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COMPARATIVE EVALUATION OF THE EFFECTIVENESS OF ACTIVE AND PASSIVE DISTRACTION AIDS IN THE MANAGEMENT OF ANXIOUS PEDIATRIC DENTAL PATIENT.

Pediatrics

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ABSTRACT

Introduction: Dental anxiety leads to undesirable distresses among caregivers that affect the treatment quality. Thus the aim of this study was to evaluate the effectiveness of active and passive distraction using audiovisual distraction (AV).
Method: 60 children patients who presented for treatment and met inclusion criteria were included and randomly divided into three groups; a control group, active distraction group and a passive distraction group. Anxiety and cooperative behaviour was assessed with the Wong-Baker Faces Pain Rating Scale and pulse rates.
Results: Statistically significant differences were found among the three groups. Pulse rate and anxiety was significantly decreased in the active audiovisual distraction group ($p<0.001$).
Conclusion: Active AV distraction is an effective method in reducing fear and anxiety in children during dental treatment

KEYWORDS

Audio-visual distraction, inferior alveolar nerve block, virtual reality box

INTRODUCTION

Pain management during dental procedures is crucial for successful behaviour guidance. Prevention of pain can nurture the relationship between the dentist and the patient, build trust, allay fear and anxiety and enhance positive dental attitude for future visits.[1] Researchers have found that one of the most provocation aspects of child behavior management is poor pain control. Even though it is challenging but it is important that clinicians must try their best to reduce pain and discomfort during dental treatment, especially injection procedure.[2]

Distraction, one of the psycho-behavioural approaches used in medical and dental treatment situations, is defined as a non-aversive approach used to modify a child's discomfort by disrupting his/her attention away from the main task to accomplish successful treatment with high quality.[3]

Distracters can be either in active or passive form. Audiovisual distraction is a mode of passively distracting two types of sensations—hearing and seeing. Whereas, playing a game is an active technique which distracts an extra source of sensation – kinesthetic sensation. Watching videos and playing video games on mobile phones are widely popular among children.[4]

In recent years, there has been an increase in behavioural research in virtual reality (VR) and virtual world. VR refers to a human–computer interface that enables the user to interact dynamically with the computer-generated environment. In contrast to the less complex audiovisual (A/V) distraction, VR uses sophisticated systems such as head-mounted, wide field-of-view; three-dimensional displays (HMDs) and motion sensing systems that measure the user's head and hand positions.[5]

The aim of this study is to evaluate and compare the effectiveness of active and passive distraction with Virtual Reality Box.

MATERIALS AND METHOD

60 children were selected from children attending the Department of Pediatric Dentistry and were based on the following inclusion criteria:

1. Age group between 6 and 10 years
2. No previous dental experience
3. No systemic or mental disorders
4. Definitely positive or positive ratings of Frank scale
5. Who required LA administration in the mandibular arch (Inferior Alveolar Nerve block).

Exclusion criteria: Patients with medically or developmentally compromising conditions; patients with mental / cognitive problems; patients with heart disorders; patients with photosensitive epilepsy.
The participants were divided into 3 groups:

Control group: Without distraction in which IANB was administrated with basic behavior guidance techniques and without using any type of distraction aids.

Group 1: Active Distraction in which IANB with using AV eyeglasses 'VR Box' while watching cartoon.

Group 2: Passive Distraction in which IANB was administrated with using AV eyeglass VR Box while playing video games.

The AV eyeglasses were used in the current study as an entertainment system, which can block the visual field of the child completely. The device was connected to a mobile phone capable of playing MP4 audio-visual files.

Pain assessment scale: The Wong-Baker FACES pain rating scale was used in this study to measure pain after delivering inferior alveolar block injection. Children were asked to choose one of the scale's faces that best described how they felt during the procedure.

Pulse rate measures: The pulse rate was recorded for the first time when patients were seated on the dental chair and immediately after Inferior Alveolar Nerve block was administered. Then, the difference of values between the two groups was observed. The data was then statistically analyzed using SPSS software (version 20.0).

RESULT

A total of 60 children participated in the study. In all the groups, pain and behavioural scale scores (Pulse rate, W-P faces) were recorded. Then one-way Anova statistical test was done, significant difference was found between three groups in the W-P faces ($p<0.001$). Paired t test revealed significant difference between three groups in the pulse rate scale ($p<0.001$).

