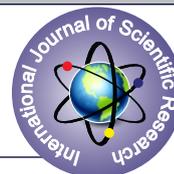


QUALITATIVE AND QUANTITATIVE ANALYSIS OF THE COMPOSITION OF FOODS SERVED TO STUDENTS BETWEEN 06 TO 10 YEARS OF AGE, IN THE MUNICIPAL SCHOOL OF SANTA TEREZINHA, LOCATED IN THE MICRO REGION OF SANTANA BAHIA, BRAZIL



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ABSTRACT

The present study aimed to analyze the nutritional composition of the school feeding offered to students aged 6 to 10 years in the schools of the municipal network of Santa Teresinha-BA, verifying that it meets the goals of nutritional recommendations proposed by the National School Feeding Program (PNAE). It was found that the goal of providing 20% of daily energy needs was fully achieved, with adequacy percentage close to 100%. All macronutrients (Carbohydrates, Proteins and Lipids) were found with average adequacy above the recommended value, but all values close to the value proposed by the FNDE. When it comes to the supply of micronutrient needs for the age range of the study, it was observed that vitamin A, vitamin C and iron values exceeded the minimum recommendation level. In contrast, calcium, magnesium and zinc are being offered in quantities below the recommendation. It was also observed that the recommended amount of fiber was not reached. In view of the above, it is evident the need for a greater variety of calcium source foods and other micronutrients, as well as food sources of fiber, in order to better meet the recommendations of the PNAE.

KEYWORDS:

School feeding. Chemical composition. Nutritional needs.

INTRODUCTION

The issue of quality-of-life growth and development is increasingly important. It is important to emphasize that when considering the needs of growth and development with quality of life, food stands out as one of the most important environmental factors, since, adequate nutrition provides the body with the energy and nutrients needed for performance of their functions and for the maintenance of a good state of health (LOPEZ; BRASIL, 2004; ACCIOLY; SAUNDERS; LACERDA, 2009; MURGUERO, 2009; BRASIL et al., 2013).

In addition to health risk, it is a proven fact that children's school performance is closely associated with eating habits. It is also known that the energy intake by them in this phase varies greatly and this energy should be enough to save the protein from being used as a source of energy (WHITNEY, 2008; MENDONÇA, 2010; BRASIL et al., 2013).

Given this, it is assumed that the well-fed student presents better scholastic performance; Greater balance for their physical and psychic development; Lower rate of absenteeism; Improves the organic defenses necessary for good health. Therefore, as an essential element in the fight against hunger and malnutrition, the School Feeding Program in Brazil was created on March 31, 1955, with the signing of Decree No. 37106, subordinated since that period to the Ministry of Education (PINHO; MARTINEZ, 2013; BRASIL, 2014).

In 1979, the program was renamed the National School Feeding Program (PNAE), and aims to guarantee the nutritional needs of students; Contribute to growth, development, learning and school performance and favor the adoption of healthy eating habits and practices (BRASIL, 2014).

It is verified that the school feeding, popularly called "school lunch" is a strategy that provides access to the social right to adequate food, being defined as "all food done by the student during the period in which he is in school" (CARVALHO; CASTRO, 2009).

The first thought of school feeding was enunciated by Dante Costa, a nutrologist doctor, in 1939, who said, "It is a small meal, with easy digestion and very nutritious value, performed in the interval of school activity" (FOTA, 2011).

Currently, the PNAE has been the subject of many discussions, as the nutritional needs of students during their stay in school are of fundamental importance, and the Program provides for an adequate supply of food in quantity and quality. Considering that the reflection of a high-calorie and low-nutrient diet favors the adoption of inadequate dietary habits, detrimentally affect the health of children, bringing diseases both in the short and long term, and still directly influences school performance.

In view of the above, it is relevant to know the nutritional composition of the menu of school feeding, since it is considered one of the most important services provided to the population, fitting as an additional source of energy and nutrients on a daily basis Feeding, contributing to quality education and acquisition of healthy eating habits and practices.

Therefore, feeding in the school environment should be healthy, complete, varied and enjoyable, with proportionality, aiming at a balance between the nutrients of the foods offered, moderation of products that can cause harm to the health of the student, such as excess sugar, fat and salt and Variety with a balanced diet rich in nutrients essential for age. In view of the nutritional needs of students, as well as the reversal of illness and / or prevention since childhood, food should

be a source of pleasure and health and not something that could compromise the well-being of the child. Abuse or inappropriate consumption (LOPEZ; BRASIL, 2004).

