Preschool children and dental caries as associated factors with dental fear and stress

Crianças em idade pré-escolar e cáries dentárias como factores associados ao medo e ao stress dentários

Los niños en edad preescolar y la caries dental como factores asociados con el miedo y el estrés dental

DOI: 10.55905/revconv.17n.3-180

Originals received: 02/12/2024
Acceptance for publication: 02/27/2024

Miler Lucas Santos da Trindade
Specialist in Family Health
Institution: Universidade Federal de Alfenas (UNIFAL)
Address: Alfenas - Minas Gerais, Brasil
E-mail: milerlstrindade@gmail.com

Maria Eugênia Domingueti Rabelo Ribeiro
Master Student in Dental Science
Institution: Universidade Federal de Alfenas (UNIFAL)
Address: Alfenas - Minas Gerais, Brasil
E-mail: maria.rabelo@sou.unifal-mg.edu.br
Orcid: https://orcid.org/0000-0003-1182-2002

Lara Evangelista Orlandi
Master Student in Dental Science
Institution: Universidade Federal de Alfenas (UNIFAL)
Address: Alfenas - Minas Gerais, Brasil
E-mail: lara.orlandi@sou.unifal-mg.edu.br
Orcid: https://orcid.org/0000-0003-3926-0750

Leone Pereira Soares
Specialist in Family Health
Institution: Universidade Federal de Alfenas (UNIFAL)
Address: Alfenas – Minas Gerais, Brasil
E-mail: leonepereirasoares@gmail.com

Rodrigo Rodrigues
PhD Student in Orthodontics
Institution: Universidade Federal de Alfenas (UNIFAL)
Address: Alfenas - Minas Gerais, Brasil
E-mail: rodrigorodriguesorto@yahoo.com.br
Orcid: https://orcid.org/0000-0002-0065-9556
ABSTRACT
Fear, anxiety, and stress are psychological characteristics inherent to human beings that can be attenuated in the face of different stimuli that involve adverse situations that are generally associated with family relationships, socioeconomic conditions, and quality of life, which includes dentistry and oral health. This study aimed to test the association between the oral condition and psychosocial aspects of children aged 4 to 12 years during dental care at the Pediatric Dentistry Clinic of the Faculty of Dentistry of the Federal University of Alfenas/MG (UNIFAL/MG). For this, the children underwent professional dental prophylaxis followed by a clinical examination, in which the professional assessed the oral health condition based on the dmft/DMFT index, observing the presence and severity of the disease. After that, the dentist used the Visual Analogue Scale (VAS) to assess the children's anxiety, fear, and stress during care. The data were tabulated and analyzed using descriptive and bivariate statistics, using the IBM SPSS Statistics 22.0 software, with the Spearman correlation test, Mann-Whitney test, and Kruskal Wallis, considering 5% as a significance value. The correlations found a statistically significant association between the presence of cavities and the child's stress (P=0.03) and between age and fear (P=0.03). On the other hand, dental anxiety was not associated with oral condition or demographic aspects (P>0.05). It can be said that children who have caries lesions tend to be more stressed during dental care. Furthermore, preschool children are more afraid of the dentist compared to older children.

Keywords: pediatric dentistry, stress psychological, dental caries.

RESUMO
O medo, a ansiedade e o estresse são características psicológicas inerentes ao ser humano que podem se atenuar frente a diferentes estímulos que envolvem situações adversas que geralmente estão associadas a relação familiar, a condição socioeconômica e a qualidade de vida, no qual
se enquadra o atendimento odontológico e a saúde bucal. Este estudo objetivou testar a associação entre condição bucal e aspectos psicossociais de crianças de 4 a 12 anos durante atendimento odontológico na Clínica de Odontopediatria da Faculdade de Odontologia da Universidade Federal de Alfenas/MG (UNIFAL/MG). Para isso as crianças foram submetidas a profilaxia odontológica profissional seguida de exame clínico, no qual o profissional avaliou a condição de saúde bucal baseado nos índices ceod/CPOD, observando a presença e severidade da doença. Depois disso, o cirurgião-dentista utilizou a Escala Visual analógica (EVA) para avaliar a ansiedade, o medo e o estresse das crianças durante o atendimento. Os dados foram tabulados e analisados por meio da estatística descritiva e bivariada deles, utilizando o software IBM SPSS Statistics 22.0, através dos testes de correlação de Spearman, Teste de Mann-Whitney e Kruskal Wallis, considerando 5% como valor de significância. A partir das correlações, foi encontrado uma associação estatisticamente significativa entre a presença de cárie e o estresse da criança ($P=0,03$) e entre a idade e o medo ($P=0,03$). Por outro lado, a ansiedade odontológica não se associou com a condição bucal nem com aspectos demográficos ($P>0,05$). Pode-se dizer que crianças que apresentam lesões de cárie tendem a serem mais estresadas durante o atendimento odontológico. Além disso, crianças pré-escolares apresentam mais medo no dentista comparado com crianças maiores.

