

Composition of state school menus in three cities of southern Brazil in relation to legislation

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Abstract

This study aimed to characterize the menu composition of public schools in three municipalities in Southern Brazil. This is a descriptive and exploratory piece of research, outlined as a case study. Documentary analysis of planned menus was conducted in elementary schools for 20 days in May 2011. Analysis of menu structure was divided into three categories: complete meal, savory snack and sweet snack. The composition of these meals was evaluated according to the Brazilian National School Feeding Program and the *Dietary Guidelines for the Brazilian Population*. The categories used were: vegetables; fruits; cereals, roots and tubers; meat and eggs; legumes; milk and dairy products; processed meat, food powder or concentrates. Complete meals were provided on most days in the states of Paraná (70%) and Rio Grande do Sul (60%). Complete meals were generally associated with provision of vegetables. There was low incidence of beans and of rice-beans combination, and little variety of fruits and vegetables. Whole food, fish and viscera did not appear on the menus. Fruits were only included on 7 days at most, but with high sugar content, however. Cookies and crackers were offered on 5 days in two out of the three municipalities. Savory or sweet snacks were usually combined with foods that contained high levels of sodium, fat and sugar, i.e., cookies, processed meat and food concentrates.

Keywords: School Feeding. Food. Food Security. Menu Planning. Food Composition.

Introduction

Children's current dietary intake differs substantially from the recommended standards and reflects a model that puts their health at risk;¹ there are rising rates of overweight and obesity in many countries.² Additionally, a nutrient-deficient diet can affect children's cognitive development and learning ability.³

For this reason, public policies need to be developed in order to promote healthier eating patterns and lifestyle habits.^{4,5} The Global Strategy on Diet, Physical Activity and Health considers food companies, such as the Food and Nutrition Units (FNUs), preferred partners in the implementation of measures to improve the quality of nutrition and healthy lifestyles.⁴ From this perspective, schools are direct partners of the Global Strategy.

Menus are an important tool for ensuring good health to children when meals are produced in an FNU.⁶ According to the National School Feeding Program (PNAE), dietitians are in charge of preparing the menus, and they must comply with the guidelines of the program.^{7,8}

The National Fund for the Development of Education (NFDE) provides quantitative parameters of micro and macronutrients, which must be supplied by food offered at school. Food items that are served must meet at least 20% of the daily nutritional needs of elementary students.^{7,8} This prerogative is based on the recommendation for providing at least four daily meals. In other words, breakfast (20% of total energy intake - TEI); lunch (30% of TEI) and dinner (30% of TEI) and food provided by schools (20% of TEI).⁹

The *Dietary Guidelines for the Brazilian Population* (DGBP) recommend eating three large meals, and snacks in between those meals, which means having between five and six meals per day.¹⁰ However, the regulations of the program do not specify the type of meal to be served.^{7,8} The NFDE recommends that a variety of savory and iron-rich foods should be provided at least three times a week. Nevertheless, whether to serve complete meals or snacks is a decision to be made by municipal authorities.^{7,9}

This study was undertaken because of the importance of the quality of school meals in Brazil and the need to gain information that supports the planning and execution of public policies. Based on situations identified in the surveyed municipalities, this paper aims to provide significant information that could describe school feeding. Thus, the objective of this research was to characterize the composition of public school menus in three municipalities in southern Brazil.

Method

This is descriptive exploratory research,¹¹ designed as a case study.¹² The study was conducted in three municipalities, one from each state in Southern Brazil.

The criteria for selection of the municipalities was that they should have a dietitian/technician in charge willing to participate in the research study. The study was conducted in a municipality located in the central-southern region in the state of Paraná (PR), with 30,605 inhabitants; one municipality in the west of Santa Catarina (SC), with 22,101 inhabitants; and one in the southeastern region of Rio Grande do Sul (RS), with 24,534 inhabitants.

In the three surveyed municipalities, the Secretary of Education was responsible for executing the PNAE. In 2011, the surveyed municipalities in Paraná, Santa Catarina and Rio Grande do Sul had 3,495, 2,253 and 2,658 students, respectively, who studied in 27, 14 and 24 schools (Elementary Education, Early Childhood Education, and Adult and Youth Education).¹³

This paper focused on analyzing menus of school meals served to elementary students from the three municipalities. All menus available were collected in the year 2011. Collection took place in May because meals were served on twenty school days, while the other months had fewer school days as a result of municipal and state holidays, school games and vacation. It should be noted that the menus followed a standard structure throughout the year; thus, the results can be extrapolated to the meals served throughout the school year.