In view of this, school feeding menus should be prepared by the Technical Nurse Nutritionist (PNAE), whose objective is to ensure the preservation, promotion and recovery of health, food and nutrition in the school environment. Also, the menu should be composed of basic foodstuffs, so as to respect the nutritional references, food habits, food culture of the locality, based on sustainability, seasonality and agricultural diversification of the region and healthy and adequate food (LEAL, 2004; CARVALHO; CASTRO, 2009; MINISTRY OF EDUCATION, 2012).

This study aimed at analyzing the nutritional composition of school feeding offered to students from 6 to 10 years of age in the schools of the municipal network of Santa Teresinha-BA, in order to verify if it meets the needs of the students. Goals of nutritional recommendations proposed by the National School Feeding Program - PNAE.

METHODOLOGY

In order to choose a methodology that is more appropriate to the objectives of this study, the decisions and methodological options adopted to carry out the project, which are nothing more than the set of processes necessary to achieve this end, will be made explicit.

The present study refers to an exploratory cross-sectional survey, with a quantitative approach, on the menu offered in school feeding, in the city of Santa Teresinha-BA. Exploratory research aims to provide greater familiarity with the problem, in order to make it more explicit.

Field of study

The study was carried out in the municipality of Santa Teresinha-Bahia, located in the micro-region of Feira de Santana, with neighboring cities: Castro Aves, Rafael Jambeiro, Itatim and Elisio Medrado. Its distance to the capital is 201 km. In 2010, its population was approximately 9,000 inhabitants, according to data from the Brazilian Institute of Geography and Statistics - IBGE.

According to data provided by the Municipal Department of Education, the Municipality currently has 30 Schools, where about 2,000 primary school pupils are attended (kindergarten, pre-school, elementary school I and II and EJA). Regarding the study in question, the municipality serves about 800 elementary school students I, attended in 28 schools.

Sample Study and Data Collection

The study sample consisted of preparations present in the menu of April 2015, planned and offered to students in the initial grades of elementary school, aged between 06 and 10 years, enrolled in the municipal network of Santa Teresinha-BA, and beneficiaries Of the School Feeding Program.

The study evaluated the nutritional composition of all the preparations present in the menu for the month of April of the current year, planned and offered to students of elementary school I, aged between 6 and 10 years, enrolled in the municipal network of Santa Teresinha-BA.

To this end, a request for authorization to carry out the research was sent to the Secretary of Municipal Education requesting the menu to be evaluated. Through its release, the PNAE Technical Responsible Nutritionist in the city made available a copy of the menu for the month of April 2017, as well as the net and raw per capita (amount in grams) used for the age group delimited in the study.

For each preparation of this menu, a technical file was elaborated, with the respective ingredients and liquid and raw per capita (amount in grams). Through these datasheets, nutritional value was analyzed in relation to energy, macronutrients, and micronutrients (vitamin C, vitamin A, sodium, calcium, magnesium and zinc), as well as fiber. The nutrients contained in the menus were calculated using the AVANUTRI® nutritional prescription and evaluation software, using as a filter the Brazilian Food Composition Table (TACO, 2011) and the Food Composition Table, support for the nutritional decision (PHILIPPI, 2002).

The values obtained were used to establish the average energy and nutrients offered. Subsequently, the percentage of adequacy compared to the recommended one was verified, through a comparison between

the means of nutrients provided daily and the value of nutritional needs for schoolchildren aged between 06 and 10 years, as established by the legislation. The reference values are: 300 kilo calories (KCAL) of energy, 48.8 g of carbohydrate (CHE), 9.4 g of proteins (PTN), 7.5 g of lipids (LIP), 5.4 g of fibers (FIB), 100 µg of vitamin A, 7 mg of vitamin C, 210 mg of calcium, 1.8mg of iron, 37mg of magnesium, Zinc 3mg and sodium <400mg. Equivalent to 20% of daily nutritional needs for primary school students between the ages of 6 and 10, according to Resolution 26 of June 17, 2013.

Data analysis

Statistical analysis was performed by means of percentages, using the software Prism 5.1.

RESULTS AND DISCUSSION

The analysis of the nutritional value of food offered in schools represents an important instrument for evaluating the quality and quantity of food offered. Although it seems a simple work, the nutritional evaluation of the menus elaborated by the nutritionist is of great importance, as it reveals the quality of the school feeding offered.

This analysis is fundamental to verify the effectiveness of the PNAE, since, from the same it is possible to draw up new policies and actions that aim at the improvement of the health and feeding of the children (DECKER; STRACK; GIOVANNONI, 2013).