**Palavras-chave:** odontopediatria, estresse psicológico, cárie dentária.

**RESUMEN**

El miedo, la ansiedad y el estrés son características psicológicas inherentes al ser humano que pueden ser atenuadas ante diferentes estímulos que involucran situaciones adversas, generalmente asociadas a las relaciones familiares, al nivel socioeconómico y a la calidad de vida, lo que incluye la atención odontológica y la salud bucal. El objetivo de este estudio fue comprobar la asociación entre la condición bucal y los aspectos psicosociales de niños de 4 a 12 años durante la atención odontológica en la Clínica de Odontopediatría de la Facultad de Odontología de la Universidad Federal de Alfenas/MG (UNIFAL/MG). Para ello, los niños fueron sometidos a una profilaxis dental profesional seguida de un examen clínico, en el que el profesional evaluó su salud bucal a partir de los índices ceod/CPOD, observando la presencia y gravedad de la enfermedad. Posteriormente, el dentista utilizó la Escala Visual Analógica (EVA) para evaluar la ansiedad, el miedo y el estrés de los niños durante el tratamiento. Los datos se tabularon y analizaron mediante estadística descriptiva y bivariada, con el programa IBM SPSS Statistics 22.0, utilizando la prueba de correlación de Spearman, la prueba de Mann-Whitney y la prueba de Kruskal Wallis, considerando el 5% como valor de significación. A partir de las correlaciones, se encontró una asociación estadísticamente significativa entre la presencia de caries y el estrés del niño ($P=0,03$) y entre la edad y el miedo ($P=0,03$). Por otra parte, la ansiedad dental no se asoció con el estado bucodental ni con aspectos demográficos ($P>0,05$). Puede decirse que los niños con lesiones de caries tienden a estar más estresados durante la atención odontológica. Además, los niños en edad preescolar muestran más miedo al dentista en comparación con los niños mayores.

**Palabras clave:** odontopediatría, estrés psicológico, caries dental.
1 INTRODUCTION

Fear, anxiety and stress are psychological characteristics inherent to human beings that can be attenuated when faced with different stimuli. Fear is conceptualized as a state of great unease, which manifests itself in the face of real or fictitious danger, to avoid a situation that is going to happen (SANTOS; CAMPOS; MARTINS, 2007; FERREIRA; OLIVEIRA, 2017). On the other hand, anxiety can be understood as the result of various feelings, such as tension, apprehension, nervousness and concern about a threat, differing from fear in the degree of intensity (PETRY et al., 2006). Stress, on the other hand, becomes a consequence of these two emotions (JACOB, 1998).

Possible factors that act as a stimulus for these emotional changes are related to adverse situations that occur for different reasons, which generally involve family relationships, socioeconomic status and quality of life, which includes dental care and oral health (RAMOS-JORGE; PAIVA, 2003). In addition, the use of sharp instruments and needles for anesthesia, the use of high and low rotation, the complexity and duration of the treatment, the professional's posture and the way of acting can influence the emergence of these psychological changes, especially in child patients (PINTO, 2018).

In dentistry, dental caries is one of the most prevalent oral diseases and is considered one of the main oral health problems in Brazil (BRASIL, 2008), as well as being the biggest cause of tooth loss in the world (FEJERSKOV; KIDD, 2005). Because it is a disease that affects the integrity of the tooth, depending on its progression, it has the potential to negatively impact the individual's quality of life, causing pain, difficulty eating, self-esteem, and behavioral problems (MARCENES et al., 2013).

