

## Overweight in *Goiás'* *quilombola* students and food insecurity in their families<sup>1</sup>

### *Excesso de peso de estudantes quilombolas de Goiás e a insegurança alimentar em suas famílias*

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#### **ABSTRACT**

##### **Objective**

To characterize the nutritional status of *quilombola* students and determine the food security status of their households.

##### **Methods**

This is a cross-sectional study with students aged six to nineteen years from *quilombola* communities in twelve municipalities of *Goiás* categorized by age, gender, school location (urban/rural), and nutritional status based on the World Health Organization's height-for-age and body mass index for-age charts. The Brazilian Food Insecurity Scale was used for measuring food (in)security in their families. Descriptive and association analyses were conducted using the Chi-square test at a significance level of 5% ( $p < 0.05$ ).

##### **Results**

In a sample of 226 students, overweight (17.2%) was more common than malnutrition (1.3%), especially in students attending urban schools (28.2%) ( $p < 0.05$ ). Most (75.2%) *quilombola* families experienced food insecurity, especially mild.

##### **Conclusion**

The apparent contradiction of excess weight and food insecurity occurring simultaneously indicates the need of revising the study instruments and the causal network that identify poverty.

**Indexing terms:** African continental ascestry. Food security. Nutritional status. School feeding.

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## RESUMO

### Objetivo

Caracterizar o estado nutricional de estudantes quilombolas e a segurança alimentar nos seus domicílios.

### Métodos

Estudo transversal com estudantes na faixa etária de 6 a 19 anos, de comunidades quilombolas de 12 municípios goianos, categorizados quanto à idade; ao sexo; à localização da escola em que estavam matriculados, e ao estado nutricional, classificado segundo os critérios do World Health Organization para os parâmetros estatura para idade e índice de massa corporal para idade. Por meio da Escala Brasileira de Medida de Insegurança Alimentar, foi estudada a (in)segurança alimentar das famílias dos respectivos alunos. Realizaram-se análises descritivas e de associação utilizando-se o Qui-quadrado com significância estatística quando  $p$ -valor < 0,05.

### Resultados

Em amostra de 226 estudantes, observou-se maior frequência de excesso de peso (17,2%) em comparação à desnutrição (1,3%), com maior ocorrência entre os alunos matriculados nas escolas da zona urbana (28,2%) ( $p < 0,05$ ). A insegurança alimentar esteve presente em 75,2% das famílias quilombolas, sendo a insegurança alimentar leve a mais frequente.

### Conclusão

A aparente contradição da ocorrência simultânea de excesso de peso e insegurança alimentar aponta para a necessidade de que sejam revistos os instrumentos de estudo, bem como a rede de causalidade que identifica a pobreza e o excesso de peso.

**Termos de indexação:** Grupo com ancestrais do continente africano. Segurança alimentar e nutricional. Estado nutricional. Alimentação escolar.

## INTRODUCTION

The remaining *quilombolas* are considered ethnic/racial groups according to self-attribution criteria and have a history of their own<sup>1</sup>. A close bond with the land is one of the most striking *quilombola* characteristics, with mostly subsistence agriculture being the main economic activity. A small part of the farm products is sold at very low prices, generating low income for the families<sup>2-4</sup>.

Studies have found that *quilombola* communities have poor basic sanitation, characterized by frequent water shortages and no garbage collection or sewerage. In addition to these vulnerabilities, low education level and illiteracy are common, and access to primary health care services is difficult, compromising *quilombola* health, characterized by nutritional deficiencies, malnutrition, and chronic Noncommunicable Diseases (NCD)<sup>2,3,5-7</sup>.

Although *quilombola* children aged less than five years are often malnourished<sup>2,8</sup>, some

are overweight. *Quilombola* individuals aged more than seventeen years have frequencies of overweight and NCD, such as high blood pressure, of 41.9% and 41.6%, respectively<sup>9</sup>.

Economic changes in rural communities, such as wage labor, retirement pensions, and access to welfare programs such as *Bolsa Família*, may change food habits because they enable the acquisition of processed foods at urban grocery stores instead of those grown in the community, which may increase the intake of processed and high-fat foods. Such transitions and exposure to the urban environment may explain the changes in the nutritional profile of the *quilombola* population<sup>10,11</sup>. *Quilombola* youth frequently move to cities because their communities lack high schools, so they move to cities to continue their education and find work, losing touch with their cultural and social center<sup>12-14</sup>.

