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Markers of food consumption in children up to five years of age living in shelters in the city of Fortaleza, Ceará

Marcadores de consumo alimentar de crianças com até cinco anos de idade vivendo em abrigos na cidade de Fortaleza, Ceará

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Abstract

Introduction: Food is a right ensured by law, and foster care institutions must ensure it to the children they admit by providing healthy food to avoid nutritional disorders and non-communicable diseases. *Objective:*To assess food consumption in institutionalized children. *Method:* a study was carried out in five foster care institutions in the city of Fortaleza, Ceará, Brazil, with 62 children aged 0-5 years between May and August 2017. The variables studied were sex, age, age at admission to the institution, duration of foster care and food consumption. Food consumption was assessed using the "Food Consumption Markers" form designed by the Food and Nutrition Surveillance System, which considers the consumption of fruits, vegetables and beans as markers of healthy eating and the consumption of ultra-processed foods as a marker of unhealthy eating. Food consumption data were analyzed based on the recommendations of the Guidelines for the Assessment of Food Consumption Markers in Primary Care. Data were collected by a nutritionist in face-to-face interviews. *Results:* There was a predominance of female children, with a mean age of 30.19±16.67 months. In all, 92.7% of the children exhibited some indicator of unhealthy food consumption for their age group. The consumption of ultra-processed foods and sweetened beverages by children aged 6-23 months and 29 days was high (83.33%). *Conclusion:* Most children exhibited some indicator of unhealthy food consumption for their age group in addition to the high frequency of consumption of ultra-processed foods, especially sweetened beverages, in all institutions.

Keywords: Nutrition. Food Consumption. Diet.

Resumo

Introdução: Alimentação é um direito assegurado por lei, e as instituições de acolhimento devem garanti-lo às crianças acolhidas, fornecendo alimentação saudável para evitar distúrbios nutricionais e doenças crônicas não transmissíveis. *Objetivo*: Avaliar o consumo alimentar de crianças institucionalizadas. *Método*: estudo realizado em cinco instituições de acolhimento na cidade de Fortaleza, Ceará, Brasil, com 62 crianças de 0-5 anos de idade, entre maio e agosto de 2017. As variáveis estudadas foram sexo, idade, idade quando do acolhimento na instituição, tempo de acolhimento e consumo alimentar. Para avaliar o consumo alimentar, utilizou-se o formulário "Marcadores do Consumo Alimentar" do Sistema de Vigilância Alimentar e Nutricional, que considera marcador de alimentação saudável o consumo de frutas, verduras e feijão; e não saudável, o consumo de alimentos ultraprocessados. Para análise dos dados do consumo alimentar, seguiram-se as recomendações do documento

Orientação para Avaliação de Marcadores de Consumo Alimentar na Atenção Básica. Os dados foram coletados por um nutricionista em entrevistas presenciais. ***Resultados***: Predominaram crianças do sexo feminino, com idade média de 30,19±16,67meses. Verificou-se que 92,7% das crianças apresentavam algum indicador de consumo alimentar não saudável para sua faixa etária. O consumo de alimentos ultraprocessados e bebidas adoçadas pelas crianças com idade de 6-23 meses e 29 dias foi alto (83,33%). ***Conclusão***: A maioria das crianças apresentava algum indicador de consumo alimentar não saudável para sua faixa etária, além de alta frequência de consumo de alimentos ultraprocessados, sobretudo de bebidas adoçadas em todas as instituições.

Palavras-chave: Nutrição. Consumo Alimentar. Alimentação.

INTRODUCTION

Children's health and nutrition are rights ensured by the *Estatuto da Criança e do Adolescente – ECA* (Child and Adolescent Statute).[1] Food is a basic human right and was recognized as a social right by Constitutional Amendment 64, of February 4, 2010.[2] It was an important achievement for the Brazilian population, especially for children, as they constitute one the population groups at greatest risk of health and nutrition problems.