Given the ability of caries to generate pain and knowing that fear is directly related to this feeling (PERONIO; SILVA; DIAS, 2019), it is essential to understand the possible relationship between this oral condition and emotions. These situations experienced at the time of and before the dental appointment make it a great potential to cause fear in many people, being a reason for them to stay away and postpone the necessary treatments, entering a vicious cycle (SEMENOFF-SEGUNDO et al., 2016).

Knowing that fear, anxiety and stress are psychological factors present in children's dental environments and that they can also hinder the search for dental care for children, it is important...
to investigate the relationship between these psychological factors and the oral condition of children.

2 METHODOLOGY

2.1 TYPE OF STUDY AND ETHICAL ASPECTS

This is a cross-sectional clinical study carried out with children aged between 4 and 12 years who, accompanied by their parents, sought care at the Pediatric Dentistry Clinic of the School of Dentistry at the Federal University of Alfenas/MG (UNIFAL/MG). To this end, the study was approved by the University's Research Ethics Committee, under CAAE: 57180222.6.0000.5142.

Before starting the data collection, the participants, both the guardians and the children, were invited and informed about the objectives, importance, risks and benefits of the research. After agreeing to take part in the study, written authorization was requested: A Free and Informed Consent Form (FICF) for the guardians, a Term of Assent (TA) for the non-literate children and a Term of Informed Assent (TIA) for the literate children.

To define the sample size for this cross-sectional study, a sample calculation was carried out considering the following parameters: a finite population (N=220), a tolerable absolute error (d=0.05), an initially unknown prevalence, assumed to be 0.5 (or 50%), and a 95% confidence coefficient. Using this approach, the minimum sample size was obtained, estimated at 141 participants. In addition, an additional margin of 10% was incorporated into the calculated sample size to mitigate any possible loss of data during collection.

2.2 DATA COLLECTION

The assessment of the child's oral health condition, such as the prevalence and severity of caries disease, and emotional aspects, such as anxiety, fear and stress in the face of dental care, was carried out at the Pediatric Dentistry Clinic of UNIFAL/MG.

2.2.1 Evaluation of dental caries

It was carried out by 3 examiners who had been previously trained and calibrated (kappa coefficient of 0.82, almost perfect relationship) to carry out a clinical examination, using a
number 5 flat mouth mirror, OMS probe and clinical tweezers (Golgran, São Caetano do Sul, São Paulo - Brazil), after professional dental prophylaxis.

To assess the condition of each tooth, the dmft/DMFT classification (deciduous/permanent teeth) was used, in which all dental elements that were decayed, missing and/or filled were recorded according to the World Health Organization (WHO, 1997).

2.2.2 Psychological stimuli – anxiety, fear and stress

To analyze the stimuli expressed by the child during dental care, it was used the Visual Analogue Scale (VAS), which consists of a horizontal line 10 centimeters (cm) long, corresponding to each emotion, anxiety, fear and stress. They were filled in according to the professional's assessment after the clinical service.

To answer the scale, the professional had to mark a vertical line, in which the closer to the extreme right meant the more exacerbated condition, the more anxiety, fear and stress. The closer the mark was to the left, meant less anxiety, fear and stress. To do this, the three lines were measured with a ruler, defining the size of each emotion attributed by the dental surgeon to each child. Before starting the collection, the professionals were calibrated concerning the assessment of fear, anxiety and stress, obtaining an intra-examiner agreement of 0.85 and an inter-examiner Kappa coefficient of 0.80, considered a strong, substantial relationship.

2.3 STATISTICAL ANALYSIS

The data collected was tabulated in the Microsoft Excell program and then descriptive and bivariate analyses were carried out using the IBM SPSS software version 22.0. Absolute and relative frequencies were obtained, as well as descriptive measures for the quantitative variables.

