NUTRITIONAL STATUS OF CHILDREN ADMITTED TO A SHELTER

Condição nutricional de crianças admitidas em uma instituição de acolhimento

Condición nutricional de niños admitidos en una institución de acogida

ABSTRACT

Objective: To assess the nutritional status of children in a shelter located in the city of Recife, Northeastern Brazil. **Methods**: Retrospective cross-sectional study carried out with a sample of 166 children under five years of age admitted to a shelter in Recife, Pernambuco, between September 2007 and September 2012. The study variables were: gender, weight, height, age and reason for institutionalization. Nutritional status was determined based on the following anthropometric indicators: weight-for-age, height-for-age, weight-for-height and body mass index-for-age using the Z score and the World Health Organization growth curves standards. SPSS 13.0 was used for the statistical analysis. For all analyses, statistical significance was set at $p<0.05$. **Results:** Most children (78.3%) were at normal weight at admission; however, the underweight rate (9.6%) was higher than that of the population of the same age group in the state of Pernambuco (3.2%). Based on the weight-for-height index, underweight was higher in the age group 6-to-11 months (23%), and it was positively associated with age ($p=0.025$). The prevalence of stunting was 12%. **Conclusion:** Underweight and stunting rates found in the study sample were higher than those reported for children in the same age group in the state of Pernambuco and are much higher than the recommendations of international organizations.

Descriptors: Child; Shelter; Nutrition Assessment.

RESUMO

Objetivo: *Avaliar o estado nutricional de crianças de uma instituição de acolhimento na cidade de Recife, no momento da admissão.* **Métodos**: *Estudo transversal, retrospectivo, que estudou uma amostra de 166 crianças menores de cinco anos de idade, acolhidas entre setembro de 2007 e setembro de 2012, em uma instituição de Recife, Pernambuco. As variáveis estudadas foram sexo, peso, estatura, idade e motivo do acolhimento. O estado nutricional foi analisado mediante os índices antropométricos: peso por idade, estatura por idade, peso por estatura e índice de massa corporal para idade pelo Escore Z, utilizando como padrão de referência as curvas de crescimento da Organização Mundial da Saúde. Para as análises estatísticas, utilizou-se o software SPSS, versão 13.0. Para todas as análises, considerou-se significância estatística quando $p<0,05$.* **Resultados:** *A maioria das crianças (78,3%) chegou eutrófica à instituição, entretanto, os níveis de desnutrição (9,6%) foram superiores aos da população de mesma faixa etária no estado de Pernambuco (3,2%). A desnutrição segundo o índice peso por estatura foi maior na faixa etária dos 6 aos 11 meses (23%), mas somente com esse índice a associação com a faixa etária foi positiva ($p=0,025$). A prevalência de baixa estatura foi de 12%.* **Conclusão:** *A desnutrição e a baixa estatura na amostra estudada apresentaram índices maiores que o encontrado em crianças de mesma faixa etária do Estado de Pernambuco, e estão aquém dos valores aceitáveis por organizações internacionais.*

Descritores: *Criança; Abrigo; Avaliação Nutricional.*

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RESUMEN

Objetivo: Evaluar el estado nutricional de niños de una institución de acogida localizada en la ciudad de Recife, noreste brasileño. Métodos: Estudio transversal y retrospectivo que estudió una muestra de 166 niños abajo de cinco años de edad acogidos entre septiembre de 2007 y septiembre de 2012 en una institución de Recife, Pernambuco. Las variables estudiadas fueron el sexo, el peso, la estatura, la edad y el motivo de la acogida. El estado nutricional fue analizado a través de los índices antropométricos: el peso por la edad, la estatura por la edad, el peso por la estatura y el índice de masa corporal para la edad por la puntuación Z utilizando como patrón de referencia las curvas de crecimiento de la Organización Mundial de la Salud. Para los análisis estadísticos se utilizó el software SPSS, versión 13.0. Para todos los análisis se consideró la significancia estadística para p<0,05. Resultados: La mayoría de los niños (78,3%) llegó eutrófica a la institución, sin embargo, los niveles de desnutrición (9,6%) fueron superiores a los de la población para la misma franja de edad en el estado de Pernambuco (3,2%). La desnutrición según el índice del peso por la estatura fue mayor para la franja de edad entre los 6 y 11 meses (23%) pero solamente con ese índice la asociación con la franja de edad fue positiva (p=0,025). La prevalencia de baja estatura fue del 12%. Conclusión: La desnutrición y la baja estatura de la muestra estudiada presentaron mayores índices que aquellos encontrados en los niños de la misma franja de edad del estado de Pernambuco y están inferiores a los valores aceptables por las organizaciones internacionales.

