DENTAL CARIES AND GINGIVITIS PREVALENCE: RISK FACTOR ANALYSIS IN INSTITUTIONALIZED CHILDREN

Prevalência de cárie dentária e gengivite: Análise dos fatores de risco em crianças institucionalizadas

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ABSTRACT - It was evaluated the prevalence and related risk factors of caries and gingivitis in children from a day-care center. We examined 228 children ranging from 1 to 5 years of age. In the first group (116 subjects 12 to 42 months of age), the dmft index was applied. In the second group (112 children 43 to 71 months of age), the dmft and gingival status were evaluated. A dmft of 0 was found in 92 children from group 1, and the average was 0.7. The second group showed a dmft index of 0 in 46 children and an average of 2. The average prevalence of gingivitis was 71.3%: 4.5% showed a maximum of 50% of teeth affected, 48.2% showed 51% to 70% of teeth affected, 44.6% showed 71% to 90% of teeth affected, and 2.7% showed more than 90% of teeth affected by gingival bleeding. Dental plaque was observed in 100% of the subjects. Roughly 89.3% showed very poor oral hygiene. Of all risk factors analyzed, a sweet diet during sleep was the main cause for changes in the dmft index. The prevalence of diseases is high. More educational procedures must be established in order to minimize these conditions.

DESCRIPTORS - Dental caries; Gingivitis; Epidemiology.

INTRODUCTION

Dental caries and periodontal disease, which frequently involve the deciduous teeth, are the most prevalent alterations seen as the main public health problems relevant to dentistry in Brazil.[1] Both are considered to be of multifactor etiology, and both have dental plaques as their main bacterial etiological factor.[2] The dramatic situation of oral health of the Brazilian population presents a negative epidemiologic profile due to dental caries and periodontal disease. However, the majority of developed countries have recently observed a significant enhancement of the oral health levels of their populations. In these countries, a general decline in the prevalence and gravity of dental caries in the infantile and adolescent population is occurring. This decline stands in contrast to the current situation in some underdeveloped countries, such as Brazil. Strong cariogenic involvement of the deciduous teeth still exists in this country, as demonstrated in recent research examining a significant contingent of children. These data highlighted the necessity of dental treatment among children.[3] According to these data, dental professionals must have enough knowledge to carry out the adequate diagnosis of the alterations; they must know how to promote oral health in order to avoid or prevent the diseases.[4]

For the development of dental caries, many factors (e.g., cariogenic diet, microbiota, susceptible host, time factors, buffer capacity of the saliva, fluoride interference, and associated social-economic-cultural aspects like social class, family income, and education level) must interact simultaneously. These factors are related to and influence the disease's developmental process.[5] On the other hand, the diagnosis of periodontal diseases is a constant reality and is considered one of the most prevalent diseases in humans. Although some dentists consider it to be of secondary importance in children, gingivitis is the most frequent periodontal alteration.[6]

The multifactor nature of dental caries makes the development of an effective model identifying children at high risk for this disease difficult. Main risk factors include socioeconomic condition, oral hygiene, parental interest, dietary habits, and presence of cariogenic microorganisms.[7]

Other factors, such as the anatomical characteristics of the host, dental age, flow and buffer capacity of the saliva, positioning of teeth in the arch, presence of dental fillings and devices, motor incapacity for the disorganization of dental plaque, hereditary factors, extended use of medicines, time of food retention in the mouth, and influence of a cariogenic diet, must also be taken into consideration.[8]

The compulsive use by children of breastfeeding or bottle feeding with high sugar content during the nocturnal period, the extreme consumption of sucrose, and the unfamiliarity of children and their parents with procedures of oral hygiene are also considered risk factors of significant importance[9]. Social-economic-cultural levels can also influence corporeal properties, such as feeding, housing, sanitation, medical assistance, and education level; changes in these properties alter the standard of living and can make the appearance and development of diseases both more severe and more frequent.[10] Although preventive procedures are followed, a relationship between the increasing prevalence of dental caries and increasing age has been clearly demonstrated.[11,12]