The violation of this right among children in institutional foster care may lead to a maintenance of a state of social vulnerability. In Brazil, there are no public food and nutrition security policies specifically targeted at institutionalized people, except for other vulnerable groups such as traditional peoples and communities.[3]

The nutrition transition process that occurred in the last decades in Brazil is translated into a decrease in the prevalence of malnutrition and a significant increase in overweight and obesity,[4,5] which also occurred in other countries. However, for children in foster care institutions, the nutrition panorama is different, with a higher prevalence of underweight, short stature and presence of specific nutritional deficiencies.[6-8]

Despite describing children in environments marked by adversity, studies do not show common causal associations for this fact. However, it is known that early mother-child separation has negative consequences for the child's behavior,[9] and the weak mother-child bond is a determining factor for presence of nutritional disorders in childhood,[10] with both factors being present in these children's life histories. In addition, when associated with other factors, these problems may lead to nutritional indexes below the recommended.

The temporal trend showing a decrease in the acquisition of fresh or minimally processed foods and an increase in the intake of ultra-processed foods by the Brazilian population is worrying given the low nutritional quality of the latter.[11] This is reflected in the food consumption among families, including children, as demonstrated by several studies.[12-15] The consumption of these foods implies an increased intake of fat, cholesterol, sodium, and calories.[16]

Institutionalized children are not included in the large surveys that investigate food acquisition and food consumption conducted in Brazil, where only private households are studied.[11,17,18] Therefore, the aim of this study was to assess food consumption in children up to five years of age in foster care.

METHODS

This observational and analytical study used data collected between May and August 2017. Data from the National Register of Children in Foster Care were consulted and all children up to five years old in foster care in the city of Fortaleza, capital of Ceará, Brazil, were selected for the study. Exclusion criteria were children whose birth date was unknown and existence of conditions that prevented oral feeding.

The variables studied were sex, age, age at admission to the institution, duration of foster care, and children's food consumption. Data were collected by a nutritionist during face-to-face interviews using structured questionnaires. Questions on food consumption were answered by employees who directly cared for the children and by one nutritionist in one institution. The other data were provided by social workers or coordinators of the institutions.

Food consumption was assessed using the "Food Consumption Markers" form designed by the Ministry of Health (MoH) Food and Nutrition Surveillance System to identify healthy or unhealthy eating behaviors. According to this document, the consumption of fruits, vegetables and beans is a marker of healthy eating, and a marker of unhealthy eating is the consumption of ultra-processed foods[19] (sausages, sweetened beverages, instant noodles,

and crackers, and the consumption of sweets, treats and sandwich cookies).[20] A comparative analysis was performed based on duration in foster care and children's sex and age.

For children under two years of age, the form considered markers for assessing feeding practices in this age group published by the World Health Organization, which, to achieve the proposed objective, divides children into age ranges of up to five months and 29 days, for which it assesses breastfeeding and early introduction of food, and children aged 6-23 months and 29 days, for which it assesses the introduction of food and identifies markers of risk of or protection against nutritional disorders as well as the maintenance of breastfeeding after six months of life.[19] The markers for children below two years of age are: exclusive breastfeeding for children under six months; continued breastfeeding (children aged 6-23 months and 29 days); introduction of food; minimum dietary diversity; minimum frequency and adequate consistency; consumption of foods rich in iron (beef, chicken, fish, pork, offal, other or egg; liver; and beans); consumption of foods rich in vitamin A (orange-colored vegetables or fruits or dark green leaves); consumption of ultra-processed foods.[19,21,22]

For this age group, it is appropriate to consume breast milk exclusively until six months of life; maintenance of breastfeeding for up to two years or more; the daily consumption of two fruits and a "salty meal" for 6-6 months and 29 days; and the consumption of two fruits and two "salty meals" a day for children aged 7-8 months and 29 days; consumption of iron-rich foods on a daily basis; presence of foods rich in vitamin A in the recommended daily servings of vegetables and legumes. It is inappropriate to consume at least one ultra-processed food a day.[19,21,22]

