



## PREDICTORS OF DENTAL ANXIETY IN CHILDREN: SELF-PERCEPTION AND PARENTAL FACTORS

### ABSTRACT





**Objectives:** To identify the factors involved with dental anxiety in children.

**Materials and Methods:** A cross-sectional study was conducted with children aged 8–12 years and their parents. They were interviewed and examined. Oral health and treatment need perceptions were assessed using a self-reported index. Information about DMFT and dental anxiety scores were collected from children and their parents. Regression analysis was obtained to find association between anxiety in children scores and all variables studied. Spearman's correlation coefficients were calculated to determine possible correlations between variables.

**Results:** Significant association was observed between the child's oral health self-perception, DMFT and parents' anxiety. It was found a significant correlation between dental anxiety and oral health self perception to children and adults. Moreover, dental anxiety in children is positive correlated to DMFT.

**Conclusions:** Dental anxiety in children is affected by parental dental anxiety. Moreover, it seems child's dental anxiety is influenced not only by DMFT scores but also by oral health self-perception.

**Keywords:** Dental anxiety, oral health, self-assessment, child, parents.

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## **INTRODUCTION**

Dental anxiety is a common condition, which can affect people of all ages, mostly children and adolescence.<sup>1,2</sup> The prevalence of dental anxiety in children varies across international literature ranging from 3% to 43% depending on populations and age groups. The development of dental anxiety has a multifactorial and not well-known background. It can influence patient management, dental attendance and can persist even in adulthood, leading to dental avoidance.<sup>3,4</sup>

Existing evidence about parental effect and oral health condition on anxiety in children are conflicting. Even though many studies have showed a positive correlation between those and dental anxiety.<sup>5,6,7</sup> It seems there is a vicious circle, in which children with dental anxiety are more prone to delaying their treatment, thereby leading to worsening of their problems and fueling the dental anxiety that was already present.<sup>8</sup>

Patient perception of oral condition has multidimensional nature and it is not only influenced by clinical conditions but also by psychosocial features, as dental anxiety.<sup>9</sup> People with dental anxiety can report a negative perception about their oral health influenced by misconceptions about dental treatment, regardless of their real context.<sup>10</sup>

Identifying potentially modifiable factors that may affect the interaction between the negative self-perception and clinical status is crucial to achieve a patient management success. Therefore, assessing the background of anxiety in children can determine the most appropriate and effective management strategy. So, the dentist plays an important role in decreasing or eliminating dental anxiety in the patient and promoting good general oral hygiene habits.<sup>10,11</sup>

## **MATERIAL AND METHODS**

### ***Study design and subjects***

The study participants included 230 people, who were 115 school-children (51 girls, 64 boys) ranging 8-12 years old from schools and 115 respective parents (81 mothers 34 fathers). The average children's age was 9.2 years (SD = 1.2).

From August 2015 to August 2017, data were

collected from children enrolled in public schools. Sample was selected including all schools of the city. In each school, all children ranging 8-12 years were invited to participate, and their parents as well. Children and their parents who agreed were included in the data collection at school, which consisted of an interview and clinical oral examination.

A member of the research team explained the questionnaire instructions to the children and their parents, who individually completed each assessment. Moreover, a researcher was available for further clarification or explanation of the survey whether needed.

Informed consent from parents and school staff was obtained for all participants. This study received ethical approval from the local ethics committee of authors institutions (No. 1448908).

### ***Dental anxiety scores***

An adaptation of the 5-item Modified Dental Anxiety Scale (MDAS) for the Portuguese language was used to all adults. Participants reported levels of dental anxiety on a 5-point Likert scale, with 1 meaning, 'relaxed/not worried' and 5 meaning, 'very nervous/very worried'.<sup>12</sup>

Faces representing the level of anxiety were included on the Likert scale to facilitate the children's understanding of the questionnaire items (MDAS(f)). A total score was calculated by adding the child's responses, which ranged from 5 to 25 (higher scores reflected greater anxiety levels).<sup>13</sup>

**Dental health status:** An experienced paediatric dentist conducted a clinical examination and determined the dental status of each participant using a flat-surface mouth mirror and gauze. The index for decayed, missed and filled primary teeth (dmft), and permanent teeth (DMFT) were recorded.<sup>14</sup>

**Self-assessed oral health status:** Children and their parents were asked, 'How would you describe your dental status?' The response format included three options: Good, Fair or Bad.

