Food items in the food intake of children aged seven to ten years

Itens alimentares no consumo alimentar de crianças de 7 a 10 anos*

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Abstract

Objective: To describe the most representative food items regarding the total intake of energy, carbohydrates, proteins and lipids in children with ages between 7 and 10 years. **Methods:** A list was prepared with all food intake and quantities, and the diet composition in relation to energy and macronutrients was calculated. The list was based on information provided by a 3-day-Food Diary completed by 85 schoolchildren ranging from seven to ten years old and enrolled in a public school in São Paulo, Brazil. After dividing the food into 129 items, we calculated the percentage in which each item contributed to diet nutrient intake and identified those which contributed to up to 95% of the total intake of calories and selected nutrients. **Results:** The items "White rice, Greek rice, rice with vegetables" and "Brown, black and white beans, lentils" contributed significantly to the total intake of energy and carbohydrates. The item "Whole milk, powdered milk" had a significant participation in the total intake of lipids, protein and energy. We emphasize the importance of carbohydrates and energy intake from sugar-sweetened beverages (sodas and processed juices) in the total diet intake of the children. **Conclusions:** the contribution of rice in the total food intake of energy and carbohydrates; of beans in energy, carbohydrates and proteins; of milk and meat in energy, protein and lipids; and bread in energy and carbohydrates is noticeable. The participation of sugar-sweetened beverage in the total intake in energy and carbohydrates and of candies in the total intake of lipids is also evident.

Keywords: Eating. Children. Nutrients. Caloric intake. Child nutrition. Public health.

Resumo

Objetivo: Descrever os itens alimentares mais representativos para o consumo total de energia, carboidratos, proteínas e lipídios de crianças de 7 a 10 anos. **Métodos:** Elaborou-se uma lista com todos os alimentos consumidos com suas respectivas quantidades e quantificou-se a composição da dieta em energia e macronutrientes. A lista foi baseada em informações fornecidas pelo preenchimento de três Diários Alimentares (DA) por 85 escolares de 7 a 10 anos que frequentavam uma escola pública na cidade de São Paulo. Obteve-se o agrupamento dos alimentos em 129 itens, calculou-se o percentual de contribuição de cada item no consumo alimentar dos nutrientes e identificaram-se aqueles que contribuíram com até 95% da ingestão total de calorias e dos nutrientes selecionados. **Resultados:** Os itens "Arroz branco, arroz à grega, arroz com legumes" e "Feijão marrom, preto, branco, lentilha" contribuíram de forma importante para o consumo de energia e carboidratos. O item "Leite integral fluido, leite integral em pó" foi representativo para o consumo de lipídios, além de proteínas e energia. Ressalta-se a importância no consumo em energia e carboidratos das bebidas doces (refrigerantes e sucos industrializados) na dieta deste grupo populacional. **Conclusões:** É evidente a participação do arroz no consumo alimentar total de energia e carboidratos; do feijão em energia, carboidratos e proteínas; do leite em energia, proteínas e lipídios; carnes em energia, proteínas e lipídios; e pão em energia e carboidratos. Merece destaque a participação das bebidas doces no consumo total de energia e carboidratos e das guloseimas no consumo total de lipídios.

Palavras-chave: Consumo de alimentos. Crianças. Macronutrientes. Ingestão de energia. Nutrição da criança. Saúde pública.

Introduction

There is evidence that an unsuitable diet from an early stage of life is associated with the occurrence of diseases such as obesity, heart disease, some cancers, osteoporosis, and hypertension in adult life[1]. From this standpoint, early investigation of unsuitable eating practices among children is important so as to establish intervention strategies to promote health, particularly because the years preceding adolescence are a critical period for developing dietary habits[2].

Identifying foodstuffs that are important contributors in total nutrient consumption may help investigate the role of diet in health and disease, plan public health programs so as to target interventions, and develop dietary evaluation instruments[3].

The list of foodstuffs that are the basis for building instruments to evaluate dietary consumption must reflect the eating habits of a population so as suitably to represent consumption[1,3]. If constructed for children, such measuring instruments must contain the foodstuffs that this group habitually consumes.

There is little scientific output intended to identify foodstuffs that contribute significantly to the dietary consumption of 7-to-10-year-old children, making it difficult to build measuring instruments for the consumption of this population group.