Minimum dietary diversity (for children aged 6-23 months and 29 days) is considered to be the consumption of any amount of food from the six food groups, namely breast milk or milk other than breast milk, porridge with milk or yogurt; fruits and vegetables; orange-colored vegetables or fruits and dark green leaves; meat and eggs; beans; cereals and tubers. The minimum frequency of consumption should be at least once a day for "salty meals" for 6-6 months and 29 days, and at least twice a day for "salty meals" for 7-23 months and 29 days. Consistency should be mashed, shredded, chopped after six months of life.[19,21,22]

For children aged two years or older, the food consumption markers were based on the Dietary Guidelines for the Brazilian Population.[21] The markers for this age group are: eating at least the three main meals of the day (breakfast, lunch and dinner); eating meals while watching television (television, computer and/or cell phone); consumption of beans; consumption of fruits; consumption of vegetables and legumes; consumption of hamburgers and/or sausages; consumption of sweetened beverages; consumption of instant noodles, packaged snacks or crackers; consumption of sandwich cookies, sweets or treats.[19]

For this age group, it is considered appropriate having at least the three main meals of the day (breakfast, lunch, and dinner); not having meals while watching television, using a computer and/or cell phone; avoiding consumption of ultra-processed foods or consuming them occasionally; and having a varied fresh food-based diet covering all food groups.[21]

The analysis of food consumption data followed the recommendations of the Guidelines for the Assessment of Food Consumption Markers in Primary Care,[19] which guide the assessment of food consumption based on indicators and the questions that make up the form for assessing food consumption markers. Statistical analysis was performed using SPSS version 20.0. Continuous variables were described as mean and standard deviation, and median and interquartile range according to their adherence to normal distribution tested by the Kolmogorov-Smirnov test. The Chi-Squared test (χ^2) was used to compare the frequencies. The significance threshold was set at 5%, and associations with a p-value <0.05 were considered statistically significant.

The informed consent form was signed by the judge responsible for the *Coordenadoria da Infância e da Adolescência* (Childhood and Adolescence Coordination Office) of the *Tribunal de Justiça do Ceará* (Ceará Court of Justice). The research followed the rules for research involving human beings established by Resolution No. 466/2012

of the *Conselho Nacional de Saúde* (National Health Council) and followed the ethical principles of the Declaration of Helsinki. The study started only after approval by the Research Ethics Committee of the *Universidade Federal de Pernambuco* (Federal University of Pernambuco), under protocol No. 2.019.560 (CAAE: 64680116.4.00005208).

RESULTS

Five of the six foster care institutions for children up to five years of age in the city of Fortaleza participated in the study. Two shelters were run by the state government, two by the city hall, and one was a non-governmental organization (NGO). Three children were excluded because they were fed via nasoenteral feeding tube. Therefore, of the 78 children within this age range in foster care, 62 were included in the study sample.

Table 1. Characterization of children aged 0-60 months admitted to foster care institutions in Fortaleza, Brazil, 2017.

Characteristics	N	%
Sex		
Female	32	51.6
Male	30	48.4
Age		
up to 5 months and 29 days	3	4.8
6-23 months and 29 days	18	29.0
from 24 months	41	66.1
Age at admission		
≤ 12 months	28	46.8
> 12 months	33	53.2
Duration of foster care		
< 24 months	52	83.9
≥ 24 months	10	16.1
Institution		
NGO*	10	16.1
government	52	83.9

*Non-governmental Organization

Some children were allergic to cow's milk protein (2) and lactose intolerant (1) and others presented with gastroesophageal reflux disease (1) and chronic constipation (1). In all cases, special attention was paid to their feeding. All the children under one year of age received infant formulas appropriate for their age. No child was found to eat meals while watching television, and all the institutions offered six meals a day.

Some institutions had inadequate infrastructure for preparing a large number of meals. Only two institutions had a nutritionist as part of their staff. In the others, the meals were prepared by the cooks who used the food available on the day.

Considering the total sample in the assessment of food consumption, 92.7% of the children exhibited some indicator of unhealthy eating for their age range. Three children were under six months of age; one of them, who

was only one month old, was only fed with baby formula; the other two, who were four months old, received, in addition to baby formula, unsweetened fruit juice (data not shown in tables).

