Effectiveness of Dental Game Apps In Managing Anxiety In Pediatric Dental Procedures

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Abstract
Aim and objectives: The aim of the study was to compare the child’s anxiety before and after the use of dental game app.

Materials and Methodology: 68 children of age 7 – 12 years where made to use ‘dentist game’, which is a mobile dental game app developed by Mazarredo, available in google play store on android smart phones. The anxiety levels were recorded before and after playing the game using the modified dental anxiety scale.

Results: The results were found to be highly significant; 36.8% for high anxiety & low anxiety was 63.2%,were as after the treatment high anxiety reduced to 0% and low anxiety was 100%.

Conclusion: The use of mobile game dental app was found to reduce the anxiety and fear of the paediatric patients in dental setup.

Keywords: Mobile Phone, Dental Game App, Modified Dental Anxiety, Pediatric, Airotor.

Introduction
The greatest challenge that dentist is facing today is managing paediatric patients in a dental clinic. Children found to be so anxious these days as they consider the dental clinic to be a very scary place to visit. False information from the peer, media and even the parents have created an objective fear and anxiety within many children. Dental anxiety is a state of apprehension that something dreadful is going to happen in relation to the
dental treatment and it is coupled with a sense of losing control [1]. In order to reduce dental anxiety among children, behavioral management techniques are implemented. The basic techniques of behavior management used to reduce child’s anxiety are telling, show do (TSD), positive reinforcement, nonverbal communication, voice control, and distraction [2].

Distraction is a method of behavior management in which the patients are distracted from the sound or sight of the dental treatment thereby reducing the anxiety. With the advancement in technology, a standard mobile device has gone from being no more than a simple two-way to being a mobile phone, GPS navigation device, an embedded web browser, instant messaging, and a handheld game [3]. Generally seen that children from all age groups, be it a toddler to a teenager are stuck up to the mobile phone playing games or browsing internet. Hence mobile phones can be used in favor of pediatric dentistry for educating the patients about the treatment procedures which can help in reducing their fear or anxiety. Therefore, the aim of the study was to compare the child’s anxiety before and after the use of dental game app.

Materials and Methods
A total of 68 patients, between 7 to 12 years selected from the Department of Paedodontics, Yenepoya dental college, Mangalore. The candidates with good general health and with no history of systemic illness or hospitalization. Children undergone class 1 restoration in any of these visits was included in this study. Children with systemic diseases, Visual and hearing impairment and mental retardation were excluded from this study. Materials required were Modified Dental Anxiety Scale, Dentist game, Smart mobile phone, Gloves, Mouth mirror, Probe, Airotor, burs, Excavators, Restorative cement, Cotton and gauge.

This experimental study was conducted after obtaining the institutional ethical committee clearance and informed written consent from the patients or parents of the selected subjects. After obtaining the consent, parents were given a brief introduction about the procedure and purpose of the study. There was a set of data assessment. The first assessment was done before the treatment using modified dental anxiety scale. During the using modified dental anxiety scale. During the procedure dentist game app was given. Then second assessment was carried out after the treatment using modified dental anxiety scale Fig(1). Finally anxiety level of children where compared.

Fig. 1: shows Modified dental anxiety scale
Dentist game-Dental game app
This is a smart phone game which demonstrates and educates various dental procedures to the children such as use of airotor, forceps, Local anesthesia, scaling. Developed from Mazarredo, 69 3rd Bilbao CP 48009 Bizkaia Fig(2), Fig(3).
Fig. 2: Shows dentist games

Fig. 3: Shows dental instruments in dentist game

Result
The obtained data were entered into standardized form and were statistically analysed using SPSS version 21.0. T - test was applied for comparison of before and after the use of modified dental anxiety scale with and without using dental game apps where P value was 0.0001 which was statistically significant.