The present study thus intends to describe the most representative food items in total energy, carbohydrate, protein and lipid intake in 7-to-10-year-old children.

Methods

The study was carried out at the University of São Paulo's "Escola de Aplicação" from May to July 2008 and from March to June 2009, and involved 115 schoolchildren who were drawn from a simple random sample of a total of 240 students enrolled from the second to the fifth years of Primary School. In order to calculate sample size, we adopted probabilities $\alpha = 0.05$ and $\beta = 0.10$ and correlation

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coefficient ρ = 0.3, which, when applied to the formula $n = \dfrac{(z_{1-\alpha} + z_{1-\beta})^2}{u_\rho^2} + 3$, where $u_\rho = \dfrac{1}{2}\log\left[\dfrac{1+\rho}{1-\rho}\right]$[4], resulted in 115 participants after adding 25% for losses. No exclusion criterion was adopted, so every schoolchild was eligible to take part in the study provided they presented a signed Free and Informed Consent Agreement.

Foodstuffs were identified on the basis of three daily food diaries, one of which had to refer to the weekend. The schoolchildren received prior training under procedures put forward by Consolmagno et al.[5]. Two 30-minute sessions were held so that the necessary skills could be acquired to record food consumption in detail and with quality. The first session aimed to introduce the food diary and provide information on the fields to be filled out, including the characteristics and quantity of each foodstuff consumed. The goal of the second session was to review and reinforce concepts learnt in the first session. The instruments used for recording information are described by Hinnig et al.[6].

The food diary data were transcribed to an ancillary document in order to standardize data entry into the NutWin software program, version 2.5[7] to convert home-made measurements into grams and determining quantities in energy and nutrients. National foodstuff composition tables were used[8-11], as well as the Manual of Recipes and Home-made Measurements for Calculation in Foodstuff Studies by Fisberg and Villar[12], as were the labels of industrially-produced foodstuffs in order to key in information lacking from the program's database. The data were transferred to an Excel (2003) spreadsheet and analyzed in Stata version 9.0[13].

An initial list of quantities of foodstuffs (grams or milliliters), and their respective energy and macronutrient values, was drawn up. Different types of foodstuff and modes of preparation were numbered as 393 codes and later grouped together as 129 items using criteria of conceptual similarity, physical characteristics, and quantity of nutrients per portion[3]. This grouping was reviewed by two other nutritionists in case foodstuffs had been improperly classified within the items.

The most representative foodstuffs accounting for up to 95% of energy and macronutrient consumption were identified by an approach put forward by Block et al.[3], which determines obtaining a percentage of the relative contribution of each foodstuff in the diet, for the nutrient of interest, given by:

$$\text{Relative contribution of item (\%)} = \frac{\text{total nutrient in item } i}{\text{total nutrient by all foodstuffs}} \times 100$$

For $i=1, 2...k$, where i represents the foodstuff.

The numerator of the formula is made up of the sum of all quantities of the nutrient from all portions of the foodstuff consumed by all the schoolchildren. The denominator is made up of the amount of nutrients present in all foodstuffs consumed, estimated by the sum of this nutrient in all portions of all items listed.

The foodstuffs were put into descending order by the percentage of relative contribution to energy and each macronutrient. The accumulated percentage was also calculated, and foodstuffs contributing up to 95% were identified.

This study was approved by the Committee of Ethics in Research of the School of Public Health of USP, in compliance with Resolution 196, published October 10, 1996, by the National Council for Health (*Conselho Nacional de Saúde*).

Results

Dietary information for 85 seven-to--ten-year-old schoolchildren of both sexes, accounting for 74% of the randomly drawn total, was used; 57.7% (n=49) were girls, and 42.3% (n=36) were boys. Of those who did not take part (26%), 14.7% (n= 17) failed to hand in their Informed Consent, 3.5% (n=4) did not complete their food diaries properly, 3.5% (n=4) were below seven or above 10 years of age, 2.6% (n= 3) were excluded at

the request of their parents, and 1.7% (n=2) brought in empty food diaries.

Eighty-two schoolchildren filled out three daily food diaries; one filled out two food diaries, and two filled out four, giving a total of 256. It was decided to fill out four food diaries to balance the days of the week. Since any information provided could contribute to making up the lists of representative foodstuffs, it was decided to take into consideration all data irrespective of the number of food diaries filled in by the participant.