Studies on the nutritional status and health profile of *quilombola* children aged more than five years and adolescents are few. Their nutritional profile is concerning because 7.5% of

the population aged eleven or more years consume fewer than three meals a day, and 32.5% of children aged three to eleven years have a maximum of three meals a day<sup>2</sup>.

It is plausible to assume that the causal network of the nutritional status of *quilombola* communities has changed given their usually difficult access to food and resultant hunger, characterizing a situation of food insecurity in these families<sup>2,15</sup>. The availability of affordable energy-dense foods may be a factor that explains this paradigm shift<sup>16-18</sup>.

Given the need to expand the discussion about food (in)security and its relationships with the nutritional status-related epidemiologic landscape, the objective of this study was to characterize the nutritional status of *quilombola* students and food (in)security in their households.

## METHODS

This cross-sectional study was conducted from March to August 2012 in 12 municipalities in *Goiás* with *quilombola* communities recognized by the *Fundação Cultural Palmares*<sup>19</sup>, selected according to the local leaders' interest in participating in the study.

The study target population was estimated based on the 2011 school census<sup>20</sup> and consisted of male and female *quilombola* children aged six to nine years and adolescents aged ten to nineteen years enrolled in municipal and state elementary, middle, and high schools. Since the study universe was diverse, all schools with *quilombola* students were visited. The local *quilombola* leader helped to determine the schools with *quilombola* students by examining the enrollment forms.

Ninety-one schools had *quilombola* students, but twelve (13.2%) were not included because of their remoteness (n=4) or absence of a teacher or another person in charge (n=4), being closed and/or abandoned (n=2), and not having enough time to conduct the study (n=2).

Therefore, the study population consisted of 2,413 *quilombola* students from 79 schools.

Students were randomly selected at each school taking into account an error estimate of 6%, a Confidence Interval of 95% (95%CI), and a desired proportion of 50% since there is no data on the percentage of *quilombola* children and adolescents at nutritional risk. The sample was defined in 175 students with an extra 30% to compensate for losses<sup>21</sup>, thereby totaling 226 *quilombola* students considering a loss by refusal. The sample size was given by calculating sampling weights to maintain proportionality with the *quilombola* students in each municipality<sup>22</sup>.

The field team consisted of properly trained dietitians who collected sociodemographic data, such as age, gender, and school location (rural/urban), anthropometric data (weight and height), and Food Security (FS) and Food Insecurity (FI) data of the students' families.

Anthropometric assessment included measuring weight (kg) and height (cm) as recommended by the World Health Organization (WHO)<sup>23</sup>, using a solar digital scale with a capacity of 150 kg and accuracy of 0.1 kg of the brand Tanita, and compact stadiometer of the brand Seca with a total length of 210 cm and accuracy of 0.1 cm. Nutritional status was also classified as recommended by the WHO according to height-for-age and Body Mass Index (BMI)-for age Z-scores<sup>24</sup>.

The *Escala Brasileira de Insegurança Alimentar* (EBIA, Brazilian food Insecurity Scale) was used for assessing food (in)security in the households, classifying it as follows: (1) mild food insecurity - poor diet and family concerned with running out of food soon; (2) moderate food insecurity - quantitative food restriction in the household; (3) severe food insecurity - food deficit and even hunger among the family's adults and/or children<sup>25</sup>. Although this instrument was developed for assessing traditional populations, changes were not proposed because the instrument is validated and has already been used

in Brazilian *quilombola* surveys and other studies<sup>2,25-27</sup>.

The software Stata version 12.0® treated the data, and the WHO's program AnthroPlus version 1.0.4® assessed the participants' nutritional profile. The Chi-square test measured the association between the study variables and the food security indicator of the *quilombola* students with a significance level of  $\alpha < 5.0\%$  ( $p < 0.05$ ).

The study "Food, health, and quality of life of *quilombola* schoolchildren from Goiás" upon which the present study is based was approved by the Research Ethics Committee of the *Universidade Federal de Goiás* under Protocol number 263/2011, and all participants signed an Informed Consent Form before entering the study.

## RESULTS

The mean age and standard deviation of the 226 study students was  $10.5 \pm 3.3$  years, 51.8% ( $n=117$ ) were females, and 52.2% ( $n=118$ ) were enrolled in urban schools. Only three adolescents were stunted, and another three students (1.3%), two children (66.7%) and one adolescent (33.3%), were underweight. Thirty-nine (17.2%) participants were overweight (overweight or obese). Table 1 shows the *quilombola* student profiles.

