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| ORIGINAL

Nutritional status and dental caries of schoolchildren from Sobral - Ceará

Estado nutricional E cárie dentária em pré - escolares no município de Sobral - Ceará

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ABSTRACT

Objective: To examine the relationship between nutritional status and dental caries of schoolchildren from Sobral, Ceará, Braszil. **Methods**: Dental health and nutritional status of 92 children studying in two different schools and aging 5 years old were evaluated. The nutritional status was evaluated using the Body Mass Index (BMI), and the dental health status was evaluated using the Decayed, Missing, and Filling Tooth Index (DMFT-index). An interview with the parents of the children was also performed to investigate the socioeconomic profile and nutritional habits of the children. **Results**: A DMFT-index of 1.97 was found, and 39.6% of the children presented overweight. Higher prevalence of dental caries was associated with low income, public schools, and less schooled parents. The variable overweight presented the inverse situation found for dental caries. Moreover, it was observed lower prevalence of caries in overweight children. **Conclusion**: Dental caries and nutritional status exhibited different behaviors in the population studied, which were driven by the sociodemographic profile of the family.

Indexing terms: Child preschool. Dental caries. Obesity.

RESUMO

***Objetivo**: estabelecer a relação do estado nutricional e o desenvolvimento da cárie dentária em pré-escolares no município de Sobral, Ceará. **Métodos**: foram realizados uma avaliação nutricional e um levantamento epidemiológico em saúde bucal numa amostra constituída por 92 crianças na faixa etária de 5 anos em duas escolas do município. O estado nutricional foi avaliado através do índice*

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IMC/idade e a cárie dentária a partir do índice do ceo-d. Foi realizado uma entrevista com os pais sobre as variáveis socioeconômicas e marcadores de consumo alimentar. ***Resultados****: o ceo-d encontrado foi de 1,97 e 39,6% das crianças apresentaram excesso de peso. Observou-se que a cárie dentária estava relacionada com a menor renda familiar, escola pública e menor escolaridade dos pais, enquanto que o excesso de peso observou-se uma relação inversa. Verificou-se que as crianças que apresentaram excesso de peso foram aquelas com menor prevalência de cárie.* ***Conclusão****: a cárie dentária e o excesso de peso demonstraram padrões de comportamentos diferentes na população infantil de acordo com as condições socioeconômicas da família.*

Termos de indexação: *Pré-escolares. Cáries dentárias. Obesidade.*

INTRODUCTION

Dental caries is a multifactorial infectious disease highly associated with the intake of fermentable carbohydrates, mainly sucrose. Sucrose is a widely consumed sugar, and it presents the greatest cariogenic potential when compared to other dietary carbohydrates. Caries is one of the most prevalent chronic diseases, and sucrose consumption is considered a primary determinant factor of the disease onset and progress [1].

During the past few years, a change has been observed in the pattern of caries disease occurrence in the world, mainly in the children population. In developed countries, caries presented a declining tendency during the last decades of the XX century and first years of the XXI century [2]. The same pattern was observed in Brazil. However, this pattern was heterogeneous, given that different prevalence was found when comparing different populational groups [3].

Although there is no consensus among authors [4-6] regarding the phenomenon polarization, it is widely accepted that polarization occurs when in one pole there is disease, while in the other one a higher number of cases are found among a small group of individuals. For instance, in Brazil, 20% of the schoolchildren population concentrate 60% of the dental caries burden, with the worse scenario being found in the North and Northeastern regions. Such characteristic is also the expression of iniquity, which posits that the differences in disease occurrence results not only from biological variables, but also from social aspects [7].

In developing countries, dental caries is still a major problem [8]. Such polarization phenomenon is characterized by the concentration of the disease in small groups of people, mainly in the ones who live in worse sociodemographic context [9]. Low income communities are frequently more susceptible to caries, mainly due to poorer nutritional habits of mothers and their children.

The nutritional profile presents an important role in the oral health status. It contributes to the prevention of diseases, as well as it can be a determinant factor for the occurrence of diseases such as caries. As an example, it is known that the frequent exposure to sugars is associated with the onset and progress of caries, and that sugary products are commonly present in the diet of children during their infancies [10].

Obesity and dental caries present close relationship with nutritional habits. The consequences of obesity to the general health are numerous and vary from non-lethal conditions to the risk of premature death. Obesity is a chronic disease that requires changes in the nutritional and exercise habits. Heredity, sex and age must also be considered when the disease occurs. Environment and family are also key factors in the etiology of obesity in children [11].

The evaluation of the nutritional status of children aging from 5 to 9 years old, which was studied by the Family Budget Research 2000-2009, showed that 33.5% of the children from the suited families presented overweight, while 14.3% presented obesity. Overweight has grown in prevalence among children from all over the world. In this scenario, it is a consensus that obesity influences negatively infancy and adult life. Thus, preventive strategies during infancy are needed to diminish the harm. Data of the city of Sobral show that 17.2% of children who receive the benefit of the Bolsa Familia Program are under risk of being overweight, while 8.95% are under risk of developing obesity at the age of 5 years old [14].

