

Food and nutrition security in families with children under five years old in the city of Campina Grande, Paraíba

Segurança alimentar e nutricional de famílias com crianças menores de cinco anos do município de Campina Grande, Paraíba

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ABSTRACT: *Objective:* To estimate the prevalence and identify the socioeconomic risk factors for food insecurity in households with children under five years in the city of Campina Grande, Paraíba. *Methods:* This cross-sectional study involved 793 families with children assisted in municipal day care centers in Campina Grande, Paraíba, Brazil. Household socioeconomic variables were analyzed as the possible predictors of mild food insecurity and moderate/severe food insecurity. For the evaluation of food and nutrition security of households, the Brazilian Food Insecurity Scale was used. *Results:* Mild food insecurity was characterized in 37.6% of families, and moderate/severe food insecurity affected 31.6% of households. Regarding the household socioeconomic variables, none was associated with mild food insecurity. Meanwhile, the highest prevalence of moderate/severe food insecurity, when compared with reference categories, was present in households without water treatment for drinking purposes, with toilets that are not flushable and individual, with larger families, and without a refrigerator. Being a beneficiary, or not, of the social welfare program “Bolsa Família” did not represent a factor associated with food insecurity. *Conclusions:* The results show high rates of food insecurity with the most severe degrees being related to factors dependent on the family purchasing power, indicating a major challenge for them.

Keywords: Child Day Care Centers. Child. Nutrition programs and policies. Food and nutrition security. Socioeconomic factors. Government programs.

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RESUMO: *Objetivo:* Determinar a prevalência de insegurança alimentar e identificar fatores socioeconômicos associados à sua ocorrência em famílias com crianças menores de cinco anos do município de Campina Grande, Paraíba. *Métodos:* Estudo transversal que envolveu 793 famílias com crianças assistidas em creches públicas municipais de Campina Grande, Paraíba. Foram contempladas variáveis socioeconômicas domiciliares analisadas como possíveis preditores da insegurança alimentar leve e da insegurança alimentar moderada/grave. Para a avaliação da segurança alimentar e nutricional das famílias foi utilizada a Escala Brasileira de Insegurança Alimentar. *Resultados:* A insegurança alimentar leve foi caracterizada em 37,6% das famílias e a insegurança alimentar moderada/grave atingiu 31,6% dos domicílios. Com relação às variáveis socioeconômicas domiciliares, nenhuma delas apresentou associação com a insegurança alimentar leve. Enquanto isso, maiores prevalências de insegurança alimentar moderada/grave, em relação às categorias de referência, estiveram presentes nos domicílios sem tratamento da água para beber, com outro tipo de sanitário que não individual com descarga, em famílias mais numerosas e sem geladeira. Ser beneficiário ou não do Programa Bolsa Família não representou um fator associado à insegurança alimentar. *Conclusões:* Os resultados mostram taxas elevadas de insegurança alimentar cujos graus mais graves relacionam-se a fatores dependentes do poder aquisitivo das famílias, indicando um grande desafio para as mesmas. *Palavras-chave:* Creches. Criança. Programas e políticas de nutrição e alimentação. Segurança alimentar e nutricional. Fatores socioeconômicos. Programas governamentais.

INTRODUCTION

Food insecurity that is determined, primarily, by poverty and social inequality has been a recurrent theme in national and international literature in the fields of health, nutrition, and social sciences, in general, focusing its occurrence on different groups of the population, on its repercussions and determinants¹. Knowing the prevalence of food insecurity and its associated factors is of great importance for the assessment of living conditions and, consequently, for the planning of programs and public policies of a preventative, health-promoting, and hunger-fighting character^{2,3}. With this, the search for indicators of the current situation of food security/insecurity indicators that allow for a follow-up of its evolution, the time-space comparability, and the assessment of interventions is essential¹.

There are five methods that are commonly used to measure food insecurity. Four of them are indirect, based on the repercussion of the consumption of foods or of their nutritional state:

1. method from the United Nations for Agriculture and Food;
2. studies on family expenses;
3. assessment of food consumption; and
4. anthropometry.