The NFDE uses the terms “complete meal” and “snack”; however, it does not define them clearly.⁹ Thus, in order to analyze the structure of the menus, food preparations were categorized according to the predominant characteristics of each particular day. The categories used were: complete meals, savory snacks and sweet snacks.

“Complete meal” comprised savory meals, with or without meat, salad or vegetables, which represent a typical Brazilian lunch meal, for example, rice and beans, pasta in general, risottos and soups. Sandwich, hot dogs and junk food were grouped as “savory snacks”. Tea with cookies, chocolate milk, yogurt, cakes and *cucas* (typical cake recipe of German immigrants in Brazil) were classified as “sweet snacks”. This classification was based on the contents of the *Handbook for Effective Management of School Meals* (written in Brazilian Portuguese) by Weis and colleagues.¹⁴ According to the handbook, snacks are viewed negatively by dietitians working with school meals, and considered to be a small meal.

In order to identify the presence of different food groups on the menus, the food items were categorized according to the norms established by the NFDE for PNAE,^{7,8} as well as the classification of food groups established by the *Dietary Guidelines for the Brazilian Population*.¹⁰ The categories were: vegetables; fruit; cereals, tubers and roots; meat and eggs; legumes; milk and dairy products; cured sausages and whole food concentrates or powder food for dilution in water or milk.

The classification proposed by Börjes was used for grouping vegetables.¹⁵ The presence of legumes was analyzed separately because they are important in Brazilians' eating habits.¹⁰ Fruits were also analyzed separately in order to check if they were offered fresh or with added sugar.

Quantitative and qualitative data were gathered by document analysis of the menus. They were stored and analyzed on a database, developed on a spreadsheet, composed of independent spreadsheets for every aspect under analysis. Data analysis used the monthly rate of supply of each food group analyzed.

Results and discussion

Structure of the menu

Complete meals were present on most school days in the municipalities of the states of Paraná and Rio Grande do Sul. In Santa Catarina, sweet snacks amounted to half the days when there was provision of school meals. The analysis of the provision of savory snacks showed that their supply was the smallest in all the three southern states.

There are several factors that affect the inclusion of sweet or savory snacks on school menus. The study by Soares,¹⁶ conducted in schools in one municipality of Santa Catarina, pointed to factors that limit the inclusion of some foods on school menus, i.e., small number of staff, poor infrastructure of schools and the complex supply process of the program.

Whereas menu planning is an activity assigned to dietitians that work within PNAE, it should be noted that the municipalities surveyed did not have the number of nutritionists recommended for efficient provision of school meals. In the cases studied, the program had only one dietitian in charge of activities in PNAE. According to the Federal Board of Nutrition (FBN), a school with 2,501 to 5,000 students, as in the cases studied, should have three dietitians and a technical manager.¹⁷ As menu planning is an activity that can have nutritional, cultural and symbolic impact on the target population, it is essential to comply with the standards established by the FBN in order not to overload the dietitians in charge and allow them to perform their tasks within PNAE appropriately.

Analysis of sweet and savory snacks evidenced the provision of foods with high contents of sodium, sugar and trans fat such as sausage, mortadella, milk drinks, cookies and jelly. This situation may jeopardize the health of the students in view of the high intake of these nutrients and their relationship to the development of chronic diseases.¹⁰ Table 1 shows some examples of these snacks on the menus.

Table 1. Examples of snacks on menus; municipalities in the states of Paraná, Santa Catarina and Rio Grande do Sul, in 2011.

Savory snacks	Sweet snacks
<ul style="list-style-type: none"> • Milkshake • Chocolate milk • Yogurt • Fruit juice • Tea • Fruit milk drinks • Cakes and cucas • Cookies • Jelly • Sago pudding • Porridge • Bread and jam • Fruit salad 	<ul style="list-style-type: none"> • Saltine cracker pie • Hot dog • Sandwich • Bread and mortadella • Garlic bread and ground beef

There were important differences in complete meals among the three municipalities. Figure 1 shows that the municipality in Paraná served this type of meal on 70% of school days. In contrast, the municipality in Santa Catarina had the lowest rate: 40% of school days.