Given the exposed, there is still the need to investigate the relationship between dental caries and overweight/obesity since these conditions present common etiology factors. Therefore, the aim of this study was to investigate sociodemographic factors associated with overweight/obesity and dental caries in children aging 5 years old.

METHODS

A transversal study was performed in Sobral-CE to evaluate the nutritional and dental health status of 92

children aging 5 years old who studied in two different schools, one private and the other one public. The present work is one arm of a broader intervention, which is a result of the PET Vigilância (Impacto das atividades educativas e de orientação nutricional em pré-escolares). Our study focuses on the results of the epidemiological survey of nutritional and dental health status.

Initially, the parents of the children were interviewed to investigate frequency of meals (raw and boiled vegetables, fruits, milk or yogurt, soda, cookies, hamburger, fries); sociodemographic data (parents schooling level, family income, income per capita, number of people living together); and the children's health status. In the sequence, all the children were examined regarding their dental health status. Dental caries was evaluated using the DMFT-index. The exam was performed under natural light using mouth mirrors and the WHO periodontal probe. Five examiners were calibrated before the dental caries evaluation (Kappa 0,879).

The values of weight and height were obtained to calculate the Body Mass Index by age. The material used to evaluate the weight and height of the children were, respectively: a portable electronic scale of 150 km of capacity (Scale® BF 105) and a measuring tape. The questionnaire used is based on the standards of aliments intake for individuals of 5 years old or more used by the System of Nutritional Vigilance 9SISVAN-WEB).

The obtained data were evaluated using the program SPSS version 20. Chi square test was used to evaluate the correlation between overweight, dental caries, and sociodemographic status. A significance level of 95% was adopted. This research was approved by the Ethics Committee of the Federal University of Ceara (n° 749539). Moreover, the parents signed a consentient term, allowing their children to participate in the investigation.

RESULTS

The DMFT-index found was 1.54 and the caries prevalence among the examined children was 45.7%. Moreover, 39.6% of the children were overweight, while 18.9% of the children were already obese. The intake of fries (p=0.01) and cookies (p=0.03) presented a significative correlation with overweight. However, the intake of any of the foods listed in the questionnaire presented significative association with caries.

Table 1 depicts the relationship of overweight according to the sociodemographic variables. The results show that overweight presented significative correlation with the higher family income (p=0.008), private schools (p<0.001), and parents with better schooling.

Regarding dental caries (table 2), the results show that caries was highly associated with families with low income (p=0.0005), public schools (p<0.001), but it did not present a significative association with the parents schooling (p=0.01). Overweight presented an inverse association with dental caries (p=0.001), and most of the overweight children did not present dental caries.

Table 1. Overweight according to sociodemographic variables and presence of caries. Sobral (CE), 2014.

	Non-overweight children		Overweight children		p value
	n	%	n	%	
Type of school					
Public	43	74.1	15	25.9	<0.001
Private	12	36.4	21	63.6	
Gender					
Female	27	52.9	24	47.1	0.09
Male	28	70.0	12	30.0	
Parents schooling					
8 years or less	19	82.6	4	17.4	0.01
More than 8 years	36	53.7	31	46.3	
Family income					
2 minimum wages or less	41	70.7	17	29.3	0.008
More than 2 minimum wages	14	42.4	19	57.6	

Table 2. Prevalence of caries according to socioeconomic variables. Sobral (CE), 2014.

	Without caries		With caries		P value
	n	%	n	%	
Type of school					
Public	23	39.7	35	60.3	<0.001
Private	27	79.4	7	20.6	
Gender					
Female	29	56.9	22	43.1	0.58
Male	21	51.2	20	48.8	
Parents schooling					
8 years or less	10	41.7	14	58.3	0.12
More than 8 years	40	59.7	27	40.3	
Income					
2 minimum wages or less	25	43.1	33	56.9	0.005
More than 2 minimum wages	25	73.5	9	26.5	

DISCUSSION

In Brazil, as well as in other developing countries, the social inequalities are the main determinant of dental caries [15]. Moreover, it is known that societies in which there are less inequalities present better health status. This is justified by the fact that unequal income distribution implies contrasting scenarios regarding the population health status [16].

Family income has been already studied by other authors, who showed that it presents a direct relationship with nutritional habits, mainly of the children [17]. Our study showed that family income was associated with caries experience, being the worse scenario found in those families with lower income, in which the caries prevalence and severity was higher.

Our results did not show a significative association between caries experience and parent's schooling. However, higher caries prevalence was found among children who studied in the public school. In this context, it is known that the parents with higher income also have better access to education and access to dental treatments [18].

