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## ORAL HEALTH OF NURSERY SCHOOL CHILDREN IN THE MUNICIPALITY OF JURUÁ, AMAZONAS, BRAZIL

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### ABSTRACT

According to the World Health Organization (WHO), dental caries and malocclusion are responsible for much of the population's oral health problems. A cross-sectional study was conducted through the investigation of the presence of dental caries and malocclusion in children in the municipality of Juruá, Amazonas state. The parents/guardians answered a questionnaire and a clinical examination was performed under natural light, with the aid of disposable wooden spatulas. To evaluate dental caries and malocclusion, the indices proposed by the World Health Organization (WHO) were used. For the data analysis, the SPSS version 20.0 program and the Pearson Chi-square test were used, adopting a significance level of 5%. A total of 44 children participated in the study, just over half of which were males (24/54.5%); with 5 full years of age, (30/68.2%). Of their respective parents/guardians, the main responsible parent was the mother (29/65.9%). Most of the families (34/77.3%) have an income of up to the minimum wage and possess at least elementary school education (25/56.8%). Most children brush teeth alone (37/84.1%), every day (31/70.5%), do not floss (38/86.4%), claim to have not received information about brushing (24/54.5%), and consume candy every day (20/45.5%). The mean ceo/CPO was 2.82 and the SIC index was 3.0. Only 27.3% (12) of the children were free of tooth decay. As for malocclusion, the majority (35/79.5%) of the children do not need to use braces according to the opinion of parents/guardians. A good part of the subjects (30/68.2% and 31/70.5%) had normal overjet and overbite respectively, and almost all (40/90.9%) presented an absence of posterior crossbite while the majority are considered to have normal occlusion; class I (79.5%). There was a statistically significant relationship between the variables ceo/CPO, the frequency of brushing ( $p < 0.01$ ) and the act of parental brushing of the child's teeth ( $p = 0.03$ ) and also with the amount of lost teeth ( $p = 0.02$ ). It can be concluded that the children presented unsatisfactory oral health since most presented the presence of caries and had an average ceo/CPO of 2.82. Health education actions that provide guidance on the etiology and prevention of dental caries, on the importance of keeping the primary teeth healthy and in correct occlusion are evidently necessary for children and caregivers.

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## INTRODUÇÃO

Oral health is an important part of the general health of the individual and, when in good condition, allows for proper chewing, adequate phonation, absence of dental pain, identification of food taste, and also has an aesthetic impact. As such, it is fundamental for good quality of life. According to the World Health Organization (WHO), dental caries and malocclusion are responsible for much of the population's oral health problems (Tesch et al., 2007; Bittencourt &

Dental caries is a chronic disease and is considered the main aggravation in oral health. It is important in the origin of dental pain, in addition to the loss of dental elements when in a more advanced stage. Its etiology comprises the interaction of biological, social and environmental factors. Early childhood caries (ECC) are responsible for affecting the deciduous dentition of children in the pre-school phase, and can develop soon after tooth eruption and generate damage to the permanent dentition (Oliveira et al., 2013; Areias et al., 2010). Malocclusions occupy third place in the scale of oral

Since they have a multifactorial origin, they are often characterized as a change in the development of the dental arches that affects both the deciduous and the permanent dentition. They can cause damage to the individual ranging from aesthetic discomfort to difficulties in social interaction, eating, phonation, disabilities and psychosocial disorders (Tesch *et al.*, 2007; Bardal *et al.*, 2011). The importance of the family in this awareness process is indisputable, but it cannot be the only and exclusive form of dissemination of knowledge about prevention of oral diseases in early childhood. It is necessary to engage the State and consequently oral health teams within schools. The presence of these professionals in schools is essential since the knowledge of parents in relation to the prevention of oral diseases is often fragmented (Guarienti *et al.*, 2009). The negative impacts caused by caries are numerous, and include difficulty in chewing, the emergence of recurrent pain and discomfort, as well as aspects in social interaction, such as when interaction is hampered by embarrassment when smiling or expressing oneself publicly. Thus, it is also worth measuring the negative impacts arising from the problem of malocclusion in people's lives (Guarienti *et al.*, 2009). It is of great importance to identify the risk factors of dental caries and malocclusion in children, associated with the use of preventive methods, in order to contribute to the maintenance of children's health. Therefore, this cross-sectional study aims to contribute to the quality of life of pre-school children in an educational center in the city of Juruá by analyzing the prevalence of malocclusions and dental caries and investigating their main risk factors.