The only method to directly measure food insecurity constitutes in a scale based on the experience/perception of food insecurity^{1,4}. The scale proposed by Radimer et al.⁵ has been applied in various countries to give dimension to the magnitude of food insecurity². On the basis of this instrument, researchers of various Brazilian institutions have validated a method for the assessment

of food insecurity in the country: Escala Brasileira de Insegurança Alimentar–EBIA (Brazilian Scale for Food Insecurity)⁶. This scale has been recognized as a sensitive indicator for detecting families at risk of food insecurity⁷. Through this scale, it is possible to verify if food insecurity affects the various members, adults and children, of a family differently, or if, for example, the children would be privileged in the food supply in detriment of the adults, reflecting the gravity of the food insecurity situation when food is scarce among the younger members of a family⁶.

In Brazil, the EBIA scale was applied, initially, in a population-based study of national representation — Pesquisa Nacional por Amostra de Domicílios (PNAD) (National Survey by Household Sampling)⁷, in 2004. This project identified 34.8% of the Brazilian population as revealing some degree of food insecurity, with regional variations, with the northern and northeastern regions presenting the worst conditions. While in Brazil, the prevalence of severe food insecurity was found in 6.5% of families, with the rates in the northern and northeastern regions were 10.9% and 12.4%, respectively. Subsequently, the results of the Pesquisa Nacional de Demografia e Saúde da Criança e da Mulher (PNDS) (National Demographic and Health Survey for Children and Women) from 2006⁸ and the PNAD from 2009⁹ revealed the prevalence of food insecurity in 37.5% and 30.3%, respectively, of Brazilian families, respectively. By considering severe food insecurity, the scenario of regional inequality is still present in the northern and northeastern regions⁹.

According to the results from the 2004 and 2009 PNAD, the state of Paraíba is among the most vulnerable federal units: 52.3% of families showed food insecurity in 2004 and 41.0% in 2009; 17.4% being mild in 2004 and 23.5% in 2009; 20.8% moderate in 2004 and 10.5% in 2009; and 15.1% severe in 2004 and 7.0% in 2009⁹. Another study that was done in 14 cities in the countryside of Paraíba, which did not include the city of Campina Grande, indicated that 52.5% of families revealed food insecurity, 23.6% being mild, 17.6% moderate, and 11.3% severe³.

When the frequency of food insecurity is broken down according to family composition, considering the presence of children and teenagers, it can be noted that homes with individuals between the ages of 0 – 4 and 5 – 17 years are the ones that present the highest rates of severe food insecurity. This situation is typical considering the data of the country (prevalence of severe food insecurity in 17.3% of homes with children between 0 and 4 years) and of Paraíba (prevalence of severe food insecurity in 22.9% of homes with children 0 – 4 years)⁹. These data are consistent with the condition of greater vulnerability to food insecurity and nutritional risks which children are susceptible to¹⁰; however, few studies have been specifically developed with this population group^{10,11}.

Results of the studies with families whose nucleus has children under five years has indicated, in addition to social conditions, a lower intake of foods that regulate the metabolism, build tissue, and contain iron and a larger intake of carbohydrates as factors associated with food insecurity¹². These results are of great interest when considering the difficulties of assessing the food intake of children¹³ and the changes in current eating patterns that indicate a profile in favor of children developing obesity and health repercussions¹⁴.

Thus, this study has the objective of determining the prevalence of food insecurity and identifying socioeconomic factors associated with its occurrence in families with children under five years in the city of Campina Grande, Paraíba.

METHODS

It is a cross-sectional study with the data collection between October and November, 2011, in public day care centers in the city of Campina Grande, Paraíba, which belong to the Ministry of Education. Overall, during the data collection, there were 25 working day care centers in different districts of the city, often situated in distressed areas. According to their localization, 23 day care centers were in the urban zone and two in the rural zone.

The study population was 2,649 registered families, with 2,417 in the urban zone and 232 in the rural zone. The eligible population included all the families, except those with twins, adopted children, or children with physical problems, which might make an anthropometric assessment difficult and families with the mother aged younger than 18 years. In the case of families with beneficiary siblings, one child was considered as a unit of analysis.

The calculation to estimate the size of the sample was based on a procedure for the description of the proportion¹⁰. For the study, the following were considered: an estimated prevalence (p) of food insecurity of 52.3% according to the results of the State of Paraíba in the PNAD from 2004⁷, a sampling error (d) of 3%, and a confidence interval of 95% ($IC_{95\%}$) ($Z_{\alpha}^2 = 1.96^2$). Thus, utilizing the formula,

$$n = \frac{N * Z_{\alpha}^2 * p * q}{d^2 * (N - 1) + Z_{\alpha}^2 * p * q}$$

it was estimated that there was a need to study 760 families. By considering the fact that five day care centers were being renovated and that one day care center was included in the pilot study, totaling in 772 unavailable families and 1,877 available ones and by considering the exclusions and the possible losses or refusals, it was decided that 40 families from each of the 19 day care centers available would be analyzed for this study, when the mothers gave their consent and the children were at the day care center on the day of data collection.