None of the children younger than 24 months received breast milk, nor did they consume hamburgers and/or sausages. Only one child out of the five aged 6-8 months and 29 days received food at the frequency recommended for their age. Most (72.22%) of the children aged 6-23 months and 29 days received six food groups at the frequency recommended for their age, but 38.98% did not receive "salty meals" at a frequency and consistency appropriate for their age. Most of the children in this age range (83.33%) consumed ultra-processed foods and sweetened beverages (table 2).

Table 2. Food consumption in children aged 6-23 months and 29 days admitted to foster care institutions in Fortaleza, Brazil, 2017.

Indicators*	Frequency	
	N (18)	%
Minimum dietary diversity		
receive six food groups at the frequency recommended for their age	13	72.22
Minimum frequency and adequate consistency	11	61.11
receive "salty meals" at a frequency and consistency appropriate for their age		
Consumption of foods rich in iron	4	22.22
consume meat, eggs, liver and beans		
Consumption of foods rich vitamin A	17	94.44
consume orange-colored vegetables and fruits or dark green leaves		
Consumption of ultra-processed foods	15	83.33
consume at least one food from the group of ultra-processed foods		
Consumption of sweetened beverages	15	83.33
soft drinks, juice box, powdered juice, coconut water box, guaraná/redcurrent syrup, sweetened fruit juice		
Consumption of instant noodles, packaged snacks or crackers	2	11.11
Consumption of sandwich cookies, sweets or treats	2	11.11

*Sistema de Vigilância Alimentar e Nutricional – SISVAN (Food and Nutrition Surveillance System), 2015

Most children between two and five years old consumed beans, fruits, and vegetables; however, consumption of ultra-processed foods was also found in large proportions in this age range (table 3).

Table 3. Food consumption in children aged 2-5 years admitted to foster care institutions in Fortaleza, Brazil, 2017.

Marker *	Consumption	
	N (41)	%
Markers of healthy eating		
Consumption of beans	37	90.2
Consumption of fruits	40	97.61
Consumption of vegetables and legumes	35	85.36
Markers of unhealthy eating		
Consumption of hamburger and/or sausages	11	26.19
Consumption of sweetened beverages**	38	92.7
Consumption of instant noodle, packaged snacks or crackers***	29	69.04
Consumption of sandwich cookies, sweets or treats	14	33.33

* *Sistema de Vigilância Alimentar e Nutricional – SISVAN* (Food and Nutrition Surveillance System), 2015
**for this item, only the consumption of sweetened fruit juice was observed
*** for this item, only the consumption of crackers was observed

The consumption of sweetened beverages was high among children of both sexes aged six months or older. There was a higher consumption of instant noodles and packaged snacks (p=0.019) and sandwich cookies, sweets, and treats (p=0.044) among boys. The consumption of instant noodles, packaged snacks (p=0.044) and sandwich cookies (p=0.000) was higher among those older than 24 months. Table 4 shows the proportion of consumption in children aged six months or older.

Table 4. Markers of food consumption in children admitted to foster care institutions in Fortaleza, Brazil, 2017, according to sex and age range.

Marker*	Consumption					
	Sex			Age Range** (months)		
	Male n=30 %	Female n=29 %	p-value***	≥6 < 24 n=18 %	≥24 n=41 %	p-value***
	Markers of unhealthy eating					
Consumption of sweetened beverages	90.0	89.7	0.965	83.3	92.7	0.274
Consumption of instant noodle	50.0	20.7	0.019	16.7	43.9	0.044
Consumption of packaged snacks	50.0	20.7	0.019	16.7	43.9	0.044
Consumption of crackers	60.0	37.9	0.090	11.1	65.9	0.000
Consumption of sandwich cookies	36.7	13.8	0.044	11.1	31.7	0.094
Consumption of sweets	36.7	13.8	0.044	11.1	31.7	0.094
Consumption of treats	36.7	13.8	0.044	11.1	31.7	0.094
	Markers of healthy eating					
Consumption of beans	93.3	79.3	0.116	77.8	90.2	0.198
Consumption of fruits	96.7	89.7	0.284	83.3	97.6	0.045
Consumption of legumes	90.0	93.1	0.669	94.4	90.2	0.594
Consumption of vegetables	73.3	79.3	0.590	55.6	85.4	0.013

