

**Food and nutrition surveillance: study with preschool and school age children participating in the Bolsa Família Program****Vigilância alimentar e nutricional: estudo com pré-escolares e escolares participantes do Programa Bolsa Família****Vigilancia alimentaria y nutricional: estudio con preescolares y escolares participantes en el Programa Bolsa Família**

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**Objective:** to describe the situation of food and nutritional [in]security of preschool and school children participating in the Bolsa Família Program. **Methods:** cross-sectional study with families of preschool and school age children. Questionnaires of socioeconomic characterization, food consumption and the Brazilian Food Insecurity Scale were applied. Anthropometric and food assessment was performed following the protocols of the Food and Nutrition Surveillance System. For the statistical analysis, a chi-square test was performed with a significance level of 5%. **Results:** 144 families and 163 children were considered. The prevalence of food insecurity was 74.3%, and 29.4% of the children were overweight. There was a high consumption of ultra-processed foods, especially sugary drinks (80.4%). A statistically significant association was identified between the use of electronic devices and the consumption of sweets. **Conclusion:** to expand the positive effects of the Bolsa Família Program, intersectoral action is important with a view to strengthening food security programs and regulatory actions in food.

**Descriptors:** Child nutrition; Eating; Food security; Public health administration.

**Objetivo:** descrever a situação de [in]segurança alimentar e nutricional dos pré-escolares e escolares participantes do Programa Bolsa Família. **Método:** estudo transversal com famílias de crianças em idade pré-escolar e escolar. Aplicou-se os questionários de caracterização socioeconômica, de consumo alimentar e a Escala Brasileira de Insegurança Alimentar. A avaliação antropométrica e alimentar foi realizada seguindo os protocolos do Sistema de Vigilância Alimentar e Nutricional. Para a análise estatística foi realizado teste qui-quadrado com nível de significância de 5%. **Resultados:** foram consideradas 144 famílias e 163 crianças. A prevalência de insegurança alimentar foi de 74,3%, e 29,4% das crianças estavam com excesso de peso. Observou-se alto consumo de alimentos ultraprocessados, principalmente de bebidas açucaradas (80,4%). Foi identificada associação estatisticamente significativa entre o uso de dispositivos eletrônicos e o consumo de guloseimas. **Conclusão:** para ampliar os efeitos positivos do Programa Bolsa Família é importante a atuação intersectorial com vistas ao fortalecimento dos programas de segurança alimentar e de ações regulatórias em alimentação.

**Descritores:** Nutrição da criança; Consumo alimentar; Segurança alimentar; Administração em saúde pública.

**Objetivo:** describir la situación de [in]seguridad alimentaria y nutricional de los preescolares y escolares participantes en el Programa Bolsa Família. **Método:** estudio transversal con familias de niños preescolares y escolares. Se aplicaron los cuestionarios de caracterización socioeconómica, de consumo de alimentos y la Escala Brasileña de Inseguridad Alimentaria. La evaluación antropométrica y alimentaria se realizó siguiendo los protocolos del Sistema de Vigilancia Alimentaria y Nutricional. Para el análisis estadístico, se realizó la prueba de chi-cuadrado con un nivel de significación del 5%. **Resultados:** Se consideraron 144 familias y 163 niños. La prevalencia de la inseguridad alimentaria fue del 74,3% y el 29,4% de los niños tenían sobrepeso. Se observó un elevado consumo de alimentos ultraprocessados, especialmente de bebidas azucaradas (80,4%). Se identificó una asociación estadísticamente significativa entre el uso de dispositivos electrónicos y el consumo de golosinas. **Conclusión:** para ampliar los efectos positivos del Programa Bolsa Família es importante la actuación intersectorial con vistas al fortalecimiento de los programas de seguridad alimentaria y de las acciones reguladoras en la alimentación.

**Descriptores:** Nutrición del niño; Ingestión de Alimentos; Seguridad alimentaria; Administración en salud pública.

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## INTRODUCTION

**T**he Human Right to Adequate Food (HRAF) is fundamental to human beings, and must be guaranteed through public policies on Food and Nutrition Security (FNS). The Bolsa Família Program (BFP), established by the Brazilian government in 2003, is part of this context, as it aims to contribute to the reduction of situations of hunger and food insecurity (FI). In addition to providing conditional monetary transfers, the program seeks to guarantee basic social rights in the areas of education, health and social assistance<sup>1</sup>.