A total of 214 families were interviewed to collect food access information, classifying the household as food secure or insecure. The number of families is smaller than the number of participants because some households had more than one participant. Food insecurity was found in 160 (75.2%) households, most of which were mildly (45.1%) and moderately (21.6%) food insecure (Table 2).

The following groups had similar percentages of food insecurity: females (74.4%), males (76.1%), children (73.1%), adolescents (77.0%), students from rural schools (78.7%), and students from urban schools (72.0%). Table 3

**Table 1.** Profile of *quilombola* students attending public schools. Goiás, Brazil, 2012 ( $n=226$ ).

Characteristics	Age group			
	6 to 9 years		10 to 19 years	
	n	%	n	%
<i>Gender</i>				
Female	55	47.0	62	53.0
Male	49	45.4	60	55.0
<i>Height-for-age</i>				
Low height-for-age	0	0.0	3	100.0
Appropriate height-for-age	104	46.6	119	53.4
<i>BMI-for-age</i>				
Underweight	2	66.7	1	33.3
Normal weight	84	45.7	100	54.3
Overweight	18	46.2	21	53.8
<i>Location</i>				
Rural	56	51.9	52	48.1
Urban	48	40.7	70	59.3

Note: BMI: Body Mass Index.

**Table 2.** Food (in)security distribution in *quilombola* students' households. Goiás, Brazil, 2012 ( $n=214$ ).

Characteristics	n	%	95%CI
<i>Food (in)security</i>			
Food security	54	24.8	19.0 - 30.6
Mild food insecurity	96	45.1	38.4 - 51.8
Moderate food insecurity	46	21.6	16.1 - 27.1
Severe food insecurity	18	8.5	4.8 - 12.2

Note: 95%CI: Confidence Interval of 95%.

**Table 3.** Food security/insecurity frequency by the sociodemographic variables of *quilombola* children and adolescents. Goiás, Brazil, 2012 ( $n=226$ ).

Characteristics	Food (in)security				$p^1$
	Food security		Food insecurity		
	n	%	n	%	
<i>Gender</i>					
Female	30	25.6	87	74.4	0.497
Male	26	23.9	83	76.1	
<i>Age</i>					
6 to 9 years	28	26.9	76	73.1	0.242
10 to 19 years	28	23.0	94	77.0	
<i>School location</i>					
Rural	23	21.3	85	78.7	0.069
Urban	33	28.0	85	72.0	

Note: <sup>1</sup>Chi-square test.

**Table 4.** Nutritional status distribution of quilombola children and adolescents by sociodemographic and food security/insecurity variables. Goiás, Brazil, 2012 (n=226).

Characteristics	Food (in)security				$p^1$
	Not overweight		Overweight		
	n	%	n	%	
<i>Gender</i>					
Female	94	80.4	23	19.7	0.294
Male	93	85.3	16	14.7	
<i>Age</i>					
6 to 9 years	86	82.7	18	17.3	0.888
10 to 19 years	101	82.8	21	17.2	
<i>School location</i>					
Rural	103	95.4	5	4.6	0.000
Urban	84	71.8	33	28.2	
<i>Food (in)security</i>					
Food security	45	80.4	11	19.6	0.690
Food insecurity	142	83.6	28	16.5	

Note: <sup>1</sup>Chi-square test.

shows that these sociodemographic variables were not associated with food insecurity ( $p>0.05$ ).

Most (19.6%) overweight children and adolescents lived in food secure households. Excess weight was more frequent among girls (19.7%) than boys (14.7%) but the difference was not significant ( $p>0.05$ ). There was a statistically significant association ( $p<0.05$ ) between school location (urban/rural) and the students' nutritional status: 28.2% of the children attending urban schools were overweight (Table 4).

## DISCUSSION

Stunting was found in only three adolescents, no children were affected. Adolescents were also more likely to be overweight or obese than children. Moreover, the frequency of food insecurity for the study sample was high.

The small number of studies on the nutritional status of *quilombola* children aged six to nineteen years limits the discussion of the results, justifying comparison with other population groups with similar sociocultural trajectory.

The increasing prevalence of overweight has already been observed in other specific populations, such as *Xavante* in *Mato Grosso*, with an overweight prevalence of 27.5% in adolescents<sup>28</sup>, and in *Alto Xingu* where the adolescents' BMI was higher than the country's average BMI, also suggesting a high frequency of overweight<sup>29</sup>. The nutritional profile of students from public schools in *Juiz de Fora* (MG) with a mean age of 10.8 years was also similar to that of the present sample given that 7.5% and 10.4% of the women were overweight and obese, respectively, and 13.5% and 7.6% of the men were overweight and obese, respectively<sup>30</sup>.