Table 1 T-test

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>Change (%)</th>
<th>T test P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before treatment - Total score</td>
<td>68</td>
<td>14.38</td>
<td>4.66</td>
<td>13.50</td>
<td>55.21</td>
<td>0.0001 HS</td>
</tr>
<tr>
<td>After treatment -Total score</td>
<td>68</td>
<td>6.44</td>
<td>2.03</td>
<td>5.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

High significant difference was seen,(p-value=0.0001)
Before the treatment; anxiety score was $14.38\pm4.66$ & after the treatment it was $6.44\pm2.03$. This showed $55.21\%$ reduction after the treatment compared to before treatment and was highly significant with P=0.0001.
Table 2: shows Comparison of anxiety level before and after the use of dental game app

<table>
<thead>
<tr>
<th></th>
<th>Count</th>
<th>Column N %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Before - Total score</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High anxiety</td>
<td>25</td>
<td>36.8%</td>
</tr>
<tr>
<td>Low anxiety</td>
<td>43</td>
<td>63.2%</td>
</tr>
<tr>
<td>Total</td>
<td>68</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>After - Total score</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High anxiety</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Low anxiety</td>
<td>68</td>
<td>100.0%</td>
</tr>
<tr>
<td>Total</td>
<td>68</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Before the treatment 36.8% for high anxiety & low anxiety 63.2%, whereas after the treatment high anxiety reduced to 0% and low anxiety increased to 100%.

Discussion

The integral component in pediatric dental practice is managing of a child’s behaviour. The fundamental method to achieve success in treating a child is based on knowledge of dental materials, hand piece skills and most important is behavioural management. The aim of behavioural management technique is to enhance child’s acceptance and cooperative towards dental treatment. This ultimately helps in reducing child’s fear and anxiety towards dental treatment such as use of hand piece. To establish communication, build a trusting relationship between child, dentist and parent and to reduce anxiety and fear behavioural management techniques are induced by pediatric dental practitioners. This encourages the child to build positive attitude towards oral and dental health care, by coping up and willing to understand, undertake dental procedures for treatment.

In present condition, there are wide variety of behavioural management technique for pediatric dental practitioners such as densensitization, tel-show-do, positive reinforcement, modeling, distraction, voice control, nonverbal communication and general anesthetia. Parallel to the mentioned above techniques smart mobile offers opportunity to track emotional changes and regular behaviour.

Dental tools as mobile game app educate children about restoration, scaling and extractions. The present study explains regarding restoration, scaling and extractions. The evolution of computers and electronic based application gave rise to smart phones. Smart phones has dental as well as mental health apps which benefits in cost effectiveness, can collect date through online. According to the India’s latest survey, the internet users are 34.8%. So this can challenge to spread the technology based knowledge effectively and equally. Another benefit of mobile application is that, it is available in all languages including English. In the present study 7-14 years children included in study where they can understand English. This study supports various authors that smart phone dental game app technique are effective tool to reduce dental anxiety in children. The most concern in children is preoperative anxiety. Preoperative anxiety is expressed in form of fear of separate from caretaker or mother and fear towards unknown where as fear of mutilation and death is observed in children. Around 40-60% of children undergoing dental procedures experiences preoperative anxiety.

Preoperative anxiety have negative impact on children such as emergence delirium, postoperative pain, uncooperative behaviour or pre-operative analgesia. Signs in preoperative anxiety includes sleep disturbance, increased muscle tone, escape behaviour and agitation. In this study post treatment anxiety was reduced when compared to pretreatment anxiety after the use of mobile dental game app. This is because dental game apps might have influenced and educated the children regarding
treatment and have contributed significantly for behaviour management during procedure. Playing mobile games can allow a child to experience an interactive reward-dependent and might act as an attractive option for pretreatment exposure.

**Conclusion**

The use of mobile game dental app was found to reduce the anxiety and fear of the paediatric patients in dental setup. Henceforth we can conclude that mobile dental game application could be used as an adjunct behaviour management technique.

**References**