According to Table 1, it is possible to observe that the average calorie adequacy found is 8% above the value recommended by the PNAE for the age group. Adequate supply of energy and some micronutrients is essential because, when not met with recommendations for ingestion, they can contribute negatively to the development and growth of the school.

From the analysis of the menu of the four weeks, the following results were found:

Table 1 - Results of the analysis of the menu offered to students aged between 6 and 10 years in the schools of the Municipality of Santa Teresinha-BA (Energy and Macronutrients)

NUTRIENT	MEAN	PNAE RECOMMEN DATION	% DE ADEQUAÇÃO
Energy (Kcal)	326	300	108%
CHE (g)	52	48.8	106%
PTN (g)	11	9.4	117%
LIP (g)	8.2	7.5	109%

Source: Field Research (2017)

In disagreement with the study in question, the evaluation of the nutritional composition of the school feeding menu of the Municipal Network of Conceição do Jacuípe - BA, carried out by Mascarenhas; Santos (2006) showed that the menu offered in the municipal schools did not meet the nutritional objectives proposed by the National School Feeding Program (PNAE).

A study by Silva; Gregório (2012) presented a similar result to that of this research, with 100% of energy adequacy for the school feeding menu in Taquaraçu de Minas - MG, against the nutritional needs recommended by PNAE for students aged six to ten years.

As shown in Table 1, in relation to carbohydrate, the average suitability is 6% above the value recommended by the FNDE (2013). Marques; Tirapegui (2002) reports that carbohydrates represent the most important dietary energy source in the world, being this nutrient that mediates the functioning of the central nervous system, the "economizer" of the proteins so they do not need to be used as fuel while maintaining their functions. Therefore deserve special attention in food. However, according to the author, the excess of calorie intake results in a buildup of fat in the body. Therefore, the composition of the diet and the balance between the macronutrients are fundamental.

Table 1 shows that the protein adequacy was 117%, that is, the average adequacy is 17% above the value proposed by the FNDE (2013). The intake of proteins should be in adequate amounts the recommendations, as this is an essential nutrient that fulfills in the body structural, regulatory, defense and transport functions in biological fluids. Insufficient supply of protein is extremely detrimental, since the healthy physical development of a child depends on the supply of

proteins in sufficient quality and quantity. Brain maturation depends on the correct supply, at the right age, of proteins of high nutritional value. Consumption below the recommended level of protein in childhood leads to serious problems of conduct and reasoning in adulthood (DECKER; STRACK; GIOVANONI, 2013).

The study of the nutritional composition of the School Feeding Menu of the Municipal Network of Conceição do Jacuípe - BA, carried out by Mascarenhas; Santos (2006) showed that the amount of protein was below that recommended by the legislation, being this result different from that found in the study in question.

The results found in relation to lipids, as presented in Table 1, was an average adequacy of 109%, being this macronutrient with an average adequacy of 9% above the recommended value when compared to the recommendation proposed by the FNDE (2013). According to Dutra-de-Oliveira; Marchini (2008) lipids are macronutrients that perform energetic, structural and hormonal functions in the body. However, its excessive intake has been related to coronary diseases, and the consumption of this nutrient should be balanced. However, observing the menu, we can observe that fried foods, fatty meats are not offered and there is still a low amount of food rich in hydrogenated vegetable fat, which is a beneficial factor.

In the study carried out by Azevedo et al (2010), regarding the amount of lipids consumed by children in the school environment, an adequacy of 117.3% was observed, being above the recommended value in comparison to the PNAE legislation, showing no divergence with The values found in this research.

As shown in Table 2, of the vitamins and minerals, vitamin A, vitamin C and iron exceeded that recommended by the PNAE legislation.

Table 2 - Results of the analysis of the menu offered to students aged between 6 and 10 years in the schools of the Municipality of Santa Teresinha-BA (Micronutrients and Fibers)

NUTRIENTE	MEAN	PNAE RECOMMENDATION	% DE ADEQUAÇÃO
Vitamin A (mcg)	135	100	135%
Vitamin C (mg)	19	7	271%
Calcium (mg)	101	210	48%
Iron (mg)	3	1.8	167%
Magnesium (mg)	17	37	50%
Zinc (mg)	0.8	1.3	61%
Sodium (mg)	309	<400	-
Fibers (g)	2	5.4	37%

Source: Field Research (2017)

