

# Qualitative evaluation of menus offered in primary schools in the metropolitan area of São Paulo

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## Abstract

*Objectives:* To perform a qualitative assessment of menu preparations of municipal schools in Great São Paulo. *Method:* The monthly menus of municipal schools in the cities of Barueri, Guarulhos, São Bernardo do Campo and São Paulo (SP) were qualitatively evaluated by the method of Qualitative Assessment of Menu Preparations (AQPC). *Results:* The supply of vegetables was satisfactory. Although fruits have been adequately supplied, the presence of sweets is constant. Of the five menus analyzed, three presented color monotony in at least one of the large meals. The cooking techniques of protein dishes were appropriate. Beef is the meat that is most present in the menus, and the supply of fish is limited. *Conclusion:* The method used is a good tool for assessing the quality of meals, because food is not eaten only by its nutritional quality, but also for its sensory characteristics. In general the evaluated menus are adequate in relation to the supply of fruits, vegetables and dairy products and cooking techniques employed. However, it is suggested to review the frequency of the use of sulfur and sweet foods on the menu.

**Key words:** Menu Planning. School Meals. Food and Nutrition Education.

## Introduction

Children have their eating behavior shaped by the society in which they live. It is during this step that eating habits are formed, but children do not have the capacity to choose foods according to their nutritional value, so the foods eaten are chosen by experience, observation and education. They don't eat only due to hunger, but also due to the environment and social context in which the family and school have a fundamental role.<sup>1-4</sup> During childhood, a balanced nutrition is of paramount importance to ensure adequate growth and development.<sup>2,4</sup>

The food offered at daycare centers has a direct action on the formation of eating habits due to the time that children spend in these locations. Foods that are part of the school menu must be adapted to the needs of children; thus, the meal served should contain fruits, vegetables, juices, whole breads and, biscuits etc., and food of low or no nutritional value should not be included.<sup>5,6</sup> The adoption of healthy eating practices by preschoolers might be an important instrument to promote health and can interfere positively or not in adulthood these individuals.<sup>3</sup>

A menu consists of culinary preparations that make up the daily meals or meals planned over a certain period. To meet both their physiological and sensory needs, the menu must be colorful, contain foods from all food groups, have balanced textures, have common foods of the region in which they live, be safe from the hygienic-sanitary point of view and meet the financial limits available, among other criteria.<sup>7</sup> In addition to being nutritionally adequate, menus offered to children should be attractive.<sup>4</sup> These menus should be planned by nutritionists from the diagnosis of the nutritional status of the children in line with the standards of the National Fund for Education Development (FNDE), to adapt them to the needs of this specific population.<sup>8,9</sup>

The menu offered in educational institutions should be appropriate to the needs of the students, the conditions of the school and the time the student will remain in that environment. It should contain foods with high nutritional value, providing children with food that is quantitatively sufficient, qualitatively complete, harmonious in its components and suitable for their purpose and to the body to which it is intended.<sup>3,7</sup>

The menu can also be used as a tool for nutritional education, because food present in it can serve as an example for a healthy and balanced diet. It is essential that nutritionists in these institutions perform periodic qualitative assessments of the menus so that they remain appropriate for the intended population, thus preventing nutritional imbalances.<sup>5</sup>

In order to assist in the professional development of an appropriate menu of the nutritional and sensory point of view, the method of Qualitative Assessment of Menu Preparations (AQPC) analyzes the preparations that comprise it, providing an overview of it.<sup>10</sup>

The menu planning according to the National School Feeding Programme (PNAE) should consider the nutritional and sensory aspects such as color, texture, flavors, combination preparations, type of food and preparation techniques.<sup>11-13</sup> Given the above, this study aimed to qualitatively assess the menu preparations in municipal schools in the Greater São Paulo.

## Methodology

A cross-sectional study was performed from August through November 2012, qualitatively evaluating the planning of menus for 19 days (approximately four weeks) of municipal schools in the following cities of the Greater São Paulo: Barueri, Guarulhos, São Bernardo do Campo and São Paulo. The menus considered were those of schools in which students remained enrolled full time, having at least five on-site meals, aged one to three years and 11 months.

Data collection for the cities of Barueri and São Paulo was performed using the menus available in the websites of the respective municipalities. The menus of the city of Guarulhos were provided by the nutritionist from the Division of School Meals of the Department of Education (DASE) and menus in São Bernardo do Campo were provided by the nutritionist responsible for the city's Department of Education Support.