The rice-beans combination was present on only one day of the monthly menu of the municipality in Santa Catarina, which also had homemade pasta, stuffed polenta and *galinhada* (rice and chicken), all served with two types of salads. The same town served soup on all Tuesdays of the month, twice with vegetables and twice with meat and pasta.

The menus in the municipality in Paraná showed greater variety of preparations composing complete meals. Examples of meals include *galinhada* (rice and chicken), *vaca atolada* (ribs of beef cooked with cassava), *feijão tropeiro* (beans cooked with cassava flour), *tutu de feijão* (beans with cassava flour), *carreteiro* (rice and meat), pasta, polenta with soy meat meatballs, mashed potatoes with ground beef and pork with cassava.

On the menus in the municipality in Rio Grande do Sul, complete meals were served on Mondays, Wednesdays and Fridays, at 60% of school days. The most frequent foods were pasta and rice with meat, vegetables and beans, and corn grits and vegetable pizza.

The legal recommendations of the program do not specify the times when school meals should be served. However, upon the recommendations of the technical working group,⁹ it is assumed that it is a morning snack or afternoon snack, which represents small snacks rather than complete meals. Accordingly, students who have regular meals in their homes may have a nutrient intake above the recommended level. However, considering that some students do not eat food at breakfast in their homes, a school meal should be served at the beginning of school activities.

Moreover, there are rural schools in the municipalities; thus, students have to travel long distances to go to school. In this case, students need more nutritional intake for the long time in transit, and the provision of breakfast and lunch could meet those needs. It should be noted that, in cases where the school manager chooses to provide more than one meal, nutritional adequacy is recommended depending on the meal offered.⁹

Thus, it is believed that the organization implementing the program must evaluate the characteristics of each location to meet the needs of the target public the best way possible. However, snacks seem to favor the supply of industrial products with higher calories and higher amounts of fats (including trans fat), sugar and sodium.

There is a high concentration of sodium in savory snacks, particularly in hot dog sausages, ham and cheese, while in sweet snacks, there is a greater amount of sugar and fat, for example in sweet cookies and chocolate milk. In this regard, the offer of snacks can lead to inadequacies on the recommendations of the NFDE for sodium, sugar and fat. Also, additives, artificial coloring and preservatives are commonly found in processed foods offered as snacks.

Figure 1 shows the composition of school menus based on the type of meal offered.

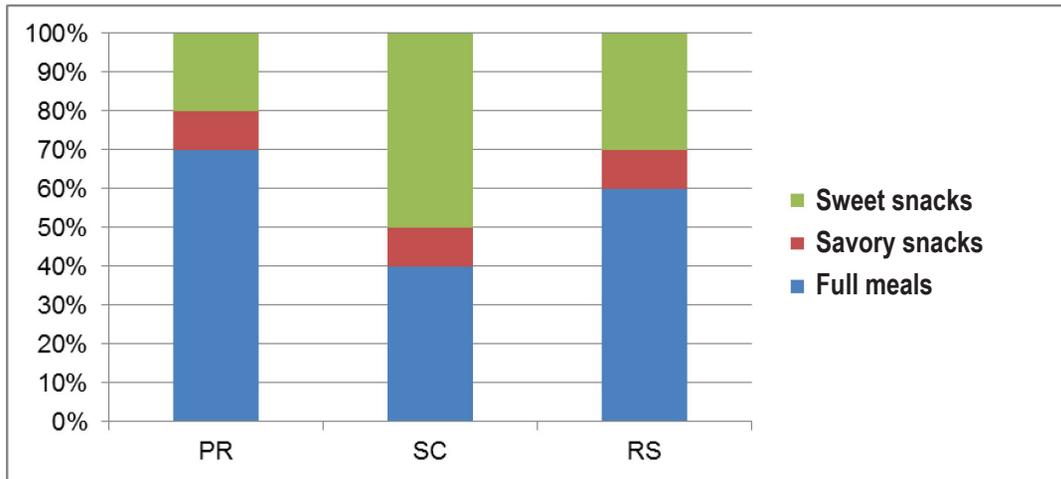


Figure 1. Composition of meals offered to students in the municipalities surveyed in the states of Paraná, Santa Catarina and Rio Grande do Sul, in 2011.

To evaluate the nutritional quality of school menus, the presence and the monthly rate of supply of the food groups were identified in the menus of the three municipalities, as shown in Figure 2.

