

Assessment of the diet of 0- to 6-year-old children in municipal schools in a Brazilian city

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Abstract

Diet control is one of the important factors in the prevention of dental caries because food functions as substratum for fermentation and, consequently, for the formation of the organic acids that demineralize the tooth surface. This study aims to descriptively assess school diet and the associated caries-preventive methods applied to children in all municipal nursery schools of a Brazilian city (Aragatuba/SP). For this, a questionnaire with open and closed questions was used. The results showed that all schools serve school meal, which is composed mainly of sugar, carbohydrates, and proteins. The students enjoy the meal very much because for most of them, the meal served at school is the only source of food. It was observed that 90% of the schools offer other kinds of food besides the main school meal. The snacks served such as cakes, white hominy, and milk fudge are composed of sweet and highly cariogenic foods. It was also verified that in 13.30% of the schools, the daily supervised dental hygiene, an important procedure that should not be neglected, is not carried out. This procedure introduces the children to healthy habits that are added to those acquired in the family environment. It was concluded that the school diet is potentially cariogenic and, in association with the lack of daily dental hygiene, this potential may become even higher.

Key words: Diet, Oral hygiene, Sugar

Extensive literature has attempted to confirm the influence of diet, particularly of fermentable carbohydrates, on the development of dental caries. In general, food participates in the etiology of dental caries, mainly because of its fermentable components. A diet rich in glucose, sucrose, and carbohydrates, which remains in the oral cavity for some time, will induce a decrease in oral pH. Acid production by bacterial plaque may reach the critical level (pH 5.5) to dissolve or demineralize dental enamel in a time period of 5–15 min.^[11–14] The classical study of Vipeholm, in Sweden, determined that sugar significantly enhances the occurrence of caries when ingested between meals. The time, the frequency, and the form of ingestion are important.^[5] Stecksen-Blicks and Holm^[6] concluded that children with high ingestion of snacks and irregular frequency of brushing their teeth have a higher caries experience. With the reduction of sugar consumption by Iraqi children, dental caries incidence could be observed to decline.^[6] Therefore, an increase in sugar consumption increases the risk of dental caries in children.^{[11],[7]–[10]} soft drinks ingestion, according to Levy et al.,^[11] contributes substantially to a rise in the risk of dental caries. The number of sweets ingested between meals was also highly related to the incidence of dental caries in children.^{[12],[13]}

It is known that diet has a great influence in the prevalence of dental caries; therefore, its composition should be ana-

lyzed. It is important to check the school meals, snacks, and the presence of other food suppliers to students, as well as the frequency of food ingestion and the means to fight the harms of sugary foods.

It is very important to keep in mind that the increase in the number of *Streptococcus mutans*, and its correlation with dental caries, is highly dependent upon diet.^{[14],[15]} Food composition and dietary habits may or may not affect caries activity. Food serves as the substratum for fermentation because of the activity of the microbiota in the plaque, and consequent formation of organic acids that are able to demineralize the tooth surface.^{[16]–[19]} Dental caries in preschoolers is caused by a combination of factors that includes the colonization of cariogenic bacteria, type of food ingested, frequency of exposure to those foods, and child susceptibility. Caries risk is higher when sugar is consumed.^{[20],[21]} Marshall et al.,^[22] affirm that inadequate nutrition and limitation in food choice are related to precarious oral health. Dietary habits are the main factors in the etiology of dental caries in any age, principally in preschoolers.^[23]

The greatest effect of diet on the teeth is the local action of foods in the mouth enabling the development of dental caries and enamel erosion.^[24] Tsubouchi et al.,^[25] when analyzing dental caries and its risk factors in 77 North American children, listed the following as the main factors: the use of feeding bottles after 1 year of age (63.9%), high ingestion of goodies in between meals (60%), and inefficient oral hygiene. Diet is the essential component of oral health, together with fluoride therapy and oral hygiene.^{[20],[26]} It is widely known that dietary and hygiene habits are established very early in

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childhood. This fact recommends the implantation of effective preventive measures to ensure oral health in babies and preschoolers, by mainly involving parents and tutors in preventive and educational dental programmes.^{[27],[28]}

Therefore, based on the Brazilian reality, diet orientation still plays an important role in the control of dental caries, mainly when the current tendency of dentistry is to promote health by giving attention to children's early years of life, the phase in which dietary habits are established. This study aims to descriptively assess school diet and the associated caries preventive methods applied to 0- to 6-year-old children in all municipal nursery schools of a Brazilian city (Aragatuba/SP), through a questionnaire constituted of open and closed questions.

