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Evaluation of the composition of public-school menu in the municipality of São Paulo using the quality index of the Food and Nutrition Security Coordination and the method of qualitative analysis of menu preparations

Avaliação da composição de cardápios de escolas públicas do município de São Paulo utilizando o índice de qualidade da Coordenação de Segurança Alimentar e Nutricional e o método de análise qualitativa das preparações do cardápio

Abstract

Introduction: In childhood, school has an important impact on the formation of eating habits. Qualitatively and quantitatively adequate food is essential to ensure growth and development and, in this scenario, the National School Feeding Program aims to carry out food and nutrition education actions and offer meals that guarantee nutritional needs during the school term. *Objective*: To quantitatively and qualitatively evaluate the composition of the menus in the School Meals Program of the municipal network of São Paulo. *Methods*: Data collection was carried out from August to October 2019, using menus available on the electronic platform "Prato Aberto", published under the responsibility of the Municipal Education Department of São Paulo from August to October 2019, for Municipal Elementary Schools. The menus were evaluated by drawing lots of schools according to their location. *Results*: The average total score demonstrates that all evaluated menus were classified as adequate; however, when analyzing in detail the monthly results for each school, it was possible to notice the impact of different forms of management, food purchases and menu planning. *Conclusion*: The menus were positively evaluated against the two tools and were adequate in terms of the PNAE recommendations, although there were points to be improved, especially regarding the high forecast of restricted food supply.

Keywords: School Feeding. Menu Planning. Nutritional Policy. Food and Nutrition Security. Food, Feeding and Nutrition.

Resumo

Introdução: Na infância, a escola tem importante impacto na formação de hábitos alimentares. A alimentação qualitativa e quantitativamente adequada é essencial para garantir o crescimento e o desenvolvimento e, nesse cenário, o Programa Nacional de Alimentação Escolar tem por objetivo realizar ações de educação alimentar e nutricional e oferecer refeições que garantam as necessidades nutricionais durante o período letivo. *Objetivo:* Avaliar quanti-qualitativamente a composição dos cardápios do Programa de Alimentação Escolar da rede municipal de São Paulo. *Métodos:* A coleta de dados foi realizada nos meses de agosto a outubro de 2019, por meio dos

cardápios disponibilizados na plataforma eletrônica "Prato Aberto", publicada sob responsabilidade da Secretaria Municipal de Educação de São Paulo nos meses de agosto a outubro de 2019, para as Escolas Municipais de Ensino Fundamental. Os cardápios foram avaliados por sorteio das escolas de acordo com sua localização. *Resultados:* A média de pontuação total demonstra que todos os cardápios avaliados foram classificados como adequados; entretanto, ao analisar detalhadamente os resultados mensais para cada escola, foi possível notar o impacto das diferentes formas de gestão, compras de alimentos e planejamento dos cardápios. *Conclusão:* Os cardápios foram avaliados positivamente frente às duas ferramentas e estavam adequados quanto às recomendações do PNAE, embora houvesse pontos a serem melhorados, sobretudo quanto à alta previsão de oferta de alimentos restritos.

Palavras-chave: Alimentação Escolar. Planejamento de Cardápio. Política Nutricional. Segurança Alimentar e Nutricional. Alimentos, Alimentação e Nutrição.

INTRODUCTION

Attendance of the National School Feeding Program

Faced with a scenario of importance of feeding in childhood, the idealization of the National School Feeding Program (PNAE) started in the 1940s, one of the oldest feeding programs implemented in Brazil, covering students from preschool to elementary school. Its main objective is to contribute to the growth and biopsychosocial development, learning, school performance and the formation of healthy eating habits of schoolchildren, through actions of food and nutrition education and the provision of meals that guarantee nutritional needs during the school period, according to Article 4 of Law 11,947 of 2009.[1,2]

In this context, the menus prepared for the PNAE are an important strategy for the consolidation of healthy eating habits to schoolchildren and therefore considers that they should be prepared so as to meet on average the nutritional needs established in the form of the provisions of Resolution/CN/FNDE 26, June 17, 2013.[3]

From its creation until 1993, the implementation of the program took place centrally, that is, the management body planned the menus, acquired the genres by bidding process, hired specialized laboratories to perform quality control and was still responsible for the distribution of food throughout the national territory; however, in1994, the decentralization of resources for the implementation of the Program was instituted through Law 8,913, of 7/12/94, through the conclusion of agreements with the municipalities and with the involvement of states and Federal Departments of Education, which was delegated competence to serve students from their networks and municipal networks of the municipalities. [2]

