# Assessment of school children's diet quality by their parents and / or guardians

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## Abstract

This study aimed to characterize the evaluation of parents/guardians of the diet quality of children enrolled in 1st to 5th school year, and its association with socioeconomic and demographic variables, and behaviors related to children's and parents' health. The cross-sectional study included students from the city of Itajaí, Santa Catarina, between June and August 2011. The socioeconomic profile, health-related habits and eating behavior were assessed by a structured questionnaire and a food frequency questionnaire (FFQ). We evaluated 523 children (89.9%) with mean age 8.5 years (±1.52 years). Among guardians, 19.3% (95% CI 15.93, 22.8) evaluated the quality of schoolchildren diet as negative. In children whose diet was perceived as better, we observed a higher frequency of breakfast meals (6.1 versus 5.2 days, $p < 0.001$), and a greater number of daily meals (5.5 versus 5.04, $p = 0.027$ (95% CI: 4.72, 5.37). After adjusted analysis, having regular meals in front of TV, consumption of fruits and vegetables, presence of constipation, use of medication and unfavorable evaluation of children's health by parents/guardians, remained associated with a more negative perception of the diet by parents/guardians. This study characterized parents' perception about their children's diet as better when it included more vegetables (healthy food) and more meals a day, associated with a better evaluation of children's health.

**Key words:** Children. Parents. School Health. Dietary Habits. Feeding Behavior.

## Introduction

A balanced diet contributes to continued good health. The deficit of food intake predisposes to malnutrition and micronutrient deficiency; on the other hand, excessive food intake is associated with chronic non-communicable diseases (NCDs) such as hypertension, diabetes mellitus, dyslipidemia and cardiovascular diseases, the leading causes of death all over the the world.[3] In 2008, the Household Budget Survey (*Pesquisa de Orçamento Familiar*) found that one out of three Brazilian children aged five to nine years old were overweight.[4] Factors related to family environment operate in the genesis and maintenance of excess weight.[5] Children's eating habits are also influenced by the attitudes and beliefs of the adults around them, by their parents, siblings and peers' food preferences, and by exposure to diverse content disseminated through the media.[6]

Recognition of an inadequate diet enables the use of strategies aimed at correcting wrong habits and preventing them from being passed on[7]. Parents' active engagement in changing their children's feeding behavior requires their ability to distinguish the quality of the diet and awareness of consequences to children's health. Nevertheless, data on parents'/guardians' assessments about the quality of children's diets are virtually nonexistent, even in international publications.[7]

Thus, this study aimed to characterize parents and guardians' assessment of the diet quality of schoolchildren enrolled in the 1st through the 5th grade at a school in Santa Catarina, and the association of such assessment with socioeconomic and demographic variables and health-related behavior of the children and the people who look after them.

## Methodology

This is a cross-sectional study with schoolchildren from a municipal school in Itajai, Santa Catarina, southern Brazil, conducted from June to August 2011. The school offered education from the first to the fifth grades to 627 children enrolled in 2011. The neighborhood where the school was located showed clear features of social segregation by the urban center of the city. Itajaí is located in the Itajaí Valley, 91 km away from capital of the state (Florianópols); its economy is based on the activities of the local port, wholesale trade of fuel and fishing, and the manufacture industry.[8]

Sample size calculation was performed using the application Epi Info 6.04 (Center for Disease Control and Prevention, USA). 50% prevalence of the outcome was assumed to increase sample size with a margin of error of three percentage points and a confidence level of 95%, totaling 395 students. To compensate for refusals and allow greater statistical power in the analyses between the outcome and the study exposures, 30% was added, which amounted to a sample of 514 students.

To collect information about students' socioeconomic profile, health-related behaviors and eating habits, a structured food frequency questionnaire (FFQ) was sent to parents or guardians to be answered and returned within ten days.

Socioeconomic and demographic variables of guardians referred to schooling (years of schooling completed ≤ 4, between 5 and 8 or ≥ 9), age (older or younger than 30 years), housing tenure status (owned, rented or courtesy), skin color: white and other (brown, black, yellow and indigenous) and nutritional status through self-reported weight and height. Data collected about children consisted of age (in years) and the habit of having meals with their family and in front of the television set (no, sometimes or always). Health-related habits were referred to the guardians' classification of students' health and eating habits as positive (good/very good/ average) or negative (poor/very poor), and also their physical activity (occurrence, type and frequency). Parents were also asked about their children's use of medication and hospitalization in the past year (yes or no), and presence of constipation (never, sometimes or always).

