

Nutritional indicators of food and nutrition security of families: 2008/2009 Household Budget Survey

Indicadores nutricionais da segurança alimentar e nutricional de famílias: Pesquisa de Orçamentos Familiares 2008/2009

Dayane de Castro Morais¹ , Cristiana Tristão Rodrigues² , Andreia Queiroz
Ribeiro¹ , Sylvia do Carmo Castro Franceschini¹ , Silvia Eloiza Priore¹ 

¹ Universidade Federal de Viçosa, Centro de Ciências Biológicas e da Saúde, Departamento de Nutrição e Saúde. Viçosa, MG, Brasil. Correspondence to: DC MORAIS. E-mail: <dayanecm@yahoo.com.br>.

² Universidade Federal de Viçosa, Departamento de Economia. Viçosa, MG, Brasil.

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ABSTRACT

Objective

To evaluate the food and nutrition insecurity of Brazilian families, according to indicators of food consumption and nutritional status, by location and situation of the households investigated using the 2008/2009 Household Budget Survey.

Methods

Inadequate consumption of macronutrients and nutritional dystrophies (underweight, short stature or overweight) in at least one family member were used as indicators, according to location and geographical situation of households. The prevalence of food and nutritional insecurity and their confidence intervals were calculated.

Results

Food consumption was assessed in a total of 13,569 households; a total of 67.55%, 43.96% and 6.85% revealed inadequacy for lipids, carbohydrates and proteins, respectively. Among the 53,640 households assessed by nutritional status, 15.10%, 35.15% and 45.50% had, at least one resident with low weight, short stature or overweight respectively. The Northeastern Region showed statistically higher prevalence than other Brazilian macro-regions for inadequate lipids (24.88%) and carbohydrates (15.32%), as well as for the presence of underweight (6.15%), overweight (14.77%) and short stature (15.17%), in at least one of the residents of the household.

Conclusion

Assessing the nutritional aspect of food insecurity allows for a better understanding of the dimensions of this situation by considering the effects of access and availability of food, as well as biological use and stability, based on indicators of inadequate food consumption and the presence of nutritional dystrophy. The results found in this study enhance the need to include nutritional indicators in the assessment of food security.

Keywords: Eating. Food security. Household and family. Nutritional status.

RESUMO

Objetivo

Avaliar a insegurança alimentar e nutricional de famílias brasileiras segundo indicadores de consumo alimentar e estado nutricional, por localização e situação dos domicílios investigados pela Pesquisa de Orçamento Familiar 2008/2009.

Métodos

Foram utilizados, como indicadores de insegurança alimentar e nutricional, o consumo inadequado de macronutrientes e distrofias nutricionais (baixo peso, baixa estatura ou excesso de peso) em pelo menos um membro da família, conforme localização e situação geográfica dos domicílios. Calculou-se a prevalência de insegurança alimentar e nutricional e seus intervalos de confiança.

Resultados

Foram avaliados 13.569 domicílios pelo consumo alimentar, sendo que 67,55%, 43,96% e 6,85% apresentaram inadequação para lipídios, carboidratos e proteínas, respectivamente. Entre os 53.640 domicílios avaliados pelo estado nutricional, 15,10%, 35,15% e 45,50% apresentam, respectivamente, pelo menos um morador com baixo peso, baixa estatura ou excesso de peso. O Nordeste apresentou prevalências estatisticamente maiores do que as demais macrorregiões para as inadequações de lipídios (24,88%) e de carboidratos (15,32%), bem como para presença de baixo peso (6,15%), excesso de peso (14,77%) e baixa estatura (15,17%), em pelo menos um dos moradores do domicílio.

Conclusão

Avaliar a vertente nutricional da insegurança alimentar permite maior compreensão das dimensões dessa situação por considerar os reflexos do acesso e disponibilidade de alimentos, bem como a utilização biológica e estabilidade, a partir dos indicadores de consumo alimentar inadequado e presença de distrofia nutricional. Os resultados encontrados reforçam a necessidade de incluir indicadores nutricionais na avaliação da segurança alimentar.