On the other hand, periodontal disease in children has been extensively studied during recent decades. A strong correlation between oral hygiene conditions and gingival alterations has been also demonstrated. In the process of dental health or periodontal disease, two classic manifestations are described: gingival disease (gingivitis) is related to inflammatory reactions in the marginal gingiva that are unchained by the accumulation of supragingival dental plaque, and periodontal disease (periodontitis) is caused by subgingival dental plaque and may cause alterations in support tissues. It is essential for dentists to have sufficient knowledge regarding the local and systemic etiological factors, signals involved, and symptoms of these diseases.[13]

Several factors make possible the adherence and/or increase of dental plaque and contribute to the development of gingivitis in children. They are: the presence of teeth in eruption, mobility of deciduous teeth, difficulties of oral hygiene, presence of caries, the presence of teeth in the exfoliation process, food impaction, and deleterious habits (suction of the finger, biting of objects, oral breath, and unilateral biting). Independent of any situation, the maintenance of the state of periodontal health will be directly related to both defense capacity and tissue regeneration. These abilities offer resistance against the attack of microflora and its pathogenic products.[8]

The prevalence of gingivitis in Brazilian children is considered high. Dental care is almost exclusively concentrated in the treatment of caries. Thus, the periodontium is relegated to a secondary level of importance during the examination and treatment of children.[14]

Thus, the aim of this study is to evaluate the prevalence and related risk factors of dental caries and gingivitis in institutionalized children from a day-care center.

MATERIAL AND METHODS

This study examined 228 children (census) who were registered in an educational center as well as their parents, residents in a slum quarter in the city of Belo Horizonte, Brazil. They were divided into two groups. The first group was composed of 116 children (50% male) 12 to 42 months old who were evaluated via the dmft index. The second group consisted of 112 children (50% male) 43 to 71 months old who were evaluated for both the dmft

index as well as gingival disease (gingivitis).

We applied the Student's t-test to examine the agreement of intra-examiner data regarding the dmft index and dental plaques, and the Kappa test to examine gingival bleeding. Results were considered statistically significant at $p<0.05$, so we are at least 95% confident in the presented conclusions.

For dental caries diagnosis, we used the criteria recommended by the Brazilian Health Ministry (Project Oral Health 2000)[15] in the examination, we included teeth with indicated extraction. We used the dmft (decayed, missing, and filled - tooth) index to determine the prevalence of dental caries, as considered by Johnsen *et al.*[16] When the index was zero, we considered the dmft index to be "without alteration"; index values greater than zero were considered to represent an "altered dmft index".

Gingival condition was evaluated by the presence of bleeding during probing, according to index of Ainamo and Bay[17] with modification (IS = teeth with gingival bleeding / number of existing teeth X 100%). In relation to the presence of dental plaque, the index of Quigley and Hein, as cited by Preber *et al.*[18], was adapted and used (IB = total score evaluated / 16 X 100%).

The material for clinical intraoral examination included an oral mirror, clinical clamp, periodontal probe type WHO, wooden dismissible tongue depressor, disposable latex gloves for procedures, gauze, and 0.5% solution of basic fuchsine.

This study was approved by the Ethical in Research Committee of the University, register number 2002/01.

RESULTS AND DISCUSSION

It was observed that the majority of children belonged to social class D, and the prevalence of social class D children did differ significantly between group 1 (67%) and group 2 (57.3%). Moreover, 32% of the group 1 children and 38.8% of the group 2 children belonged to social class E. According to the criteria of Brazil Economic Classification adopted by ABA/ANEP/ABIPEME[19] in population research, the evaluated children belonged to social classes D and E.

It was considered in this study that dmft without alteration means dmft=0 (zero), and dmft with alteration means dmft>0. We verified that modified dmft indexes were primarily found in children 43 to 71 months in age according to social class (Graphic 1). These findings are in accordance with the data of Freire[20], which examined poorer populations, and demonstrate that children in worse socioeconomic conditions present a greater prevalence of dental caries.[10] The dmft index was 0 for 79.3% of children 12 to 42 months in age. In the group of children 43 to 71 months in age, this percentage diminished to 41.1% (Table 1).