Time spent in inactive leisure activities (television, computer or video games, in number of hours) and weekly hours of sports practice (sum of weekly hours devoted to regular physical activity) were also evaluated. The variable was categorized as sedentary leisure when they watched television for two hours a day. Those who practiced at least 180 minutes of physical activity per week were classified as physically active, as indicated by the American Academy of Pediatrics and the American College of Sports.

According to Molina et al.,[11] although food consumption questionnaires have been developed and validated in Brazil, no index had been proposed yet to assess children's diet quality. Thus, these researchers developed both a questionnaire - based on a similar study conducted in Spain with children and adolescents - and an evaluation index, the School Feeding Index (SFI).

The FFQ included the weekly intake frequency of beans, noodles, meat/chicken, fish and seafood, French fries/cassava or manioc/fried banana, raw vegetables, baked potato/cassava or cooked manioc, cooked vegetables (except potatoes and manioc/cassava), mayonnaise/butter,

hamburger/hot dog, milkyogurt/cheese, fruit, fresh fruit juice, soda, snacks (conrmeal balls, deep-fried pastry), sweets/candies/dessert, ham/mortadella/salami/sausage and cookies (chip/ stuffed cookies), in addition to breakfast.

The proposed index sets a score according to the frequency of consumption of breakfast and 15 food items tailored to the guidelines of healthy eating from Brazil's Ministry of Health[12]. Therefore, a choice was made to use the questionnaire proposed by Molina et al. in this study. When considering the smaller sample size of the investigated population in this study as well as the easiness of interpretation of binary outcome variables, we decided to use the median (instead of the tertile) as the cutoff point for the study population.

To reduce the food consumption items and to evaluate their association with the outcome, a principal component/factor analysis was performed with orthogonal rotation. The suitability of the samples for the analsies was assessed by test of Kaiser Meyer Olkin[13], whose index ranges from zero to 1.0, with borderline at 0.50. The test of Kaiser Meyer Olkin[13] reached a total value of 0.89 and principal component/factor analysis allowed the grouping of items (food) into three categories: 1) food rich in saturated fats, sugars and sodium: noodles, French fries, hamburgers/ hot dogs, mayonnaise/butter, soda, fried snacks, sweets, sausages, stuffed cookies and soda, 2) fruits, vegetables and fish: fish and shellfish, raw vegetables, baked potato, cooked vegetables, fruits, fresh fruit juice; 3) other protein foods: meat/poultry, dairy, beans. The internal consistency of the component items of each group was analyzed using Cronbach's Alpha coefficient[14], and it reached values of 0.79 (lower limit - LL 0.76), 0.74 (LL 0.71) and 0.69 (LL 0.65) for groups 1, 2 and 3, respectively.

The variables weight and height were respectively obtained by Plenna ® digital scale and Seca ® stadiometer, following the method of Lohman et al.[15] Data were tabulated and analyzed for body mass index (BMI) according to the percentiles for age[16], with the cutoff points proposed by the Ministry of Health for both parents (self-reported data) and children (measured data). For the analyses, the variable overweight was created: not (malnutrition and normal), or yes (overweight and obesity). Waist circumference was measured with a Wiso ® non-elastic anthropometric tape measure at the narrowest circumference between the lowest rib and the iliac crest, without compressing the tissues.

All questionnaires were double-entered onto a Microsoft Excel ® database and checked with the software EpiInfo 6.04.

The variable considered as outcome was the assessment of diet quality of students from parents's point of view: "How do you consider the quality of your child's food?". Response options included the following categories: very good, good, average, poor and very poor. For the analysis, the first two categories were grouped together (positive), and the last three were defined as a negative evaluation in the parents' perception of their children's diet quality.