Materials and Methods

A descriptive cross-sectional study, according to Almeida and Rouquayrol was carried out.^[29] It aimed at identifying and analyzing school diet, and the association of preventive methods applied to the 0- to 6-year-old children in all municipal nursery schools in a Brazilian city (Aragatuba/SP). These included 30 schools with approximately 200 children each. Data collection was carried out by means of a questionnaire with open and closed questions. The issues assessed were: whether or not the schools served the school meal; whether all children benefited from the school meal; the presence or absence of a nutritionist responsible for the diet; the number of breaks in a school per day; whether there was a cafeteria on the premises; whether the students brought food from home; the menu of the school meal; whether the school offered other kinds of foods besides the school meal and how many times a day; whether there was daily supervised tooth brushing.

The universe under study constituted all ($n = 30$) municipal nursery schools in the municipality of Aragtuba/SP/Brazil, where children start their education and establish attitudes and behavior. A pilot study was carried out. This was limited to obtaining better knowledge of the reality, and elimination or minimization of possible inappropriate criteria in the study. Because it is a descriptive cross-sectional study, the analysis was carried out using absolute and relative frequency for the data found. The data were recorded by an Epidemiology information software (EPI-INFO for Dos 6.04), which enabled the tabulation of the data available. This information was then copied to Excel 7.0 for Windows 98, to be presented in the form of graphs and tables.

Results

The questionnaire was applied to all schools and the response rate was 100%. According to the results obtained, it was observed that 36.7% of municipal nursery schools in

Aragatuba/SP/Brazil had one meal break, 23.3% had two breaks, 30% had more than two breaks, and 10% had no breaks at all [Graph 1].

All schools affirmed to offer school meal, and all students were entitled to the school meal. In 96.7% of the schools, the meal was prepared in the school and 3.3% affirmed that the meal was prepared in a pilot kitchen. The menu was diversified and consisted of rice, beans, red meat, fish, chicken, salad, soup, pasta, vegetables, eggs, fruit, sausage, polenta, and juice.

As it can be observed in Graph 2, 60% of the schools had a nutritionist responsible for the school meal, whereas 40% of them did not. This is an important issue for the establishment of a healthy diet.

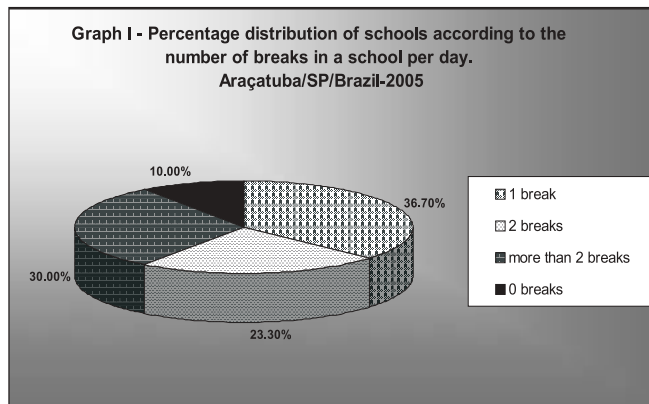
Children's acceptance of the school meal was great because most children came from low-income families and the school meal was the only source of food for them. Furthermore, the menu was varied and the cooks tried to prepare the kind of food the children relished. In addition to the main meal, 90% of the schools offered some other kind of food, which generally consisted of cariogenic foods such as sweets. The schools that offered other kinds of food besides the main meal provided cakes, bread, biscuits, sweet rice, white hominy, milk fudge, milk, jelly, and fruit salad. As for beverages, soft drinks, fruit juices added with sugar, and chocolate milk were mentioned as being provided. The frequency of distribution of these foods in the schools were: 63% once a school day, 22.2% twice a school day, 3.7% more than twice a school day, and 11.1 once a week or whenever it was possible [Graph 3].