Palavras-chave: Ingestão de alimentos. Segurança alimentar. Família e domicílio. Estado nutricional.

INTRODUCTION

Food and Nutrition Security (FNS) consists in ensuring access to quality food in adequate quantity and that considers culture and promotes health for the population. Thus, nutritional dystrophies and food consumption inadequacies are characteristics of Food and Nutritional Insecurity (FNI) and violation of the Human Right to Adequate Food, which is used in the monitoring of the FNS situation by the Food and Agriculture Organization of the United Nations. The FNI goes beyond fighting hunger and malnutrition and going beyond overweight and diseases associated with poor diet [1-4].

In Brazil, and in other countries, scales of Food Insecurity (FI) perception are used to assess the food dimension; however, they consider a short reference period, insufficient to identify the biological consequences of FNI as they are mainly associated with nutritional status [2-5].

The nutritional aspect, reflected by the dimensions of biological use of food and stability, is not always considered in the assessment of insecurity [1,2,6].

There are few studies that measure the nutritional aspect [6,7]; the majority reports nutritional indicators with FI, generally assessed by perception scales, but do not expand the discussion of this aspect. Researchers have difficulties in this measurement due to the absence of food consumption and nutritional status standardized indicators to be used in the assessment and monitoring of the FNS situation.

The evaluation of the FNI, covering food and nutritional aspects, is essential because it involves its determinants and consequences. Countries like Brazil, with socioeconomic and nutritional vulnerability, that are experiencing epidemiological and nutritional transitions, require a broad

investigation of the FNI in order to generate targeted public interventions, according to the location and dimensions involved [1,2,4,5].

The use of databases such as the Household Budget Survey (HBS) allows the assessment of the FNI dimensions of Brazilian families, by measuring food consumption and anthropometric parameters, in different regions of the country [8,9].

Thus, the objective of our study was to evaluate the FNI of Brazilian families, according to indicators of food consumption and nutritional status, by location and situation of the households that were investigated in the 2008/2009 HBS.

METHODS

Data from the 2008/2009 HBS were used, based on the blocks of questions: Characteristics of the household (situation: urban or rural; and location: macro-region) and of the residents (anthropometry); and Individual food consumption were assessed. This information includes households in all Brazilian states [8,9].

The family was considered as the sampling unit, defined as “the group of people living in the household, linked by kinship ties, domestic dependency or rules of coexistence” [8,9]. The term domicile was used synonymously.

Food consumption was investigated in individuals older than 10 years, not pregnant, representing 24.3% of the sample [8]. The instrument used was the food record, with an assessment of consumption inside and outside the home, on two non-consecutive days, following the guidelines and reviews by the investigation agents [8]. The average food consumption of each resident in the households was calculated.

The reported foods were transformed and analyzed for macronutrients and calories [10]. Consumption below or above the recommendations for macronutrients, according to the Acceptable Macronutrients Distribution Range, was considered inadequate. The adequacy ranges, according to the total energy value, were: lipids 25 to 35%; carbohydrates 45 to 65%; and proteins 10 to 30% for individuals aged 10 to 18 years and 10 to 35% for those aged ≥ 19 years, according to the Institute of Medicine.

Families were classified in FNI by food consumption when at least one of the members had inadequacy of at least one macronutrient (Figure 1).

For the assessment of the nutritional status, the body mass index and height/age of all residents present in the household were measured, except for pregnant women [8,11-14]. Short stature was evaluated in all age groups, and in adults and elderly people the current height was considered, reviewed at the maximum age present in the curves (19 years old), according to the cutoff point < -2 Z-score [14].

From the individual data, the nutritional status of the family was defined. The FNI, related to nutritional dystrophy, was determined by the presence of at least one member with low weight, short stature or overweight [1] (Figure 1).

Statistical analyses were performed using STATA software (version 13.0). Prevalence of FNI was calculated according to the situation (urban and rural) and location (macro-region) of the household, and their 95% confidence intervals. To assess the difference between prevalence, the confidence interval values that did not overlap were considered.