The data collection was able to count on the participation of a trained team, made up of undergraduate professors and students of health areas or areas related to it. In relation to this study, in addition to the assessment of the food and nutritional security situation, socio-economic information from the family, which was obtained through a structured survey conducted with the mothers of the children, was also contemplated. For this study, the following socio-economic household characteristics were considered independent variables: waste disposal (collection and noncollection), water supply (regular public network and other), type of drinking water (treated or mineral and not treated), presence of toilets (individual with flushing and other), type of construction (brick and other), number of people (< 6 and ≥ 6), possession of refrigerator (yes and no), and beneficiary of the welfare program Bolsa Família (yes and no).

To assess the food and nutrition security (SAN), EBIA was utilized. The families were classified into four categories of food security considering the quantification of the total number of affirmative responses in the scale:

- food Security for 0 positive answers;

- mild food insecurity for 1 – 5 positive answers;
- moderate food insecurity for 6 – 10 positive answers; and
- severe food insecurity for 11 – 15 positive answers¹⁵.

With the objective of assuring the validation of entering the data into a computer, the data were recorded with double entry, utilizing the Excel Program (Microsoft Inc., USA). After entering the data into the computer, both the databases were crossed utilizing the Validate application from the Epi Info Program v. 6.04b (WHO/CDC, Atlanta, USA), allowing, then, the verification of consistency in the data and generating the final database that was used for the statistical analysis.

For the analyses, the prevalence of results with mild food insecurity and moderate/severe food insecurity were compared with the prevalence of food security (reference situation). The association was investigated based on the prevalence reason (PR) and its confidence interval was 95% (IC95%). For the unadjusted analysis and the adjusted one (one controlled by the other), Poisson's regression with a robust adjusted variance was used.

The project was approved by the Research Ethics Committee of the Universidade Estadual da Paraíba (UEPB) under the n° 0167.0.133.000-11. All the mothers whose children were evaluated and the directors of the day care centers signed the Term of Free and Informed Consent. The results were released in the pertinent moments, through meetings between the Municipal Secretary of Education and through direct contact with the parents or legal guardians of the children. The disclosure included the diagnosis of the municipality, per institution and per family.

RESULTS

Of the 1,877 families available for the study, 1,728 of them were considered eligible; 74 families with twin children, 47 with adopted children, 14 with children who revealed physical problems, which could compromise the anthropometric assessment, and 14 with mothers younger than 18 years were excluded. In 23 cases, the mothers refused to participate in the study; 64 children were not present at the day care center or were not accompanied by their mothers on the day of data collection, and in 19 children, it was impossible to perform the anthropometric assessment. Owing to the size of some day care centers, in some of them, we were faced with an incomplete sample in comparison with what was proposed, 40 families in each one. Nonetheless, this incompleteness was compensated with the study of a larger number of families in the larger day care centers, totaling in 760 families of the sample size. In addition, at the end of the data collection, one of the day care centers that was being renovated had returned to its regular activities, which made it possible to include it in the data collection with the information of 33 families. Thus, data corresponding to 793 families with children cared for in the day care centers were analyzed.

According to the EBIA, 69.2% of the families presented some degree of food insecurity. The level of mild insecurity was the most common, because it affected 37.6% of the

families, while moderate/severe food insecurity affected 31.6% of the families, from which 11.2% were in a severe situation, as seen in Figure 1.

Table 1 reveals that the socioeconomic household conditions that most affected the vulnerability of the families were water supply that was not from the regular public network, the lack of treatment for drinking water, the lack of toilets or of nonindividual toilets with flushing per family, the presence of six or more people per household and the unavailability of a refrigerator, the conditions in which, at least, 100 (12.6%) of families were in. Large families (25.1%), without treated drinking water (20.7%) and in inadequate conditions in relation to toilets (20.1%) were the most frequent conditions of vulnerability. Regarding the welfare program Bolsa Família, it was noted that the majority of the families (73.1%) were beneficiaries.

