ABSTRACT

Aim To assess levels of anxiety in children concerning different dental instruments and equipment and to relate them with parents' anxiety levels moments before the appointment.

Materials and methods Fifty children from 4 to 12 years of age (average of 10±3.07) and their respective parents were evaluated. A facial scale was used to assess children's anxiety levels, while the Dental Anxiety Scale (DAS) was used to assess parents. Friedman test was applied to check any differences in children's anxiety levels relative to the equipment/instruments, and this was complemented by the use of the Wilcoxon test for two-by-two comparison. In order to assess correlation between parents' and their children's anxiety levels, the study used Spearman correlation coefficient.

Results With regard to parents' anxiety levels, 4% resulted as null, 18% were low, 56% were moderate, and 22% were exacerbated; children's anxiety level results were: 52% light, 44% intermediate, and 4% intense. Anxiety levels related to instruments/equipment were, in descending order: carpule syringe > paediatric forceps > dental explorer > x-ray machine > rubber dam punch > high speed handpiece > rubber dam forceps > mouth mirror > clinical tweezers > dental chair. No correlation was found between parents' anxiety levels and those of their children (p=0.546).

Conclusion The instruments/equipment used in the assessment generated different anxiety levels in the children. No correlation was found between parents' anxiety levels and those of their children.

Keywords Anxiety; Fear; Paediatric Dentistry.

Introduction

Fear and/or anxiety are recurring feelings and a cause of concern in paediatric dental treatment, since emotions influence children's behaviour and play an important role in pain perception [Marsac and Funk, 2008; Kuscu and Akyuz, 2008].

While anxiety is a systemic response to an imminent danger reflected in a combination of biochemical alterations and is influenced by memory, personal history and social context [Corah et al., 1978], fear represents a normal emotional reaction to specific external stimuli considered threatening [Klinberg, 2008].

Anxious children tend to avoid dental treatment and their dental health tends to be worse than that of less anxious, more cooperative children [Bankole et al., 2002]. Thus, paediatric dentists should address these concerns seeking a satisfactory patient/professional relationship and making it easier to provide dental treatment for children.

Treating fearful or anxious children is a challenge faced by paediatric dentists, and parents' attitude toward their children's anxiety/fear at the dental office has been the object of several studies [Themessl-Huber et al., 2010; Olumide et al., 2009; Luoto et al., 2009]. While a direct experience of displeasure at the dentist's office is very important for developing anxiety, an indirect experience, i.e. contact with others' experiences can also have a triggering effect [Shearer and Thomson, 2010]. Therefore, parents can play an important role in their children's dental treatment and behaviour during visits to the dentist. Evaluating a child's level of anxiety before paediatric treatment is the key, since this anxiety is closely related to their behaviour during dental visits [Ramos-Jorge et al., 2006]. Identifying and quantifying which factors trigger a situation of fear/anxiety is a basic requirement for controlling these factors to the largest extent possible and therefore reducing the child's negative behaviour during treatment.

This study sought to assess levels of anxiety in children when confronted with dental instruments and equipment and to correlate these levels with parents' anxiety levels moments before the appointment.

Materials and methods

This study was approved by the Ethics in Research Committee of University Ceuma - Order No. 65397/12. The research was conducted in 2010, in a private university located in the city of São Luís, in the Brazilian northeastern state of Maranhão. It is a prospective, transversal and descriptive study, using quantitative variables. The study was conducted in a waiting room at the Dentistry Clinic of the Centro Universitário do Maranhão, University Ceuma, which
has a clinic for dental treatment of paediatric patients. A sample calculation was performed [Zar, 1984] using as parameters alpha = 0.05, test value 0.30 (average or typical according to Cohen’s classification, 1998) and beta = 0.7 for the correlation test. The minimum number of participants was set at forty-six. In order to compensate for possible losses we added four participants to each of the groups, totaling 100 participants. The sample therefore consisted of two groups: 50 children and 50 parents of these children. The latter met the following criteria for participation: being a patient at the paediatric dental clinic and being in the company of their parents.