The menu of São Paulo was divided into two age groups (1 year to 1 year and 11 months and 2 years to 3 years and 11 months), called São Paulo 1 and São Paulo 2, respectively.

The menus were evaluated by the method of Qualitative Assessment of Preparations of Menus (AQPC) proposed by Veiros & Proenca,<sup>10</sup> with adaptations according to the following criteria:

- presence of fruit or natural fruit juices (without added water or sugar);
- presence of vegetables;
- monthly frequency of dairy products;

- presence of food rich in sulphur: the lunch and dinner preparations were analyzed (with exception of beans, since the alimentary guide recommends its daily consumption), evaluating the presence of the following sulphurated foods: avocado, napa, celery, garlic, peanut, sweet potato, broccoli, chestnut, onion, brussel sprouts, cauliflower, peas, beans, ginger, guava, jackfruit, lentils, apples, watermelon, cantaloupes, corn, mustard, turnip, nuts, eggs, radish, cabbage and grape. The meal was considered rich in sulfur when two or more of the foods mentioned were offered on the same day;<sup>2,13</sup>
- presence of pastries served in the month: we considered some processed products containing sugar as one of its main ingredients, such as milk drinks, chocolate, artificial juice, gelatin, cake, sweet biscuits, porridge and cornflakes;
- monotony of colors: the meals were evaluated according to the number of colors. They were considered monotonous when at least 50% of the food had similar colors;
- cooking techniques employed in protein preparations;
- types of protein in the dish offered in main meals, classified as: beef, processed meats, chicken, egg and fish.

The AQPC method was applied considering first the evaluation of the daily menus, then weekly, and finally evaluating monthly menus. The monthly review grouped the weekly data and subsequently these were tabulated in percentages relative to the total number of days of menus investigated.

## Results

Of the five monthly menus analyzed, average weekly servings of fruit / juice offered in various municipalities were: 14.25 in Barueri, 3.75 in Guarulhos, 9.5 in São Bernardo do Campo, and 13.25 in both São Paulo menus.

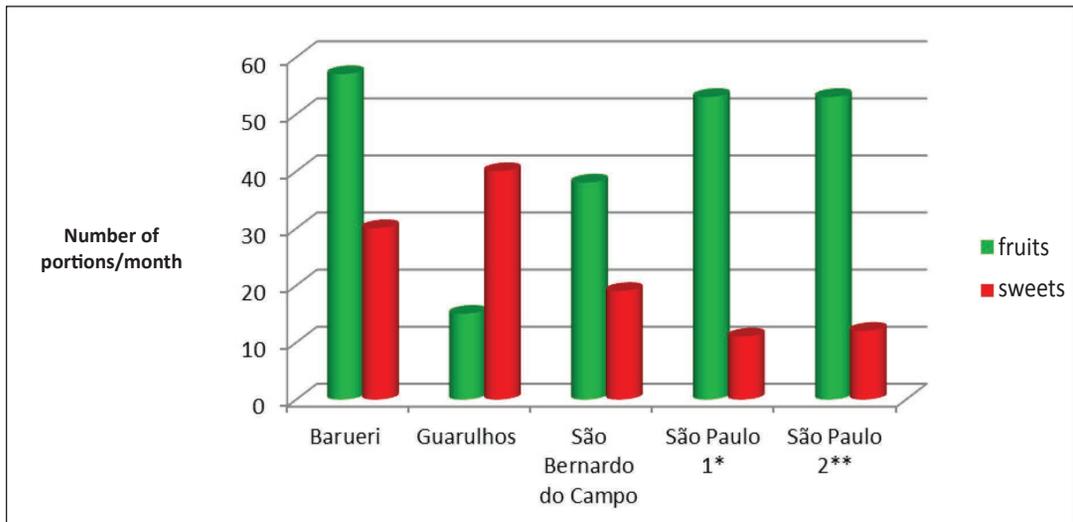
Table 1 shows the monthly review of the menus of the cities.

**Table 1.** Distribution of the qualitative analysis of the menus for the percentage of days on which there was the occurrence of each criterion considered. São Paulo, SP, 2012.