The prevalence of quality of the negative diet reported by parents was compared across categories of exposure variables by means of prevalence ratios (PR) and their respective 95% confidence intervals (95% CI). Multivariate analysis was conducted using Poisson regression with hierarchical entry of variables into the model. Initially, variables of guardians were included in the model; later, variables for children such as sex and age group were introduced, followed by those related to eating behavior, physical activity and nutritional status. The presence of constipation and use of medication were then included in the model, and ultimately, the health assessment by parents. The multivariate analysis also included the variables that reached the 25% level of confidence in the bivariate analysis; variables with a value of $p \leq 0.10$. were mantained in the final model. Additionally, the weekly food consumption frequency of each of the component items of the FFQ was compared to the diet quality as perceived by parents, using Student's t-test. Analyses were performed using the software Stata10.

The study was approved by the Research Ethics Committee of the Universidade do Vale do Itajaí through report number 99/11a. Data collection was authorized by parent/guardian when signing the Term of Consent, which detailed the steps of the study.

## Results

523 children (89.9%) were evaluated; the variable sex had the highest rate of completion (100%), while nutritional status of the guardian had the lowest (82.2%). The population was characterized homogeneously regarding gender (50.3% female) with a mean age of 8.5 years (minimum 5.8 years and maximum 15.1 years). Among guardians, 83.2% were women, the most recurrent length of schooling for women was greater than or equal to nine years, and for men it was up to four years (Table 1).

Table 1. Description of the variables of the children and their guardians. enrolled in a school in Itajaí. Santa Catarina, Brazil. 2011.

| Variables<br>Categories | n | % | CI 95% |
|---|---|---|---|
| *Parent/Guardian* | | | |
| Sex | | | |
| Male | 83 | 16.8 | 13.7 ; 20.5 |
| Female | 411 | 83.2 | 79.5 ; 86.3 |
| Nutritional status | | | |
| Low weight | 10 | 2.2 | 1.1 ; 4.2 |
| Normal | 213 | 47.2 | 42.6 ; 52.0 |
| Overweight | 165 | 36.6 | 32.2 ; 41.2 |
| Obesity | 63 | 14.0 | 11.0 ; 17.6 |
| Age | | | |
| Up to 30 years | 185 | 38.2 | 33.9 ; 42.7 |
| Over 30 years | 299 | 61.8 | 57.3 ; 66.1 |
| Skin color | | | |
| White | 336 | 67.1 | 62.7; 71.1 |
| Others | 165 | 32.9 | 28.9 ; 37.3 |
| Father's schooling | | | |
| ≥ 9 years | 141 | 29.1 | 25.1; 33.4 |
| 5 - 8 years | 203 | 41.9 | 37.4; 46.4 |
| ≤ 4 years | 141 | 29.1 | 25.1; 33.4 |
| Mother's schooling | | | |
| ≥ 9 anos | 185 | 37.0 | 32.8; 41.4 |
| 5 - 8 anos | 224 | 44.8 | 40.4; 49.3 |
| ≤ 4 anos | 91 | 18.2 | 15.0; 21.9 |

| Variables<br>Categories | n | % | CI 95% |
|---|---|---|---|
| *Child* | | | |
| Sex | | | |
| Male | 260 | 49.7 | 45.4; 54.1 |
| Female | 263 | 50.3 | 45.9; 54.6 |
| Age | | | |
| 6 to 9 years | 419 | 80.1 | 76.7; 83.5 |
| 10 years or more | 104 | 19.9 | 16.5; 23.3 |
| Nutritional status | | | |
| Low weight | 12 | 2.4 | 1.3 ; 4.2 |
| Normal | 341 | 67.7 | 63.4 ; 71.7 |
| Overweight | 93 | 18.5 | 15.2 ; 22.2 |
| Obesity | 58 | 11.5 | 8.9 ; 14.7 |
| Sedentary leisure | | | |
| Up to 2 hours/day | 226 | 72.2 | 66.8 ; 77.0 |
| More than 2 hours / day | 87 | 27.8 | 23.0 ; 33.2 |
| Health assessment by parent/guardian | | | |
| Positive | 465 | 89.4 | 86.4 ; 91.9 |
| Negative | 55 | 10.6 | 8.1 ; 13.6 |
| Nutritional assessment by parent/guardian | | | |
| Positive | 417 | 80.7 | 76.9 ; 83.9 |
| Negative | 100 | 19.3 | 16.1 ; 23.1 |

95% CI = 95%confidence interval

Most parents assessed diet quality positively (80.7% 95% CI 76.9, 83.9), while 19.3% (95% CI 16.1, 23.1) classified it more negatively (Table 1). Children whose diet was assessed by their guardians as having high quality also had a higher frequency of breakfast meals (6.1 versus 5.2 days, p <0.001) and a higher number of meals per day (5.5 versus 5.04, p = 0.027).