The facial scale validated in Brazil by Buchanan & Niven [2002] was used for assessing the children’s level of anxiety. Children were shown in random order ten photographs of instruments/equipment used in dental paediatric routine (dentistry chair; mouth mirror; dental explorer; clinical tweezers; x-ray machine; rubber dam forceps; rubber dam punch; paediatric forceps; high speed handpiece; carpule syringe). For each of the photographs, the child was asked to choose one item on the facial scale (1 to 5 with faces varying from very sad to very happy). Images 1 and 2 were considered light anxiety, image 3 was considered intermediate, and 4 and 5 were intense.

Parent’s anxiety levels were assessed using the Dental Anxiety Scale (DAS) proposed by Corah [1969], translated by Pereira and Queluz [2000], which consists of four questions to be answered by the parents. The values assigned to each question (1 to 5) were added and classified according to the level of anxiety as: null (totals up to 4), low (5-10), moderate (10-15), or exacerbated (15-20).

A T Student test (t) for independent samples was employed to compare male and female children’s anxiety levels.

Results

A total of 50 children aged 4 to 12 (average of 10 ± 3.07 years old) were evaluated, of which 29 were male and 21 were female. The respective parents were all female, aged 29 to 41 (average of 34 ± 4.17 years old).

The average anxiety level for male children was 2.89 (±0.53), while for female children it was 2.85 (±0.64). There was no significant statistical gender difference (t=0.265; p=0.792), thus indicating that the children’s anxiety levels did not depend on gender.

As to the parents’ anxiety levels, 4% were found to be null, 18% were low, 56% were moderate, and 22% were exacerbated. Whereas the children’s anxiety levels were: 52% light, 44% intermediate, and 4% intense.

Table 1 shows averages and standard deviations for children’s anxiety levels regarding the instruments/equipment, as well as distribution by anxiety level percentage.

<table>
<thead>
<tr>
<th>INSTRUMENTS / EQUIPMENT</th>
<th>AVERAGE</th>
<th>STANDARD DEVIATION</th>
<th>ANXIETY LEVEL (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intense</td>
<td>Intermediate</td>
<td>Mild</td>
</tr>
<tr>
<td>Carpule syringe</td>
<td>3.56</td>
<td>1.459</td>
<td>52 28 20</td>
</tr>
<tr>
<td>Paediatric forceps</td>
<td>3.40</td>
<td>1.400</td>
<td>48 24 30</td>
</tr>
<tr>
<td>Dental explorer</td>
<td>3.28</td>
<td>1.485</td>
<td>50 20 30</td>
</tr>
<tr>
<td>X-ray equipment</td>
<td>3.06</td>
<td>1.202</td>
<td>38 30 32</td>
</tr>
<tr>
<td>Rubber dam punch</td>
<td>3.06</td>
<td>1.406</td>
<td>38 26 36</td>
</tr>
<tr>
<td>High speed handpiece</td>
<td>2.84</td>
<td>1.405</td>
<td>40 12 48</td>
</tr>
<tr>
<td>Rubber dam forceps</td>
<td>2.50</td>
<td>1.432</td>
<td>30 12 58</td>
</tr>
<tr>
<td>Mouth mirror</td>
<td>2.34</td>
<td>1.022</td>
<td>10 32 58</td>
</tr>
<tr>
<td>Clinical tweezers</td>
<td>2.42</td>
<td>1.430</td>
<td>22 16 62</td>
</tr>
<tr>
<td>Dentistry chair</td>
<td>2.32</td>
<td>1.362</td>
<td>16 28 56</td>
</tr>
</tbody>
</table>

To find out whether there was a correlation between parents’ anxiety levels and their children’s, the Spearman test was applied (r) between the average anxiety levels found for parents and the average anxiety levels found for children. Data were tabulated and submitted to statistical analysis using the SPSS program version 17.00 (SPSS Inc. Chicago, IL, USA). The significance value used was 5%.