The dietary pattern is influenced by several factors such as income, food cost, individual preferences, food environment and directly depends on the social class and culture in which the individual lives<sup>2</sup>. In Brazil and in the world, the food pattern is in transition, where culinary preparations, *in natura* and minimally processed foods are being increasingly replaced by ultra-processed foods (UPF), which are nutritionally poor and high in calories<sup>3</sup> and yet are more accessible for all age groups, including children<sup>4</sup>.

Along with dietary changes, there is a nutritional transition characterized by an increase in the prevalence of overweight and obesity<sup>5</sup>. These changes have been observed at all stages of life, both in families with greater purchasing power and in those with greater socioeconomic vulnerability<sup>6</sup>. Thus, it is necessary to monitor the food consumption of BFP participants, evaluating consumption trends according to the degree of food processing, for the adoption of adequate and healthy food<sup>7</sup>.

In Brazil, the analysis of data from the National Food and Nutrition Surveillance System (SISVAN), between 2008 and 2015, showed that there was an increase in the number of overweight children in the country, aged between 5 and 9 years old<sup>8</sup>. This reality is worrying because, with excess weight, there is the possibility of comorbidities, such as cardiovascular diseases, cancer and diabetes<sup>4</sup>.

Currently, there are also changes in lifestyle that contribute to the food and nutrition transition, especially the high screen time of the majority of the population. Time spent in front of the television can be related to excessive weight gain, by promoting a sedentary lifestyle, encouraging excessive and inattentive food consumption while watching television. In addition, exposure to food advertising that induces the consumption of products advertised mainly for children, which are often of low nutritional value, also contributes to this scenario<sup>9</sup>. Thus, this study aims to describe the situation of food and nutritional [in]security of preschool and school children participating in the Bolsa Família Program.

## METHODS

Cross-sectional study, carried out in Lavras, a medium-sized municipality in the south of the state of Minas Gerais, included in a larger project entitled: *“Bolsa Família Program: assessment of the Food and Nutritional Security of participating families and monitoring of health conditionalities from the perspective of professionals”*.

For sample calculation, the prevalence of 80.3% of food insecurity was considered for the families that are members of the BFP in the Southeast region of Brazil, according to the results of the survey by the Brazilian Institute of Social and Economic Analysis (IBASE) of 2008<sup>10</sup>. A maximum error of 5% was estimated. For sample selection, simple random sampling was used using the R software, including families registered in the *Cadastro Único* and belonging to the program. Sample losses occurred due to changes in the families' addresses, addresses not located, refusal to participate in the study, and suspension of the benefit (data that differs from the official register of the Municipal Department of Social Development).

Data collection took place from March to September 2018, through home visits at pre-scheduled times with the help of Community Health Agents from the seventeen Family Health Strategies of Lavras, including, in addition to questionnaires, the verification of anthropometric measurements.

For data collection were used; i) semi-structured socioeconomic questionnaire - evaluation of social and economic characteristics and the destination of the program's resources, ii) the Brazilian Food Insecurity Scale (EBIA) - to analyze the life experience with food insecurity (FI) and hunger by the family nucleus, iii) questionnaire adapted from the SISVAN food consumption marker - to assess the eating habits of preschoolers and schoolchildren.

The Brazilian Food Insecurity Scale (EBIA) is a psychometric scale, composed of 14 questions, which allows obtaining the sum of points to classify the FI in: food security (0 points), mild FI (perception of concern and anguish due to uncertainty having food regularly - 1-5 points), moderate FI (use of food saving strategies - 6-10 points) or severe FI (concrete experience of not having enough to eat for an entire day - 11-15 points)<sup>11</sup>.

The SISVAN food consumption marker assesses food consumption the day before the interview, with the possibility of answering “yes”, “no” or “do not know”. Composed of negative (UPF) and positive (in natura and minimally processed foods) food markers.