For the bivariate analyses, the adequacy of the normal distribution was assessed using the Kolmogorov-Smirnov test. Once it was confirmed that the distribution of the variables did not follow normality (P<0.05), the Mann-Whitney non-parametric tests were used to compare two independent groups, the Kruskal Wallis test for three or more independent groups and Spearman's correlation coefficient according to the different outcome variables observed in the consultation. All tests were carried out at a 5% significance level.

To analyze oral health status, the sample was divided into two groups: those without caries lesions (absent - group 1) and those with at least one decayed tooth (present - group 2). In
addition, the severity of the children's oral health condition was assessed, observing the presence and quantity of caries lesions, which it was also decided to transform into a qualitative variable, where there were three different groups according to severity: group 1) Caries-free; 2) Low severity (with 1 to 5 caries lesions) and 3 High severity (with more than 5 lesions) (HALLET; O’ROURKE, 2006).

In addition, the children were divided into three groups according to the type of dentition, with group 1 corresponding to deciduous dentition, group 2 to mixed dentition and group 3 to permanent dentition. In terms of age, the children were divided into: pre-school children (up to 6 years old), and school children over 6 years old.

3 RESULTS

Initially, 168 children were recruited for the study, however, 15 were excluded due to parents and/or children not signing the consent and assent forms or for not continuing with treatment, resulting in a final sample of 153 children. Of these, 71 were female (46.4%) and 82 male (53.6%) with an average age of 7.62 (±2.32) years.

The mean and standard deviation of the psychological stimuli presented by the children were assessed in isolation using the Visual Analog Scale (VAS), as perceived by the professional. The mean for anxiety was 1.84 (±2.28) cm, for stress 1.45 (±1.92) cm and for fear 1.74 (±2.27) cm.

Most of the children had mixed dentition (69.9%; n=107), followed by deciduous dentition (23.5%; n=36). We also found that 30.7% (n=47) of them had no decayed teeth, 96.1% (n=147) had no missing teeth and 32.7% (n=50) had no filled teeth. The average number of decayed teeth per child was 2.93 (±3.26); missing teeth 0.07 (±0.41); filled teeth 2.12 (±2.24); the total ceod/CPOD classification was 5.13 (±3.50) teeth.

There was no statistically significant association between the dmft/DMFT index and any of the psychological stimuli (P>0.05) (Table 1).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Anxiety</th>
<th>Anxiety</th>
<th>Stress</th>
<th>Stress</th>
<th>Fear</th>
<th>Fear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decay</td>
<td>0.16</td>
<td>0.11</td>
<td>0.06</td>
<td>0.15</td>
<td>0.07</td>
<td>0.14</td>
</tr>
<tr>
<td>Missing</td>
<td>0.66</td>
<td>-0.03</td>
<td>0.83</td>
<td>-0.01</td>
<td>0.81</td>
<td>-0.01</td>
</tr>
<tr>
<td>Filled</td>
<td>0.58</td>
<td>-0.04</td>
<td>0.28</td>
<td>-0.08</td>
<td>0.54</td>
<td>-0.05</td>
</tr>
<tr>
<td>DMFT total</td>
<td>0.48</td>
<td>0.05</td>
<td>0.31</td>
<td>0.08</td>
<td>0.35</td>
<td>0.07</td>
</tr>
</tbody>
</table>

Source: Author (2024).
Regarding the presence or absence of caries, it can be seen that most of the children had at least one tooth with a carious lesion in the oral cavity, corresponding to 69.3% (n=106) of them. They were further divided into three groups according to severity, with 30.7% (n=47) of the children classified as caries-free, 49.7% (n=76) as low severity (up to 5 decayed teeth) and 19.6% (n=30) as high severity (>5 decayed teeth).

There was a statistically significant correlation between age and fear (P=0.03) and between the presence of caries and children's stress (P=0.03), Mann-Whitney test (Table 2).