**Treatment need perception:** Those information were obtained from the question: "As for today, in your opinion, how many treatments do you need?"

The response format included three options: A lot, Some or Not at all.

### Data analysis

The data obtained on the questionnaires and scales were analyzed with the aid of the Statistical Package for the Social Sciences (SPSS®, Version 15.0, Chicago, USA). Regression analysis was obtained trying to find association between anxiety in children scores and all variables studied. Spearman's correlation coefficients were calculated to determine possible correlations

between variables. The level of significance was set to 5% ( $P \leq 0.05$ ).

### RESULTS

A hundred fifteen children and their parents were included in this study. Mean of dental anxiety in children and their parents was 20.57 and 11.32, respectively. Table 1 shows the distribution of the sample and descriptive analyses to all variables. Most of all people consider their dental health needs to be 'some', and dental status to be 'fair'.

**Table 1.** Descriptive analysis of the investigated variables

| Variables                                 | Subjects               |                 |                 |
|---|------------------------|-----------------|-----------------|
|   | Average                | Sd              |                 |
| Child's Anxiety                           | 20.57                  | 5.69            |                 |
| Parental Anxiety                          | 11.32                  | 4.56            |                 |
| Dmft                                      | 3.83                   | 1.75            |                 |
| Dmft                                      | 6.42                   | 2.38            |                 |
|   | Percentual Of Subjects |                 |                 |
|   | Good                   | Fair            | Bad             |
| Child's Self-Assessed Oral Health Status  | 32 (28%)               | 75 (65%)        | 8 (7%)          |
| Parental Self-Assessed Oral Health Status | 44 (38%)               | 65 (56%)        | 6 (6%)          |
|   | Not At All             | Some            | A Lot           |
| Child's Treatment Need Perception         | 30 (26%)               | 71 (62%)        | 14 (12%)        |
| Parental Treatment Need Perception        | <b>34 (30%)</b>        | <b>66 (57%)</b> | <b>15 (13%)</b> |

Association between anxiety in children and all independent variables is shown in Table 2. Significant association was observed in the analysis between the child's oral health self-

perception, dtmf and parental anxiety, considering anxiety in children as dependent variable ( $P < 0.005$ ).

**Table 2 -** Results of multiple linear regression analysis, considering child anxiety as the dependent variable.

| Variables                                 | Child's Anxiety        |
|---|------------------------|
|   | P                      |
| Parental Anxiety                          | 0.016*                 |
| Dmft                                      | 0.001*                 |
| Dmft                                      | 0.074                  |
| Child's Self-Assessed Oral Health Status  | 0.039*                 |
| Parental Self-Assessed Oral Health Status | 0.479                  |
| Child's Treatment Need Perception         | 0.151                  |
| Parental Treatment Need Perception        | 0.903                  |
| R= 0.468                                  | R <sup>2</sup> = 0.219 |

\*Statistically significant at  $P < 0.05$ .

The data also demonstrate a significant correlation between dental anxiety and oral health self-perception to children and adults. Moreover, children's dental anxiety is positive correlated to

DMFT. To all people, oral health self-perception is correlated to treatment need perception (Tables 3 and 4).

**Table 3.** Correlation coefficients among parental anxiety, DMFT index, Self-assessed oral health status and treatment need perception – Spearman's (r) correlation coefficients.

| Variable                                  | Parental Anxiety     | Dmft                 | Parental Self-Assessed Oral Health Status | Parental Treatment Need Perception |
|---|----------------------|----------------------|---|------------------------------------|
| Parental Anxiety                          |                      |                      |   |                                    |
| Dmft                                      | 0.0626<br>P=0.510    |                      |   |                                    |
| Parental Self-Assessed Oral Health Status | -0.2041<br>P=0.030*  | -0.1507<br>P=0.111   |   |                                    |
| Parental Treatment Need Perception        | - 0.0237<br>P= 0.803 | - 0.2136<br>P=0.023* | 0.3866<br>P=0.000*                        |                                    |

\*Statistically significant at P < 0.05.