Descriptores: Niño; Refugio; Evaluación Nutricional.

INTRODUCTION

In Brazil, approximately 30 thousand children and adolescents live in shelters, mainly due to unfavorable socioeconomic conditions[1], and this is often reflected in a nutritional deficiency, especially in children under five years of age[2]. The nutritional status of children reflects their living conditions given that growth is sensitive to many factors such as environmental conditions, poor economic status and poor housing, low maternal education, lack of prenatal care and the occurrence of low birth weight[3].

Malnutrition is still considered a public health problem in Brazil; however, it has been observed a significant decrease in its prevalence in recent decades, although there is a difference in magnitude between the regions of the country, with its prevalence in the Northeast region (17.9%) being much higher than that in the South Central region (5.6%)[4]. The process of nutritional transition in Brazil appears as the effect of social changes that resulted in the reduction of poverty in the country, generating a positive impact on the reduction of malnutrition and also stunting[2,5]. In Pernambuco, particularly, there has been a decrease in

nutritional deficiency over time[6,7]. Nutritional deficiency in childhood can lead to irreversible consequences for the individual, especially with regard to intellectual development[8].

According to the Statute of the Child and Adolescent, the right to life, health, respect and dignity is considered essential; therefore, when these basic principles are not granted, shelters must take on the parental role in order to grant these rights, providing appropriate conditions for the normal growth and development. Sheltering, which is considered a protective measure, should be temporary[9]; however, many children can remain in this condition for several years[10].

Shelters should be fully responsible for the growth and psychomotor development of children under their protection. The cognitive ability of the child depends on the quality of environmental stimulation[11,12]. Studies have shown the negative effects of institutionalization on child development[13,14]. The nutritional status of children who are institutionalized can and should be monitored through anthropometric measurements, which are simple, inexpensive and sensitive to detect nutritional disorders. The monitoring can be done using the Child Health Record (*Caderneta de Saúde da Criança*), which is an instrument designed for this purpose[15].

Few studies have documented the nutritional status of children admitted to these institutions as well as the effects of institutionalization on their physical development[16,17]. In this context, the aim of the present study was to assess the nutritional status of children in a shelter located in the city of Recife at admission.

METHODS

This is a retrospective cross-sectional study conducted in a shelter for children at social risk located in Recife, Pernambuco, Brazil. The sample comprised 166 children younger than 60 months of age, of both genders, admitted from September 2007 to September 2012. This study is the result of a five year-survey of the nutritional status at admission of children.

The institution in which the study sample was collected is a Non-governmental Organization (NGO) recognized as a public entity that temporarily receives children at social or abandonment risk, granting them full protection until a court decision on their fate – family reintegration or adoption by a foster family. It has a multidisciplinary team consisting of pediatrician, nutritionist, nursing technicians, pedagogues, psychologists and social workers. It predominantly receives children from the capital, with the rare inclusion of children from other municipalities of the state.

Exclusion criteria were: prematurity, low birth weight, genetic syndrome or severe chronic disease that could lead to nutritional deficiency, cerebral palsy, unknown date of birth of the child, inability to perform anthropometric measurements in the first 48h after admission and readmissions due to guardianship return.

Of the 206 children under five years of age admitted to the institution between September 2007 and September 2012, 40 (19.4%) had to be excluded. Of these, 15 (37.5%) were excluded due to prematurity, 12 (30.0%) due to the impossibility of performing anthropometric measurements in the first 48 hours after admission, 8 (20.0%) because of readmission due to guardianship return, 4 (10.0%) for being older than 5 years, and 1 (2.5%) due to the unknown date of birth.

The study variables were: gender, age, weight, height and reason for admission to the shelter. Data were obtained from the individual forms of children. Children born at term were those born from the 37th week of pregnancy; low birth weight children wqere those born weighing < 2,500 g[18]. The nutritional diagnosis was carried out using the following anthropometric measurements: weight for age (W/A), weight for height (W/H), height for age (H/A) and body mass index (kg/m2) for age (BMI/A), expressed in Z score considering the cutoffs of the World Health Organization[19] established for children under 60 months of age.