Also, they were asked about the habit of having meals in front of electronic devices, through the question *“Do you have the habit of having meals watching TV, using the computer and/or mobile phone?”*, with the possibility of answering: “yes”, “no” or “do not know”<sup>12</sup>. The

possible use of the BFP resource for the purchase of foods preferred by children was questioned based on the following questions: *“What happened to the family's food from the BFP: the purchase of foods preferred by children - Increased (1) Decreased (2) There was no change. What are the foods?”*.

Anthropometric assessment of children was performed using the Protocols of the Food and Nutrition Surveillance System (SISVAN), and guidelines for the collection and analysis of anthropometric data<sup>13</sup>. Anthropometric measurements (weight and height) were measured in the home environment or in the health facilities of the territories. Anthropometric indicators were generated from the Growth Curves of the World Health Organization (WHO) through the macro WHO Anthro (version 3.2.2) and WHO Anthro PLUS, version 1.0.4. The indicators calculated for children under five years of age were: weight-for-age (W/A), height-for-age (H/A), weight-for-height (W/H), body mass index- for age (BMI/A). For children aged five to nine years, the same indices were used, with the exception of W/H, based on the WHO proposals and adopted by SISVAN<sup>13</sup>.

Data entry and analysis were performed using the Epi-Info 3.5.4 program (Centers for Disease Control and Prevention, Atlanta, USA). The data underwent double typing and subsequent validation so that there were no discrepancies.

Descriptive statistics and percentage of sociodemographic issues and FI situation were used. The chi-square test to verify the existence of an association between food consumption and electronic devices and the simple agreement coefficient (yes-yes or no-no) for the responses about food consumption of negative markers and food consumption in front of electronic devices. A significance level of 5% was considered for all analyzes performed by the R Studio software (version 3.4.4).

The Research Ethics Committee of the Universidade Federal de Lavras (CAAE: 79529017.3.000035148), in accordance with Resolution 466/2012 of the National Health Council, approved the study. The voluntary participation in the research took place by signing the Free and Informed Consent Term (FICT) by the mother or guardian and the consent form for the children.

## RESULTS

The city had 3448 families in BFP and, in the sample calculation, 248 families were considered, which, due to the losses, reached 233 families. In turn, when considering the age group of interest in the study, 144 families were considered, with 163 children, in which 106 were preschoolers (2 to 6 years old) and 57 schoolchildren (7 to 9 years old), with a predominance of female (50.3%).

With regard to the socioeconomic profile of the families evaluated, 96.5% (95%CI: 93.5 - 97.5) of those responsible for receiving the BFP resource were female, 53.5% (95%CI: 45.3 - 53.4) were mixed raced, and 63.2% (95% CI: 55.3 - 63.4) had less than 8 years of schooling. More than half had a monthly income of less than one minimum wage, and 62.5% were in a situation of food insecurity, with 13.9% (95%CI: 8.2 - 12.7) being in a situation of severe food insecurity; and 69.4% (95%CI: 61.8 - 69.8) reported using the BFP resource to purchase food (Table 1).

**Table 1.** Socioeconomic characterization of the families of preschoolers and schoolchildren assisted by the Bolsa Família Program. Lavras (MG), 2018.

Variables	No. (144)	%	CI 95%	
			IF	SL
<b>Gender of the person responsible for the resource</b>				
Female	139	96.5	93.50	99.50
Male	5	3.5	0.50	6.50
<b>Race of the person responsible for the resource</b>				
Mixed	76	53.5	45.35	61.65
White	37	26.1	18.93	33.27
Black	27	19.0	12.59	25.41
Asian	2	1.4	0.0	3.32
<b>Educational level of the person responsible for the resource</b>				
> 8 years of study	91	63.2	55.32	71.08
≤ 8 years of study	53	36.8	28.92	44.68
<b>Total monthly family income</b>				
> 1 minimum wage*	77	53.5	45.35	61.65
≤ 1 minimum wage*	67	47.5	39.34	55.66
<b>Number of residents in the household</b>				
≤ 5 residents	115	79.9	73.35	86.45
> 5 residents	29	20.1	13.55	26.65
<b>Housing type</b>				
Owned	79	54.9	46.77	63.03
Leased	40	27.8	20.48	35.12
Granted	23	16.0	10.01	21.99
Others	2	1.4	0.0	3.32
<b>BFP resource destination</b>				
Food	100	69.4	61.87	76.93
Others	44	30.6	23.03	38.08
<b>Household food security level</b>				
Food security	37	37.5	29.59	45.41
Mild food insecurity	54	25.7	18.56	32.84
Moderate food insecurity	33	22.9	16.04	29.76
Severe food insecurity	20	13.9	8.25	19.55

\*Minimum wage of R\$954,00, according to DIEESE (Departamento Intersindical de Estatística e Estudos Socioeconômicos), 2018<sup>14</sup>.

