



Original research

## Dental Anxiety and Caries Experience in Patients from 7 to 12 Years Old

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### ABSTRACT

**Introduction:** Dental anxiety has been related to caries experience, as anxiety may lead to avoidance behaviours towards dental care. **Objective:** To compare caries experience according to the level of dental anxiety in a paediatric population. **Materials and methods:** We investigated the association between dental anxiety and caries experience measured by the Decayed, Missing and Filled Teeth (DMFT) Index in a sample of children (n=110) between 7 and 12 years of age who attended dental consultations at four health care centres in the Mexico City Metropolitan Area. During the dental consultation, the patients were clinically inspected and the DMFT index (decayed, missing and filled) was recorded. Then, they were assessed with the Corah's Dental Anxiety Scale (DAS) according to which they were classified into two groups: a group without

dental anxiety (4 to 8 points) and a group with dental anxiety (9 to 20 points). The means of the DMFT index, as well as its individual components, were obtained and the results were compared between the groups with Student's *t*- and Chi-squared statistical tests. **Results:** Significant differences were found between the groups when analysing the 'decayed teeth' component ( $p < 0.05$ ), with a greater number of decayed teeth in the group with dental anxiety. **Conclusions:** Higher scores on the 'decayed teeth' component of the DMFT were found in children with dental anxiety compared to children without dental anxiety.

**Keywords:** Dental anxiety, caries, DMFT index, Dental Anxiety Scale, dental health.

## INTRODUCTION

Dental anxiety is the emotional response to the anticipation of dental treatment, with states of tension and apprehension and autonomic manifestations that can generate difficulties during dental care. Its prevalence is high in the world population, from 10% to 20%, in children and adolescents requiring dental treatment or revision<sup>1</sup>. Various authors associate dental anxiety with multiple factors such as gender, age, personality characteristics of the individual, fear of pain, previous experiences, the influence of family members or the association with experiences of people close to them, the influence of the media, fear of blood, wounds and injections and, the sensory stimuli to which they are exposed during a dental consultation<sup>2</sup>.

There are studies that relate dental anxiety to the experience of caries, the presence of which can lead the patient to cancel or postpone their appointment, with negative consequences for oral health<sup>3-6</sup>. The Corah's Dental Anxiety Scale (DAS) is a reliable instrument for the measurement of dental anxiety, which allows the identification of patients with dental anxiety, thus improving the quality of dental care and the oral health of the patient<sup>7</sup>. On the other hand, dental caries is one of the most prevalent multifactorial non-communicable diseases<sup>8</sup>. Cavities lesions occur due to the interaction of biological, behavioural and psychological factors. In adults, it has been found that dental anxiety can negatively influence oral health, which is reflected in an increased caries rate<sup>9</sup>. It has been reported that dental anxiety can hinder management in adolescents due to non-attendance at dental visits<sup>10-12</sup>.

When examining the importance of these risk factors, it is important to consider how psychological constructs, such as states of anxiety and fear, influence dental caries risk<sup>13</sup>. Even so, research shows conflicting results<sup>13-17</sup>, and further research is needed to understand why variability exists, and whether and specifically how anxiety impacts on oral health. For this reason, the purpose of the present study is to compare the experience of caries according to the level of dental anxiety in children aged 7 to 12 years.

## MATERIALS AND METHODS

A cross-sectional study was carried out, in which dental anxiety was measured using the Corah's Dental Anxiety Scale (DAS)<sup>18</sup> and caries experience was measured using the Decayed, Missing and Filled Teeth (DMFT) Index<sup>19</sup>. The study protocol was approved by the Ethics Committee of the School of High Studies, FES [Facultad de Estudios Superiores] Iztacala, with registration

number CE/FESI/102019/1332. The identity data of the minors are protected in accordance with the regulations for the protection of personal data of the FES Iztacala, and will not be disclosed.

A non-probabilistic sample of 110 children aged 7 to 12 years who attended dental consultations between April 1 and July 31, 2019, at the San Rafael Chamapa Odontopediatric Module, the Santiago Tepatlaxco Health Centre, the Dr. Maximiliano Ruiz Castañeda General Hospital and the Azcapotzalco Peripheral Clinic of Universidad Nacional Autónoma de México was used. A statistical power calculation was performed, based on the sample size analysed and the difference in means of teeth with caries experience between groups, and it was found that, with a confidence level of 95%, the sample has an estimated power of 60%.

Inclusion criteria were children aged 7 to 12 years at the time of the study who agreed to participate; who had previously attended one or more dental consultations, and whose parents or guardians authorised their participation by signing the informed consent form. Exclusion criteria were children with physical, sensory or neuropsychological disabilities or under psychological or psychiatric treatment. Participants who did not complete the survey or who did not cooperate with the review to obtain the DMFT Index were eliminated.

The Corah's DAS was used to identify individuals with dental anxiety as the independent variable. Participants who scored in the range of 4-8 were classified as having no dental anxiety while those scoring  $\geq 9$  were placed in the group considered to have dental anxiety. The dependent variable was caries experience. To measure it, the researchers clinically assessed dental caries lesions in each participant, who had to be seated in a dental chair and under natural light. Only teeth present in the mouth and missing due to pathology were considered; those not taken into account were for loss corresponding to physiological exfoliation without evidence of carious lesion. Periodontal probes known as "WHO-621 Trinity" and plane dental mirrors No. 5 of the Community Periodontal Index of Treatment Needs (CPTN) of the World Health Organization (WHO) were used to obtain the DMFT Index. The examinations were performed according to the methodology recommended by the WHO<sup>19</sup>. Prior to the clinical inspection, the children's parents signed the informed consent form and the children were asked to participate verbally on a voluntary basis.