As noted in Table 2, Tukey's post hoc test to find pairwise comparison revealed that there was significant difference between Group 1 and Group 2 ($p< 0.001$), no significant differences between Group 1 and Group 3 ($p =0.071$) and significant difference between group 2 and group 3 ($p =0.01$) in the W-P faces scale.

As in Table 3, Tukey's post hoc test to find pairwise comparison

revealed that there was significant difference between Group 1 and Group 2 (p=0.003), significant difference between Group 1 and Group 3 (p =0.008) and no significant difference between group 2 and group 3 (p =0.945) in the pulse rate scale.

Table 1: Descriptive statistics of Wong-Baker Faces Pain Rating Scale among three study groups

	Mean	S.D	Std.error	Minimum	Maximum
Group 1 (control)	6.4	2.30	0.51	2.0	10.0
Group 2 (active Distraction)	2.2	2.14	0.47	0.0	6.0
Group 3 (passive Distraction)	4.6	3.05	0.68	0.0	10.0

Table 2: Comparative statistics of Wong-Baker Faces Pain Rating Scale among three study groups

	Mean	S.D	Anova F Test	p value, Significance
Group 1 (CONTROL)	6.4	2.30	F = 13.875	p <0.001**
Group 2 (active Distraction)	2.2	2.14		
Group 3 (passive Distraction)	4.6	3.05		
Tukey's post hoc test to find pairwise comparison				
Group	**Comparison Group**	**Mean Difference**	**p value Significance**	
Group 1 (CONTROL) vs	Group 2 (active Distraction)	4.2	p <0.001**	
	Group 3 (passive Distraction)	1.8	p =0.071	
Group 2 (active Distraction) vs	Group 3 (passive Distraction)	2.4	p =0.011*	

p >0.05 – not significant *p<0.05 – significant **p<0.001 – highly significant

Table 3: Intragroup comparison of pulse rate in each group (before & after)

	Before Mean (S.D)	After Mean (S.D)	Paired 't' test	p value , Significance
Group 1 (control)	115.35 (16.35)	127.8 (16.21)	t = -7.402	p <0.001**
Group 2 (active Distraction)	118.95 (20.11)	83.95 (9.16)	t = 7.071	p <0.001**
Group 3 (passive Distraction)	121.05 (22.41)	88.15 (13.48)	t = 5.403	p <0.001**

DISCUSSION

In pediatric dentistry, there is a strong relationship between a child's dental anxiety and successful dental treatment. Even more, the painful situations like needle insertion can result in fear and affect the behaviour of the child.[2]

Pharmacological methods in combination with non pharmacological methods have been used to allay fear and anxiety. In this study it was found that using VR box with audiovisual distraction while playing video games decreased fear of the child than children in the passive distraction group in which no games were played and control group.

In active distraction, the child is more involved in the activity as compared to passive distraction. Distraction works through a process. The more an activity needs attention, the more distracted is the patient.[1] A study by Prabhakar et al. (2007) reported results coinciding with the present study. They found that the use of AV distraction during dental treatment was more effective in managing the children than using audio distraction solely.[3]

A study conducted by Attar et al. suggested that active distraction that enhances visual, mental, and motor participation of the child patient would provide anxiolysis and analgesia that surpasses the effect of passive distraction. There has been evidence from medicine that passive distraction, such as watching a film, is not as effective as active distraction (e.g. playing a video game) in reducing patient anxiety as proven by the results of this study.[4] This study excluded children with previous bad experience which might have affected the results and could hence be considered a limitation. However, this was chosen in order to achieve as a homogeneous group as possible to be able to draw any conclusions.

Although it has been hypothesized that active strategies are more effective than the passive ones, studies conducted by Peretz B et al., Mason S et al and Dahlquist LM et al suggested that passive distraction may be as effective or even better, since, the active forms are too demanding for children.[6,7,8] In this study it was found that it was significantly easier to carry out the procedure using active video game distraction than passive video viewing of cartoons. Both the distraction techniques were found to be very effective in relation to handling patients pre-operatively and during the procedure.[4]

CONCLUSION

In conclusion, children using AV active distraction during IANB do not only report less distress during the procedure than those with AV passive distraction, but they also show a more positive response after injection with local anaesthesia. Hence, AV- active distraction seems to be a useful tool to decrease the distress and anxiety during dental treatment.

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