Table 1 also shows the distribution of the mild food insecurity and the moderate/severe food insecurity according to the different categories of independent variables studied. It is found that none of the variables presented a relationship to mild food insecurity. For moderate/severe food insecurity, untreated drinking water, toilets that were not individual per family with flushing, large families, and lack of a refrigerator presented higher frequencies than the respective reference categories, with RPs that varied between 1.21 (1.09 – 1.63) for the type of toilet and 1.65 (1.26–2.17) for the type of drinking water. Being a beneficiary of the welfare program Bolsa Família or not did not represent a factor associated to food insecurity.

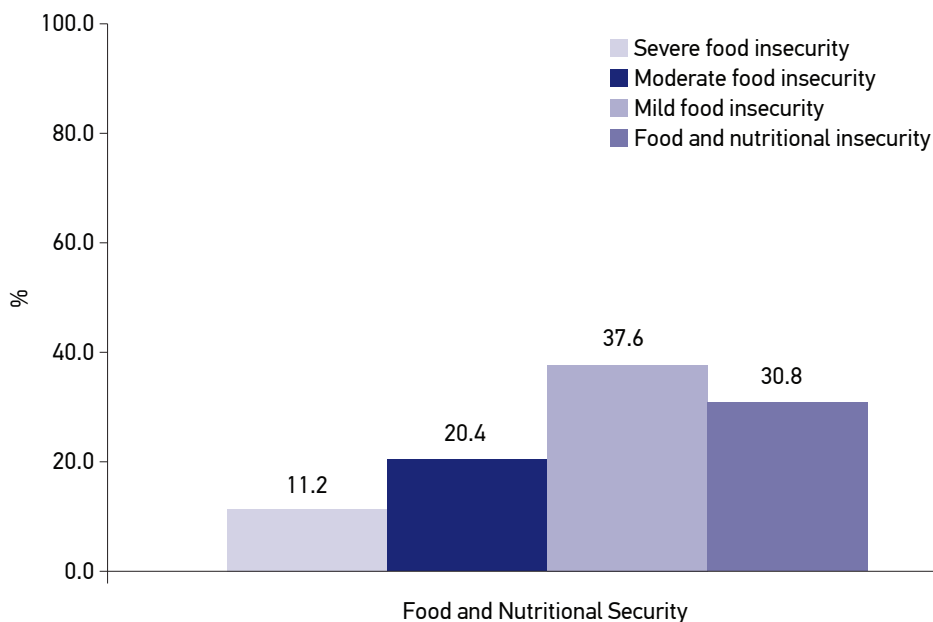


Figure 1. Prevalence of food (in)security of families with children who are cared for in day care centers. Campina Grande, Paraíba, 2011.

Table 1. Distribution of mild food insecurity and moderate/severe food insecurity, prevalence ratio, and confidence interval of 95% of families with children who are cared for in day care centers according to socioeconomic household factors, Campina Grande, PB, 2011.

Socioeconomic household variables	Interviewed	Food insecurity					
		Mild			Moderate/severe		
	n	%	Unadjusted PR (IC95%)	Adjusted PR (IC95%)	%	Unadjusted PR (IC95%)	Adjusted PR (IC95%)
Waste disposal							
Collected	729	38	1	1	29.8	1	1
Not collected	64	32.8	0.79 (0.62 – 1.00)	0.95 (0.58 – 1.55)	53.1	1.79 (1.24 – 2.56)	1.25 (0.85 – 1.84)
Water supply							
Regular public network	672	37.6	1	1	29.5	1	1
Other	121	37.2	0.86 (0.55 – 1.35)	1.11 (0.79 – 1.54)	43.8	1.49 (1.10 – 2.01)	1.17 (0.86 – 1.61)
Type of drinking water							
Treated or mineral	629	39.4	1	1	26.2	1	1
Nontreated	164	30.5	0.99 (0.72 – 1.36)	0.75 (0.53 – 1.04)	52.4	2.00 (1.54 – 2.59)	1.65 (1.26 – 2.17)
Presence of toilet							
Individual with flushing	634	37.7	1	1	27.0	1	1
Other	159	37.1	0.77 (0.57 – 1.05)	0.98 (0.7 – 1.39)	50.3	1.87 (1.43 – 2.43)	1.21 (1.09 – 1.63)
Type of construction							
Brick	765	37.6	1	1	30.8	1	1
Other	28	35.7	0.98 (0.74 – 1.31)	0.98 (0.47 – 2.05)	53.6	1.74 (1.03 – 2.93)	1.03 (0.60 – 1.79)
Number of people							
< 6	594	37.9	1	1	28.6	1	1
≥ 6	199	36.7	1.13 (0.62 – 2.07)	0.96 (0.72 – 1.28)	40.7	1.42 (1.09 – 1.85)	1.24 (1.04 – 1.64)
Possession of a refrigerator							
Yes	685	38.2	1	1	28.6	1	1
No	108	33.3	1.16 (0.92 – 1.46)	0.79 (0.53 – 1.18)	50.9	1.78 (1.32 – 2.40)	1.54 (1.13 – 2.09)
Beneficiary of Bolsa Família							
Yes	580	38.4	1	1	34.3	1	1
No	212	34.9	0.87 (0.62 – 1.24)	0.87 (0.66 – 1.16)	24.5	0.72 (0.53 – 0.97)	0.83 (0.61 – 1.13)