* *Sistema de Vigilância Alimentar e Nutricional – SISVAN* (Food and Nutrition Surveillance System), 2015
**children under six months of age were not included as they did not yet consume the analyzed foods.
***Chi-squared test

DISCUSSION

This is the first study on the food consumption of institutionalized children in Northeastern Brazil using food consumption markers and covering children from various institutions. Although the number of children studied is small, it represents 79.5% of the children in foster care in the municipality within the age range chosen for the study. Freitas[23] studied the food consumption of 67 children and adolescents in five foster care institutions in the municipality of Nova Iguaçu, Rio de Janeiro, based on food consumption markers, but only eight children were under the age of five, and one of the institutions assessed was a residential child care community, another type of foster care institution, which makes comparisons difficult.

A considerable number of children had been admitted to the institutions before the age of six months and were therefore weaned early. Failure to breastfeed children under 24 months of age is a health risk condition;[24] therefore, children who are separated from their mothers at this age need special attention. The

provision of pasteurized human milk by Human Milk Banks would be the best alternative to feed children who are institutionalized under six months of age, but unfortunately there are no conditions, as in Brazil these services generally do not have enough milk to meet their own demands.[25]

Our results differ from the recommendations of the Dietary Guidelines for Brazilian children under 2 years of age[22] in the following terms: 1 (Feed only breast milk up to 6 months); 2 (After 6 months of age, introduce other foods slowly and gradually, keeping breast milk up to two years of age or older; 3 (offer the child proper drinking water instead of juices, soft drinks and other sweetened beverages); 5 (do not offer sugar or preparations or products containing sugar to the child until 2 years of age), and 6 (do not offer ultra-processed foods to the child).

Some children aged 6-24 months did not receive food at the frequency and consistency appropriate for their age range. Current data show that worldwide children in this age range suffer from the absence of fruits or vegetables.[26] In shelters, soups and porridges replacing solid meals can be offered to children to comfort them. Inadequate frequency may be due to failures in the supply of foods in some institutions or the lack of technical support for donors and shelter staff and managers to provide adequate food.

There was a high frequency of consumption of ultra-processed foods. These results are similar to those found by Holland & Szarfarc[27] in foster care institutions in São Paulo. The consumption of instant noodles, packaged snacks and sandwich cookie was significantly higher among children older than 24 months, probably due to adults' judgment regarding the quality of food according to age range, which makes them avoid giving less nutritious foods to the youngest.

With regard to the institution that refused to participate in the study, we only know that it was an NGO and that it sheltered twelve children within the age range analyzed in the present study. This prevents us from inferring whether the results would have been different if such institution had been included in the study.

Inappropriate eating behaviors are observed in children of all ages, whether they are institutionalized or not.[28-30] The National Health Survey carried out in 2013 found that 60.8% of children under 24 months of age already consumed cookies, crackers or cake, and 32.3% consumed soft drinks or artificial juice.[18] Also serious is the drop in the share of cereals, legumes and oilseeds consumed, which decreased from 10.4% to 5.0% in food expenditure in Brazilian households, as observed in the last national survey.[11] Holland[27] and Freitas[23] found in their studies with children and adolescents in shelters that the menus were prepared based on what was available on the day, and that the participation of donations was of fundamental importance, although it was not enough to guarantee an adequate supply of fruits and vegetables, items which are not often donated, unlike processed foods.

In government-run institutions, food was purchased through bidding processes. In the NGO, there was a direct purchase. However, all the institutions relied on food donations to complete their supply. The quality of donated food does not depend on the institutions, and the choice of products offered is made by the donors themselves based on their eating habits, income, and knowledge about food.