IL - Inferior Limit / SL - Superior Limit

Most of the children had an adequate height for their age 98.2% (95%CI: 96.2 – 99.1). In terms of BMI/Age, excess weight was observed among 29.4% of the children, with 11% (95%CI: 6.2 – 9.9) being classified as obese (Table 2).

**Table 2** - Nutritional status of children aged 2 to 9 accompanied by the Bolsa Família Program. Lavras (MG), 2018.

Anthropometric index	Nutritional state	No.	%	CI95%	
				IL	SL
<b>Height/Age</b>	Age-appropriate height	160	98.2	96.2	100.0
	Low height for age	3	1.8	-0.2	3.8
	<b>Total</b>	<b>163</b>	<b>100</b>		
<b>Weight/Age</b>	Age-appropriate weight	141	86.5	81.3	91.7
	High weight for age	19	11.7	6.8	16.6
	Low weight for age	3	1.8	0.0	3.8
	<b>Total</b>	<b>163</b>	<b>100</b>		
<b>BMI/Age</b>	Eutrophy	108	66.3	59.0	73.6
	Overweight	30	18.4	12.5	24.3
	Obesity	18	11.0	6.2	15.8
	Thinness	7	4.3	1.2	7.4
	<b>Total</b>	<b>163</b>	<b>100</b>		
<b>Weight/Height</b>	Eutrophy	49	75.4	68.8	82.0
	Overweight	11	16.9	11.1	22.7
	Thinness	4	6.2	2.5	9.9
	Obesity	1	1.5	0.0	3.4
	<b>Total</b>	<b>65</b>	<b>100</b>		

Li - Limite Inferior / Ls - Limite Superior

Regarding food consumption, 70% of the children studied reported having consumed the positive markers (rice, beans, meats and milk) at the time questioned. Fruit consumption was reported by only 47.9% (95% CI: 40.2 – 47.8), and greens by 23.3% (95% CI: 16.8 – 22.6). On the other hand, consumption of UPF such as sugary drinks, sweets and sandwich biscuits was reported by 80.4% (95% CI: 74.3 – 81), 54.6% (95% CI: 47 – 54.6) and 35.6% (95%CI: 28.8 – 35.2), respectively. The habit of eating in front of electronic devices was observed in 80.4% (95% CI: 74.3 – 81) (Table 3).

The increase in the purchase of foods considered preferred by children after receiving the BFP resource was reported by 70.1% of the families evaluated, and 64.5% mentioned the purchase of at least one UPF. A positive association was observed between the consumption of sweets and the use of electronic devices ( $p=0.048$ ) (Table 4).

**Table 3.** Food consumption and use of electronic devices at mealtimes by preschoolers and schoolchildren. Lavras (MG), 2018.

Variables	No	%	IC 95%	
			IL	SL
<b>Positive markers</b>				
Rice	159	97.5	95.1	98.4
Beans	143	87.7	82.7	88.5
Meats	122	74.8	68.1	75.3
Milk	116	71.2	64.2	71.6
Vegetables	82	50.3	42.6	50.2
Fruits	78	47.9	40.2	47.8
Eggs	43	26.4	19.6	25.7
Greens	38	23.3	16.8	22.6
<b>Negative markers</b>				
Sugary drinks	131	80.4	74.3	81.0
Treats	89	54.6	47.0	54.6
Sandwich biscuits	58	35.6	28.2	35.2
Sweets	52	31.9	24.7	31.4
Processed meats	51	31.3	24.2	30.8
Packet snacks	30	18.4	12.5	17.5
Instant noodles	22	13.5	8.3	12.5
Electronic devices	131	80.4	74.3	81.0

IL - Inferior Limit / LS - Superior Limit

**Table 4.** Association between food consumption and use of electronic devices at mealtimes in preschoolers and schoolchildren. Lavras (MG), 2018.