Table 2: Association between emotional stimuli with the oral condition and demographic characteristics of the target audience.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Anxiety Mean (SD)</th>
<th>P-value</th>
<th>Stress Mean (SD)</th>
<th>P-value</th>
<th>Fear Mean (SD)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex^a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1.94 (2.33)</td>
<td>0.73</td>
<td>1.58 (2.08)</td>
<td>0.83</td>
<td>1.74 (2.24)</td>
<td>0.96</td>
</tr>
<tr>
<td>Female</td>
<td>1.73 (2.22)</td>
<td></td>
<td>1.29 (1.72)</td>
<td></td>
<td>1.74 (2.32)</td>
<td></td>
</tr>
<tr>
<td>Age^a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preschool</td>
<td>2.47 (2.66)</td>
<td>0.08</td>
<td>1.98 (2.42)</td>
<td>0.07</td>
<td>2.55 (2.77)</td>
<td>0.03^*</td>
</tr>
<tr>
<td>School</td>
<td>1.64 (2.12)</td>
<td></td>
<td>1.28 (1.72)</td>
<td></td>
<td>1.49 (2.04)</td>
<td></td>
</tr>
<tr>
<td>Dentition^b</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deciduous</td>
<td>2.49 (2.97)</td>
<td>0.47</td>
<td>2.10 (2.61)</td>
<td>0.25</td>
<td>2.78 (3.13)</td>
<td>0.12</td>
</tr>
<tr>
<td>Mixed</td>
<td>1.70 (2.05)</td>
<td></td>
<td>1.27 (1.66)</td>
<td></td>
<td>1.47 (1.89)</td>
<td></td>
</tr>
<tr>
<td>Permanent</td>
<td>0.85 (0.46)</td>
<td></td>
<td>0.98 (0.77)</td>
<td></td>
<td>0.76 (0.41)</td>
<td></td>
</tr>
<tr>
<td>Caries Lesion^a</td>
<td></td>
<td>0.10</td>
<td></td>
<td>0.03^*</td>
<td></td>
<td>0.05</td>
</tr>
<tr>
<td>Absent</td>
<td>1.45 (1.99)</td>
<td></td>
<td>1.15 (1.71)</td>
<td></td>
<td>1.32 (2.06)</td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>2.01 (2.38)</td>
<td></td>
<td>1.58 (2.00)</td>
<td></td>
<td>1.93 (2.34)</td>
<td></td>
</tr>
<tr>
<td>Severity^b</td>
<td></td>
<td>0.27</td>
<td></td>
<td>0.09</td>
<td></td>
<td>0.13</td>
</tr>
<tr>
<td>Caries free</td>
<td>1.45 (1.99)</td>
<td></td>
<td>1.15 (1.71)</td>
<td></td>
<td>1.32 (2.06)</td>
<td></td>
</tr>
<tr>
<td>Low severity</td>
<td>1.90 (2.20)</td>
<td></td>
<td>1.35 (1.64)</td>
<td></td>
<td>1.67 (1.95)</td>
<td></td>
</tr>
<tr>
<td>High severity</td>
<td>2.29 (2.79)</td>
<td></td>
<td>2.14 (2.65)</td>
<td></td>
<td>2.56 (3.07)</td>
<td></td>
</tr>
</tbody>
</table>

^Statistically significant.  
^Mann-Whitney Test; ^Kruskal-Wallis Test.

Source: Author (2024).

4 DISCUSSION

This study found a relationship between the presence of caries and the stress perceived by the professional during the dental appointment, and between the presence of fear assessed by the dental surgeon and the child's age. This can be explained by a study that states the psychological stimuli of fear, anxiety and stress can have a strong relationship with oral health conditions (RENZO et al., 2020), an association which may have increased during the Covid-19 pandemic, especially due to social isolation.

Another recent study showed a strong association between the development of caries and stress, in which children who were more stressed had more decayed teeth. To arrive at this result,
the study was carried out on schoolchildren, divided into two groups, one corresponding to children with some kind of mental alteration due to stressful situations, such as bullying, and the second, children who did not have this condition. This resulted in a significant difference between the groups, in which the children belonging to the most stressed group were more likely to develop caries (NAKANO et al., 2022).

Concerning oral health, especially dental caries, a cross-sectional observational study was carried out in the same region as the present study, which assessed 453 schoolchildren aged between 5 and 12 from the town's public school system. Among the main results found, 57.5% of the participants had decayed teeth, 0.5% had lost teeth and 38.4% had filled teeth, with only 30.7% having all their permanent teeth without caries (MARTINS, 2018). It is possible to analyze that there were some quantitative differences when evaluating decayed, missing, and filled elements in isolation with the present study, however, it is observed that the percentage of children free of caries was similar, this may be because the study was developed before the pandemic period.