Since 2006, the requirement of the presence of the nutritionist as technical responsible for the Program allowed significant improvements in the quality of the PNAE in terms of achieving its objective. Thus, the nutritionist is responsible for the planning of the menu, respecting local and cultural eating habits, meeting the specific nutritional needs, according to minimum percentages established in Article 14 of Resolution No. 26/2013; the bidding process of food stuffs; as well as the monitoring of the production of food in schools.[3,4]

The last reformulation of the programme, which took place in 2013, was responsible for the reformulation of Food and Nutrition Education (AN) and the existence of the National Plan Against Obesity and the Strategic Action Plan for the address of chronic noncommunicable diseases (NCDs), resulting in the redistribution of funds to certain food products; the new requirements were developed from Resolution CD/FNDE No. 26 June 2013. In 2015, Resolution CD/FNDE No. 4 was published, considering the strengthening of Family Agriculture and its contribution to local social and economic development, another action that had a significant impact on the program.[2,4,5]

In addition, it is important to highlight the need to increase attention to the implementation of the PNAE in order to provide the right to food, and food and nutritional security. Therefore, it is essential to monitor and evaluate the parameters of the program to ensure feeding within the established principles.[6]

Regarding the administration and practice of the PNAE in the city of São Paulo, it is important to highlight that the Department of School Feeding (DAE) currently has the Municipal Elementary Schools (EMEFs) and the Municipal Schools of Early Childhood Education (EMEIs) without sourced and mixed management of the feeding program and with a fortnightly offer of a vegetarian meal, being the textured soy protein (PTS) chosen as the main vegetarian source of protein. It is also important to highlight the ANE actions developed and strengthened by the DAE, as well as cooperation to promote the production of Family Agriculture, favoring agroecological and organic options, in accordance with the law.[7-9]

Menu analysis: The IQ COSAN tool and the AQPC method

The analysis of menus offered by PNAE is of great importance to assess the quality and quantity of food offered, and is a valuable parameter as well for study the impact of public policies on the living conditions of this population group.[1]

In general, menu analysis instruments aim to verify the quality of the food plans elaborated. Therefore, an appropriate evaluation is based on thouse of quantitative and/or qualitative indicators that allow the analysis of the overall quality of planned meals. [1]

Therefore, according to the General Coordination of the PNAE:

> To quantitative analyze the school meals menus elaborated under the PNAE, an analysis tool was created, developed and improved for the use of the Coordenação de Segurança Alimentae e Nutricional [Food and Safety Nutrition Coordination] - COSAN, called "Índice de Qualidade da Coordenação de Segurança Alimentar e Nutricional (IQ COSAN)" [Quality Index of the of the Food and Nutrition Safety Coordination].[10]

Thus, the IQ COSAN tool aims to standardize the analysis of the menus, and can be used by the FNDE technical team, as well as by nutritionists and other professionals working within the PNAE, in order to verify compliance with the program guidelines and the pillars of an adequate and healthy diet.[10]

IQ COSAN had its basis in the current laws of the Program and its inspiration in the Menu Quality Indicator for School Feeding - IQCAE. Thus, it is mainly based on the sensitivity of the presence of food by groups as a marker of menu quality, evaluating the daily and weekly presence of different food groups, scoring them positively, if they are recommended food groups, or negatively, if they are prohibited foods, that is, that should not be purchased with federal funds.[10]

Although it is recognized that quantitative analyses are extremely important, it is emphasized that generally the adequacy of the chemical composition of the foods in the menu is not an attraction enough to awaken in people the desire to consume them. That is, humans eat food, not nutrients.[11]

The Method of Qualitative Evaluation of Menu Preparations (AQPC) was proposed Veiros & Proença to assist in the construction of a more appropriate menu both from the nutritional and sensory point of view, that is, to facilitate the structuring of the menu.[11,12]

It is then possible to highlight two points of the method: it assists in the wide possibility of evaluation and in the consideration of numerical items. The percentages obtained will help in the evaluation of this menu, emphasizing that it should be used as a reference, a parameter that should be evaluated together with the conditions of the meal producing unit.[11,12]

Considering all these aspects of food, the planning of the menu, especially according to the PNAE, should consider the nutritional and sensory aspects, such as colors, texture, flavors, combination of preparations, type of food and preparation techniques, in addition to the appropriate adaptations to the recommendations proposed by the PNAE to ensure the adequate supply of nutrients and the quality of meals.[13]

In view of all considerations, the present study aims to evaluate quantitatively the composition of the menus of the municipal network of São Paulo belonging to the School Feeding Program based on the IQ COSAN tool of the FNDE and the AQPC method, through the verification of the adequacy of the menus of the municipal network of São Paulo and the provision forecast of food groups, in addition to evaluating the scope

as well as the limitations of the new menu analysis tool, the quality of the menus offered in schools under outsourced and mixed management and for each region of the municipality of São Paulo.