This work was approved by the Research Ethics Committee of the Federal University of Viçosa, under opinion nº 1.269.063/2015.

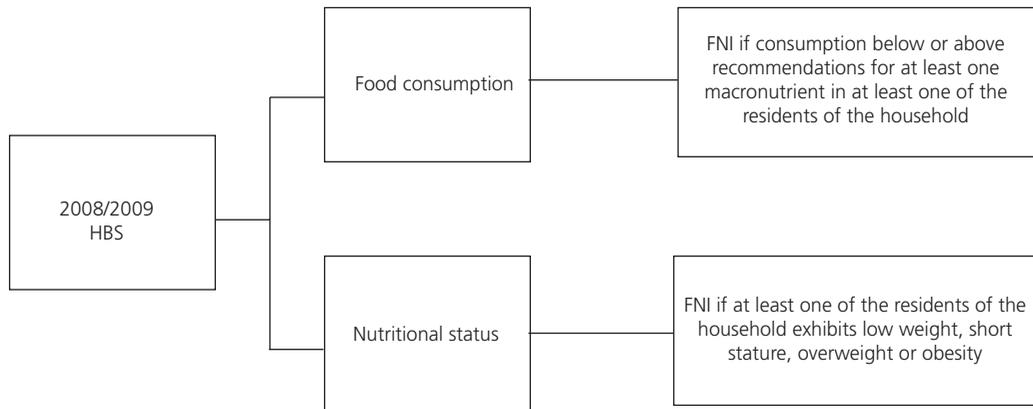


Figure 1 – Suggestions for the assessment of food and nutritional insecurity according to the methodologies to detect nutritional dystrophy and inadequate food consumption in the family.

Note: FNI: Food and Nutritional Insecurity; HBS: Household Budget Survey.

RESULTS

Food and Nutritional Insecurity according to dietary intake of macronutrients

The consumption of macronutrients was evaluated in 13,569 households, of which 76.88% were located in urban areas. Considering the macro-region, 35.30% were located in the Northeast, 22.58% in the Southeast, 14.86% in the Midwest, 14.59% in the North and 12.66% in the South.

The Food and Nutritional Insecurity (FNI), reflected by the presence of at least one member with inadequate consumption of macronutrients, that is, below or above the recommendations, was present in 74.71% of the families. In 5,924 families (43.66%) there was concomitant inadequate consumption of more than one macronutrient.

Most households had inadequate consumption of lipids (67.55%), with those located in the Northeast having a significantly higher prevalence than the other macro-regions and rural areas of the country (Table 1).

Table 1 – Prevalence of inadequate food consumption of macronutrients by at least one resident of the household, and their relevant confidence intervals (95% CI), reflecting the food and nutritional insecurity of Brazilian families. Brazil, 2008-2009.

| Location or situation | Inadequate consumption of macronutrients by at least one resident – % (95% CI) | | |
|-----------------------|--------------------------------------------------------------------------------|----------------------------------|--------------------------------|
| | Lipids | Carbohydrates | Proteins |
| Brazil | 67.55 (66.52-68.45) | 43.96 (42.64-45.17) | 6.85 (5.24-8.58) |
| Urban | 50.82 (49.61-51.98) | 32.33 (30.91-33.70) | 4.75 (3.15-6.57) |
| Rural | 16.73 ^a (15.18-18.29) | 11.63 ^a (10.05-13.28) | 2.10 ^a (0.77-4.52) |
| Northeast | 24.88 ^b (23.34-26.28) | 15.32 ^b (13.76-16.90) | 2.60 ^a (1.16-4.77) |
| Southeast | 14.01 ^c (12.45-15.62) | 8.93 ^c (7.36-10.65) | 1.06 ^a (0.01-3.78) |
| North | 10.85 ^c (9.26-12.50) | 7.17 ^c (5.55-8.88) | 1.73 ^a (0.46-4.28) |
| Central-West | 9.29 ^c (7.66-10.93) | 6.69 ^c (5.07-8.41) | 0.72 ^a (0.025-5.49) |
| South | 8.51 ^c (6.94-10.24) | 5.82 ^c (4.28-7.68) | 0.70 ^a (0.02-5.66) |

Note: ^{a, b, c}. Equal letters (column) indicate prevalence of inadequacy in the dietary intake of macronutrients by at least one resident of the household statistically equal, according to situation (rural) and/or location (macro-region).