None of the schools had a cafeteria or other kind of food suppliers (popcorn carts, candy carts, etc.) on the school premises or at the school gates.

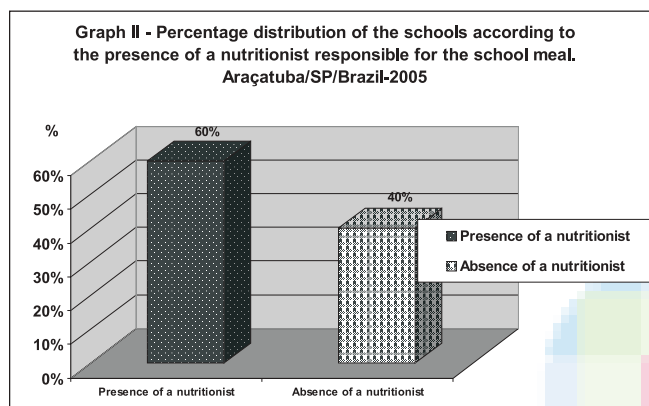
It was still observed that in 86.70% of the schools, the children carried out supervised oral hygiene, mostly only once a day, and in 13.30% the children did not carry out oral hygiene procedures [Graph 4].

Discussion

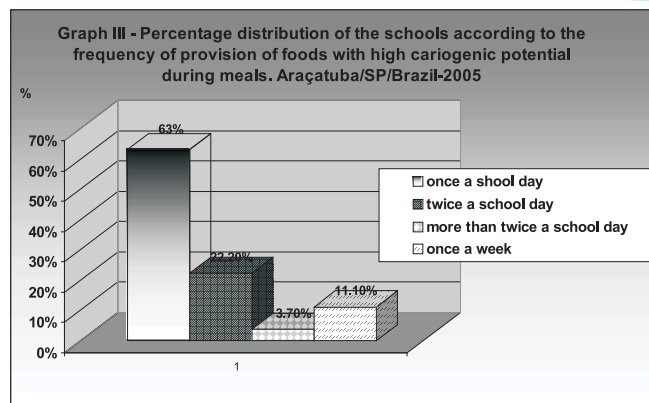
According to the school diet survey, it was possible to observe that the school meal was rich in carbohydrates and sugars, which conferred on it a cariogenic character, and 60% of the schools had a nutritionist responsible for the school meal. Rodrigues^[30] adopted some guidelines to reduce the consumption of sugar by children enrolled in day-care centers, and later observed that there was a considerable reduction in the incidence of dental caries. She concluded that public health interventions to reduce dental caries in children should follow guidelines to reduce sugar



Graph 1: Percentage distribution of the schools according to the number of breaks in a school per day (Araçatuba/SP/Brazil-2005)



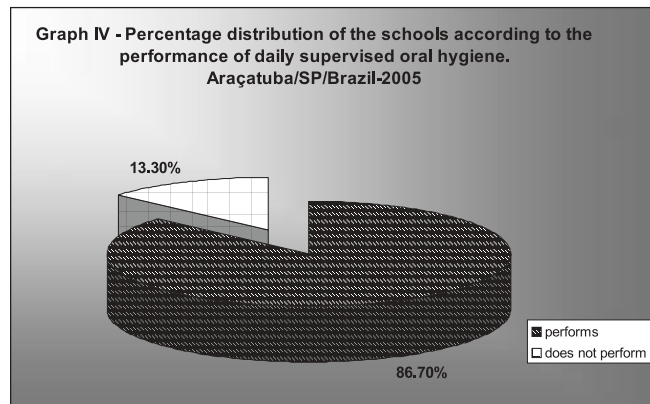
Graph 2: Percentage distribution of the schools according to the presence of a nutritionist responsible for the school meal (Araçatuba/SP/Brazil-2005)



Graph 3: Percentage distribution of the schools according to the frequency of provision of foods with high cariogenic potential during meals. Araçatuba/SP/Brazil-2005

consumption.