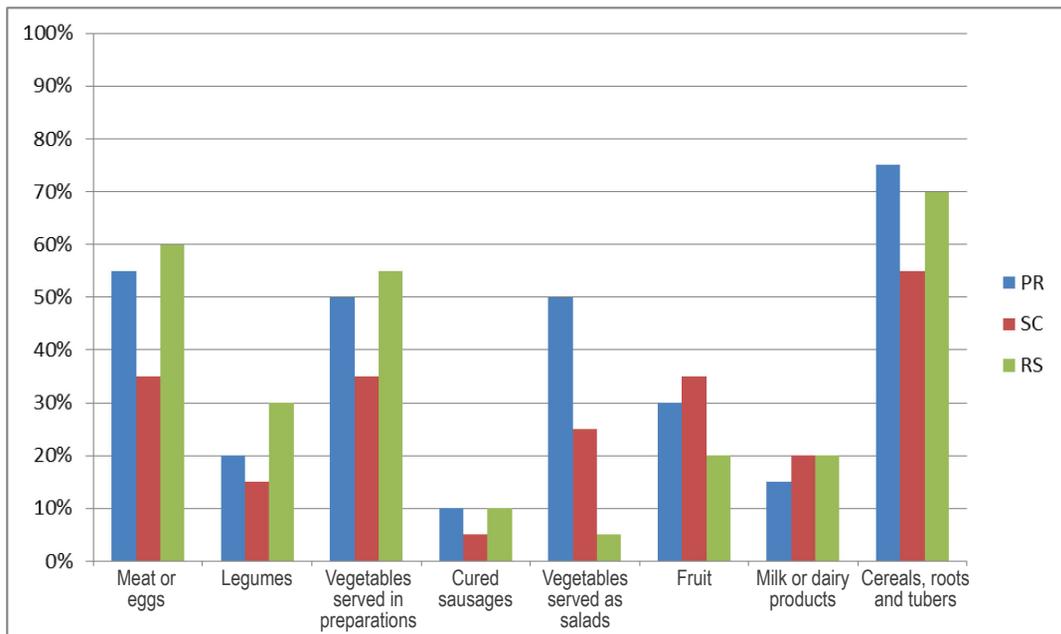


Figure 2. Food supply on school menus on twenty school days in the three municipalities surveyed in the states of Paraná, Santa Catarina and Rio Grande do Sul, in 2011.

Legumes

In Rio Grande do Sul, beans were offered six times in the analyzed month, which corresponds to at least once a week. On menus of the municipalities in Paraná and Santa Catarina, legumes were present on three and four days, respectively. The menus of Rio Grande do Sul had lentil as another option of legume. However, only the menu of the municipality of Santa Catarina showed the combination “rice and beans”.

The *Dietary Guidelines for the Brazilian Population* recommend daily intake of one serving of legumes, and the combination of rice and beans is considered to be a traditional Brazilian food that is nutritionally rich, adequate and full in protein.¹⁰

Dalla Costa et al.,¹⁸ in a study with schoolchildren in Paraná, observed that legumes were not part of the food habits of respondents. According to the Household Budget Survey (HBS), between 2002-2003 and 2008-2009, the average annual *per capita* household acquisition of bean decreased 26.4% (from 12.4 kg to 9.1 kg),¹⁹ showing reduced consumption of that food item in households. These data emphasize the relevance of offering beans in school menus, considering their nutritional and cultural importance. Thus, because the intake of the rice-beans combination should be valued, encouraged, readopted and maintained, the *Dietary Guidelines* advocate the need for the government to ensure the use of beans and other legumes in nutrition programs in schools, kindergartens and other institutions.¹⁰

Vegetables and fruit

Vegetables were present on most days when complete meals were offered. Food preparations had vegetables as ingredients and also as side dishes such as salads. Figure 3 shows that there were no vegetables in some of the complete meals on the menu in the municipality of Paraná, but only *galinhada*, *carreteiro*, and chicken noodles with sauce. In Rio Grande do Sul, only one complete meal did not contain vegetables. There were complete meals on 40% of the school days assessed in the municipality of Santa Catarina, and vegetables were offered on 90% of such days. Figure 3 shows the supply of vegetables in complete meals.