Unadjusted PR: unadjusted prevalence ratio; Adjusted PR: adjusted prevalence ratio; IC95%: confidence interval of 95%.

DISCUSSION

The prevalence of food insecurity (69.2%) in the population studied was larger than what was found for Brazilian families in the PNDS from 2006 (37.5%)⁸ and the PNAD from 2009 (30.2%)⁹. Still, based on the PNAD, the prevalence of families in Campina Grande surpasses the prevalence released for the northeastern region of Brazil (46.1%) and even the state of Paraíba (41.0%). However, a closer prevalence was found for families who presented children who attended public day care centers in Paraíba, of 62.0¹⁰ and 59.6%¹⁶. A similar prevalence, of 72.0¹⁷ and 74.6%¹⁸, was also detected in socioeconomically vulnerable families who were beneficiaries of the welfare program Bolsa Família. The largest prevalence of food insecurity, in both families with children and those with greater vulnerability, can be the consequence of inadequate or insufficient access to foods that prevail in the conditions of socioeconomic inequality, which exist in the Brazilian society.¹¹ Families with underage members present a higher possibility of lower per capita income¹⁹, and among the beneficiary families of transfer payment programs, only this benefit is not enough to create significant changes in problems related to adequate food access²⁰.

On the basis of the results of previous studies^{8-10,16-18}, it can be pointed out, also, that similarly to the results of this, the higher prevalence of food insecurity is present in a mild degree and the lower prevalence in the severe situation. In line with these considerations, in a cohort study done in cities in the countryside of the state of Paraíba, researchers verified the increase of mild food security/food insecurity in detriment to the moderate/severe levels between the years of 2005 and 2011²¹.

By considering that the concept of food insecurity, based on the EBIA, involves three dimensions: the perception of worry and angst before the uncertainty of regularly affording food (mild food insecurity), the utilization of strategies aiming at saving with regard to food (moderate food insecurity), and the concrete experience of going hungry for a whole day owing to not having anything to eat (severe food insecurity)²². Thus, it can be inferred that, although the concern over the regular availability of food is the main reason for food insecurity, there is still a significant portion of families who have the need to adopt measures that harm the satisfaction of nutritional needs (20.4% of families in this study) or in a condition of hunger (11.2% of families in this study). It is in this context that the study of families with children becomes relevant, because the possibility of a quantitative and qualitative reduction of food occurring and, more specifically, the fact of not having anything to eat, is predominant among families with children or teenagers in their nuclear family^{9,19,23}.

Although the occurrence of food insecurity among Brazilian families owing to socioeconomic factors has been consolidated in the literature, the situation has not been specific in terms of more severe degrees of food insecurity, not even for the families with children who attend day care centers¹¹. In this sense, the results in this study highlight clear differences in the determination of moderate/severe food insecurity in

comparison with mild food insecurity, steering the understanding categories as differing entities and of a larger similarity between food security and mild food insecurity. Moreover, the results associated with moderate/severe food insecurity suggest a higher contribution of the variables of a higher dependency on the family structure (type of drinking water, presence of toilets, number of people in the household, and possession of a refrigerator) rather than the variables related to the context of public policies (waste disposal and form of water supply).

In a recent study developed with families in cities in the north of the state of Alagoas²², researchers found results that were similar to this article, when they observed a higher frequency of moderate/severe food insecurity in the case of families who drank water that was not mineral water and in those families with a higher number of members. The findings were also similar in the absence of a relationship between the construction materials of their dwelling but were different in relation to the characterization of the household toilet, because in Alagoas, it did not represent an associated factor. In other studies^{24,25}, which also considered moderate/severe food insecurity as an outcome, the results were equally significant in terms of the number of people (total number of people or the number of people per room); however, in one of them²⁴, the significance was also verified for the type of construction of the dwelling. There are still population-based studies: one, in the metropolitan region of Rio de Janeiro, considering only severe food insecurity²; another, in Columbia, considering food insecurity²⁶. Both reported that the number of people is a strong predictor of these situations.