Municipalities	Fruits (%)	Vegetables (%)	Dairy (%)	Sweets (%)	Sulfur (%)
Barueri	100	100	100	100	58
Guarulhos	79	63	100	100	21
São Bernardo do Campo	100	100	100	100	26
São Paulo 1*	100	100	100	53	74
São Paulo 2**	100	100	100	53	58

\*Menu 1 year-1 year and 11 months \*\* Menu 2 years -2 years and 11 months

When comparing the offer of fruits and sweets (Figure 1), we found the presence of fruit on menus in all cities, but the constant presence of sweets can be noted, such as in Guarulhos, where the prevalence of sweets proved to be higher - 40 sweet preparations in 19 days - exceeding the number of fruit served in the month. In the city of Guarulhos were served, on average, two sweet preparations per day, while Barueri, São Bernardo do Campo and São Paulo had a mean of 1.6, 1 and 0.6, respectively.



**Figure 1.** Distribution of the presence of fruit and sweets in the school monthly menu. São Paulo, SP, 2012.

\*Menu 1 year-1 year and 11 months \*\* Menu 2 years -2 years and 11 months

Meals with little diversity of color interfere in the acceptance of the child, because it composes an unappetizing meal. Table 2 shows the evaluation of the adequacy of the colors on the menu.

**Table 2.** Percentage distribution of the qualitative analysis of colors in large meals. São Paulo, SP, 2012.

Color	Lunch		Dinner	
	Colorful (%)	Monotonous (%)	Colorful (%)	Monotonous (%)
Barueri	95	5	42	58
Guarulhos	63	37	74	26
São Bernardo do Campo	79	21	47	53
São Paulo 1*	47	53	47	53
São Paulo 2**	63	37	79	21

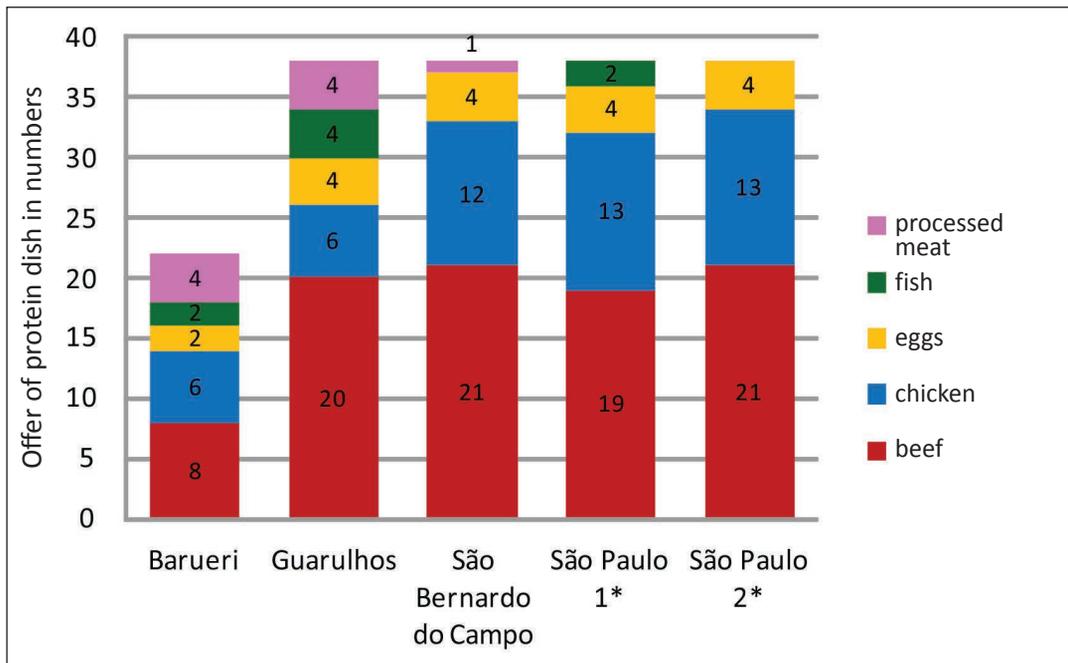
\*Menu 1 year-1 year and 11 months \*\* Menu 2 years -2 years and 11 months

In São Paulo there was no analysis of the cooking techniques of protein preparations, because the menu offered did not discriminate them, leaving the choice of technique for the person responsible for preparing the meals, according to the standard recipes provided by municipalities to schools. The distribution of cooking methods of protein preparations is shown in table 3. We notice that boiling was the most used technique for lunch and dinner for the cities evaluated in this criterion.

