

Bolsa-Família Program: Diet quality of adult population in Curitiba, Paraná

Programa Bolsa-Família: qualidade da dieta de população adulta do município de Curitiba, PR

Flávia Emília Leite de Lima^I

Regina Mara Fisberg^{II}

Kátia Yumi Uchimura^{III}

Telma Picheth^{III}

^I Departamento de Nutrição da Universidade Federal da Paraíba.

^{II} Departamento de Nutrição, Faculdade de Saúde Pública, Universidade de São Paulo.

^{III} Curso de Nutrição da Faculdade Evangélica do Paraná.

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Corresponding author: Flávia Emília Leite de Lima. Universidade Federal da Paraíba - Centro de Ciências da Saúde - Departamento de Nutrição. Cidade Universitária s/n. João Pessoa - PB. CEP: 58000-00. E-mail: flavia_emilia@yahoo.com.br

Abstract

This study evaluated the quality of diet of the population receiving the Bolsa Familia Program in Curitiba, state of Parana, Brazil. It was a population-based cross-sectional study, conducted from July 2006 to July 2007. 747 beneficiaries were interviewed from 19 years of age, of both genders. A 24 hour-recall was implemented in order to assess the quality of the diet and the Healthy Eating Index (HEI) was used as a parameter for the classification of the group in consumption levels. Descriptive statistics were used to describe the diet quality of the studied population. Wald test and ANOVA test were performed to compare the means of the index according to the socio-economic variables, considering a significance level of 5%. The sample comprised 91.4% of women and 8.6% of men. The average age of the population was 36.4 ± 13.3 years, with 75% having completed elementary school. The mean HEI was 51 points, which features a diet that needs improvement. The population has a monotonous diet with an adequate intake of legumes, but low for fruits, vegetables and dairy products. Comparing the categories of diet quality of individuals, all components, except sodium, showed statistically different median score ($p < 0.01$). Studies that evaluate the quality of the diet are essential to support the implementation of nutrition education programs targeted to the core of the problem in the populations studied.

Keywords: Diet. Food Habits. government programs. Healthy Eating Index. Health. Foods.

Resumo

Este estudo avaliou a qualidade da dieta da população beneficiária do Programa Bolsa-Família, em Curitiba, PR. Estudo transversal, de base populacional, realizado no período de julho de 2006 a julho de 2007. Foram entrevistados 747 beneficiários, a partir dos 19 anos de idade, de ambos os sexos. Para avaliação da qualidade da dieta foi aplicado recordatório de 24 horas, e o Índice de Qualidade da Dieta (IQD) foi utilizado como parâmetro para classificação do grupo em níveis de consumo. Estatística descritiva foi utilizada para descrever a qualidade da dieta da população. Para a comparação de médias do índice segundo as variáveis socioeconômicas foram realizados o teste *t* de Wald e a análise de variância ANOVA, considerando-se um nível de significância de 5%. A amostra foi constituída por 91,4% de mulheres e 8,6 % de homens. A média de idade da população foi de $36,4 \pm 13,3$ anos, com cerca de 75 % possuindo o ensino fundamental incompleto. A média do IQD foi de 51 pontos, o que caracteriza uma dieta que precisa de ajustes. A população possui uma dieta monótona, com um consumo adequado de leguminosas, porém baixo para frutas, verduras e produtos lácteos. Na comparação entre as categorias de qualidade da dieta dos indivíduos, todos os componentes, com exceção do sódio, apresentaram medianas de pontuação estatisticamente diferentes ($p < 0,01$). Estudos que avaliem a qualidade da dieta são fundamentais para subsidiar a implantação de programas de educação alimentar direcionados para o cerne do problema nas populações estudadas.

Palavras-chave: Dieta. Hábitos alimentares. Programas de governo. Índice de qualidade da dieta. Saúde. Alimentos.

Introduction

The social food and nutrition policies developed in Brazil have provided several proposals, aimed at solving food and nutritional problems of the population¹.

The *Bolsa-Família* (Family Allowance) is a cash transfer program that provides financial aid to poor Brazilian families and aims to fight hunger, poverty and inequalities.² Its functioning is based on direct monthly cash transfers to registered families. According to Marques et al³, this program benefits approximately 47 million Brazilians and may total up to 21% of the household income. Attanasio and Mesnard⁴ reported that the resources provided through the social welfare program implemented in Colombia were more frequently used to purchase foods.

Data from the *Instituto Brasileiro de Análises Sociais e Econômicas* (IBASE – Brazilian Institute of Socioeconomic Analyses) show that beneficiaries of the *Programa Bolsa-Família* (PBF – Family Allowance Program) spend 73% of the benefits on foods on average, in the Southern region of the country. The consumption of foods from the group of vegetables in this region was the one that changed the least, when compared to the remaining food groups⁵.