METHODS

Cross-sectional study conducted from May to December 2019, to evaluate quantitative-qualitatively the menus of municipal schools of the public school system of the City of São Paulo.

The sample criteria were based on a probabilistic sample, giving random and non-biased, using the simple random sample method, which requires the total numbering of schools in the city of São Paulo, in this case EMEFs, and the realization of sweepstakes.

Data collection was performed through the menus available on the electronic platform "Prato Aberto - Comida Boa Não tem Segredo", published under the responsibility of the Municipal Department of Education of São Paulo (SME).[14] The platform was created in December 2017, replacing the publications of the Official Gazette and which can be accessed on computers and mobile devices, allowing the consultation of menus by day and by school, with map view.[15] The analysis was based on the monthly menus of August, September and October of year 2019, for schools called EMEFs, which form a large part of the meals served by the municipality for both mixed and outsourced management. According to the reports published by the SME, in 2018, the supply of meals by these schools totaled 105,518,959, of which 40,224,512 were offered by mixed management schools and 65,294,447 outsourced.[16]

EMEFs are elementary schools which are intended to provide mandatory and free care, aiming at the basic training of citizens, attending the age group of 6 to 14 years. The daily food program offers snack and meals for units with 5-hour shifts; snack or meal for units with 4-hour shifts; dry snack/initial snack for specific cases.[17]

It is also important to consider the definition of each type of management of these school units. Outsourced management is the one in which a specialized company is hired through public bidding to provide the service of preparation and distribution of school feeding to educational units, being the responsibility of the company hiring and training the workforce; acquisition of foodstuffs and supplies according to the specification of CODAE (School Feeding Coordination); acquisition, replacement/maintenance of equipment, kitchen ware and furniture; and maintenance of the facilities used. While in mixed management, the company contracted by public bidding provides the service of preparation and distribution of school feeding to educational units without, however, being responsible for the acquisition of food. Finally, CODAE is responsible for preparing the object for the bidding process; standardization; defining the menu; overseeing the service provided; managing the contract; and training of servers in the educational units.[18] Thus, even with the planning being done by CODAE, there may be differences between the supply forecast for each type of management due to the different forms of food acquisition, justifying the analysis and comparison of both.

The menus were evaluated by lot of schools according to their location, and one school was evaluated in each of the following regions of the city of São Paulo: East, West and Central; and two schools for the South and North regions. This difference is justified because there are no schools with both types of management in the East, West and Central regions, only in the South and North regions, according to the report published by the EMS in 2018.[19]

The menus were evaluated using two different tools: IQ COSAN and AQPC. IQ COSAN was created by COSAN and made available virtually by FNDE in order to assist and unify the analysis of menus by the

nutritionists in charge, being a specific tool for menu analysis.[10] The AQPC method, proposed by Veiros and Proença, analyzes the preparations that make up the menu, evaluating its sensory and nutritional adequacy, providing an overview of it.[11,12]

IQ COSAN is an instrument elaborated in the Microsoft Excel program that, through the award of points, analyzes the menus of school feeding according to four main parameters. These are: presence of six groups of foods (1. Cereals and tubers; 2. Beans; 3. Vegetables and vegetables; 4. Fresh fruits; 5. Milk and dairy products; 6. Meat and eggs); presence of regional foods and socio-biodiversity; weekly diversity of meals offered; and absence of foods classified as restricted, prohibited and sweet foods or preparations.[20]

The evaluation of these parameters through the tool generates a sum of the score of each menu week and perform the calculation of weekly averages. This score varies between 0 and 95 points and, according to the points obtained, classifies the menus as: Inadequate (0 to 45.9 points), Need improvements (46 to 75.9 points) and Adequado (76 to 95 points).[20]