The habit of more frequent meals with the family was also associated with the outcome (PR 1.56 95% CI 0.98; 2.47). Children who had their meals always in front of the television showed 79% higher prevalence (PR 1.79 95% CI 1.21; 2.64) than those whose diet was considered of poorer quality by parents. The students whose diet was considered poorer by parents had higher prevalence of use of medication in the previous year, had constipated, as well as less physical activity during leisure time, and their health was assessed more negatively by parents (Table 2).

Table 2. Association of variables of the child and negative evaluation of diet quality by parents/ guardians. Study with students enrolled in a school in Itajaí – Santa Catarina, Brazil. 2011.

| Variables Categories | n | % | Gross PR(IC 95%) | p* | Adjusted PR (IC 95%) | p** |
|---|---|---|---|---|---|---|
| *Parent/ Guardian* | | | | | | |
| Sex of appraiser | | | | 0.588 | | |
| Male | 14 | 16.9 | 1.00 | | | |
| Female | 79 | 19.5 | 1.15 (0.69 ; 1.94) | | | |
| Age | | | | 0.515 | | |
| Up to 30 years | 33 | 18.0 | 1.00 | | | |
| Over 30 years | 61 | 20.5 | 1.13 (0.77 ; 1.66) | | | |
| Father's schooling | | | | | | |
| ≥ 9 years | 25 | 17.9 | 1.00 | 0.648 | | |
| 5 – 8 years | 39 | 19.4 | 0.97 (0.63 ; 1.50) | | | |
| ≤ 4 years | 28 | 20.0 | 0.89 (0.55 ; 1.45) | | | |
| Mother's schooling | | | | 0.286 | | |
| ≥ 9 years | 40 | 21.9 | 1.00 | | | |
| 5 – 8 years | 43 | 19.4 | 1.18 (0.69 ; 2.01) | | | |
| ≤ 4 anos | 15 | 16.5 | 1.33 (0.77 ; 2.27) | | | |

| Variables Categories | n | % | Gross PR(IC 95%) | p* | Adjusted PR (IC 95%) | p** |
|---|---|---|---|---|---|---|
| Nutricional status | | | | 0.690 | | |
| Normal | 40 | 18.1 | 1.00 | | | |
| Overweight | 34 | 20.7 | 1.15 (0.76 ; 1.73) | | | |
| Obesity | 12 | 19.1 | 1.05 (0.59 ; 1.88) | | | |
| *Child* | | | | | | |
| Sex | | | | 0.258 | | |
| Male | 55 | 21.3 | 1.00 | | | |
| Female | 45 | 17.4 | 0.82 (0.57 ; 1.16) | | | |
| Age | | | | 0.632 | | |
| Up to 9 yeras | 82 | 19.8 | 1.00 | | | |
| 10 or more | 18 | 17.7 | 0.89 (0.56 ; 1.42) | | | |
| Meals with the family | | | | 0.061 | | |
| 1 – 3 days/no | 16 | 27.6 | 1.56 (0.98 ; 2.47) | | | |
| 4 – 7 days/no | 80 | 17.7 | 1.00 | | | |
| Meals in front of TV | | | | 0.003 | | 0.040 |
| Never, sometimes | 73 | 17.1 | 1.00 | | 1.00 | |
| Always | 25 | 30.5 | 1.79 (1.21 ; 2.64) | | 1.43 (1.00; 2.05) | |
| Consumption of foods rich in saturated fat. sugars and sodium | | | | | | |
| 1.5 – 2.6 x/no | 34 | 21.1 | 1.04 (0.69 ; 1.57) | | | |
| 2.7– 6.7 x/no | 28 | 16.6 | 0.82 (0.52 ; 1.27) | | | |
| Fruit consumption vegetables and fish | | | | <0.001 | | <0.001 |
| 0.0 – 4.3 x/no | 66 | 35.5 | 1.00 | | 1.00 | |
| 4.4 – 6.0 x/no | 21 | 12.4 | 0.35 (0.22 ; 0.55) | | 0.38 (0.24; 0.59) | |
| 6.1 – 7.0 x/sem | 13 | 8.0 | 0.23 (0.13 ; 0.39) | | 0.24 (0.14; 0.42) | |