However, it is known that the adequate consumption of vitamin C contributes in a valuable way to the potentiation of non-heme iron absorption from the diet, in the synthesis of collagen, in the healing processes, in oral health, in capillary integrity, in normal function Fibroblasts and osteoclasts, in the synthesis of adrenal hormones and in leukocyte functions. In addition, their probable loss should be considered during the food preparation process. Regarding vitamin A, considering its essentiality in the age range studied for cell differentiation and proliferation, immune system integrity and linear growth, the above recommendation does not represent health risks, since it corresponds to only 35% of the recommended value By the PNAE. The consumption of iron in sufficient quantity deserves attention in the studied age group, since iron is the component of enzymes that participates in the process of cellular respiration and is essential in the transportation of oxygen and carbon dioxide. Its deficiency, even in the moderate form, is worrying because anemia can end up with consequent damages to the abnormality of growth and cognitive development (BARBOSA; SOARES; LANZILLOTTI, 2007; VITOLO, 2008; DECKER; STRACK; GIOVANONI, 2013).

The other micronutrients calcium, magnesium and zinc, were below the recommended by the legislation, with adequacy percentages

around 50% of the recommended. The compliance of the calcium recommendation is important, since this mineral is necessary for the normal growth of bone tissue and teeth. Inadequate calcium diets increase the reabsorption of bone tissue by decreasing bone density and may contribute in the long run to an increased risk of osteoporosis. (BARBOSA; SOARES; LANZILLOTTI, 2007).

Despite the supply of calcium source foods, the menu evaluated failed to provide the amount recommended by the legislation. The insufficient supply of magnesium and zinc also causes health damage, since the changes caused by the serum deficits of these minerals compromise the functioning of the immune system, leading to immunosuppression. The deficiency of these micronutrients during childhood may induce deficits in biological maturation, especially in the nervous and immune systems (DECKER; STRACK; GIOVANONI, 2013).

In relation to the sodium supply, it was observed that the value found is adequate, according to the value determined in the legislation. Sodium is essential for maintenance of body fluid balance, maintenance of basic acid balance, excitability of muscles and control of osmotic pressure, absorption of glucose and transport of various substances by the body. Its consumption must be according to the recommendations, since the deficit or excess of this mineral is harmful to the health of the organism (WHITNEY, 2008).

The amount of fibers also did not reach the recommended level, reaching 37% adequacy. Study conducted by Carvajal, Koehnlein; Ben-nemann (2009) evaluated the school meal in a municipal school from the 1st to the 4th grades of Maringá, PR, found that the menu was deficient in fiber, with the percentage of adequacy found 34% in relation to the recommendation of the PNAE. Dietary fiber acts to prevent and treat obesity, reduce blood cholesterol, regulate blood glucose after meals, and reduce the risk of cardiovascular disease, diabetes and cancer (VITOLO, 2008). Adequate values of fiber intake are important for a better functioning of the child's gastrointestinal tract. (DULTRADE OLIVEIRA and MARCHINI, 2008). In the menu evaluated in the present study, despite the supply of fruits and vegetables three times a week, fiber consumption was insufficient.

FINAL CONSIDERATIONS

Feeding the school public is one of the oldest and most enduring government interventions in welfare policy. This activity comes from the beginning, when it acted in the context of campaigns, then to the competence of education and health. Therefore, this topic has been the subject of many discussions, as the nutritional needs of pupils during their stay in school are of fundamental importance, with a view to ensuring a better learning capacity, training good eating habits and maintaining the Student at school.

Through the study in question, it was possible to know the nutritional composition of the menu offered to the students of the initial series of elementary schools of the Santa Teresinha-BA Municipal Schools, noting that the goal of providing 20% of daily energy needs was totally achieved, with a percentage Of adequacy close to 100%. All macronutrients (Carbohydrates, Proteins and Lipids) were found with average adequacy above the recommended value, but all with values close to the value recommended by the FNDE. When it comes to the supply of micronutrient needs for the age range of the study, it was observed that vitamin A, vitamin C and iron values exceeded the minimum recommendation level.

The large amount of vitamin A and vitamin C observed is a favorable finding because they are essential for the immune response and antioxidant protection, respectively, among other important functions in the body, and iron is essential for prevention And reversion of anemia due to deficiencies of this micronutrient. In contrast, calcium, magnesium and zinc are being offered in quantities below the recommendation. It was also found that despite the provision of three portions of fruit and vegetables per week, as required by legislation, the supply offered did not correspond to the required quantity of fiber. In view of the above, it is evident the need for a greater variety of calcium source foods and other micronutrients, as well as food sources of fiber and it is important to encourage the consumption of natural and integral foods in the school environment, which can be achieved through Insertion of more food from local and regional family farms, in order to better meet the PNAE recommendations, since the food served at school is considered as a foundation for quality education, as well as contributing to the acquisition of habits and practices food.

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