The evaluation using the AQPC method was performed based on the observation of the percentage of daily occurrence of food according to each criterion. To analyze the presence of foods rich in sulfur, it was observed the presence of the following sulfurous foods: avocado, chard, potato-sweet, cabbage, broccoli, cauliflower, pea, beans, guava, jackfruit, lentil, apple, watermelon, melon, corn, mustard, turnip, egg, radish, cabbage and grape. It was considered as rich in sulfur when two or more foods were offered on the same day, except for beans, which despite being rich in sulfur, is a food that according to the recommendation should be offered daily, thus was excluded from the list of evaluated foods. Regarding color monotony, it was considered when three or more foods with similar colors were present in the same meal. To verify the fatty meats, we considered the presence of fillet flap, chuck, tenderloin, neck steak, rib, hump steak, flank steak, shoulder clod, neck, sirloin cap and chuck. Finally, the presence of fruits and vegetables was analyzed as a positive quality factor, and of sweets and preserves as negative factors according to the AQPC method.[11,12,21]

Then the analysis of these data and its correlations was performed through tabulation in the Microsoft Excel 2011program. The results were presented in the form of tables, according to their distributions, percentages, means and deviation-standard. The qualitative variables were presented by means of frequencies in number and percentage and quantitative variables by mean and standard deviation.

The present study had no contact with humans for data collection, because it was an analysis of menus available on the "Prato Aberto" website. Therefore, no type of free and informed consent form was used, since they are publicly opened data.

RESULTS

To verify the adequacy of the menus served in public schools of the municipal network of São Paulo, the study sample consisted of 7 different school units,4 under outsourced management and 3 under mixed management. Schools from different regions of the municipality were evaluated, so that regions with outsourced and mixed schools, such as the South and North, obtained two analyses, one for each type of management and the others (East, West and Center) only one, because they have EMEFs only one type of management.

The results obtained from the mean total score for the months analyzed according to the IQ COSAN tools how that all the menus evaluated were classified as adequate, with minimal variations in mean scores between regions and type of management, as shown in Table 1. The menus that obtained the highest average score were from the Central regions, to a outsourced EMEF and West for a mixed EMEF (Table 1).

Table 1. Average evaluation and classification of menus for the months of August, September and October of outsourced and mixed EMEFs from different regions of the municipality according to the IQ COSAN tool score. São Paulo-SP, 2019.

EMEF Region	Type of Management	Average Rating	DP*	Classification of the quality of menus
Central	Outsourced	77,5	0,7	Adequate
East	Outsourced	76,4	0,7	Adequate
North	Outsourced	76,4	0,7	Adequate
North	Mixed	76,4	1,3	Adequate
West	Mixed	77,5	0,3	Adequate
South	Outsourced	77,3	0,5	Adequate
South	Mixed	76,2	0,5	Adequate

*Standard Deviation
Source: Authors.

By individually analyzing the monthly results for each school unit, it was possible to notice the impact of different forms of management, food purchases and menu planning, impacting on the result regarding the classification of the adequacy of the menus. Contrary to this, the comparison by region of the municipality showed no significant differences in the score, as shown in Table 2.

Table 2. Average monthly evaluation and classification of menus of outsourced and mixed EMEFs from different regions of the municipality according to the IQ COSAN tool score. São Paulo-SP, 2019.

Month	EMEF Region	Type of Management	Average Rating	Classification of the quality of menus
August	Central	Outsourced	77,0	Adequate
	East	Outsourced	77,0	Adequate
	North	Outsourced	76,5	Adequate
	North	Mixed	78,0	Adequate
	West	Mixed	77,0	Adequate
	South	Outsourced	76,5	Adequate
	South	Mixed	77,0	Adequate
September	Central	Outsourced	76,5	Adequate
	East	Outsourced	76,5	Adequate
	North	Outsourced	77,0	Adequate
	North	Mixed	77,0	Adequate
	West	Mixed	77,5	Adequate
	South	Outsourced	76,5	Adequate
	South	Mixed	78,0	Adequate
October	Central	Outsourced	75,6	Need improvements
	East	Outsourced	75,6	Need improvements
	North	Outsourced	75,6	Need improvements
	North	Mixed	78,5	Adequate
	West	Mixed	77,5	Adequate
	South	Outsourced	75,6	Need improvements
	South	Mixed	77,5	Adequate

Source: Authors.