| Variables Categories | n | % | Gross PR(IC 95%) | p* | Adjusted PR (IC 95%) | p** |
|---|---|---|---|---|---|---|
| Consumption of other protein food | | | | <0.001 | | |
| 0.0 – 1.5 x/sem | 54 | 28.1 | 1.00 | | | |
| 1.6 – 2.8 x/sem | 29 | 15.6 | 0.55 (0.37 ; 0.83) | | | |
| 2.9 – 6.3 x/sem | 17 | 12.2 | 0.43 (0.26 ; 0.72) | | | |
| Physically inative | | | | 0.038 | | |
| Yes | 33 | 15.1 | 1.00 | | | |
| No | 67 | 22.5 | 1.49 (1.02 ; 2.18) | | | |
| Obesity | | | | 0.140 | | |
| No | 81 | 18.4 | 1.00 | | | |
| Yes | 15 | 26.3 | 1.43 (0.89 ; 2.30) | | | |
| Cosntipation | | | | <0.001 | | <0.001 |
| No | 58 | 14.7 | 1.00 | | 1.00 | |
| Sometimes/always | 40 | 33.6 | 2.28 (1.61 ; 3.23) | | 1.83 (1.30; 2.57) | |
| Use of medication | | | | 0.001 | | 0.008 |
| No | 25 | 11.7 | 1.00 | | 1.00 | |
| Yes | 71 | 24.3 | 2.07 (1.36 ; 3.15) | | 1.73 (1.16; 2.58) | |
| Hospitalization | | | | 0.761 | | |
| No | 93 | 19.6 | 1.00 | | | |
| Yes | 5 | 17.2 | 0.88 (0.39 ; 2.00) | | | |
| Health evaluation | | | | <0.001 | | <0.001 |
| Positive | 71 | 15.4 | 1.00 | | 1.00 | |
| Negative | 28 | 50.9 | 3.30 (2.36 ; 4.63) | | 1.99 (1.38; 2.87) | |

PR = prevalence ratio. x / wk = times a week. 95% CI = 95%confidence interval; * Wald test; ** adjusted for variables with p <0.10.

None of the guardian's variables was statistically associated with the prevalence of classifying a child's diet more negatively. Among children whose mothers had less education, their diet was more frequently classified as having lower quality (Table 2) Among the variables related to eating habits, increased consumption of fruits and vegetables as well as protein foods was positively associated with the classification of the diet as having better quality. However, the consumption of foods rich in saturated fat, sugar and sodium was not associated with negative assessment of diet quality from the perspective of guardians (Table 2).

After adjusted analysis, performing usual meals in front of the television, consumption of fruits and vegetables, presence of constipation, use of medication and unfavorable evaluation of child's health remained associated with more negative assessment of diet by parents. Children who always performed meals in front of the television showed 43% higher prevalence of having their diet classified as having lower quality (Table 2).

Individual analysis of the average consumption of each food, according to the questionnaire, was significant for higher consumption of meat, French fries, raw vegetables, boiled tubers, vegetables, fruits, fresh fruit juice and beans, among students whose diet was classified as having best quality by parents (Table 3).

Table 3. Means and standard deviations for food consumption according to the parents'/ guardians' assessment of diet quality of children enrolled in a school in Itajaí. Santa Catarina, Brazil. 2011.