Graphic 1 – Evaluation of dmft index according to social class in children 43 to 71 months in
Note: The probability of significance is related to Fisher test

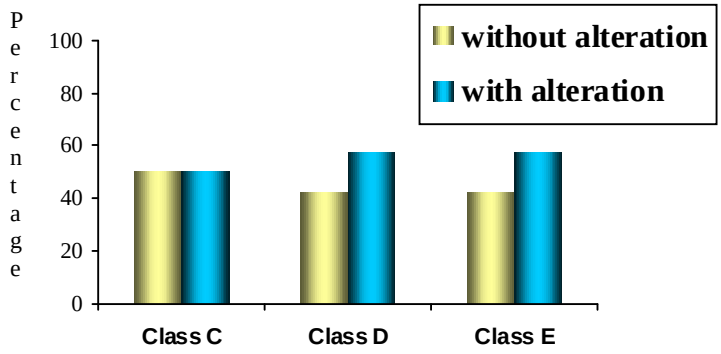


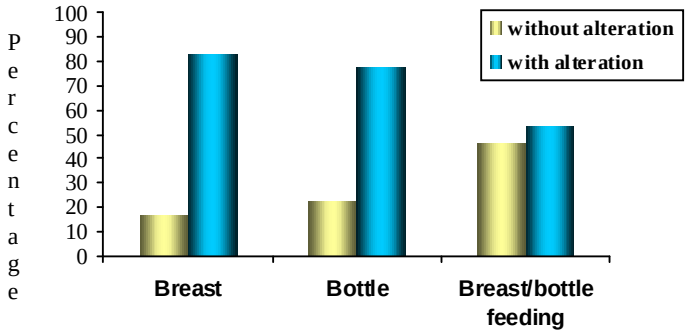
Table 1 – Characterization of children related to dmft index and age

Dmf-t	Age			
	12 to 42 months		43 to 71 months	
	N	%	N	%
0	92	79,3	46	41,1
1-2	16	13,8	25	22,3
3-4	2	1,7	23	20,5
5-6	1	0,9	13	11,6
7-8	2	1,7	4	3,6
9-11	3	2,6	1	0,9
Total	116	100,0	112	100,0
Mean	0,7		2,0	

Highly worrying result was found by Leite *et al.*[21], who examined 51 preschool age children and found that only 29.4% were caries-free. Results similar to those found in the children of the first group of this study (79.3%) were published by Mattos-Graner *et al.*[22] and Frisso *et al.*[23]. These groups found that 65% of the studied children lacked caries.

More severe dmft index alterations were noted in children 43 to 71 months in age, and this difference was related to the children's type of breast-feeding. These alterations can be observed in Graphic 2. These findings can be justified by the extensive use of natural or artificial breast-feeding above of 12 months of age. This practice facilitates the appearance of caries[24] and may be compounded by the action of lactose, which is considered to be involved in the demineralization of dental surfaces, in both types of milk.[25]

Graphic 2 – Evaluation of dmft index according to natural or artificial feeding in children 43 to 71 months in age (p=0,078)



The influence of sugar in the baby's bottle on dmft index alterations was observed in the second group. We verified that 59.7% of the children consuming sugar in their bottles presented dmft index alterations, and 42.3% of children who did not

consume sugar also presented modified dmft indices (Graphic 3). The results of this study are in accordance with reports described in the literature, which confirm that the use of baby bottles with sugar content is directly related to the presence of caries.[9] Longer bottle use was associated with greater alterations of the dmft index in both groups when the dmft index and age group were considered (Table 2). We also verified that the prolonged use of a bottle facilitates the development of caries, corroborating the results of Paula and Dadalto.[24]

Graphic 3 – Evaluation of dmft according to sucrose content in bottle-feeding in children 43 to 71 months in age (p=0,854)