Table 2 shows that for the three months evaluated, the school units under mixed management scored higher when compared to those under outsourced management, even if by a few points. It was possible to

notice that the only schools classified as "Need improvement" were outsourced schools. In addition, for the months of August and September the scores were similar, demonstrating the maintenance of a pattern of forecasting food offerings, unlike the menu of the month of October, which obtained the lowest scores among the three months evaluated for both outsourced and mixed schools, with a sharp decrease in scores for outsourced schools, culminating in the only month in which they were not classified as adequate.

It is important to point out that the distribution of funds by the FNDE takes place in monthly installments divided between the school months and that there are no public data demonstrating the decrease in October 2019, as well as the reduction of the complement of municipal funds of the city of São Paulo for this month. This leads us to consider the seasonality of some horticultural items commonly used in the composition of school feeding that may impact on the worsening of the menu in October, with an increase in the supply of processed and ultra-processed products.

Regarding the analysis of the variation in the presence of food groups, the highest forecast of fruit and legumes supply to schools under mixed management and lower supply of sweet foods and preparations when compared to schools under outsourced management stands out, as shown in Table 3.

Table 3. Average monthly content of food groups, restricted foods, food and sweet preparations for menus of outsourced and mixed EMEFs according to IQCOSAN evaluation. São Paulo-SP, 2019.

Month	Management	Monthly school days	L		Vegetables		Fruits		Meat and Eggs		AIR*		APD*	
			n	%	n	%	n	%	n	%	n	%	n	%
August	Mixed	20	19	95	16	80	20	100	14	70	20	100	0	0
	Outsourced	20	15	75	17	85	17	85	18	90	14	70	5	25
September	Mixed	20	19	95	17	85	20	100	16	80	20	100	1	5
	Outsourced	20	16	80	16	80	18	90	18	90	14	70	6	30
October	Mixed	20	19	95	18	90	20	100	16	80	20	100	2	10
	Outsourced	20	17	85	16	80	18	90	18	90	14	70	6	30

L = Legumes; AR = Restricted foods; APD = Sweet Foods and Preparations.
Source: Authors.

Thus, in Table 3, it is clear that there were differences in the supply forecast of almost all food groups for both types of management, except for the Group of Cereals and Tubers and Milk and Derivatives that were expected to be served daily. When evaluating more specifically which foods influenced the divergence of these points, it was noticed that foods such as jam, gelatin, individual banana sweets, individual guava jam and individual cakes of various flavors were offered more frequently in the outsourced school units of all the regions evaluated, which did not occur for the offer of mixed schools that contained fruit as dessert in their daily menus and on some days also in the morning snack.

The supply of restricted foods takes place in both forms of management, so that the mixed management units had the highest forecast of restricted food supply, because daily there was the provision of dairy compound in the morning snacks, – varying only the taste – food that is classified as restricted, because it is added with sugar, despite being accounted for in the group of milks and derivatives. Also, schools under outsourced management often had coffee with milk or milk with chocolate milk, and the items coffee

and chocolate were counted as restricted foods, although milk preparations entered the group of milk and dairy products.

For meat and eggs, it is emphasized that in no region, under any type of management, there was a forecast of daily supply, and this fact was justified by the adoption of the "Monday without meat" by the SME, in order to offer other options of proteins of plant origin, encouraging the reduction of the consumption of meat and eggs without excluding them from feeding.

When evaluating the forecast of regional food supply for all menus, it was noticed that in all weeks there was a score. Foods such as: chickpeas, *mandioquinha*, cabbage, zucchini, eggplant, cabbage and orange, which are among the regional foods for the Southeastern region, according to COSAN;[20] however, in no week of the menus there were foods classified as socio-biodiversity for the Southeastern region. The variety of the weekly food supply forecast also directly influenced the evaluation, since every week the recommended food variety was reached, which is at least 21 different foods for menus offering two daily meals or reaching 30% of daily nutritional needs, as is the case with EMEFs menus. It is important to highlight that no evaluated menu had prohibited foods, being an item that contributed significantly to a positive evaluation.

As for the evaluation using the AQPC method, it was found that the supply of food groups fresh fruits, non-starchy vegetables, cereals, breads and tubers, meat and eggs, legumes and milk and dairy products the results were identical to those of the IQ COSAN tool.