**Table 3.** Percentage distribution of analysis of the cooking methods of protein dishes of large meals. São Paulo, SP, 2012.

Cooking techniques	Lunch			Dinner		
	Roasted (%)	Cooked (%)	Fried (%)	Roasted (%)	Cooked (%)	Fried (%)
Barueri	26	68	5	0	100	0
Guarulhos	0	89	11	0	89	11
São Bernardo do Campo	5	89	5	0	100	0

In all cities (Figure 2), the menu showed a higher prevalence of beef, then chicken. The supply of protein dish in the city of Barueri was lower, because it is offered with low frequency at dinner. No intention of serving fish was observed in the menus of São Bernardo do Campo and São Paulo 2. In Guarulhos, 50% of the supply of fish (2 meals) had canned tuna. Processed meats were not offered on the São Paulo (1 and 2) menus. But eggs were offered on average once a week in all cities except Barueri, where it was planned for only two days of the month (Figure 2).



**Figure 2.** Monthly distribution of the supply of protein dish on menus provided within 4 weeks. São Paulo, 2012.

\*Menu 1 year-1 year and 11 months \*\* Menu 2 years -2 years and 11 months

## Discussion

According to the analysis of the menus of the different municipalities according to the AQPC method, it was observed that the amount of fruits and vegetables recommended by the PNAE (3 servings of fruit and vegetables weekly) on all locations studied.<sup>11</sup>

Aside from Guarulhos (79%), all cities had a supply of fruit in 100% of the days, unlike the results found by Christmann,<sup>14</sup> who evaluated a state school in Guarapuava-PR, and Menegazzo et al.,<sup>4</sup> who reviewed the menus of a state school in the city of Florianópolis-SC, both by the AQPC method. In both studies, the supply of fruit was found in only 4% of the month, once. This improvement may be due to the increase in per capita transfer of the PNAE,<sup>15</sup> from R\$ 0.66 at the time of the studies by Christmann<sup>14</sup> Menegazzo et al.<sup>4</sup> to R\$ 1,00,<sup>16</sup> which may have brought an improvement in the menus.

The presence of vegetables on the menus (Table 1) was observed on all days, except in Guarulhos (63%). Menegazzo et al.<sup>4</sup> found in their study the supply of vegetables only in 48% of days, and Christmann<sup>14</sup> every day, but this school had an organic garden, which may have facilitated this offer.

Eating habits are formed in childhood, so the meals offered at nurseries must be balanced in order to encourage consumption of healthy foods<sup>1</sup>. Fruits and vegetables (FV) are essential for development because they are sources of vitamins, minerals and dietary fiber. The intake of these foods is a shield factor for the risk of DCNTs.<sup>2</sup> We also observed the adequacy of the supply of FV for children 2 to 10 years old at lunch in a private school in São Paulo, described by Pioltine and Spinelli.<sup>17</sup>

It was observed that milk was given at least once a day in all studied schools. Because these are pre-school institutions, where children have at least five meals a day, it would be advisable to supply milk and dairy products, as these foods are sources of calcium, an essential mineral for bone development and maturation. However, the PNAE<sup>11</sup> sets no weekly frequency or the number of portions to be served. Milk and dairy products are sources of protein, calcium and vitamins, and, according to the food pyramid for children two to three years old, three daily servings of foods from this group<sup>18</sup> must be consumed to achieve 700mg/dia, content recommended by the *Dietary Reference Intakes*<sup>19</sup> for children one to three years old.

It is observed in Table 1, that in the cities of Barueri and São Paulo, in more than half of the days, the meals contained two or more preparations containing sulfur foods (salads and juices). Sulfur-rich foods may produce flatulence and abdominal discomfort, which can lead to inattention and reduced school performance, so these foods should not be served in large quantities.<sup>14</sup> In the study by Christmann,<sup>14</sup> 52% of days contained meals with sulfur foods, which, similar to what occurs in this present study, were served in the form of salad.

The *Guia Alimentar para a População Brasileira*<sup>2</sup> recommends a daily intake of no more than one serving of sweets, showing an adequacy in São Bernardo do Campo and São Paulo. In the cities of Barueri (1.6 serving) and Guarulhos (2 servings), however, more than one preparation of this type was served per day, similar to the results found by Menegazzo et al.,<sup>4</sup> thus evidencing the need for adequacy of the menu.