	Negative markers - Electronic devices				Total	%	P-Value
	YES	%	NO	%			
<b>Processed meats</b>							
No	86	76.7	26	23.2	112	68.7	0.135
Yes	45	88.2	6	11.7	51	31.2	
<b>Sugary drinks</b>							
Yes	106	80.9	25	19.0	131	80.3	0.913
No	25	78.1	7	21.8	32	19.6	
<b>Instant noodles</b>							
No	113	80.1	28	19.8	141	86.5	0.916
Yes	18	81.8	4	18.1	22	13.5	
<b>Packet snacks</b>							
No	109	81.9	24	18.0	133	81.6	0.412
Yes	22	73.3	8	26.6	30	18.4	
<b>Sandwich biscuits</b>							
No	84	80.0	21	20.0	105	64.4	0.962
Yes	47	81.0	11	18.9	58	35.5	
<b>Treats</b>							
Yes	77	86.5	12	13.4	89	54.6	<b>0.048</b>
No	54	72.9	20	27.0	74	45.4	
<b>Sweets</b>							
No	91	81.9	20	18.0	111	68.1	0.584
Yes	40	76.9	12	23.0	52	31.9	
<b>Negatives*</b>							
Yes	124	81.5	28	18.4	152	93.2	0.292
No	7	63.6	4	36.3	11	6.7	

\*The "negative" variable refers to the consumption of at least one of the listed foods.

## DISCUSSION

The socioeconomic conditions of families, such as income, basic sanitation, level of education and health care, can influence the situation of Food Security and nutritional status of the family nucleus<sup>15</sup>. According to the Cadastro Único report (2013), of the 13.9 million registered families belonging to the BFP, most had low schooling (< 8 years)<sup>16</sup>.

In this study, the majority reported schooling for more than 8 years. This fact can be positive, since a higher level of schooling can provide a greater chance of employment and income, which increases the probability of access to food and a diversified and healthy diet<sup>17</sup>.

Some socioeconomic conditions were favorable, however, the majority had the HRAF violated, for which 74.3% of the families were in FI. Higher prevalence when compared to the National Family Budget Survey (POF) (2017-2018), where 36.7% of Brazilian households were in a situation of food insecurity<sup>18</sup>. This can be explained by the fact that the POF assesses the FI in families of different socioeconomic classes, while in the BFP public, sample homogeneity and a higher level of FI are expected, since there is a tendency for this population to live with biopsychosocial vulnerability. As a result of IBASE (2008), 80.3% of the families participating in the BFP were in an FI<sup>10</sup> situation.

In recent decades, there have been improvements in the anthropometric parameters of children's health in Brazil, with malnutrition (deficit in weight for age) having significantly reduced between 1989 and 2006, from 7.1% to 1.7%. While the height deficit decreased from 19.6% to 6.7% in the same period<sup>19</sup>.

In the present study, most of the nutritional status was adequate. It may be related to the participation of the BFP, since the literary data show that the malnutrition index decreased as the coverage of the BFP increased<sup>17</sup>.

The prevalence of chronic malnutrition is still persistent in vulnerable groups, mainly affecting children and women living in pockets of poverty such as those belonging to the BFP, which indicates the importance of health care for this public<sup>6</sup>. Here, a small portion of the children were in a state of malnutrition, which should not be neglected, since the compromised nutritional status is a violation of the HRAF<sup>20</sup>.

There was a considerable prevalence of overweight among children, which corroborates another study that shows that overweight and obesity are more prevalent in children from municipalities with a lower Human Development Index (HDI) and is on the rise among children benefiting from the BFP<sup>21</sup>.

The excess weight found may be influenced by food consumption. A study carried out with 319 children identified that the increase in the prevalence of overweight children in low-



income classes is possibly related to the greater consumption of processed foods, rich in trans fat and sugars<sup>1</sup>.

There is a positive relationship between belonging to the conditional cash transfer program and improving the food and nutrition of beneficiary families in Brazil<sup>22</sup>. This may be linked to the opportunity to purchase food through the income provided by the program, as seen by IBASE<sup>10</sup>, in which the majority of BFP participants (87%) used the resource received with food. This converges with the result of this study, in which 69.4% of the families declared that they invest the resources received mainly with food.