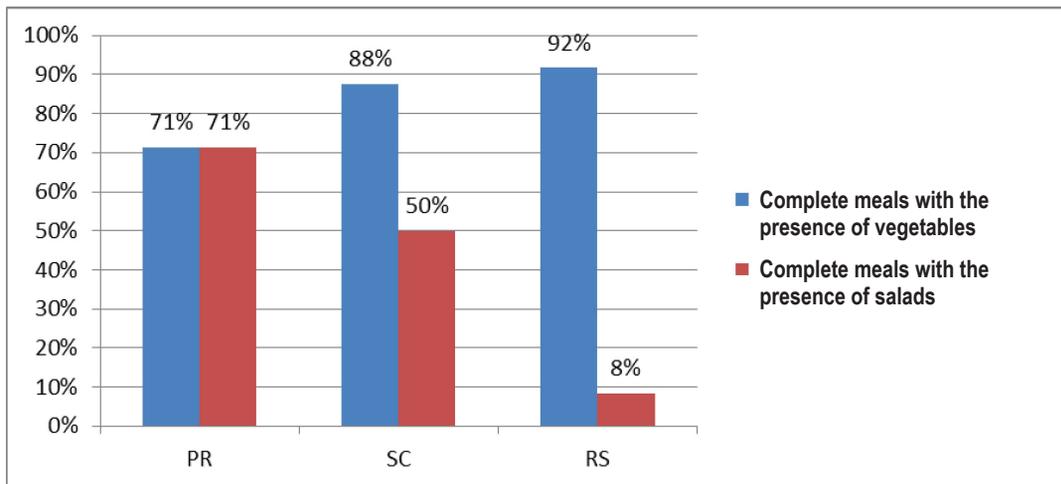


Figure 3. Presence of vegetable or salad at complete meals on menus in the municipalities surveyed in the states of Paraná, Santa Catarina and Rio Grande do Sul, in 2011.

The analysis of the supply of salads together with main meals showed that they were more frequent in the municipality in Paraná. In Santa Catarina, half of the complete meals offered salads. On the other days when complete meals did not have salad, the meals were composed of various types of soup. In the municipality in Rio Grande do Sul, salad was present on the menu on one day only, although almost all meals offered vegetables in their composition.

As regards vegetables served as salads, lettuce was repeated on four days of the monthly menu of the municipality of Santa Catarina, combined with endive (1), chicory (1), chayote (1), chayote with oregano (1) and broccoli (1). In the municipality in Rio Grande do Sul, salad was offered on one day only - boiled beets. In Paraná, the menu included tomato (1), lettuce (4), cabbage (3), carrot (2) and beets (1).

In all three cases studied, fruit was present on the menus with or without added sugar (Figure 4), and the supply frequency was 20% (Rio Grande do Sul), 30% (Paraná) and 35% (Santa Catarina). The municipality in Paraná had the highest supply of fresh fruit, while the municipality of Rio Grande do Sul not only had the smallest availability of this food group, but also showed a predominance of fruit with added sugar.