The ten most frequently mentioned items by at least 49% of the schoolchildren were: "White Rice, Greek rice, rice with vegetables"; "Brown, black, white beans, lentils"; "Whole milk, powdered whole milk"; "Normal soft drink, powdered chocolate drink, and other flavors"; "French roll, French roll toast"; "Industrially-produced juices in a carton"; "Unfilled sweet bread and other types of bread (hot dog rolls, baps, sliced bread, cornbread, pita bread, mini roll)"; "Margarine, butter"; "Beef (roast, stewed, minced, cooked)".

Of those foodstuffs that most contributed to total energy consumption, the first 13 (Table 1) accounted for approximately 50% of consumption. It should be stated that of these, the items "White Rice, Greek rice, rice with vegetables", "Whole milk, powdered whole milk", "Brown, black, white beans, lentils", "French roll, French roll toast", "Normal soft drink" and "Industrially-produced juice in a carton" are among the most commonly cited foodstuffs on the food diaries.

In the case of carbohydrates (Table 2), if the percentage contributions of the sweet beverages: "Normal soft drink" and "Industrially-produced juice in a carton" were summed, they would account for 11.5%, which is very close to the percentage of the first item on the list. The roles of the items "Filled sweet biscuits", "Unfilled sponge cakes, chocolate-coated honey biscuits (lebkuchen or *pão de mel*)", "Chocolate, candies, bonbons, sweet peanut fudge (*paçoca*)", and "Filled cakes, tarts, Panettone,

doughnuts, éclairs, *churros*" are significant, and along with "normal soft drink" account for approximately 17% of carbohydrates consumed.

For proteins (Table 3), it should be pointed out that two very traditional foodstuffs in the Brazilian diet – "Brown, black, white beans, lentils" and "White rice, Greek rice, rice with vegetables" – accounted for approximately 13% of the schoolchildren's total protein consumption. Despite being important sources of proteins, "fried fish" and "battered or breaded pan-fried fish", ranked low, were infrequently consumed, and accounted for less than 2% of the consumption of this macronutrient. On the list of foodstuffs accounting for up to 95% of protein consumption is "industrially-produced juice in a carton". This item includes soy-based juices, which, when compared to other foodstuffs such as meats, have a low protein value, but since they are consumed so often, eventually figure as a representative item for this nutrient.

In table 4, if the treats "Chocolate, candies, bonbons, sweet peanut fudge (*paçoca*)" (4.77%), "potato crisp-type savories, straw chips" (4.21%), "Filled sweet biscuits" (3.87%), "Unfilled sponge cakes, chocolate-coated honey biscuits (lebkuchen or *pão de mel*)" (3.23%), "Milk-based popsicle, ice cream" (3.03%) and "Filled cakes, tarts, Panettone, doughnuts, éclairs, *churros*" (2.96%) are grouped together, they can be seen to account for roughly one quarter of total lipid consumption.

Discussion

This study describes the most representative food items in total energy, carbohydrate, protein and lipid intake in 7 to 10-year-old children based on dietary information given in a food diary.

We hope that the data presented will be useful for the fields of epidemiology and nutrition, particularly if there is methodological interest in building and enhancing evaluation instruments for dietary consumption, because the data provide

Table 1 – Description of food items that contributed to up to 95% to the total intake of **energy** in the diet of the schoolchildren. Escola de Aplicação da USP, São Paulo, SP, Brazil, 2009.

*Tabela 1 – Descrição dos itens alimentares que contribuíram com até 95% do consumo em **energia** na dieta dos escolares. Escola de Aplicação da USP, São Paulo, 2009.*