## METHODOLOGY

**Type of study:** A cross-sectional study with a quantitative approach was conducted through the investigation of the presence of dental caries and malocclusion in pre-school children of an educational center in the municipality of Juruá, Amazonas state, Brazil. The proposed study was submitted to the Research Ethics Committee of the Amazonas State University and approved under Opinion No. 3,827,684 (CAAE: 25689619.0.0000.5016) in accordance with the fundamental requirements of Resolution 196/96 and the complementary rules of the Brazilian National Health Council. The target population of the study were 149 children aged 4 years and 11 months or 5 complete years of age, who were enrolled at the nursery school, and their respective parents or guardians. The school is located in Juruá, which is a municipality of the interior of the state of Amazonas, 672 km from the state capital Manaus. Juruá has a population of 10,802 inhabitants, of which 570 are children of 4 or 5 years of age. The school was chosen because of the institution's support for research and the expressive quantity of participants available for the study. Out of a total of 149 children, only 44 parents/guardians authorized the participation of their children, which equates to a participation rate of 29.5%. The lack of participation is justified by the COVID pandemic since, at the time, there were many cases in the municipality and this caused a fear of contamination. Students who did not have the authorization of their parents or guardians, school children who were not enrolled at the nursery and were not present on the day of the clinical examination were excluded from the study, constituting a non-probabilistic sample of convenience.

Those responsible for the children were informed about the study through a meeting previously scheduled at the school, during which they signed the informed consent form and answered a questionnaire containing questions about children's oral hygiene habits. This questionnaire contained multiple choice questions and was prepared by the researchers. The clinical examination was performed under natural light, with the aid of a disposable wooden spatula after calibration of the examiner with the parameters of National Research on Oral Health (SB Brazil 2010). To evaluate dental caries and malocclusion, the indices proposed by the World Health Organization (WHO) were used. Dental caries were evaluated using the ceo/CPOD index and the *Significant Caries Index* (SIC) which is calculated as follows: individuals are classified according to their ceo/CPO-D

values. The third of the population with the highest caries score is selected and the average ceo/CPO-d for this subgroup is calculated. Malocclusion was evaluated according to the codes and criteria proposed by the WHO. The dental occlusion examination consisted of visual inspection performed under natural lighting, with the aid of disposable wooden spatulas. Occlusion, overbite, and posterior crossbite were evaluated. As a benefit of the project, the children who presented the presence of dental caries were referred for treatment in a basic health unit (UBS), which is located near the school, and a lecture was also given to the parents and guardians regarding the prevention of oral problems and which presented the results obtained in the study. The importance of the presence of the parents during oral hygiene was also highlighted. After data collection, the tabulation and descriptive analysis were performed using the programs Excel (2013) and SPSS (version 20.0), with the aim of epidemiologically addressing the results obtained. The variables were related to each other using the Pearson Chi-square test, adopting a significance level of 5% ( $p < 0.05$ ).