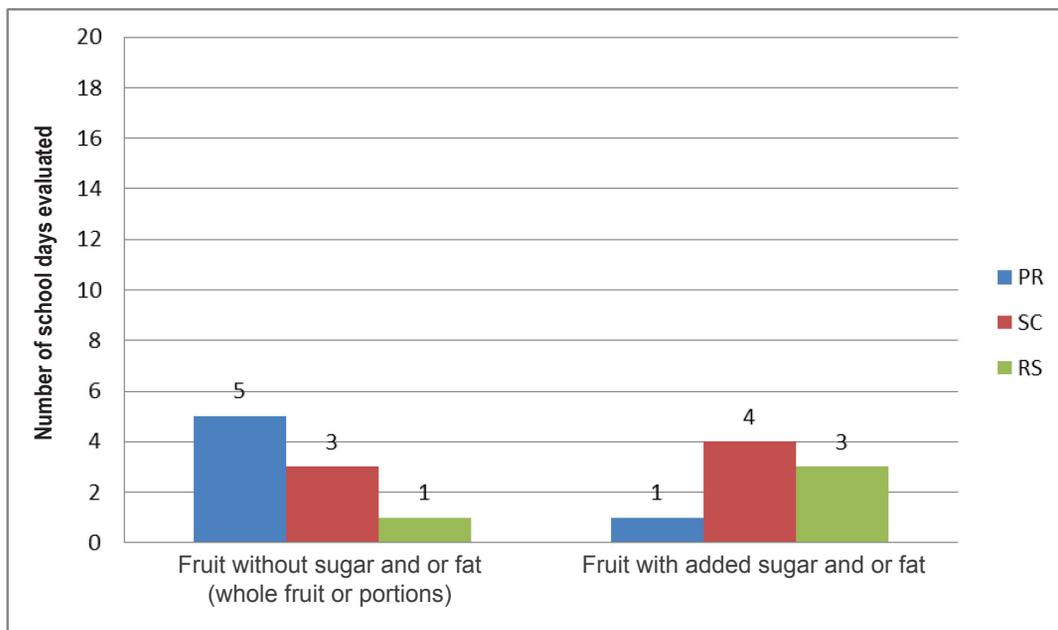


Figure 4. Monthly supply of fruit with and without added sugar and / or fat in the municipalities surveyed in the states of Paraná, Santa Catarina and Rio Grande do Sul, in 2011.

Current guidelines recommend the intake of three servings of fruits and three servings of vegetables in daily meals, 400g per day.¹⁰ Faced with the requirement to supply 20% of the nutritional needs of students, three servings of fruits and three servings of vegetables should be offered, i.e., 400g per week. However, the NFDE establishes as mandatory an offer of three servings of fruits and vegetables per week (200g/student/week).^{7,8}

According to data from POF (2008-09), the daily intake of these foods is below the level recommended by the Ministry of Health (400g) for more than 90% of the population¹⁹. This situation is not different for public school students.^{18,20} Ciochetto et al.²¹ analyzed the intake of vegetables and fruit by 356 schoolchildren from the public schools in a municipality in Rio Grande do Sul. The authors found that, for seven days preceding the interviews, 43.1% of them frequently ate fruit, and 20.2%, vegetables; 12.1% did not eat any fruit, and 22.5% did not eat any vegetables. Gama,²² in a study with adolescents, found that vegetables and fruits were present in the dietary habits of the majority, but 50% of them consumed amounts below the recommended levels.

In the municipalities of Rio Grande do Sul and Santa Catarina, the supply of fruit with added sugar and/or fat was greater than that of fresh fruits. The latter were only offered on one, three and five days on the menu in the analyzed month, in Rio Grande do Sul, Santa Catarina and Paraná, respectively. Even in the municipality of Paraná, where fresh fruit was offered to students at 25% of the days, the amount is still rather low.

There were differences in the variety of fruit offer, depending on the municipality surveyed. Five, three and two different types of fruit were offered in Santa Catarina, Paraná, and Rio Grande do Sul, respectively. In particular, apple and banana were offered in the three municipalities. Orange was offered in Paraná, and papaya, orange and pineapple, in Santa Catarina.

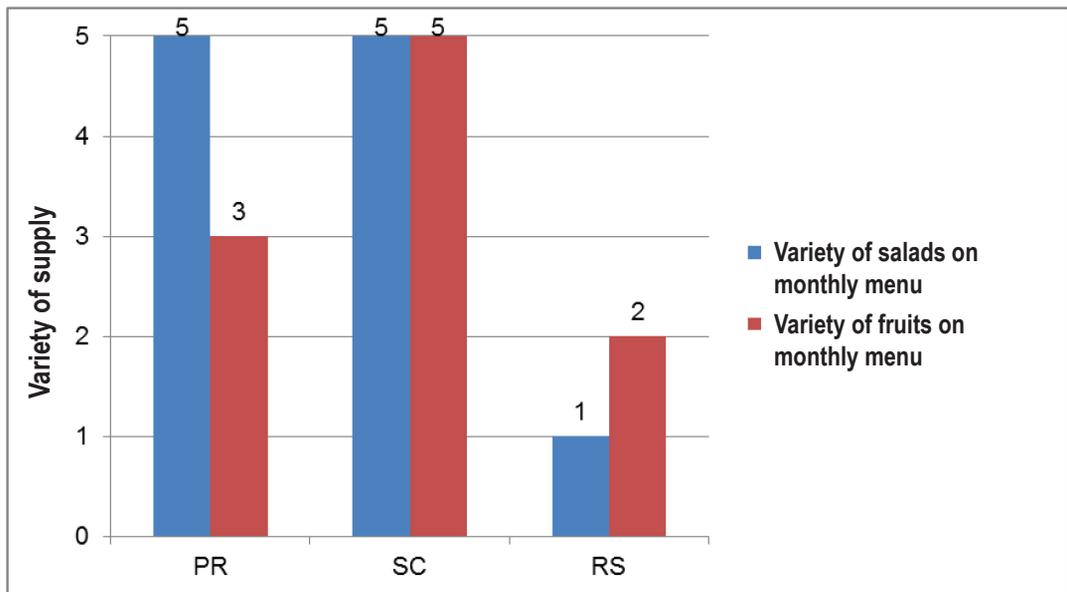
In the study by Dalla-Costa et al.,¹⁸ orange and banana were the favorite fruits of adolescents. The authors also found that the fruits in season were the least frequently eaten.