The most recent study on household budget conducted in Brazil confirms the increase in the consumption of fat-rich foods, to the detriment of typical Brazilian staples, such as rice, beans, fruits and vegetables. When stratified by income, beans, roots and tubers are more consumed by the population with an income of up to $\frac{1}{4}$ of one minimum wage, whose diet is mainly based on carbohydrates. Food quality in the Southern region was assessed, revealing the lowest consumption of beans and the highest consumption of saturated fats among the five Brazilian regions⁶.

The PBF follows the perspective of guaranteeing the human right to adequate food and, although not being a nutritional intervention program, it is closely associated with the change in the health and nutrition

status of a certain population. Changes in the consumption of certain foods by this population have been shown in different studies. However, it is important to identify what direction beneficiaries have followed with regard to the quality of what they have consumed.^{5,7,8}

The approach to food quality, in terms of foods and/or food groups, is useful not only to describe dietary habits, but also to show the characteristics of the socio-cultural context in which a certain population is included⁹⁻¹¹.

In view of the nutritional situation in Brazil that has been described here and the lack of studies with a population with such representativeness, the present study aimed to investigate the diet quality of the population registered with the PBF, in the city of Curitiba, PR.

Methods

A cross-sectional study was conducted between 2006 and 2007, in Curitiba, PR, Southern Brazil. This city is divided into nine Health Districts, whose boundaries correspond to the division of the geographical space into regional administrative units.

According to the 2005 estimates from the *Instituto Brasileiro de Geografia e Estatística* (IBGE – Brazilian Institute of Geography and Statistics), there are 1,757,903 inhabitants living in this city. The highest growth rate (5.34% per year) occurred between the 1970s and 1980s. When the period between 1996 and 2000 is considered, the annual growth rate was 1.82%¹².

The city of Curitiba health network was comprised of 105 Health Units (HU) in 2005 and, according to data from the Brazilian Ministry of Social Development and Fight against Hunger of that same year, there were 31,323 families registered with the above mentioned program in Curitiba¹³.

Sample selection

The number of families registered with the PBF, who lived in the coverage area of

the city of Curitiba in 2005, was considered to calculate the sample size. The size of this population per health district and per health unit was made available by the Epidemiology Sector of the Municipal Department of Health.

The calculation of the sample size considered the population of 31,323 families, an acceptable error of 3% and significance level of 5%, resulting in a total number of 1,073 households. The districts of Bairro Novo and Cajuru were excluded from the sample, as a similar study had been conducted in the year prior to the data collection of this study, totaling 747 households. The sampling plan, as far as the selection of individuals to be interviewed is concerned, was designed according to probabilistic process techniques, using a proportional stratified sample in stages. First, the health district (HD) was considered as stratum, aiming to guarantee that representatives of the entire benefited population could be interviewed without restrictions.

To guarantee population representativeness in the study of diet quality, families registered in all health units of Curitiba were selected. To achieve this, after dividing the sample per health district, the proportional distribution of the number of families per health unit was made.

A selection was carried out according to a numbered list of the families to choose the households whose individuals would be interviewed.

Researchers determined that the head of the family or another adult, who was aged more than 18 years, lived in the household and was present at the moment of the visit, would be appropriate to participate in the study. If there was nobody in the selected household at the moment of the visit or if all household members refused to participate, the following household on the list was chosen.

Data collection

Data were collected by teams of interviewers who had been chosen through a

selection process. undergraduate Nutrition students and newly graduated nutritionists participated in the teams. All interviewers were previously trained for this task.

Data collection occurred simultaneously in two health districts. In addition, community health agents from primary health care units helped with this activity to facilitate interviewers' access to households.

Individuals were invited to participate in the study to voluntarily respond to a questionnaire about life habits and food intake.

Information about socio-demographic characteristics of the population was also collected, such as age, marital status, occupation, number of residents in the household, place of origin, and level of education of the interviewee and head of the family.

A 24-hour food recall was applied to obtain data on food intake. All foods consumed on the previous day were recorded, with their respective cooking measures. In certain cases, when it was difficult to measure the amount consumed (for example: a small slice of cake), the photo album developed by Zabotto et al (1996)¹⁴ was used as an additional resource for food questionnaires. In the case of certain foods for whose serving there were no photographs, the serving size reported by the participant was taken into consideration, following the food table developed by Pinheiro et al (2001)¹⁵ as the standard.