The 2008/2009 Family Budget Survey found that more than 30% of Brazilian children aged five to nine years and roughly 20% of Brazilian adolescents were overweight<sup>31</sup>. The *Pesquisa Nacional de Saúde do Escolar* (PeNSE, National Schoolchild Health Survey) found that 23% of the students aged 11 to 19 years attending public and private schools in Brazilian capitals were overweight<sup>32</sup>.

An association was found between nutritional status and school location (urban/rural) as most overweight students attended urban schools. A study of adolescents aged 10 to 17 years attending public schools found that those living in urban areas were 75% more likely to be overweight than those living in rural areas<sup>33</sup>. Although the present study did not investigate where the sample lived, the fact that they studied in urban schools may have facilitated access to processed foods, uncommon in rural areas, a factor that may promote weight gain.

The proximity between *quilombola* communities and roads going to large cities may impact the socioeconomic, and consequently, the behavioral aspects of this population. In other words, greater proximity to cities may change the eating habits of *quilombola* communities, justifying the increase in the prevalence of overweight in this population. New fields of work, such as tourism, wage labor, and ease of distributing agricultural products lead communities near roads to adopt a new pattern

of subsistence, characterized by smaller involvement with subsistent farming and greater access to foods common in urban areas. These pieces of evidence may be indicative of nutritional transition in this population and thereby, higher food insecurity<sup>3,10,11,34</sup>.

The impact of this change on the subsistence model was observed by ecological farmers from *Paraná*. They believe that purchased foods are important because their production does not meet all their nutritional requirements, but they know that purchased foods have a negative impact on their health. Some farmers also wanted to buy processed foods, such as sweets, bouillon cubes, soft drinks, and others, regardless of their unhealthiness<sup>35</sup>.

Although the frequency of overweight was high, the number of food insecure families was also high. This result reaffirms the evidence found by some studies regarding the broken paradigm that food insecurity is a synonym of malnutrition, introducing a new concept where hunger is associated with overweight<sup>16-18</sup>. However, nutritional status was not associated with food insecurity in the study *quilombola* families.

The identified food insecurity confirms the vulnerable situation of *quilombola* families<sup>2,3,5-7</sup> and corroborates a study of *quilombolas* in *Tocantins* that found percentages of mild and moderate food insecurity of 85.1% and 70.2%, respectively<sup>15</sup>.

The frequency of food insecurity in *quilombola* families and the nutritional profile of the study children and adolescents are concerning and deserve the attention of public policies. The *Programa Nacional de Alimentação Escolar* (PNAE, National School Food Program) is an example of the students' right to appropriate food, that is, food quality and amount that meet their nutritional requirements while at school, especially its teaching nature<sup>36</sup>. However, in practice the recommendations of the program are distorted since schools in some *quilombola* communities served foods alien to the local food habits<sup>3</sup>.

One of *Programa Nacional de Alimentação Escolar's* principles is the respect for local food

habits. The traditional practices that are part of a healthy food culture must be considered along with the guideline of buying diverse, locally produced foods<sup>36</sup>.

In 2009 *Programa Nacional de Alimentação Escolar* determined that schools should purchase foods from family farms, which is a way of providing better quality meals to the students and food and nutrition security to the farmers, improving everyone's quality of life. Schools should also prefer foods produced by *quilombola* farmers<sup>36</sup>. However, the percentage of Brazilian municipalities that buy food from family farms is still small (47.4%), especially in the Midwest region (35.3%)<sup>37</sup>.

The *Programa de Aquisição de Alimentos* (PAA, Food Acquisition Program) also aims to promote farmer food and nutrition security and school meals of higher quality by purchasing foods from family farms and donating the foods to schools<sup>38</sup>. However, these programs require farmers to own the land, but land ownership is not very common in *quilombola* communities<sup>11,13</sup>.

Given the nutritional status profile of the study *quilombola* students and the importance of public policies that aim to improve their quality of life, one must investigate the obstacles that must be overcome for implementing and ensuring the effectiveness of these policies for the proposition to actually improve the quality of life of individuals living in *quilombola* communities.

## CONCLUSION

The simultaneous presence of overweight and food insecurity raises questions regarding new life and consumption habits, and even about today's poverty profile in Brazil. Therefore we suggest new studies to expand the discussion about this apparent paradigm shift.

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#### CONTRIBUTORS

The authors participated in all study and manuscript stages: conception, design, proposition of ideas, critical analysis, and writing.

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