**Table 4.** Correlation coefficients among children's Anxiety, dmft index, Self-assessed oral health status and Treatment need perception – Spearman's (r) correlation coefficients.

| Variable                                 | Child's Anxiety     | DMFT                | Child's Self-Assessed Oral Health Status | Child's Treatment Need Perception |
|--|---------------------|---------------------|--|-----------------------------------|
| Child's Anxiety                          |                     |                     |  |                                   |
| DMFT                                     | 0.3162<br>P= 0.001* |                     |  |                                   |
| Child's Self-Assessed Oral Health Status | -0.1953<br>P=0.038* | -0.1777<br>P=0.060  |  |                                   |
| Child's Treatment Need Perception        | 0.095<br>P=0.312    | - 0.0191<br>P=0.841 | 0.3968<br>P=0.000*                       |                                   |

\*Statistically significant at P < 0.05.

## DISCUSSION

Dentists should know more about aetiology of anxiety to gain a better understanding of it and therefore to help paediatric patients and their families to cope with dental anxiety. Indeed, the evaluation of anxiety should be part of a paediatric anamnesis.<sup>15,16,17</sup> An understanding of psychologic and behavioural sciences has long been a central part of dental education and essential for a better clinical practice. Patients who have anxiety regarding their dental health and treatment needs, tend to delay appointments and avoidance behaviour towards oral care.<sup>18</sup> For this reason, evaluation of anxiety levels and treatment needs can be supportive for a good oral health maintenance and psychological improvement of children. Once child behaviour is

changed, it is possible to prevent not only diseases, but also help to streamline appropriate oral hygiene habits and regular dental appointment.<sup>12,19,20</sup>

There are many instruments available for the assessment of dental anxiety, both in children and adults. In this study, the Modified Dental Anxiety Scale<sup>12</sup>, a reliable and quick five item scale to administer was adopted for all parents. It has a scale ranging between mild, moderate, and phobic levels of anxiety.<sup>21</sup> Although there are some measures which allow for the particular identification of characteristics of the individual's dental anxiety, the MDAS provides a quick and easy-to-use screening tool. It has been found to be acceptable both to patients and dentists.<sup>22-24</sup>

A version is also available for use with children<sup>25</sup> (Modified Child Dental Anxiety Scale, MCDAS), although there are various scales and techniques used in order to assess anxiety in children. In the current study, anxiety in children rates were recorded by MCDAS – faces<sup>13</sup>, as it has been shown to be reliable and valid scale.<sup>1,26,27</sup> Since children are limited by the level of cognitive functioning required to complete the various other numeric rating scales, we understand a self-reported and an easy index for children are necessary.<sup>28</sup> The faces version of the MCDAS has been tested in a series of studies with children. Aminabadi *et al.*<sup>29</sup> and Fakhruddin *et al.*<sup>30</sup> have also used this scale for recording anxiety in their studies.<sup>31,32</sup> And a good test-retest reliability was demonstrated in children between 8 and 12 years old.<sup>13</sup>

The aetiology of dental anxiety is believed to be multifactorial with sociodemographic status playing important roles as risk factor.<sup>33</sup> That means homogeneity of children and parents in terms of sociodemographic issues is crucial to avoid confounding factors. In this study, only one type of school was included to obtain a better representation of children and their parents, regarding economic and demographic factors. This aspect reinforces the robustness of our results.