Within the current model of development, in which many factors contribute to consumerism and unhealthy eating practices,[31] food donors in foster care institutions, represented by entrepreneurs and civil society, are the fruit of generations influenced by marketing of the food industry, which influences choices[32,33] and hence disrupts cultural habits. A narrative has been created and disseminated to tell that healthy is not tasty, which makes these foods nonattractive, especially for children. Some foods, labeled by the industry as "for children" in a constant media appeal, have been widely publicized and marketed for decades in Brazil.

The lack of specific public policies targeted at this population and the absence of nutritionists in the institutions can contribute to this situation. Unfortunately, this professional is not considered essential in social care services.[34]

The findings of the present study draw attention to the need to be especially careful with the diet of institutionalized children, both for their fundamental importance for growth and development[22] and for their cultural, affective and social significance,[21,31] since children in foster care experience a relative deprivation of liberty and many spend years institutionalized.[35] Therefore, it is of paramount importance that the foster care institutions be able to offer children meals that contain regional food and preparations and promote eating in a healthy way.

Unhealthy eating habits are risk factors for nutritional disorders[36,37] and for the development of non-communicable diseases. Despite being diagnosed in adulthood, these diseases have a slow pathogenesis and start to develop in childhood.[38] Therefore, the supply of healthy and balanced food for children in early childhood, especially in the first thousand days, ranging from conception to the end of the second year of life, is essential, as it is a period of rapid growth and development of various functions in which nutrition is essential for this process to take place in a complete and healthy way.[39]

According to data from the Global Burden of Disease Study 2015, inadequate diet was the main risk factor in Brazil in the analysis of the proportion of the global burden of disease according to disability-adjusted life years,[40] which justifies efforts to offer healthy diets to children.

Several factors are associated with the child's eating patterns and are related to the context in which the family is inserted.[41,42] This plays an important role in the development of children's eating habits, as they can reproduce the model learned in childhood. In foster care institutions, caregivers "replace" family members and are thus susceptible to the same failures and successes, but due to the professional nature of this relationship, they must play an educational role.

The chance of a full development according to the child's genetic potential is related to good environmental conditions;[43] therefore, foster care institutions must be healthy environments, which includes offering and promoting healthy eating. The concern should not only be with excesses, but also with specific nutritional deficiencies, which are more difficult to diagnose. In Brazil, although the prevalence of anemia may be decreasing in general terms, it is not known to what extent the same is occurring among institutionalized children, since they are not included in population-based surveys.[44]

The State of the World's Children 2019 report examines child malnutrition in present times and describes the global changes over the past 20 years in the environmental, political, and cultural contexts and their influence on child nutrition. It draws attention to what it classifies as "triple burden of malnutrition" (undernutrition, hidden hunger and overweight), which threatens the full development of children and of society.[26]

Permanent education for shelter teams addressing themes related to nutrition education needs to be implemented to ensure healthy eating for children, since they do not have autonomy in food choices and, even if autonomy were given to them, they would not be able to compose an adequate diet. This publication is expected to highlight the need for a systematic collection of data on this population. There are many challenges that the Brazilian society urgently needs to face in order to ensure the Human Right to Adequate Food for children in shelters because after 30 years of the creation of ECA and Brazil's approval of the Convention on the Rights of the Child children cannot be deprived of fundamental rights, despite so many equally important achievements.[45]

In further studies, it would be important to collect information about the teams' knowledge about health and food, as well as the institutions' supply policy for the identification of the determinants of the eating habits of similar populations.

CONCLUSION

Most children exhibited some indicator of unhealthy food consumption for their age group. There was a high frequency of consumption of ultra-processed foods, especially sweetened beverages in all institutions, which justifies, in the context of institutionalization of children, the adoption of intervention measures such as advice from nutritionists on the planning of menus and promotion of nutrition education and the monitoring of children's health conditions by the Judiciary.

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Contributors

Silveira AC was responsible for the conception of the research project, collection, analysis and interpretation of data, and writing of the manuscript; Leite AJM and Lira PIC were responsible for the conception of the research project, analysis and interpretation of data, and writing and critical review of the manuscript; Cabral PC and Viana Júnior AB were responsible for the analysis and interpretation of data; and writing and critical review of the manuscript.

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