Regarding the evaluation of the items' preparations and products with addition of sugar and concentrated foods, dehydrated or powdered, there was 100%(n=20) of supply on the days evaluated, due to the presence of dairy compound for schools under mixed management and milk powder, coffee and chocolate for schools under outsourced management, and these evaluations were negative, because the supply of these products should be minimal. It was also considered, however positively, the absence in the provision forecast of sausages or industrialized meat products, canned and preserved, beverages with low nutritional content, and fried foods, meats, and fatty sauces.

For the other items of the evaluation of the AQPC method, such as color monotony, presence of sulfur-rich foods, whole foods and breakfast cereals, cakes and biscuits were found differences in both types of management and between the months analyzed, as shown in Table 4.

Table 4. Average of the monthly content of food categories and preparations for menus of outsourced and mixed EMEFs according to the evaluation of the AQPC method. São Paulo-SP, 2019.

Month	Management	Monthly school days	Monotony of colors		Rich in sulfur		Whole foods		Breakfast cereals, cakesand biscuits	
			n	%	n	%	n	%	n	%
August	Mixed	20	5	25	2	10	15	75	15	75
	Outsourced	20	5	25	4	20	10	50	7	35
September	Mixed	20	3	15	3	15	11	55	11	55
	Outsourced	20	6	30	4	20	9	45	7	35
October	Mixed	20	5	25	2	10	12	60	12	60
	Outsourced	20	4	20	3	15	8	40	7	35

Source: Authors.

Table 4 shows that schools under mixed management stood out positively and were better evaluated, except that the presence of breakfast cereals, cakes and biscuits is more frequent. It is noteworthy that the

monotony of colors of the menu preparations was lower for the school units under mixed management, except for the month of August, in which they were equal; sulphur-rich foods were also less present in the provision forecast of mixed-management schools; as well as whole foods such as biscuits, breads and rice, were included more often for mixed schools for every month, making them better evaluation. Despite these data, it is important to highlight that for all items evaluated in the AQPC method there were no differences in the supply forecast for the different regions, only for the types of management and months evaluated.

Finally, it is understood that the forecast of food supply by location of EMEFs was very similar, with no significant differences to be pointed out. However, for the types of management of school units it was evidenced that when analyzing the prediction of food groups and the impact of some specific foods, there were significant divergences to be pointed out, although all menus were positively evaluated in relation to the two tools.

DISCUSSION

In 2006, the General Coordination of the PNAE/FNDE[3] conducted a nationwide survey, including quilombola and indigenous populations in order to understand the adequacy of the menus offered in public schools. The study observed that 41% of the menus analyzed did not provide for the supply of fruits in the recommended amounts and 16% of them did not provide for the minimum supply of vegetables, differently from the results obtained in the present study, in which the supply of fruits, vegetables and vegetables was frequent.

Study performed in public schools in the municipality of Conceição do Jacuípe, State of Bahia, evaluated the nutritional composition of 23 menus of different schools in the municipality during six months. The low results obtained were similar to the analysis of the costs of the menu, and the complementation in resources made by the municipality under study was not enough to ensure the preparation of the meal with the minimum nutrient content provided for in the program. In addition, the lack of infrastructure, adequate physical spaces and basic equipment, such as refrigerators in some schools, was considered as aggravating, which made it impossible to store perishable foods, especially milk products.[1] This reason can be applied to the justification of the daily supply of dairy compound and the non-daily supply of vegetables identified in the present study, because equipment and costs of buying food are strongly considered for the preparation of menus, even more so for the composition of menus in the city of São Paulo, which only accounting for EMEFs has 514 school units.

Also on the study conducted in Jacuípe, Bahia, the results showed that the meals offered in schools were unsatisfactory regarding the presence of fruits, vegetables and vegetables in natura, justified by the low regularity of buying fresh foods for school feeding, directly interfering in the quality of the menu composition. It was also evidenced that foods that are sources of vitamins, minerals and fibers, were little offered in school feeding.[1]

In the present study, through the analysis with the AQPC method, the menus presented monotony of colors of the preparations, high supply of simple carbohydrates and non-offer of fatty meats and fried foods. Very similar data regarding the supply of fresh foods were also found by Menegazzo et al.,[22] and the results obtained through the AQPC showed that the diet offered to preschoolers in a municipality of Greater Florianópolis, state of Santa Catarina, had little supply of fruits and vegetables, high supply of simple carbohydrates and trans fatty acids and was monotonous, although as an advantage it did not offer fatty meats and fried foods.