According to the study by O'Brien et al.²³, conducted in the state of Minnesota, USA, the average consumption of fruits and vegetables was less than five servings per day for 80% of the students. The data showed that most of children's daily intake of such foods occurred at school. Moreover, it was observed that students had higher intake of these foods at home when their families had higher income. The children of lower-income households ate a larger proportion of this group of foods at school; thus, the authors stressed the importance of school feeding programs. These data reinforce the need to develop strategies for increasing the supply of fruit and vegetables on school menus.

In the study by Boaventura et al.²⁴, in four municipalities in Greater São Paulo, the supply of fruits and vegetables was evaluated as positive. Only one of these municipalities did not offer food to students at 100% of the analyzed days (19 days). However, the analysis considered the menus of schools where students had full-time classes, i.e., they had five meals at school.

Thus, it seems essential that schools should provide at least one serving of fruits and vegetables per day, as it does not modify the standard meal. Fruit can be offered after the main meal or after the sweet or savory snack, in order to encourage greater consumption. In addition to frequency of offer, both the variety of food groups available and the method of preparation are important.

Figure 5 shows the variety of fresh salad and fruit offered in the monthly menus of the municipalities.



Note: The evaluation of variety was not possible in the case of vegetables in general, since on all menus, preparations were labeled as, for example, “vegetable soup” without specification.

Figure 5. Variety of fruits and salads on school menus of the three municipalities on twenty school days, 2011.

Based on a systematic review on the intake of fruits and vegetables by children, Knai et al.²⁵ reported, among other aspects, the need for funding and appropriate policies for the provision of food in schools, including locally produced fresh fruits and vegetables; reduced access to unhealthy foods in schools, providing “healthy choices”, and nutrition education in the classroom.

Cereals, tubers and roots

The DGBP recommends daily intake of six portions of tubers, roots and cereals, and whole grains should be prioritized. The recommended intake of this food group is based on its importance as a source of energy and should be the main component of most meals, because of its high carbohydrate content¹⁰.

It is noteworthy that in a classification of foods by carbohydrate content, cookies would be included in this food group. However, the DGBP warns against the large amount of fat and sodium of these products.¹⁰ Given the high presence of these nutrients in cookies, they were excluded from the analysis of this group.

On the five days when cereals, roots and tubers were not offered in Paraná, food offer included cookies, scrambled eggs with vegetables, gelatin with fruit, chocolate pudding with bananas, and cream with caramelized banana. In Santa Catarina, on the nine days without food of the cereal group, fruit or fruit salad was offered on four days, and cookies on five days. In Rio Grande do Sul, on the six days without this food group, there was cream powder for pudding and fruit on one day, while cookies were offered on the other five days.

Given the recommendations of the NFDE^{7,8} for supply of at least 20% of the nutritional needs of students, and the importance of cereals, roots and tubers for meeting energy needs,¹⁰ it can be inferred that these foods should be present on the menus on a daily basis.

In the municipality of Santa Catarina, it was found that on days when no food with high carbohydrate was offered, the students only ate fruits at meals. This points to non-compliance with the nutritional recommendations by the NFDE, since the offer of fruit alone falls short of 20% of nutritional needs, as recommended by the guidelines of the program.^{7,8}

In addition, supplying cookies and cream crackers as a replacement for cereals, tubers and roots, should be avoided, because the former have low nutritional value and high content of fat and sodium.