Data processing

The chemical composition of participants' 24-hour food recalls was calculated using the Nutri software, version 1.0¹⁶. Before inputting the data on food recalls into the software program, a critical analysis of these food recalls was made to identify measurement errors in the amounts reported. Homemade preparations such as pizza, sandwiches and salads were broken down into their respective ingredients to be input into the program, aiming to better categorize foods according to the food pyramid groups. To achieve this, the standardized

recipes proposed by Pinheiro et al (2000)¹⁶ and Fisberg and Villar¹⁷ were used. In all preparations, the amount of salt added was considered separately, aiming to more accurately observe the amount consumed to assess its sodium, a component of the Healthy Eating Index (HEI). Questionnaires with a daily consumption lower than 500kcal or higher than 4,000kcal were excluded from the sample, according to what has been established by Willett (1998)¹⁸.

Food consumption was assessed with the HEI, an instrument that measures global eating quality, incorporates nutrients and foods as quality components and establishes scores from zero to ten points for each component to classify an individual's diet^{11,19}.

Individuals with a consumption equal to the recommended level achieve a maximum score of ten points. The minimum score of zero is obtained when no foods of a certain food group were consumed. Low consumption refers to those components whose score is lower than five; intermediate, from five to eight points; and high, above eight points.

The maximum value that the HEI can achieve is 100 points. High scores mean that consumption is close to the intervals or amounts recommended; low scores indicate consumption below the recommendation. In the present study, the HEI whose score had been established by Bowman (1998)²⁰ was used, which categorizes individuals' diet into inadequate – up to 51 points; requiring adjustments – 51 to 80 points; and adequate – more than 80 points.

Data were processed in the Statistical Package for the Social Sciences (SPSS) software for Windows to calculate the HEI. This software program calculates and attributes a score to each component of the HEI and to each individual. Descriptive statistics was used to describe food groups. Student's t-test or ANOVA variance analysis was used to verify the existence of statistical differences in HEI means between categories of socio-demographic variables for those with a normal distribution and more than two categories. When statistically significant

associations were found, the Tukey's test was used to identify the categories that differed from one another. The Kruskal-Wallis test was used to observe the difference between medians of consumption in each group, according to the HEI score.

The present research project was approved by the Research Ethics Committee of the *Faculdade Evangélica do Paraná* and authors declared there were no conflicts of interest.

Results

A total of 747 individuals were interviewed. Among these, 91.4% were women and 8.6% were men. The mean age of the population was 36.4 ± 13.3 years, of which approximately 75% had an incomplete

primary school level, 35.1% were married, and 51.7% were day workers. The mean HEI was 50.4 points. According to this index, 52.9% were categorized as having an inadequate diet, 45.7% as diet requiring adjustments, and 1.3% as adequate diet.

Table 1 shows that the HEI indicated a higher mean among females, housewives, those aged more than 40 years, those with a partner, and those having between four and eight years of education. "Level of education" and "occupation" showed a statistically significant difference in means between their categories.

Table 2 shows the mean consumption of energy, fats and cholesterol, according to HEI categories. There was an increase in the consumption of energy with the increase in index scores. The median score of each

Table 1 – Distribution of number and percentage of individuals, health eating index(HEI) means, standard error and "p" value according sociodemographic variables. Curitiba, 2006-2007.

Tabela 1 - Distribuição do número e porcentagem de indivíduos, média do índice de qualidade da dieta (IQD), erro padrão e valor de p segundo variáveis sociodemográficas. Curitiba, 2006-2007.

Variable	N	%	Mean	EP	P
Sex*					0.13
Male	63	8.4	48.02	1.62	
Female	683	91.6	50.62	0.51	
Age group (years)*					0.23
<40	484	65.3	49.97	0.61	
40 or more	257	34.7	51.20	0.80	
Marital status*					0.98
With a partner	450	60.3	51.26	0.62	
Without a partner	296	39.7	49.11	0.78	
Number of residents in the household*					0.38
<4	480	64.5	50.10	0.60	
4 or more	263	35.5	50.99	0.83	
Level of education (years of school)*					0.007
Up to 4 years	249	33.8	49.03	0.84	
4 to 8 years	313	42.5	52.26	0.78	
>8 years	175	23.7	49.33	0.88	
Level of education of the head of the household (years of school)*					0.72
Up to 4 years	76	10.3	51.30	1.62	
4 to 8 years	552	75.0	50.49	0.56	
>8 years	108	14.7	49.72	1.17	
Occupation*					0.04
Housewife	385	51.7	51.38	0.69	
Others	359	48.3	49.34	0.67	

* Subjects with missing information were excluded

Table 2 – Energy, total fat, saturated fat and cholesterol means intake according to Health Eating Index categories of adults of Bolsa Família Program in Curitiba. Curitiba, 2006-2007.