Inadequate consumption of carbohydrates in households located in the Northeast was higher than in other macro-regions and rural areas. Inadequate consumption of proteins had a lower prevalence than in the case of other macronutrients (Table 1), but without statistical difference according to situation and location.

Food and Nutritional Insecurity due to inadequate nutritional status

The nutritional status of 53,640 households' residents was evaluated; a total of 76.40% were located in urban areas. Regarding the macro regions, 34.52% were located in the Northeastern region of Brazil, 24.88% in the Southeast, 14.89% in the Midwest, 13.83% in the North and 11.88% in the South.

The FNI, based on at least one household member being underweight or overweight, was present in 52.14% of the families. Out of these, 15.10% had at least one resident with low weight, with the highest prevalence in households located in the Northeast and in rural areas (Table 2).

Table 2 – Prevalence of inadequacy in the nutritional status of at least one resident of the household, and their relevant confidence intervals (95%CI), reflecting the food and nutritional insecurity of Brazilian families. Brazil, 2008-2009.

| Location or situation | Inadequate nutritional status of at least one resident - % (95% CI) | | |
|-----------------------|---------------------------------------------------------------------|----------------------------------|----------------------------------|
| | Low weight | Overweight | Short stature |
| Brazil | 15.10 (14.32-15.89) | 45.50 (45.07-46.32) | 35.15 (34.41-35.78) |
| Urban | 10.93 (10.11-11.72) | 35.47 (34.71-36.08) | 25.28 (24.47-25.94) |
| Rural | 4.17 ^a (3.32-5.02) | 10.03 ^a (9.21-10.83) | 9.87 ^a (9.01-10.63) |
| Northeast | 6.15 ^b (5.32-6.98) | 14.77 ^b (13.92-15.49) | 15.17 ^b (14.33-15.90) |
| Southeast | 3.49 ^a (2.63-4.34) | 11.42 ^a (10.61-12.21) | 6.49 ^c (5.61-7.26) |
| North | 2.01 ^c (1.28-3.06) | 6.42 ^c (5.61-7.27) | 6.41 ^c (5.60-7.26) |
| Central-West | 2.16 ^c (1.32-3.05) | 6.88 ^c (6.00-7.66) | 4.23 ^d (3.40-5.09) |
| South | 1.26 ^c (0.05-2.30) | 6.00 ^c (5.20-6.87) | 2.84 ^d (2.04-3.77) |

Note: ^{a, b, c, d}. Equal letters (column) indicate prevalence of inadequacy in the nutritional status of at least one household resident statistically equal, according to situation (rural) and/or location (macro-region).

Considering the age group, 1.80% (95% CI 1.02-2.79) of the households had underweight children, 1.57% (95% CI 0.82-2.62) adolescents, 4.36% (95% CI 3.53-5.22) adults and 8.33% (95% CI 7.51-9.15) older adults. In families, underweight in adults and the elderly (12.32%, 95% CI 12.03-12.59) was higher than in children and adolescents (3.28%, 95% CI 3.12-3.42). Households with low-weight elderly people were 4.62 and 5.31 times higher than households with children or adolescents with this dystrophy, respectively. In 515 families (0.96%) there was the presence of low weight individuals in different age groups.

There was a coexistence of underweight and overweight individuals in 1,866 families (3.48%), in the different age groups. Those families were considered as being under FNI due to the two concomitant dystrophies.

Excess weight, reflecting FNI, was present in 45.50% of the families (Table 2), with 7.28% (95% CI 6.40-8.05) children, 6.18% (95% CI 5.29-6.95) adolescents, 27.44% (95% CI 26.67-28.12) adults and 4.60% (95% CI 3.81-5.51) older adults considered overweight or obese.