In the latest survey carried out by the Minas Gerais Oral Health Project in 2013 (MINAS GERAIS, 2013), it was possible to analyze that 44% were decayed, 2.2% lost, and 50% filled, with 45.9% being caries-free (MINAS GERAIS, 2013). The National Oral Health Survey carried out in 2010 (BRASIL, 2012) showed that 43.5% were caries-free, with 54.1% decayed, 5.8% missing and 35.3% filled. Comparing these studies with the current survey, it can be seen that the result was different, with more children with decayed teeth and fewer with missing and filled teeth.

With regard to decayed teeth, this figure is similar to a study carried out in Passo Fundo/RS, in which 69.9% of the teeth examined were decayed among the 573 children evaluated (RIGO; ABEG; BASSANI, 2008). Furthermore, this finding is in line with a study that reported the prevalence of caries in school-age children ranges from 60% to 90%, especially children in Latin American countries (PETERSEN, 2003).

As for the psychological characteristics presented by the children during the prophylaxis procedure and analyzed using the Visual Analogue Scale (VAS), with values ranging from 0 to 10 centimeters, it was noted that the average presented was between 1.45 and 1.84 centimeters. A similar result was published by a study carried out at the Pediatric Dentistry Clinic of the Federal University of Ceará, which assessed the fear and stress of 24 children during non-
invasive clinical examination and prophylaxis procedures using the VAS, obtaining an average of 1.46 cm for these same stimuli (MELO et al., 2015).

Analyzing the relationship between age and fear, it can be said that this emotional aspect was observed to a greater extent in younger children, especially those of pre-school age. This is in line with a study carried out with children aged 6 to 12, which showed that dental fear tends to decrease with age and found no relationship between this stimulus and dental caries (BOKA et al., 2017). This can be explained by understanding the concept of fear, which is a state of great unease, that manifests itself in the face of a real or fictitious danger, to avoid a situation that will happen (SANTOS; CAMPOS; MARTINS, 2007; FERREIRA; OLIVEIRA, 2017), and that with age, children already have greater experience and knowledge of situations, which tends to decrease over time.

A study carried out at the Pediatric Dentistry Clinic of the Regional University of Blumenau assessed the anxiety of 50 children of both genders, who were divided into two groups (4 to 6 years and 7 to 9 years), and found that there was no difference between these groups when assessing this psychological stimulus (OLIVEIRA; MORAES; EVARISTO, 2012). This result is similar to this research, as no significance was found between anxiety and age group, which is also reinforced by the analysis of the groups of dentition types, which change according to age, where no significant result was found when compared to the emotional aspects.

When comparing the sex of the participants, it can be seen that there was also no significant difference in this study and similar studies have obtained the same results (OLIVEIRA; MORAES; EVARISTO, 2012; RIBAS; GUIMARÃES; LOSSO, 2016). However, it is possible to analyze other studies that girls had higher levels of anxiety compared to boys (BOTTAN; LEHMKUHL; ARAÚJO, 2008; LEE; CHANG; HUANG, 2007; TICKLE et al., 2009), corroborating the possible idea that women can be more anxious than men, which is also explained by the hormonal issue.

The study had important limitations in terms of the sample, which was carried out on a limited population, but the collection was carried out by the sample calculation. It is essential to understand the differences in the characteristics of each population compared in this study, since the levels of anxiety, fear and stress can be different between them, precisely because they live in different social, economic and cultural contexts.
Given the above, understanding the context in which children live is extremely important for dental professionals, given that the psychological characteristics they display may be related to the environment in which they live. It was possible to analyze similarities and differences with other studies carried out nationally and internationally, which makes it important for more studies to be carried out on this subject. In addition, dental surgeons must be able to welcome and actively listen to this public, which is undergoing constant psychosocial transformations.

5 CONCLUSION

According to the dentist's perception, preschool children show more fear than school children in the dental environment. In addition, children with dental caries show a higher level of stress during dental care than children without caries.
REFERENCES