The height for age ratio (H/A) was used as an indicator of stunting and the body mass index (kg/m2) for age (BMI/A) was used as an indicator of current nutritional status. The classification of nutritional status according to the anthropometric indices chosen followed the recommendation of the Food and Nutrition Surveillance System (*Sistema de Vigilância Alimentar e Nutricional – SISVAN*)[15], which establishes for W/H and BMI/A: malnutrition (thinness and severe thinness) when z-score <-2; normal weight when Z score is $\geq$ -2 and $\leq$ +2; and excessive weight (overweight and obesity) when Z score > +2. Regarding H/A: stunting when Z score < -2; adequate height when Z score $\geq$ -2. And with regard to W/A: low weight when Z score <-2; normal weight when Z score $\geq$ - 2 and $\leq$ +2; and high weight when Z score $\geq$ +2.

The height and weight of children are routinely measured by a nutritionist at the time of admission to the institution following techniques recommended by the Ministry of Health[15]. The institution has appropriate equipment for performing anthropometric measurements, such as a pediatric digital scale with a maximum capacity of 15 kg and 5 g graduation to weigh children up to 24 months of age and a platform digital scale with capacity of 180 kg and 100 g graduation for children older than 24 months of age – both scales are manufactured by Filizola. In addition, the institution has a wooden pediatric anthropometric ruler with removable marker and 100 cm and graduation in millimeters numbered at every centimeter.

The reasons for admission to the shelter were classified according to the categorization of the Center for Guidance and Supervision of Entities (*Núcleo de Orientação e Fiscalização de Entidades – NOFE*) of the Integrated Children and Adolescent Center (*Centro Integrado da Criança e do Adolescente*) of the 1st Children and Youth Court of Pernambuco: abandonment, domestic violence, social violence (beggary and misery) and street situation. Additionally, the study included children admitted through the Legal Mother Program (*Programa Mãe Legal*) developed by the Center for Special Curatorship and Family Protection (*Núcleo de Curadoria Especial e Proteção à Família – NUCE*) the 2nd Child and Youth Court of Recife. For analysis purposes, the abandoned children and those admitted through the Legal Mother Program were grouped.

Statistical analyses were performed using the SPSS version 13.0 (SPSS Inc., Chicago, IL, USA), and continuous variables were tested for normal distribution using the Kolmogorov-Smirnov test – as they presented normal distribution, they were described as mean and standard deviation. The Chi-squared test was used to compare categorical variables, and the Kappa test was used to assess the agreement of the diagnosis of malnutrition established by the BMI/A and the Weight/Height rations. For all analyses, p <0.05 was considered statistically significant.

The research took place after approval by the Ethics Committee of the Maurício de Nassau University Center (*Centro Universitário Maurício de Nassau*) under Protocol No. 91.170/12.

RESULTS

The final study sample consisted of 166 children with a mean age of 13 (± 13.97) months, ranging from 0-53 months. There was a homogeneous distribution of genders, with 88 (53%) boys; there was a higher proportion of children under one year of age (57.2%, n=95) and 24.1% (n=40) were admitted when they were newborns.

The distribution of children according to the age revealed that 41.6% (n=69) were between 0 and 5 months old, and 77.1% (n=128) were up to 24 months of age. Regarding the reasons for admission to the shelter, 98 (59%) were institutionalized because of abandonment, 54 (32.5%) because of domestic violence, 10 (6%) because of street situation, and 4 (2.5%) were admitted through the Legal Mother Program.

The analysis of the anthropometric indicators showed that the majority (78.3%, n=130) of children were at normal

weight in all the measurements analyzed. Stunting was the most prevalent nutritional disorder (12%, n=20). BMI/A was more accurate in detecting the extreme values of normality compared to the W/H (Figure 1). The agreement on the malnutrition diagnosis between W/H (7.2%, n=12) and BMI/A (9.0%, n=15) was 0.557 (p <0.001), which is considered regular.

The prevalence of malnutrition, according to W/H ratio, was higher among children aged 6 to 11 months (p=0.02) (Table I). There was no difference in the distribution of the BMI according to gender, age and reasons for admission to the shelter (Table II).