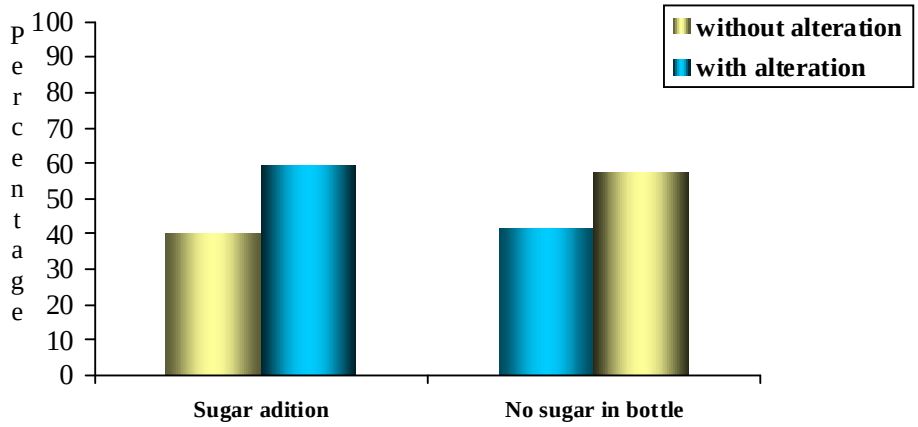


Table 2 – Characterization of children related to bottle-feeding interruption, dmft, and age

Age	dmft	Descriptive measures				p
		Minimum	Maximum	Mean	sd	
12 to 42 months	without alteration	12.0	39.0	24.2	7.8	0.031
	with alteration	22.0	38.0	30.8	6.7	
43 a 71 months	without alteration	8.0	60.0	30.9	10.0	0.038
	with alteration	9.0	60.0	35.8	12.5	

Information from the parents regarding the ingestion of foods and liquids at home associated with sugar in tea, water, mixtures, and soups also verified the

association between the consumption sweets and candies and dmft index alterations (Table 3). Among all studied foods, chocolate and biscuit candy had the most influence on alterations in the dmft index. Stickier and more adherent food offered has a greater amount of sucrose, so it will be retained on children's dental surfaces for a longer period of time. Without adequate dental hygiene, caries will develop. These characteristics are inherent to determining the types of foods responsible for the biggest alterations in the dmft index.[7]

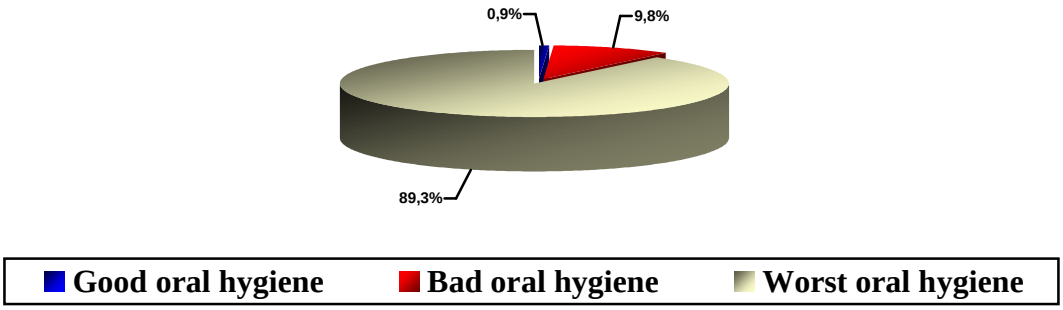
We detected the presence of dental plaque in 100% of the evaluated children. The majority of the children (89.3%) presented the worst possible oral hygiene, and 9.8% showed a bad state of oral hygiene; only 0.9% had good oral hygiene condition (Graphic 4). A strong correlation between dental plaque and the dmft index was identified. An increase of the dmf-t index is followed by an increase in dental plaque (Table 4). The correlation between dental plaque and the dmft index is in accordance with the study of Barros et al.[11]. These studies note that educational programs teaching parents about the oral hygiene of their children are necessary. Such program should be implemented as soon as possible to prevent and control oral diseases.

Table 3 – Evaluation of food containing sugar considering dmft in children 12 to 42 months in age

Food	Use	dmft		Total	p
		without alteration	with alteration		
	Total	92	24	116	
Candies	No	11 (73.3)	4 (26.7)	15	0.509(**)
	Yes	81 (80.2)	20 (19.8)	101	
	Total	92	24	116	
Sweets	No	38 (86.4)	6 (13.6)	44	0.143(*)
	Yes	54 (75.0)	18 (25.0)	72	
	Total	92	24	116	
Chocolate	No	39 (90.7)	4 (9.3)	43	0.020(*)
	Yes	53 (72.6)	20 (27.4)	73	
	Total	92	24	116	
Biscuit candy	No	23 (92.0)	2 (8.0)	25	0.077(*)
	Yes	69 (75.8)	22 (24.2)	91	
	Total	92	24	116	