An understanding of the factors underlying the aetiology and maintenance of dental anxiety and how children learn it may assist dentists to reduce this fear in children. It has been suggested that fears are learned by observing the behaviour of other individuals and the outcomes of those behaviour. Parents usually serve as a model for development of anxiety, and parental behaviour towards oral health may be considered a modelling process in which children imitate adult models.<sup>34-37</sup>

In the present study, associations were found between the children and parents' dental anxiety scores, although both showed lower dental anxiety score. That lower anxiety score was unreported in other studies, although no information was shared about dental experience, history of dental phobia, history of dental pain, and diagnosed behaviour

disorders.<sup>10,38-41</sup> Those aspects are known to cause dental anxiety.<sup>42</sup> Our findings indicate the parents had an influence on anxiety in children level, in a good or bad way. Indeed, negative or positive dental attitudes and experiences transmitted by parents are related somehow to anxiety in children, even though there is not an agreement in the international data about this finding. Previous studies report no association between parental and MCDAS scores<sup>37,41,43-45</sup>, whereas others found that parental anxiety was associated with children anxiety.<sup>3,46,47</sup>

That difference can be explained by the fact that mothers are usually more involved in childcare.<sup>37</sup> Our findings showed the children were most often accompanied by their mothers during dental care (70,44%). Previous studies found that maternal anxiety level was predictive of dental anxiety score in children, and these findings are supported with our results.<sup>15,37,48</sup>

A recent literature review<sup>49</sup> suggested that parental dental anxiety may affect child dental anxiety by transmission of anxiety model and verbal learning that it would cause decreased self-efficacy for pain and affect perceptions of dental stimuli. Moreover, parental anxiety could also impact a child's learning history when it results in avoidance of dental appointments.

Self-reported measures regarding oral health and treatment need are cost- and time-effective.<sup>50,51</sup> It is hypothesized that they can give an opportunity to determine dental health for a single person and populations also. This kind of evaluation can help people who avoid clinical examination, for reason of either cost or fear of embarrassment of their oral condition.<sup>18,52</sup>

Our findings show there is no correlation between DMFT/dmft scores and self-reported dental status for children and their parents. In general, the present study results indicate that most of the children and their parents consider their dental health needs to be 'some', and dental status to be 'fair' which it was also reported before.<sup>18</sup> Even though, people tend to underestimate their dental treatment needs<sup>53</sup>,

possibly that is why those variables were not correlated.

On the other hand, it was found a positive correlation between self-reported dental health needs and oral health dental status. It was stated that the use of patient self-assessment was a good predictor of patient dental status and it could serve as a tool for public and preventive dentistry, as well as to help the dental practitioner in managing patients according to their complaints and self-assessment.<sup>50</sup> According to the results of this study, simply asking straightforward questions regarding child's dental status may predict the results of their dental anxiety. Tables 3 and 4 show that the dental status self-perception is positive correlated to dental anxiety for children and adults. Once there is a tendency toward a correlation between the dental anxiety and the need for dental treatment shows that, despite minimally invasive dentistry, dentist's appointment remains closely associated with unpleasant experiences.<sup>15,54,55</sup>

Hence, it is reasonable to understand that since children found their oral health status fair, their dental anxiety score was also small.<sup>56</sup>

It is recognized that dental anxiety is associated with irregular dental attendance<sup>48,57,58</sup>, which can head to a poor oral health, with a higher incidence of caries lesions in children with dental anxiety.<sup>57,59-61</sup> It is important that dentists must consider that dental fear may also affect oral health self-perception. Our results show that children dental anxiety is directly affected by their oral health and also by their self-perception about oral health status. That means dental anxiety is likely to be a predictor of dental caries, and may be a risk factor for dental caries and incidence.<sup>61</sup> Tables 4 also shows a positive correlation. In this sample, the more the children caries experience, the more dental anxiety in children was significantly higher. That can be explained since dental anxiety children might perceive that dentists will only provide symptomatic care for their declining oral health, rather than a comprehensive treatment. This behaviour is most likely related to their previous negatively perceived experiences.<sup>62</sup> De Jongh *et al.*<sup>48</sup>,

confirmed that avoidance of dental care is related to a worse oral health and likelihood of experiencing anxiety. Besides, it was suggested that patients with high dental anxiety would particularly benefit from minimal interventions to break their avoidance pattern.<sup>37,48</sup>

## CONCLUSIONS

We suggest family factors may serve to help determine the pattern of learning in which child's dental anxiety is affected by their parental dental anxiety. Moreover, it seems children's dental anxiety is influenced not only by DMFT scores but also by the oral health self-perception.

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