Food items	Percentage Contribution	accumulated %	Food items	Percentage Contribution	accumulated %
White Rice, Greek rice, rice and vegetables	7.99	7.99	Natural fruit juice with sugar	0.80	78.25
Liquid whole milk, powdered whole milk	5.32	13.31	Natural fruit juice without sugar	0.77	79.02
Brown, black, white beans and lentils	5.25	18.56	Sugar, honey	0.76	79.77
Beef (roast, soup, minced, stewed)	4.35	22.90	Breaded or battered pan-fried beef or chicken	0.76	80.53
French roll, French roll toast	3.75	26.65	Other roast savories (pasties, sfiha, pastel, etc)	0.75	81.28
Normal soft drink	3.19	29.84	Fried chicken	0.75	82.03
Filled sweet biscuit	3.08	32.92	Fried hen's egg	0.75	82.78
Industrially-produced juices in cartons	3.08	36.00	Hot dog	0.75	83.53
Chocolates, candies, bonbons, sweet peanut fudge (paçoca)	2.94	38.93	Boiled, sautéed, and mashed potato, cassava, arracacha (white carrot)	0.73	84.26
Unfilled sponge cakes, chocolate-coated honey biscuits (pão de mel)	2.79	41.73	Banana	0.71	84.98
Pasta (bolognaise, al sugo, aglio e olio, yakisoba noodles), gnocchi	2.74	44.47	Salted popcorn	0.67	85.65
Unfilled sweet bread and other types (hot dog rolls, hamburger baps, sliced bread, cornbread, pita bread, mini-rolls)	2.73	47.20	Apples, pears, pineapples	0.63	86.27
Potato-crisp type savories, straw chips	2.54	49.74	Liquid semi-skimmed, skimmed cow's milk	0.62	86.90
Instant noodles	2.25	51.98	Fried Pork	0.56	87.45
Filled cakes, tarts, pannetone, doughnuts, éclairs, churros	2.23	54.21	Yoghurt	0.55	88.01
Milk-based popsicle, ice-cream	2.15	56.36	Artificial powdered juices	0.50	88.51
Fried red steak	1.88	58.25	Brazilian cheese bread	0.49	88.99
Powdered chocolate drink and other flavors	1.87	60.12	Bean or lentil soup with meat	0.48	89.48
Ready-to-drink chocolate milk	1.71	61.83	Vegetable soup with or without beans, and without meat	0.47	89.95
Chicken (roast, stewed, grilled, cooked)	1.52	63.35	Yellow cheeses (mozzarella, Danbo, etc.)	0.45	90.40
Nuggets, hamburgers	1.43	64.78	Meat and vegetable soups, broths	0.44	90.84
Fried savories: pastel (deep-fried filled pastry envelope) , coxinha (shredded chicken deep fried in batter)	1.34	66.12	Cassava flour, tapioca pancakes, farofa (toasted manioc flour)	0.41	91.25
Unfilled biscuit (sweet or savory)	1.22	67.34	Mousses, milk flans	0.39	91.64
Pizza	1.16	68.50	Fruit smoothies	0.37	92.01
Other pasta (cannelloni, lasagna, etc)	1.14	69.64	Fried fish	0.36	92.37
French fried potatoes, fried cassava	1.09	70.73	Eggs (boiled, scrambled), omelettes, quails' eggs	0.36	92.73
Pork sausage (fried, boiled)	1.07	71.80	Breaded or battered fried fish	0.36	93.09
Croissants	1.00	72.80	Dulce de leche, banana sweet, jams, quince jam	0.34	93.43
Breakfast cereal	0.99	73.79	Fermented milk	0.34	93.77
Frankfurters	0.98	74.77	Porridge oats, porridge	0.31	94.08
Hamburger or chicken sandwiches	0.94	75.71	Whole bread	0.27	94.35
Filled rolls	0.94	76.65	Cream cheese (normal, light, cheddar)	0.25	94.60
Margarine, butter	0.80	77.45	Petit suisse yoghurt	0.25	94.85

information on the most important foodstuffs in present-day diet, thus containing indications for inclusion in a questionnaire. Based on the tables we present, it is obviously important to include, for example, treats (cakes, chocolates, savories, biscuits) and sweetened drinks (soft drinks, juices) in instruments for evaluating children's diets,

Table 2 – Description of food items that contributed to up to 95% to the total intake of carbohydrates in the diet of the schoolchildren. Escola de Aplicação da USP, São Paulo, SP, Brazil, 2009.
Tabela 2 – Descrição dos itens alimentares que contribuíram com até 95% do consumo em carboidratos na dieta dos escolares. Escola de Aplicação da USP, São Paulo, 2009.