It is assumed that some variables that were not considered in the present article could also present an association with moderate/severe food insecurity. In this sense, a study is worth pointing out where the authors analyzed food insecurity in urban households with children under seven years of age, representing the southern and northeastern regions. In both the regions, the highest probability of moderate/severe food insecurity was identified in homes run by women—mothers, with black and mixed skin, with lower maternal education level, with lower family income per capita, and beneficiaries of the welfare program Bolsa Família. Moreover, in the northeastern region, residing in dwellings with a higher number of residents under the age of seven years also represented a factor associated with the results²⁷. Other studies that, in this debate, deserve attention are the ones where researchers attempted to systemize the factors associated with food insecurity for Brazilian families. These researchers found that the most frequent factors, in addition to the ones previously specified, were the type of dwelling and the education level of the mother or the head of the family^{11,12}. Thus, future analysis centered on this combination of variables is suggested.

It is possible to consolidate, through the studies described, that the number of residents in a household constitutes is one of the main factors in determining the higher degrees of food insecurity. The quantity of individuals in the household as a factor associated with food insecurity has been explained by considering that larger families present a higher probability of possessing a lower income per capita or the need for

more resources to by food^{22,28}. The association found in this study for moderate / severe food insecurity was systemized for overall food insecurity¹¹.

In this study, beneficiary and nonbeneficiary families of the welfare program Bolsa Família presented a frequency of moderate / severe food insecurity that did not reach a statistically significant figure. Different results were found by other researchers^{22,27}. Yet, some articles indicated different conclusions^{21,29}. One of the studies based on national data indicated that the transfer payment programs reduce the food insecurity of families and increase the chance of food security by 8% for every R\$10.00 extra that is received through the transfer payment²⁹. In another cohort study, it was indicated that the benefit positively impacted the increase of income and, with this, the levels of food security / mild food insecurity²¹.

These two conditions, which seem contradictory, in reality, are plausible. A higher prevalence of food insecurity in the cases of beneficiary families of the welfare program Bolsa Família suggests the appropriate steering of the resources of the program, however, without reaching food security. On the other hand, it is assumed that the correct focus of the program would be reaching the families who, in fact, find themselves most socially vulnerable and positively impacting their food security^{10,22}. These considerations necessarily refer to the theory that indicates that per capita income is the biggest factor in food insecurity, which translates into the positive effects of transfer or in the need to increase the values that are transferred so that the desired affect can be reached^{21,22,27}.

Still, in this perspective, it is necessary to ponder whether the conditioned transfer of income presents positive aspects in relation, among other things, to the strengthening of the local economy, the autonomy of the beneficiaries in the utilization of these resources and to the increase of demand for health services and negative aspects such as the depreciation of the benefit with the inflation and the raising of prices owing to the increase of unmatched demand²¹. In one review study that aimed at analyzing the studies that assessed the impact of the welfare program Bolsa Família in promoting (SAN) in Brazil, the authors concluded that the program can help with this well-being²⁰, however, without considering the assessment of bias hazards in the reviewed studies.

It is recommended, then, that studies be more specific for a better understanding of such questions, analyzing possible explanatory limits in the convergence of both the situations and the influence of the variables. Similar interpretations can be posed in the absence of a correlation between the waste disposal and the form of water supply with the food insecurity, suggesting the positive impact of the SAN public policies, because, in addition to food, other basic necessities are related to food security, those which when satisfied, provides the satisfaction of the basic needs related to food.

The authors declare that they do not have any conflicts of interest regarding the positions presented here. The authors also declare that they do not have any link to institutions that enforce or regulate the regulations surrounding day care centers.

CONCLUSION

The results in this study show that, for every 10 families with younger children who are cared for in municipal day care centers in Campina Grande, in the state of Paraíba, seven live in a state of food insecurity, four in moderate/severe food insecurity, and one in severe food insecurity or hunger, the rates that can be considered high. Among these families, moderate/severe food insecurity is more relevantly related to socioeconomic factors of the family itself, than those factors related to public policies, suggesting that the social and health interventions are obtaining positive results. The factors associated with moderate/severe food insecurity are related to the purchasing power of the families, indicating that the quantitative and qualitative reduction of food represents a great challenge not only for the creators of public policies but also for the families.

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