The prevalence of families with overweight adults was 5.97 and 3.77 times higher than those families with elderly people and children in this situation, respectively. Families with this children dystrophy had 1.58 times greater prevalence than those with elderly people.

In relation to the macro-regions, Northeastern families had a higher prevalence of excess weight than the other macro-regions; on the other hand, those living in the rural area had a higher prevalence of this dystrophy than families from the South, North and Midwest (Table 2).

Height deficit in at least one resident was present in 35.15% of the families, being higher in households located in the Northeast and rural areas (Table 2).

Among the households, 4.43% (95% CI 3.62-5.32) had height deficit in children, 13.13% (95% CI 12.32-13.91) in adolescents, 16.23% (95% CI % 15.43-16.99) in adults and 8.71% (95% CI 7.91-9.55) in the elderly.

In 49.97% of families with individuals with short stature, children and/or adolescents were affected. Prevalence differed according to the age groups, being 3.66 and 2.96 times higher in families with this dystrophy in adults and adolescents, respectively, when compared to those with children in the same nutritional situation. There was concomitance of short stature in different age groups in the same family (7.35%).

DISCUSSION

Inadequate food consumption and nutritional dystrophy are indirect indicators of FNI, being influenced by socioeconomic vulnerability and eating habits. These may reflect difficulties in achieving the FNS dimensions of access, availability and biological use of food, with stability, generating implications such as hunger, including hidden hunger [2-4,7,15,16].

In the FNI evaluated by food consumption, approximately $\frac{3}{4}$ of Brazilian families had an inadequacy of at least one macronutrient, with lipids being the most expressive (mainly in the Northeast and rural areas), followed by carbohydrates (higher prevalence in the Northeast).

These inadequacies can be explained by the greater socioeconomic vulnerability that generates greater consumption of oils, fats, simple and ultra-processed carbohydrates, and less access to diversified and healthy foods, due to the more affordable price, greater caloric density and satiety, in addition to characteristic eating habits. [4,17-22]. In the context of the FNI, food consumption is also influenced by the distribution of food within the household, with adults tending to give priority to the children's diet, when it is scarce, or even direct some specific foods (such as milk and meat), according to age range for certain family members [1].

Inadequate consumption of proteins was approximately 10 times lower than that of lipids, indicating that the main food problem of families is not protein. Despite the higher price of foods such as meat, milk and derivatives, a large part of the population maintains the habit of consuming rice and beans, which can contribute to a greater intake of this macronutrient [16,19,23].

Comparing the food consumption data of the 2008/2009 HBS with those of 2017/2018, we can see that the dietary pattern of the Brazilian population remains the same, but has undergone changes associated with the reduction in the consumption of traditional foods such as rice, beans, vegetables, fruits, beef and eggs, contrasting with the increase in the consumption of oils and fats, mainly in the lower income strata. Thus, we can infer that the FNI situation, marked by inadequacy in the food consumption of the Brazilian population, continues to be an alarming situation [23].

Current and past malnutrition is related to the already established NIF [1,2,4,6,15,22]. The continuous deprivation of food, in quantity and quality, causes weight and height deficits due to nutritional inadequacies [16].

In the FNI family context, short stature characterizes a potential chronic malnutrition, still present in emerging countries, in different age groups. This assessment in adults and the elderly is valid, since in this study it was more pronounced when compared to those under 20 years of age.

Nutritional dystrophies in Brazilian families can be considered a public health problem because their prevalence is higher than expected (5%).

According to the classification of the World Health Organization (WHO), prevalence of nutritional dystrophies of 10 to 19% indicates moderate occurrence between 20 and 29% high and $\geq 30\%$ as very high exposure. Thus, the occurrence of nutritional dystrophies in Brazilian families can be classified as: moderate, for low weight; very high for low stature (being moderate in the Northeast); and very high for excess weight (being moderate in rural areas, Northeast and Southeast) [24].

This WHO parameter considers only individuals. Adaptation for families indicates moderate to very high exposure, but does not consider the presence of more than one member with nutritional dystrophy, which may be an even more serious problem.