Table 1 Average and standard deviation with their respective score averages and percentage distribution of children’s anxiety levels with regard to the evaluated instruments.
The study found a statistically significant difference between the instruments/equipment and the level of anxiety these caused on the children ($\alpha^2=46.983$, p<0.001). The instruments/equipment used, by descending order according to how they ranked in anxiety levels caused, were: carpule syringe > paediatric forceps > dental explorer > x-ray machine > rubber dam punch > high speed handpiece > rubber dam forceps > mouth mirror > clinical tweezers > dental chair. Table 2 shows the results of two-by-two comparisons between the instruments/equipment evaluated using the Wilcoxon test with Bonferroni correction.

The children’s average anxiety level was 2.87 (±0.57), whereas the average for the parents was 2.97 (±0.95). No correlation was found ($r_s=0.092$, p=0.546) between the parents’ anxiety level and that of their children, which indicates that the children’s anxiety levels were not dependent on their parents’ or caretakers’ anxiety levels.

### Discussion

Children’s anxiety levels have frequently been assessed using images with faces, since it is a method that is fast and easy to reproduce [Buchanan and Niven, 2003]. In addition, the anxiety scale established by Corah [1978] has been shown to be a trustworthy instrument to evaluate the characteristics of dental anxiety in adults and can be used both for clinical purposes and for scientific investigation [Hu et al., 2007].

Most of the children presented light anxiety levels [52%]. This result agrees with that obtained in other studies which report that more than half of the children presented light to moderate anxiety level [Taani et al., 2005; Dogan et al., 2006].

There are investigations demonstrating that anxiety levels related to dental treatment in boys are higher than in girls [Kleiman, 1982]. However, other research shows that such anxiety levels are higher in girls [Peretz and Efrat, 2000]. This study found no significant difference between the two, thus indicating that the children’s anxiety levels did not depend on gender. This result is supported by that of other studies [Milgrom et al., 1995; Peretz et al., 2004].

The carpule syringe caused the highest anxiety levels, probably due to this instrument being associated with the application of anaesthesia, which is identified as the most painful moment in the treatment [Vassend et al., 1995]. This result concurs with Alsarheed [2011]. This suggests that apparently invasive procedures cause greater anxiety in children and the appearance of instruments can suggest an invasive, and therefore painful, procedure. In this context, in addition to the carpule syringe, the instruments that caused the highest anxiety levels were the forceps, the dental explorer and the rubber dam punch.

Some studies suggest a correlation between parents’ anxiety levels and those of their children [Themessl-Huber et al., 2010; Boman et al., 2008; Lee et al., 2008; Lara et al., 2012]. On the other hand, other studies report that, compared to other factors, parents’ fear and anxiety do not have significant effects on children’s anxiety and fear [Klaassen et al., 2003].

No correlation was found between parents’ anxiety levels and those of children in this study. However, it should be noted that the correlation test used in this investigation considered the average of all instruments/equipment, and there was significant variation between the anxiety levels caused by the different instruments. In addition, this study was conducted taking into consideration test power deemed average or typical in sample calculation and should thus be interpreted with caution. Future investigations should be performed in order to increase the power of the test and provide higher precision in assessing the effect of the variables studied on the children’s anxiety levels. Nonetheless, one of the contributions of this study consists in the adoption of measures by paediatric dentists to reduce anxiety levels related to dental treatment, since it could...
identify the instruments/equipment that caused greater anxiety in children. Thus, it is extremely important to plan interventions in order to benefit dental treatment in children.

Conclusion

The instruments/equipment that caused the highest anxiety levels were: carpule syringe, paediatric forceps and dental explorer. Parents presented mostly moderate anxiety levels, while children's anxiety levels were light. There was no statistically significant correlation between parents' and children’s anxiety levels.

References