Access to food cannot be considered as a guarantee of FNS, since they can remain in FI due to the quality of the food consumed, as they are usually ultra-processed products, as reported in this research by 70.1% who declared that the BFP allows for greater purchases of foods preferred by children, and UPF were reported among the list of preferred foods by 64.5% of families.

It was possible to observe two scenarios regarding food intake: consumption of in natura and minimally processed foods and high consumption of UPF. Despite the increasing presence of these foods, the usual diet of Brazilians still has a predominance of the consumption of in natura or minimally processed foods<sup>23</sup>.

A study<sup>24</sup> that sought to assess the impact of the BFP on food consumption in the Northeast and Southeast regions of Brazil identified that beneficiaries had lower UPF consumption, with more than 60% of total daily calories coming from in natura or minimally processed foods. However, attention is drawn to the percentage of energy coming from UPF, especially among BPF participants in the Southeast region, which reached approximately 17%. This is in line with national data where 18.4% of the population's energy consumption comes from ultra-processed products.

Regardless of income, the increase in UPF consumption among Brazilians is an important point. The high energy density and excess sugar and saturated fat contribute to the risk of developing chronic conditions. The responsibility for consumption should not be transferred only to the subjects, there are confrontations related to these food choices such as marketing and advertising strategies that induce the consumption of products with exaggerated, hyperpalatable and caloric portions<sup>25</sup>.

The advertisements are quite directed at children, which induce children to ask for such foods, thus influencing the dietary pattern<sup>26</sup>. In the present study, it was found that eating meals in front of electronic devices was a frequent situation, which may have influenced the food consumption and nutritional status of children. The longer screen time predisposes exposure

to advertisements that induce the consumption of UPF, which are high in calories, in addition to contributing to a sedentary lifestyle, which can promote weight gain and increase the prevalence of obesity in childhood due to the increased risk for excess calories<sup>27</sup>.

In a qualitative research carried out with children between 7 and 12 years old participating in the Bolsa Família Program, the importance of establishing limits regarding the use of media in the home environment is highlighted, in addition to the need to adopt actions carried out in the school environment, and to engage of child and adolescent protection entities on the subject of children's advertising and promotion of adequate and healthy food<sup>28</sup>.

Thus, it is important to monitor food and nutrition, especially with preschoolers and schoolchildren, especially from the most vulnerable classes, as the first learning and eating practices can generate repercussions throughout life, as it is at this stage that eating habits are established<sup>29</sup>.

## CONCLUSION

The PBF alone, although it is a central program in the Brazilian agenda to fight hunger, is not enough to guarantee the food security of the families participating here.

Therefore, regulatory actions in food are necessary, such as: food advertising for children, increase in UPF taxation and reduction of critical nutrients (sugar, saturated fat, sodium) to promote improvement in nutritional conditions, prevention and control of NCDs throughout life. It is also imperative to implement a food supply policy focused on valuing family farming, which considers the food system.

In addition, food and nutrition education (FNE) actions are urgent so that, along with other measures, subjects are autonomous and aware of their food choices, enabling the adoption of healthy eating patterns.

Among the limitations of the study, we point out the cross-sectional design, the small size and the heterogeneity of the sample, which hampered the advancement of the initially idealized statistical analyses. In addition, the food consumption assessment instrument was subject to information bias.

Despite the limitations, there are potentials. Based on these and other results originating from the original project, municipal management can qualify the planning of actions related to food and nutritional security of BFP beneficiary families, such as the creation of the Municipal Food Bank, the reactivation of the Municipal Food Security Council and Nutritional. In addition, it can provide subsidies for other managers to adopt measures to qualify policies for the protection and promotion of food and nutrition security.

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#### CONTRIBUTIONS

**Rayane Oliveira Santos** contributed to data collection and analysis and writing. **Milena Serenini** acted in writing and revision. **Ana Pereira Alvarenga** and **Renan Serenini Bernardes** contributed to data collection and analysis. **Maysa Helena de Aguiar Toloni** participated in the design and revision.

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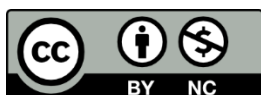
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