No relationship was found between nutritional status, according to W/A and H/A, and gender, age and reasons for admission (Tables III and IV).
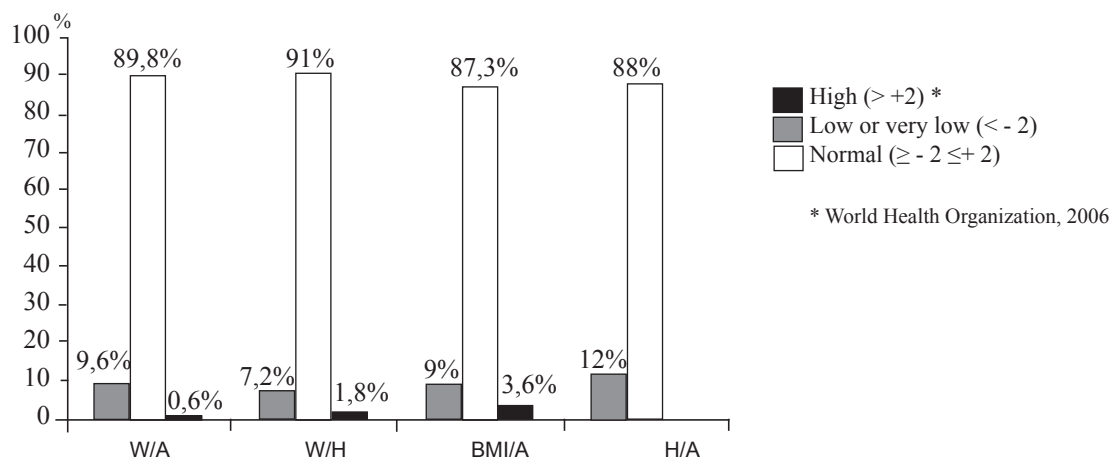

Figure 1 - Nutritional status, according to Z score, of children under five years of age admitted to a shelter in the period from 2007 to 2012. Recife, Pernambuco.

Table I - Nutritional status based on weight for height (W/H) according to gender, age group and reason for admission to the shelter of children under five years of age admitted to a shelter in the period from 2007 to 2012. Recife, Pernambuco.

Characteristics	Total	W/H(Z score)#			p-value
		Thinness < - 2	Normal Weight - 2 e < 2	Excessive Weight ≥2	
		n (%)	n (%)	n (%)	
Gender					
Male	88	6 (7.0%)	80 (91.0%)	2 (2.0%)	0.87
Female	78	6 (8.0%)	71 (91.0%)	1 (1.0%)	
Age group					
0-5 months	69	3 (4.0%)	66 (96.0%)	0 (0%)	
6-11 months	26	6 (23.0%)	19 (73.0%)	1 (4.0%)	0.02*
12-23 months	32	2 (6.0%)	29 (91.0%)	1 (3.0%)	
≥ 24 months	39	1 (2.6%)	37 (95.0%)	1 (2.6%)	
Reason for admission					
Abandonment	102	9 (9.0%)	91 (89.0%)	2 (2.0%)	
Violence	54	3 (5.6%)	50 (92.6%)	1 (1.9%)	0.80
Street situation	10	0 (0%)	10 (100%)	0 (0%)	

W/H: Weight for height ratio. #World Health Organization, 2006.
*p<0.05; Pearson's Chi-squared test.

Table II – Nutritional status based on body mass index for age (BMI/A) according to gender, age group and reason for admission to the shelter of children under five years of age admitted to a shelter in the period from 2007 to 2012. Recife, Pernambuco.

Characteristics	Total	BMI/A (Z score)#			p-value
		Thinness < - 2	Normal Weight - 2 e< 2	Excessive Weight ≥2	
		n (%)	n (%)	n (%)	
Gender					
Male	88	8 (9.0%)	75(85.0%)	5 (6.0%)	0.31
Female	78	7 (9.0%)	70(90.0%)	1 (1.0%)	
Age group					
0-5 months	69	7 (10.0%)	62 (90.0%)	0 (0.0%)	
6-11 months	26	5 (19.0%)	19 (73.0%)	2 (8.0%)	0.10
12-23 months	32	2 (6.3%)	28(87.5%)	2 (6.3%)	
≥ 24 months	39	1 (3.0%)	36(92.0%)	2 (5.0%)	
Reason for admission					
Abandonment	102	10(10.0%)	88 (86.0%)	4 (4.0%)	
Violence	54	4 (7.0%)	48 (89.0%)	2 (4.0%)	0.95
Street situation	10	1 (10.0%)	9 (90.0%)	0 (0%)	

BMI/A: Body mass index for age. #World Health Organization, 2006.
*$p<0.05$; Pearson's Chi-squared test.