Drumond et al.^[31] and Nabut and Ursi^[32] verified that in most schools, meal presented many cariogenic components, without, however, the existence of an associated technique to avoid their consequences on the teeth. Szpunar et al.^[33] calculated through the data obtained from Burt's study that



Graph 4: Percentage distribution of the schools according to the performance of daily-supervised oral hygiene (Araçatuba/SP/Brazil-2005)

each additional 5 g of sugar ingested daily was associated to a 1% increase in the probability of development of dental caries in a period of 3 years. Touger-Decker and van Loveren^[2] affirmed that diet affects teeth integrity; teeth quantity, saliva pH and composition, and plaque pH.

A study on preschoolers carried out in Kerala^[34] showed that the groups with a high risk of the occurrence of dental caries are: (1) those with poor oral hygiene; (2) those who ate sweets frequently; (3) those who were in a low-socioeconomic class.

Van Loveren and Duggal,^[35] in their survey, sent a questionnaire to 54 experts in preventive dentistry in 23 European countries and observed that in all answered questionnaires the reduction of ingestion of cariogenic foods was emphasized to prevent dental caries.

The studies of Maciel et al.^[36] concluded that 4- to 5-year-old children with the habit of consuming foods and drinks with sugar in their composition between meals had a high potential of developing caries lesions. Inadequate food habits in the first years of life are perhaps the main factors responsible for the occurrence of caries in deciduous teeth. Usually, due to the lack of information and orientation, parents or tutors are not aware of the damages arising from inadequate nutrition. No food is considered wrong in the diet, but foods should be offered adequately and rationally to avoid risk to health.^[3]

Although most schools (86.70%) carry out daily-supervised oral hygiene only once a day, there is a high percentage of schools that offer cariogenic foods twice a school day (22.20%). These results emphasize the need to include children, from birth on, in preventive dental programmes that provide the parents or tutors with information to adequately prevent the appearance of caries lesions and stimulate the early establishment of basic oral health habits. School children are inclined to acquire healthy habits, such as oral hygiene habits, and they act as multiplying agents in the fam-

ily environment.

Although the absence of a cafeteria or other food suppliers (popcorn or candy vendors, for instance) on the school premises or vicinities acts as a positive factor – because they usually offer highly cariogenic foods – it was verified that 90% of the schools offer foods with high cariogenic potential because the uptake is not accompanied by oral hygiene. This demonstrates the need to ally oral hygiene to adequate food habits, and corroborates the studies of Wendt,^[37] Frisso et al.,^[38] and Saliba et al.^[39]

The function of schools is to educate and aid the students to acquire knowledge and continuous personal growth through the integration of parents, teachers, and the students.^[39]

Studies^{[4],[10],[34],[40],[41]} affirm that food habits play an important role in the etiology of dental caries in preschoolers. A high amount of *Streptococcus mutans* in saliva has a high potential of predisposition to caries among 4- to 5-year-old children living in urban areas in Brazil.^[36] Therefore, education of preventive methods is vital in this age group. Furthermore, the children function as multiplying agents of healthy habits in the family environment.

Dimbrase and Wamnier^[42] observed that 73.2% of the school children analyzed, received oral hygiene orientation from their mothers, and only 11.5% were instructed by dentists, although all the children attended schools that had an inhouse dental surgeon. This confirms that the dental surgeon should participate in the educational and preventive actions in oral health.

Collective preventive methods, such as water supply fluoridation, application of topical fluoridated solutions, educational talks, and oriented and supervised oral hygiene, have had a great impact on dental caries.^[39] These methods, in conjunction with the graduation and training of new dental surgeons to answer the needs of the community, reinforce the role of these new professionals both as educators and opinion makers and as effective agents who use current collective preventive methods. The cost of prevention is, according to Peterson,^[43] 10% of the curative treatment. The results presented allow us to conclude that school diet is composed of high amounts of sugary foods; in schools where daily hygiene is not carried out, the cariogenic potential of diet becomes higher. Educational methods used in school are of paramount importance because the children are prone to acquire knowledge and healthy habits.

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