Regarding the monotony of colors at lunch, the city of São Paulo was the only one that showed over 50% of inadequacy at lunch time (Table 2) for children older than two. In contrast, in the city of Barueri, the meal was colorful in 95% of days. Regarding dinner, Barueri, São Bernardo do Campo and São Paulo had respectively 58, 53 and 53% monotonous meals, which may be due to the type of meal served, since, for the most part, only preparations are served, such as soups, purees and polenta. When there is monotony of colors on the menu, nutrient intake is also impaired, because a colorful meal offers a broader range of nutrients.<sup>2</sup>

The results found in this study (Table 2) differ from those found by Menegazzo et al.,<sup>4</sup> who observed monotony in only 12% of large meals. In a study by Veiros & Proenca,<sup>10</sup> who qualitatively assessed the preparations of the menu of a Food and Nutrition Unit, 65.1% of the meals were monotonous.

The low incidence of fried protein dishes (Table 3), mainly in the cities of Barueri and São Bernardo do Campo, has a positive effect on health and education of children's eating habits. In the study by Christmann,<sup>14</sup> the prevalence was higher for baked dishes (56%). Costa and Mendonça<sup>5</sup> qualitatively evaluated the menus, comparing a public and a private nursery in the Federal District, and found that only 1.19 and 3.3% of preparations were fried, respectively.

It can be observed (Figure 2) that the distribution of types of meats on menus privileges the supply of red meat, necessary for the provision of iron, an essential nutrient in this age group vulnerable to anemia. Brunken et al.<sup>20</sup> found a high prevalence of anemia in children under three years old attending public kindergartens. Animal foods such as meat and eggs have all the essential amino acids needed for growth and maintenance of the individual and are sources of iron and vitamin B<sub>12</sub>.<sup>2</sup>

Similar results were found by Assis,<sup>21</sup> who qualitatively evaluated the menu of a meal production unit of a university hospital, indicating that red meat is the most served (61.9%), followed by chicken (26.19%) and pork (9.52%).

We observed in the cities of Barueri, Guarulhos and São Bernardo do Campo the presence of processed meats. Processed meats such as sausage, ham and others contain, in general, an excess of saturated fats, sodium and preservatives, so their consumption should be moderate, because high intake of these can lead to the development of DCNTs.<sup>2,22</sup> Canned foods were served only in Guarulhos (pasta with tuna), and its frequency on the menu was of 10%. Just as processed meats, canned foods have large amounts of sodium and preservatives and should be consumed with moderation.<sup>2,22</sup>

Fish contain good quality protein, necessary for the growth and maintenance of the organism, are rich in essential fatty acids and an important source of vitamin B<sub>12</sub>. Fish were served in Barueri, São Paulo and Guarulhos, but his offer was low compared to the provision of other protein dishes. This result was similar to Assis<sup>21</sup>, according to whom fish were served in just 2.38% of days. This possibly occurs due to high market cost, which hampers the inclusion of food on the menu, since the amount transferred for the acquisition of foodstuffs is limited.<sup>2</sup> According to Agência Brasil, only 26.9% (about 1,500) of the 5,565 municipalities around the country include fish in the school

lunch menu at least once a week. This occurs due to several difficulties, such as cold stores to stock up on food, skill of the cooks in the preparation of fish and the ease or difficulty in acquiring fresh fish in their city.<sup>23</sup>

Given the above, planning the menus at local schools in general was adequate, but one must pay attention to the prevalence of sweet and sulfur foods, in order to better meet the needs of children. To maintain the adequacy of menus, periodic reviews are necessary and, to ensure that the plan is carried out, assessments of the quality of child nutrition are necessary. If inadequacies are found, these should be corrected.<sup>7,5</sup>

## Conclusions

In general, the menus assessed are adequate to the supply of fruits, vegetables and dairy products and cooking techniques used in preparing the protein dish, according to the evaluation method used in this work. However, it is suggested to review the frequency of the use of sulfur and sweet foods on the menu.

To ensure adequate school feeding, an analysis of the implementation of the planning of menus in their nurseries is necessary, as a later step in assessing the quality of infant food. It is also suggested to use other tools for evaluating the quality of meals served in schools, such as an index of healthy meal, or cut-off points for the parameters (color, cooking techniques, presence of fruit, dairy products) used in the AQPC method.

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