Food items	Percentage Contribution	accumulated %	Food items	Percentage Contribution	accumulated %
White Rice, Greek rice, rice and vegetables	11.80	11.80	Pizza	0.85	82.11
Brown, black, white beans and lentils	6.85	18.65	Croissants	0.82	82.93
Normal soft drink	5.90	24.56	Other pasta (cannelloni, lasagna, etc)	0.78	83.71
Industrially-produced juices in cartons	5.60	30.16	Artificial powdered juices	0.75	84.46
French roll, French roll toast	5.40	35.56	Filled rolls	0.68	85.14
Unfilled sweet bread and other types (hot dog rolls, hamburger baps, sliced bread, cornbread, pita bread, mini-rolls)	3.82	39.38	Cassava flour, tapioca pancakes, farofa (toasted manioc flour)	0.61	85.75
Pasta (bolognaise, al sugo, aglio e olio, yakisoba noodles), gnocchi	3.73	43.12	Yoghurt	0.58	86.33
Filled sweet biscuit	3.28	46.40	Hot dog	0.58	86.91
Unfilled sponge cakes, chocolate-coated honey biscuits (pão de mel)	3.06	49.46	Dulce de leche, banana sweet, jams, quince jam	0.57	87.49
Powdered chocolate drink and other flavors	2.98	52.44	Hamburger or chicken sandwiches	0.57	88.06
Liquid whole milk, powdered whole milk	2.93	55.38	Salted popcorn	0.56	88.61
Chocolates, candies, bonbons, sweet peanut fudge (paçoca)	2.54	57.91	Other roast savories (pasties, esfiha, pastel, etc)	0.53	89.14
Instant noodles	2.33	60.24	Liquid semi-skimmed, skimmed cow's milk	0.51	89.65
Ready-to-drink chocolate milk	2.14	62.39	Vegetable soup with or without beans, and without meat	0.51	90.16
Filled cakes, tarts, pannetone, doughnuts, éclairs, churros	2.10	64.49	Fermented milk	0.50	90.67
Potato-crisp type savories, straw chips	2.07	66.56	Brazilian cheese bread	0.47	91.14
Milk-based popsicle, ice-cream	2.03	68.59	*Nuggets, hamburgers*	0.46	91.59
Breakfast cereal	1.57	70.15	Oranges, tangerines	0.43	92.03
Natural fruit juice with sugar	1.42	71.57	Candies, chewing-gum, lollipops	0.40	92.43
Sugar, honey	1.41	72.98	Porridge oats, porridge	0.39	92.82
Unfilled biscuit (sweet or savory)	1.40	74.38	*Mousses, milk flans*	0.38	93.20
Natural fruit juice without sugar	1.30	75.68	Other fruit	0.38	93.58
Apples, pears, pineapples	1.17	76.85	Whole bread	0.37	93.95
Banana	1.15	78.01	Fruit smoothies	0.36	94.31
Fried savories: pastel (deep-fried filled pastry envelope) , coxinha (shredded chicken deep fried in batter)	1.13	79.14	Bean or lentil soup with meat	0.35	94.66
French fried potatoes, fried cassava	1.08	80.22	Persimmon, mangoes	0.34	95.00
Boiled, sautéed, and mashed potato, cassava, arracacha (white carrot)	1.04	81.26			

since they are representative within the total consumption of energy and macronutrients.

Based on the information about the frequency of consumption of foodstuffs and how representative they are in the total consumption of energy and macronutrients, certain important aspects deserve to be highlighted, since they show low rates of consumption for fruit and fish, and an overwhelming participation of rice, beans, milk, red meat, treats and sweetened beverages.

The low consumption of fruit that we found is worrying. Assis et al.[14] evaluated foodstuff consumption for seven-to-ten-year-old schoolchildren in the city of Florianópolis and found that only 15% of children attained nutritional recommendations for this group contained in the Food Guidance for the Brazilian Population (*Guia Alimentar para a População Brasileira*). Low consumption was also found by Conceição et al.[15] in the town of São Luís, Maranhão, among 9-to-16-year-old school children.

Although the Family Budget Survey (*Pesquisa de Orçamentos Familiares* – POF)[16] highlights a reduction in the share of rice

Table 3 – Description of food items that contributed to up to 95% to the total intake of **proteins** in the diet of the schoolchildren. Escola de Aplicação da USP, São Paulo, SP, Brazil, 2009.