Table III - Nutritional status based on weight for age (W/A) according to gender, age group and reason for admission to the shelter of children under five years of age admitted to a shelter in the period from 2007 to 2012. Recife, Pernambuco.

Characteristics	Total	W/A (Z score)#			p-value
		Low < - 2	Normal ≥- 2 e ≤ 2	High ≥2	
		n (%)	n (%)	n (%)	
Gender					
Male	88	7 (8.0%)	81 (92%)	0 (0%)	0.40
Female	78	9 (11.5%)	68 (87.2%)	1 (1.3%)	
Age group					
0-5 months	69	7 (10%)	62 (90%)	0 (0%)	
6-11 months	26	4 (15%)	22 (85.0%)	0 (0%)	0.25
12-23 months	32	4 (12.5%)	27 (84.4%)	1 (3.1%)	
≥ 24 months	39	1 (3.0%)	38 (97.0%)	0 (0%)	
Reason for admission					
Abandonment	102	8 (8.0%)	94 (92.0%)	0 (0.0%)	
Violence	54	6 (11.0%)	47 (87.0%)	1 (2.0%)	0.42
Street situation	10	2 (20.0%)	8 (80.0%)	0 (0.0%)	

W/A: Weight for age ratio. #World Health Organization, 2006.
*$p<0.05$; Pearson's Chi-squared test.

Table IV - Nutritional status based on height for age (H/A) according to gender, age group and reason for admission to the shelter of children under five years of age admitted to a shelter in the period from 2007 to 2012. Recife, Pernambuco.

| Characteristics | Total | H/A (Z score)# | | p-value |
| | | Low < -2 | Normal ≥2 | |
		n (%)	n (%)	
Gender				
Male	88	11 (12.5%)	77 (87.5%)	0.84
Female	78	9 (11.5%)	69 (88.5%)	
Age group				
0-5 months	69	8 (12.0%)	61 (88.0%)	
6-11 months	26	3 (11.5%)	23 (88.5%)	0.91
12-23 months	32	5 (16.0%)	27 (84.0%)	
≥ 24 months	39	4 (10.0%)	35 (90%)	
Reason for admission				
Abandonment	102	8 (8.0%)	94 (92.0%)	
Violence	54	10 (18.5%)	44 (81.5%)	0.10
Street situation	10	2 (20.0%)	8 (80.0%)	

H/A: Height for age ratio. #World Health Organization, 2006.
*p<0.05; Pearson's Chi-squared test.

DISCUSSION

Newborns represented a quarter of the sample, which highlights the need for the institution to be prepared to properly receive these children. In this age group, the individual is highly dependent on an adult and vulnerable to the environment, which has an important influence on growth and development; therefore, newborns require special care. It is noteworthy that the separation of the mother-child binomial at that age can cause serious harms to health, physical growth and intellectual development due to early weaning[20]. The institution whose children were assessed is one of the few in the city that receives newborns, which may be the reason for the high prevalence of this age group.

There was a slightly higher percentage of male children (53%); this fact has also been observed in other studies of children admitted to shelters[16,17], although in different age groups.

Unlike the results of the present study, in which 59.0% of children were institutionalized because of abandonment, other authors found that this was the second leading cause of institutionalization[17,21]. These differences in the reasons for the admission of children and adolescents to shelters in Brazil may reflect the lack of standardization in the nomenclature and classification of these reasons.

As in other studies with institutionalized children, the majority (78.3%) of children were at normal weight[16,17]. The prevalence of stunting and obesity are the main nutritional disorders in children under five years of age in Pernambuco according to the latest state survey[7]. However, obesity was a little prevalent problem in the sample. Still, the analysis of the obesity/low weight ratio, which allows inferences about the progress of the prevalence of obesity over the prevalence of low weight for age[22], revealed a ratio of 0.06:1, which is significantly lower than that found in another study (1.7:1) with children of similar age[23]. This finding suggests that the nutritional transition process in the sample is not following the changes experienced in recent decades by the Brazilian population.