Meat and eggs

In this study, meats and eggs were present on over half of the school days in the municipalities of Paraná and Rio Grande do Sul, and on 35% of days in the municipality of Santa Catarina. The DGBP recommends including foods of animal origin (beef, chicken, fish, eggs, dairy products) in the daily diet, which should reach 25% of total energy consumed, one serving per day.¹⁰

Figure 2 shows the frequency of supply of food groups on the school menus analyzed. Chicken and beef were the meats most frequently offered. In the municipality in Paraná, omelet was offered on one of the days analyzed.

In a study performed with adolescents in a private school in Teresina (state of Piauí), beef had the highest frequency of consumption, followed by chicken and eggs, especially fried eggs, among boys.²⁶

The same study showed that fish had one of the lowest rates of food supply,²⁶ corroborating the findings of Boaventura et al.,²⁴ who reported that the offer of fish ranged from zero to four days, at most, on monthly school menus, depending on the municipality analyzed. Regardless of income, consumption of eggs, fish and poultry was low among both male and female adolescents in Brazil.²⁰

In the present study, the presence of fish and viscera was not observed in school menus, which is indicative of the need for greater encouragement for consumption of such foods.

Milk and dairy products

Milk and dairy products were offered on 20% of school days in the municipalities of Santa Catarina and Rio Grande do Sul, and 15% in the municipality of Paraná (Figure 2).

A study conducted with students from a municipality in Paraná suggested that milk and dairy products should be supplied at school meals, given the low consumption of such foods among students, particularly by low-income students.¹⁸

The DGBP recommends daily consumption of three servings of milk and dairy products, especially because they are sources of protein, vitamins and the main source of calcium, an essential nutrient for skeletal development and bone mass maintenance. The intake of this food group is important at all stages of life, particularly in childhood, adolescence, young adulthood and during pregnancy.¹⁰

The supply of dairy products in schools is crucial; however, they should not be consumed together with complete meals, because calcium impairs the absorption of iron and vice versa.¹⁰ In addition, their consumption should not be associated with food preparations with a high content of sugar and fat, such as chocolate milk, drinkable yogurt, creams and cheese.

Cured sausages, food concentrates and food powders

All municipalities supplied some food of the group of cured sausages, with frequency varying between once and twice a month. The presence of sausage was found in two preparations in the municipality in Rio Grande do Sul. In the municipality of Santa Catarina, mortadella was supplied on the menu of one day of the month analyzed, together with cheese. In the municipality of Paraná, cured sausages were offered on two days: mortadella on bread with cheese, and sausage in hot dogs.

In the municipality in Santa Catarina, food concentrates or food powders were found: milkshake mix on two days and gelatin tea on one day of the monthly menu. In Paraná, chocolate pudding and jelly were present on one day, while in Rio Grande do Sul, there were chocolate milk powder and cream pudding powder.

The regulations of PNAE restrict the purchase of foods with high contents of sodium, sugar and fat, particularly cured sausages and food concentrates.^{7,8} Such restrictions occur because of risks to consumer health, given the high intake of these nutrients and their relationship to the development of noncommunicable chronic diseases.¹⁰

One of the main findings of the present study was that there was no acquisition of food compounds, prepackaged or ready-made meals and beverages with low nutritional value.

It should be noted that the restriction on acquisition of food given by NFDE occurs by limiting financial support and should represent at most 30% of funds awarded for implementing the program.^{7,8} For this reason, further studies are needed to evaluate this issue, since this survey was restricted to the analysis of school menus.

Further studies aimed at identifying possible strategies for managing the program are also necessary. In order to meet the needs of the students according to the specific characteristics of each municipality, the studies can support decision making for planning school menus, both as regards times of meals and composition of diets.

Limitations

Food supply was evaluated by means of the menu planned by the dietitian in charge. However, it is known that during preparation of meals, unexpected events may occur, causing replacement of both food items and preparations.

The findings comprise an analysis of the structure of menus and food items offered at school. The lack of more detailed information on the preparations contained in the menus is the main limitation of the study.

Conclusion

The data obtained in this study showed differences in the structure of school menus of the three municipalities surveyed. Regulatory guidelines of the program are the same for all Brazilian municipalities, but differences are seen because of the specific characteristics of each municipality.

Complete meals were associated with a greater supply of vegetables and fruits, while snacks were savory and sweet, combined with foods with high contents of sodium, sugar and trans fat.

However, there is the need for further studies to promote debate on the topic, especially with regard to the structure of the menus and types of meals to be offered, as well as research that can support the decision making of managers, and planning of national guidelines for executing the program.

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