Tabela 3 – *Descrição dos itens alimentares que contribuíram com até 95% do consumo em **proteínas** na dieta dos escolares. Escola de Aplicação da USP, São Paulo, 2009.*

Food items	Percentage Contribution	accumulated %	Food items	Percentage Contribution	accumulated %
Beef (roast, stewed, minced, cooked)	11.35	11.35	Ready-to-drink chocolate milk	0.97	80.02
Brown, black, white beans and lentils	8.85	20.21	Fried Pork	0.94	80.97
Liquid whole milk, powdered whole milk	7.72	27.93	Fried fish	0.90	81.86
Chicken (roast, stewed, grilled, cooked)	7.09	35.03	Potato-crisp type savories, straw chips	0.85	82.71
Fried red steak	4.50	39.52	Yellow cheeses (mozzarella, Danbo, etc.)	0.84	83.55
White Rice, Greek rice, rice and vegetables	4.01	43.53	Ham	0.76	84.31
Fried chicken	3.55	47.08	Eggs (boiled, scrambled), omelettes, quails' eggs	0.73	85.04
French roll, French roll toast	3.33	50.42	Breaded or battered fried fish	0.72	85.76
Nuggets, hamburgers	2.53	52.94	Meat and vegetable soups, broths	0.67	86.43
Pasta (bolognaise, al sugo, aglio e olio, yakisoba noodles), gnocchi	2.39	55.34	Fried hen's egg	0.67	87.09
Unfilled sweet bread and other types (hot dog rolls, hamburger baps, sliced bread, cornbread, pita bread, mini-rolls)	2.27	57.60	Powdered chocolate drink and other flavors	0.65	87.75
Other pasta (cannelloni, lasagna, etc)	1.81	59.42	Unfilled biscuit (sweet or savory)	0.63	88.37
Pork sausage (fried, boiled)	1.51	60.93	Hot dog	0.60	88.97
Fried savories: pastel (deep-fried filled pastry envelope) , coxinha (shredded chicken deep fried in batter)	1.36	62.30	Yoghurt	0.56	89.52
Pizza	1.36	63.66	Croissants	0.55	90.07
Chocolates, candies, bonbons, sweet peanut fudge (paçoca)	1.30	64.95	Industrially-produced juices in cartons	0.54	90.61
Other roast savories (pasties, esfiha, pastel, etc)	1.27	66.23	French fried potatoes, fried cassava	0.49	91.09
Liquid semi-skimmed, skimmed cow's milk	1.25	67.48	Pork (roast, grilled)	0.45	91.54
Instant noodles	1.22	68.71	Beef (or chicken) stroganoff	0.45	91.99
Bean or lentil soup with meat	1.21	69.92	Brazilian cheese bread	0.41	92.41
Breaded or battered pan-fried beef or chicken	1.21	71.12	Breakfast cereal	0.41	92.82
Filled rolls	1.19	72.31	White cheeses	0.37	93.19
Hamburger or chicken sandwiches	1.18	73.49	*Petit suisse yoghurt*	0.37	93.55
Frankfurters	1.16	74.65	Boiled, sautéed, and mashed potato, cassava, arracacha (white carrot)	0.35	93.90
Unfilled sponge cakes, chocolate-coated honey biscuits (pão de mel)	1.14	75.80	Salted popcorn	0.33	94.23
Filled cakes, tarts, pannetone, doughnuts, éclairs, churros	1.13	76.92	Fruit smoothies	0.31	94.54
Filled sweet biscuit	1.07	77.99	Natural fruit juice without sugar	0.30	94.84
Milk-based popsicle, ice-cream	1.06	79.05			

and beans in the diet of families residing in Greater São Paulo between 1974-1975 and 2002-2003, these foodstuffs in the present study figure strongly as representative in the children's diet. Mahan and Arlin[17] state that in combination these items provide ideal quantities of amino acids for protein synthesis, above all in children nutritionally at risk owing to insufficient consumption of foodstuffs that are sources of high biological value proteins.

Another foodstuff that draws our attention is "French roll, French roll toast". Its importance in contributing to energy, carbohydrates and proteins may be partially justified by the fact that people replace traditional meals (lunch and dinner) by rolls and cooked meats and sausages, and soft drinks[18].

