fig 4: Facial image scale.

RESULTS In this study, majority of the children were of mean age 5 years. A statistically significant proportion of facial image score was increased in group I (3.33) after treatment when compared to group II (1.47) using Wilcoxon Signed Rank Test at P-value 0.006 &<0.001 respectively. On comparison between Study & Control group using Mann Whitney Test, the result showed a significant mean percentage reduction in Facial Image scale scores i.e., 46.67 at P-value<0.001. In conclusion of result there was decrease in anxiety level in children who are subjected to mobile application compared to traditional method i.e., tell show-do.

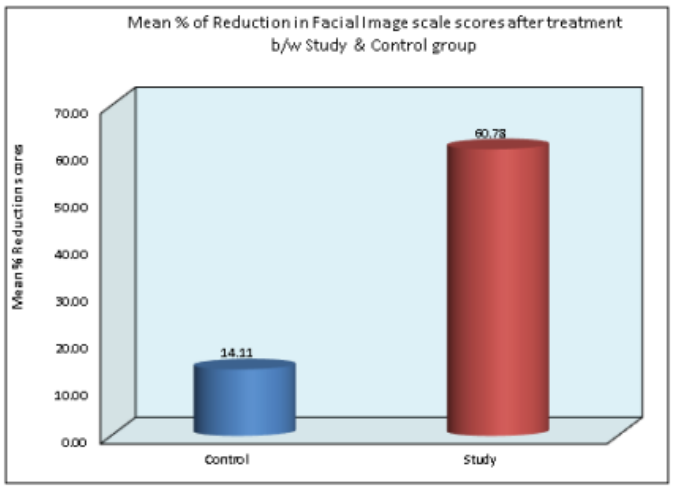
Table 1: Age and gender distribution between 2 groups.

Table 1: Age and gender distribution between 2 groups						
Variable	Category	Control		Study		P-Value
		Mean	SD	Mean	SD	
Age	Mean	5.53	1.60	5.07	1.49	0.42[a]
	Range	03 – 08		03 - 08		
		n	%	n	%	
Sex	Males	9	60.0%	7	46.7%	0.46[b]
	Females	6	40.0%	8	53.3%	

Table 2: comparison of mean facial image scores between 2 groups before and after treatment using Mann Whitney test.

Table 2: Comparison of mean Facial Image scale scores between control & study groups before & after treatment using Mann Whitney Test						
Time	Groups	N	Mean	SD	Mean Diff	p-value
Before Rx	Control	15	3.87	0.92	-0.13	0.66
	Study	15	4.00	1.00		
After Rx	Control	15	3.33	1.11	1.86	<0.001*
	Study	15	1.47	0.52		

Graph 1: mean percentage reduction on facial image scale scores after treatment between both the groups.



Discussion

This study was conducted to evaluate the effectiveness of smart dental application to manage behaviour of children who were reported to department for dental treatment under local Anesthesia. Dental anxiety has significantly one of the major problems for many patients as well as the dentists as it leads to avoidance of seeking dental treatment in children.

Various behaviour management techniques have been developed to manage child's behaviour, anxiety towards dental treatment, establish good rapport with child, inculcate the positive attitude, render successful and good quality dental care this helps to build a good bond between the dentist, child, and parent, and also to promote good oral health care.[5]

In present study unity software is used to create mobile application based on mixed reality which helps to distract the children from dental treatment and make them to involve practically in mixed reality environment. Mixed reality is combination of real and virtual world which makes the child to believe that model is really exist in real world even though it exists in virtually.

In this era, electronic devices such as smartphones, computers, laptops, televisions, smartwatches have

©2023 IJDSIR, All Rights Reserved

become part of our daily life. Through which children get familiarized to various aspects of life which include medical treatment cartoons, more specifically dental treatments. Cartoon characters and their paly have become greatest entertainment to the children, using cartoon character as we used in our study got positive response from patients and also showed reduced anxiety level during dental treatment. Presently, various medical and dental applications are developed to guide the patients regarding treatment procedure and to distract patients while doing dental procedure.[6]

Patients who were visited to the Pediatric department for their dental treatment showed different level of anxiety towards dental treatment as their first time being subjected to such situations along with personally narrated by their friends and folks who had their worst dental experience, which further makes anxious children avoid dental treatment.[7]

Patients in group II (mobile application) showed a marked reduction in their anxiety levels as compared to group I (tell show do). The application developed includes various interactive and joyful activities for the patient.

Regarding the assessment of dental anxiety before and after treatment using facial image scale (FIS), facial image scale scores decreased for group II compared to group I. However, on the other hand, the tell-show-do technique produced the most significant increase in the facial image scale scores of the Pediatric patients as compared to the other group.

Based on the result of the present study, the mobile software application is found to be the most effective method in reducing dental anxiety in patients. This study results correlated to a similar study conducted by Patil et al.[3] and Shah et al.[8] they manifested similar findings when compared with the “tell-show-do” technique.

Even though this study has included using newer technology & used to assess Pediatric dental anxiety, the present study has some limitations. Considering the smaller sample size distribution in each group can be one of the two possible limitations of this study, the other may include modifications such as adding music and other cartoon characters. Therefore, further clinical trials with larger sample size and comparison of other newer behaviour modification techniques applied in this study are recommended with other contemporary method.

Conclusion

This study highlighted that mobile application can be used as effective tool for behaviour management. This technology has advantage over many traditional behaviour management techniques. We always update our knowledge about newer techniques and also, we should in still them in our daily practice.

References

1. Kaur R, Jindal R, Dua R, et al. Comparative evaluation of the effectiveness of audio and audio-visual distraction aids in the management of anxious Pediatric dental patients. J Indian Soc Pedo dont Prevent Dent 2015;33(3):192. DOI: 10.4103/0970- 4388.160357.

2. B. Bande low, S. Michaelis, and D. Wed kind, “Treatment of anxiety disorders,” Dialogues in Clinical Neuroscience, vol. 19, no. 2, pp. 93–107, 2017

3. Patil VH, Vaid K, Gokhale NS, Shah P, Mundada M, Huger SM. Evaluation of effectiveness of dental apps in management of child behaviour: A pilot study. Int J Pedod Rehabil 2017; 2:14-8

4. Rokhsaritalemi S, Sadeghi-Niaraki A, Choi S-M. A Review on Mixed Reality: Current Trends, Challenges and Prospects. Applied Sciences. 2020; 10(2):636.

5. Kevadia MV, B Sandhyarani, Patil AT, et al. Comparative Evaluation of Effectiveness of Tell-Play-

©2023 IJDSIR, All Rights Reserved

Do, Film Modelling and Use of Smartphone Dental Application in the Management of Child Behaviour. Int J Clin Pediatr Dent 2020;13(6):682–687.

6. J. S. Radesky, H. M. Weeks, R. Ball et al., "Young children 's use of smartphones and tablets," Pediatrics, vol. 146, no. 1, article e20193518, 2020.

7. N. M. Farsi, A. A. El-Housseiny, O. M. Felemban, and M. A. Alshoraim, "Effects of familial characteristics on dental fear: a cross-sectional study," The Journal of Contemporary Dental Practice, vol. 20, no. 5, pp. 609 – 615, 2019.

8. A. Harsh, "Evaluation of dental anxiety and hemo dynamic changes (sympathoadrenal response) during various dental procedures using smartphone applications v/s traditional behaviour management techniques in Pediatric patients," International Journal of Applied Research, vol. 3, no. 5, pp. 429 –433, 2017

©2023 IJDSIR, All Rights Reserved