The weight gain and consequent excess weight, in connection with FNI, presents some hypotheses: individuals in continuous fasting, including in the intrauterine period, may present metabolic adaptations (metabolic imprinting) of greater energy storage; vulnerable families tend to purchase cheaper food, generally with high energy density and low diversity; and food deprivation generates anxiety and uncertainty regarding stability, which can lead to compulsion when food is available [17,18]. Thus, there is an intimate relationship between malnutrition, malnutrition and excess weight, in the context of FNI, since individuals with malnutrition in childhood are more likely to develop excess weight in future stages due to these metabolic adaptations, especially if the scenario of socioeconomic vulnerability persists throughout their lives [25].

The health and NIF situation in Brazil is of concern, with a high proportion of current and past malnutrition and excess weight in different age groups, due to the epidemiological and nutritional transitions experienced, characterized by less access to fresh foods and greater access to ultra-processed foods and source of lipids and simple carbohydrates. These faces of insecurity illustrate the double burden of diseases, further aggravating the situation in the country [16,21]. The differences in the households found according to the situation (rural) and location (macro-region) enhance the country's heterogeneity, marked by greater socioeconomic vulnerability in certain regions, as well as by local habits and cultures, which have an impact on the population's food consumption.

The literature discreetly covers the assessment of the nutritional dimension of the FNI [5], with the indicators used being caloric intake per equivalent adult; protocols with multiple indicators; nutritional dystrophy or inadequate food consumption [6,7,10,11,25].

The other studies associate FI, detected by perception scales, to the skipping of meals; consumption of fruits, meats, milk and derivatives, oils and sugars; nutrient intake (protein, iron, calcium); diet quality and diversity [2,3,6,7,16,19,25]; to low weight, short height and overweight [2,6,7,15,18,21].

Our study was carried out with a representative sample of the Brazilian population, using the only national survey published so far that addresses food consumption of people over ten years of age and the nutritional status of all age groups [25,26]. It should be noted that the 2017/2018 HBS presents self-reported anthropometric variables, included in the food consumption questionnaire applied only to those over ten years of age.

It should be pointed out that the FNI data by nutritional indicators are probably lower than those actually experienced by the Brazilian population today, due to the economic crisis and the

Covid-19 pandemic. Recent studies that assessed the situation of food insecurity using scales demonstrate the increase in the prevalence of this situation in recent years, with a consequent worsening in the quality of food and in the nutritional status of the population [4,27,28].

The analysis presented here considered nutritional parameters of all the family members, and not a proxy measure of a reference resident or equivalent adult.

This article assesses the nutritional dimension of insecurity, and suggests household assessment parameters that address it, reflecting the concept of FNS and its dimensions, which can mitigate the gaps found by researchers [1,3,5,6,16]. These aspects strengthen the results and allow for a broader discussion of the food and nutritional aspects of insecurity.

Thus, we enhance the importance of evaluating and monitoring the FNS in the country, using different methodologies that incorporate the food and nutritional aspects, that is, using whenever possible perception scales complemented by other indicators of the dimensions of access, availability, biological use and FNS stability [6,29].

CONCLUSION

This outlook of the FNI, evaluated by indicators of the nutritional dimension of this situation, points to it as a public health problem, in the different locations and situations of Brazilian households.

The results obtained enhance the need to evaluate the nutritional aspect given by the indicators of inadequacy in nutritional status and food consumption, in the family framework.

The investigation of familial FNI should, whenever possible, consider the urban or rural situation and its location by macro-region, due to the different probabilities of occurrence. This assessment allows public actions and policies to be focused on areas with the highest FNI, as is the case in the Northeast region and rural areas in Brazil, as mentioned in this study.

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CONTRIBUTORS

DC MORAIS contributed to the conception and design of the study, analysis and interpretation of data, writing, revision and approval of the final version of the manuscript. CT RODRIGUES, SCC FRANCESCHINI, AQ RIBEIRO and SE PRIORE contributed to the conception, review and interpretation of data, revision and approval of the final version of the article.