"Whole milk, powdered whole milk" features strongly in the lists given in this study, indicating that this population group still

Table 4 – Description of food items that contributed to up to 95% to the total intake of **lipids** in the diet of the schoolchildren. Escola de Aplicação da USP, São Paulo, SP, Brazil, 2009.

Tabela 4 – Descrição dos itens alimentares que contribuíram com até 95% do consumo em **lipídios** na dieta dos escolares. Escola de Aplicação da USP, São Paulo, 2009.

Food items	Percentage Contribution	accumulated %	Food items	Percentage Contribution	accumulated %
Liquid whole milk, powdered whole milk	8.43	8.43	Filled rolls	1.16	77.77
Beef (roast, stewed, minced, cooked)	7.85	16.27	Salted popcorn	1.10	78.88
Chocolates, candies, bonbons, sweet peanut fudge (paçoca)	4.77	21.05	Pasta (bolognaise, al sugo, aglio e olio, yakisoba noodles), gnocchi	1.07	79.95
Potato-crisp type savories, straw chips	4.21	25.26	Yellow cheeses (mozzarella, Danbo, etc.)	1.01	80.96
Filled sweet biscuit	3.87	29.13	Brown, black, white beans and lentils	1.01	81.97
Fried red steak	3.79	32.93	French roll, French roll toast	0.98	82.95
Unfilled sponge cakes, chocolate-coated honey biscuits (pão de mel)	3.23	36.16	Other roast savories (pasties, esfiha, pastel, etc)	0.95	83.90
Milk-based popsicle, ice-cream	3.03	39.18	Unfilled sweet bread and other types (hot dog rolls, hamburger baps, sliced bread, cornbread, pita bread, mini-rolls)	0.93	84.82
Filled cakes, tarts, pannetone, doughnuts, éclairs, churros	2.96	42.14	Eggs (boiled, scrambled), omelettes, quails' eggs	0.76	85.58
Pork sausage (fried, boiled)	2.67	44.81	Fried fish	0.71	86.29
Margarine, butter	2.64	47.45	*Cream cheese (normal,light,cheddar)*	0.66	86.95
Nuggets, hamburgers	2.62	50.07	Mortadella, salami	0.62	87.56
Instant noodles	2.60	52.67	Meat and vegetable soups, broths	0.61	88.17
Frankfurters	2.54	55.20	Fried chicken	0.59	88.77
White Rice, Greek rice, rice and vegetables	2.28	57.48	Brazilian cheese bread	0.57	89.34
Fried hen's egg	2.08	59.56	Breaded or battered fried fish	0.53	89.87
Fried savories: pastel (deep-fried filled pastry envelope) , coxinha (shredded chicken deep fried in batter)	1.65	61.21	Yoghurt	0.49	90.36
Pizza	1.60	62.81	Liquid semi-skimmed, skimmed cow's milk	0.48	90.84
Breaded or battered pan-fried beef or chicken	1.54	64.34	*Mousses, milk flans*	0.47	91.31
French fried potatoes, fried cassava	1.53	65.87	Vegetable soup with or without beans, and without meat	0.46	91.77
Croissants	1.52	67.39	Boiled, sautéed, and mashed potato, cassava, arracacha (white carrot)	0.44	92.22
Hamburger or chicken sandwiches	1.47	68.86	Fruit smoothies	0.43	92.64
Other pasta (cannelloni, lasagna, etc)	1.44	70.30	Powdered chocolate drink and other flavors	0.43	93.07
Chicken (roast, stewed, grilled, cooked)	1.37	71.67	White cheeses	0.42	93.49
Fried Pork	1.32	72.99	Banana	0.39	93.88
Ready-to-drink chocolate milk	1.27	74.26	Beef (or chicken) stroganoff	0.38	94.27
Unfilled biscuit (sweet or savory)	1.20	75.46	Hazelnut cream	0.37	94.64
Hot dog	1.16	76.62			

maintains eating habits common to younger age brackets as described by Colucci et al.[19], who found that liquid milk was one of the most important foodstuffs in the total energy consumption of two-to-five-year--old children.

Studies carried out on schoolchildren have shown a fall in milk consumption in the last decade, possibly associated with an increase in the consumption of sweetened beverages[14,20,21]. In the present study, the role of sweetened beverages such as "soft drinks", "industrially-produced juice in cartons" and "powdered artificial juices" in the diets of schoolchildren is striking. Blum et al.[21] state that there is strong evidence of increased consumption of soft drinks by American children and adolescents, affecting the quality of diet, and total energy consumption thereof.