## RESULTS

A total of 44 children and their respective parents/guardians participated in the study. All were residents in Juruá, which is a municipality of the interior of Amazonas and all the children were enrolled at the educational center. Of these 44 children, the majority were males (24/54.5%), 30 (68.2%) had completed 5 years of age and 14 (31.8%) had less than 1 month to go in order to complete 5 years of age. Table 1 presents the description of variables of interest for the study. It can be observed that the mother is the main parent responsible for the child (29/65.9%), many had a family income of up to 1 minimum wage (34/77.3%), the majority had up to 2 children (29/65.9%), possessed at least elementary school education (25/56.8%) and were of brown skin color (24/54.5%). In Table I, the variables related to oral hygiene habits and consumption of sugary foods are also described; with the majority of children brushing teeth alone (37/84.1%), every day (31/70.5%), do not flossing (38/86.4%) and claiming to having not received information about brushing

**Table 1. Description of the variables in the children: age, gender, responsible parent, income, education and ethnicity (n = 44)**

VARIABLES	N	%
AGE (years)		
4	14	31.8
5	30	68.2
GENDER		
Female	20	45.5
Male	24	54.5
RESPONSIBLE PARENT		
Grandfather	3	6.8
Mother	29	65.9
Father	9	20.5
Aunt	2	4.5
Uncle	1	2.3
N° CHILDREN		
1	13	29.5
2	16	36.4
3	7	15.9
4	2	4.5
5 OR +	6	13.6
INCOME		
Up to 1 minimum wage	34	77.3
Up to twice the minimum wage	6	13.6
3 or more times the minimum wage	4	9.1
EDUCATION		
Elementary	25	56.8
High school	16	36.4
University	3	6.8
ETHNICITY		
White	7	15.9
Indigenous	2	4.5
Black	11	25.0
Brown	24	54.5

(24/54.5%). most parents/guardians help children brush their teeth after breakfast (27/61.4%) and most children (20/45.5%), consume candy every day.

**Table 2. Description of the variables in the children: hygiene habits and consumption of sugary foods (n=44)**

VARIABLE	N	%
<b>BRUSH ALONE</b>		
No	7	15.9
Yes	37	84.1
<b>FREQUENCY</b>		
Once a week	2	4.5
Twice a week	11	25.0
Every day	31	70.5
<b>PARENTAL ASSISTANCE WITH BRUSHING</b>		
After breakfast	27	61.4
After breakfast and lunch	1	2.3
After breakfast, lunch and before bed	5	11.3
After breakfast and before bed	11	25.0
<b>USE OF DENTAL FLOSS</b>		
Sometimes	2	4.5
No	38	86.4
Yes	4	9.1
<b>RECEIVED GUIDANCE ON ORAL HYGIENE</b>		
No	24	54.5
Yes	20	45.5
<b>CONSUME CANDY</b>		
Every day	20	45.5
Once a week	7	15.9
Twice a week	17	38.6

As for the clinical condition of each dental element, the molars were the teeth with the greatest presence of dental caries; especially the second left lower deciduous molar (19/43.2%). There was a small number of teeth with trauma, which was observed occurring in the central and upper lateral incisors in up to 4.5% of children. In three children (6.8%), deciduous molars were extracted due to tooth decay.

**Table 3. Number of children with decayed, lost or filled teeth according to the number of teeth affected by dental caries**

Quantity	Decayed teeth (%)	Lost teeth (%)	Filled teeth (%)
0	13(29.5)	36(81.8)	43(97.7)
1	7(15.9)	5(11.4)	1(2.3)
2	5(11.4)	2 (4.5)	0
3	2(4.5)	1(2.3)	0
4	10(22.7)	0	0
5	2(4.5)	0	0
7	3(6.8)	0	0
8	1(2.3)	0	0
9	1(2.3)	0	0

**Table 4. Description of variables related to malocclusion**

Variable	n	%
<b>Does the child need to use braces?</b>		
No	35	79.5
Yes	9	20.5
<b>Occlusion key of the canines</b>		
Class I	35	79.5
Class II	4	9.1
Class III	5	11.4
<b>Overjet</b>		
Normal	30	68.2
Increased	6	13.6
Edge to edge	7	15.9
Anterior crossbite	1	2.3
<b>Overbite</b>		
Normal	31	70.5
Reduced	2	4.5
Open	1	2.3
Deep	6	13.6
No Information	4	9.1
<b>Crossbite</b>		
Absent	40	90.9
Present	4	9.1