* Qui square test - ** Test exact of Fischer

Graphic 4 - Characterization of children 43 a 71 months in age according to oral hygiene



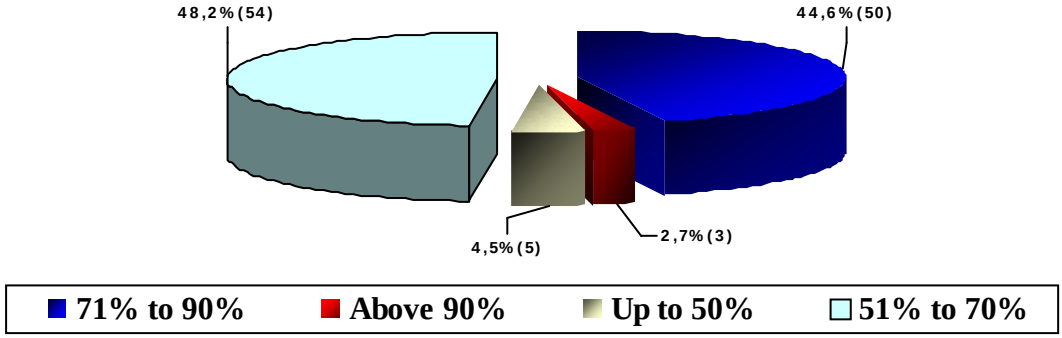
In relation to the gingival bleeding index, a strong correlation with dental plaque was observed (Table 4). Gingival bleeding (gingivitis) was detected in all 112 examined children (clinical prevalence of 100%). As it can be observed, 4.5% of the children presented up to 50% of teeth affected; 48.2% showed 51 to 70% of teeth affected, 44.6% showed 71 to 90% of teeth affected, and 2.7% showed more than 90% of teeth affected (Graphic 5).

Table 4 – Correlation analysis between dental plaque, dmft index, and gingival bleeding

Measure	r	p
dmft index	0.21	0.023
Gingival bleeding	0.17	0.066

Note: The probability of significance is related to Spearman correlation

Graphic 5 – Characterization of children 43 to 71 months in age according to percentage of teeth affected by bleeding.



We also observed a correlation between the dental plaque and gingival inflammation indices. These findings are in accordance with the study of Page et al.[2], and the prevalence of gingivitis is related to those in many published epidemiologic studies.[6,14].

Conclusion

It is concluded that the prevalence of dental caries was considered high, and the dmft index was altered in both groups (20.7% and 58.9% for groups 1 and 2, respectively). The prevalence of gingivitis also was high in the examined children (100%). With regard to the gingival bleeding index, an average of 71.3% of the teeth were affected. Among consumed foods, biscuit candy, chocolate, and nocturnal baby bottles with sugar content promoted the greatest alterations in the dmft index. Oral hygiene procedures carried out by the parents were not sufficient to prevent the alterations under study.

RESUMO

Foram avaliadas 228 crianças com dentes decíduos, de 1 a 5 anos de idade, matriculadas numa creche de uma grande cidade, divididas em 2 grupos. Nas de 12 a 42 meses de idade, foi realizado o índice ceo-d. Nas da faixa etária de 43 a 71 meses, foi avaliado o índice e as condições gengivais. Encontrou-se ceo-d zero em 92 crianças do 1º grupo (79,3%), sendo que a média foi de 0,7. No 2º grupo encontrou-se ceo-d zero em 46 crianças (41,1%) e a média 2. Observou-se que 100% das crianças apresentaram gengivite. A prevalência média foi de 71,3%, sendo que 4,5% apresentaram até 50% dos dentes afetados por sangramento gengival, 48,2% apresentaram de 51% a 70%, 44,6% de 71 % a 90% e 2,7% acima de 90%. Em relação ao biofilme dentário, constatou-se prevalência de 100%, sendo que 89,3% apresentaram péssima higiene bucal. Dos indicadores analisados, a dieta com açúcar estava

relacionada aos maiores índices. Assim, a prevalência das doenças bucais foi alta, confirmando a necessidade de implementação de ações educativas, para a significante modificação do quadro.

DESCRITORES - Cárie dentária; Gengivite; Epidemiologia.

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