Although sugar is commonly consumed in isolation (42.1%) by the group under consideration, its share of the total contribution to energy was not representative,

as mentioned for younger ages by Colucci et al[19]. However, one should consider this foodstuff to be present in other dietary items that stood out as contributing to energy, such as "filled sweet biscuits", "chocolate, candies, bonbons, sweet peanut fudge (*paçoca*)", "Unfilled sponge cakes, chocolate-coated honey biscuits (lebkuchen or *pão de mel*)" and "normal soft drinks". Ebbeling et al.[22] state that sugar is an important component of a number of foodstuffs considered unhealthy. This aspect shows how difficult it is to combat this "hidden enemy", much more so than sugar itself in isolation, since people may not realize they are consuming it, making it difficult to quantify, and unlikely to be reported.

The highly frequent consumption of treats rich in fat and sugar has also been in found in other studies of children[20,23]. McPherson et al.[23] found in a study of children and adolescents in Texas, that among the main foodstuffs accounting for total consumption of saturated fat were chocolate and ice cream, the latter also being mentioned for total cholesterol consumption. Although in the present study the percentage contribution of foodstuffs was not calculated by the type of fat and cholesterol, it is assumed that these foodstuffs are also major contributors to saturated fat and cholesterol.

The consumption of fish as found by the POF[16] and in the present study contributes little to total calories, showing how little this foodstuff is appreciated or how little it is appreciated by families responsible for purchasing and preparing it. In this respect, Drewnowski e Darmon[24] also point out that family purchasing power predicts the purchase of highly nutritive but expensive foodstuffs such as fresh fish.

Some comments may be made about the methodology used to identify representative foodstuffs, and about the samples studied. The method of Block et al.[3] enables certain foodstuffs that might otherwise be ignored—since they are not good sources of a given nutrient – to be selected as representative, since a high frequency of consumption offsets the low content of the nutrient of interest.

One example was the surprising presence of "industrially-produced juice in a carton" on the list of foodstuffs accounting for up to 95% of protein consumption, since in itself it has low protein content, but was consumed by a considerable number of schoolchildren.

The fact that other professional nutritionists reviewed the foodstuffs makes misclassification of items unlikely, a factor that might have an influence in calculating the percentage contribution proposed by Block et al.[3].

The use of the food diaries also has certain limitations. The literature discusses whether dietary recordings depend on the respondent's cognitive maturity, a fact certainly to be taken into consideration with the age bracket studied here[25]. However, if skills are developed for filling out the food diary, and training is given before the instrument is used by the child, or before dietary models and home-made measurements are used, children in this age bracket can fill out the instrument with quality[5].

For food diaries, it should be pointed out that: *i*) although it is a time-consuming method that demands collaboration and motivation of the participant, in the present study the behavior of those schoolchildren who undertook to fill out the diary as a school activity was surprising; *ii*) important methodological steps were taken to improve recording of dietary intake, such as the training of evaluators and participants before filling out the food diary, checking of food diaries one day after they were filled out, monitoring the record-keeping and delivery by using a letter in the school's activity notebook, and telephone contact to inform participants of the activity day.

Conclusion

The participation of rice in the total dietary consumption of energy and carbohydrates; of beans in energy, carbohydrates and proteins; of milk in energy, proteins and lipids; of meat in energy, proteins and lipids; and of bread in energy and carbohydrates, was very clear. The participation of sweet

drinks in the total energy and carbohydrate consumption, and of candies and sweets in the total consumption of lipids, stand out.

The data described in the present article provide input for building or enhancing questionnaires constructed for this age group, and for carrying out educational interventions to encourage or discourage the consumption of foodstuffs which, from a nutritional point of view, are desirable or harmful for proper health, growth and development.

Acknowledgments

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Errata
Correction

Itens alimentares no consumo alimentar de crianças de 7 a 10 anos*

Food items in the food intake of children aged seven to ten years

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Where it reads:
- **Patrícia de Fragas Hinnigi**
- **Denise Pimental Bergamaschi**

Replace by:
- **Patrícia de Fragas Hinnig**
- **Denise Pimentel Bergamaschi**