Tabela 2 - Consumo médio de energia, gordura total, gordura saturada e colesterol segundo categorias do Índice de Qualidade da Dieta de adultos beneficiários do Programa Bolsa-Família em Curitiba. Curitiba, 2006-2007.

HEI score	N	Energy (kcal)	Total fat (%)	Saturated fat (%)	Cholesterol (mg)
< 51	395	1,256.75	32.81	16.62	242.00
51 -80	341	1,527.43	27.51	14.43	199.70
> 80	11	2,083.06	25.54	15.93	147.34

Table 3 – Median values of Diet Quality Index component scores in adult population of Bolsa Família Program in Curitiba. Curitiba, 2006-2007.

Tabela 3 – Valores medianos de escores dos componentes do IQD, segundo a classificação da qualidade da dieta em população adulta beneficiária do programa bolsa família no Município de Curitiba. Curitiba, 2006-2007.

Components	HEI<51 ^a		HEI 51 – 80 ^a		HEI > 80 ^a	
	Median	SD	Median	SD	Median	SD
Cereals*	3.71	2.49	6.30	2.73	8.50	1.80
Vegetables*	0.00	1.85	1.19	3.25	10.00	3.69
Fruits*	0.00	2.22	0.00	4.09	10.00	3.97
Milk*	0.00	1.90	1.56	2.45	4.47	3.19
Meats*	2.06	4.69	10.00	3.70	10.00	1.35
Beans*	5.72	4.38	10.00	2.94	10.00	0.22
Cholesterol	10.00	3.26	10.00	2.55	10.00	0.80
Sodium	10.00	3.82	10.00	2.15	10.00	0.81
% fat	10.00	3.11	10.00	2.81	10.00	2.75
Variety*	0.00	1.54	4.00	2.90	10.00	0.50

a – test of medians *p<0.01 / a – teste de medianas *p < 0,01

component of the HEI (Table 3) shows a gradual increase in all food groups, according to the three categories of diet quality classification. There were no statistically significant differences for cholesterol, sodium and percentage of fat. Table 4 shows that the consumption of fruits and dairy products was very low. The same applied to the variety of the diet. The median consumption of meats and beans was high (> 8 points), although two thirds of the population did not consume any servings of fruits per day, 46% did not consume vegetables, and 43.9% did not consume milk and dairy products.

Discussion

The present study observed the diet

quality of the population benefited by the *Bolsa-Família* program in the city of Curitiba. This quality was shown with the HEI, an instrument that categorizes individuals according to levels of consumption of food groups.

The population studied was primarily comprised of women and young adults with up to eight years of education. This characterization is similar to that described in the IBASE's summarized document about *Bolsa-Família* program beneficiaries, which shows that the majority of them are women (94%), aged between 15 and 49 years, of mixed ethnicity (black and white), and with a primary school level of education (IBASE 2008).

The mean HEI was 51.0 points, indicating a diet that requires adjustments, as

Table 4 – Descriptive statistics to Diet Quality Index components and porcentual of maximum and minimum score to individuals. Curitiba, 2006-2007.

Tabela 4 – Estatística Descritiva para os principais componentes de classificação do Índice de Qualidade da Dieta e porcentual de indivíduos que obtiveram pontuação mínima ou máxima. Curitiba, 2006-2007.

Components	Mean	Median	SD	Score 0	Score 10
				%	%
Cereals	5.23	4.98	2.82	2.4	10.2
Vegetables	1.86	4.62	2.83	46.0	4.7
Fruits	1.87	0.00	3.63	75.3	12.2
Milk	1.63	0.26	2.30	49.3	1.2
Meats	6.15	9.51	4.51	30.8	48.6
Beans	6.99	9.53	4.02	20.2	39.7
Cholesterol	7.63	10.00	3.47	8.9	54.9
Sodium	8.96	10.00	2.82	7.1	84.2
% fat	8.55	10.00	2.91	5.8	69.5
Variety	3.18	2.00	3.13	33.7	7.5

observed by Morimoto et al. (2008)²¹, in a study conducted in an adult population of cities situated in the metropolitan area of São Paulo, whose mean HEI was 60.42 points.