The analysis of children considering the type of school, public or private, allows the evaluation of the influence of family income in the nutritional status of the children. Our investigation showed that children who studied in the private school presented higher prevalence of overweight. Such findings are justified by the better access to a variety of unhealthy foods, which in association with the sedentarism of the modern life, results in weight gain [19]. Although overweight was a finding in the group of children with better income, these results are not in accordance with the current tendency in Brazil. What has been observed is a transition in the nutritional status of the population, in which people with low income present higher levels of overweight. However, we posit that our findings are limited, given that we had a small sample size and evaluated only two schools.

It is worthy of note that the food choice, amount of food eaten, and the interval between meals are determined by the social group in which the individuals live. Such patterns are constructions strongly associated with the life style and experiences and cultural habits. They also suffer influence of the social and historic context of each generation [21]. Although some improvements have been achieved in terms of diminishing nutritional deficits in Brazil, there are still marked inequalities that negatively affect the more vulnerable population [22].

Regarding the association between nutritional status and dental caries, the literature presents controversy. Some authors report that there is no association between these two variables in teenagers [11,23]. Other investigations have shown that obesity is directly associated with caries experience, while some authors have found that the BMI is inversely associated with caries experience and severity in American children and adolescents [25]. A systematic review of the literature found results similar to what we showed with our investigation. In such review the studies showed an inverse association between anthropometric variables and caries experience. Such inverse association is

marked in studies performed in developing countries, such a Brazil [26]. Other systematic review demonstrated that the studies vary in their methods and experimental design, which makes the current evidence on the relationship between caries and obesity controversial [27].

Moreover, in our investigation overweight presented association with the intake of fries and salty cookies, but no association with the intake of sweetened cookies and soda was found. This explains the inverse association of overweight with dental caries, once sucrose is the most cariogenic disaccharide.

The WHO has established that the intake of fermentable carbohydrates has to be decreased in order for the populations maintain their healthy status [28,29]. The WHO has also pointed that changes in the intake of sugars are strongly associated with body mass. The recommendations of the organization on sugar consumption take in account the relationship between caries and carbohydrates intake, once it is known that amount and frequency of sugar intake play an important role in the onset and progress of caries disease [29].

One limitation of our study is the diet evaluation, which evaluated the food intake per week not per day. Such limitation may explain why we could not demonstrate a significative association between food intake and dental caries. Other limitation of our experimental design is the memory bias once the data regarding food intake were dependent on the capacity of the parents to remember what their children had eaten.

Even with those limitations, we used a well-recognized questionnaire, which is also an instrument of the System of food and nutritional vigilance [14], which is nationally recognized and used to evaluate behaviors related to food intake profile. Such questionnaire allows the study of a variety of aspects of diet and nutrition, which contributes to the study of the dietary profile of a population. The main objective of the questionnaire is to identify the frequency of intake of foods and drinks within the seven days previously to the interview. The General Coordination of Food and Nutrition provides the formularies of food intake since 2008, which are available on the website of the System of food and nutritional vigilance (SISVAN Web). The availability of such data contributes to the follow up of the population nutritional status by the primary health care institutions.

The intake of healthy food is a determinant factor for the nutritional status of the population. Thus, monitoring the profile of food intake contributes for the diagnosis of the nutritional status of the individuals, as well as it aids the planning and organization to maintain the population healthy.

The study of common risk factor for different conditions is recommended by the WHO since 1980, and this practice is recommended once it stimulates the creation of an integrated program of disease prevention. In this context, when studying dental caries and obesity, it is important to emphasize that sugar intake must be limited in terms of amount and frequency. Such instruction influences positively not only the nutritional status but also the dental health. Moreover, changes in the food intake profile influence not only on the weight gain and loss, but they also aid in the control of heart diseases, diabetes, hypertension, some types of cancer, and buccal diseases such as caries.

Health promotion, using such approach, presents a positive impact over a wide number of diseases with a low cost, diminishing inequalities.30 Therefore, we posit that the government must take action in reducing taxes for healthy foods, as well as it needs to provide better school meals for the children who study in public schools. Other strategy would also be the creation of healthy environments and health promoting schools.

CONCLUSION

Our study showed that dental caries is associated with worse scenarios of sociodemographic variables, whereas overweight presented the inverse behavior. The findings imply the need of health education involving the families, the government, and the mass media. Such strategies would be based on politics committed with the reduction of inequalities, adopting preventive programs in oral and nutritional health, focusing on the common risk factors of caries and obesity.

Dental surgeons and nutritionists present an important role in the process of health education regarding nutritional habits. In this scenario, they act as an integrated team in the promotion and protection of health, approaching strategies to prevent caries and promote the importance of good nutritional habits with emphasis on the food intake profile of children.

Collaborators

BD AGUIAR participated in all of the steps of the construction of the present manuscript. ME Frota and MHR AGUIAR contributed to the data analyses and interpretation. EC PERES and DSA TORQUATO contributed to the conception, planning, and critical review of this manuscript. AKM TEIXEIRA participated in all of the steps of the construction of the present manuscript too.

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