| | Diet quality assessment | | |
|---|---|---|---|
| *Foods* | Positive (n=417) | Negative (n=100) | p* |
| | Average (SD) | Average (SD) | |
| Noodles | 1.26 (1.66) | 1.20 (1.52) | 0.726 |
| Meat/chiken | 4.56 (2.32) | 3.71 (2.65) | <0.001 |
| Fish and seafood/ French fries / fried cassava or manioc | 0.79 (1.26) | 0.71 (1.47) | 0.542 |
| Fried banana | 1.66 (1.94) | 1.22 (1.51) | 0.034 |
| Raw vegetables | 3.11 (2.61) | 1.73 (2.06) | <0.001 |
| Baked potato / cooked cassava or manioc | 2.24 (2.01) | 1.26 (1.76) | <0.001 |
| Cooked vegetables | 2.18 (2.36) | 1.03 (1.68) | <0.001 |
| Mayonnaise / butter | 2.48 (2.53) | 2.35 (2.51) | 0.633 |
| Hamburguer/ hot dog | 1.29 (1.61) | 1.32 (1.64) | 0.869 |
| Milk / yogurt / cheese | 4.85 (2.57) | 4.42 (2.70) | 0.136 |
| Fruits | 4.14 (2.59) | 2.69 (2.53) | <0.001 |
| Fresh fruit juice | 2.19 (2.49) | 1.15 (1.90) | <0.001 |
| Soda | 2.04 (1.84) | 1.93 (1.53) | 0.626 |
| Snacks (cornmeal ball. deep-fried pastry) | 1.25 (1.72) | 1.36 (1.97) | 0.566 |
| Sweets/candy/dessert | 3.17 (2.46) | 2.82 (2.42) | 0.200 |
| Ham/ salami /mortadella/ sausage | 2.58 (2.36) | 2.21 (1.74) | 0.152 |
| Cookies (chips/stuffed) | 3.43 (3.18) | 3.45 (2.94) | 0.596 |
| Beans | 5.02 (2.45) | 4.15 (2.70) | 0.002 |

*Student's t-test.

## Discussion

Most parents of the assessed children rated the quality of their children's diet as positive (80.7%). Kourlaba et al[7]., researching the perception of mothers about feeding their children aged between two and five years, found that 82.5% of them overestimated the quality of their children's diet and their children had a higher intake of vegetables, meat and milk, compared to those whose mothers correctly assessed the quality of the diet.

Among the children surveyed, a significant association was observed between the assessment of diet quality as rated by parents and the one classified by the diet quality index. Among the items that comprise the index reported, consumption of fruits and vegetables, beans and protein foods as well as frequent breakfast consumption, were associated with parents' more positive assessment of their children's diet.

Other researchers also observed that fruits and vegetables are foods recognized and emphasized by youth and adults when they define the concept of healthy eating[21,22]. Parents play an important role in promoting the consumption of fruits and vegetables, and children's intake of these foods can be linked to their mother's knowledge and behavior towards healthy eating[23]. Parents' introduction of appropriate concepts for a healthy diet can be linked to the dissemination of information on food and nutrition in the media. Many parents find it difficult to evaluate the food items and the proportions suitable for healthy eating[24]. When upbringing their children, some parents believe that teaching them not to waste food can forward the principle of self-control and self-regulation towards food. However, there are parents who do not allow children to choose the amounts they want to eat, so children are induced to adapt the amounts desired by parents, thus following and respecting their rules[25].

Furthermore, the still quite widespread image that associates children's excess weight with health[26] may have influenced this result. It is observed that the concept of "eating well" for parents and/or guardians may favor quantity at the expense of the quality of what is ingested.

The habit of having meals with the family is positively associated with the intake of healthy foods and, inversely, with the prevalence of overweight[27], whereas the habit of eating while watching television is positively associated with less healthy diets and overweight[6]. In the present study, regular food intake in front of the television remained associated with parents' worst perception of diet quality. The food advertising broadcast on television can be interpreted by some mothers as a negative influence on their children's diet.

In the present study, negative health outcomes, such as sedentarianism by physical inactivity, higher propensity to constipation, use of medication in the previous year and more negative health as perceived by parents were also more frequent among children whose diet was considered by parents as poor.

Studies point to the existence of a clustering of risk factors from childhood and their disseminaiton in the family environment[28,29]. The pattern of physical inactivity is often found in children with poor dietary habits[28]. Dietary habits have an impact on health and nutrition, low intake of fruits, leafy greens, vegetables and meat affects the low intake of micronutrients and, therefore, may result in nutritional deficiencies[30] that favor the emergence of some diseases. In the present study, however, is not possible to say whether parents' negative health assessment was due to their children's poor diet, whether it has worsening their health, or whether children with other bad health behaviors also have also worse dietary habits.

The products most often associated by parents to a healthy diet, in the study by Lopez-Dicastillo et al.[25] were fruit, vegetables, fish, dairy products and olive oil. Parents in that study also defined a healthy diet as being a varied one, with a balance between food groups and limited consumption of salt, sugar and fat, as well as restrictive of some products, like sweets, industrial bakery products and fast food.