A study conducted with a representative sample of the American population, known as the 3rd National Health and Nutrition Examination Survey (NHANES III), showed a mean HEI of 63.4 points²⁰. While conducting the study known as Behavioral Risk Factor Surveillance System (BRFSS), Rafferty et al (2002)²¹ used a modified version of the HEI and obtained a mean of 55.7 points for individuals aged more than 18 years. Champagne et al (2007)²² analyzed the diet quality of a population experiencing food insecurity and found a HEI of 59.14 points for this population, revealing that dietary habits need to be changed, regardless of the population in which diet quality is assessed.

Level of education and occupation were the variables that showed statistically significant differences in the mean HEI.

Table 2 shows that, the better the diet quality, the higher the energy consumption and the lower the percentage of total fat and cholesterol.

Hoddinott and Skoufias (2003)²³ conducted a longitudinal study that assessed the impact of *Progres*a, a cash transfer program

developed in Mexico, and reported that, in terms of food consumption, there was an increase in the number of calories and nutrients of beneficiary families with the increase in the acquisition of vegetables and animal-based foods.

The results of the present study corroborate those found by Bhattacharya et al (2004)²⁴, who showed that poorer individuals tend to have lower HEI scores, although this does not necessarily mean insufficient energy consumption, but rather inadequate food choices. The population studied is characterized as poor or very poor and the great majority of them have a diet categorized as requiring adjustments. However, the mean energy consumption does not indicate an insufficient number of calories for the intermediate and adequate diet groups determined with the HEI.

While assessing the dietary changes that occurred with the introduction of the PBF in a sample of 5,000 households in Brazil, Lignani et al (2011)²⁵ showed an increase in the amount and variety of foods consumed and concluded that the program increased the families' access to food and purchasing power. Nevertheless, families most frequently chose a high-energy and low-nutrient diet.

Nigenda and Gonzáles-Robledo (2005)²⁶

analyzed the impact of Latin-American cash transfer programs and showed that the Social Protection Network of Nicaragua revealed an improvement in the quality of foods consumed by beneficiary families. Among those who were very poor, changes were more important in terms of the foods consumed.

Consumption of certain food groups was low, regardless of the diet quality classification (Table 2). Nearly 2/3 of the population did not consume fruits and 46% did not consume vegetables, corroborating Jaime and Monteiro's (2005)²⁷ analyses of a study conducted in Brazil, which identified a daily consumption of fruits lower than 30% in the Brazilian population. The median score of consumption of vegetables was low (4.62 points), similar to what was found by Morimoto et al (2008)¹⁰.

Lock et al (2005)²⁸ estimated the morbidity-mortality attributed to a low consumption of fruits and vegetables and showed that, among adults, this consumption is lower in the majority of Latin American countries than in Africa and that 2.6 million deaths could have been prevented worldwide, of which 31% were due to cardiovascular diseases, if the population had followed the dietary recommendations.

According to data on income in minimum wages from the last Household Budget Survey (HBS), the population eligible for cash transfers spends 0.5% of their budget on fruits and vegetables⁶. Low consumption of dairy products should be taken into consideration, as nearly 50% of the population achieved a score of zero for consumption of milk and derivatives, showing that there was no daily consumption of this group.

Studies conducted in the United States and Brazil showed an intermediate consumption (between five and seven points) of milk and derivatives in the populations studied^{11,21,29}. Morimoto et al (2008)¹⁰ assessed the diet of the population living in the metropolitan area of São Paulo and observed a low score, similarly to the present

study, although only 25% of the population studied achieved a score of zero for these foods. Panigassi et al (2008)⁷ reported that families experiencing social insecurity consumed less milk and derivatives, vegetables and fruits than those who were not in this situation.

Levy-Costa et al (2005)³⁰, whose results disagree with those found in the present study, observed that the Southern region of Brazil stands out because it shows a greater relative contribution of these foods to household food availability. In addition, this study revealed that the consumption of milk and derivatives has been increasing with time, although individuals earning up to half a minimum wage per month showed a relative contribution of milk and derivatives in the last HBS that represented 3.3% of the total energy consumption.

The present study had certain limitations. One of them was the use of the 24-hour food recall to assess diet quality. Basiotis et al (2002)³¹ reported that the scores calculated according to only one day of food recall are lower than those calculated according to three days, although this difference is not significant. Other population studies on diet quality assessment also used only one food recall^(9,10,26,27).

The present study had a cross-sectional design, which means that consumption prior to cash transfers was not observed. Instead, current consumption was characterized to assess the dietary consumption of beneficiary families.

In conclusion, this study revealed important information about the need to work with this population using nutrition education programs. The *Bolsa-Família* program has achieved its purposes. Nevertheless, attention should be paid to this population, aiming to promote better food choices that could be health determinants. The results shown here can serve as resources for the construction and implementation of regional public policies related to nutrition.

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