The Corah's DAS survey was carried out while the patients were in the waiting room. The examiners read the questions to the children and recorded the answers. During the dental consultation a DMFT record was taken, recording lesions on deciduous and permanent teeth. During the training process, the two examiners assessed 7 patients (6.4 % of the total number, not part of the study sample) by the DMFT index on two separate occasions, which were fulfilled with an interval of one week, obtaining an interrater reliability with the kappa statistic of 0.794.

The data obtained were tabulated and analysed with Statistica 7.0 software (StatSoft, Tulsa, USA). The frequency, measures of central tendency and normality of the sample were calculated with the Kolmogorov-Smirnov statistic. For inferential analysis and to determine whether statistically significant differences existed between the different groups, Student's t- and Chi-squared ( $\chi^2$ ) statistical tests were used. The significance level was considered when  $p < 0.05$ .

## RESULTS

The study population consisted of 110 patients aged 7-12 years, with a mean age of 9.2 ( $\pm 1.5$ ) years. Of the individuals, 51.8% were female ( $n=57$ ) and 48.2% were male ( $n=53$ ). The DMFT index recorded a mean of 4.5 ( $\pm 3.4$ ) points with a minimum value of 0 and a maximum of 17,

with a prevalence of 73.07% in the control group and 94.82% in the dental anxiety group. In the dental anxiety scale, a mean of 8.9 ( $\pm 3.2$ ) points was observed with a minimum value of 4, a maximum of 16 points, and a mode of 8.8 points.

Regarding the comparison of the groups and according to the scores attained in the Corah's DAS, 47 % (n=52) were in the group of children with dental anxiety (Table 1). A marginal effect on the DMFT index was found when comparing the means of both groups. The group without dental anxiety had a DMFT of 3.9  $\pm$  3.4, while the group of children with dental anxiety had a DMFT of 5.2  $\pm$  3.4 (p=0.05).

**Table 1. Mean values obtained with the Corah's das and the dmft according to the groups of children with and without anxiety.**

	Children with anxiety (n=52)	Children without anxiety (n=58)	p
DMFT	3.9 $\pm$ 3.4	5.2 $\pm$ 3.4	0.05*
Missing	0.46 $\pm$ 1.04	0.67 $\pm$ 0.96	0.271
Filled	1.6 $\pm$ 2.25	1.41 $\pm$ 1.91	0.65
Decayed	1.79 $\pm$ 2.2	3.1 $\pm$ 3.1	0.012*

\* Values are statistically significant. Statistical test: Student's t-test, p < 0.05.

No significant differences were observed when comparing the 'missing teeth' component separately. For the analysis of missing teeth, two categories were created: 'does have missing teeth' and 'does not have missing teeth', and compared between groups. The group of children without dental anxiety had a mean of 0.46  $\pm$  1.04, and the group of children with dental anxiety had a mean of 0.67  $\pm$  0.96,  $\chi^2=23.0$ , p<1.00. When analysing the component 'filled teeth', the group without anxiety had a mean of 1.6  $\pm$  2.25 and the group with dental anxiety had a mean of 1.41  $\pm$  1.91 (p=0.65).

When analysing the component 'decayed teeth', significant differences were found between the groups. The group with dental anxiety had a mean of 3.1  $\pm$  3.1, while the group without dental anxiety had a mean of 1.79  $\pm$  2.2, (p< 0.05).

## DISCUSSION

The findings of this study showed that children with dental anxiety presented a non-significant difference in the DMFT index compared to children without dental anxiety, furthermore, a higher value of the 'decayed teeth' component was observed in children with dental anxiety compared to children without dental anxiety.

The limitations of our study were the small number of participants included and the lack of validation of the instrument to measure dental anxiety in the Mexican population in the age range of the participants. Although we did not give consideration to other indicators, the measurement of dental caries experience has been employed as an index of oral health<sup>20</sup>. It has been reported that, in adults, high levels of dental anxiety have a negative impact on oral health-related quality of life, as it can be a significant risk factor for dental and periodontal problems<sup>4,21</sup>.

In contrast to the present research, a study in children aged 12-15 years found that fear of dental treatment did not correlate with DMFT or gingivitis<sup>22</sup>. Other studies have reported an

association between dental anxiety and the presence of carious lesions. In the age range 5-7 years, a relationship was found between dental anxiety or fear and a higher incidence of dental caries<sup>5</sup>. It has also been reported that dental anxiety in children aged 6-11 years is significantly correlated with poor oral health as measured by the DMFT index, although the correlation is low<sup>6,23</sup>.

Studies investigating the relationship between oral health and dental anxiety show inconsistencies in their results, creating controversy as to whether there is a relationship between caries experience and dental anxiety<sup>24</sup>. Such inconsistencies may be partly due to the design of the studies, as most of them are cross-sectional, like the present investigation, in contrast to longitudinal designs that can even predict caries incidence from the presence of dental anxiety. Future research should consider longitudinal designs that also include other variables to determine the effect of dental anxiety on oral health. In Latin America, there are few studies that address oral health and caries experience as an indicator in patients with dental anxiety, so it is important to utilise reliable instruments or test the validity of existing ones to measure the impact of anxiety on caries experience.

## CONCLUSION

In the present study, a higher number of decayed teeth was observed in children with dental anxiety, suggesting that children with a higher number of decayed teeth may have anxiety-associated avoidance behaviours that hinder the treatment of these teeth. In another aspect, the findings of this study showed that children with dental anxiety had differences in the DMFT index compared to children without dental anxiety. However, the differences were not significant, probably because this index considers teeth that have already been treated by filling or extraction. This allows us to suggest that the decayed teeth component could be an indicator of the presence of dental anxiety.

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