The mean ceo/CPO was 2.82 and SIC index was 3.0. Only 12 (27.3%) of the children were free of dental caries; 6 were girls and 6 were boys. Table 2 shows the number of children with decayed, lost or filled teeth according to the amount of teeth affected by dental caries. Of the total, only 13(29.50%) children did not have decayed teeth, 36 children had not lost teeth, and 43 children did not have fillings. Only one child had a restored tooth (1/2.3%). However, the vast majority had at least one decayed tooth (31/70.5%). As for malocclusion, most children (35/79.5%) do not need to use braces according to the opinion of the parents/guardians. Regarding the occlusion key of the canines, a higher percentage of class I was found in 35(79.5%); regarding overjet and overbite 30(68.2%) and 31(70.5%) were found, respectively. Normalbite and absence of posterior crossbite were found in 40 (90.9%) (Table 3). There was a statistically significant association between the variables ceo/CPO, the frequency of brushing ( $p < 0.01$ ) and the act of parental brushing of the child's teeth ( $p = 0.03$ ), and also with the amount of lost teeth ( $p = 0.02$ ). Pearson's Chi-Square test with a significance level of 5% ( $p < 0.05$ ) was used.

## DISCUSSION

Faced with the scenario of the COVID-19 pandemic in the municipalities of the interior of the state of Amazonas in 2020 and early 2021, there was great difficulty in carrying out the study with children. Many were in other cities, or had already turned 6 years old. The prevalence of pre-school children with dental caries in this sample was higher than the projection made by the World Health Organization (WHO) for the year 2000, which aimed to achieve 50% of children between 5 and 6 years free of caries (BRASIL, 2004). It was also superior to that of other studies with pre-schoolers in Manaus, Amazonas; Avaré, São Paulo; and Teresina, Piauí, in which, approximately, 46.84%, 47.65% and 50.2% of the schoolchildren in these cities were free of dental caries, respectively. However, most of the tooth decay were located in posterior teeth (Negreiros *et al.*, 2018; Nunes & Perosa, 2017; Nobrega *et al.*, 2019). Corroborating with the result of this research, studies have shown that the lack of information about healthy eating habits and adequate hygiene habits in people with low education levels and low family income may unfavorably affect the oral health of children (Silva *et al.*, 2017; Nunes & Perosa, 2017; Oliveira *et al.*, 2013; Almeida *et al.*, 2011). As such, this makes it essential to investigate the conditions that cause this phenomenon to occur in order to effect a decrease in this relationship and, consequently, decrease inequities in health (Oliveira *et al.*, 2013). In this study, a statistically significant association was found between the ceo/CPO, brushing frequency ( $p < 0.01$ ) and the act of parental brushing of the child's teeth ( $p = 0.03$ ), demonstrating the importance of parental-supervised brushing in children of this age group, as well as its frequency, after meals and before bedtime. The family is the basis for the social, psychological and emotional development of the child, and participates in the formation of the child's personality (Figueirai & Leite, 2008). Those responsible need to be aware of their role in the care of their child's oral health and know that preventive, educational and motivational actions are effective in improving oral health (Bardal *et al.*, 2011; Silva *et al.*, 2017). In addition, there must also be awareness of the relevance of the role of the use of fluoride toothpaste in the decline of dental caries (Silva *et al.*, 2017).