The frequency of consumption of foods rich in saturated fats, sugars and sodium was not associated with parents' assessment of their children's diet in this study. Energy-dense foods are often used by parents as a reward system for good child behavior[31]. In studies with Mexican low-income mothers, Jimenez-Cruz et al.[32] observed that mothers did not consider sodas or sugary drinks and fatty snacks as harmful to their children's health.

The cross-sectional design of this study limits conclusions regarding the causal direction of the observed associations, but the relationship between outcome and many of the analyzed variables is bidirectional. The scarcity of studies on parents' perception of their children's diet made it difficult to compare results. Moreover, parents' dependence on memory and interpretation to complete the questionnaire may have influenced the results.

To minimize misunderstandings and loss of information, this researcher remained available at the school to answer questions; verbal and written guidance were also provided for filing out the material passed on to teachers and the school.

## Conclusions

Parents'/guardians' prevailing assessment was a good quality diet. The outcome was associated with increased consumption of fruits, vegetables and protein meals, number of meals and breakfast consumption. Diets classified as poor were associated with habits of eating in front of the television, eating few fruits and vegetables, having constipation, having used medication in the previous year and unfavorable health assessment. Among guardians' variables, none remained associated.

Children's eating behavior may be influenced by their parents; thus, the latter should be part of the target audience in nutritional education programs. Further research should be conducted to evaluate parental knowledge about nutritional recommendations as well parents' behavior as trainers of children's dietary habits. Such research can provide further information on nutritional strategies on a national scale.

## References

1. Mondini L, Monteiro CA. Mudanças no padrão de alimentação da população urbana brasileira (1962-1988). Rev Saúde Públ. 1994;28(6):433-39.
2. Conceição SIO, Santos CJN, Silva AAM, Silva JS, Oliveira TC. Consumo alimentar de escolares das redes pública e privada de ensino em São Luís, Maranhão. Rev Nutr. 2010;23(6):993-04.
3. Malta DC, Morais Neto OL, Silva Junior, JB. Apresentação do plano de ações estratégicas para o enfrentamento das doenças crônicas não transmissíveis no Brasil, 2011 a 2022. Epidemiol Serv Saúde. 2011;20(4):425-38.
4. IBGE. POF 2008-2009: desnutrição cai e peso das crianças brasileiras ultrapassa padrão internacional [Internet]. 2010. [citado em 2012 ago 03]. Disponível em: <http://www.ibge.gov.br/home/presidencia/noticias/noticia_visualiza.php?id_noticia=1699&id_pagina=1/>.
5. Ramos AMPP, Barros Filho AA. Prevalência da obesidade em adolescentes de Bragança Paulista e sua relação com a obesidade dos pais. Arq Bras Endocrinol Metab. 2003;47(6):663-68.
6. Yu JH. Mothers' perceptions of the negative impact on TV food ads on children's food choices. Appetite. 2012;59(2):372-6.
7. Kourlaba G, Kondaki K, Grammatikaki E, Roma-Giannikou E, Manios Y. Diet quality of preschool children and maternal perceptions/misperceptions: The GENESIS study. BMC Public Health. 2009;123(11):738-42.
8. Secretaria de Estado de Desenvolvimento Regional. Itajaí [Internet]. 2010 [citado em 2012 out 05]. Disponível em: <http://www.iai.sdr.sc.gov.br/index2.php?option=com_content&do_pdf=1&id=70>.
9. Flores PT, Lima K, Pucci V, Souza JG, Nornberg ML, Benedetti FJ. Influência do tempo em frente à televisão na obesidade e no consume alimentar em crianças e adolescentes. 2012. Disponível em: <http://www.unifra.br/eventos/sepe2012/Trabalhos/6244.pdf>

10. American College of Sports Medicine. Guidelines for exercise testing and prescription. Philadelphia: Lea & Febiger; 1991.

11. Molina MCB, Lopéz PM, Faria CP, Cade NV, Zandonade E. Preditores socioeconômicos da qualidade da alimentação de crianças. Rev Saúde Públ. 2010; 44:785-92.

12. Brasil. Ministério da Saúde. Guia alimentar para a população brasileira: promovendo a alimentação saudável. Brasília: Ministério da Saúde; 2008.