Another study, which qualitatively evaluated the menu preparations of municipal schools located in Greater São Paulo, obtains different results from other studies found in the literature, but close to that of the present study. The analysis of the menus was satisfactory for the offer of vegetables and fruits; although it is constant the presence of sweets, monotony of colors and there is limitation of fish.[23]

As well as the data cited in the previous study, the qualitative analysis of the menus of municipal schools in Rio de Janeiro conducted by Silva et al.[24] Through the AQPC method, showed that the menus presented several positive aspects when following the indications of the PNAE, with the offer, in recommended proportions, of most suggested food groups. However, there was an excessive supply of some contraindicated products, as pointed out by the results of the present study in Tables 3 and 4.

Through the results presented in the analysis of the school feeding service offered by the PNAE in the study by Danelon et al.,[25] it was concluded that some aspects of the program need to be constantly reevaluated, such as the preparations of the menus, schedules and distribution structure of the school lunch, in order to meet the preferences of the students, increase the support to the program and provide meals of higher nutritional values.

When evaluating the menus, the IQ COSAN tool was shown to be effective for presenting different evaluation parameters. Thus, it is possible to identify which are the main points to be improved, in addition to its final result of the average points and classification as to adequacy, inadequacy or need for improvement. By completing the data regarding the daily components of the menu, for each week, it is possible to evaluate which food groups are properly contemplated or not, and whether restricted foods and sweet preparations are absent or when present which foods include these classifications and how often they are on the menu.

In addition to evaluations, the tool issues visual alerts of different geometric shapes and colors for each type of inadequacy or suitability and their frequency. This signaling occurs mainly for the low supply of fruits or vegetables, high supply of restricted or sweet foods, the presence of prohibited foods, for the different classifications of the evaluation of the diversity of the menu and for the classifications of the quality of the menu. All these facilities, as well as for filling in the data in the evaluation fields, make the IQ COSAN simple and didactic to be used and allows other people and professionals, such as members of the School Feeding Councils and school principals, to know and evaluate the menus, because there is no need for advanced technical knowledge to use this tool.

However, it is important to consider that there are limitations regarding the use of COSAN IQ, among which the lack of specifications of the preparations or foods on the menu become aggravating. It should also be considered substantially, the importance of the knowledge of the purchase of food to fill in some data. For example, for items described in the menus evaluated as cake or sauce, one must know in advance whether these foods are purchased ready or if they are prepared in the kitchens of schools, otherwise there may be losses in filling the data and consequently in the final evaluation of the menu.

There is also the impossibility of evaluating menus that do not provide for the offer of foods that make up main meals, such as only snacks or even the offer of dry snacks, which are only ready-to-eat products, such as juices in tetra pack packaging, mini-cakes or industrialized biscuits, where most often are not included foods from the groups of meat and eggs, vegetables and beans. Thus, the tool could contemplate the evaluation for the different types of school feeding menus, which would make it even more effective and increase its field of evaluations.

CONCLUSION

The results show an efficient performance of the agents promoting the PNAE, but with points to be improved. Thus, it was possible to verify that both school feeding menus of the municipal network of São Paulo were adequate regarding the recommendations of the PNAE. However, there was a high forecast of the supply of food and sweet preparations for outsourced schools in all regions and restricted food for all regions, regardless of management.

It is essential to point out that the various regions evaluated did not present significant divergences in food supply forecasts, a positive factor for the menus of the City of São Paulo, considering the concept that they must uniformly attend all schools and students in the municipality.

The COSAN IQ has been shown to be a very sensitive tool for the supply of fresh and ultraprocessed foods, and the latter causes great damage in the sum of points, demonstrating the importance of the minimum supply of these foods and maximum fresh foods. The tool proved to be simple and fast to be used, having great potential in optimizing the preparation and evaluation of menus; together with it the AQPC method was important to complement its analyses, evidencing some flaws of the menus not contemplated by IQ COSAN.

The outcome of the study highlights the problem of resources passed on by the Federal Government along with those made available by the state and municipal governments as insufficient to prepare menus that adequately meet the daily nutritional recommendations for children. Despite the good evaluation of the menus, there may still be many points to be improved, and it is necessary to review the resources for school feeding in order to fully meet the nutritional recommendations of the PNAE.

In this respect, the acquisition of food, equipment and the guarantee of skilled labor in school units should be considered, as well as the performance of outsourced companies responsible for managing part of the schools in the municipality, because the students served by them may be at a disadvantage in terms of food supply, when compared to the food supply at schools under mixed management.

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Contributors

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