Low weight was a significant nutritional problem in the studied sample, with a percentage (9.6%) higher than the expected for a population living in good environmental conditions (2.3%)[24]. The prevalence of malnutrition verified by the W/H and BMI/A ratios was 7.2% and 9.0%, respectively – regular agreement (0.557, p<0.001), which demonstrates the importance of adopting various indices for the nutritional assessment of children. Malnutrition, according to the W/H ratio, was higher (23%) among children aged 6 to 11 months (p<0.025), a stage that corresponds to the introduction of complementary feeding, although this information has not been collected in the present research. This index expresses the weight loss or excessive weight of the child, representing the relationship between weight and height, regardless of age. In this age group, there is a need for special attention to ensure proper growth and development as there are several milestones of child development in this stage of life, such as sitting, crawling, and the first teeth eruptions[20]. In addition, the nutritional status in this age group can be decisive for the future nutritional status[25].

The percentage of stunting (12%) was higher than in children of the same age group in the Brazilian population, according to the last national survey (7%)[4], and lower than that found in another study (27.3%)[17], which also assessed institutionalized children but used percentiles for nutritional assessment instead of the Z score used in the present study. However, it was similar to that found in another study with children under five years of age in the municipality of São João do Tigre, Paraíba (16.8% from rural areas and 12.9% from urban areas), in which this index was significantly associated with the household income per capita and maternal education[26]. It is noteworthy that the Human Development Index (HDI) of this municipality is low (0.552), unlike Recife, which has a high HDI (0.7772). This index measures the progress of a place based on income, health and education, and its values range from 0 to 1[2]. This finding suggests an unequal distribution of income in the city of Recife, reinforcing the social vulnerability to which the studied children may be exposed as they present percentages of stunting similar to those of children immersed in worse development conditions.

Several national surveys have shown a significant reduction in the prevalence of stunting in children under five years old between 1974-1975 and 2006-2007[2]. The compromised linear growth occurs after long periods of inadequate nutritional intake[27], and its prevalence is a useful indicator of the living conditions of a population[2], which may suggest that the children in the sample were living in precarious conditions prior to admission to the institution. Stunting in childhood is associated with impaired intellectual development and is reflected in lower education and, consequently, difficulties in entering the formal labor market in adulthood[2]. For populations like the one assessed herein, this constitutes a risk of perpetuating poverty, with the reproduction of the original scenario by enabling the closing of a cycle of material deprivation that can reach several generations.

Statewide studies have also shown a decline in malnutrition and linear growth retardation in children in this age group in Pernambuco in recent decades[6,7]. Comparing the results found in this population to the last research conducted in the State of Pernambuco[7], it was observed that the prevalence of low weight for age in institutionalized children (9.6%) was three times higher than in children of same age in the general population (3.2%). Stunting (12%), in turn, was 37.9% higher than the rate found in the statewide research. Regarding other anthropometric indices, it was observed in the present study that malnutrition, according to W/H (7.2%) and BMI/A (9.0%) ratios, was approximately four to five times higher than the values reported in the last statewide research (1.9% and 1.8%, respectively)[7].

As the study has used only anthropometric measurements, it was not possible to assess specific nutritional deficiencies, which would be interesting in future studies with similar populations. Larger samples, analysis of information from various institutions and collection of additional data such as prenatal history, socioeconomic status, and health and nutrition of children would be necessary for an assessment of the problem in the municipality. The lack of similar studies hinders comparisons and discussion of results and reflects the lack of interest in the issue.

The results of the present study are expected to help professionals working in shelters for children and highlight the importance of adopting intervention actions to minimize the negative effects of the social exclusion to which these children are exposed. In addition, prospective studies would be useful to assess the future consequences of a context marked by a series of social and emotional deprivation in the period of growth and development of the individual. We believe that institutionalized children need special attention, requiring multidisciplinary teams for their care in order to ensure their appropriate growth and development. Therefore, knowing the profile of institutionalized children contributes to the planning of shelters, the training of personnel and expenditure forecasting, which helps optimize the care provided to them.

CONCLUSION

The prevalence of malnutrition and stunting in the study sample was higher than that found in children in the same age group in the state of Pernambuco; additionally, they are far above the values accepted by international organizations.

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