13. Kaiser HF. An index of factorial simplicity. Psychometrika. 1974;39:31-6.

14. Cronbach L J. Coefficient alpha and the internal structure of the tests. Psychometrika. 1951;16(3):297-34.

15. Lohman T, Roche A, Martorell R. Anthropometric Standardization Reference Manual. Champaign: Human Kinetics Books; 1988.

16. World Health Organization. Growth reference data for 5-19 years [Internet]. 2007 [citado em 2012 jul 30]. Disponível em: <http://www.who.int/growthref/en/>.

17. Brasil. Ministério da Saúde Brasil. Vigilância Alimentar e Nutricional. SISVAN: Orientações para a coleta e análise de dados antropométricos em serviços de saúde - Norma Técnica – SISVAN. Brasília: Ministério da Saúde; 2008.

18. Taylor RW, Jones IE, Williams SM, Goulding A. Evaluation of waist circumference, waist-to-hip ratio, and the conicity index as screening tools for high trunk fat mass, as measured by dual-energy X-ray absorptiometry, in children aged 3-19 y. Am J Clin Nutr. 2000;72(2):490-95.

19. Victora CG, Huttly SR, Fuchs SC, Olinto MT. The role of conceptual frameworks in epidemiological analysis: a hierarchical approach. Int J Epidemiol. 1997;26(1):224-7.

20. Kirkwood B. Essentials of medical statistics. Oxford: Blackwell; 1988.

21. Paquette MC. Perceptions of healthy eating: state of knowledge and research gaps. Can J Public Health. 2005;96(Suppl 3):S15-9.

22. Toral N, Conti MA, Slater B. A alimentação saudável na ótica dos adolescentes: percepções e barreiras à sua implementação e características esperadas em materiais educativos. Cad Saúde Pública 2009;25(11):2386-94.

23. Yung TK, Lee A, Ho MM, Keung VM, Lee JC. Maternal influences on fruit and vegetable consumption of schoolchildren: case study in Hong Kong. Matern Child Nutr. 2010;6(2):190-8.

24. Barbosa, RMS, Colares LGT, Soares EA. Percepção de responsáveis e recreadores sobre diferentes representações gráficas de guia alimentar para crianças de dois a três anos. Rev Paul Pediatr. 2008;26(4):350-6.

25. Lopez-Dicastillo O, Grande G, Callery P. Parents' contrasting views on diet versus activity of children: Implications for health promotion and obesity prevention. Patient Educ Couns. 2010;78(1):117-23.

26. Campbell MW, Williams J, Hampton A, Wake M. Maternal concern and perceptions of overweight in Australian preschool- aged children. Med J Aust. 2006; 184(6):274-7.

27. Levy RB, Castro IRR, Cardoso LO, Tavares LF, Sardinha LMV, Gomes FS et al. Consumo e comportamento alimentar entre adolescentes brasileiros: Pesquisa Nacional de Saúde do Escolar (PeNSE), 2009. Ciênc Saúde Colet. 2010;15(Suppl.2):S3085-97.

28. Pearson N., Biddle SJ. Sedentary behavior and dietary intake in children, adolescents, and adults. A systematic review. Am J Prev Med. 2011:41(2):178-88.

29. Gubbels JS, Kremers SPJ, Stafleu A, Dagnelie PC, Vries SI, Vries NK et al. Clustering of Dietary Intake and Sedentary Behavior in 2-Year-Old Children. J Pediatr. 2009;155(2):194-8.

30. Bortolini GA, Gubert MB, Santos LMP. Consumo alimentar entre crianças brasileiras com idade de 6 a 59 meses. Cad Saúde Pública. 2012;28(9):1759-71.

31. Crawford DA, Balla K, Clelanda VJ, Campbella KJ, Timperioa AF, Abbotta G. et al. Home and neighbourhood correlates of BMI among children living in socioeconomically disadvantaged neighbourhoods. BJN. 2012;107(7):1028-36.

32. Jimenez-Cruz A, Bacardi-Gascon M, Castillo-Ruiz O, Mandujano-Trujillo Z, Pichardo-Osuna A. Low income, Mexican mothers' perception of their infants' weight status and beliefs about their foods and physical activity. Child Psychiatry Hum Dev. 2010;41(5):490-00.

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