According to Nobrega *et al.* (2019), dental caries negatively impact the quality of life related to oral health of pre-schoolers. Despite the decrease observed in the occurrence of dental caries in recent years in Brazil, a high average of the ceo-d index still persists at five years of age, justifying the development of this research. In addition, there is still a lack of information on the subject with regard to statistical data in the municipality of Jurua. The result of latest survey of conditions of the oral health of the population (SB Project Brasil) reported an average of 2.43 for Brazil (BRASIL, 2010), and the work carried out by Negreiros *et al.* (2018) in pre-school children, in which an average of 2.23 was found at 5 years of age, shows similar results to those of this survey, which showed a medium level of tooth decay at the age of five. i.e., 2.82. As for the SIC, which sought to evaluate the

inequality in the quantity of dental caries of preschoolers, the result found was higher than the mean of the ceo-d (SIC=3.0). However, it did not show an excessive inequality, which can be explained by the high percentage of children with untreated dental caries (70.5%). This result was lower than that found in Manaus (SIC=6.72) and shows the absence of expressive polarization in relation to dental caries and emphasizes the need to enhance promotion and education actions in oral health with all children in the preschool group and their respective parents. This has the effect of reducing the occurrence and severity of dental caries (Negreiros *et al.*, 2018) since parents play a fundamental role in the promotion and maintenance of the health of their children (Figueirai & Leite, 2008). As dental caries are considered a public health problem that affects all age groups, it can lead to a decrease in self-esteem, and should be better evaluated when it relates to the family environment. Similarly, malocclusion, in addition to interfering with the stomatognathic system can result in aesthetic embarrassment. Guidance for parents/guardians on deleterious habits is an excellent preventive method and minimizes the occurrence of alterations in occlusion (Almeida *et al.*, 2011). Malocclusions present a high prevalence among Brazilians, with a percentage of more than 38% among adolescents of 12 years of age, evidencing the negligence with which malocclusion has been treated by dental professionals. The clinical behavior of malocclusions provides support for early intervention, whether in the deciduous dentition or, at the latest, in the inter-transitional period (Dutra *et al.*, 2004). High prevalence is associated with gender and the macro region of the country, indicating that the understanding of different sociodemographic characteristics interferes with the prevalence and severity of oral diseases. The analysis of these differences is relevant in order to guide the implementation and expansion of public policies aimed at the treatment and prevention of their occurrence in the population (Bauman *et al.*, 2018). In a systematic review, it was found that the worldwide prevalence of malocclusion among children and adolescents was 56%, without predilection by gender. Considering malocclusion between continents, a distribution of 81% in Africa, 71% in Europe, 53% in America and 48% in Asia was found (Lombardo *et al.*, 2020). In the present study, a higher prevalence of normal conditions was found among the alterations in occlusion analyzed in the pre-school children participating in the study. This result may be related to lower occurrence of deleterious habits, such as pacifier and finger use, among other factors, which is a different result from that reported in the study by Carminatti *et al.* (2017), which observed negative impacts from pacifier sucking habits, oronasal breathing and dental caries in malocclusion in preschool children and association of malocclusion with the quality of life of children (Massuia *et al.*, 2011; Morais *et al.*, 2014). The results of epidemiological studies in Brazil indicate a high rate of malocclusion, ranging from 13% to 90.09%, in the age groups between 05 and 14 years (Marcomini *et al.*, 2010). In the present study, a prevalence of 43.2% of children with some occlusal alteration was observed. Malocclusion has significantly affected the quality of life of those affected and it is found to be associated with lower economic conditions. Similarly, this study found that among the participants in the sample, 77.3% of the parents or guardians reported having income of up to the minimum wage, or receiving only government benefits. This indicator directly interferes with the resolution of the malocclusion problem, since the treatment of these changes generates a cost that not all families are able to afford (Martins *et al.*, 2019). This study has as a limitation the non-representative sample for the study population, however, the results of this study reinforce the importance of conducting health promotion activities, oral health education for the prevention of the occurrence of dental caries and the early diagnosis and prevention of occlusion changes, with guidance on early intervention, in order to enable the prevention and early treatment of occlusal problems.

## CONCLUSION

The children presented unsatisfactory oral health in relation to tooth decay, since there was a high percentage of children with untreated tooth decay with an average ceo/CPO of 2.82. Health education

actions are necessary for children and caregivers, as well as guidance on the etiology and prevention of dental caries and on the importance of keeping the primary teeth healthy and in correct occlusion.

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